REVIEW COPY

Principles of Biomedical Science
PBS Periods 6A-7B | Case B

Late Work and Corrections

Due Friday, October 9, 2026

Complete missing work or correct mistakes in work you already submitted. Scan each assignment and upload it to its original Schoology assignment by Friday, October 9, 2026. Work already submitted correctly does not need to be resubmitted.

Where to submit

For late work and corrections, these Schoology instructions override older directions to hand in paper or upload work to a tracker.

Complete paper worksheets and notebook activities as directed. Scan the required work for submission and keep the original pages.

Using the original packet

The original packet follows unchanged. Its lesson dates and original assignment and exam deadlines are unchanged; October 9 is the deadline for this late-work and corrections process.

Notice added October 1, 2026
John Hay High School | Mr. Mendoza | Room 381

JOHN HAY HIGH SCHOOL · PLTW BIOMEDICAL SCIENCE · MR. MENDOZA · ROOM 381 · PERIOD 6A-7B

Principles of Biomedical Science Complete Assignment Packet

Period 6A-7B · Case B · Every assignment from Monday, August 24 to Friday, October 2, 2026, in order by date, then title. Each assignment's official briefing and evidence sheet are bound in right after its directions.

From Mr. Mendoza. This packet holds every assignment we have done this year, up to the Unit 1 take-home exam. Each assignment starts with my directions: what we need to accomplish, our goal, what you turn in, and color-coded steps. Right behind the directions you will find that day's own briefing pack and Daily Evidence Sheet, so the reading and the questions are never more than a page away.

Our case. Case B: your Period 6A-7B case file. Its records belong to your class only. By Day 18 your team names the manner and cause of death and backs each one with at least four exhibits across three different kinds of evidence. Every claim stops where the evidence stops.

The step colors

1 READ — **READ.** Take in the information right under the step, or in the pages right after the directions.

1 DO — **DO.** An action: set up, draw, calculate, sort, or examine.

1 WRITE — **WRITE.** Write the part you will turn in, in your own words.

1 CHECK — **CHECK.** Compare your work to the rule given and fix it.

1 TURN IN — **TURN IN.** Make one PDF and submit it to the Schoology assignment named in the step.

Before you start: how a demanding course stays clear

The bottom line. This course is rigorous on purpose, because medicine is. A rigorous course stays clear only one way: a little real work every day. Confusion is not a sign that you cannot do this. It is a predictable signal that some steps were skipped. That is good news, because skipped steps can be filled in, and this packet is how.

What being overwhelmed actually is

Your working memory, the part of your mind that holds new information while you use it, can only juggle a few new pieces at once. New material makes sense when earlier material is already stored in long-term memory, so the new piece has something to attach to (Sweller, van Merriënboer and Paas, 2019). Every lesson in this course builds on the one before it: case records lead to DNA reads, DNA reads lead to BLAST, antibodies lead to the ELISA, the ELISA leads to test accuracy. Skip one day and the next lesson arrives with nothing to attach to. The new pieces pile up in working memory at once. That pile-up is what "overwhelmed" feels like.

Three habits cause almost all of it:

What happens	Why it overwhelms you	The fix
Work left undone in class	Time not used in class does not disappear. It moves to home, where there is less help and more distraction. "I did not have time at home" usually starts with class time that went unused.	Work bell to bell. Class is the cheapest learning time you have: the teacher, the materials and your partners are all in the room.
Notes taken but never processed	Notes you only copy stay on paper, not in memory. The next lesson has nothing to connect to.	Use the 6 Rs the same day, even for 20 minutes.
Multitasking	Your brain does not do two thinking tasks at once. It switches, and every switch costs time and accuracy.	One task, full attention, phone away. Then the next task.

What the research says works

Spread it out. Studying a little across several days builds stronger, longer-lasting memory than the same amount of time crammed into one session (Cepeda and colleagues, 2006; Carpenter, Pan and Butler, 2022).

Test yourself. Pulling information out of your memory, without looking, makes it stick far better than rereading it (Roediger and Karpicke, 2006). A major review of ten common study methods rated practice testing and spaced practice as the two most effective; highlighting and rereading were rated low (Dunlosky and colleagues, 2013).

The 6 Rs put both into one routine. Record (take the notes), Reduce (turn them into short cue questions), Review (study from the cues on different days, which is spacing), Reflect (write what still confuses you), Recite (explain it out loud without looking, which is self-testing), Revise (fix your notes after practice).

Multitasking makes everything worse. Switching between tasks has a measurable cost in time and errors (Rubinstein, Meyer and Evans, 2001). College students who divided their attention with devices during class scored lower on exams (Glass and Kang, 2019), and laptop multitasking lowered learning both for the person doing it and for classmates who could see the screen (Sana, Weston and Cepeda, 2013). People who multitask with media more often have more lapses of attention, and those lapses predict forgetting (Uncapher and Wagner, 2018; Madore and colleagues, 2020). If you try to do two things at once, you do both of them worse.

Use this as a learning opportunity

The habits that clear this packet are the same habits clinicians use every day: one patient at a time, record before you interpret, check before you act. Here is the routine that keeps this course clear:

When	What to do	Time
In class	Phone away. Work bell to bell. Finish the day's turn-in before you leave whenever you can.	80 minutes
Same day, at home	Reduce and Recite: write three cue questions from the day's notes, then answer them out loud without looking.	20 minutes
Next day, before class	Review yesterday's cue questions. Mark anything you missed.	5 minutes
Once a week	Reflect and Revise: write what still confuses you and fix those notes. Bring the question to class.	20 minutes

Signs you are starting to overload, and what to do

If you notice this	It usually means	Do this
A new lesson feels like a foreign language	An earlier step is missing	Go back one assignment and finish it first
You read the same paragraph three times	Working memory is full or attention is split	Phone in another room; do one step at a time
You have a long list of missing work	A backlog has built up	Do one assignment, submit it, check it off. Then the next.
You understand in class but forget by the next day	Notes were not processed	Same-day 6 Rs: Reduce and Recite

Sources

Carpenter, S. K., Pan, S. C., and Butler, A. C. (2022). The science of effective learning with spacing and retrieval practice. Nature Reviews Psychology, 1(9), 496 to 511. https://doi.org/10.1038/s44159-022-00089-1

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Uncapher, M. R., and Wagner, A. D. (2018). Minds and brains of media multitaskers: Current findings and future directions. Proceedings of the National Academy of Sciences, 115(40), 9889 to 9896. https://doi.org/10.1073/pnas.1611612115

Your 29 assignments, in order

Check off each one when it shows as submitted in Schoology. Already turned in? Check it and skip it. Then start with the first unchecked row. The Unit 1 take-home exam is a separate printed packet and is not in this packet.

Done	#	Date	Assignment	Schoology assignment name
[ ]	1	Mon, Aug 24	Welcome, expectations, and how this class works	Wk1 Exit ticket: Welcome, expectations, and how this class works
[ ]	2	Tue, Aug 25	How to use the class website	Wk1 Exit ticket: How to use the class website
[ ]	3	Thu, Aug 27	Cornell notes and the 6 Rs	Wk1 Lab notebook: Cornell notes and the 6 Rs
[ ]	4	Thu, Aug 27	Cornell notes and the 6 Rs: the lab record	Wk1 Lab: Cornell notes 6 Rs
[ ]	5	Fri, Aug 28	Lab safety, myPLTW, and how to submit: PLTW course orientation	Wk1 PLTW: Lab safety, myPLTW, and how to submit
[ ]	6	Fri, Aug 28	Lab safety, myPLTW, and how to submit: safety check	Wk1 Pre-lab: Lab safety, myPLTW, and how to submit
[ ]	7	Mon, Aug 31	Investigation Day 1: The Rules of Evidence	Wk2 D01 · The Rules of Evidence (PLTW 1.1.1)
[ ]	8	Tue, Sep 1	The Missing Microscope: Crime Scene CER Scenario	The Missing Microscope: Crime Scene CER Scenario
[ ]	9	Wed, Sep 2	WebXam pretest and goal setting	Wk2 WebXam: WebXam pretest and goal setting
[ ]	10	Thu, Sep 3	WebXam Pretest Debrief and Study Plan (Take-Home Exam, 100 points)	WebXam Pretest Debrief and Study Plan (Take-Home Exam, 100 points)
[ ]	11	Fri, Sep 4	Investigation Day 2: Numbers That Do Not Lie to You	Wk2 D02 · Numbers That Do Not Lie to You (PLTW 1.1.1)
[ ]	12	Tue, Sep 8	Chain of custody: track the evidence	Wk3 D03 | Chain of custody: track the evidence (PLTW 1.1.1 support)
[ ]	13	Thu, Sep 10	Investigation Day 4: The Case Opens	Wk3 D04 · The Case Opens (PLTW 1.1.1)
[ ]	14	Fri, Sep 11	Investigation Day 5: Walk the Scene	Wk3 D05 · Walk the Scene (PLTW 1.1.1)
[ ]	15	Fri, Sep 11	Documentation custody: the lab record	Wk3 Lab: Documentation custody
[ ]	16	Mon, Sep 14	Process the Scene	Wk3 D06 · Process the Scene (PLTW 1.1.2)
[ ]	17	Tue, Sep 15	The Traces We Leave	Wk4 D07 · The Traces We Leave (PLTW 1.1.3)
[ ]	18	Thu, Sep 17	Maybe Is a Result	Wk4 D08 · Maybe Is a Result
[ ]	19	Fri, Sep 18	Whose Blood, Whose DNA	Wk4 D09 · Whose Blood, Whose DNA
[ ]	20	Mon, Sep 21	John Carroll bioethics debate 1: should ELISA testing be mandatory?	Wk5 CER: JCU bioethics 1, should ELISA testing be mandatory?
[ ]	21	Tue, Sep 22	Barcodes and Panels	Wk5 D10 · Barcodes and Panels
[ ]	22	Wed, Sep 23	The Clock in the Body	Wk5 D12 · The Clock in the Body
[ ]	23	Thu, Sep 24	Autopsy Day	Wk5 D13 · Autopsy Day

Done	#	Date	Assignment	Schoology assignment name
[ ]	24	Fri, Sep 25	Week 5 review: the profile, the clock, and the two errors	Wk5 Review · The profile, the clock, and the two errors
[ ]	25	Fri, Sep 25	Body systems and tissues: the lab record	Wk5 Lab: Body systems tissues
[ ]	26	Mon, Sep 28	John Carroll bioethics debate 2: should we ban antibiotic use in livestock?	Wk6 CER: JCU bioethics 2, should we prohibit antibiotic use in livestock?
[ ]	27	Wed, Sep 30	Investigation Day 14: The Fabric Under the Lens	Wk6 D14 · The Fabric Under the Lens (PLTW 1.2.4)
[ ]	28	Thu, Oct 1	Investigation Day 16: The Tree Resolves	Wk6 D16 · The Tree Resolves (PLTW 1.2.6)
[ ]	29	Fri, Oct 2	Investigation Day 17: Build the Board	Wk6 D17 · Build the Board (PLTW 1.2.6)

ASSIGNMENT 1 OF 29 Mon, Aug 24 about 15 minutes

Welcome, expectations, and how this class works

Today we need to accomplish learning how this class runs every day and setting one goal for the semester.

Our goal is routines so automatic that our energy goes into the science.

You have to turn in an exit ticket: your semester goal, one expectation in your own words, and one question.

Schoology assignment: Wk1 Exit ticket: Welcome, expectations, and how this class works

1 READ

First, we learn what this course is. Principles of Biomedical Science introduces the human body, disease, and how medical and forensic scientists use evidence. This year we start with a case we investigate together. Our five expectations are below.

Expectation	What it looks like
Be on time	In your seat when the bell rings
Be prepared	Notebook, pen, charged device
Phone away	Out of sight unless I say we are using it
Be respectful	Listen when others speak
Be on task	Working bell to bell

2 WRITE

Write your semester goal in one specific sentence.

HINT Specific means you could check it later: "Turn in every evidence sheet the day it is due."

3 WRITE

Pick one expectation from the table in step 1, explain it in your own words, and say why it matters in a lab.

4 WRITE

Write one real question you have about this class.

5 TURN IN

Now we turn it in. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Principles of Biomedical Technology, and open the assignment named **Wk1 Exit ticket: Welcome, expectations, and how this class works**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

ASSIGNMENT 2 OF 29 Tue, Aug 25 about 15 minutes

How to use the class website

Today we need to accomplish learning to find the daily plan on our class website and its Schoology assignment.

Our goal is that you can always find what we are doing, even on a day you miss.

You have to turn in a scavenger hunt sheet: one day's objective, one resource you opened, and where that day's work is submitted.

Schoology assignment: Wk1 Exit ticket: How to use the class website

1 READ	This one assignment is about the website itself, so it is the only time this packet sends you there. Every day page has Part 1 background, Part 2 directions, Part 3 a worked example, and Part 4 your work.
2 DO	Go to mendozabiomed.org/learn, choose Principles of Biomedical Technology, and open any day page. No computer? Skip to step 4.
3 WRITE	Copy that day's objective. Open one resource and write its name. Write the name of the Schoology assignment in Part 4.
4 WRITE	No computer? Write "no computer access" and answer from this packet: objective = "learning to find the daily plan on our class website," resource = "this packet," assignment = "Wk1 Exit ticket: How to use the class website."
5 TURN IN	Now we turn it in. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Principles of Biomedical Technology, and open the assignment named **Wk1 Exit ticket: How to use the class website**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

ASSIGNMENT 3 OF 29 Thu, Aug 27 about 25 minutes

Cornell notes and the 6 Rs

Today we need to accomplish setting up a Cornell notes page and taking your first notes.

Our goal is notes you actually learn from.

You have to turn in a photo or PDF of your first Cornell page: cue questions, notes, and a summary.

Schoology assignment: Wk1 Lab notebook: Cornell notes and the 6 Rs

1 DO

Set up the page: a line down the page about 2.5 inches from the left, and a strip about 2 inches tall at the bottom. Right = notes, left = cue questions, bottom = summary.

2 READ

Read this short reading once all the way through.

Reading: what forensic scientists do. Forensic science applies scientific methods to questions that matter to the law. A forensic scientist records what is observed before deciding what it means. An **observation** is something you see or measure. An **inference** is what you conclude from it. An **opinion** is a belief that evidence cannot settle. Every piece of evidence is documented, labeled, and tracked, so another scientist can check the work.

3 WRITE

Take notes on the reading in the right column, in short phrases.

Reading: what forensic scientists do. Forensic science applies scientific methods to questions that matter to the law. A forensic scientist records what is observed before deciding what it means. An **observation** is something you see or measure. An **inference** is what you conclude from it. An **opinion** is a belief that evidence cannot settle. Every piece of evidence is documented, labeled, and tracked, so another scientist can check the work.

HINT Key ideas: observation, inference, opinion, documented, another scientist can check.

4 WRITE

In the left column, write two or three questions your notes answer. At the bottom, write a two-sentence summary: *Why must a forensic scientist record an observation before explaining it?*

5 TURN IN

Now we turn it in. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Principles of Biomedical Technology, and open the assignment named **Wk1 Lab notebook: Cornell notes and the 6 Rs**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

ASSIGNMENT 4 OF 29 Thu, Aug 27 about 20 minutes

Cornell notes and the 6 Rs: the lab record

Today we need to accomplish running all six of the 6 Rs on your Cornell page.

Our goal is feeling the difference between copying notes and learning them.

You have to turn in one page showing each of the 6 Rs done.

Schoology assignment: Wk1 Lab: Cornell notes 6 Rs

1 READ

Here are the 6 Rs.

R	What you do
Record	Take notes (done on your Cornell page)
Reduce	Turn notes into 2 or 3 questions (done)
Review	Cover the notes; answer the questions from memory
Reflect	Write what still confuses you
Recite	Explain it aloud without looking
Revise	Fix or add to your notes

2 DO

On a new page write "Record: done" and "Reduce: done." Then Review: cover your notes, answer each cue question from memory, and write how many you got right.

R	What you do
Record	Take notes (done on your Cornell page)
Reduce	Turn notes into 2 or 3 questions (done)
Review	Cover the notes; answer the questions from memory
Reflect	Write what still confuses you
Recite	Explain it aloud without looking
Revise	Fix or add to your notes

3 WRITE

Reflect: write one thing that still confuses you. Recite: explain the reading aloud for one minute without looking, then write one thing you left out.

4 WRITE

Revise: add what you left out to your notes in a different color.

5 TURN IN

Now we turn it in. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Principles of Biomedical Technology, and open the assignment named **Wk1 Lab: Cornell notes 6 Rs**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

ASSIGNMENT 5 OF 29 Fri, Aug 28 about 10 minutes

Lab safety, myPLTW, and how to submit: PLTW course orientation

Today we need to accomplish completing our course orientation checklist.

Our goal is everything you need for the year set up before labs.

You have to turn in the orientation checklist, filled in.

Schoology assignment: Wk1 PLTW: Lab safety, myPLTW, and how to submit

1 READ

Copy this checklist onto a page.

Orientation item	Done? (yes or no)
I know our routine and five expectations	
I can find a day page on the class website	
My notebook has a Cornell page	
I signed the safety contract and handed it in	
I took the baseline WebXam pretest	
myPLTW: opens, or access unavailable	

2 DO

Try to open myPLTW through Clever with your school sign-in. Write "opens" or "access unavailable" in the last row.

HINT Either answer is fine. I only need to know.

3 WRITE

Fill in yes or no for every other row. For any "no," write what you need.

4 TURN IN

Now we turn it in. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Principles of Biomedical Technology, and open the assignment named **Wk1 PLTW: Lab safety, myPLTW, and how to submit**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

ASSIGNMENT 6 OF 29 Fri, Aug 28 about 20 minutes

Lab safety, myPLTW, and how to submit: safety check

Today we need to accomplish passing a safety check and signing the safety contract.

Our goal is that nobody gets hurt and no work is lost.

You have to turn in the signed contract (to me), your scavenger hunt answers, and an access note.

Schoology assignment: Wk1 Pre-lab: Lab safety, myPLTW, and how to submit

1 READ

Three safety words.

Word	Meaning
PPE	Personal protective equipment: goggles, gloves, apron.
SDS	Safety data sheet: a chemical's hazards and first aid.
SOP	Standard operating procedure: the exact steps we follow every time.

2 DO

Scavenger hunt in Room 381: write where the eyewash, fire blanket, SDS binder, and goggles and gloves are.

3 DO

Read and sign the safety contract and hand it to me. The parent copy goes home.

4 WRITE

Write whether myPLTW "opens" or is "access unavailable."

5 TURN IN

Now we turn it in. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Principles of Biomedical Technology, and open the assignment named **Wk1 Pre-lab: Lab safety, myPLTW, and how to submit**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

ASSIGNMENT 7 OF 29 Mon, Aug 31 about 80 minutes

Investigation Day 1: The Rules of Evidence

Today we need to accomplish join an investigation unit, learn the one rule this whole case runs on, and prove you can tell an observation from an inference from an opinion.

Our goal is debate whether forensic and biomedical evidence should ever be trusted blindly, and defend a claim with reasons.

You have to turn in Written CER (3-5 sentences) arguing one side of the trust-the-evidence debate with a claim, one piece of evidence, and one reasoning sentence. Post your CER to the discussion board or hand in the written copy before you leave.

Schoology assignment: Wk2 D01 · The Rules of Evidence (PLTW 1.1.1)

1 READ

This is our Case B investigation for Period 6A-7B. Your materials for this assignment start on the very next page, in this order: **D01 Case B briefing pack (read this)** (4 pages). Read the briefing first. Write your answers on the sheet. Everything you need for this assignment is in those pages.

2 READ

Read the Philosophy-for-Kids prompt: Can a lab result be wrong, and who is responsible when it is?

3 WRITE

List two reasons a measurement could mislead an investigator or doctor.

HINT Evidence earns conclusions. Nothing else does.

4 DO

Pick a side: evidence is objective truth vs. evidence is only as good as its method.

5 WRITE

Argue your position aloud in your small group using one reason and one example.

6 TURN IN

Post a short written CER: claim, one piece of evidence, one sentence of reasoning.

7 CHECK

Before you turn it in, check your claims against these limits: A hair consistent with a person proves a hair like theirs was present, not that the person was, and never when. A fingerprint proves touch, not when or why. A pattern class narrows a crowd; only minutiae can name one finger. A presumptive test says maybe. Only a confirmatory test says blood, and only DNA says whose.

8 TURN IN

Now we turn it in. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Principles of Biomedical Technology, and open the assignment named **Wk2 D01 · The Rules of Evidence (PLTW 1.1.1)**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

DAILY INVESTIGATION PACKET

Aug 31 · Investigation Day 1 of 18

OFFICIAL

THE BRIEFING: WHAT YOU ARE DOING TODAY, AND HOW THE PROS DO IT — SEC 00

The case begins today.

Real detectives and forensic scientists live by one rule: they can only claim what they can show. A detective who is sure a suspect is guilty but has no evidence has no case, while a detective with evidence does not need to be sure, because the evidence speaks for itself. Today you learn to tell what you SEE from what you GUESS, which is the first skill every investigator is taught, and you practice it on your first exhibit.

OBJECTIVE

Today you will join an investigation unit, learn the one rule this whole case runs on, and prove you can tell an observation from an inference from an opinion.

Take-home (the ten-year idea): Evidence earns conclusions. Nothing else does.

BACKGROUND AND BRIEFING (READ THIS FIRST) SEC 02

For the next five weeks this class is an investigations unit working a death case. Real agencies live and die by one discipline: what you can SHOW beats what you FEEL, every time. A detective who is sure but has no evidence has nothing. A detective with evidence does not need to be sure; the evidence speaks.

Three kinds of statements will come out of your mouth in this room. An OBSERVATION is what your senses record: the stain is reddish-brown, 40 cm from the door. An INFERENCE is a conclusion built on observations: the stain's drip pattern suggests it fell from about waist height. An OPINION is a feeling with no load-bearing structure: that stain looks suspicious. Only the first two belong in a case file, and they must be labeled as what they are.

Analogy: think of a referee reviewing a replay. The replay footage is observation. The call the referee announces is inference, built strictly on the footage. The crowd booing is opinion. LIMIT of the analogy: a replay can be rewound; a crime scene degrades every time someone touches it. That is why tomorrow is about custody.

One more tool you will use every single day: CER. Claim (what you say happened), Evidence (the exhibits that support it), Reasoning (the rule that connects them). Every exit slip in this unit is a CER. By day 18 you will write a full case report in this structure, and it will feel natural because you practiced it eighteen times.

NEW VOCABULARY (RECORD IN YOUR NOTEBOOK BANK) SEC 04

TERM	PLAIN-LANGUAGE DEFINITION	ANALOGY TO HOLD ONTO
evidence	a fact or object you can point to that supports or weakens a claim	receipts, not vibes
observation	what your senses actually record	the camera footage
inference	a conclusion you build on top of observations	the referee's call after the replay
bias	anything that pulls your judgment before the evidence gets a vote	rooting for one team while you referee
CER	Claim, Evidence, Reasoning: the sentence structure of every honest conclusion	the load-bearing frame of a report

THE DECISION OF THE DAY — SEC 03

YOUR ROLE

You are a new investigator taking the unit's entrance exam.

THE SITUATION

Six statements about the same photograph are printed on your exit slip. Some are observations, some are inferences, some are opinions dressed up in confident language.

THE RULE YOU APPLY

Observation = senses only. Inference = observation plus a stated rule. Opinion = neither.

WHAT YOU PRODUCE

Sort all six, then write one CER defending your hardest call.

> **Claim ceiling.** You may classify the statements. You may not conclude anything about what happened in the photo; you were not there and the photo is one angle.

WHAT THIS UNLOCKS

Tomorrow you earn scene access by qualifying on safety and custody.

PLTW ANCHOR AND INTERACTIVE LAYER — REF

Activity 1.1.1 A Sketchy Scene (referenced by title only; all materials in this file are John Hay original work)

- Portal: mendozabiomed.org/learn/pltw-pbt (today's day page and guided notes)

myPLTW student access is down for technical reasons. When it is restored, this day's PLTW anchor is completed online; until then the portal simulation and these printed materials carry the day.

INVESTIGATION TEAM ASSIGNMENTS — SEC 05

A **Scene and Documentation**
Draft the team charter; learn the scene-map page you will own.

B **Trace**
Draft the team charter; preview the comparison exhibits you will own.

C **Serology and DNA**
Draft the team charter; preview the match matrix you will own.

D **Toxicology and Chemistry**
Draft the team charter; preview the tox report you will own.

E **Medical Examiner**
Draft the team charter; preview the body diagram you will own.

F **Records and Timeline**
Draft the team charter; set up the master timeline spread.

NOTEBOOK PAGES IN USE TODAY — SEC 06

- Team roster and charter page
- Ethics and custody pledge
- Day 1 Cornell page

DAILY SUBMISSION FORM: ETHICS CER EXIT SLIP

JH-26-0831-B / D1

- ☐ Six statements sorted O / I / OP
- ☐ One CER defending your hardest call
- ☐ Signed ethics pledge line

INVESTIGATOR (PERIOD + CODE, NO NAMES)	TEAM	TIME SUBMITTED

ASSIGNMENT 8 OF 29 Tue, Sep 1 about 30 minutes

The Missing Microscope: Crime Scene CER Scenario

Today we need to accomplish deciding what the evidence in a small, made-up case supports.

Our goal is a claim that goes exactly as far as the evidence, and no further.

You have to turn in one CER: claim, evidence, reasoning, and a limit.

Schoology assignment: The Missing Microscope: Crime Scene CER Scenario

1 READ

The case sheet is the very next page after these directions. Read the whole scene and the reference record once before writing.

2 WRITE

Claim: which explanation is best supported: Person A, B, or C removed the microscope, or the evidence is not enough to name one person?

HINT "The evidence is not enough" is a real answer when the evidence does not point to one person.

3 WRITE

Evidence: at least two facts from the sheet. **Reasoning:** explain why those facts support your claim. **Limit:** one sentence on what the evidence cannot show.

4 TURN IN

Now we turn it in. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Principles of Biomedical Technology, and open the assignment named **The Missing Microscope: Crime Scene CER Scenario**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

CASE CF-017 | EVIDENCE REVIEW

The Missing Microscope

A fictional, nonviolent crime scene challenge. Your job is to decide what the evidence supports, not to accuse a real person.

Scene	Your role
At 4:55 p.m., a digital microscope was reported missing from the locked biomedical prep room. The door and cabinet showed no damage. Three event volunteers were nearby during cleanup. All people, times, and evidence in this case are simulated.	You are on the evidence review team. Decide which explanation is best supported: Person A removed it, Person B removed it, Person C removed it, or the evidence is insufficient to identify one person.

REFERENCE RECORD

Person	Clothing during cleanup	Shoe record	Statement
A	Navy wool jacket	28.0 cm, herringbone outsole	Entered to return goggles, then left empty-handed.
B	Royal-blue polyester hoodie	27.0 cm, diamond outsole	Walked past the prep room while carrying a sports bag.
C	Gray polyester jacket	29.0 cm, herringbone outsole	Moved a projector case from the prep room to a media cart.

EVIDENCE CARDS

E1 | DOOR LOG	**Observation:** At 4:42 p.m., the door opened using the code assigned to Person A. **Limit:** The code was shared with the cleanup team during setup.
E2 | SHOE PRINT	**Observation:** A dusty partial print beside the empty cabinet is about 28.0 +/- 0.5 cm long with a herringbone pattern. **Limit:** Size and tread are class characteristics. Many shoes can share them.
E3 | FIBERS	**Observation:** Two royal-blue polyester fibers were recovered from the cabinet latch. They match Person B's hoodie in color and fiber type. **Limit:** A fiber can transfer directly or through another object.
E4 | HALL CAMERA	**Observation:** At 4:47 p.m., a person in a dark top carried a black rectangular case away from the hallway. **Limit:** The face and height are not visible. Camera color is unreliable.
E5 | WORK ORDER	**Observation:** A signed work order tells Person C to move a black projector case from the prep room at 4:50 p.m. **Limit:** The order explains a case movement, but does not show what was inside.
E6 | CABINET CHECK	**Observation:** The microscope's black hard case is missing from its shelf. The latch print is smudged and cannot be compared reliably. **Limit:** The missing case fits the camera observation, but does not identify the carrier.

CER response prompt: Which explanation is best supported by the evidence: Person A removed the microscope, Person B removed it, Person C removed it, or there is not enough evidence to identify one person? Write one claim. Support it with at least three evidence items by ID, then explain how the evidence supports your claim. Address one limitation or conflicting clue. Use *most supported*, not *proved guilty*.

ASSIGNMENT 9 OF 29 Wed, Sep 2 about 15 minutes

WebXam pretest and goal setting

Today we need to accomplish taking an ungraded starting test and setting one goal.

Our goal is knowing where you start, so we can measure growth.

You have to turn in a written mastery goal and two routines you will keep.

Schoology assignment: Wk2 WebXam: WebXam pretest and goal setting

1 READ

The WebXam is Ohio's end-of-course test for this course, test 072110. The pass line is 65 percent. The pretest is a starting point, not a grade.

2 DO

Not tested yet? Tell me and I will set up a time. For now, use the practice values below and write "SIMULATED."

Domain (WebXam 072110)	Practice score (use only if you have no report)
1. Handling, Preparation, Storage and Disposal	44%
2. Biotechnology Research and Experiments	58%
Total	51%

3 WRITE

Write one mastery goal, for example "Raise my Total from 51 to 65 by November."

Domain (WebXam 072110)	Practice score (use only if you have no report)
1. Handling, Preparation, Storage and Disposal	44%
2. Biotechnology Research and Experiments	58%
Total	51%

4 WRITE

Write two routines from the first weeks you will keep, and one question you still have.

5 TURN IN

Now we turn it in. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Principles of Biomedical Technology, and open the assignment named **Wk2 WebXam: WebXam pretest and goal setting**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

ASSIGNMENT 10 OF 29 Thu, Sep 3 about 90 minutes

WebXam Pretest Debrief and Study Plan (Take-Home Exam, 100 points)

Today we need to accomplish turning your pretest results into a real study plan.

Our goal is a plan where scores point to priorities, priorities to weekly actions, and actions to proof. Graded on the plan, never on your score.

You have to turn in one document with Parts 1 to 5, named FirstName LastName - WebXam Pretest Debrief and Study Plan - 2026-09-03.

Schoology assignment: WebXam Pretest Debrief and Study Plan (Take-Home Exam, 100 points)

1 READ

Your two reference sheets start on the very next page: the take-home directions and rubric (3 pages), then the simulated report (2 pages). Read the directions first.

2 WRITE

Part 1, baseline. Table with Domain 1, Domain 2, and Total: your score (or the practice values below, marked SIMULATED) and points to 65 (65 minus your score).

Domain (WebXam 072110)	Practice score (use only if you have no report)
1. Handling, Preparation, Storage and Disposal	44%
2. Biotechnology Research and Experiments	58%
Total	51%

3 WRITE

Part 2, three priority concepts with one sentence of evidence each. Good choices: lab safety, chain of custody, storing and preparing samples, reading a data table against a reference range, choosing the right graph.

4 WRITE

Part 3, weekly routine: concept, resource, 6 Rs action, day and time, minutes (at least 20), for 12 weeks. One sentence per concept on why the action fits.

5 DO

Part 4, graphs: a bar graph of your scores with a line at 65 (axis from 0), and a straight growth line from your Total at week 0 (Sep 4) to a target of at least 65 at week 12 (Nov 27). Rate = (target minus baseline) divided by 12.

Domain (WebXam 072110)	Practice score (use only if you have no report)
1. Handling, Preparation, Storage and Disposal	44%
2. Biotechnology Research and Experiments	58%
Total	51%

HINT Example: (65 minus 51) divided by 12 = about 1.17 points per week.

6 WRITE

Part 5, checkpoints: predicted score and one proof of learning for Oct 2 and Oct 30, what you will change if Oct 2 comes in low, and one paragraph explaining how the parts connect.

7
TURN IN

Now we turn it in. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Principles of Biomedical Technology, and open the assignment named **WebXam Pretest Debrief and Study Plan (Take-Home Exam, 100 points)**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

WEBXAM PRETEST DEBRIEF AND STUDY PLAN

OFFICIAL

Take-home exam · 100 points · Assessment category

ASSESSMENT · 100 POINTS | GRADED ON COHERENCE, NOT ON YOUR SCORE | DUE TUESDAY, SEPTEMBER 8, 11:29 PM IN SCHOOLOGY

DIRECTIONS, IN PLAIN ENGLISH — SEC 00

Earn 100 points with a **coherent study plan**, a plan whose parts fit together. Your pretest score cannot lower this grade. Use available evidence to choose three concepts, practice each one, and check your progress.

Start with your private WebXam report in Schoology. If you have not tested, use the **SIMULATED report** linked on the portal lesson. Label its numbers "simulated." Revise your plan in class after your make-up test. If you cannot find your report, tell me; do not use someone else's.

What you turn in. One PDF, built from the Google Doc template linked on the portal day page, with these five parts in this order: (1) your baseline, (2) three priority concepts with evidence, (3) your weekly routine, (4) your graphs and growth line, (5) your checkpoints and proof. Name the file: *FirstName LastName - WebXam Pretest Debrief and Study Plan - 2026-09-03.pdf*. Put the same line in the document header.

Test security. Do not copy, photograph, or share any test question. Use only the scores and broad concept areas actually provided in your report. Mark absent fields "not reported"; do not guess.

THE TEST YOU ARE PLANNING FOR — SEC 01

WebXam 072110 is this course's end-of-course test. A score of **65 percent** passes. I will announce the testing date. Each weight shows about how much of the test covers that domain.

DOMAIN	NAME	WEIGHT	IN PLAIN ENGLISH
Domain 1	Handling, Preparation, Storage and Disposal	about 54 of 100	lab safety, chain of custody, storing and preparing samples
Domain 2	Biotechnology Research and Experiments	about 46 of 100	designing an investigation, collecting data, statistics, drawing conclusions

Test weights are not your results. Name a lowest domain only when your scores support it.

CATEGORIES AND CHOICES: BUILD YOUR PLAN FROM THIS MENU

Choose a resource you can open and name a specific action. If a resource will not open, use your class notes or ask me for help.

CATEGORY	YOUR CHOICES
1. Baseline (what your report says)	Copy the total and domain percentages actually reported. Mark missing fields "not reported," not zero or an estimate. Name the lowest domain only if the scores support it; name the biggest-weight domain from the table above. Label simulated values "simulated."
2. Priority concepts (choose three)	If scores identify your two weakest domains, choose one concept from each plus one of your choice. Otherwise choose three course concepts and label them "practice priorities, not report-identified weaknesses." Use broad concept names from the report or course menu, never test questions. For each, give one sentence of evidence from available report data or classwork.
3. Resources (choose one per concept)	The portal day pages and guided notes. The printed pack, SEC 02 Background and briefing. The lab simulations (Safety Practical, The Traces We Leave, Kastle-Meyer blood testing, DNA Evidence from the Scene, DNA Fingerprinting, Toxicology and Drug Delivery). The Anki flashcard deck for this course. The NotebookLM study guide. The lab manual procedures. Your Investigative Notebook.
4. Action (choose one per concept, from the 6 Rs)	**Record** a one-page Cornell note from the resource. **Reduce** it to ten flashcards. **Review** the flashcards from memory. **Reflect**: write what still confuses you. **Recite**: teach the concept aloud to someone in two minutes. **Revise**: redo a simulation or a practice set and correct your errors.
5. Schedule	A fixed day and time each week for each concept, at least 20 minutes, for example "Tuesday 7:00 PM, 20 minutes." Twelve weeks, from September 4 to November 27.
6. Target and growth line	A target score for the end of November of at least 65 percent. Graph reported baseline scores against the 65 pass line; leave unavailable bars blank. Draw the straight-line growth plan from week 0 to week 12, with the rate in points per week. Equal weekly gain is a planning assumption, not a promise.
7. Checkpoints and proof	October 2 (week 4) and October 30 (week 8). At each, one proof of learning you can show: a practice-set score, a photo of corrected flashcards, a teach-back recording, a simulation completion, or a self-check score. Write the score your line predicts at each checkpoint.
8. The honest limitation	One sentence naming the assumption your line makes (equal gain every week) and what you will change if the October 2 checkpoint comes in low.

Each criterion is scored on the descriptors below. A plan can score full marks with a low pretest score; the score is data, the plan is the work.

CRITERION	FULL (POINTS SHOWN)	PARTIAL (ABOUT HALF)	NOT YET (0)
A. Honest baseline 15 points	All available scores copied in percent; unavailable fields marked "not reported"; simulated values labeled. Lowest domain named only when scores support it; heaviest domain named from the test table.	An available score omitted, a simulated value unlabeled, or a supported lowest-domain comparison omitted. Correctly marking an unavailable field "not reported" is not a deduction.	No baseline, or numbers that do not match the report.
B. Three priority concepts, each with evidence 20 points	Three concepts with one evidence sentence each. Use the two weakest domains when reported scores identify them. Otherwise label course concepts as practice priorities and use available report data or classwork as evidence.	Three concepts but one lacks evidence, or reported weak domains are ignored when available. Missing domain data alone is not a deduction.	Fewer than three concepts, or concepts copied from a classmate's report, or a test question quoted.
C. Weekly routine that fits the concepts 30 points	For each concept: one resource, one 6 Rs action, a fixed day and time, at least 20 minutes, and the action really practices that concept (a flashcard deck for vocabulary, a simulation for a procedure).	Routine present but an action does not fit its concept, a time is missing, or a resource is vague.	"Study more" with no resource, action, or time.
D. Graphs and growth line 20 points	Bar graph of available scores with the axis at zero and the 65 pass line; unavailable bars blank. Growth plan from week 0 to week 12 to a target of at least 65; rate in points per week with arithmetic shown; checkpoint predictions from the line.	Graphs present but an axis does not start at zero, the rate is missing, or a checkpoint prediction is not shown.	No graphs, or a target below the pass line.
E. Coherence and the limitation 15 points	The five parts agree: available evidence leads to concepts, concepts to actions, and actions to checkpoint proof. Plain English names equal gain as a planning assumption, not guaranteed growth, and a concrete change if October 2 comes in low.	Parts mostly agree but one contradicts another, or the limitation is generic ("I will try harder").	Parts do not connect, or no limitation.

Scoring note. Partial credit is awarded per criterion. A plan built from the simulated report can earn full marks; its baseline row must say "simulated" and the plan is rewritten after the make-up test.

SIMULATED PRETEST REPORT (PRACTICE DATA)

For students who have not taken the pretest yet

OFFICIAL

SIMULATED DATA. THESE ARE NOT YOUR SCORES. USE THEM TO PRACTICE THE PLAN UNTIL YOUR MAKE-UP PRETEST.

WHY YOU HAVE THIS SHEET — SEC 00

You did not take the WebXam pretest on September 3, so there is no real report for you yet. You still complete the take-home exam, because the grade is for a coherent plan, not for a score. Use the practice numbers below exactly as if they were yours, and write the word **SIMULATED** in your baseline row. After your make-up pretest, you will redo Parts 1 and 4 with your real numbers in class, and your plan will be revised to match.

Your make-up pretest. See Mr. Mendoza to schedule it; it takes 20 to 40 minutes and can be done during a study hall or before school. Do not ask a classmate about the questions.

SIMULATED PRETEST REPORT — SEC 01

ROW	SCORE	PASS LINE	WHAT IT MEANS
Domain 1: Handling, Preparation, Storage and Disposal	44 percent (SIMULATED)	65	21 points below the pass line
Domain 2: Biotechnology Research and Experiments	58 percent (SIMULATED)	65	7 points below the pass line
Total	**51 percent (SIMULATED)**	65	14 points below the pass line

Weak areas the simulated report lists: lab safety, chain of custody, storing and preparing samples (Domain 1); and, in Domain 2, reading a data table against a reference range and choosing the right graph.

WHAT TO PRACTICE UNTIL YOUR MAKE-UP TEST: CLEAR DIRECTIONS — SEC 02

1. **This week, Domain 1 first.** Open the portal day page for the current lesson and the printed pack, SEC 02 Background and briefing. Record one Cornell note page on lab safety, chain of custody, storing and

preparing samples. Reduce it to ten flashcards.

2. **Run one simulation from start to finish** (Safety Practical first, then The Traces We Leave). A simulation counts as practice only when you finish it and can say what each step was for.
3. **Practice the data skills.** On the WebXam Baseline sheet from September 4, use the simulated numbers above: make the bar graph against the 65 pass line, choose a target, draw the growth line, and compute the rate in points per week.
4. **Build your plan from the menu** on the rubric sheet (Categories and choices, SEC 02): three priority concepts, a resource and a 6 Rs action for each, a fixed weekly time, and the two checkpoints.
5. **Proof of learning by October 2:** one practice-set score or one teach-back, recorded on your plan.
6. **Schedule the make-up pretest with Mr. Mendoza** and write the date on your plan. When the real report arrives, replace the simulated baseline and re-check that your three concepts still match your weakest domains.

ASSIGNMENT 11 OF 29 Fri, Sep 4 about 80 minutes

Investigation Day 2: Numbers That Do Not Lie to You

Today we need to accomplish calibrate the data tools this case will lean on: mean, median, range, reference ranges, and choosing a graph that tells the truth.

Our goal is use pretest data to make three graphs and explain a study goal. Keep actual scores and simulated practice values clearly labeled.

You have to turn in Completed WebXam Baseline sheet: baseline table, bar graph, class histogram with median bin, growth line with points per week and the October 2 checkpoint, and a claim-evidence-reasoning paragraph. Report exact median and range only when raw scores are available. Hand the paper sheet in before you leave. If you were absent, print the PDF from this page or pick one up, complete it, and bring it to the next class.

Schoology assignment: Wk2 D02 · Numbers That Do Not Lie to You (PLTW 1.1.1)

1 READ

This is our Case B investigation for Period 6A-7B. Your materials for this assignment start on the very next page, in this order: **D02 Case B briefing pack (read this)** (3 pages); then **pltw pbt D02 webxam baseline graph your start** (8 pages); then **D02 Case B webxam baseline sheet** (9 pages). Read the briefing first. Write your answers on the sheet. Everything you need for this assignment is in those pages.

2 READ

Open the WebXam Baseline sheet for your section under Today's materials. Use your report, or the worksheet's SIMULATED practice values if your report is unavailable. Label which source you used.

3 DO

Section 1: read the two-paragraph briefing and answer the two reading questions using the sentence you cite.

HINT A number means nothing until it stands next to its reference range.

4 DO

Section 2: copy only the scores your report provides. Write not reported for a missing domain score and leave its bar blank. If you use the complete simulated example instead, label the whole dataset SIMULATED.

5 DO

Section 3: draw the bar graph of your baseline by domain with the 65 percent pass line, axis starting at 0.

6 DO

Section 4: use the anonymous class data provided in class or Schoology. Draw a histogram and find the bin containing the median. Calculate an exact median and range only if individual score values are provided; bins alone do not give exact values.

7 DO

Section 5: choose a target score, draw the straight line from your baseline at week 0 to your target at week 12, compute the points per week, and predict your October 2 checkpoint.

8 DO

Section 6: write the claim-evidence-reasoning paragraph that defends your target and names what would make you revise it.

9 DO

Section 7: complete the vocabulary-in-use items and the three self-check items, then hand the sheet to Mr. Mendoza before you leave.

10
CHECK

Before you turn it in, check your claims against these limits: A hair consistent with a person proves a hair like theirs was present, not that the person was, and never when. A fingerprint proves touch, not when or why. A pattern class narrows a crowd; only minutiae can name one finger. A presumptive test says maybe. Only a confirmatory test says blood, and only DNA says whose.

11
TURN IN

Now we turn it in. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Principles of Biomedical Technology, and open the assignment named **Wk2 D02 · Numbers That Do Not Lie to You (PLTW 1.1.1)**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

DAILY INVESTIGATION PACKET

Sep 4 · Investigation Day 2 of 18

OFFICIAL

THE BRIEFING: WHAT YOU ARE DOING TODAY, AND HOW THE PROS DO IT — SEC 00

Picking up from yesterday: you learned that evidence earns conclusions. Nothing else does.

Real analysts never trust a single number on its own. They compare it to what is normal and they chart it to see whether it is climbing, falling, or holding steady. Today you tune up those same data tools, because in about two weeks a lab number is going to land on your desk and you will need to know whether it is boring or case-cracking.

OBJECTIVE

Today you will calibrate the data tools this case will lean on: mean, median, range, reference ranges, and choosing a graph that tells the truth.

Take-home (the ten-year idea): A number means nothing until it stands next to its reference range.

BACKGROUND AND BRIEFING (READ THIS FIRST) — SEC 02

In two weeks a lab panel will land on your desk with a number like 612 on it. Whether that number is boring or case-cracking depends on one question: what is normal? A reference range is the interval where healthy values usually land. Analogy: every road has its own speed limit; 55 is legal on the highway and reckless in a school zone. A lab value is only high or low relative to ITS range. LIMIT of the analogy: speed limits are laws with hard edges; biology is a distribution, and healthy people sometimes sit slightly outside the range. One out-of-range number is a flag, not a verdict.

Three summary numbers you will use constantly: MEAN (add and divide; fair when values cluster), MEDIAN (the middle value; fair when one outlier would drag the mean), RANGE (spread; tells you how much the data disagrees with itself).

Choosing the graph: BAR for comparing categories (blood types found at a scene), LINE for change over time (body temperature falling), SCATTER for testing whether two things move together (dose vs response). The wrong graph is not just ugly, it can lie: a bar chart whose axis starts at 90 instead of 0 makes a tiny difference look huge.

The skill today is skepticism with a pencil: before you accept any chart, check the axis start, the units, and whether the graph type fits the question.

NEW VOCABULARY (RECORD IN YOUR NOTEBOOK BANK) SEC 04

TERM	PLAIN-LANGUAGE DEFINITION	ANALOGY TO HOLD ONTO
reference range	the interval where healthy values usually land	the speed limit for a lab number

THE DECISION OF THE DAY SEC 03

YOUR ROLE

You are the team's data analyst.

THE SITUATION

Three practice datasets (category counts, a temperature series over hours, dose-response pairs) plus one deliberately misleading chart with a truncated axis.

THE RULE YOU APPLY

Match graph type to question type; report center with the statistic the data shape deserves; every axis starts where honesty starts.

WHAT YOU PRODUCE

One correct graph per dataset, plus a two-sentence callout of exactly how the misleading chart misleads.

Claim ceiling. You may describe what these practice data show. They are practice data; they prove nothing about our case yet.

WHAT THIS UNLOCKS

Next class you qualify for the scene: the safety practical and chain of custody.

PLTW ANCHOR AND INTERACTIVE LAYER REF

Activity 1.1.1 A Sketchy Scene (referenced by title only; all materials in this file are John Hay original work)

- Portal: day page and guided notes; the WebXam Baseline sheet (graph your start, predict your growth) carries today's data

myPLTW student access is down for technical reasons. When it is restored, this day's PLTW anchor is completed online; until then the portal simulation and these printed materials carry the day.

INVESTIGATION TEAM ASSIGNMENTS — SEC 05

A **Scene and Documentation**
Own the axis-honesty checklist; post it by the board.

B **Trace**
Build the bar graph station answer and brief it.

C **Serology and DNA**
Build the line graph station answer and brief it.

D **Toxicology and Chemistry**
Build the scatter station answer and brief it; this is your team's home turf.

E **Medical Examiner**
Compute the summary statistics table and brief the mean-vs-median call.

F **Records and Timeline**
Start the unit timeline: enter days 1 and 2 as its first two events, then log which graph goes with which future evidence type.

NOTEBOOK PAGES IN USE TODAY — SEC 06

- Day 2 Cornell page
- Vocabulary bank: reference range entry with your own analogy

DAILY SUBMISSION FORM: GRAPH EXIT SLIP

JH-26-0831-B / D2

- ☐ Three graphs, labeled axes and units
- ☐ Mean, median, range table
- ☐ Misleading-chart callout (two sentences)

INVESTIGATOR (PERIOD + CODE, NO NAMES)	TEAM	TIME SUBMITTED

WEBXAM BASELINE SHEET

OFFICIAL

Sep 4 · Investigation Day 2 of 18 · Graph your start, predict your growth

WEBXAM · DOMAIN 2 BIOTECHNOLOGY RESEARCH AND EXPERIMENTS · OHIO OUTCOME 5.8

VOCABULARY IN BOLD IS DEFINED WHERE IT FIRST APPEARS

INVESTIGATOR CODE (PERIOD + CODE, NOT YOUR NAME)	TEAM	DATE
		Sep 4, 2026

WHY TODAY MATTERS, IN PLAIN ENGLISH — SEC 00

Yesterday you took a practice version of **WebXam** and wrote a study plan. Today the numbers on that report stop being a grade and become **data**: facts you can chart, compare, and use to make a decision. Real biomedical labs do exactly this with a patient's first blood draw.

The first number is not the verdict. It is the **baseline**, the starting point every later number is measured against.

> **WebXam**: Ohio's end-of-course test for this class. Its test code is Principles and Practice of Biomedical Technology (072110). You take it once, inside the testing window that opens October 12, 2026 and closes May 28, 2027. A score of **65 percent** or higher passes.

> **domain**: one big topic area the test is built from. This test has two. Domain 1, Handling, Preparation, Storage and Disposal, carries about 54 of every 100 points (lab safety, chain of custody, storing and preparing samples). Domain 2, Biotechnology Research and Experiments, carries about 46 (designing an investigation, collecting data, statistics, drawing conclusions). Today's sheet lives in Domain 2.

> **baseline**: your first measurement, taken before any training. Its job is to show where you start so growth can be measured, not to label you.

Two rules from today's pack apply to every graph on this sheet. First, the axis starts where honesty starts: at zero. Second, match the graph to the question: a **bar graph** compares categories, a **line graph** shows change over time.

PART A · READ THE BRIEFING — SEC 01

Answer from the text above. Cite the sentence you used by copying its first three words in quotation marks. _____

PBS-U1-D02-A1

Which domain carries more points, and by about how much? Cite the sentence.

PBS-U1-D02-A2

In your own words, what is a baseline for, and what is it not for? Cite the sentence.

PART B · RECORD YOUR BASELINE

SEC 02

Copy your numbers from your pretest report. If your report shows only one total, fill the Total row and write **estimate** in the domain rows using the pattern your group found yesterday (for example "most of my misses were safety questions" means Domain 1 is your lower estimate). An estimate labeled as an estimate is honest data. An estimate written as a fact is not.

> **PERCENT**: a score out of 100. A score of 52 percent means 52 out of every 100 points.

ROW	YOUR SCORE (PERCENT)	POINTS TO THE PASS LINE (65 MINUS YOUR SCORE)	ESTIMATE? (YES OR NO)
Domain 1: Handling, Preparation, Storage and Disposal			
Domain 2: Biotechnology Research and Experiments			
Total			

PBS-U1-D02-B1

Table complete: every score has the unit "percent," and every estimate is labeled. (Scored on the table itself; no writing needed here.)

PBS-U1-D02-B2

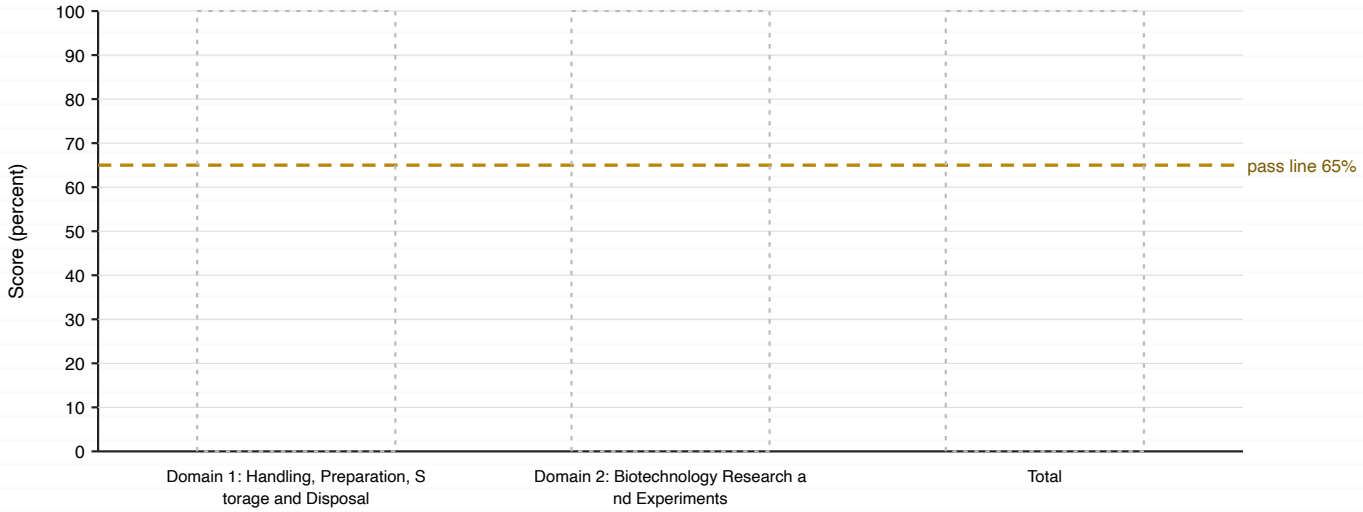
Show the subtraction for the Total row. If your total is already above 65, write how many points above the line you are, and label it "above."

PART C · GRAPH 1: YOUR BASELINE AGAINST THE PASS LINE

SEC 03

Draw one bar for each row of your table. Shade the bar to the height of your score. The dashed gold line is the pass line at 65 percent, the **reference line** every bar is judged against.

> **REFERENCE LINE**: a fixed value drawn on a graph so you can see at a glance whether each measurement is above or below it. On a lab report it is the edge of the reference range. Here it is the pass score.



PBS-U1-D02-C1 ☐

Graph check: axis starts at 0, each bar is labeled, each bar's top matches the table, the pass line is used in your one-sentence reading of the graph. Write that sentence: "My graph shows ..."

PART D · GRAPH 2: THE CLASS PICTURE, NO NAMES

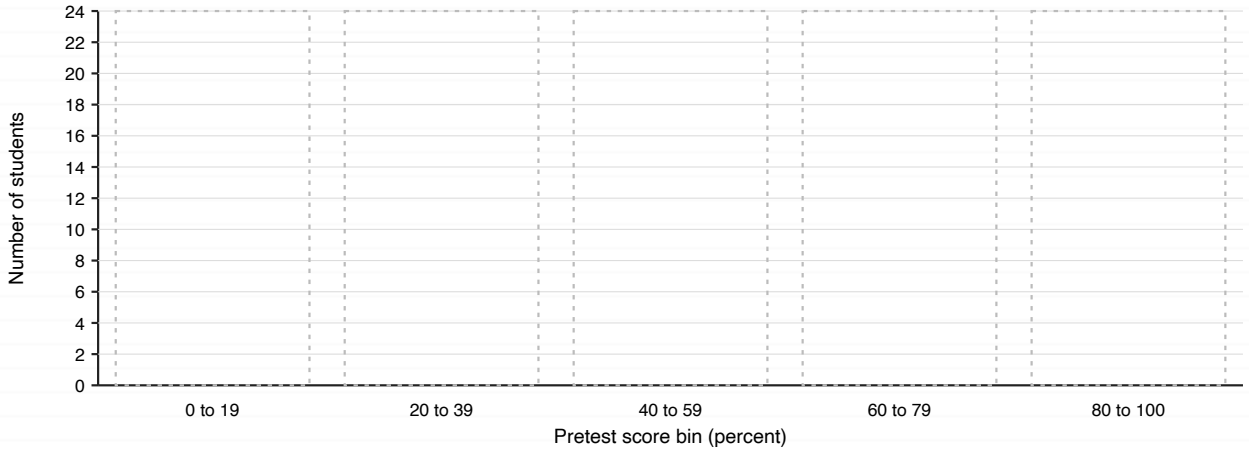
SEC 04

Mr. Mendoza will post a **tally** on the board: how many students scored in each bin. No names, no individual scores. Copy the tally, then draw the bars.

> **TALLY**: a count of how many items fall in each group. Five bins of 20 points each turn a list of scores into a shape you can read.

> **HISTOGRAM**: a bar graph of a tally. The bins sit in order along the bottom, so the shape shows where most people are and how spread out the class is.

BIN (PERCENT)	0 TO 19	20 TO 39	40 TO 59	60 TO 79	80 TO 100
Number of students					



MEDIAN: the middle value when every score is lined up in order. With a tally, the median bin is the bin the middle student falls in. Count up from the lowest bin until you pass half the class.

RANGE: the spread: highest bin minus lowest bin that has at least one student. It tells you how much the class disagrees with itself.

PBS-U1-D02-D1 ☐ Histogram drawn: five bars, heights match the tally, axis starts at 0.

PBS-U1-D02-D2 ☐ Median bin: _____ Range of bins: from _____ to _____. Show your count to the middle student.

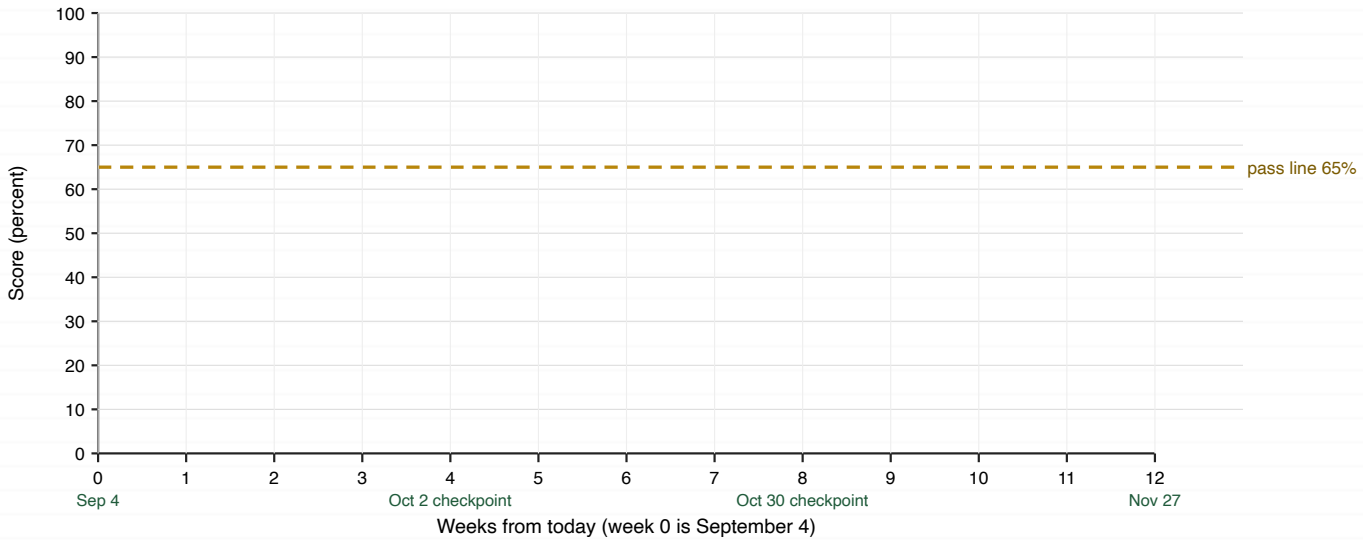
PBS-U1-D02-D3 ☐ Mean or median: which summary number is fairer for this class picture, and why? (Hint from the pack: what does one very high or very low score do to a mean?)

PART E · GRAPH 3: PREDICT YOUR GROWTH SEC 05

Pick a **target**: the score you are aiming for at the end of November, at least 65. Plot your baseline total at week 0 and your target at week 12. Connect them with a straight line. That line is a **projection**: a plan drawn as if you gain the same number of points every week.

PROJECTION: a line that extends what you know today into the future under a stated assumption. Ours assumes equal gain every week. Real learning jumps after a unit and stalls in a busy week. That is why the class checks the real number at week 4 and week 8, then redraws the line.

RATE: how much a value changes per unit of time. Here: points gained per week, which is (target minus baseline) divided by 12 weeks. On the graph, the rate is the steepness of your line.



PBS-U1-D02-E1 ☐ Target: _____ percent. Baseline total: _____ percent. Line drawn from week 0 to week 12.

PBS-U1-D02-E2 ☐ Rate: (target minus baseline) divided by 12 weeks = _____ points per week. Show the work with units.

PBS-U1-D02-E3 ☐ Prediction: at the October 2 checkpoint (week 4), your line says you should be at about _____ percent. Show the work: baseline plus 4 times the rate. Then finish this sentence: "If my October 2 score is far below this, the first thing I will change is ..."

PART F · WRITE THE CALL: CLAIM, EVIDENCE, REASONING

SEC 06

One paragraph, five to seven sentences. **Claim**: your target and the date. **Evidence**: your baseline, your rate, and two study actions from yesterday's plan (name the resource and the day). **Reasoning**: why those actions should produce that rate, and the one assumption the straight line makes. End with what would make you revise the target.

Claim ceiling. A projection is a plan you can check, not a promise of your real test score. The strongest allowed sentence is "if I keep this rate, the line reaches my target." Nothing on this sheet predicts the actual WebXam result.

PBS–U1–D02–F1 ☐

Your paragraph:

PART G · VOCABULARY IN USE AND SELF-CHECK — SEC 07

PBS–U1–D02–G1 ☐

Use **baseline** and **rate** correctly in one sentence about your own graph.

Self-check. Answer in one line each. These come from today's pack.

PBS–U1–D02–G2 ☐

Your data has one huge outlier. Mean or median, and why?

PBS–U1–D02–G3 ☐

Your score measured every four weeks: which graph type, and why?

PBS–U1–D02–G4 ☐

A bar chart's axis starts at 50 instead of 0. What does that do to a small difference?

STANDARDS CITED ON THIS SHEET, AND HOW IT IS USED IN DATA-DRIVEN INSTRUCTION — REF

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NGSS	SEP-5	Using mathematics and computational thinking: use mathematical representations to describe and support explanations and predictions.

How this sheet is used in DDI. Each item carries a code (for example PBS-U1-D02-E2). Mr. Mendoza scores every item 0, 1, or 2 (2 = complete and correct, 1 = partly, 0 = missing or wrong) and records the scores by period and investigator code, never by name. The scores roll up into five skills:

PBS.S.02a	Record data in a table with units and flag estimates	items B1, B2
PBS.S.02b	Build an honest graph: right type, labeled, axis at zero, read against a reference line	items C1, D1, E1
PBS.S.02c	Compute and choose center and spread (median, range, mean) for the data shape	items D2, D3, G2
PBS.S.02d	Use a straight-line model: rate per week and a checkpoint prediction	items E2, E3, G3
PBS.S.02e	Defend a quantitative claim with evidence and name its assumption	items A1, A2, F1, G1, G4

Mastery rule. A skill is on track when at least two of its items score 2. A skill below that routes you to the Day 2 pack, SEC 02 (Background and briefing), and to the Graphing and statistics page on the portal. It also comes back as a warm-up question next week. These scores are Mr. Mendoza's instructional record for deciding what to reteach. They are not the report-card grade, which lives in Schoology.

WEBXAM BASELINE SHEET

OFFICIAL

Sep 4 · Investigation Day 2 of 18 · John Hay teacher-created practice

WEBXAM · DOMAIN 2 BIOTECHNOLOGY RESEARCH AND EXPERIMENTS · OHIO OUTCOME 5.8

VOCABULARY IN BOLD IS DEFINED WHERE IT FIRST APPEARS

INVESTIGATOR CODE (PERIOD + CODE, NOT YOUR NAME)	TEAM	DATE
		Sep 4, 2026

WHY TODAY MATTERS, IN PLAIN ENGLISH — SEC 00

Yesterday you took a practice version of **WebXam** and wrote a study plan. Today the numbers on that report stop being a grade and become **data**: facts you can chart, compare, and use to make a decision. Real biomedical labs do exactly this with a patient's first blood draw.

The first number is not the verdict. It is the **baseline**, the starting point every later number is measured against.

> **WebXam**: Ohio's end-of-course test for this class. Its test code is Principles and Practice of Biomedical Technology (072110). Mr. Mendoza will announce the testing date. The pretest helps us plan practice. A score of **65 percent** or higher passes.

> **domain**: one big topic area the test is built from. This test has two. Domain 1, Handling, Preparation, Storage and Disposal, carries about 54 of every 100 points (lab safety, chain of custody, storing and preparing samples). Domain 2, Biotechnology Research and Experiments, carries about 46 (designing an investigation, collecting data, statistics, drawing conclusions). Today's sheet lives in Domain 2.

> **baseline**: your first measurement, taken before any training. Its job is to show where you start so growth can be measured, not to label you.

Two rules from today's pack apply to every graph on this sheet. First, the axis starts where honesty starts: at zero. Second, match the graph to the question: a **bar graph** compares categories, a **line graph** shows change over time.

WORKED EXAMPLE, STEP BY STEP (SIMULATED PRACTICE DATA) — SEC 00A

SIMULATED report, not school results. Domain 1: 48 percent. Domain 2: 56 percent. Total: 52 percent. Target chosen: 70 percent by the end of November.

1. Record the baseline in the table with the unit percent. Points to the pass line for the total: 65 minus 52 = 13 points.
2. Draw the three bars to 48, 56, and 52 on an axis that starts at 0. The dashed line at 65 is the pass line. All three bars sit below it, so the one-sentence reading is: "My graph shows every score below the pass line, with Domain 1 lowest."
3. Graph the simulated class tally below. For 22 scores, count to positions 11 and 12; both fall in the 40 to 59 bin. This is the median bin, not an exact median.
4. Rate: (target minus baseline) divided by 12 weeks = (70 minus 52) divided by 12 = 18 divided by 12 = 1.5 points per week.
5. October 2 checkpoint (week 4): baseline plus 4 times the rate = 52 + 4 x 1.5 = 52 + 6 = 58 percent. Plot the point at week 4, height 58.
6. Claim, evidence, reasoning: "My practice target is 70 percent by the end of November. My baseline is 52 and my line needs 1.5 points a week. I will do the Tuesday SDS retrieval and the Thursday portal practice set. Those target Domain 1, my lowest domain. The line assumes equal gain every week; if my October 2 score is under 55, I add a second retrieval day."

ABSENT OR NEW? USE THIS SIMULATED PRACTICE DATASET

SIMULATED pretest report: Domain 1: 44 percent. Domain 2: 60 percent. Total: 51 percent. These are practice values, not school results. Label each row "simulated."

SIMULATED class tally (22 practice scores): 0 to 19: 1. 20 to 39: 6. 40 to 59: 9. 60 to 79: 5. 80 to 100: 1.

Use these values and write "SIMULATED" at the top of Parts B and D. When your own report arrives, redo Parts B, C, and E with its reported scores on a second copy. Mark missing scores "not reported."

PART A · READ THE BRIEFING

SEC 01

Answer from the text above. Cite the sentence you used by copying its first three words in quotation marks.

PBS-U1-D02-A1 ☐ Which domain carries more points, and by about how much? Cite the sentence.

PBS-U1-D02-A2 ☐ In your own words, what is a baseline for, and what is it not for? Cite the sentence.

PART B · RECORD YOUR BASELINE SEC 02

Copy only the scores your report provides. If it shows only a total, fill the Total row and write **not reported** for each missing domain score. Leave its points calculation and bar blank. Do not guess domain scores. If you use the complete practice dataset above instead, label every row **simulated**. Keep actual and simulated datasets separate.

> **PERCENT**: a score out of 100. A score of 52 percent means 52 out of every 100 points.

ROW	YOUR SCORE (PERCENT)	POINTS TO THE PASS LINE (65 MINUS YOUR SCORE)	ACTUAL, SIMULATED, OR NOT REPORTED?
Domain 1: Handling, Preparation, Storage and Disposal			
Domain 2: Biotechnology Research and Experiments			
Total			

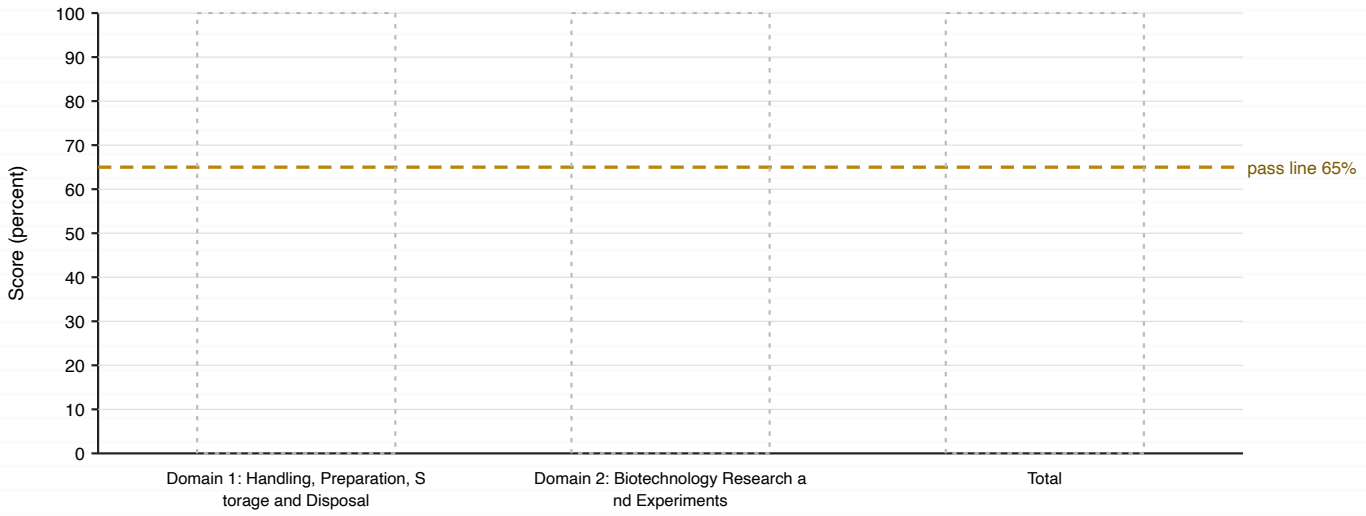
PBS-U1-D02-B1 ☐ Table complete: scores use percent; sources are labeled; missing scores say "not reported." (Scored on the table itself; no writing needed here.)

PBS-U1-D02-B2 ☐ Show the subtraction for the Total row. If your total is already above 65, write how many points above the line you are, and label it "above."

PART C · GRAPH 1: YOUR BASELINE AGAINST THE PASS LINE SEC 03

Draw a bar for each score you have. Leave a missing score blank, not zero. Shade each bar to match its score. The dashed gold line is the pass line at 65 percent, the **reference line** every bar is judged against.

> **REFERENCE LINE**: a fixed value drawn on a graph so you can see at a glance whether each measurement is above or below it. On a lab report it is the edge of the reference range. Here it is the pass score.



PBS-U1-D02-C1 ☐

Graph check: axis starts at 0, each bar is labeled, each bar's top matches the table, the pass line is used in your one-sentence reading of the graph. Write that sentence: "My graph shows ..."

PART D · GRAPH 2: THE CLASS PICTURE, NO NAMES

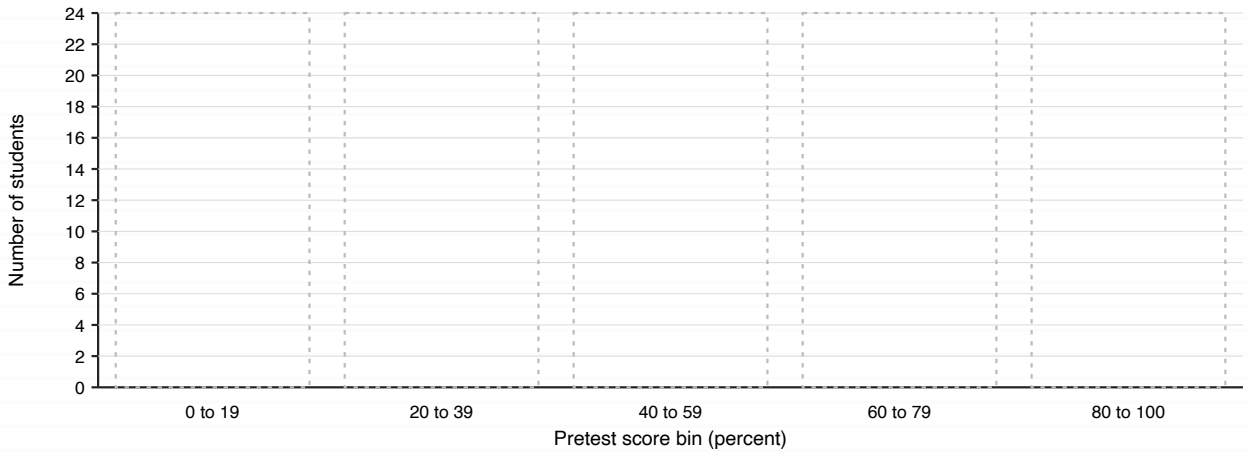
SEC 04

Mr. Mendoza will post a **tally** on the board: how many students scored in each bin. No names, no individual scores. Copy the tally, then draw the bars.

> **TALLY**: a count of how many items fall in each group. The five labeled score bins turn a list of scores into a shape you can read.

> **HISTOGRAM**: a bar graph of a tally. The bins sit in order along the bottom, so the shape shows where most people are and how spread out the class is.

BIN (PERCENT)	0 TO 19	20 TO 39	40 TO 59	60 TO 79	80 TO 100
Number of students					



MEDIAN: the middle ordered score, or the average of the two middle scores for an even count. Count through the tally to locate the middle position(s). If they fall in different bins, report both bins; an exact median needs raw scores.

RANGE: highest score minus lowest score. A grouped tally shows occupied bins, not the exact range. Exact mean, mode, median, range, and standard deviation need raw score values. Do not use bin midpoints as actual scores.

PBS-U1-D02-D1 ☐ Histogram drawn: five bars, heights match the tally, axis starts at 0.

PBS-U1-D02-D2 ☐ Middle-score bin(s): _____ Occupied bins: from _____ to _____. Show the count to the middle position(s). The occupied bins are not an exact range.

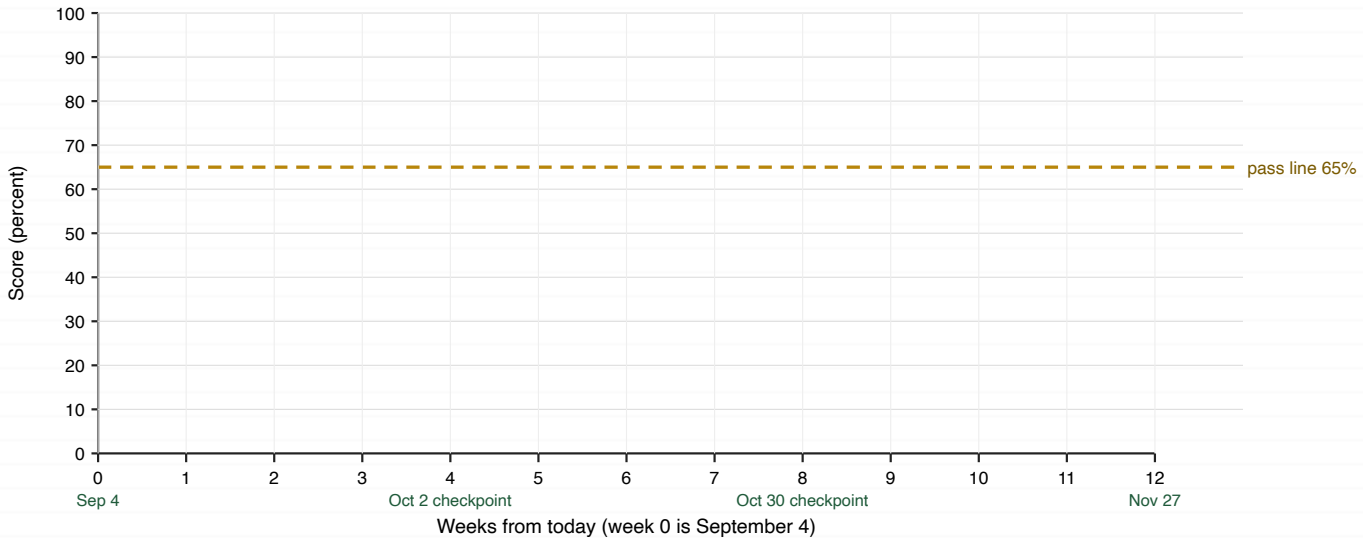
PBS-U1-D02-D3 ☐ Mean or median: which summary number is fairer for this class picture, and why? (Hint from the pack: what does one very high or very low score do to a mean?)

PART E · GRAPH 3: PREDICT YOUR GROWTH SEC 05

Pick a **target**: the score you are aiming for at the end of November, at least 65. Plot your baseline total at week 0 and your target at week 12. Connect them with a straight line. That line is a **projection**: a plan drawn as if you gain the same number of points every week.

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PART F · WRITE THE CALL: CLAIM, EVIDENCE, REASONING

SEC 06

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Claim ceiling. A projection is a plan you can check, not a promise of your real test score. The strongest allowed sentence is "if I keep this rate, the line reaches my target." Nothing on this sheet predicts the actual WebXam result.

PBS–U1–D02–F1 ☐

Your paragraph:

PART G · VOCABULARY IN USE AND SELF-CHECK — SEC 07

PBS–U1–D02–G1 ☐

Use **baseline** and **rate** correctly in one sentence about your own graph.

Self-check. Answer in one line each. These come from today's pack.

PBS–U1–D02–G2 ☐

Your data has one huge outlier. Mean or median, and why?

PBS–U1–D02–G3 ☐

Your score measured every four weeks: which graph type, and why?

PBS–U1–D02–G4 ☐

A bar chart's axis starts at 50 instead of 0. What does that do to a small difference?

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PBS.S.02a	Record reported scores with units; label simulated and missing values	items B1, B2
PBS.S.02b	Build an honest graph: right type, labeled, axis at zero, read against a reference line	items C1, D1, E1
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ASSIGNMENT 12 OF 29 Tue, Sep 8 about 80 minutes

Chain of custody: track the evidence

Today we need to accomplish check four simulated handling records and write one complete evidence-transfer entry.

Our goal is making only the claims your evidence supports.

You have to turn in the completed Daily Evidence Sheet, every Part complete.

Schoology assignment: Wk3 D03 | Chain of custody: track the evidence (PLTW 1.1.1 support)

1 READ	Your materials for this assignment start on the very next page, in this order: **student handout and response sheet (write on this)** (4 pages). Read the briefing first. Write your answers on the sheet. Everything you need for this assignment is in those pages.
2 READ	Open the custody handout. Read the rule and worked Model M. If you already passed safety, skip the safety catch-up links.
3 READ	Read R1 through R4. For each record, check who had the item and its reported condition. Use the handout's table to record your decision, a fact, and one next step.
4 DO	Use Record T to write one transfer entry with all six fields shown in Model M. Use only the facts supplied. Do not imitate anyone's signature.
5 WRITE	Write the two conclusion sentences in Part 5. Check your four-row review and transfer entry, then submit all three parts together in your section's Week 3 Schoology assignment.
6 TURN IN	Now we turn it in. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Principles of Biomedical Technology, and open the assignment named **Wk3 D03 | Chain of custody: track the evidence (PLTW 1.1.1 support)**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

Chain of custody: track the evidence

PBS • Week 3 • September 8, 2026

Today, focus on chain of custody. If you already passed safety, do not retake the test. If you are new or have not passed, use the safety catch-up directions in Schoology. Ask me if you are unsure.

Your job

Check whether an evidence record accounts for an item's handling. Turn in one document with three parts: a four-record review, one transfer entry, and a two-sentence conclusion.

You need this handout and paper or a document you can type in. This is a paper-based practice. Do not handle chemicals or collect real biological samples.

Source label: All records below are original, AI-assisted simulated practice. The people, items, and events are fictional. These are not evidence from PLTW's Anna Garcia case. This practice supports the documentation skills in PLTW Activity 1.1.1, A Sketchy Scene. Use the official handout in Schoology for that activity.

1. Learn the rule

How can we check that the item tested is the item collected?

An observation is something recorded directly. An inference is an explanation drawn from observations. Keep them separate when you read a record.

Chain of custody is the record of an evidence item's collection, storage, and transfers. A **transfer** is a change in who is responsible for the item. An **item ID** is its unique label. A **seal** helps show whether a package has been opened. **Condition** describes the item's or package's state, such as dry, wet, sealed, or torn.

A transfer record identifies the item, date and time, sender, receiver, purpose, location, and condition. A signature or secure electronic receipt confirms the handoff. A signature alone does not tell us whether the package stayed sealed.

Check two things separately:

1. **Record:** Can you account for who had the item and when?

2. **Condition:** Is there a reported change that could affect the item?

Use these decisions: **no gap shown**, **gap or concern shown**, or **not enough information**. Name the fact behind your decision. Missing information does not prove that someone changed the evidence. Do not fill a gap with a guess.

Forensic teams use these records when they transfer samples for DNA testing. A lab result cannot supply a missing handling record. Your job today is to assess the record, not decide guilt or a cause of death.

2. Study one worked model

Model M: simulated blue thread

Practice case M. Collector M1 collected item M-1, a dry blue thread, from a chair at 9:00 AM on September 8, 2026. M1 labeled and sealed it in a paper packet. M1 kept it until the handoff below.

Transfer field	Model entry
Case and item	M; M-1, dry blue thread
Date and time	September 8, 2026, 9:15 AM
Released by / received by	M1 / M2
Purpose and destination	Secure storage; evidence locker 2
Package condition	Label matches M-1; seal intact
Transfer confirmation	M1 and M2 signed at the handoff

What to notice: The item ID stays the same. A new person becomes responsible at a recorded time.

Model decision: No gap is shown from collection to this handoff. The record names both people, the time, the item, and the intact seal. It does not tell us what happened after 9:15 AM.

Try the rule: If the receiver field were blank, what question would you ask before trusting the transfer record? Write one question in your notes.

Optional source reading

The required facts are in this handout. These National Institute of Justice training pages explain the professional practices behind it:

- Chain of Custody, 2023.

- Documentation: Chain of Custody, accessed September 5, 2026.

- Preservation of Evidence, 2023.

3. Review four practice records

All four records are separate simulations dated September 8, 2026. Review only the interval described. Do not assume an unreported earlier or later event happened.

R1 • Sealed envelope. At 10:00 AM, collector A1 gave item R1-1 to technician A2 for storage in locker 3. The item label matched the record. Both signed at 10:00 AM and recorded an intact seal. A2 placed it in the locked locker immediately.

R2 • Unattended packet. Collector B1 left sealed item R2-1 on an open classroom table at 10:05 AM. B1 returned at 10:20 AM. No one was assigned to watch it. B1 recorded that the seal still looked intact. The record does not identify who had access during those 15 minutes.

R3 • Missing receipt. Collector C1 wrote, "Gave sealed item R3-1 to C2 at 10:30 AM for secure storage in locker 4." The receiving-confirmation field is blank. No secure electronic receipt is supplied. The record does not report a damaged seal.

R4 • Torn package. At 10:40 AM, D1 gave item R4-1 to D2 for storage in locker 5. Both signed. Their record says, "Package torn; opening exposes the dry thread inside." The record does not explain when the tear occurred or whether anything touched the thread.

Copy this table. Write a short answer in each cell.

Record	Record decision and fact	Condition decision and fact	One next step
R1			
R2			
R3			
R4			

Need a starting point? Ask who, when, and which item. Then look for a stated condition. A next step might confirm a receipt or report a documented problem. Do not invent a signature or silently rewrite an earlier entry.

4. Make one transfer entry

Record T • Simulated paper sample. Practice case T. E1 collected item T-1, a dry paper square, from practice station 2 at 11:00 AM. E1 labeled and sealed it, then kept it until 11:12 AM. At 11:12 AM on September 8, 2026, E1 handed it to E2 for secure storage in locker 6. Both checked the item label and intact seal. Both signed at the handoff.

Use the Model M field names to write this transfer entry. Include all six rows. Write the supplied confirmation fact; do not imitate anyone's signature.

Transfer field	Your entry
Case and item	
Date and time	
Released by / received by	
Purpose and destination	
Package condition	
Transfer confirmation	

5. Finish and turn in

Write two sentences about R2, R3, or R4:

1. "Record ___ shows ___ because ___."

2. "It does not show ___, so my next step is ___."

Check that your document contains the four-row review, the six-field transfer entry, and both sentences. Submit it to your section's Week 3 chain-of-custody assignment in Schoology. Check that assignment for the deadline.

Remember: Record what you know. Mark what you do not know. Never repair a gap by inventing a fact.

Next lesson: Apply careful documentation to the PLTW scene work. Keep today's practice records separate from the official case file.

ASSIGNMENT 13 OF 29 Thu, Sep 10 about 80 minutes

Investigation Day 4: The Case Opens

Today we need to accomplish hear the dispatch call, meet the victim on paper, learn manner versus cause of death, and open the two organizers that will run the whole unit: the timeline and the suspect matrix.

Our goal is open your section's case: record what each released document states, label what you add, start the timeline with sources, and write one open question for the scene walk.

You have to turn in Daily Evidence Sheet, Parts A to E: an initial observations log of ten entries labeled O or I, first timeline entries with a source column, and one open question for the scene walk with its Part C explanation. Hand in the paper sheet or submit one PDF of it to your section's Wk3 D04 · The Case Opens (PLTW 1.1.1) assignment by September 10 at 11:59 PM. Notebook pages stay in your Investigative Notebook.

Schoology assignment: Wk3 D04 · The Case Opens (PLTW 1.1.1)

1 READ

This is our Case B investigation for Period 6A-7B. Your materials for this assignment start on the very next page, in this order: **D04 Case B briefing pack (read this)** (6 pages); then **D04 Case B Daily Evidence Sheet (write on this)** (9 pages). Read the briefing first. Write your answers on the sheet. Everything you need for this assignment is in those pages.

2 READ

Read the Day 4 briefing and the grouped glossary; complete Part A of the Daily Evidence Sheet from the assigned reading.

3 WRITE

Record ten entries in the initial observations log, each labeled O or I, each with its source.

HINT Cause is what stopped the body. Manner is the story of how it came to happen. They are different questions with different evidence.

4 DO

Start the first timeline in Part B with at least five entries and sources; compare the sources in B2; show the time gap with units in B3.

5 WRITE

Write one open question for the scene walk in Part C and explain in 3 to 5 sentences why today's documents cannot answer it.

6 WRITE

Finish Parts D and E, then hand in the paper sheet or submit one PDF to your section's assignment.

7 CHECK

Before you turn it in, check your claims against these limits: A hair consistent with a person proves a hair like theirs was present, not that the person was, and never when. A fingerprint proves touch, not when or why. A pattern class narrows a crowd; only minutiae can name one finger. A presumptive test says maybe. Only a confirmatory test says blood, and only DNA says whose.

8
TURN IN

Now we turn it in. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Principles of Biomedical Technology, and open the assignment named **Wk3 D04 · The Case Opens (PLTW 1.1.1)**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

DAILY INVESTIGATION PACKET

OFFICIAL

Sep 10 · Investigation Day 4 of 18

THE BRIEFING: WHAT YOU ARE DOING TODAY, AND HOW THE PROS DO IT — SEC 00

Picking up from yesterday: you learned that evidence you cannot account for is evidence you do not have.

When a real death investigation opens, the medical examiner keeps two questions separate: what physically stopped the body (the cause) and how it came about, whether natural, accident, or something worse (the manner). Mixing them up is the number one rookie mistake. Today you open the case and start the timeline and the suspect board exactly as a real cold-case unit would, with question marks, not verdicts.

OBJECTIVE

Today you will hear the dispatch call, meet the victim on paper, learn manner versus cause of death, and open the two organizers that will run the whole unit: the timeline and the suspect matrix.

Take-home (the ten-year idea): Cause is what stopped the body. Manner is the story of how it came to happen. They are different questions with different evidence.

CASE FILE UPDATE — SEC 01

The case opens. 7:16 AM, a 911 call from the Respawn e-sports lounge: the morning shift lead found owner Dana Okafor, 29, collapsed behind the smoothie counter before opening. Dana had a severe peanut allergy that every employee knew about.

COLD OPEN: PLAY THE 911 CALL — AUD

Open the case by playing the dispatch recording before anything else: `exhibits/audio/911-call-RESPAWN.m4a` (about 52 seconds, SIMULATED). The verbatim transcript is Document DOC-1 in the case-document set.

BACKGROUND AND BRIEFING (READ THIS FIRST) SEC 02

Every death investigation answers two questions, and mixing them up is the number one rookie error. CAUSE of death is the physical event: the heart stopped from blood loss, the brain was injured, an infection overwhelmed the lungs. MANNER of death is the category of circumstance: natural, accident, homicide, suicide, or undetermined. Analogy: when a machine breaks, the mechanic reports what broke (cause) and the incident report says how it came to break: wear and tear, operator mistake, or sabotage (manner). LIMIT: bodies are not machines; disease and injury can stack, and one can hide the other. That is why undetermined is an honest verdict, not a failure.

Today you get the first documents of the case file: the dispatch transcript and the victim background card. Documents are evidence too, and they get the same discipline as a bloodstain: what does this page actually SAY (observation) versus what am I ADDING to it (inference)?

Two organizers open today and stay open for fifteen days. The MASTER TIMELINE holds every time-stamped fact with its source; when timelines from different sources agree, that is corroboration, and when they conflict, that is a lead. The SUSPECT MATRIX holds motive, means, and opportunity for each person of interest, but read the column headers: evidence FOR and evidence AGAINST. A motive with no evidence is just gossip with a nametag.

NEW VOCABULARY (RECORD IN YOUR NOTEBOOK BANK) SEC 04

TERM	PLAIN-LANGUAGE DEFINITION	ANALOGY TO HOLD ONTO
cause of death	the physical event that stopped life	what broke the machine
manner of death	the category of how it came about: natural, accident, homicide, suicide, or undetermined	the story behind the breakdown
dispatch	the emergency call record that starts a case clock	the opening whistle

THE DECISION OF THE DAY — SEC 03

YOUR ROLE

You are the first analysts on a fresh case.

THE SITUATION

You have exactly two documents: the dispatch transcript and the victim background card. The room will be full of theories in four minutes.

THE RULE YOU APPLY

Separate what the documents state from what you are assuming. Every timeline entry needs a source column filled.

WHAT YOU PRODUCE

Initial observations log: ten entries minimum, each labeled O or I, plus the first timeline entries with sources.

Claim ceiling. You may not name a cause, a manner, or a suspect today. You have two pieces of paper. The matrix opens with question marks, not verdicts.

WHAT THIS UNLOCKS

Tomorrow you walk the scene.

PLTW ANCHOR AND INTERACTIVE LAYER — REF

Activity 1.1.1 A Sketchy Scene (referenced by title only; all materials in this file are John Hay original work)

- Portal: day page and guided notes

Hand out only the exhibits listed for this day.

EXHIBIT 001 · Records thread GIVEN AT CASE OPEN

Person of interest: Jae Whitfield (former employee)



EXHIBIT 002 · Records thread GIVEN AT CASE OPEN

Person of interest: Marcus Nguyen (shift lead)



EXHIBIT 003 · Records thread GIVEN AT CASE OPEN

Persons of interest: Priya Rao and Victor Boone



INVESTIGATION TEAM ASSIGNMENTS — SEC 05

A **Scene and Documentation**
Prep the scene-walk plan for tomorrow: photo order, sketch duties.

B **Trace**
List what trace evidence the background card hints you might find.

C **Serology and DNA**
List what serology or DNA questions the documents raise.

D **Toxicology and Chemistry**
List what chemistry questions the documents raise.

E **Medical Examiner**
Start the victim profile margin on the body diagram page: age, known health notes from the card only.

F **Records and Timeline**
Own the master timeline; enter the 911 call time (7:16 AM) and every stamp in the documents. Log the routine: Dana taste-tests the first smoothie every morning; routines are timeline gold.

NOTEBOOK PAGES IN USE TODAY — SEC 06

- Master timeline spread (opens today)
- Suspect matrix (opens today)
- Day 4 Cornell page

DAILY SUBMISSION FORM: INITIAL OBSERVATIONS LOG

JH-26-0831-B / D4

- ☐ Ten entries labeled O / I
- ☐ First timeline entries with source column
- ☐ One open question for tomorrow's scene walk

INVESTIGATOR (PERIOD + CODE, NO NAMES)	TEAM	TIME SUBMITTED

DAILY EVIDENCE SHEET

Sep 10 · Investigation Day 4 of 18 · The Case Opens

OFFICIAL

WEBXAM · DOMAIN 2 BIOTECHNOLOGY RESEARCH AND EXPERIMENTS · OHIO OUTCOME 5.8

VOCABULARY IN BOLD IS DEFINED WHERE IT FIRST APPEARS

INVESTIGATOR CODE (PERIOD + CODE, NOT YOUR NAME)	TEAM	DATE
		Sep 10, 2026

WHY TODAY MATTERS, IN PLAIN ENGLISH — SEC 00

When a real death investigation opens, the medical examiner keeps two questions separate: what physically stopped the body (the cause) and how it came about, whether natural, accident, or something worse (the manner). Mixing them up is the number one rookie mistake. Today you open the case and start the timeline and the suspect board exactly as a real cold-case unit would, with question marks, not verdicts.

Today you will: hear the **dispatch** call, meet the victim on paper, learn manner versus **cause of death**, and open the two organizers that will run the whole unit: the timeline and the suspect matrix.

The ten-year idea: Cause is what stopped the body. Manner is the story of how it came to happen. They are different questions with different evidence.

> **CAUSE OF DEATH**: the physical event that stopped life. Analogy to hold onto: what broke the machine.

> **MANNER OF DEATH**: the category of how it came about: natural, accident, homicide, suicide, or undetermined. Analogy to hold onto: the story behind the breakdown.

> **DISPATCH**: the emergency call record that starts a case clock. Analogy to hold onto: the opening whistle.

PART A · READ THE BRIEFING, THEN ANSWER FROM THE TEXT — SEC 01

Every death investigation answers two questions, and mixing them up is the number one rookie error. **CAUSE of death** is the physical event: the heart stopped from blood loss, the brain was injured, an infection overwhelmed the lungs. **MANNER of death** is the category of circumstance: natural, accident, homicide, suicide, or undetermined. Analogy: when a machine breaks, the mechanic reports what broke (cause) and the incident report

says how it came to break: wear and tear, operator mistake, or sabotage (manner). LIMIT: bodies are not machines; disease and injury can stack, and one can hide the other. That is why undetermined is an honest verdict, not a failure.

Today you get the first documents of the case file: the **dispatch** transcript and the victim background card. Documents are evidence too, and they get the same discipline as a bloodstain: what does this page actually SAY (observation) versus what am I ADDING to it (inference)?

Two organizers open today and stay open for fifteen days. The MASTER TIMELINE holds every time-stamped fact with its source; when timelines from different sources agree, that is corroboration, and when they conflict, that is a lead. The SUSPECT MATRIX holds motive, means, and opportunity for each person of interest, but read the column headers: evidence FOR and evidence AGAINST. A motive with no evidence is just gossip with a nametag.

Answer from the reading above. Cite the sentence you used by copying its first three words in quotation marks.

PBS-U1-D04-A1 ☐

In your own words, what is the difference between the cause of death and the manner of death? Copy the first three words of the sentence you used.

PBS-U1-D04-A2 ☐

The reading says undetermined is an honest verdict, not a failure. Why?

WORKED EXAMPLE, STEP BY STEP (A PRACTICE CASE, NOT OURS) SEC 01A

Building timeline rows from a practice dispatch call

Practice case, not ours: a bicycle shop's burglar alarm goes off overnight and the keyholder calls it in; here is how you turn that call into timeline rows.



What to notice: Notice there are two separate pieces of paper: a timeline row is only as strong as the document you can point to for it.

1. Read the call record for clock stamps first. The operator's stamp says: time of this call is 2:38 AM. Row 1: 2:38 AM, call placed, source DOC-1, O (the document states it).
2. Read for events the caller states with no clock. The caller says: the alarm company texted me and I drove over, the back window is broken, nothing looks moved. Row 2: none, back window broken, DOC-1, O. Row 3: none, nothing looks moved, DOC-1, O (it is what he said, even though it is his impression).
3. Now add what a second document states. The alarm company's log says the alarm tripped at 2:05 AM. Row 4: 2:05 AM, alarm tripped, alarm log, O.
4. Add the row you had to compute, and label it I. The caller says he arrived about six minutes before calling. 2:38 minus 6 minutes = 2:32 AM. Row 5: 2:32 AM, keyholder arrives, DOC-1 plus arithmetic, I (you added the subtraction).
5. Look for an overlap. The caller says the alarm company texted him; the alarm log shows a trip at 2:05. The two sources agree that an alarm happened, so that is corroboration. If the log had shown no trip, that would be a conflict and a lead.
6. Report the gap two ways. Arrival to call: 2:38 minus 2:32 = 6 minutes. 6 minutes divided by 60 minutes per hour = 0.1 hours.

Finished product: Five rows, every one with a source, four labeled O and one labeled I; the alarm is corroborated by two sources; the arrival-to-call gap is 6 minutes, or 0.1 hours.

Now do the same steps on today's real data in Part B. If you were in class, use your team's data. If you were absent or are new, use the canned data set below.

IF YOU WERE NOT IN CLASS: THE DATA YOU NEED

SEC 01B

ABSENT OR NEW TO THE CLASS? START HERE

The case opened. The class heard the dispatch transcript (DOC-1) read aloud, then received the victim background card and the persons-of-interest brief (DOC-3). Teams opened the master timeline and the suspect matrix. These are the facts a team pulled from the documents, with the source for each.

TIME (OR NONE)	EVENT, IN THE DOCUMENT'S OWN WORDS	SOURCE	O OR I
7:16 AM	Time of this call is 7:16 AM (operator's stamp)	DOC-1	O
none	I just got to work (no minutes given on DOC-1)	DOC-1	O
7:14 AM	I badged in at 7:14 like always (the caller's own interview card)	DOC-3 persons-of-interest brief	O
none	My boss is on the floor behind the counter and she's not responding. Her face is really swollen	DOC-1	O
none	The drawer where it always is, it's open and it's empty	DOC-1	O
none	There's a shelf knocked over on her, there's a smoothie sitting right here	DOC-1	O
none	Severe peanut allergy, documented since childhood, two prior emergency visits at ages 9 and 21 (RECORD)	background card	O
work hours, daily	Every employee states the epinephrine auto-injector was kept in the counter drawer, without exception (STATEMENTS)	background card	O
about 6:00 AM, daily	Arrived around 6:00 AM most mornings, alone; made and taste-tested the first protein smoothie herself, every day (STATEMENTS)	background card	O
two weeks before; ten days before	Fired an employee over register discrepancies; won the regional tournament hosting contract over a rival lounge	background card	O

Overlap for B2	Background card: the injector is always in the counter drawer. DOC-1: the drawer is open and empty. The two documents talk about the same drawer and a lead: the same drawer described in two states. A conflict is a lead: the investigation now has to find out where the injector is and how the drawer came to be empty. It is not a verdict about anyone.
Numbers for B3	Call time 7:16 AM. DOC-1 gives no minutes; the caller's interview card (DOC-3, released today) says he badged in at 7:14. Arrival = 7:14 AM. Gap = 2 minutes. 2 minutes divided by 60 minutes per hour = 0.03 hours (rounded). Write which document the 7:14 came from.
Suspect matrix after today (F team)	Four names: Jae Whitfield, Marcus Nguyen, Priya Rao, Victor Boone. Motives in the CLAIMED column only. Evidence-for and evidence-against columns empty.
Open question the room posted for the scene walk	Where is the auto-injector, and what does the counter area show around the smoothie and the open drawer? (Nobody may name a cause, a manner, or a suspect yet.)

Use these values exactly as your team's data for Part B and Part E. Write "canned data set" at the top of Part B so Mr. Mendoza scores it as make-up work. Where the case file does not fix a number (room measurements, clock times, hair features), the value here is a classroom placeholder; your room's real numbers replace it.

PART B · WORK THE EVIDENCE

SEC 02

You have exactly two documents today: the dispatch transcript (Document DOC-1) and the victim background card. Every entry below must come from one of them, with the source written down.

TIME STAMP: a clock time attached to an event. If the document gives no clock time, write none.

SOURCE: the document a fact came from. A fact with no source is a rumor.

CORROBORATION: two independent sources that agree. It is the strongest thing a timeline can show.

TIME (OR NONE)	EVENT, IN THE DOCUMENT'S OWN WORDS	SOURCE (DOC-1 OR BACKGROUND CARD)	O OR I

PBS–U1–D04–B1 ☐ Timeline table: at least five entries, every one with a source, every one labeled O (the document states it) or I (you added it). (Scored on the table.)

PBS–U1–D04–B2 ☐ Find one place where the two documents talk about the same thing. Do they agree or conflict? Write which, and what a conflict would mean for the investigation.

PBS–U1–D04–B3 ☐ DOC-1 prints the time of the call. The caller says they arrived shortly before calling; use the minutes given by the caller (Case A: DOC-1) or by the first interview card (Case B: the shift lead, DOC-3). Write the arrival time, then the gap between arrival and the call in minutes and as a decimal fraction of an hour (divide by 60). Show the work with units.

PART C · WRITE THE CALL — SEC 03

Write the one open question tomorrow's scene walk must answer. Then explain in three to five sentences why the two documents you hold today cannot answer it. Use at least one observation (O) and one inference (I) from your table, and label each one.

Claim ceiling. You may not name a cause, a manner, or a suspect today. You have two pieces of paper. The matrix opens with question marks, not verdicts.

PBS-U1-D04-C1 ☐ Your writing:

PART D · VOCABULARY IN USE — SEC 04

PBS-U1-D04-D1 ☐ Use **cause of death** and **manner of death** and **dispatch** correctly in one or two sentences about today's work. A definition alone does not count; use the words about something real.

PART E · SELF-CHECK AND EXIT — SEC 05

One line each. These come from today's pack; answer from memory first, then check.

PBS-U1-D04-E1 ☐ The heart stopped from blood loss. Cause or manner?

PBS-U1-D04-E2 ☐ The five manners of death?

PBS-U1-D04-E3 ☐ A suspect has a strong motive and nothing else. What does the matrix say?

TURN IN — SLIP

Initial observations log: Ten entries labeled O / I; First timeline entries with source column; One open question for tomorrow's scene walk.

Hand this sheet to Mr. Mendoza before you leave. The notebook pages named on today's pack stay in your Investigative Notebook.

STANDARDS CITED ON THIS SHEET, AND HOW IT IS USED IN DATA-DRIVEN INSTRUCTION REF

WebXam alignment. Principles and Practice of Biomedical Technology (code 072110), Biotechnology Research and Experiments (46.07 percent of the test), Ohio outcome 5.8 Biotechnology Research and Experiments.

Ohio Health Science	5.8.4	Establish and implement procedures for systematic collection, organization and use of data.
Ohio Health Science	5.8.7	Document results of the experiment in a laboratory notebook, adhering to professional protocol.
Ohio Health Science	5.9.1	Maintain the integrity of a clinical sample, including patient/client identification and chain of custody and explain how to adhere to chain-of-custody guidelines when required (e.g., forensic studies, drug screen).
Ohio Health Science	1.2.1	Extract relevant, valid information from materials and cite sources of information (e.g., medical reports, fitness assessment, medical test results).
Ohio Health Science	1.3.3	Use ethical character traits consistent with workplace standards (e.g., honesty, personal integrity, compassion, justice).
PLTW PBS framework	EXD-A.4	Maintain a detailed repeatable account of an experiment in a physical or digital laboratory notebook.
PLTW PBS framework	COM-A.7	Use appropriate scientific terminology and abbreviations.
Common Core	RST.9-10.1	Cite specific textual evidence to support analysis of science and technical texts, noting the precise details of explanations or descriptions.
Common Core	RST.9-10.2	Determine the central ideas or conclusions of a text; trace the text's explanation of a complex process; summarize accurately.
Common Core	WHST.9-10.2	Write informative or explanatory texts, including scientific procedures and technical processes, with precise language and domain-specific vocabulary.
Common Core	HSN-Q.A.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently, and choose and interpret the scale and the origin in graphs and data displays.
NGSS	SEP-8	Obtaining, evaluating, and communicating information: read scientific texts to summarize and evaluate claims and evidence.

How this sheet is used in DDI. Each item carries a code (for example PBS-U1-D04-B2). Mr. Mendoza scores every item 0, 1, or 2 (2 = complete and correct, 1 = partly, 0 = missing or wrong) and records the scores by period and investigator code, never by name. The scores roll up into these skills:

PBS.S.04a	Tell cause of death from manner of death and name the five manners	items A1, A2, E1, E2
PBS.S.04b	Build a timeline entry: time, event, and the source document it came from	items B1, B2
PBS.S.04c	Compute elapsed time and report it in two units	items B3
PBS.S.04d	Separate observation from inference and write the open question the evidence must answer	items C1, D1, E3

Mastery rule. A skill is on track when at least two of its items score 2 (or its single item scores 2). A skill below that routes you to today's pack, SEC 02 (Background and briefing), and to the matching page on the portal, and it comes back as a warm-up question next week. These scores are Mr. Mendoza's instructional record for deciding what to reteach. They are not the report-card grade, which lives in Schoology.

ASSIGNMENT 14 OF 29 Fri, Sep 11 about 80 minutes

Investigation Day 5: Walk the Scene

Today we need to accomplish make a scaled practice sketch, evaluate five labeled photo frames and complete the whole D05 evidence sheet.

Our goal is make a scaled practice sketch, evaluate five photo frames and complete your D05 evidence sheet.

You have to turn in One completed D05 packet: evidence sheet, PLAN-1 sketch and four measurements, five photo-log rows and five judgments. Hand in one paper D05 packet or submit one PDF to PBS6782 Walk the Scene. Include the whole evidence sheet and the completed sketch, measurement, photo-log and judgment pages once. Notebook pages stay in your notebook. Check Schoology for the deadline.

Schoology assignment: Wk3 D05 · Walk the Scene (PLTW 1.1.1)

1 READ

This is our Case B investigation for Period 6A-7B. Your materials for this assignment start on the very next page, in this order: **D05 Case B briefing pack (read this)** (4 pages); then **student handout and response sheet (write on this)** (5 pages); then **D05 Case B Daily Evidence Sheet (write on this)** (9 pages). Read the briefing first. Write your answers on the sheet. Everything you need for this assignment is in those pages.

2 READ

Open your D05 pack, evidence sheet and Documentation Practice supplement. Read the briefing and Part A. This is paper-scene practice; do not stage, touch or collect case materials.

3 DO

Use PLAN-1 to place P1 to P4 on the blank sketch. Copy the supplied RP1 and RP2 distances into your record to plot and check it. These are simulated values, not measurements you collected. Show north, scale and units; write See PLAN-1 page in B1.

HINT Record what is supplied. Mark what is missing. Keep practice separate from case facts.

4 READ

Read PHOTO-1 to PHOTO-5. Complete five log rows and five judgments for each stated purpose. Write not visible or not supplied when needed. For B2, explain the most debated or hardest frame.

5 WRITE

Complete B3 and Parts C, D and E on the evidence sheet. For C1, use only your section's case image and records. Keep the listed notebook work in your notebook.

6 CHECK

Check the whole D05 packet. Hand in paper or submit one PDF through your section's Walk the Scene assignment. Include each completed supplement page once.

7 CHECK

Before you turn it in, check your claims against these limits: A hair consistent with a person proves a hair like theirs was present, not that the person was, and never when. A fingerprint proves touch, not when or why. A pattern class narrows a crowd; only minutiae can name one finger. A presumptive test says maybe. Only a confirmatory test says blood, and only DNA says whose.

8
TURN IN

Now we turn it in. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Principles of Biomedical Technology, and open the assignment named **Wk3 D05 · Walk the Scene (PLTW 1.1.1)**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

DAILY INVESTIGATION PACKET

Sep 11 · Investigation Day 5 of 18

CLASSROOM SIMULATION

FRIDAY ROUTE: ONE D05 PACKET

For September 11, use Documentation Practice for B1, B2, the scene sketch and the photo records. Complete the whole D05 sheet. Keep B3 and tasks A, C, D and E. The supplement replaces the older sample measurements and five photo answers for this lesson. This is original John Hay paper-scene practice; no scene staging, touching or collection is required.

Turn in one completed D05 packet: the whole evidence sheet, your PLAN-1 sketch and four measurement rows, five photo-log rows and five judgments. Include the supplement's completed pages once. Keep the listed notebook work in your notebook. Hand in paper or submit one PDF through PBS6782 Walk the Scene.

THE BRIEFING: WHAT YOU ARE DOING TODAY, AND HOW THE PROS DO IT — SEC 00

Picking up from The Case Opens: keep a source beside every statement and an open question beside each gap. Today document the supplied practice while keeping case observations separate.

Real crime scene investigators photograph a scene wide, then closer, then close-up with a ruler in the frame, and they sketch it with measurements, all before touching a single thing, because you only ever get one untouched scene. Today you document this scene the same disciplined way, so nothing is lost before it is recorded.

> Objective: make a scaled practice sketch, evaluate five labeled photo frames and complete the whole D05 evidence sheet.

Take-home (the ten-year idea): Document first, touch second. You get exactly one untouched scene.

CASE FILE UPDATE — SEC 01

Scene access granted. The lounge: gaming stations dark, the smoothie counter mid-prep, a supply shelf toppled behind it, a rubber floor mat pulled over the lower body. A drawer under the counter sits open, and empty.

BACKGROUND AND BRIEFING (READ THIS FIRST) SEC 02

A crime scene is a one-time download. The moment anyone moves anything, the original arrangement is gone forever, so the entire first pass is capture, not collection. Analogy: save the game before you fight the boss. LIMIT: in real life there is no reload; the save file IS the case, which is why the documentation standard is brutal.

Photography runs wide, mid, close: the WIDE shot places the scene in the room, the MID shot places the item in the scene, the CLOSE shot shows the item with a scale marker, because a photo without scale cannot testify to size. Every photo enters the log: number, subject, direction faced.

Two-point measurement records a distance from each fixed reference point. You also need their separation and the correct side of the line between them. PLAN-1 supplies both. All four points are north of that line.

Tagging: each item gets a number tent beside it, entered in the evidence log with location and description. The custody row opens only when an item is bagged, and nothing is bagged today unless released. Nothing is bagged today unless the teacher-investigator releases it; capture beats collection on day one at a scene.

THE DECISION OF THE DAY SEC 03

Check your record before adding a number or a claim. PLAN-1 supplies the geometry. The captions identify the photo frames. If a size, direction or history is not supplied, mark the gap. Use that decision in the existing B2 and photo-log work; do not create a second response.

PLTW ANCHOR AND INTERACTIVE LAYER REF

Activity 1.1.1 A Sketchy Scene (referenced by title only; all materials in this file are John Hay original work)

- Portal: day page and guided notes

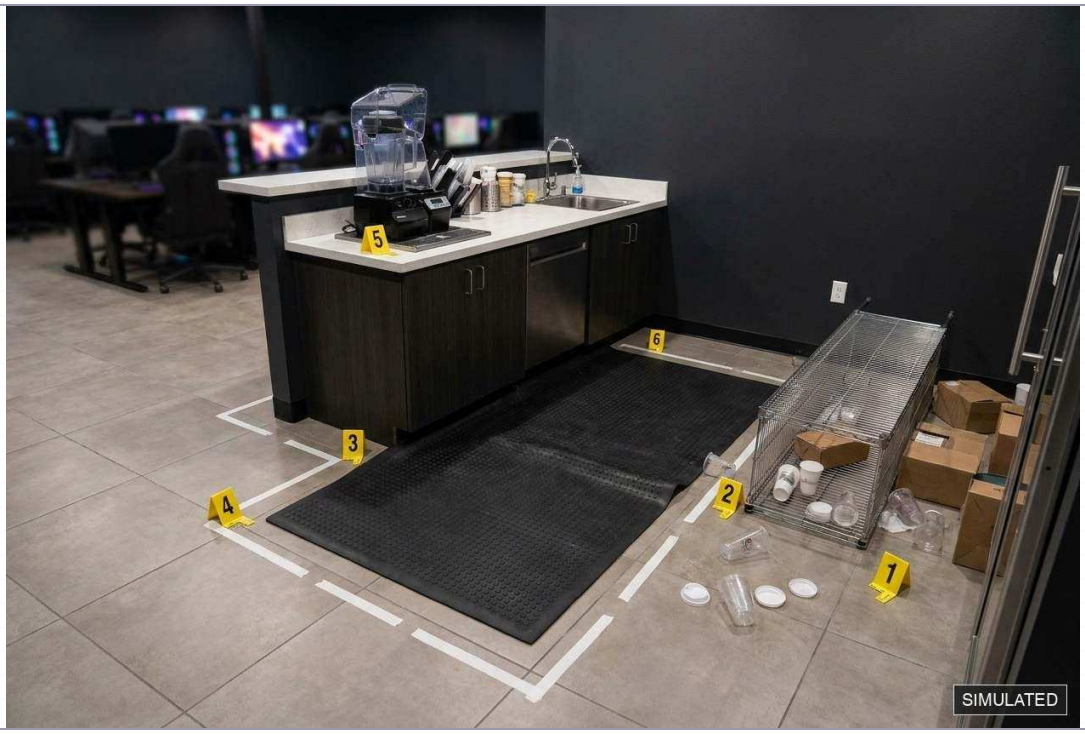
This original practice supports documentation skills connected to Activity 1.1.1. Official PLTW work remains separate; use your section's linked Schoology directions for that work. This packet does not record official activity completion.

EVIDENCE RELEASED TODAY — SEC 07

Hand out only the exhibits listed for this day. Everything marked RELEASED DAY N stays restricted until then.

EXHIBIT 004 · Scene thread — RELEASED DAY 5

Scene, wide shot: behind the smoothie counter



DOCUMENTATION METHOD AND FRIDAY PAPER PRACTICE — SEC 08

Today uses paper and the supplied frames. Do not handle or collect case materials. For any later physical scene, follow the teacher's safety instructions and document the original arrangement before collection.

1. Read PLAN-1 and label the sketch with north, scale and both fixed reference points.
2. Locate P1 to P4 and record both distances with units. Use the supplied side of the baseline.
3. Read each photo caption and purpose. A digital crop is not a new camera view.
4. Log visible features and missing information. Judge the five frames with a reason and improvement or limit.

The illustration below is simulated. It teaches documentation features; it supplies no numerical dimensions or case findings.



INVESTIGATION TEAM ASSIGNMENTS — SEC 05

Work independently or compare with your assigned group. Everyone completes the same D05 packet. First finish Part A, then the PLAN-1 sketch and B1/B3, the five photo records and B2, and Parts C, D and E. Use your own case image for C1. Keep the listed notebook work in your notebook. No scene staging, collection or second team product is required.

NOTEBOOK PAGES IN USE TODAY — SEC 06

- PLAN-1 sketch: include it once in your D05 packet
- Observation vs inference Venn
- Day 5 Cornell page

Turn in one completed D05 packet: the whole evidence sheet, your PLAN-1 sketch and four measurement rows, five photo-log rows and five judgments. Include the supplement's completed pages once. Keep the listed notebook work in your notebook. Hand in paper or submit one PDF through PBS6782 Walk the Scene.

Documentation practice

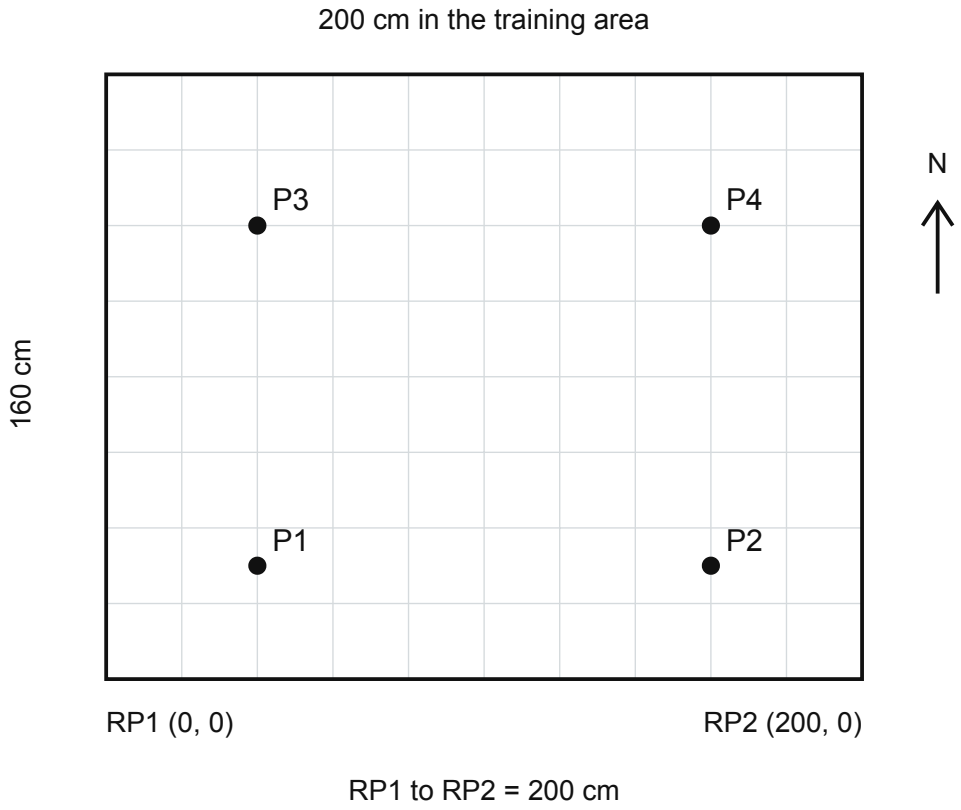
Measure a paper scene and check what five photo examples can show.

Open your D05 evidence sheet, Case B

Complete the whole D05 evidence sheet. Use this supplement for **B1, B2 and the sketch and photo records**. Do not copy the older sample measurements or photo answers. Keep the existing B3 calculation and A, C, D and E tasks.

PLAN-1 reference

This practice area is **200 cm wide and 160 cm long**. RP1 and RP2 are fixed reference points. All four points are north of their connecting line. Each grid step represents 20 cm. These dimensions describe this simulation only.



Scale

1 cm on paper represents 20 cm in the training area.

Example:
100 cm ÷ 20 = 5 cm on paper.

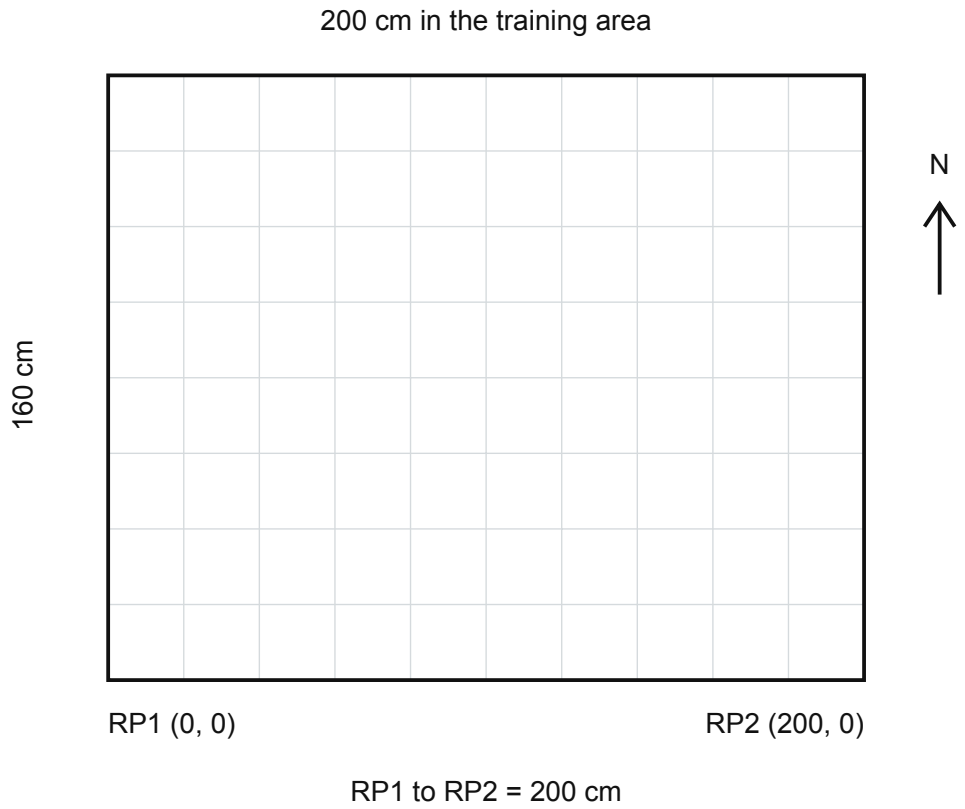
At actual-size printing, the rectangle is 10 cm wide and 8 cm tall. Screen size varies.

Given simulation values in centimeters

Point	East, north from RP1	Distance from RP1	Distance from RP2
P1	40, 30	50.0	162.8
P2	160, 30	162.8	50.0
P3	40, 120	126.5	200.0
P4	160, 120	200.0	126.5

Your sketch and four measurements

1. Use the blank frame below or draw a 10 cm by 8 cm frame on paper.
2. Keep the north arrow and both reference points. Add P1 to P4 using the reference plan.
3. Copy the supplied RP1 and RP2 distances into your record. Use them to plot and check your sketch; these are simulated values, not measurements you collected.
4. Complete the four rows below. On D05 B1, write **“See PLAN-1 page”**. Do not make a second copy.



Print at 100% or Actual size. Check the rectangle with a ruler before using it as a scale drawing. If it is not 10 cm by 8 cm, draw your own frame at that size.

B1 record · Reference points RP1 and RP2 are named on the plan

Point	Distance from RP1 in cm	Distance from RP2 in cm	Photo-set status
P1			No PLAN-1 photos supplied
P2			No PLAN-1 photos supplied
P3			No PLAN-1 photos supplied
P4			No PLAN-1 photos supplied

Compare the framing

A frame is the part of an image shown. These are **training views**, not five recovered photographs from a previous case. A digital crop does not move the camera.

PHOTO-1 · Complete counter overview



Source: Case B scene illustration, b01.png. **Purpose:** show the relationships between visible objects. What cannot be measured from this overview?

PHOTO-2 · Digital detail crop of PHOTO-1



Source: the same scene image, cropped for a framing exercise. No object was changed. **Purpose:** show an item in relation to its surroundings. Is enough context visible? Name an additional view that would help.

Check identification and scale

For C1, use your own Case B image and case records. PLAN-1 and these shared illustrations add no case facts. A reddish-brown mark does not identify a substance.

PHOTO-3 · Digital crop



Source: scene-scale illustration, cropped. **Purpose:** establish the mark's size and item identity. Which needed features can you see?

PHOTO-4 · Backpack



Source: D05 parallel illustration, unchanged. **Purpose:** connect the frame to a numbered record. Is the item identified? Do not infer movement from this one view.

PHOTO-5 · Complete scale illustration



Source: scene-scale illustration, unchanged. **Purpose:** support a size measurement. Compare it with PHOTO-3. What else would you need before giving a numerical size?

This original John Hay practice supports observation and documentation skills connected to PLTW. It does not record completion of a separate official PLTW activity.

Record and judge each frame

Use the source captions on pages 3 and 4. Write **“not visible”** or **“not supplied”** when needed. Never make up a photographer, time, camera direction or original item position.

Photo log · Sources are given in each frame's caption

ID	View and visible item number or label	Scale information you can see	What is not supplied
PHOTO-1			
PHOTO-2			
PHOTO-3			
PHOTO-4			
PHOTO-5			

Judge each frame for its stated purpose: **useful, not useful, or not enough information**. Give a visible reason and an improvement or limit.

Five judgments · For B2, choose the most debated or hardest frame

ID	Judgment and visible reason	One improvement or limit
PHOTO-1		
PHOTO-2		
PHOTO-3		
PHOTO-4		
PHOTO-5		

Turn in one completed D05 packet

Include the whole evidence sheet, PLAN-1 sketch and measurement rows, this photo log and all five judgments. Keep the listed notebook work in your notebook. Hand in paper or submit one PDF to PBS6782 Walk the Scene.

DAILY EVIDENCE SHEET

Sep 11 · Investigation Day 5 of 18 · Walk the Scene

CLASSROOM SIMULATION

WEBXAM · DOMAIN 1 HANDLING, PREPARATION, STORAGE AND DISPOSAL · OHIO OUTCOME 5.9

VOCABULARY IN BOLD IS DEFINED WHERE IT FIRST APPEARS

INVESTIGATOR CODE (PERIOD + CODE, NOT YOUR NAME)	TEAM	DATE
		Sep 11, 2026

WHY TODAY MATTERS, IN PLAIN ENGLISH — SEC 00

For September 11, use Documentation Practice for B1, B2, the scene sketch and the photo records. Complete the whole D05 sheet. Keep B3 and tasks A, C, D and E. The supplement replaces the older sample measurements and five photo answers for this lesson. This is original John Hay paper-scene practice; no scene staging, touching or collection is required.

Real crime scene investigators photograph a scene wide, then closer, then close-up with a ruler in the frame, and they sketch it with measurements, all before touching a single thing, because you only ever get one untouched scene. Today you document this scene the same disciplined way, so nothing is lost before it is recorded.

Today you will: document the scene the way professionals do: photograph wide to close with scales, sketch with two-point measurements, and tag without touching.

The ten-year idea: Document first, touch second. You get exactly one untouched scene.

> **SCALE MARKER**: a ruler or L-shaped card placed in a photo so the picture can show true size. Analogy to hold onto: the person standing next to the fish.

> **REFERENCE POINT**: a fixed spot in the room, like a doorframe corner, that every measurement starts from. Analogy to hold onto: home plate.

PART A · READ THE BRIEFING, THEN ANSWER FROM THE TEXT

SEC 01

A crime scene is a one-time download. The moment anyone moves anything, the original arrangement is gone forever, so the entire first pass is capture, not collection. Analogy: save the game before you fight the boss. LIMIT: in real life there is no reload; the save file IS the case, which is why the documentation standard is brutal.

Photography runs wide, mid, close: the WIDE shot places the scene in the room, the MID shot places the item in the scene, the CLOSE shot shows the item with a **scale marker**, because a photo without scale cannot testify to size. Every photo enters the log: number, subject, direction faced.

Two-point measurement records a distance from each fixed reference point. You also need their separation and the correct side of the line between them. PLAN-1 supplies both. All four points are north of that line.

Tagging: each item gets a number tent beside it, entered in the evidence log with location and description. The custody row opens only when an item is bagged, and nothing is bagged today unless released. Nothing is bagged today unless the teacher-investigator releases it; capture beats collection on day one at a scene.

Answer from the reading above. Cite the sentence you used by copying its first three words in quotation marks.

PBS–U1–D05–A1 ☐

The reading says a photo without scale cannot testify to size. What does a scale marker let a photo prove? Copy the first three words of the sentence you used.

PBS–U1–D05–A2 ☐

The reading calls the first pass capture, not collection. In your own words, what is the difference, and why does the order matter?

WORKED EXAMPLE, STEP BY STEP (A PRACTICE CASE, NOT OURS)

SEC 01A

Locating one item with two measurements and drawing it to scale

Practice scene, not ours: a backpack dropped in a school hallway after a locker break-in; you have a tape, a sketch pad, and a camera.



What to notice: Notice the tape runs from a fixed doorframe corner, not from a chair or a cart that could be moved tomorrow.

1. Pick two fixed reference points that will still be there next year. RP1 = the doorframe corner of room 114. RP2 = the end of the locker bank. Write both at the top of the sketch.
2. Photograph before you measure: WIDE (the hallway with the backpack in it), MID (the backpack and the nearest locker), CLOSE (the backpack strap with the L-shaped scale marker in the frame). Log each: photo 1 wide facing north, photo 2 mid facing north, photo 3 close facing down.
3. Measure from RP1 to the nearest edge of the backpack with the tape held level: 240 cm. Measure from RP2 to the same edge: 155 cm. Both numbers get the unit written next to them.
4. Convert each to the sketch scale of 1 cm on paper = 20 cm in the room. 240 cm divided by 20 cm per drawn cm = 12 cm on paper from RP1. 155 cm divided by 20 cm per drawn cm = 7.75 cm on paper from RP2, drawn as 7.8 cm.
5. Place it: set a compass to 12 cm and swing an arc from RP1 on the sketch; set it to 7.8 cm and swing an arc from RP2. The backpack goes where the two arcs cross. One arc alone would only draw a circle of maybe.
6. State the precision. The room tape reads to the nearest millimeter (0.1 cm), so 240 cm really means 240.0 cm. On paper at this scale, 0.1 cm in the room is far too small to draw, so the sketch's precision is limited by the pencil, about 0.1 cm on paper, which stands for 2 cm in the room.

Finished product: The backpack sits 240 cm from the doorframe corner and 155 cm from the locker-bank end, which is 12 cm and 7.8 cm on a 1:20 sketch; the two arcs pin one spot, and the tape's millimeter precision is finer than the sketch can show.

Now use PLAN-1 and the five labeled frames in the supplement for your Part B work. Do not copy the older example as your case data.

Model limit: The scalar conversions above show a method. Without the separation of the two reference points and the correct side of their baseline, those two arcs do not supply a unique layout. Use PLAN-1 for the required sketch; it supplies the coordinates, reference-point separation and north side. The described backpack photo history is a fictional worked example, not a history of PHOTO-4.

FRIDAY PRACTICE INPUTS AND CASE BOUNDARIES

SEC 01B

Measurement input: PLAN-1, supplement page 1. It is an original mathematical training area, not the room in either case. Record P1 to P4 using its named reference points.

Photo input: PHOTO-1 to PHOTO-5, supplement pages 3 and 4. These are labeled training frames and illustrations, not five recovered photographs. They establish no new case facts.

Use only your own section's image and supplied case records for Part C. Mark this work as original simulation practice.

ABSENT OR NEW TO THE CLASS? START HERE

Drawer-to-hand distance (Team A must-measure)	From the hand end of the extended arm to the front lip of the open drawer: 22 cm, measured with the tape held level.
Room layout on the sketch (Team A)	The storeroom is a back room with an interior door that opens straight onto the counter prep area; a second interior door connects the storeroom to the back office. Both interior doors are drawn and labeled on the sketch.
Body position from the tape line (Team E)	On the side, head toward the counter edge, one arm extended, hand end 22 cm from the drawer lip, lower body beneath the toppled shelf and the rubber mat. What cannot be seen: the legs and anything under the mat. Written as cannot see, not as absent.
Numbers for B3	Sketch scale 1 cm on paper = 20 cm in the room. Example item at 180 cm from RP1. Divide and keep units. Given training precision: the example tape reads to the nearest millimeter (0.1 cm). This is not a claim about an inspected classroom tape.
Claim ceiling reminder	The mark at the counter edge is a dried stain in every log line today. No word stronger than stain.

PART B · WORK THE EVIDENCE — SEC 02

Use PLAN-1. The diagram names both fixed reference points and shows their separation. Add P1 to P4 to the blank sketch. Label both distances for each point, with centimeters. Complete the four measurement rows on supplement page 2. Write “See PLAN-1 page” in this B1 space so you do not copy the table twice. Copy the supplied RP1 and RP2 distances into your record. Use them to plot and check your sketch; these are simulated values, not measurements you collected.

> Two-point measurement records a distance from each fixed reference point. You also need their separation and the correct side of the line between them. PLAN-1 supplies both. All four points are north of that line.

B1 uses supplement page 2. Write: See PLAN-1 page.

PBS–U1–D05–B1 ☐

Check your PLAN-1 page: RP1 and RP2 named; P1 to P4 placed; two distances with units for each; photo-set status recorded truthfully. No PLAN-1 photographs are supplied. Do not invent photo numbers. The five training frames have their own log.

PBS–U1–D05–B2 ☐

Complete one log row and one judgment for each PHOTO-1 to PHOTO-5 in the supplement. Judge its stated purpose: useful, not useful, or not enough information. Give a visible reason and an improvement or limit. Here, explain the frame your group debated most. If working alone, choose the hardest judgment.

PBS–U1–D05–B3 ☐

Your sketch is drawn at a scale of 1 centimeter on paper to 20 centimeters in the room. An item measured 180 centimeters from reference point 1. How many centimeters from that point do you draw it? Show the division with units. Then say how precise the room tape lets you be (to the nearest what on the tape?).

PART C · WRITE THE CALL — SEC 03

Use your own Case B image and records for C1. PLAN-1 is a measurement exercise. The shared scale/backpack illustrations are documentation examples. They add no facts about your case.

Write the first-impressions entry for today's scene as it will appear in the record. Give three observations (what the camera would also see). Then, in a separate second paragraph, give two inferences you are tempted to make. Label each one I, and follow each with the test or measurement that would be needed before it could become a finding.

Claim ceiling. You may document what is present. You may not yet say what any stain or item IS; a reddish-brown stain is a reddish-brown stain until a test says more.

PBS-U1-D05-C1 ☐

Your writing:

PART D · VOCABULARY IN USE — SEC 04

PBS-U1-D05-D1 ☐

Use **scale marker** and **reference point** correctly in one or two sentences about today's work. A definition alone does not count; use the words about something real.

PART E · SELF-CHECK AND EXIT — SEC 05

One line each. These come from today's pack; answer from memory first, then check.

PBS-U1-D05-E1 ☐

Why does a close-up need a scale marker?

PBS-U1-D05-E2 ☐

Why two measurements per item on the sketch?

PBS-U1-D05-E3 ☐

You see a reddish-brown stain. What may you call it today?

_____

TURN IN — SLIP

Turn in one completed D05 packet: the whole evidence sheet, your PLAN-1 sketch and four measurement rows, five photo-log rows and five judgments. Include the supplement's completed pages once. Keep the listed notebook work in your notebook. Hand in paper or submit one PDF through PBS6782 Walk the Scene.

STANDARDS CITED ON THIS SHEET, AND HOW IT IS USED IN DATA-DRIVEN INSTRUCTION — REF

WebXam alignment. Principles and Practice of Biomedical Technology (code 072110), Handling, Preparation, Storage and Disposal (53.93 percent of the test), Ohio outcome 5.9 Clinical Laboratory Techniques and Procedures.

Ohio Health Science	5.9.1	Maintain the integrity of a clinical sample, including patient/client identification and chain of custody and explain how to adhere to chain-of-custody guidelines when required (e.g., forensic studies, drug screen).
Ohio Health Science	5.8.4	Establish and implement procedures for systematic collection, organization and use of data.
Ohio Health Science	5.8.7	Document results of the experiment in a laboratory notebook, adhering to professional protocol.
Ohio Health Science	5.8.10	Create, interpret, and use tabular and graphical displays and describe the data.
Ohio Health Science	1.2.12	Use technical writing skills to complete forms and create reports.
PLTW PBS framework	EXD-A.4	Maintain a detailed repeatable account of an experiment in a physical or digital laboratory notebook.
PLTW PBS framework	EXD-B.2	Display data appropriately and accurately in digital or written form (graphs, tables, diagrams).
PLTW PBS framework	GLP-B.1	Use and apply principles of measurement.
Common Core	RST.9-10.2	Determine the central ideas or conclusions of a text; trace the text's explanation of a complex process; summarize accurately.
Common Core	RST.9-10.7	Translate quantitative or technical information expressed in words into visual form (a table or chart) and translate information expressed visually or mathematically into words.
Common Core	WHST.9-10.2	Write informative or explanatory texts, including scientific procedures and technical processes, with precise language and domain-specific vocabulary.
Common Core	HSN-Q.A.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently, and choose and interpret the scale and the origin in graphs and data displays.
Common Core	HSN-Q.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
NGSS	SEP-8	Obtaining, evaluating, and communicating information: read scientific texts to summarize and evaluate claims and evidence.

How this sheet is used in DDI. Each item carries a code (for example PBS-U1-D05-B2). Mr. Mendoza scores every item 0, 1, or 2 (2 = complete and correct, 1 = partly, 0 = missing or wrong) and records the scores by period and investigator code, never by name. The scores roll up into these skills:

PBS.S.05a	Explain why a photo needs wide, mid, and close shots and a scale marker	items A1, E1
PBS.S.05b	Locate an item with two measurements from fixed reference points and draw it to scale	items B1, B3, E2
PBS.S.05c	Judge whether a photo is usable and say why	items B2
PBS.S.05d	Keep observation and inference apart in a written record	items A2, C1, D1, E3

Mastery rule. A skill is on track when at least two of its items score 2 (or its single item scores 2). A skill below that routes you to today's pack, SEC 02 (Background and briefing), and to the matching page on the portal, and it comes back as a warm-up question next week. These scores are Mr. Mendoza's instructional record for deciding what to reteach. They are not the report-card grade, which lives in Schoology.

ASSIGNMENT 15 OF 29 Fri, Sep 11 about 30 minutes

Documentation custody: the lab record

Today we need to accomplish practicing how evidence is documented and signed for.

Our goal is a record where every item can be traced from collection to the lab.

You have to turn in the completed documentation practice sheet.

Schoology assignment: Wk3 Lab: Documentation custody

1 READ

The practice sheet starts on the very next page. Read its directions top to bottom once.

2 WRITE

Complete every part of the sheet. Every item gets a number, a description, who handled it, and when.

HINT Chain of custody means every person who touched the evidence signs, with the date and time. A gap breaks the chain.

3 TURN IN

Now we turn it in. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Principles of Biomedical Technology, and open the assignment named **Wk3 Lab: Documentation custody**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

Documentation practice

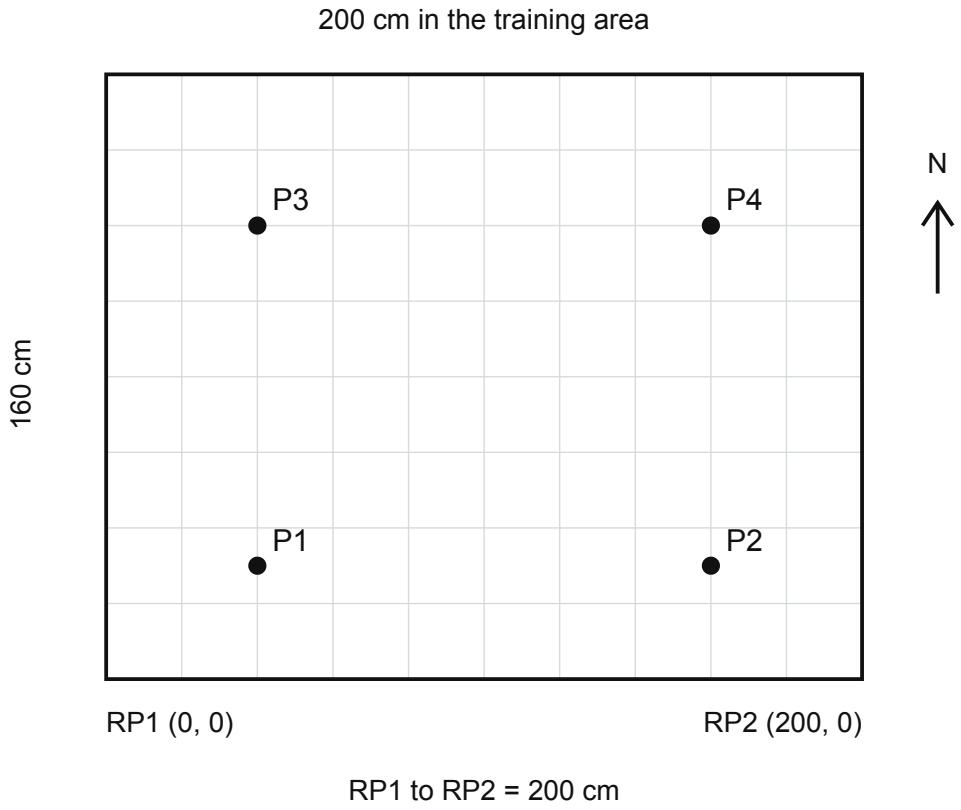
Measure a paper scene and check what five photo examples can show.

Open your D05 evidence sheet, Case B

Complete the whole D05 evidence sheet. Use this supplement for **B1, B2 and the sketch and photo records**. Do not copy the older sample measurements or photo answers. Keep the existing B3 calculation and A, C, D and E tasks.

PLAN-1 reference

This practice area is **200 cm wide and 160 cm long**. RP1 and RP2 are fixed reference points. All four points are north of their connecting line. Each grid step represents 20 cm. These dimensions describe this simulation only.



Scale

1 cm on paper represents 20 cm in the training area.

Example:
100 cm ÷ 20 = 5 cm on paper.

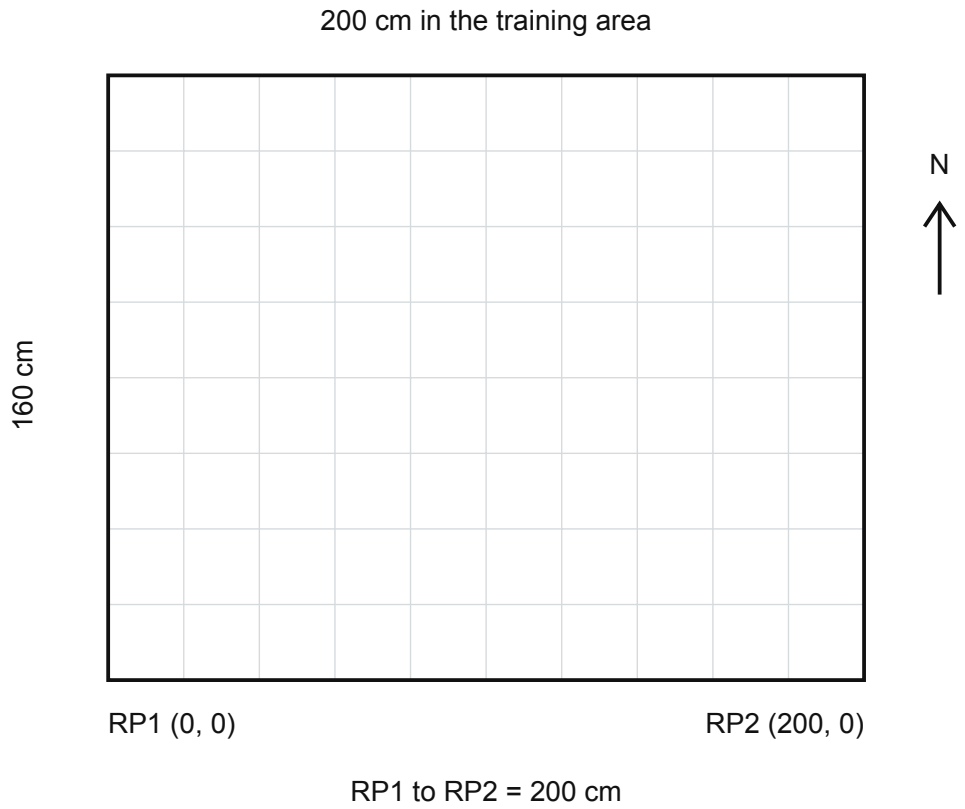
At actual-size printing, the rectangle is 10 cm wide and 8 cm tall. Screen size varies.

Given simulation values in centimeters

Point	East, north from RP1	Distance from RP1	Distance from RP2
P1	40, 30	50.0	162.8
P2	160, 30	162.8	50.0
P3	40, 120	126.5	200.0
P4	160, 120	200.0	126.5

Your sketch and four measurements

1. Use the blank frame below or draw a 10 cm by 8 cm frame on paper.
2. Keep the north arrow and both reference points. Add P1 to P4 using the reference plan.
3. Copy the supplied RP1 and RP2 distances into your record. Use them to plot and check your sketch; these are simulated values, not measurements you collected.
4. Complete the four rows below. On D05 B1, write **“See PLAN-1 page”**. Do not make a second copy.



Print at 100% or Actual size. Check the rectangle with a ruler before using it as a scale drawing. If it is not 10 cm by 8 cm, draw your own frame at that size.

B1 record · Reference points RP1 and RP2 are named on the plan

Point	Distance from RP1 in cm	Distance from RP2 in cm	Photo-set status
P1			No PLAN-1 photos supplied
P2			No PLAN-1 photos supplied
P3			No PLAN-1 photos supplied
P4			No PLAN-1 photos supplied

Compare the framing

A frame is the part of an image shown. These are **training views**, not five recovered photographs from a previous case. A digital crop does not move the camera.

PHOTO-1 · Complete counter overview



Source: Case B scene illustration, b01.png. **Purpose:** show the relationships between visible objects. What cannot be measured from this overview?

PHOTO-2 · Digital detail crop of PHOTO-1



Source: the same scene image, cropped for a framing exercise. No object was changed. **Purpose:** show an item in relation to its surroundings. Is enough context visible? Name an additional view that would help.

Check identification and scale

For C1, use your own Case B image and case records. PLAN-1 and these shared illustrations add no case facts. A reddish-brown mark does not identify a substance.

PHOTO-3 · Digital crop



Source: scene-scale illustration, cropped. **Purpose:** establish the mark's size and item identity. Which needed features can you see?

PHOTO-4 · Backpack



Source: D05 parallel illustration, unchanged. **Purpose:** connect the frame to a numbered record. Is the item identified? Do not infer movement from this one view.

PHOTO-5 · Complete scale illustration



Source: scene-scale illustration, unchanged. **Purpose:** support a size measurement. Compare it with PHOTO-3. What else would you need before giving a numerical size?

This original John Hay practice supports observation and documentation skills connected to PLTW. It does not record completion of a separate official PLTW activity.

Record and judge each frame

Use the source captions on pages 3 and 4. Write **“not visible”** or **“not supplied”** when needed. Never make up a photographer, time, camera direction or original item position.

Photo log · Sources are given in each frame's caption

ID	View and visible item number or label	Scale information you can see	What is not supplied
PHOTO-1			
PHOTO-2			
PHOTO-3			
PHOTO-4			
PHOTO-5			

Judge each frame for its stated purpose: **useful, not useful, or not enough information**. Give a visible reason and an improvement or limit.

Five judgments · For B2, choose the most debated or hardest frame

ID	Judgment and visible reason	One improvement or limit
PHOTO-1		
PHOTO-2		
PHOTO-3		
PHOTO-4		
PHOTO-5		

Turn in one completed D05 packet

Include the whole evidence sheet, PLAN-1 sketch and measurement rows, this photo log and all five judgments. Keep the listed notebook work in your notebook. Hand in paper or submit one PDF to PBS6782 Walk the Scene.

ASSIGNMENT 16 OF 29 Mon, Sep 14 about 80 minutes

Process the Scene

Today we need to accomplish complete one intake sheet that preserves each item's source, location, photo references and handling status without making a stronger claim than the record supports.

Our goal is making only the claims your evidence supports.

You have to turn in D06 Parts A–E intake sheet

Schoology assignment: Wk3 D06 · Process the Scene (PLTW 1.1.2)

1 READ	Your materials for this assignment start on the very next page, in this order: **case evidence folder (read this)** (11 pages); then **student handout and response sheet (write on this)** (20 pages). Read the briefing first. Write your answers on the sheet. Everything you need for this assignment is in those pages.
2 READ	Open your case's D06 sheet, choose the permitted record source and read R1–R6. Complete Part A.
3 DO	Follow the separate MODEL-1 row. Use your case's RECORDS and STATUS to complete every Part B intake row.
4 WRITE	Finish B2/B3 from the same sources and the four PRIORITY groups. Keep observations separate from identification and record missing fields honestly.
5 WRITE	Write the approved four-to-six-sentence Part C correction. Finish Parts D and E; check your source labels and required fields.
6 TURN IN	Now we turn it in. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Principles of Biomedical Technology, and open the assignment named **Wk3 D06 · Process the Scene (PLTW 1.1.2)**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

EVIDENCE FOLDER · D06 · MONDAY 2026-09-14

RESPAWN: the frames your records name

Respawn, an e-sports lounge with a smoothie counter. Case JH-26-0831-B. Period 6A-7B. Today's lesson: Process the scene: review the intake records.

Why this folder opened today

Today you build one intake row for every supplied item. Each row needs the item, its location with both reference distances and units, its photo references, and who handled it. These plates are the frames those photo references name.

Released today: **14 plates**, plus the measured scene sketch. Every plate carries its own frame number, the item it covers, and both reference distances exactly as your record gives them.

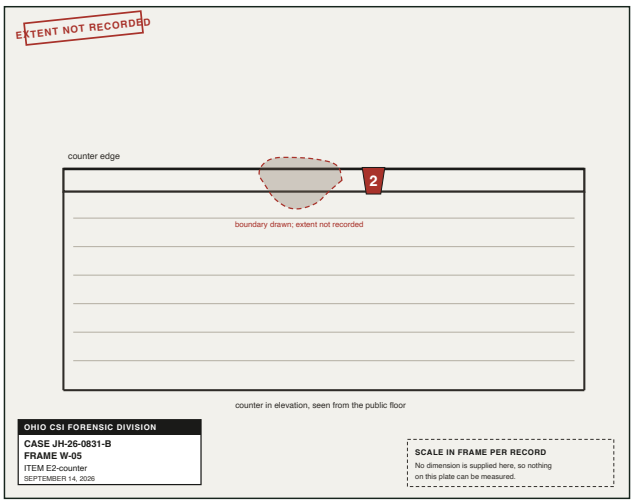
> **Read this before you use a plate**
>
> These plates are **drawings**, made from the written case record. Not one of them is a photograph. That matters for the exact reason your reading gives: a photo reference is a pointer to a frame, and a frame is not an identification. A plate shows you where an item was and what the record says about it. It cannot tell you what a stain is.
>
> Where the record does not supply something, the plate leaves it missing on purpose. A dashed boundary with **EXTENT NOT RECORDED** means the record never gave that area a size, so there is nothing on that plate to measure. Copy the status, not a guess.

The plates

OHIO CSI FORENSIC DIVISION · SCENE DOCUMENTATION PLATE

W-05 E2-counter

CASE JH-26-0831-B
D06 · Monday 2026-09-14
WHITE LIGHT



WHAT THIS FRAME COVERS

The candidate stain on the counter edge, white light, with a scale in frame.

THE RECORD, COPIED

E2-counter (swab of the counter-edge candidate stain). 388 cm from RP1, 142 cm from RP2, on the counter edge 92 cm above the floor. Photo references W-05 (white light with scale), UV-01.

USE IT IN YOUR INTAKE ROW

Task B1, one intake row. Location: 388 cm from RP1, 142 cm from RP2, 92 cm above the floor. Photo references: copy W-05 and UV-01 exactly as your record writes them. Task B3 groups this item by collection priority. Check where E2-counter sits in your case's PRIORITY record before you explain the recorded order.

WHAT THIS PLATE IS NOT

This is a measured drawing made from the written case record, not a photograph and not a photograph of anything that happened. The substrate outline is a drawing convention: the record names the surface and the measurements printed here, not the object's shape. The record gives no extent for the marked area, so its boundary is dashed and nothing on this plate is measurable. Do not report a size. Case JH-26-0831-B only. Photo numbers repeat between cases and between the practice model, so a frame number alone never identifies a scene.

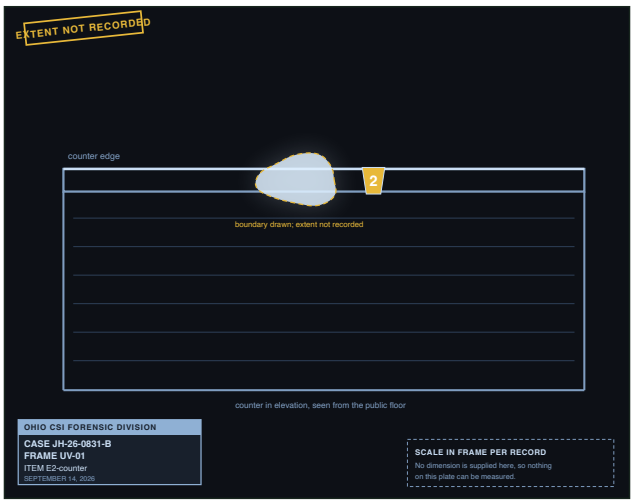
John Hay Biomedical · original classroom simulation · drawn from the supplied case record, not a photograph

JH-26-0831-B · W-05

OHIO CSI FORENSIC DIVISION · SCENE DOCUMENTATION PLATE

UV-01 E2-counter

CASE JH-26-0831-B
D06 · Monday 2026-09-14
ALTERNATE LIGHT SOURCE



WHAT THIS FRAME COVERS

The same counter edge under an alternate light source. The supplied record reports a response here.

THE RECORD, COPIED

Light record: two hits, the counter edge and a floor smear near the head end of the outline. The storeroom and the rest of the floor did not fluoresce. Both hits were photographed under UV with a scale, then under white light, before swabbing.

USE IT IN YOUR INTAKE ROW

Task B1, one intake row. Location: 388 cm from RP1, 142 cm from RP2, 92 cm above the floor. Photo references: copy UV-01 and W-05 exactly as your record writes them. Task B2 asks for a statement that keeps the reported observation separate from an identification. This frame is where the response was reported, and that is all it is. Task C1 is where you correct the claim that the glow identifies blood. Task B3 groups this item by collection priority. Check where E2-counter sits in your case's PRIORITY record before you explain the recorded order.

WHAT THIS PLATE IS NOT

This is a measured drawing made from the written case record, not a photograph and not a photograph of anything that happened. The substrate outline is a drawing convention: the record names the surface and the measurements printed here, not the object's shape. The record gives no extent for the marked area, so its boundary is dashed and nothing on this plate is measurable. Do not report a size. A reported response under an alternate light source is an observation. It does not identify the material, and this plate does not identify it either. Case JH-26-0831-B only. Photo numbers repeat between cases and between the practice model, so a frame number alone never identifies a scene.

John Hay Biomedical · original classroom simulation · drawn from the supplied case record, not a photograph

JH-26-0831-B · UV-01

W-05

E2-counter · 388 cm from RP1 · 142 cm from RP2

WHITE LIGHT | EXTENT NOT RECORDED

The candidate stain on the counter edge, white light, with a scale in frame.

UV-01

E2-counter · 388 cm from RP1 · 142 cm from RP2

ALTERNATE LIGHT | RESPONSE REPORTED

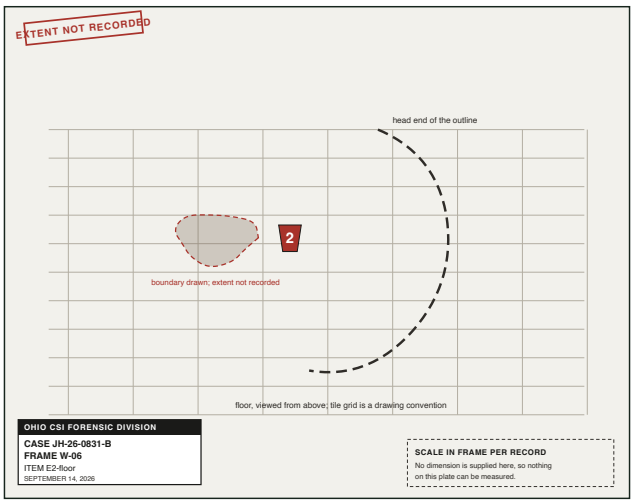
EXTENT NOT RECORDED

The same counter edge under an alternate light source. The supplied record reports a response here.

OHIO CSI FORENSIC DIVISION · SCENE DOCUMENTATION PLATE

W-06 E2-floor

CASE JH-26-0831-B
D06 · Monday 2026-09-14
WHITE LIGHT



WHAT THIS FRAME COVERS

The candidate floor stain near the head end of the outline, white light.

THE RECORD, COPIED

E2-floor (swab of the floor candidate stain near the head end of the outline). 406 cm from RP1, 149 cm from RP2, floor. Photo references W-06, UV-02.

USE IT IN YOUR INTAKE ROW

Task B1, one intake row. Location: 406 cm from RP1, 149 cm from RP2. Photo references: copy W-06 and UV-02 exactly as your record writes them. Task B3 groups this item by collection priority. Check where E2-floor sits in your case's PRIORITY record before you explain the recorded order.

WHAT THIS PLATE IS NOT

This is a measured drawing made from the written case record, not a photograph and not a photograph of anything that happened. The substrate outline is a drawing convention: the record names the surface and the measurements printed here, not the object's shape. The record gives no extent for the marked area, so its boundary is dashed and nothing on this plate is measurable. Do not report a size. Case JH-26-0831-B only. Photo numbers repeat between cases and between the practice model, so a frame number alone never identifies a scene.

John Hay Biomedical · original classroom simulation · drawn from the supplied case record, not a photograph

JH-26-0831-B · W-06

W-06

E2-floor · 406 cm from RP1 · 149 cm from RP2

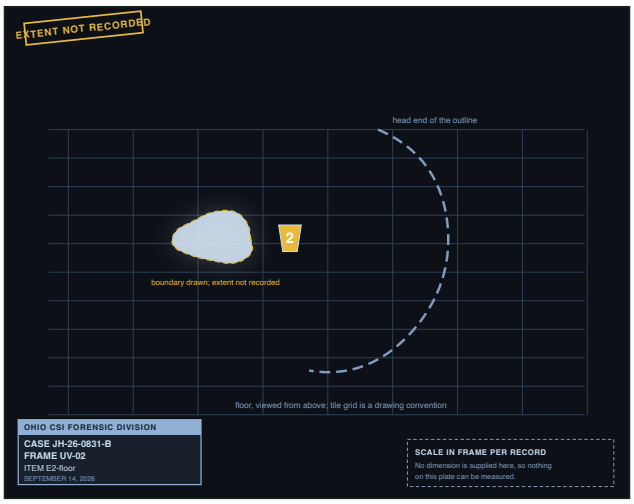
WHITE LIGHT | EXTENT NOT RECORDED

The candidate floor stain near the head end of the outline, white light.

OHIO CSI FORENSIC DIVISION · SCENE DOCUMENTATION PLATE

UV-02 E2-floor

CASE JH-26-0831-B
D06 · Monday 2026-09-14
ALTERNATE LIGHT SOURCE



WHAT THIS FRAME COVERS

The same floor area under an alternate light source. The supplied record reports the second of two responses here.

THE RECORD, COPIED

Light record: two hits, the counter edge and a floor smear near the head end of the outline. The storeroom and the rest of the floor did not fluoresce.

USE IT IN YOUR INTAKE ROW

Task B1, one intake row. Location: 406 cm from RP1, 149 cm from RP2. Photo references: copy UV-02 and W-06 exactly as your record writes them. Task B2 asks for a statement that keeps the reported observation separate from an identification. This frame is where the response was reported, and that is all it is. Task C1 is where you correct the claim that the glow identifies blood. Task B3 groups this item by collection priority. Check where E2-floor sits in your case's PRIORITY record before you explain the recorded order.

WHAT THIS PLATE IS NOT

This is a measured drawing made from the written case record, not a photograph and not a photograph of anything that happened. The substrate outline is a drawing convention: the record names the surface and the measurements printed here, not the object's shape. The record gives no extent for the marked area, so its boundary is dashed and nothing on this plate is measurable. Do not report a size. A reported response under an alternate light source is an observation. It does not identify the material, and this plate does not identify it either. Case JH-26-0831-B only. Photo numbers repeat between cases and between the practice model, so a frame number alone never identifies a scene.

John Hay Biomedical · original classroom simulation · drawn from the supplied case record, not a photograph

JH-26-0831-B · UV-02

UV-02

E2-floor · 406 cm from RP1 · 149 cm from RP2

ALTERNATE LIGHT | RESPONSE REPORTED

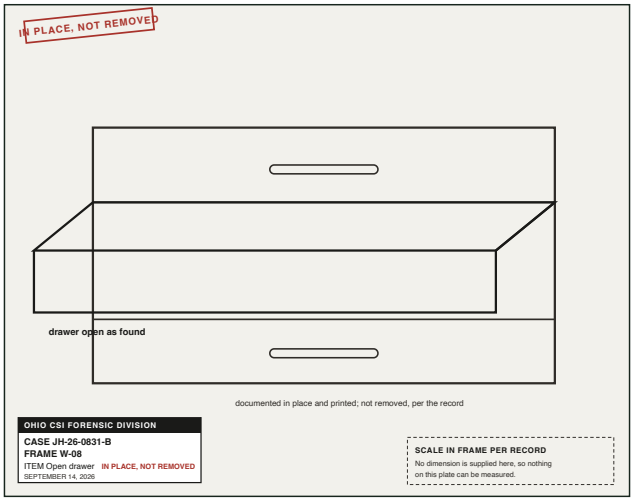
EXTENT NOT RECORDED

The same floor area under an alternate light source. The supplied record reports the second of two responses here.

OHIO CSI FORENSIC DIVISION · SCENE DOCUMENTATION PLATE

W-08 Open drawer

CASE JH-26-0831-B
D06 · Monday 2026-09-14
WHITE LIGHT



documented in place and printed; not removed, per the record

OHIO CSI FORENSIC DIVISION
CASE JH-26-0831-B
FRAME W-08
ITEM Open drawer IN PLACE, NOT REMOVED
SEPTEMBER 14, 2026

SCALE IN FRAME PER RECORD
No dimension is supplied here, so nothing on this plate can be measured.

WHAT THIS FRAME COVERS

The open drawer as found, frame 1 of 2.

THE RECORD, COPIED

Open drawer (photographed and printed, not removed). 371 cm from RP1, 118 cm from RP2. Photo references W-08, W-09 with scale. Documented by Team A at 1:44 PM. Status: no bag. In place, documented, not removed. No collector, transfer or receiver may be invented.

The record cites W-08 and W-09 together for the drawer and does not state what separates the two frames.

USE IT IN YOUR INTAKE ROW

Task B1, one intake row. Location: 371 cm from RP1, 118 cm from RP2. Photo references: copy W-08 exactly as your record writes them. The handling entry for this row is documented in place, not removed. There is no collector, transfer or receiver to copy, and task E3 asks when a custody row opens.

WHAT THIS PLATE IS NOT

This is a measured drawing made from the written case record, not a photograph and not a photograph of anything that happened. The substrate outline is a drawing convention: the record names the surface and the measurements printed here, not the object's shape. The record gives no dimension for this item, so nothing on this plate is measurable and no size belongs in your row. This item was documented in place and not removed. It has no custody transfer and none may be invented. Case JH-26-0831-B only. Photo numbers repeat between cases and between the practice model, so a frame number alone never identifies a scene.

John Hay Biomedical · original classroom simulation · drawn from the supplied case record, not a photograph

JH-26-0831-B · W-08

W-08

Open drawer · 371 cm from RP1 · 118 cm from RP2

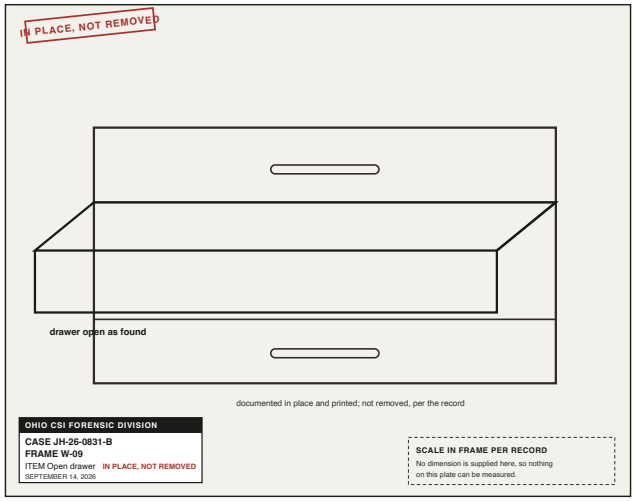
WHITE LIGHT | IN PLACE, NOT REMOVED | EXTENT NOT RECORDED

The open drawer as found, frame 1 of 2.

OHIO CSI FORENSIC DIVISION · SCENE DOCUMENTATION PLATE

W-09 Open drawer

CASE JH-26-0831-B
D06 · Monday 2026-09-14
WHITE LIGHT



documented in place and printed; not removed, per the record

OHIO CSI FORENSIC DIVISION
CASE JH-26-0831-B
FRAME W-09
ITEM Open drawer IN PLACE, NOT REMOVED
SEPTEMBER 14, 2026

SCALE IN FRAME PER RECORD
No dimension is supplied here, so nothing on this plate can be measured.

WHAT THIS FRAME COVERS

The open drawer as found, frame 2 of 2, with a scale in frame.

THE RECORD, COPIED

Open drawer (photographed and printed, not removed). 371 cm from RP1, 118 cm from RP2. Photo references W-08, W-09 with scale. Documented by Team A at 1:44 PM. Status: no bag. In place, documented, not removed. No collector, transfer or receiver may be invented.

The record cites W-08 and W-09 together for the drawer and does not state what separates the two frames.

USE IT IN YOUR INTAKE ROW

Task B1, one intake row. Location: 371 cm from RP1, 118 cm from RP2. Photo references: copy W-09 exactly as your record writes them. The handling entry for this row is documented in place, not removed. There is no collector, transfer or receiver to copy, and task E3 asks when a custody row opens.

WHAT THIS PLATE IS NOT

This is a measured drawing made from the written case record, not a photograph and not a photograph of anything that happened. The substrate outline is a drawing convention: the record names the surface and the measurements printed here, not the object's shape. The record gives no dimension for this item, so nothing on this plate is measurable and no size belongs in your row. This item was documented in place and not removed. It has no custody transfer and none may be invented. Case JH-26-0831-B only. Photo numbers repeat between cases and between the practice model, so a frame number alone never identifies a scene.

John Hay Biomedical · original classroom simulation · drawn from the supplied case record, not a photograph

JH-26-0831-B · W-09

W-09

Open drawer · 371 cm from RP1 · 118 cm from RP2

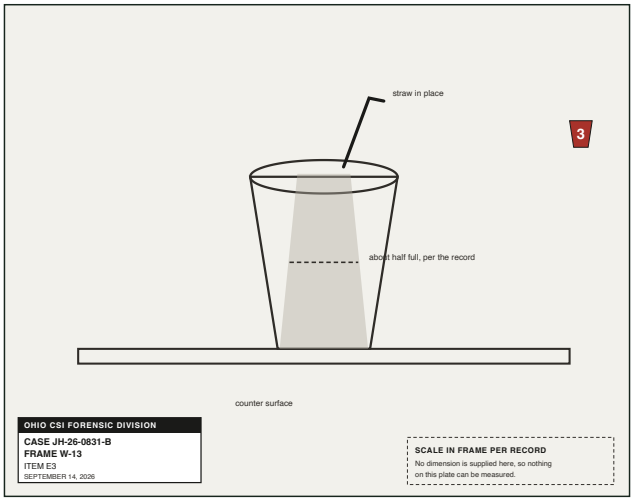
WHITE LIGHT | IN PLACE, NOT REMOVED | EXTENT NOT RECORDED

The open drawer as found, frame 2 of 2, with a scale in frame.

OHIO CSI FORENSIC DIVISION · SCENE DOCUMENTATION PLATE

W-13 E3

CASE JH-26-0831-B
D06 · Monday 2026-09-14
WHITE LIGHT



OHIO CSI FORENSIC DIVISION
CASE JH-26-0831-B
FRAME W-13
ITEM E3
SEPTEMBER 14, 2026

SCALE IN FRAME PER RECORD
No dimension is supplied here, so nothing on this plate can be measured.

WHAT THIS FRAME COVERS

The smoothie cup with its straw on the counter, frame 1 of 2.

THE RECORD, COPIED

E3 (smoothie cup with straw). 366 cm from RP1, 160 cm from RP2, on the counter. Photo references W-13, W-14 with scale; no UV hit. Container state: cup about half full, straw in place.

The record cites W-13 and W-14 together for E3 and does not state what separates the two frames.

USE IT IN YOUR INTAKE ROW

Task B1, one intake row. Location: 366 cm from RP1, 160 cm from RP2. Photo references: copy W-13 exactly as your record writes them. Task B3 groups this item by collection priority. Check where E3 sits in your case's PRIORITY record before you explain the recorded order.

WHAT THIS PLATE IS NOT

This is a measured drawing made from the written case record, not a photograph and not a photograph of anything that happened. The substrate outline is a drawing convention: the record names the surface and the measurements printed here, not the object's shape. The record gives no dimension for this item, so nothing on this plate is measurable and no size belongs in your row. Case JH-26-0831-B only. Photo numbers repeat between cases and between the practice model, so a frame number alone never identifies a scene.

John Hay Biomedical · original classroom simulation · drawn from the supplied case record, not a photograph

JH-26-0831-B · W-13

W-13

E3 · 366 cm from RP1 · 160 cm from RP2

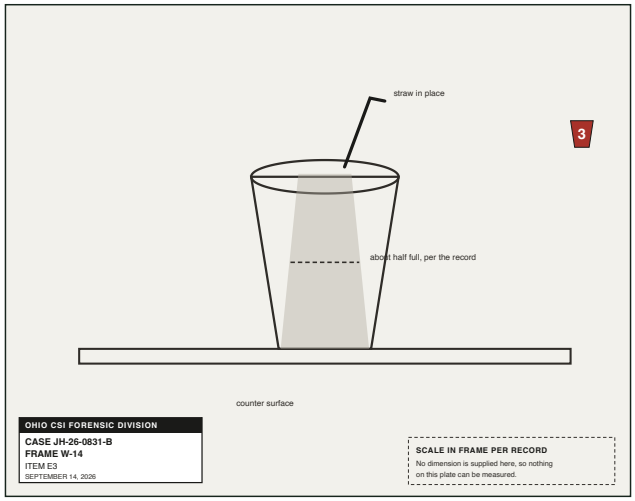
WHITE LIGHT | EXTENT NOT RECORDED

The smoothie cup with its straw on the counter, frame 1 of 2.

OHIO CSI FORENSIC DIVISION · SCENE DOCUMENTATION PLATE

W-14 E3

CASE JH-26-0831-B
D06 · Monday 2026-09-14
WHITE LIGHT



OHIO CSI FORENSIC DIVISION
CASE JH-26-0831-B
FRAME W-14
ITEM E3
SEPTEMBER 14, 2026

SCALE IN FRAME PER RECORD
No dimension is supplied here, so nothing on this plate can be measured.

WHAT THIS FRAME COVERS

The smoothie cup with its straw on the counter, frame 2 of 2, with a scale in frame.

THE RECORD, COPIED

E3 (smoothie cup with straw). 366 cm from RP1, 160 cm from RP2, on the counter. Photo references W-13, W-14 with scale; no UV hit. Container state: cup about half full, straw in place.

The record cites W-13 and W-14 together for E3 and does not state what separates the two frames.

USE IT IN YOUR INTAKE ROW

Task B1, one intake row. Location: 366 cm from RP1, 160 cm from RP2. Photo references: copy W-14 exactly as your record writes them. Task B3 groups this item by collection priority. Check where E3 sits in your case's PRIORITY record before you explain the recorded order.

WHAT THIS PLATE IS NOT

This is a measured drawing made from the written case record, not a photograph and not a photograph of anything that happened. The substrate outline is a drawing convention: the record names the surface and the measurements printed here, not the object's shape. The record gives no dimension for this item, so nothing on this plate is measurable and no size belongs in your row. Case JH-26-0831-B only. Photo numbers repeat between cases and between the practice model, so a frame number alone never identifies a scene.

John Hay Biomedical · original classroom simulation · drawn from the supplied case record, not a photograph

JH-26-0831-B · W-14

W-14

E3 · 366 cm from RP1 · 160 cm from RP2

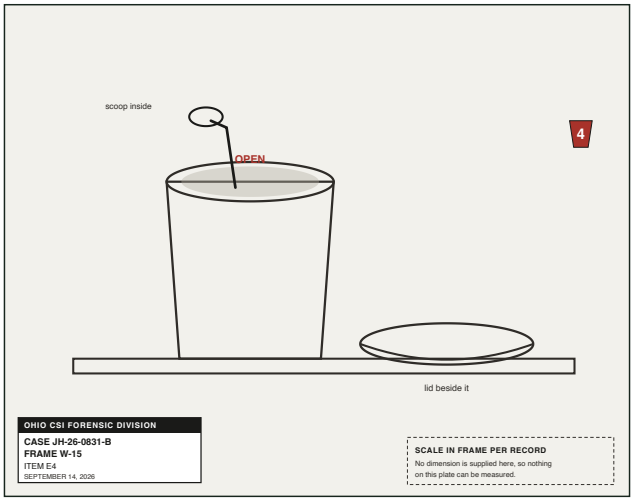
WHITE LIGHT | EXTENT NOT RECORDED

The smoothie cup with its straw on the counter, frame 2 of 2, with a scale in frame.

OHIO CSI FORENSIC DIVISION · SCENE DOCUMENTATION PLATE

W-15 E4

CASE JH-26-0831-B
D06 · Monday 2026-09-14
WHITE LIGHT



WHAT THIS FRAME COVERS

The open protein-base container and its lid on the counter, with a scale in frame.

THE RECORD, COPIED

E4 (open protein-base container and its lid). 352 cm from RP1, 176 cm from RP2, on the counter. Photo references W-15, W-16 with scale; no UV hit. Container state: OPEN, scoop inside, lid beside it. The E8 print-lift row also cites W-15 for the container lid.

Two rows cite W-15: the E4 container row and the E8 print-lift row, whose L-3 and L-4 lifts come from the container lid. The record does not separate them further.

USE IT IN YOUR INTAKE ROW

Task B1, one intake row. Location: 352 cm from RP1, 176 cm from RP2. Photo references: copy W-15 exactly as your record writes them. Task B3 groups this item by collection priority. Check where E4 sits in your case's PRIORITY record before you explain the recorded order.

WHAT THIS PLATE IS NOT

This is a measured drawing made from the written case record, not a photograph and not a photograph of anything that happened. The substrate outline is a drawing convention: the record names the surface and the measurements printed here, not the object's shape. The record gives no dimension for this item, so nothing on this plate is measurable and no size belongs in your row. Case JH-26-0831-B only. Photo numbers repeat between cases and between the practice model, so a frame number alone never identifies a scene.

John Hay Biomedical · original classroom simulation · drawn from the supplied case record, not a photograph

JH-26-0831-B · W-15

W-15

E4 · 352 cm from RP1 · 176 cm from RP2

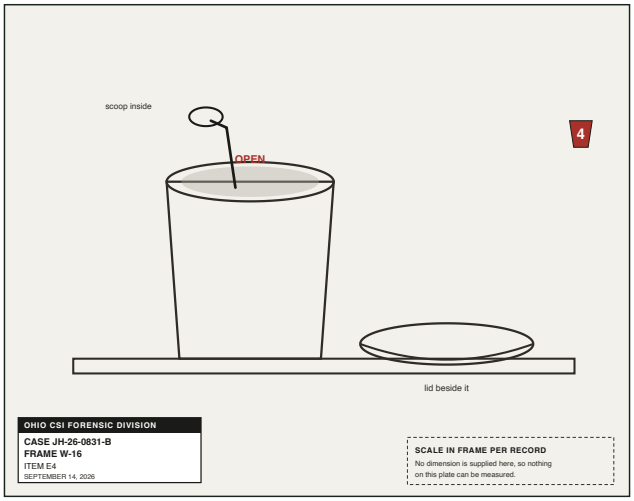
WHITE LIGHT | EXTENT NOT RECORDED

The open protein-base container and its lid on the counter, with a scale in frame.

OHIO CSI FORENSIC DIVISION · SCENE DOCUMENTATION PLATE

W-16 E4

CASE JH-26-0831-B
D06 · Monday 2026-09-14
WHITE LIGHT



WHAT THIS FRAME COVERS

The open protein-base container and its lid, second frame, with a scale in frame.

THE RECORD, COPIED

E4 (open protein-base container and its lid). 352 cm from RP1, 176 cm from RP2, on the counter. Photo references W-15, W-16 with scale; no UV hit. Container state: OPEN, scoop inside, lid beside it.

The record cites W-15 and W-16 together for E4 and does not state what separates the two frames.

USE IT IN YOUR INTAKE ROW

Task B1, one intake row. Location: 352 cm from RP1, 176 cm from RP2. Photo references: copy W-16 exactly as your record writes them. Task B3 groups this item by collection priority. Check where E4 sits in your case's PRIORITY record before you explain the recorded order.

WHAT THIS PLATE IS NOT

This is a measured drawing made from the written case record, not a photograph and not a photograph of anything that happened. The substrate outline is a drawing convention: the record names the surface and the measurements printed here, not the object's shape. The record gives no dimension for this item, so nothing on this plate is measurable and no size belongs in your row. Case JH-26-0831-B only. Photo numbers repeat between cases and between the practice model, so a frame number alone never identifies a scene.

John Hay Biomedical · original classroom simulation · drawn from the supplied case record, not a photograph

JH-26-0831-B · W-16

W-16

E4 · 352 cm from RP1 · 176 cm from RP2

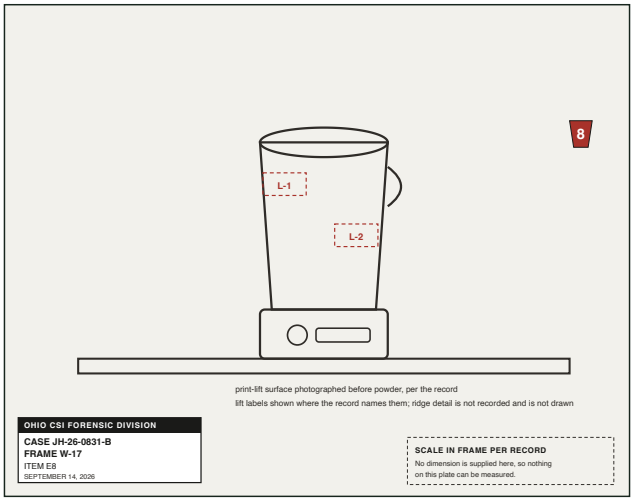
WHITE LIGHT | EXTENT NOT RECORDED

The open protein-base container and its lid, second frame, with a scale in frame.

OHIO CSI FORENSIC DIVISION · SCENE DOCUMENTATION PLATE

W-17 E8

CASE JH-26-0831-B
D06 · Monday 2026-09-14
WHITE LIGHT



print-lift surface photographed before powder, per the record
lift labels shown where the record names them; ridge detail is not recorded and is not drawn

OHIO CSI FORENSIC DIVISION
CASE JH-26-0831-B
FRAME W-17
ITEM E8
SEPTEMBER 14, 2026

SCALE IN FRAME PER RECORD
No dimension is supplied here, so nothing on this plate can be measured.

WHAT THIS FRAME COVERS

The blender print-lift surface before powder, with a scale in frame.

THE RECORD, COPIED

E8 (print lifts: blender L-1, L-2; container lid L-3, L-4). Blender: 360 cm from RP1, 168 cm from RP2. Lid: with E4. Photo references W-15, W-17 with scale before powder; no UV.

USE IT IN YOUR INTAKE ROW

Task B1, one intake row. Location: 360 cm from RP1, 168 cm from RP2. Photo references: copy W-17 exactly as your record writes them. Task B3 groups this item by collection priority. Check where E8 sits in your case's PRIORITY record before you explain the recorded order.

WHAT THIS PLATE IS NOT

This is a measured drawing made from the written case record, not a photograph and not a photograph of anything that happened. The substrate outline is a drawing convention: the record names the surface and the measurements printed here, not the object's shape. The record gives no dimension for this item, so nothing on this plate is measurable and no size belongs in your row. Case JH-26-0831-B only. Photo numbers repeat between cases and between the practice model, so a frame number alone never identifies a scene.

John Hay Biomedical · original classroom simulation · drawn from the supplied case record, not a photograph

JH-26-0831-B · W-17

W-17

E8 · 360 cm from RP1 · 168 cm from RP2

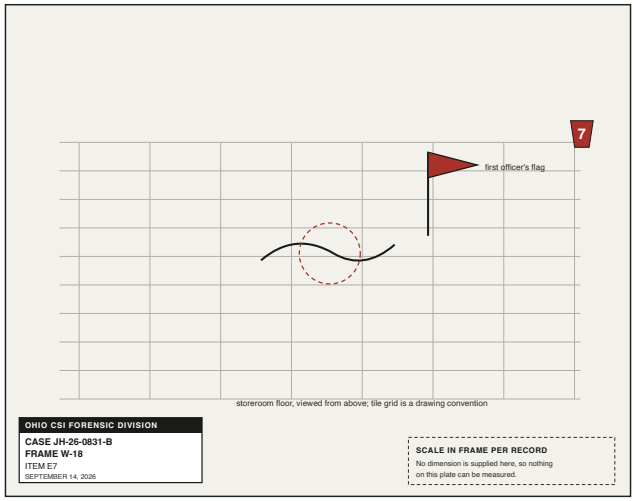
WHITE LIGHT | EXTENT NOT RECORDED

The blender print-lift surface before powder, with a scale in frame.

OHIO CSI FORENSIC DIVISION · SCENE DOCUMENTATION PLATE

W-18 E7

CASE JH-26-0831-B
D06 · Monday 2026-09-14
WHITE LIGHT



storeroom floor, viewed from above; tile grid is a drawing convention

OHIO CSI FORENSIC DIVISION
CASE JH-26-0831-B
FRAME W-18
ITEM E7
SEPTEMBER 14, 2026

SCALE IN FRAME PER RECORD
No dimension is supplied here, so nothing on this plate can be measured.

WHAT THIS FRAME COVERS

The single hair on the storeroom floor at the first officer's flag, with a scale in frame.

THE RECORD, COPIED

E7 (single hair, storeroom floor, at the first officer's flag). Storeroom floor: 598 cm from RP1, 228 cm from RP2. Photo references W-18 with scale, UV-03 (storeroom sweep, no other hits).

USE IT IN YOUR INTAKE ROW

Task B1, one intake row. Location: 598 cm from RP1, 228 cm from RP2. Photo references: copy W-18 and UV-03 exactly as your record writes them. Task B3 groups this item by collection priority. Check where E7 sits in your case's PRIORITY record before you explain the recorded order.

WHAT THIS PLATE IS NOT

This is a measured drawing made from the written case record, not a photograph and not a photograph of anything that happened. The substrate outline is a drawing convention: the record names the surface and the measurements printed here, not the object's shape. The record gives no dimension for this item, so nothing on this plate is measurable and no size belongs in your row. Case JH-26-0831-B only. Photo numbers repeat between cases and between the practice model, so a frame number alone never identifies a scene.

John Hay Biomedical · original classroom simulation · drawn from the supplied case record, not a photograph

JH-26-0831-B · W-18

W-18

E7 · 598 cm from RP1 · 228 cm from RP2

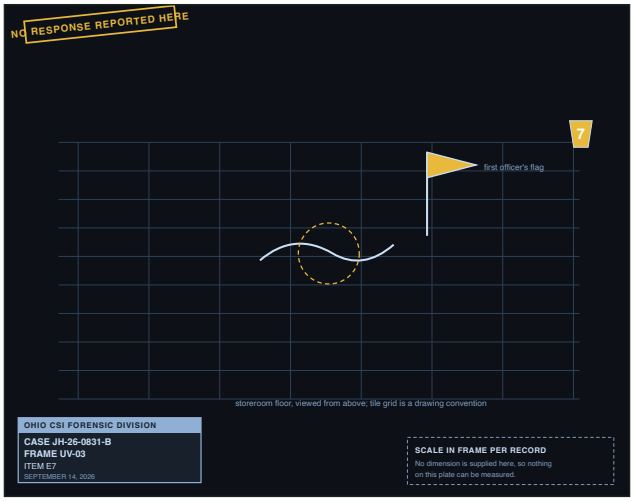
WHITE LIGHT | EXTENT NOT RECORDED

The single hair on the storeroom floor at the first officer's flag, with a scale in frame.

OHIO CSI FORENSIC DIVISION · SCENE DOCUMENTATION PLATE

UV-03 E7

CASE JH-26-0831-B
D06 · Monday 2026-09-14
ALTERNATE LIGHT SOURCE



WHAT THIS FRAME COVERS

The storeroom sweep under an alternate light source. The record reports no response in the storeroom.

THE RECORD, COPIED

UV-03 (storeroom sweep, no other hits). The light record reports that the storeroom and the rest of the floor did not fluoresce.

USE IT IN YOUR INTAKE ROW

Task B1, one intake row. Location: 598 cm from RP1, 228 cm from RP2. Photo references: copy UV-03 and W-18 exactly as your record writes them. The record reports that nothing responded here. Copy that status. It is not the same as no photograph supplied, and not the same as nothing being present. Task B3 groups this item by collection priority. Check where E7 sits in your case's PRIORITY record before you explain the recorded order.

WHAT THIS PLATE IS NOT

This is a measured drawing made from the written case record, not a photograph and not a photograph of anything that happened. The substrate outline is a drawing convention: the record names the surface and the measurements printed here, not the object's shape. The record gives no dimension for this item, so nothing on this plate is measurable and no size belongs in your row. No response reported is not the same as nothing present. Copy the status the record gives. Case JH-26-0831-B only. Photo numbers repeat between cases and between the practice model, so a frame number alone never identifies a scene.

John Hay Biomedical · original classroom simulation · drawn from the supplied case record, not a photograph

JH-26-0831-B · UV-03

UV-03

E7 · 598 cm from RP1 · 228 cm from RP2

ALTERNATE LIGHT

NO RESPONSE REPORTED

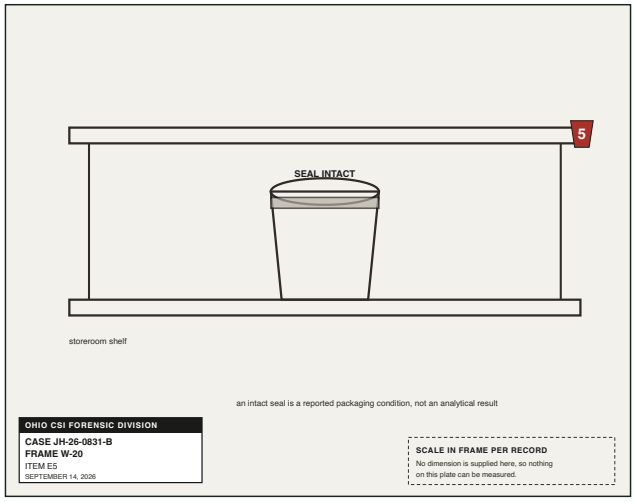
EXTENT NOT RECORDED

The storeroom sweep under an alternate light source. The record reports no response in the storeroom.

OHIO CSI FORENSIC DIVISION · SCENE DOCUMENTATION PLATE

W-20 E5

CASE JH-26-0831-B
D06 · Monday 2026-09-14
WHITE LIGHT



WHAT THIS FRAME COVERS

The sealed comparison container on the storeroom shelf, with a scale in frame.

THE RECORD, COPIED

E5 (sealed identical protein-base container, comparison item). Storeroom shelf: 610 cm from RP1, 240 cm from RP2. Photo reference W-20 with scale; no UV. Container state: the same product and size as E4, seal intact. E5 is the sealed comparison item. Its intact seal is a reported packaging condition, not an analytical result.

USE IT IN YOUR INTAKE ROW

Task B1, one intake row. Location: 610 cm from RP1, 240 cm from RP2. Photo references: copy W-20 exactly as your record writes them. Task B3 groups this item by collection priority. Check where E5 sits in your case's PRIORITY record before you explain the recorded order.

WHAT THIS PLATE IS NOT

This is a measured drawing made from the written case record, not a photograph and not a photograph of anything that happened. The substrate outline is a drawing convention: the record names the surface and the measurements printed here, not the object's shape. The record gives no dimension for this item, so nothing on this plate is measurable and no size belongs in your row. Case JH-26-0831-B only. Photo numbers repeat between cases and between the practice model, so a frame number alone never identifies a scene.

John Hay Biomedical · original classroom simulation · drawn from the supplied case record, not a photograph

JH-26-0831-B · W-20

W-20

E5 · 610 cm from RP1 · 240 cm from RP2

WHITE LIGHT

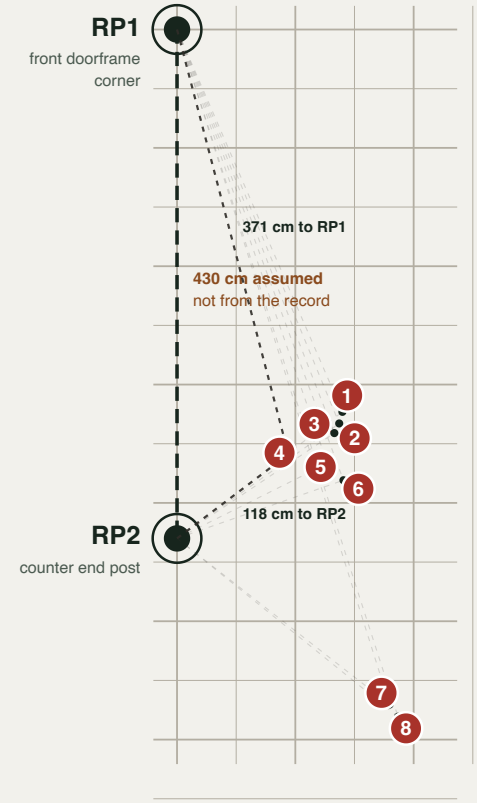
EXTENT NOT RECORDED

The sealed comparison container on the storeroom shelf, with a scale in frame.

The measured scene sketch

Where every item in this folder sits, plotted from the two distances your record gives. Open it beside your intake sheet.

PLAN RESPAWN



KEY

1. **E4**
   352 cm from RP1 · 176 cm from RP2
   frames W-15
2. **E8**
   360 cm from RP1 · 168 cm from RP2
   frames W-17
3. **E3**
   366 cm from RP1 · 160 cm from RP2
   frames W-13
4. **Open drawer**
   371 cm from RP1 · 118 cm from RP2
   frames W-08
5. **E2-counter**
   388 cm from RP1 · 142 cm from RP2
   frames W-05 and UV-01
6. **E2-floor**
   406 cm from RP1 · 149 cm from RP2
   frames W-06 and UV-02
7. **E7**
   598 cm from RP1 · 228 cm from RP2
   frames W-18 and UV-03
8. **E5**
   610 cm from RP1 · 240 cm from RP2
   frames W-20

HOW TO READ THIS SKETCH

Each item was measured twice, once to RP1 and once to RP2. The two dashed lines running to a point are those two measurements, drawn solid on one item as a worked example. A small black dot is the measured position itself. Where items sat too close for their numbers to be read, the numbered badge is pushed aside and a thin line runs back to the dot, so the badge moves and the measurement does not. Every number in the key is the number in the case record, unchanged.

WHAT IS DRAWING AND NOT RECORD

No case record gives the distance between RP1 and RP2. Without it, two distances cannot be plotted at all, so this sketch assumes 430 cm and prints the assumption. Every distance to RP1 and to RP2 matches the record exactly; the spacing between the two reference points does not come from the record. No wall, door or room dimension is supplied anywhere, so none is drawn. This is a measured point sketch, not a floor plan, and it is not to be used to argue about what happened.

Frame to row, at a glance

Use this to check you put the right frame number in the right intake row.

Frame	Item	Location as recorded	What the record says about the frame
W-05	E2-counter	388 cm from RP1, 142 cm from RP2, 92 cm above the floor	no extent given
UV-01	E2-counter	388 cm from RP1, 142 cm from RP2, 92 cm above the floor	a response is reported here; no extent given
W-06	E2-floor	406 cm from RP1, 149 cm from RP2	no extent given
UV-02	E2-floor	406 cm from RP1, 149 cm from RP2	a response is reported here; no extent given
W-08	Open drawer	371 cm from RP1, 118 cm from RP2	no extent given
W-09	Open drawer	371 cm from RP1, 118 cm from RP2	no extent given
W-13	E3	366 cm from RP1, 160 cm from RP2	no extent given
W-14	E3	366 cm from RP1, 160 cm from RP2	no extent given
W-15	E4	352 cm from RP1, 176 cm from RP2	no extent given
W-16	E4	352 cm from RP1, 176 cm from RP2	no extent given
W-17	E8	360 cm from RP1, 168 cm from RP2	no extent given
W-18	E7	598 cm from RP1, 228 cm from RP2	no extent given
UV-03	E7	598 cm from RP1, 228 cm from RP2	no response reported here; no extent given
W-20	E5	610 cm from RP1, 240 cm from RP2	no extent given

Where this folder sits

All days for this case The whole evidence portfolio Today's lesson page

JH-26-0831-B · D06 · John Hay Biomedical · PBS Unit 1 evidence portfolio. Every plate is drawn from the supplied classroom simulation record. None is a photograph, and none of it is a real case.

Process the Scene: review the intake records

Student handout and one Parts A–E response sheet. Record review only.

One intake sheet

One individual D06 Daily Evidence Sheet, Parts A–E, with all required intake rows in the same sheet or PDF.

Hand in the paper sheet or submit one PDF of the same completed sheet to your section's Schoology assignment by September 14 at 11:59 PM. Include continuation rows in that same submission. Submit once.

Use the supplied classroom simulation records for your case. If teacher-approved classroom records are available, you may use them for the same sheet. State your source. Do not claim you performed the events described.

Your Case B D06 Schoology assignment · Daily directions · Case B evidence folder

The frames your records name

Every photo reference in these records, W-05, UV-01 and the rest, names a frame. Your evidence folder holds one measured plate for each of them, drawn from the written record, plus a measured sketch of where each item sat. A plate is not a photograph and it identifies nothing. Where the record withheld something, the plate shows it missing instead of filling it in.

Five steps

1. Open your case's D06 sheet, choose the permitted record source and read R1–R6. Complete Part A.
2. Follow the separate MODEL-1 row. Use your case's RECORDS and STATUS to complete every Part B intake row.
3. Finish B2/B3 from the same sources and the four PRIORITY groups. Keep observations separate from identification and record missing fields honestly.
4. Write the approved four-to-six-sentence Part C correction. Finish Parts D and E; check your source labels and required fields.
5. Submit the same completed sheet once, on paper or as one PDF to your exact section assignment. Keep your notebook work separate.

No separate microscopy drawing, new scene photograph, scale sketch, group document, extra CER or exit ticket is required. Notebook work stays in the notebook.

Today is a record review. Do not collect samples, handle a stain, use UV equipment or perform chemical tests for this assignment. Any practical work requires separate teacher direction and approved safety preparation.

R1 / R2. Reading

R1. What should an intake record tell the next reader?

Friday's case work practiced keeping a source beside each statement. Today, use that rule to organize the supplied records. You are reviewing a classroom simulation. You are not collecting samples or testing a stain.

An intake record lists an item, its location, its photo references, and who handled it. An E-number is the evidence number used to track an item. Keep the number supplied. If none is assigned, say so. Do not make one up.

A reference point, or RP, is a named place used to describe a location. Keep both distances and their units. Chain of custody is the record of who handled an item and when. In today's collected-item records, the custody row starts when the item is bagged. An item left in place needs its true status, not a made-up transfer.

R2. A light response is an observation

Latent means not readily visible under the conditions being used. An alternate light source uses selected light to help make some material easier to see. Fluorescence means a material absorbs light and gives off light. The supplied classroom records describe a fluorescent visual model.

Luminol is different. It produces light through a chemical reaction. The classroom model does not reproduce that test or identify a substance. It helps us practice describing a response without naming its cause. [Sources S1 and S2]

R3 / R4. Reading

R3. What can a first check establish?

A presumptive test is an initial check that may suggest a substance is present but does not identify it conclusively. Some chemical screens can respond to bleach or copper. These are examples of interference, not claims about the contents of our case items. Repeating initial screens does not itself establish identification. [Sources S3 and S4]

A visible response can be misleading if another material caused it. A missing response can also mislead if the material was not detected under the viewing conditions. Write what was reported. Do not turn “no response observed” into “nothing was present.” [Sources S1, S3 and S4]

R4. Keep the missing information visible

“No UV photograph supplied” describes a missing image reference. “No UV hit” describes a reported observation. They are different. Copy the status the record actually gives. If a record says only “no UV,” copy those words and add “meaning not specified.” If UV is not mentioned, write “UV status not supplied.” Do not change either into “no UV hit.” You do not need to open an unavailable photograph for this record exercise.

For a reported glowing area, write that the supplied record reports fluorescence, then name the recorded location and photo reference. The material remains unconfirmed. A stronger identification needs a method appropriate for the material and its actual result. You do not need to name or perform a test. [Sources S3 and S4]

R5 / R6 / R7. Reading

R5. Which records should be handled first?

Fragile means easily damaged or lost. Time-sensitive means delay could change the item. The supplied case record groups the items into four collection priorities. Use those groups to explain the recorded order. The groups are not a replacement for the full intake list.

R6. Use the same rule in biomedical work

In laboratory work, a comparison is useful only when its role is clear. A comparison item is an item used to compare with another. A seal describes packaging; it does not establish the contents as clean. A control is used to check how a test or comparison performs. [Source S5]

The strongest statement today preserves what the source reports and what remains unknown. An observation by itself does not identify a person, substance or cause.

R7. Use it now

Follow MODEL-1 before starting Part B. Notice how its source, location, photo references and custody status stay together. Then use your own case's records for your sheet. Keep that sheet for Tuesday's trace-comparison work.

Plain-English terms and preparation

Intake record
A list of an item's identifier, location, photo references and handling information.

Reference point (RP)
A named place used to describe a location. Keep both distances and units.

Custody row
The handling entry. In these collected-item records it starts at bagging; an in-place item has no invented transfer.

Alternate light source
Selected light used to help make some material easier to see.

Presumptive test
An initial check that may suggest a substance is present but does not identify it conclusively.

Time-sensitive
Delay could change the item.

W and UV
W labels a white-light photograph; UV labels an ultraviolet-light photograph. A reference names a frame. Your evidence folder supplies a measured plate drawn from each frame's record; the plate is not the photograph.

E-number
The evidence number used to track an item. Retain an unassigned status when no number is supplied.

Chain of custody
The record of who handled an item and when.

Latent
Not readily visible under the conditions being used.

Fluorescence
A material absorbs light and gives off light. The response alone does not identify it.

Fragile
Easily damaged or lost.

Comparison item
An item used to compare with another. A seal describes packaging, not a clean analytical result.

Claim
A statement about what happened or what something is.

Three knowledge checks

1. Name today's purpose: preserve the source, location, photo status and handling information in one intake sheet.
2. State the boundary: read the records only. Practical work requires separate teacher direction and approved safety preparation.
3. Prepare the intake-row headings before copying any record. This knowledge check does not give permission to handle materials.

MODEL-1. Separate supplied practice

This is not Case A or Case B. These values come from an existing classroom practice record, not actions performed by you.

The source describes a stairwell landing and third step tread with a patch about 6 cm across that reportedly fluoresced. No material identification is supplied.

Identifier	MODEL-1, E2-step3
RP1	fire-door frame at the landing
RP2	handrail's bottom post
Location	138 cm from RP1, 96 cm from RP2, on the third step tread
Photo references	W-04 and UV-01, both with scale. Earlier white-light references: W-01, W-02, W-03
Collected by	evidence officer
Recorded time	3:14 PM
Received by	intake
Status	custody row opened at bagging

A four-sentence practice correction

The MODEL-1 record reports fluorescence on the third step. That light response does not identify the material. The intake entry should preserve the reported location and photo references without changing the item description to blood. An identification claim would need a method appropriate for the material and its actual result, which this practice record does not supply.

Use the shape to understand Part C. Write your own case response; never copy MODEL-1 values into the class-case record.

F1. The record workflow



F1. A record-review workflow. Teaching illustration, not a scene photograph or test result.

Start with the supplied source. Keep the identifier, location, photo references and handling status together. State limits or missing information. Finish the single Parts A–E intake sheet.

One support level, if helpful

Check one row: use R1 and MODEL-1, then complete the next intake row.

Explain your choice: use PRIORITY to explain the first and last groups in B3.

Check a limit: revise an unsupported claim in your existing Part C.

Optional guided notes can help you organize your thinking. They are not another submission. Use one support level, not all three.

Case B RECORDS. Rows 1–3

Supplied classroom simulation records, not observations made by the student

RP1: front doorframe corner. RP2: counter end post.

B-R1. E2-counter (swab of the counter-edge candidate stain)

Location: 388 cm from RP1, 142 cm from RP2, on the counter edge 92 cm above the floor

Photo/status: W-05 (white light with scale), UV-01

Recorded handling: Collected by Team C evidence officer; 1:48 PM; received by Team A intake.

B-R2. E2-floor (swab of the floor candidate stain near the head end of the outline)

Location: 406 cm from RP1, 149 cm from RP2, floor

Photo/status: W-06, UV-02

Recorded handling: Collected by Team C evidence officer; 1:51 PM; received by Team A intake.

B-R3. E3 (smoothie cup with straw)

Location: 366 cm from RP1, 160 cm from RP2, on the counter

Photo/status: W-13, W-14 with scale; no UV hit

Recorded handling: Collected by Team D evidence officer; 2:04 PM; received by Team A intake.

Case B RECORDS. Rows 4–6

Supplied classroom simulation records, not observations made by the student

RP1: front doorframe corner. RP2: counter end post.

B-R4. E4 (open protein-base container and its lid)

Location: 352 cm from RP1, 176 cm from RP2, on the counter

Photo/status: W-15, W-16 with scale; no UV hit

Recorded handling: Collected by Team D evidence officer; 2:06 PM; received by Team A intake.

B-R5. E5 (sealed identical protein-base container, comparison item)

Location: Storeroom shelf: 610 cm from RP1, 240 cm from RP2

Photo/status: W-20 with scale; no UV

Recorded handling: Collected by Team D evidence officer; 2:09 PM; received by Team A intake.

B-R6. E7 (single hair, storeroom floor, at the first officer's flag)

Location: Storeroom floor: 598 cm from RP1, 228 cm from RP2

Photo/status: W-18 with scale, UV-03 (storeroom sweep, no other hits)

Recorded handling: Collected by Team B evidence officer; 1:56 PM; received by Team A intake.

Case B RECORDS. Rows 7–8

Supplied classroom simulation records, not observations made by the student

RP1: front doorframe corner. RP2: counter end post.

B-R7. E8 (print lifts: blender L-1, L-2; container lid L-3, L-4)

Location: Blender: 360 cm from RP1, 168 cm from RP2. Lid: with E4

Photo/status: W-15, W-17 with scale before powder; no UV

Recorded handling: Collected by Team B evidence officer; 2:01 PM; received by Team A intake.

B-R8. Open drawer (photographed and printed, not removed)

Location: 371 cm from RP1, 118 cm from RP2

Photo/status: W-08, W-09 with scale

Recorded handling: Documented by Team A; 1:44 PM; no bag; documented in place, not removed. No transfer or receiver.

Case B STATUS and PRIORITY

Reported item conditions

Cup about half full, straw in place. Protein-base container OPEN, scoop inside, lid beside it. The sealed container on the storeroom shelf is the same product and size, seal intact.

E5 is the sealed comparison item. Its intact seal is a reported packaging condition, not an analytical result. No analytical result for E5 is supplied here.

The storeroom opens by an interior door directly onto the counter prep area and by a second interior door to the back office. Someone in the storeroom can reach the counter and the office without crossing the public floor.

Reported light response

The supplied classroom simulation record reports: Two hits: the counter edge and a floor smear near the head end of the outline. The storeroom and the rest of the floor did not fluoresce. Both hits were photographed under UV with a scale, then under white light, before swabbing.

This reports what was observed under those conditions. It does not establish that no material was present elsewhere.

Handling record

Every bag has a row; every row has a released-by and a received-by. Seven bags, seven rows, plus the drawer documented in place.

Four recorded priority groups

1. E2 stain swabs: a floor stain can be walked on or smeared; fragile and time-sensitive.
2. E7 storeroom hair: a single hair can lift off a floor with one gust or one footstep.
3. E8 print lifts: powder and tape work has to happen before anyone touches the blender or lid.
4. E3, E4, E5 cup and containers: durable, not going anywhere.

The four priority groups do not replace the complete intake inventory.

Your D06 Parts A–E response sheet

Case A or B and period

Investigator code, not name

Record source: supplied classroom simulation or teacher-approved classroom records

Date: September 14, 2026

Part A. Read before responding

PBS-U1-D06-A1

Name two kinds of material that the reading says can cause a chemical screening response. Copy the first three words of the sentence you used.

PBS-U1-D06-A2

What does latent mean, and how can an alternate light source help an observer? Answer from R2.

B1. Intake continuation 1

Complete one intake row for every item in your permitted record set. Keep its item identifier, location with units, photo references or stated photo status, and handling information. Record an in-place item as in place. Never invent a missing field.

Same product: keep every continuation page in this one sheet or PDF. If using teacher-approved actual records, copy this page as needed and retain your source label.

Intake row 1 of 8

Item / identifier

Location, both reference distances and units

Photo references and true photo/status information

Recorded handler

Recorded time

Receiver or in-place status

Intake row 2 of 8

Item / identifier

Location, both reference distances and units

Photo references and true photo/status information

Recorded handler

Recorded time

Receiver or in-place status

B1. Intake continuation 2

Complete one intake row for every item in your permitted record set. Keep its item identifier, location with units, photo references or stated photo status, and handling information. Record an in-place item as in place. Never invent a missing field.

Same product: keep every continuation page in this one sheet or PDF. If using teacher-approved actual records, copy this page as needed and retain your source label.

Intake row 3 of 8

Item / identifier

Location, both reference distances and units

Photo references and true photo/status information

Recorded handler

Recorded time

Receiver or in-place status

Intake row 4 of 8

Item / identifier

Location, both reference distances and units

Photo references and true photo/status information

Recorded handler

Recorded time

Receiver or in-place status

B1. Intake continuation 3

Complete one intake row for every item in your permitted record set. Keep its item identifier, location with units, photo references or stated photo status, and handling information. Record an in-place item as in place. Never invent a missing field.

Same product: keep every continuation page in this one sheet or PDF. If using teacher-approved actual records, copy this page as needed and retain your source label.

Intake row 5 of 8

Item / identifier

Location, both reference distances and units

Photo references and true photo/status information

Recorded handler

Recorded time

Receiver or in-place status

Intake row 6 of 8

Item / identifier

Location, both reference distances and units

Photo references and true photo/status information

Recorded handler

Recorded time

Receiver or in-place status

B1. Intake continuation 4

Complete one intake row for every item in your permitted record set. Keep its item identifier, location with units, photo references or stated photo status, and handling information. Record an in-place item as in place. Never invent a missing field.

Same product: keep every continuation page in this one sheet or PDF. If using teacher-approved actual records, copy this page as needed and retain your source label.

Intake row 7 of 8

Item / identifier

Location, both reference distances and units

Photo references and true photo/status information

Recorded handler

Recorded time

Receiver or in-place status

Intake row 8 of 8

Item / identifier

Location, both reference distances and units

Photo references and true photo/status information

Recorded handler

Recorded time

Receiver or in-place status

Part B. Observation and priority

PBS-U1-D06-B2

The supplied record reports a glowing area. Write an intake statement that keeps the reported observation separate from an identification. Use your case's recorded location and photo reference.

PBS-U1-D06-B3

Use the four priority groups in your case's PRIORITY record. List their recorded order and explain the reason for the first and last groups. The record also explains which group would wait if there were time for only three.

Part C. Your own-case correction

PBS-U1-D06-C1

Write four to six sentences correcting the claim that the glow identifies blood. Include what the source record reports, what that observation cannot establish, the wording that belongs in the intake log, and what remains unknown. Explain that a stronger identification needs an identification method appropriate for the material and its actual result. You do not need to name or perform a test.

Use R2–R4 and MODEL-1's separate four-sentence shape. Keep your own case's source, reported observation, identification limit and missing evidence explicit. Do not name or perform a new test.

Parts D and E. Complete the same sheet

PBS-U1-D06-D1

Use latent and presumptive test correctly in one or two sentences about the supplied classroom work. Use the terms in context, rather than listing definitions.

PBS-U1-D06-E1

A supplied record reports a glow under the lamp. Write an honest intake statement without identifying the material.

PBS-U1-D06-E2

Name two ways an initial check can mislead. Use the explanation in R3.

PBS-U1-D06-E3

When does the custody row open for a collected item in today's records?

Part E is the existing self-check section of this sheet. Do not upload another exit ticket.

Handoff, PLTW and sources

Hand in the paper sheet or submit one PDF of the same completed sheet to your section's Schoology assignment by September 14 at 11:59 PM. Include continuation rows in that same submission. Submit once.

Keep your intake sheet for Tuesday's trace-comparison work. It records the source and limits of the information you will use.

Related PLTW reference: Principles of Biomedical Science, Activity 1.1.1 A Sketchy Scene. This John Hay record exercise practices connected documentation skills. It does not by itself complete the official activity.

Complete the assigned D06 sheet here. Record official PLTW completion only when the teacher assigns and verifies the actual activity requirements.

Case B D06 assignment · Official PLTW section hub

Sources and optional background

The required reading above supplies the explanations. These links are optional background.

- S1. FTCoE/NIJ, Landscape Study of Alternate Light Sources, 2018
- S2. Cassidy and colleagues, NIJ research record, 2017
- S3. NIJ, Locating Evidence, archived training
- S4. NIJ, Screening Tests, archived training
- S5. NIST OSAC Lexicon, Control

Today's records cannot identify a substance, person, cause of death or responsible suspect. They describe reported observations and handling. A copied photo reference does not mean you viewed its photograph; the evidence folder supplies a measured plate drawn from that frame's record, and a plate identifies nothing either.

ASSIGNMENT 17 OF 29 Tue, Sep 15 about 80 minutes

The Traces We Leave

Today we need to accomplish today you will read trace records, compare the information that is available and explain where a conclusion must stop.

Our goal is making only the claims your evidence supports.

You have to turn in D07 trace comparison sheet, Parts A–E.

Schoology assignment: Wk4 D07 · The Traces We Leave (PLTW 1.1.3)

1 READ

Your materials for this assignment start on the very next page, in this order: **student handout and response sheet (write on this)** (21 pages). Read the briefing first. Write your answers on the sheet. Everything you need for this assignment is in those pages.

2 DO

Start in Part 1. Read R1 to R4, the four readings about hair and about what any comparison needs, then answer Part A on your sheet. A1 asks about R3 and A2 asks about R4. With each answer, copy the first three words of the reading sentence you used, so a reader can find it.

3 DO

Now read R5 and R6, the two readings about fingerprints, and then the worked example in Part 3. MODEL-1 shows the whole process on a practice print that belongs to neither case: features first, then the 12-match rule, then the percentage, then the limit. Then go to Part 4 and complete Part B with your own case's records: one row for each hair record, giving its reported features and naming the missing known-reference input, and one row for each of the four print summaries, applying the 12-match rule from R5 to the supplied counts. Finish Part B with B2, one limit you can explain well, and B3, a separate calculation that uses its own numbers, not the model's.

4 WRITE

Write Part C from the hypothetical facts in the prompt and nothing else. Give three things: the strongest statement those facts support, one stronger statement you may not make and why, and one extra kind of evidence that would be needed and what it would have to show. Do not invent a result, and do not bring in your case's records.

5 WRITE

Write Part D: one or two sentences about today's records that use all four terms correctly, class evidence, individual evidence, morphology and minutiae. The definitions are in Part 1. A list of definitions on its own does not count.

6 WRITE

Finish with Part E, then hand in. Answer E1, E2 and E3 from memory first, then check each one against the reading and fix it if you need to. Before you turn in, check that every row carries its evidence number, your case label and its limit. Turn in the one sheet and nothing else. Guided notes and extra help are optional support, not another submission. You may discuss your thinking with a partner, but write your own responses.

7 TURN IN

Now we turn it in. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Principles of Biomedical Technology, and open the assignment named **Wk4 D07 · The Traces We Leave (PLTW 1.1.3)**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

The Traces We Leave: compare records and state the limit

RESPAWN · Period 6A-7B · Supplied classroom records

Read me first: how this handout is organized

One individual D07 trace comparison sheet, Parts A–E.

1. **Part 1. Background and definitions.** Six short readings and the terms. Read R1 to R4 before you write, and R5 to R6 with the worked example.
2. **Part 2. Directions in plain English.** Five steps, one per part of the sheet, and the 80-minute plan.
3. **Part 3. Worked example.** The F1 workflow and MODEL-1, a finished comparison on a practice print that belongs to neither case.
4. **Part 4. Your work.** Your Case B records, then the response sheet for Parts A to E.

Start with Part 1, then follow the steps in Part 2. Everything you write goes on the one response sheet in Part 4.

Use the supplied classroom records for your case. This route is available to everyone. These are not observations you made. You do not need to locate a missing image or sample.

Your Case B D07 assignment · Daily directions on the portal

Part 1. Reading R1 and R2

Everything on the sheet comes from these six readings. Part A quotes R3 and R4. Part B uses all six, with R2, R5 and R6 doing most of the work. Part C uses R3 and R4. Part D uses R1, R3 and R5. Part E sends you back to R1, R3 and R4.

R1. Why comparisons need two sides

A questioned sample has an unknown source. A known sample, also called a reference or elimination sample, has a stated source and is used for comparison. A person's name by itself is not a reference sample. You need comparable features from both sides before deciding whether they are consistent.

Morphology means visible shape and structure. Hair descriptions may include color, thickness, curl, the medulla or central core, and root condition. List the supplied features first. Keeping the features ahead of a person's name helps reduce bias, which is allowing an expectation to influence a judgment.

R2. A missing input is a real limit

In this packet, the questioned-hair descriptions are supplied, but the known-hair reference features are not. Record the provided features and the missing comparison input. You cannot name a matching or excluded hair source from these descriptions alone. A missing reference is not a mismatch and is not evidence that someone was absent.

Consistent means the compared features agree. Inconsistent means the compared features disagree. Inconclusive means the available information does not support a clear comparison conclusion. For these supplied hair records, explain the input limit instead of guessing a person's name.

Part 1. Reading R3 and R4

R3. Class features and source conclusions

Class features may be shared by many sources. Evidence showing only these shared features is class evidence. A blood type, hair color or fingerprint pattern family can be a class feature. A sedan is a useful analogy for a broad class: many cars are sedans. A license plate is the analogy for a particular source, but comparing classroom evidence is not as simple as reading a plate.

Individual evidence is the term used when discussing evidence that can support a particular-source conclusion. For fingerprints, detailed ridge features can support a source-identification conclusion when the analysis is sufficient; it does not automatically prove identity. Similar visible hair features can support a possible-source comparison; they do not identify the donor or establish that the person was at the scene.

R4. What root information can support

Root shape and attached follicular tissue can provide clues about how a hair was removed. Follicular tissue is tissue from around the growing hair that remains attached. A visible root is not the same as attached tissue. These features do not establish when the hair reached the scene.

Attached follicular tissue may provide DNA for testing. Hairs without attached tissue can also contain DNA, but useful results depend on the sample and method. Appearance alone does not provide a DNA result. No DNA test result is supplied in this lesson, and no new test is required.

Part 1. Reading R5 and R6

R5. The 12-match rule for prints

Minutiae are small fingerprint ridge details, such as endings and splits. Pattern families include loops, whorls and arches. The records state how many details were readable, how many matched a specified card and how many mismatched. Use those supplied counts; do not claim that you counted a missing image.

The 12-match rule, for this classroom exercise only: a model “individual” call needs at least 12 matching minutiae and zero mismatching minutiae. The 12-match rule is a practice rule, not a real forensic identification standard. Under this simplified model, a mismatch gives an inconsistent comparison. With fewer than 12 matches and no mismatches, use an inconclusive call. Keep each call limited to this model.

A match in this classroom comparison supports a possible source under the 12-match rule; it does not by itself prove who touched the object, when, or why. A missing hair reference does not become an “individual” call because another row contains a fingerprint count.

R6. Report a proportion, not a probability

Matching count divided by readable count, multiplied by 100, gives the percentage of readable features that match. Show the fraction and calculation before rounding. The percentage describes the matching features counted in this exercise. It is not the probability that a person is the source, touched the object or committed an act.

Keep your evidence number beside every case-record statement. Keep the separate worked model and the Part C hypothetical labeled as practice. Neither supplies a missing result for your case.

Part 1. Plain-English terms and the limit

Fourteen terms, one line each. Part D asks you to use four of them correctly: class evidence, individual evidence, morphology and minutiae.

Questioned sample
A sample whose source is unknown.

Known reference
A sample with a stated source, used for comparison. A name alone is not a reference.

Morphology
Visible shape and structure.

Medulla
The central core of a hair.

Bias
An expectation influencing a judgment.

Consistent
The compared features agree.

Inconsistent
The compared features disagree.

Inconclusive
The available information does not support a clear comparison conclusion.

Class evidence
Evidence showing features shared by many sources.

Individual evidence
Evidence that can support a particular-source conclusion when the analysis is sufficient.

Follicular tissue
Tissue from around the growing hair that remains attached.

Minutiae
Small fingerprint ridge details, such as endings and splits.

Pattern family
A broad fingerprint pattern, such as a loop, whorl or arch.

Proportion
The matching count divided by the readable count in this exercise.

The limit that applies to everything today

These supplied records cannot establish a hair source without known-reference features, or prove who touched an object, when or why. The 12-match rule is a classroom model, not a real forensic identification standard. No DNA result is supplied.

This assignment reviews supplied records. It does not require handling specimens, collecting material or running a test. Practical work needs separate teacher direction and approved preparation.

Part 2. Directions in plain English

Today you will read trace records, compare the information that is available and explain where a conclusion must stop.

You fill in one sheet with five parts, A to E. The five steps below match those five parts. Each step says what to do, what to use and where to find it.

1. Start in Part 1. Read R1 to R4, the four readings about hair and about what any comparison needs, then answer Part A on your sheet. A1 asks about R3 and A2 asks about R4. With each answer, copy the first three words of the reading sentence you used, so a reader can find it.
2. Now read R5 and R6, the two readings about fingerprints, and then the worked example in Part 3. MODEL-1 shows the whole process on a practice print that belongs to neither case: features first, then the 12-match rule, then the percentage, then the limit. Then go to Part 4 and complete Part B with your own case's records: one row for each hair record, giving its reported features and naming the missing known-reference input, and one row for each of the four print summaries, applying the 12-match rule from R5 to the supplied counts. Finish Part B with B2, one limit you can explain well, and B3, a separate calculation that uses its own numbers, not the model's.
3. Write Part C from the hypothetical facts in the prompt and nothing else. Give three things: the strongest statement those facts support, one stronger statement you may not make and why, and one extra kind of evidence that would be needed and what it would have to show. Do not invent a result, and do not bring in your case's records.
4. Write Part D: one or two sentences about today's records that use all four terms correctly, class evidence, individual evidence, morphology and minutiae. The definitions are in Part 1. A list of definitions on its own does not count.
5. Finish with Part E, then hand in. Answer E1, E2 and E3 from memory first, then check each one against the reading and fix it if you need to. Before you turn in, check that every row carries its evidence number, your case label and its limit. Turn in the one sheet and nothing else.

The 80-minute plan

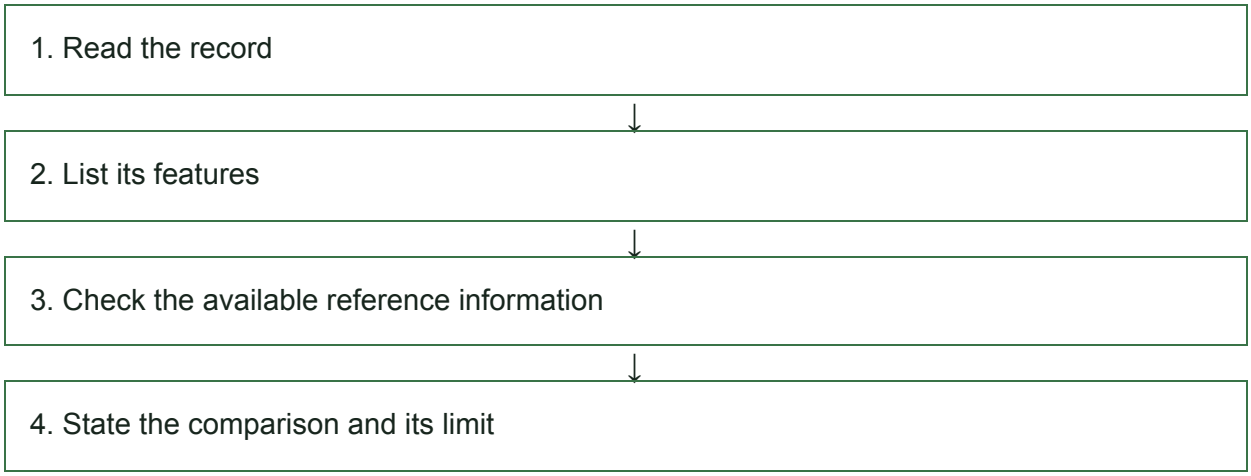
- **0–10 min:** Open your case handout. Label supplied records, read R1–R4 and answer A1–A2.
- **10–25 min:** Follow MODEL-1 and R5–R6. Find the 12-match rule and the percentage method.
- **25–40 min:** Complete your own-case hair rows. State the missing reference and needed comparison.
- **40–60 min:** Complete four print-summary rows, B2 and B3. Keep model and case numbers separate.
- **60–70 min:** Complete C1’s three hypothetical components and D1’s one or two sentences.
- **70–80 min:** Complete E1–E3, check evidence numbers and limits, then hand in one sheet.

Guided notes and extra help are optional support, not another submission. You may discuss your thinking with a partner, but write your own responses.

Turn in only the completed Parts A–E sheet. No extra CER, tracker, specimen image, microscope drawing or notebook upload is required.

Part 3. F1, the workflow, and the MODEL-1 inputs

This example uses a locker print that belongs to neither case. Its counts are supplied; nobody recounted an image. Read it for the order of the work, because Part B asks you to repeat that order with your own case: features first, then the 12-match rule, then the percentage, then the limit.



F1. A comparison workflow, not a specimen image.

Begin with the evidence number and source label. Copy the reported features. Check whether the necessary comparison information is actually present. Use the supplied counts or approved reference features only. End with a conclusion no stronger than those inputs support.

The supplied inputs

Pattern family	Right loop
Readable minutiae	16
Card 1	13 matching, 0 mismatching
Card 2	5 matching, 3 mismatching

The 12-match rule, from R5: a model-individual call needs at least 12 matching minutiae and zero mismatching minutiae. Any mismatch makes the comparison inconsistent. Fewer than 12 matches with no mismatch is inconclusive. Every print call today uses this one rule.

Part 3. MODEL-1, the five moves and the finished entry

The five moves, in order

1. List the features before considering the card's identity: right loop and 16 readable ridge details. A pattern family is a class feature.
2. Compare card 1's supplied count with the 12-match rule: 13 is at least 12, and the record reports zero mismatches. Under this exercise model, this supports the model's “individual” call, consistent with card 1. It is not automatic proof of identity or an action.
3. Compare card 2's supplied count with the same model. The record includes three mismatches. Under the 12-match rule, the comparison is inconsistent with card 2. This is an exercise conclusion, not a real forensic exclusion based only on counts.
4. Show the card 1 proportion: 13 ÷ 16 × 100 = 81.25%, or about 81% to the nearest whole percent. This percentage describes matching features in the record, not the probability that card 1's source touched the locker.
5. Keep the limit beside the comparison. A match in this classroom comparison supports a possible source under the 12-match rule; it does not by itself prove who touched the object, when, or why.

What the finished entry looks like

MODEL-1 reports a right loop with 16 readable minutiae. Card 1 has 13 matches and zero mismatches, meeting the 12-match rule; 13 of 16 is about 81%. Card 2 has five matches and three mismatches, giving an inconsistent comparison under that same model. These practice counts support bounded comparisons, not proof of who touched the locker or when.

A counterfactual, for practice only

The original model also asks you to imagine nine of 16 matching details with zero mismatches. That gives 56.25%, about 56%, and is below the classroom model's 12-match requirement. This counterfactual is practice only. Do not copy its numbers into B3, which supplies its own values.

> **Do not copy the model's numbers.** B3 supplies its own: 14 readable, 9 matching and 0 mismatching. The model's 81% belongs to the model.

Part 4. Your Case B hair records

Everything from here on is yours to write. These records are the only inputs for Part B. The frame each item came out of is in your evidence folder; the record says what was reported about it.

Supplied classroom simulation records, not observations made by the student

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E7-H1: storeroom floor hair

Light brown; fine; slight wave; interrupted medulla; root with TISSUE ATTACHED.

Known-reference features: not supplied. State this input limit.

Known-hair reference features are not supplied. Record the reported features and the missing comparison input. Do not name a matching or excluded source. A missing reference is not a mismatch or evidence of absence.

Part 4. Your Case B print records 1 and 2

Supplied classroom summaries. Apply the stated counts without claiming an independent image count.

E8-L1: blender lift

whorl; 16 readable minutiae; 14 matching and 0 mismatching with Nguyen's card.

E8-L2: blender lift

right loop; 13 readable minutiae; 12 matching and 0 mismatching with victim's card.

Use the 12-match rule from R5 and nothing else. A call based on this model does not establish a real forensic identification or prove who touched an object, when or why.

Part 4. Your Case B print records 3 and 4

Supplied classroom summaries. Apply the stated counts without claiming an independent image count.

E8-L3: container lid lift

right loop; 13 readable minutiae; 12 matching and 0 mismatching with victim's card. Reported feature: Broad, ridgeless smears lie OVER the ridge detail.

E8-L4: container lid lift

whorl; 14 readable minutiae; 12 matching and 0 mismatching with Nguyen's card. Reported feature: Same ridgeless smears lie OVER this print too.

Use the 12-match rule from R5 and nothing else. A call based on this model does not establish a real forensic identification or prove who touched an object, when or why.

Part 4. Response sheet, Part A: use the reading

Case B, RESPAWN, Period 6A-7B. Investigator code, not name:

Source label: supplied classroom records, or complete teacher-approved actual classroom records.

Date: September 15, 2026

Two short answers that quote the reading. A1 uses R3 and A2 uses R4. Copy the first three words of the sentence you used.

A1 PBS-U1-D07-A1

In R3, which part of the sedan and license-plate analogy represents class evidence, and which represents a particular source? Copy the first three words of the reading sentence you used.

A2 PBS-U1-D07-A2

According to R4, what clues can root shape and attached tissue provide, and what can they not establish? Copy the first three words of the reading sentence you used.

Part 4. Response sheet, Part B1: comparison rows 1 to 2 of 5

One row per record from the pages before this. Same order as MODEL-1: features, reference or missing input, bounded conclusion, evidence level and limit.

Complete one comparison row for every supplied questioned item in your case. List its reported features first. For hair, state the missing known-reference input and the comparison you would need; do not name a matching or excluded source. For prints, use the supplied card label and counts to apply the classroom model. Identify class features. Label a model-individual print call only when the 12-match rule allows it; otherwise label the inconclusive or inconsistent comparison. State the limit and keep the evidence number on every row.

Same product: include all continuation pages with this sheet. Copy this page if teacher-approved actual records require more rows.

Row 1 of 5

Evidence number and item

Reported features or counts

Available reference information or missing input

Bounded call or input-limited conclusion

Evidence level and limit

Row 2 of 5

Evidence number and item

Reported features or counts

Available reference information or missing input

Bounded call or input-limited conclusion

Evidence level and limit

Part 4. Response sheet, Part B1: comparison rows 3 to 4 of 5

Complete one comparison row for every supplied questioned item in your case. List its reported features first. For hair, state the missing known-reference input and the comparison you would need; do not name a matching or excluded source. For prints, use the supplied card label and counts to apply the classroom model. Identify class features. Label a model-individual print call only when the 12-match rule allows it; otherwise label the inconclusive or inconsistent comparison. State the limit and keep the evidence number on every row.

Same product: include all continuation pages with this sheet. Copy this page if teacher-approved actual records require more rows.

Row 3 of 5

Evidence number and item

Reported features or counts

Available reference information or missing input

Bounded call or input-limited conclusion

Evidence level and limit

Row 4 of 5

Evidence number and item

Reported features or counts

Available reference information or missing input

Bounded call or input-limited conclusion

Evidence level and limit

Part 4. Response sheet, Part B1: comparison rows 5 to 5 of 5

Complete one comparison row for every supplied questioned item in your case. List its reported features first. For hair, state the missing known-reference input and the comparison you would need; do not name a matching or excluded source. For prints, use the supplied card label and counts to apply the classroom model. Identify class features. Label a model-individual print call only when the 12-match rule allows it; otherwise label the inconclusive or inconsistent comparison. State the limit and keep the evidence number on every row.

Same product: include all continuation pages with this sheet. Copy this page if teacher-approved actual records require more rows.

Row 5 of 5

Evidence number and item

Reported features or counts

Available reference information or missing input

Bounded call or input-limited conclusion

Evidence level and limit

Part 4. Response sheet, B2 and B3: one limit and one separate calculation

B2 PBS-U1-D07-B2

Choose your weakest supported comparison or a documented input limit. Give its evidence number and explain exactly what prevents a stronger conclusion. Why is reporting that limit useful?

B3 PBS-U1-D07-B3

Separate practice: a questioned print has 14 readable minutiae, 9 matching and 0 mismatching. Show the fraction matching and calculate the percentage. What call does our classroom model allow, and what could you honestly say instead of identifying a person?

Fraction and calculation:

Classroom call and qualified explanation:

Part 4. Response sheet, Part C: a separate hypothetical

C1 PBS-U1-D07-C1

Separate hypothetical: suppose a hair is consistent with one known reference and has attached root tissue. Write a three-part practice matrix note: the strongest statement those facts support; a stronger statement you are not allowed to make and why; and one additional type of evidence that could support a more specific source comparison. State what that additional evidence would need to show. No additional test result is supplied or required.

1. Strongest supported statement

2. Stronger statement not allowed, and why

3. Additional evidence and what it would need to show

Part 4. Response sheet, Parts D and E: vocabulary, then check yourself

D1 uses four terms from Part 1. E1 to E3 are answered from memory first, then checked against the reading and fixed if needed.

D1 PBS-U1-D07-D1

Use class evidence, individual evidence, morphology and minutiae correctly in one or two sentences about today's records. A list of definitions alone does not count.

E1 PBS-U1-D07-E1

Blood type B at a scene: class or individual evidence? Answer in one line from memory, then check R3.

E2 PBS-U1-D07-E2

What clues can root features provide, and what can they not establish? Answer in one line from memory, then check R4.

E3 PBS-U1-D07-E3

Why list features before considering a person's name? Answer in one line from memory, then check R1.

The reading remains available for checking. This self-check is part of the same sheet, not another exit-ticket submission.

Optional notebook support

Keep notebook pages in your notebook. They are not an additional submission.

Use this template only if helpful. It does not replace a required response or add another product.

One matrix row

Evidence number

Supplied record statement

What this supports

Limit or missing input

Cornell cues

1. What information is supplied?
2. What reference is available or missing?
3. What can the comparison support?
4. What can it not support?

Write a brief reminder of how to keep a comparison within its evidence.

Turn in, help, PLTW and sources

Complete your D07 trace comparison sheet during class. Hand the paper sheet to me before leaving, or submit one PDF to this Schoology assignment by Tuesday, September 15, at 11:59 p.m. Submit once. Keep notebook pages in your notebook.

Turn in only the completed Parts A–E sheet. No extra CER, tracker, specimen image, microscope drawing or notebook upload is required.

Keep your source-labeled comparison and its limits for the next class on Thursday, September 17. Your notebook pages stay in your notebook.

Help when you need it

Find your next unanswered task ID. For hair, use R1–R4. For prints and percentages, use R5–R6 and MODEL-1. Check that each conclusion includes its evidence number and limit.

Your teacher may offer an actual classroom-record route only when complete, approved questioned and reference inputs are available. Follow the preparation requirements for that route. Finishing this record exercise does not give a practical-lab pass or mark an official PLTW activity complete.

PLTW

Related PLTW reference: Activity 1.1.3, The Traces We Leave Behind, in Lesson 1.1, Investigating the Scene. This John Hay classroom adaptation practices describing evidence, comparing available information and explaining limits.

This sheet does not replace or certify completion of the official activity. If assigned, open the matching activity through your existing myPLTW account or section hub.

Case B D07 assignment · Official PLTW section hub

Sources and optional background

Everything needed is in the reading, records, model and task prompts. Opening these sources is optional background, not another assignment.

- S1. FBI Handbook of Forensic Services

  limits of hair comparison.
- S2. NIST: follicular tag

  attached follicular tissue.
- S3. NIJ-supported research on rootless hair DNA

  why appearance alone cannot decide DNA-test usefulness.
- S4. Department of Justice: latent print testimony and reporting

  limits on source conclusions.
- S5. NIJ Fingerprint Sourcebook

  fingerprint comparison background. The 12-match rule above is a teaching model.

These supplied records cannot establish a hair source without known-reference features, or prove who touched an object, when or why. The 12-match rule is a classroom model, not a real forensic identification standard. No DNA result is supplied.

ASSIGNMENT 18 OF 29 Thu, Sep 17 about 80 minutes

Maybe Is a Result

Today we need to accomplish interpret four supplied stain records, distinguish reported results from missing observations, and justify a paper-record route using the classroom allowance budget.

Our goal is making only the claims your evidence supports.

You have to turn in Presumptive test report, Parts A–E.

Schoology assignment: Wk4 D08 · Maybe Is a Result

1 READ

Your materials for this assignment start on the very next page, in this order: **student handout and response sheet (write on this)** (24 pages); then **PBS RESPAWN Thu mini lab circuit** (24 pages); then **PBS RESPAWN guided notes STUDENT** (4 pages); then **PBS RESPAWN investigation notebook** (7 pages); then **PBS RESPAWN persons of interest cards** (4 pages). Read the briefing first. Write your answers on the sheet. Everything you need for this assignment is in those pages.

2 DO

Start in Part 1. Put your period and investigator code on the report and label the record route: supplied illustrative case record. Read R1 to R6, the briefing on what a screen can and cannot tell you, then answer Part A. Both A1 and A2 come from R2. With each answer, copy the first three words of the sentence you used.

3 READ

Study the worked example in Part 3 before you touch your own case. F1 shows the four moves, and the kitchen model K1 shows one finished report card, the allowance arithmetic and a short memo, all on a kitchen record that is not your case. Then go to Part 4 and write B1: one report card for each of your case's four stain IDs, keeping the documentation references, the reported classification, the missing color and time, the qualified phrase and the proposed route together on each card. Rust stays a conditional inference.

4 DO

Still in Part 4, write B2 and B3. B2 is the negative log for your case's named negative stain, not rust: its evidence ID, the qualified negative phrase, its photo reference and the allowance it has left. B3 is the allowance arithmetic: four swabs times two allowances, minus the four recorded screens, then the two follow-up allowances set against the two reported positives. Decide whether any positive must wait. None waits is a valid answer when your record supports it.

5 WRITE

Write C1, a short memo in four labeled parts: which reported positives can proceed and whether any waits, the evidence reason for each route, how the allowance limit shaped the choice, and the qualified wording that stays until a result is actually supplied. Then write D1: one or two sentences that use confirmatory test and serology correctly. The definitions are in Part 1.

6
WRITE

Finish with Part E, then hand in. E1, E2 and E3 are one-line reading checks from R3, R2 and R6. Then check all ten task IDs, all four stain IDs and your source labels, and turn in the one report on paper or as one PDF to your section's assignment. Record route: Supplied illustrative case record . These are supplied illustrative case records, not observations you made. Photo labels and coordinates are reported references, not photographs or measurements you independently examined. No individual color or timing observations are supplied for these four rows. One work sequence. Optional help explains the current task; it does not add a parallel work plan. Guided notes and the kitchen model are support, not extra submissions.

7
TURN IN

Now we turn it in. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Principles of Biomedical Technology, and open the assignment named **Wk4 D08 · Maybe Is a Result**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

Maybe Is a Result

RESPAWN · Period 6A-7B · Supplied illustrative case record

Read me first: how this handout is organized, then the directions

Make one presumptive test report, Parts A–E. Use the handout for your class's case. You will interpret four supplied stain records, explain what their results cannot establish, and account for the classroom test allowances.

1. **Part 1. Background and definitions.** Six short readings, the two qualified phrases and the terms. Read all six before you write.
2. **Part 2. Directions in plain English.** Five steps, one per part of the report, and the 80-minute plan.
3. **Part 3. Worked example.** The F1 workflow and K1, a finished report on a kitchen record that is not your case.
4. **Part 4. Your work.** Your Case B stain records, then the response sheet for Parts A to E.

Start with Part 1, then follow the steps in Part 2. Everything you write goes in the one report in Part 4.

Supplied illustrative case record. These are supplied illustrative case records, not observations you made. Photo labels and coordinates are reported references, not photographs or measurements you independently examined. No individual color or timing observations are supplied for these four rows.

Your Case B D08 assignment · Daily directions on the portal · Case B evidence folder

Four stains, four frames

Your evidence folder holds a plate for each of the four stains this report covers, the two you logged on day 6 and the two screened beside them, plus a sketch showing where all four sat. Look at them together before you write. Each plate is a measured drawing made from the written record, not a photograph, and no plate tells you what any stain is.

Part 2. Directions in plain English

Interpret four supplied stain records, distinguish reported results from missing observations, and justify a paper-record route using the classroom allowance budget.

You fill in one report with five parts, A to E. The five steps below match those five parts. Each step says what to do, what to use and where to find it.

1. Start in Part 1. Put your period and investigator code on the report and label the record route: supplied illustrative case record. Read R1 to R6, the briefing on what a screen can and cannot tell you, then answer Part A. Both A1 and A2 come from R2. With each answer, copy the first three words of the sentence you used.

2. Study the worked example in Part 3 before you touch your own case. F1 shows the four moves, and the kitchen model K1 shows one finished report card, the allowance arithmetic and a short memo, all on a kitchen record that is not your case. Then go to Part 4 and write B1: one report card for each of your case's four stain IDs, keeping the documentation references, the reported classification, the missing color and time, the qualified phrase and the proposed route together on each card. Rust stays a conditional inference.
3. Still in Part 4, write B2 and B3. B2 is the negative log for your case's named negative stain, not rust: its evidence ID, the qualified negative phrase, its photo reference and the allowance it has left. B3 is the allowance arithmetic: four swabs times two allowances, minus the four recorded screens, then the two follow-up allowances set against the two reported positives. Decide whether any positive must wait. None waits is a valid answer when your record supports it.
4. Write C1, a short memo in four labeled parts: which reported positives can proceed and whether any waits, the evidence reason for each route, how the allowance limit shaped the choice, and the qualified wording that stays until a result is actually supplied. Then write D1: one or two sentences that use confirmatory test and serology correctly. The definitions are in Part 1.
5. Finish with Part E, then hand in. E1, E2 and E3 are one-line reading checks from R3, R2 and R6. Then check all ten task IDs, all four stain IDs and your source labels, and turn in the one report on paper or as one PDF to your section's assignment.

The 80-minute plan is on the portal page and the slides.

One work sequence. Optional help explains the current task; it does not add a parallel work plan.

Keep notebook pages in your notebook. You may copy F1 and update a line in your evidence log as support; do not upload a second product.

Before you submit

I have four complete report cards, B2's negative log, B3's arithmetic, C1's four-part memo, D1 and all five short reading/self-check answers. A1–A2 and E1–E3 are those five short answers, not another product. Missing observations are labeled; the rust inference stays conditional. I have not claimed to view missing photos or identify a donor.

Hand the paper report to Mr. Mendoza before leaving, or submit one PDF in the assignment Wk4 D08 · Maybe Is a Result (PLTW 1.1.4). The online deadline is September 17 at 11:59 PM. Use your period and investigator code in the header. Do not submit the same work twice. Keep notebook pages in your notebook.

Part 1. Reading R1 and R2

Everything in your report comes from these six readings. Part A quotes R2. B1 uses all six, with R3 and the F1 workflow doing most of the work. B2 uses R2 and R3. B3 uses R4. C1 uses R4 to R6. D1 uses R1 and R5. E1 to E3 check R3, R2 and R6.

R1. Your job today

Complete one presumptive test report, Parts A–E. A presumptive test is an initial screen that can indicate a material may be present without identifying it. Serology is the study of blood and other body fluids. Today you analyze supplied illustrative records. You do not run a test, photograph a stain or identify a person.

Use only the four stain records for your class's case. The evidence ID identifies a row. The description, photo references and coordinates come from the supplied record. RP1 and RP2 mean reference point 1 and reference point 2; the distances are recorded in centimeters. Do not replace these with guessed room measurements.

R2. Why careful language matters

Some other materials, including fruits and oxidizing substances on a surface, can affect a chemical screen. An oxidizing substance can cause a chemical change that affects the screen's response. This does not identify the substance in any of our case stains. An expected classroom outcome is a prediction, not a recorded result. A stain's name does not establish that the testing process worked correctly. NIJ screening background [S1].

Calling an initial positive confirmed blood can send attention or a limited follow-up allowance toward an unsupported conclusion. Treating a negative as proof that nothing was present can cause relevant information to be dismissed. These are possible consequences, not measured error rates for this exercise. A reported negative means the material of interest was not detected by that screen; it does not establish its absence. NIST definition [S2].

Part 1. Reading R3 and R4

R3. Record the result and its limit

For a reported positive, use the case's qualified phrase: presumptive positive for blood; confirmatory testing required. For the explicitly reported negative, use no indication of blood by presumptive screen. These are the classroom report's labels, not guarantees of identification or absence.

If an observation is missing, write not reported in the supplied record. A missing observation is not a negative result or proof of test failure. Individual colors and times are not supplied for the four case rows. Do not invent them.

Rust needs a different status. Its individual observation is not reported. The aggregate summary lists two negative swabs, while only one is individually named. Use the permitted statement: Individual observation not reported; the summary implies a negative classification if its four-stain record is complete. An inference is a conclusion drawn from other information. Keep this inference conditional rather than calling it an observed negative.

R4. Use the classroom budget

For this paper exercise, each swab starts with two test allowances. Each recorded screen uses one allowance. Multiply swabs by allowances per swab, then subtract the recorded screens. The follow-up limit is a separate constraint. Compare that limit with the number of reported positives before deciding whether any must wait.

This is classroom accounting; it does not establish how much real material a test uses or whether a real sample can be tested again. Those decisions require the approved method and sample information. A route is the next step proposed or reported for an item, with a reason. “None waits” is a valid decision when the supplied numbers support it. Keep the kitchen example's different numbers out of your case report.

Part 1. Reading R5 and R6

R5. A route is not an identification result

The term confirmatory test is used in the original classroom record for further evaluation. It does not guarantee a definite answer. In this exercise, “confirmatory allowance” names a place in the follow-up budget, not a guarantee of identification. Further testing would need a stated question, an appropriate method, an actual result and its limits. Sending an item forward does not supply that result.

Today's records do not establish species, donor or time of deposition. A DNA comparison would be separate evidence; none is supplied here. The NIST report warns against categorical identification wording, and NIJ explains that DNA results require interpretation and suitable comparison information. NIST, §§4.6.2–4.6.3 [S3], NIJ DNA-result background [S4].

R6. Keep the documentation attached

Documentation preserves a record of an item's location and appearance before later work. Keeping its references beside its evidence ID lets another reader trace your statement to its source. The W and UV labels in this packet are supplied photo references, not pictures you examined. A reported pattern description is also a source statement, not your own image analysis.

Attribute the case's pattern descriptions and reported absences to that record. A pattern reported absent differs from one the record does not mention. The descriptions alone do not establish whether an event was a fall or an attack. The historical reporting draft separates source information, observations and conclusions; it does not validate this case. NIST-hosted 2017 draft, §§4.2.9–4.2.12 [S5].

PLTW connection and preparation

This John Hay original record exercise practices careful reporting, limited-resource reasoning and evidence limits connected to PLTW Activity 1.1.4, Blood Evidence, in Lesson 1.1, Investigating the Scene. It does not certify completion of the official activity. The retained PLTW activity link is supporting access, not an extra task for this report. If it does not open, the required explanation and records are here.

Before any separate teacher-directed hands-on task, complete the existing Kastle-Meyer preparation gate and follow your teacher's approved instructions. This paper report does not provide bench clearance or certify practical performance. No extra DNA simulation is required for the report.

Optional help

For A1–A2, use R2. For the four rows, use R3 and the F1 record workflow. For the budget and memo, use R4–R5 and the separate kitchen model. For a documentation question, use R6. Guided notes can help organize your thinking; they are not another submission. The explanation above contains the required background, so the source links are not an additional reading assignment.

Part 1. The two phrases, the terms and the limit

From R3. A reported positive gets "presumptive positive for blood; confirmatory testing required". A reported negative gets "no indication of blood by presumptive screen". Both keep the limit attached to the result.

Part D asks you to use two of the terms correctly: confirmatory test and serology.

Presumptive test
An initial screen that can indicate a material may be present without identifying it.

Serology
The study of blood and other body fluids.

Evidence ID
Identifies a row. The description, photo references and coordinates come from the supplied record.

RP1 and RP2
Reference point 1 and reference point 2; the distances are recorded in centimeters.

Oxidizing substance
Can cause a chemical change that affects the screen's response. This does not identify the substance in any of our case stains.

Reported negative
The material of interest was not detected by that screen; it does not establish its absence.

Not reported in the supplied record
The status to write when an observation is missing. A missing observation is not a negative result or proof of test failure.

Inference
A conclusion drawn from other information. Keep the rust inference conditional rather than calling it an observed negative.

Test allowance
For this paper exercise, each swab starts with two test allowances. Each recorded screen uses one allowance.

Route
The next step proposed or reported for an item, with a reason.

Confirmatory test
The term used in the original classroom record for further evaluation. It does not guarantee a definite answer.

Confirmatory allowance
A place in the follow-up budget, not a guarantee of identification.

Documentation
A record of an item's location and appearance before later work.

W and UV labels
Supplied photo references, not pictures you examined.

The limit that applies to everything today

Today's records do not establish species, donor or time of deposition. A DNA comparison would be separate evidence; none is supplied here. A route does not produce a new result or identify a donor.

The mistake to avoid: A positive label identifies blood, a negative proves absence, or a missing value can be filled from an expected outcome. Each of these goes beyond the record.

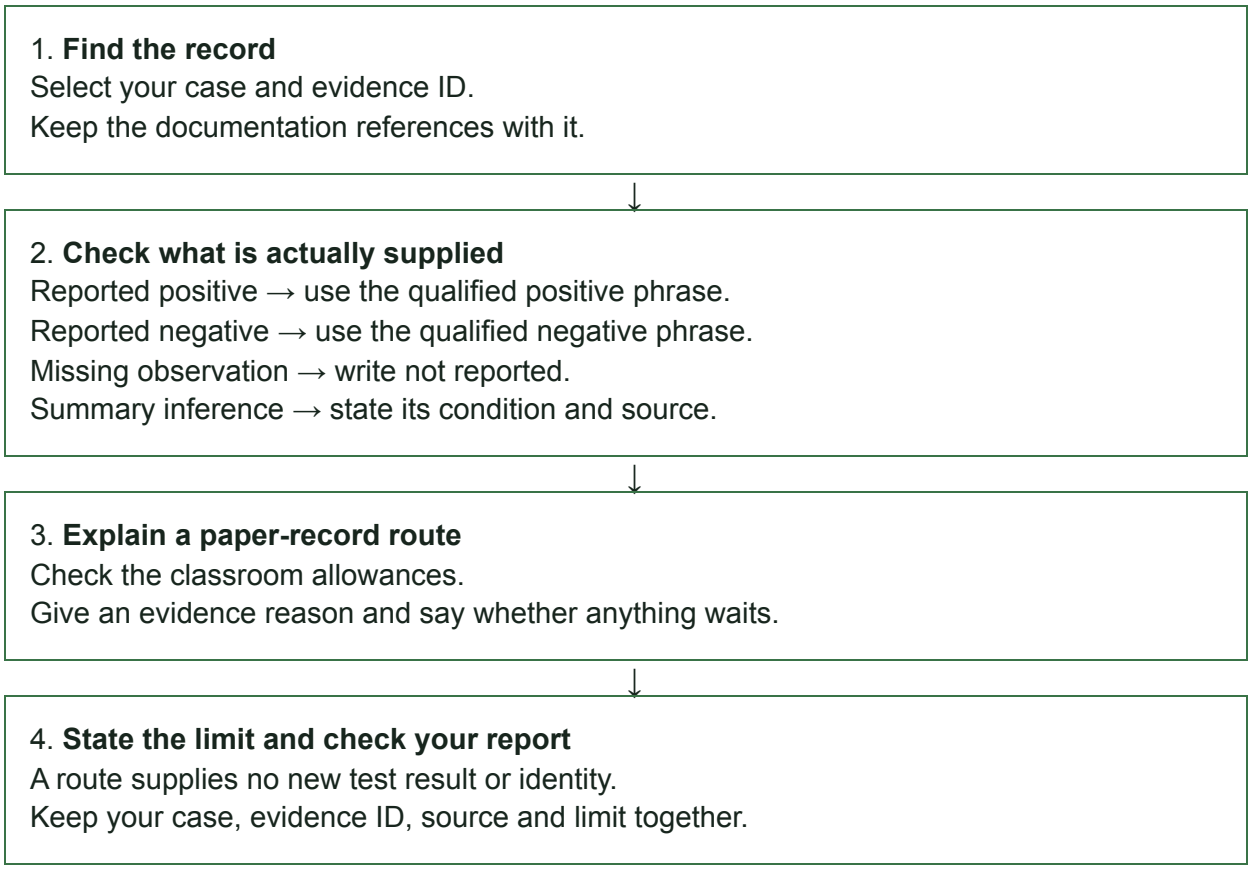
Complete the existing preparation gate before any separate teacher-directed hands-on task. This paper report does not grant bench clearance or certify practical performance.

No extra DNA simulation is required for the report.

If your teacher supplies actual approved classroom observations, label that separate source and follow the assigned instructions; do not silently combine it with this practice record.

Part 3. F1. From a supplied record to a careful report, the workflow

The kitchen record on the next pages is not your case: it has three swabs and one follow-up allowance, where your case has four swabs and two. Read it for the shape of the work, because Part B asks for the same shape with your own records.



Teaching workflow for paper-record analysis. This is not a specimen image, a test procedure or a case result.

Find your case and evidence ID, then retain its documentation references. Check whether the record supplies an individual positive, an individual negative, a missing observation or a conditional inference. Do not collapse those four statuses into two. Copy the supported qualified phrase or state the missing item or inference. Next, check the classroom allowance record and explain a proposed route with an evidence reason, including whether any reported positive must wait. Finish by stating the limits. A route does not produce a new result or identify a donor.

The qualified positive phrase is “presumptive positive for blood; confirmatory testing required.” The qualified negative phrase is “no indication of blood by presumptive screen.” Both keep the limits explained in R3. The rust row keeps the exact conditional status provided in your case data.

Optional check

If two entries disagree, record the disagreement or missing information. Do not fill a gap with the other case, the kitchen example or an expected color. In this exercise, no new test is required to finish the report.

Part 3. K1. Separate kitchen practice report: a finished report card

Optional worked support. This is the existing illustrative kitchen example, not Case A or Case B. No part of this model is a new required submission or evidence for your assigned case.

A reddish smear is described on a wooden cutting board in a kitchen where someone reported a bad cut. The record has three swabs. It identifies photo C-01 for the cutting-board smear and mentions two location measurements, but supplies no numerical coordinates. C-01 is a listed reference, not a photograph shown here. The other descriptions are a brown spot on the sink rim and a red spot on the counter.

The supplied kitchen narrative classifies the cutting-board smear and counter spot as presumptive positives and the sink-rim spot as negative. Its colors are part of that illustrative narrative, not observations you made. This paper model uses its reported classifications. It gives no operating instructions and supplies no new result for your case.

A worked report row

Record	cutting-board smear, separate kitchen practice.
Documentation	the record names C-01 and says the location was documented. The two measurement values are not reported here.
Reported result	presumptive positive.
Qualified phrase	presumptive positive for blood; confirmatory testing required.
Recorded route and reason	the practice record sends this item forward because the surface was reportedly used by the injured person. That is the reason given in the record, not proof of the person's identity or where an injury occurred.
Limit	the referral supplies no follow-up result. Species, donor and time remain unestablished.

For the sink-rim spot, the model uses “no indication of blood by presumptive screen” and records that this example stops further routing for that item. It does not change the phrase to “no blood.” The counter spot retains the qualified positive phrase while waiting under this example's budget.

Part 3. K1: the arithmetic and the memo, done once

The kitchen example has three swabs and two allowances per swab:

- Starting allowances: 3 × 2 = 6.
- Recorded screens: 3. Remaining after screens: 6 − 3 = 3.
- Separate follow-up allowance: 1.
- Reported positives: 2. One can proceed under this limit; the other waits.

The remaining total allowance and the follow-up cap answer different questions. The example uses the one follow-up place for the cutting-board smear and leaves the counter spot waiting. This illustrates how a stated constraint affects a paper-record choice. It is not a universal rule about sample consumption.

Worked short memo

The separate kitchen record routes the cutting-board smear forward and leaves the counter spot waiting. Both are reported positives, but the practice budget allows only one follow-up. The source gives priority to the cutting board because it was reportedly used by the injured person; this is a stated reason, not proof of the event. Using that one allowance leaves no follow-up place for the counter spot now. Both records still need qualified positive language because no follow-up result is supplied.

Use the structure, not the answers

For your assigned report, return to your four own-case IDs, documentation references and budget. Your case has four swabs and two follow-up allowances. Decide from that record whether anything waits. Do not transfer C-01, the kitchen locations or the one-place limit into your case. F1 and R1–R6 provide the same report method without requiring a second example response.

Part 4. Your Case B stain records 1 and 2

Everything from here on is yours to write. These four records, with the routing and allowance record after them, are the only inputs for Parts B and C.

Supplied illustrative case record. These are supplied illustrative case records, not observations you made. Photo labels and coordinates are reported references, not photographs or measurements you independently examined. No individual color or timing observations are supplied for these four rows.

Setting: Respawn, an e-sports lounge with a smoothie counter. Case number JH-26-0831-B.

E2-counter: counter-edge stain swab

Documented before screening	Yes, according to the supplied record
Photo references	W-05, UV-01, scale reported
Recorded coordinates	388 cm from RP1, 142 cm from RP2
Prior log	day 6
Color	Not reported in the supplied record
Time	Not reported in the supplied record
Classification	Reported presumptive positive
Classification source	reported in the case record

E2-floor: floor stain swab near the head end

Documented before screening	Yes, according to the supplied record
Photo references	W-06, UV-02, scale reported
Recorded coordinates	406 cm from RP1, 149 cm from RP2
Prior log	day 6
Color	Not reported in the supplied record
Time	Not reported in the supplied record
Classification	Reported presumptive positive
Classification source	reported in the case record

Part 4. Your Case B stain records 3 and 4

E2-ctrl-berry: berry-smoothie splash near the blender

Documented before screening	Yes, according to the supplied record
Photo references	W-21, scale reported
Recorded coordinates	358 cm from RP1, 166 cm from RP2
Color	Not reported in the supplied record
Time	Not reported in the supplied record
Classification	Reported negative
Classification source	reported in the case record
Negative log	E2-ctrl-berry: no indication of blood by presumptive screen. Photo W-21. Sample remaining: one test.

E2-ctrl-rust: rust mark on the shelf bracket

Documented before screening	Yes, according to the supplied record
Photo references	W-22, scale reported
Recorded coordinates	452 cm from RP1, 205 cm from RP2
Color	Not reported in the supplied record
Time	Not reported in the supplied record
Classification	Individual observation not reported; the summary implies a negative classification if its four-stain record is complete.
Classification source	conditional inference from the complete summary, not an individually reported result

The summary does not individually name rust as the second negative. Keep its conditional inference separate from a reported individual result. Do not guess a color or time.

Part 4. Your Case B routing, allowance and pattern records

The supplied summary reports that E2-counter and E2-floor went forward under the two follow-up allowances and that no positive had to wait. It supplies no follow-up test result.

Negative log: E2-ctrl-berry: no indication of blood by presumptive screen. Photo W-21. Sample remaining: one test.

Classroom allowance record: 4 swabs, 2 allowances per swab, 4 recorded screens, 2 follow-up allowances, 2 reported positives.

The summary reports four screens, two swab halves reserved for follow-up, and two negative swabs retained with their untested halves kept in custody. This is a supplied classroom record, not a procedure to follow.

The two-allowances-per-swab rule is classroom accounting. It does not establish real sample consumption, compatibility or suitability for another test.

Pattern summary, as reported

The source describes a contact-type mark at the counter edge, at about head height of a falling person, and round passive drops on the floor below. It reports no spray-type field anywhere. These are the source's descriptions, not a demonstrated reconstruction. Its fall-versus-attack implications were recorded as questions only.

Qualified phrases from R3: presumptive positive for blood; confirmatory testing required; no indication of blood by presumptive screen.

Part 4. Response sheet, Part A: use the reading

Case B, RESPAWN, Period 6A-7B. Investigator code, not name:

Record route label: Supplied illustrative case record, or a separately labeled teacher-approved actual classroom record.

Date: September 17, 2026

Complete Parts A–E in one report. Use your period and investigator code, not a name. Label the record route. Keep every evidence number beside its response. The supplied-record route is available to everyone.

A1 PBS-U1-D08-A1

Name two kinds of material besides blood that the reading says can affect a screen. Copy the first three words of the sentence you used.

A2 PBS-U1-D08-A2

Explain two reporting errors: treating an initial positive as confirmed blood, and treating a negative as proof that no blood was present. Give one possible consequence of each. Copy the first three words of a supporting sentence from R2.

Part 4. Response sheet, B1: report card 1 of 4

B1 PBS-U1-D08-B1

Complete one report card for each of your case's four stain IDs. Record the documentation references, reported classification or missing-status statement, qualified result phrase or conditional inference, and proposed route with a reason. For color and time, use not reported when the record supplies none. Keep the rust inference conditional.

One card per stain ID. Keep the four cards together in the same report.

Evidence ID

Documentation references and recorded coordinates

Reported classification and source

Color and time status

Qualified result phrase or exact conditional inference

Proposed paper-record route and evidence reason

What remains unknown

Part 4. Response sheet, B1: report card 2 of 4

B1 PBS-U1-D08-B1

Complete one report card for each of your case's four stain IDs. Record the documentation references, reported classification or missing-status statement, qualified result phrase or conditional inference, and proposed route with a reason. For color and time, use not reported when the record supplies none. Keep the rust inference conditional.

One card per stain ID. Keep the four cards together in the same report.

Evidence ID

Documentation references and recorded coordinates

Reported classification and source

Color and time status

Qualified result phrase or exact conditional inference

Proposed paper-record route and evidence reason

What remains unknown

Part 4. Response sheet, B1: report card 3 of 4

B1 PBS-U1-D08-B1

Complete one report card for each of your case's four stain IDs. Record the documentation references, reported classification or missing-status statement, qualified result phrase or conditional inference, and proposed route with a reason. For color and time, use not reported when the record supplies none. Keep the rust inference conditional.

One card per stain ID. Keep the four cards together in the same report.

Evidence ID

Documentation references and recorded coordinates

Reported classification and source

Color and time status

Qualified result phrase or exact conditional inference

Proposed paper-record route and evidence reason

What remains unknown

Part 4. Response sheet, B1: report card 4 of 4

B1 PBS-U1-D08-B1

Complete one report card for each of your case's four stain IDs. Record the documentation references, reported classification or missing-status statement, qualified result phrase or conditional inference, and proposed route with a reason. For color and time, use not reported when the record supplies none. Keep the rust inference conditional.

One card per stain ID. Keep the four cards together in the same report.

Evidence ID

Documentation references and recorded coordinates

Reported classification and source

Color and time status

Qualified result phrase or exact conditional inference

Proposed paper-record route and evidence reason

What remains unknown

Part 4. Response sheet, B2 and B3: negative log and allowance arithmetic

B2 PBS-U1-D08-B2

Use your case's explicitly named negative stain, not rust. Write its evidence ID, qualified negative phrase, photo reference and remaining test allowance. Explain why the phrase does not prove that blood was absent.

B3 PBS-U1-D08-B3

Show the classroom budget for four swabs with two test allowances each. Subtract the four recorded screens. Then use the two follow-up allowances and the two reported positive IDs to explain how many can proceed and whether any must wait. Keep the allowance calculation separate from a claim that a follow-up test succeeded.

Starting allowances: ___ × ___ = ___

After recorded screens: ___ − ___ = ___

Separate follow-up limit: ___

Reported positive IDs: ___

Can proceed: ___; must wait: ___

Reason and accounting limit: ___

Part 4. Response sheet, Part C: the routing memo

C1 PBS-U1-D08-C1

Write one short routing-and-ethics memo with four parts: which reported positives can proceed and whether any must wait; an evidence reason for each proposed route; how the classroom allowance limit affects the choice; and the qualified wording that remains until further results are actually supplied. None waits is valid when the case supports it. Do not claim species, donor, time, or a completed follow-up result.

1. Proceed/wait decision

2. Evidence reasons

3. Allowance and ethics reason

4. Result wording and limits

Part 4. Response sheet, Parts D and E: vocabulary, then reading checks

D1 PBS-U1-D08-D1

Use confirmatory test and serology in one or two sentences about this paper-record exercise. Explain the follow-up role without claiming that it guarantees identification. A copied definition alone is not enough.

E1 PBS-U1-D08-E1

A supplied record classifies a stain as a presumptive positive. Write the qualified report phrase. This is a reading check, not a new case result.

E2 PBS-U1-D08-E2

A supplied record classifies a screen as negative. Does that prove the material was absent? Answer in one line with the limit.

E3 PBS-U1-D08-E3

Why does the report keep the documentation made before testing? Give one reason, and do not claim to have viewed photographs that are only listed by reference.

I have four complete report cards, B2's negative log, B3's arithmetic, C1's four-part memo, D1 and all five short reading/self-check answers. A1–A2 and E1–E3 are those five short answers, not another product. Missing observations are labeled; the rust inference stays conditional. I have not claimed to view missing photos or identify a donor.

Optional check within B1, not three work plans

The rust row has no individual observation, but the summary reports two negatives. Which reporting choice preserves the evidence limit?

1. Call rust an observed negative because its name sounds familiar.
2. Keep the missing observation and label the negative classification as a conditional inference from the complete summary.
3. Copy a result from the kitchen example to fill the blank.

Short check, same report

Can a correct routing memo say that no positive waits? Explain using your case's classroom allowances, without claiming that any follow-up succeeded.

Use B3 and the supplied routing record. This is a check of the same report, not another task.

If you were absent or need help, and optional notebook support

Use the same supplied-record handout and complete the same report. You do not need to find missing specimens or make up colors, times or pictures. If your teacher supplies actual approved classroom observations, label that separate source and follow the assigned instructions; do not silently combine it with this practice record.

Lost your place? Find the next unanswered task ID. R2 supports the reading questions; R3 and F1 support the rows; R4–R5 support the budget and memo; R6 supports documentation. Guided notes and the kitchen model are support, not extra submissions. The existing preparation gate applies before any separate teacher-directed bench task, not as proof that this paper report completed one.

If your teacher is absent: Use the complete handout, R1–R6 and F1. Complete the paper-record report only. Do not begin an unassigned hands-on task.

Optional notebook support

Keep notebook pages in your notebook. You may copy F1 and update a line in your evidence log as support; do not upload a second product.

Use this template only if helpful. It does not replace a required response or add another product.

One evidence log row

Date

Evidence ID

Supplied-record statement

Interpretation and limit

Report task ID

Cornell cues

1. What was reported?
2. What was not reported?
3. What can the budget support?

In one sentence, explain where a report must stop.

Optional vocabulary extra credit

The existing optional vocabulary extra credit may remain optional, separate from required D1. Use terms from this lesson and do not add a required submission.

Turn in, PLTW and sources

Complete one presumptive test report, Parts A–E. Hand the paper report to Mr. Mendoza before leaving, or submit one PDF to this section's Schoology assignment by September 17 at 11:59 PM. Use your period and investigator code. Do not submit the same report twice; keep notebook pages in your notebook.

Carry forward your evidence IDs, reported classifications and limits. A later lesson needs its own supplied evidence; today's report does not supply a DNA result.

This John Hay original record exercise practices careful reporting, limited-resource reasoning and evidence limits connected to PLTW Activity 1.1.4, Blood Evidence, in Lesson 1.1, Investigating the Scene. It does not certify completion of the official activity.

Local John Hay practice connected to the activity, not certification of official completion. The retained PLTW activity link is supporting access, not an extra task for this report. If it does not open, the required explanation and records are here.

Case B D08 assignment · Official PLTW section hub · Activity 1.1.4 Blood Evidence

Sources and optional background

- S1. NIJ screening background

  cited in R2.
- S2. NIST definition

  cited in R2.
- S3. NIST, §§4.6.2–4.6.3

  cited in R5.
- S4. NIJ DNA-result background

  cited in R5.
- S5. NIST-hosted 2017 draft, §§4.2.9–4.2.12

  cited in R6.

Today's records do not establish species, donor or time of deposition. A DNA comparison would be separate evidence; none is supplied here. A route does not produce a new result or identify a donor.

PBS UNIT 1 · CASE B · RESPAWN · PERIOD 6A-7B

Five Tests, One Question

The evidence analysis circuit that closes the investigation into the death of Dana Okafor, 29.

CASE	DATE	SCENE
RESPAWN (JH-26-0831-B)	**Thursday, September 17, 2026**	**Respawn, an e-sports lounge with a smoothie counter**
BLOCK	**STATIONS**	**WET LAB**
80 minutes	**5 mini labs**	**SEC 03 only**

YOUR CHARGE TODAY

By the end of this block you will say whether the death of Dana Okafor was an accident or foul play, and you will back that with at least four exhibits drawn from at least three different evidence types.

YOU TURN IN

- **One completed packet**, every green block filled in.
- **Five graphs**, one per mini lab, plotted on the axes provided.
- **One verdict paragraph** in SEC 07, with four exhibits named across three evidence types.

Time: 80 minutes, in class. Every station is timed. You will not finish if you read ahead.

GREEN RULE	GOLD GROUND	GREY GROUND	RED GROUND
You write here. Nothing else on the page is yours to fill in.	Given to you. Do not re-derive it. Controls and reference values live here.	Instructions from Mr. Mendoza. Read before you start the step.	Safety. Read it before you touch any material.

SEC 01 How a test earns an answer

6 min

WHY THIS MATTERS

Forensic laboratories in the United States handle hundreds of thousands of evidence submissions a year, and the single most common reason a result is thrown out in court is not bad chemistry. It is a missing control. A test nobody can check is a test nobody has to believe.

READ THIS

Today is five short investigations, not five worksheets. Each one has the same three parts, and the whole point of the block is that you can name those parts by the end of it. This is the part of today that will be on next week's exam.

THE SHAPE OF EVERY TEST YOU RUN TODAY

INDEPENDENT

the one thing you change on purpose

DEPENDENT

the thing you measure because it responds

CONTROLLED

everything you deliberately hold the same

THE CONTROL GROUP

A run where you already know what should happen. If the control does not do what it should, every other result in that mini lab is void, no matter how good it looks.

Today every control is already set up for you, and the reason it is there is printed next to it.

The parts of one test. Read the three boxes before SEC 02 and keep them in view all block. It does not supply any variable for any of today's mini labs; you name those yourself in each green block.

YOUR WORK · YOU COMPLETE THIS

In one sentence of your own, what is a control group for?

A classmate says, "my result looks clean, so I do not need the control." Write the one sentence you would say back.

SEC 02 Mini lab 1 · The print on the surface

15 min

WHY THIS MATTERS

No two people have ever been found to share a complete fingerprint, which is why prints have been used to identify people for over a century. In the same century, wrongful convictions have also turned on print examiners who were sure and wrong. Both facts are true, and they are why the procedure below makes you classify before you compare.

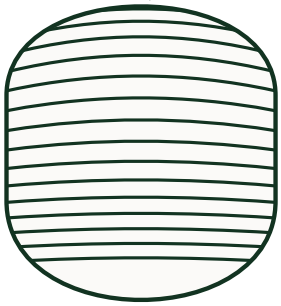
READ THIS

A print lifted from the scene is on the left of EXHIBIT FP-1. Five reference prints are on file. You work in two passes: **classify** the pattern, which narrows the crowd, then **compare minutiae**, which is the only step that can point at one finger.

Read this before you decide anything: a print proves that a finger touched a surface. It does not say when, and it does not say why. Some of the people on file have an ordinary reason to have touched the customer side of the smoothie counter.

STEP 1 REFERENCE: which of the three ridge patterns is it?

Every fingerprint belongs to one of three ridge patterns. Naming which one is called classifying the print. Do that first: it narrows the crowd, and it never names one person.



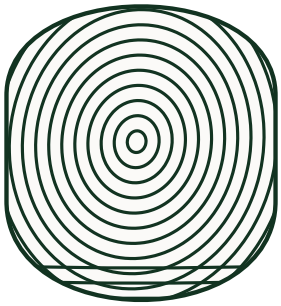
ARCH

Ridges enter one side, rise, and leave the other. No delta.



LOOP

Ridges turn back the way they came. One delta (the triangle).



WHORL

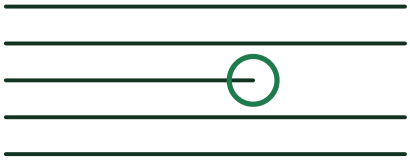
At least one ridge makes a full circle around the core.

The three ridge patterns. Use it for the first pass only. It does not supply the pattern of any print on the evidence sheet.

STEP 2 REFERENCE: the two marks you will count

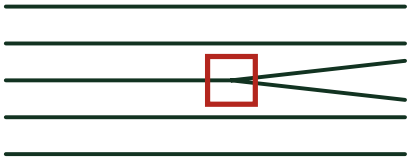
Minutiae are where ridges stop or split. Their positions relative to each other are what identify one finger.

RIDGE ENDING



One ridge simply stops.

BIFURCATION



One ridge splits into two.

The two minutiae marks. A circle is a ridge ending, a square is a bifurcation. It does not supply the position of any minutia on any print you have to compare.

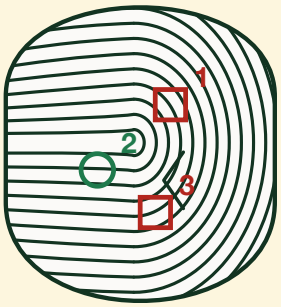
CONTROL GROUP · ALREADY SET UP FOR YOU

Your control is the victim's own reference print, printed on the reverse of your evidence sheet. Dana Okafor lived and worked at this scene, so that print should appear on scene surfaces. Check that your procedure finds it before you trust your procedure on anybody else. A method that cannot find the print you know is there has not earned an opinion about the prints you are unsure of.

DO THIS

1. Under each reference print in EXHIBIT FP-2, write which of the three ridge patterns it is: arch, loop or whorl. Naming it is called classifying the print.
2. Do the same for the scene print, and write it in your table below.
3. Cross out every reference whose ridge pattern is different from the scene print. Record how many are left.
4. For each remaining reference, compare the three numbered minutiae to the scene print: same type, same position relative to the core.
5. Record the number of minutiae that agree, out of three, for each remaining reference.
6. Plot your agreement counts on the graph. Then answer the two questions in the green block.

EXHIBIT FP-1: the print lifted from the scene



Lifted from the surface named in your case pack.

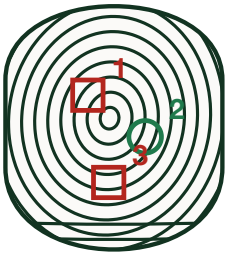
Its three minutiae are circled and numbered 1, 2, 3.

Circle = ridge ending. Square = bifurcation.

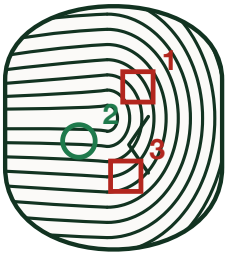
What this print can establish: that this finger touched that surface at some time. Not when. Not why.

Name the ridge pattern first. Then compare the three marks.

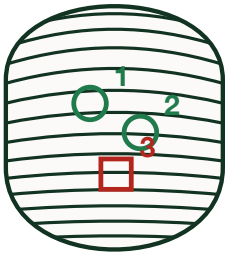
EXHIBIT FP-2: the five reference prints on file



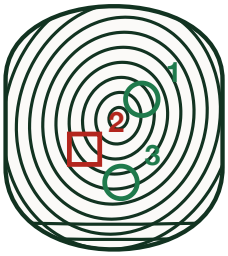
J. Whitfield
fired employee
arch, loop or whorl?



M. Nguyen
shift lead, found her
arch, loop or whorl?



P. Rao
plaza manager
arch, loop or whorl?



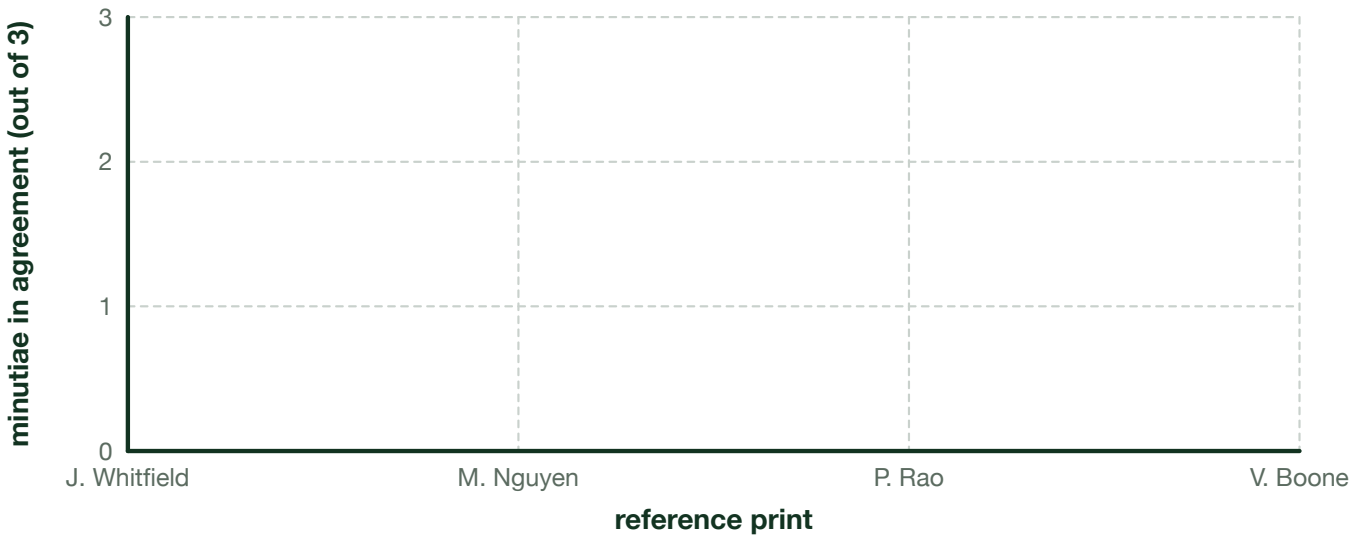
V. Boone
rival lounge owner
arch, loop or whorl?

Write arch, loop or whorl under each print. Then decide which of them the scene print could have come from.

The scene print and the four references. It does not supply a ridge pattern, a minutiae count, or a match. Those are the three things you produce.

MINI LAB 1 · RECORD YOUR COMPARISON

Reference print	**Ridge pattern** arch, loop or whorl	**Same pattern as the scene print?** yes / no	**Marks in agreement** out of 3
J. Whitfield			
M. Nguyen			
P. Rao			
V. Boone			



Plot one bar per reference. It does not supply any bar height.

YOUR WORK · YOU COMPLETE THIS

Which reference print could the scene print have come from, and which step told you: naming the ridge pattern, or comparing the marks?

That person has a reason to have touched the customer side of the smoothie counter that has nothing to do with this death. Write it. Then write what the print does and does not prove.

SEC 03 Mini lab 2 · Serial dilution, the only wet lab today

20 min

WHY THIS MATTERS

A presumptive blood test can find blood that has been wiped, washed and painted over, at dilutions far below what an eye can see. That sensitivity is why investigators still swab a scene that looks clean, and the number you measure today is exactly the number that decides whether a faint pink result means anything at all.

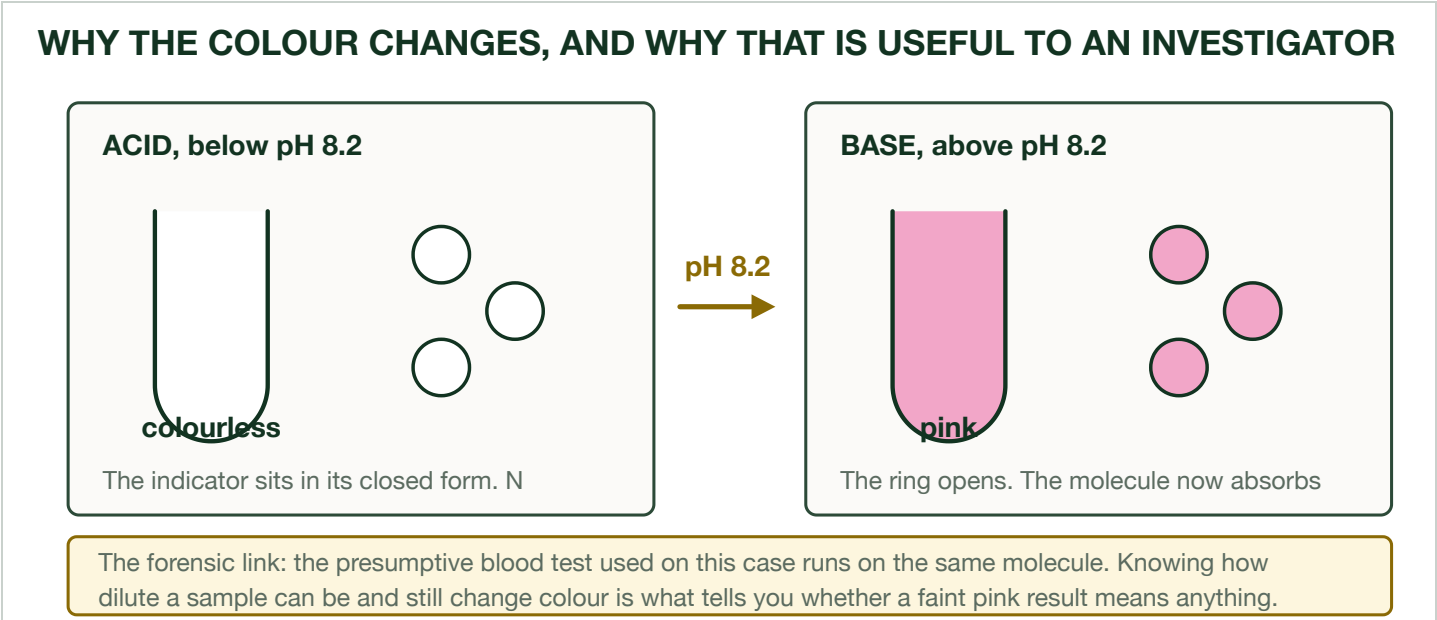
READ THIS

This is the only wet lab today. You are making a serial dilution of hydrochloric acid and using phenolphthalein, the same indicator molecule that sits inside the presumptive blood test used on this case, to find how far you can dilute something and still detect it.

A **serial dilution** is the same dilution done over and over. Each tube takes 1.0 mL from the tube before it into 9.0 mL of water, so each tube is one tenth the concentration of the one before it. Five tubes gets you from the stock down to one hundred thousandth of it, using nothing but a pipette.

SAFETY · READ BEFORE YOU TOUCH ANYTHING

- **Goggles on before the rack is in front of you.** Aprons on. Long hair tied back.
- 0.1 M hydrochloric acid and 0.1 M sodium hydroxide are both dilute, and both still burn eyes. Neither goes near a face.
- The phenolphthalein solution is made up in alcohol and is flammable. There is no flame at this station and none is permitted.
- Anything spilled on skin goes straight under the tap for a full minute, then you tell me. You do not clean it up first.
- Everything in the rack is rinsed into the labelled waste carboy, not the sink.



Why the colour changes. The indicator is colourless in acid and pink above pH 8.2. It does not supply the pH of any tube in your rack.

CONTROL GROUP · ALREADY SET UP FOR YOU

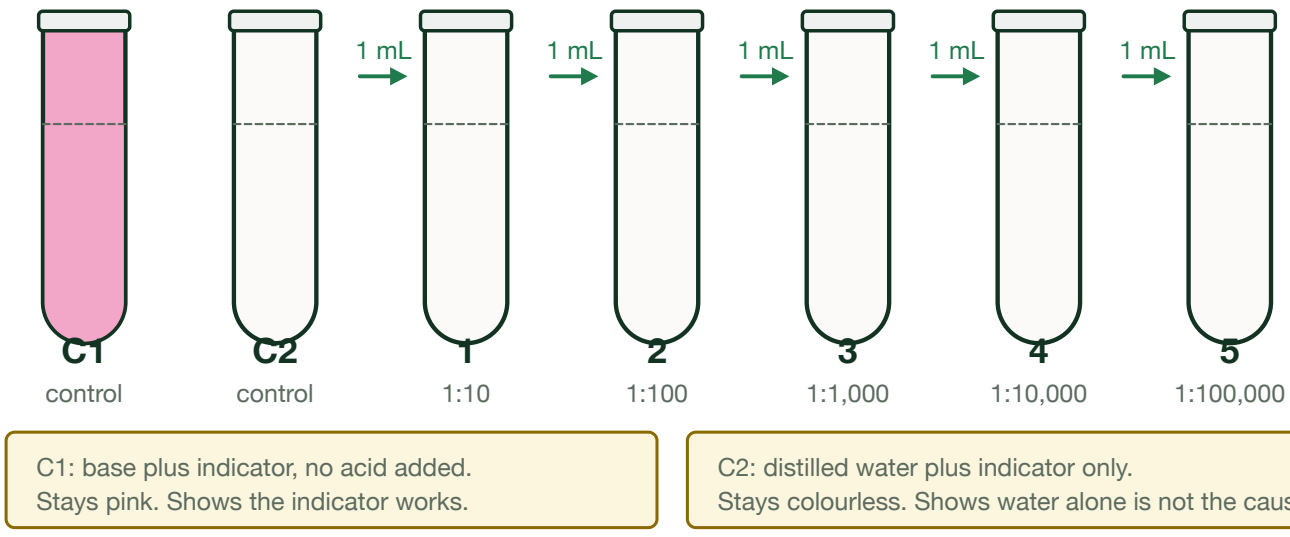
Two control tubes are already made up and already in your rack.

- **C1, base plus indicator, no acid.** Stays pink for the whole block. It proves the indicator in your rack is working. If C1 is not pink, your indicator is dead and every colourless tube you report is meaningless.
- **C2, distilled water plus indicator only.** Stays colourless. It proves that water and glassware alone do not produce a colour. If C2 turns pink, something in your glassware is contaminated and the run is void.

Check both before tube 1 and again at the end. Record both checks in the table.

SET-UP: the rack as it will be waiting at your station

Each tube already holds 9.0 mL of distilled water. You add 1.0 mL from the tube to its left, mix, and move on.



C1: base plus indicator, no acid added.
Stays pink. Shows the indicator works.

C2: distilled water plus indicator only.
Stays colourless. Shows water alone is not the cause.

The rack as it will be waiting. The two control tubes are drawn with their colours because a control is given to you. It does not supply the colour, the drop count or the concentration of any of the five dilution tubes.

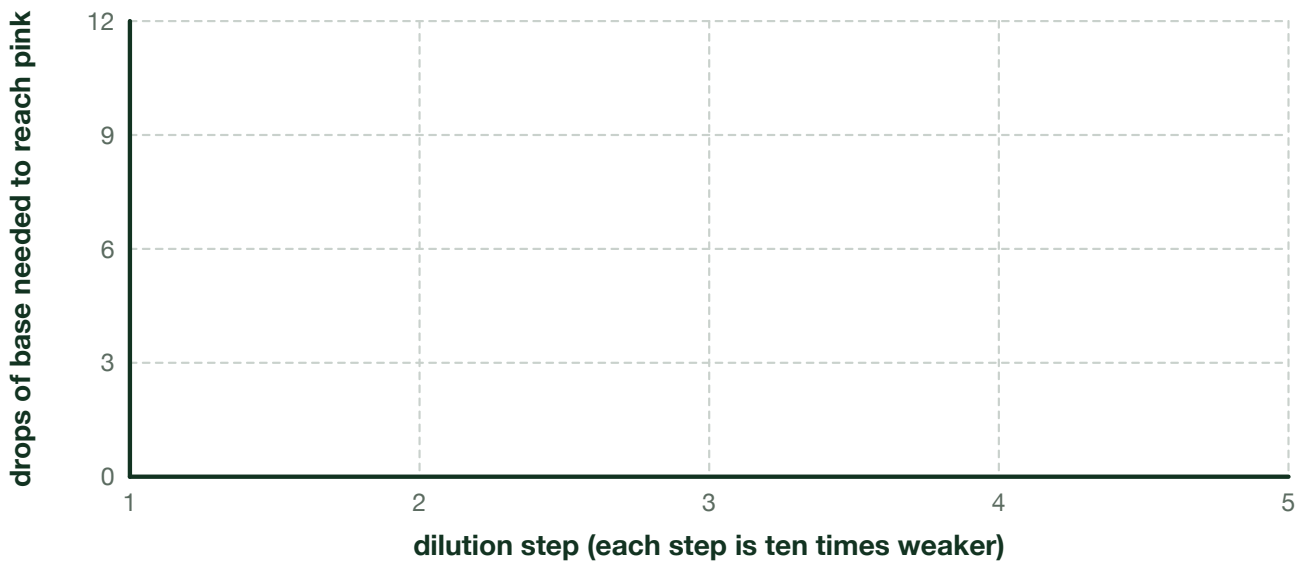
DO THIS

1. Check C1 is pink and C2 is colourless. Record both in the table. If either is wrong, stop and raise your hand.
2. Tube 1 already holds 9.0 mL of water. Add 1.0 mL of the stock acid. Cap and invert three times.
3. Move 1.0 mL from tube 1 into tube 2. Invert three times. Repeat down the row to tube 5, new tip each time.
4. Add two drops of phenolphthalein to every tube, 1 through 5.
5. Add 0.1 M sodium hydroxide to tube 1 one drop at a time, swirling after each drop, until the pink stays for a full five seconds. Record the number of drops.
6. Repeat step 5 for tubes 2, 3, 4 and 5. Record every drop count.
7. Re-check C1 and C2. Record. Then plot drops against dilution on the graph.

MINI LAB 2 · RECORD YOUR DILUTION SERIES

Tube	**Dilution from stock** factor	**Concentration** mol/L	**Drops of base to reach pink** drops	**Colour before base** pink / colourless
C1	**('control',)**	**('0.1 M base',)**	**('none needed',)**	
C2	**('control',)**	**('water only',)**	**('none needed',)**	
1	**('1:10',)**	**('0.010',)**		
2	**('1:100',)**	**('0.0010',)**		
3	**('1:1,000',)**	**('0.00010',)**		
4	**('1:10,000',)**	**('0.000010',)**		

5	('1:100,000',)	('0.0000010',)		



Plot one point per tube, then join them. The shape of the line is the answer, not any one point.

Plot drops against dilution step. It does not supply any point, the shape of the line, or the detection limit.

YOUR WORK · YOU COMPLETE THIS

Each step is ten times weaker than the one before. What happened to the drop count at each step, and does the pattern match that?

Which tube was the last one where you could still tell something was there? That is your detection limit. Write the tube and its concentration.

Exhibits E2-console and E2-floor gave a faint pink on the presumptive test, and the two controls on file, E2-ctrl-soda and E2-ctrl-rust, are there because both can also turn a presumptive test pink. Using your detection limit, write one sentence on what a faint pink does prove and one on what it does not.

SEC 04 Mini lab 3 · Gel electrophoresis of the scene swabs

15 min

WHY THIS MATTERS

DNA profiling has freed more than two hundred wrongly convicted people in the United States and has identified thousands of others. It does both jobs with the same property: fragments of different lengths travel different distances through a gel. Everything below is that one idea, used carefully.

READ THIS

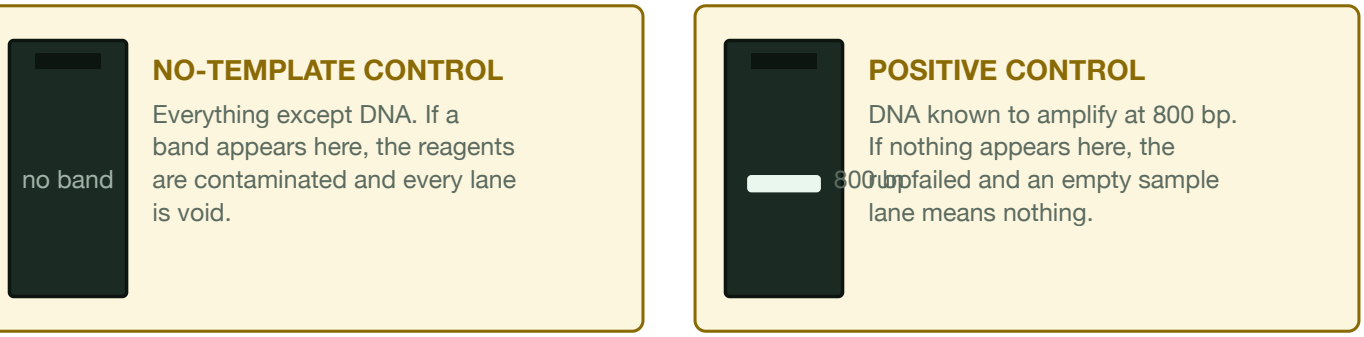
DNA is cut into fragments, loaded into wells at the top of a gel, and pulled through by an electric field. DNA carries a negative charge, so it travels toward the positive end. **Short fragments travel further than long ones**, because the gel is a mesh and small pieces slip through it faster.

Lane 1 is a **ladder**: fragments of known size, printed on the figure. You use the ladder to build a **standard curve**, and then read every unknown band off that curve. That is the whole method.

CONTROL GROUP · ALREADY SET UP FOR YOU

Two control lanes are already on your gel and they do two different jobs. Look at both before you read a single sample lane.

THE TWO CONTROL LANES, AND WHAT EACH ONE RULES OUT



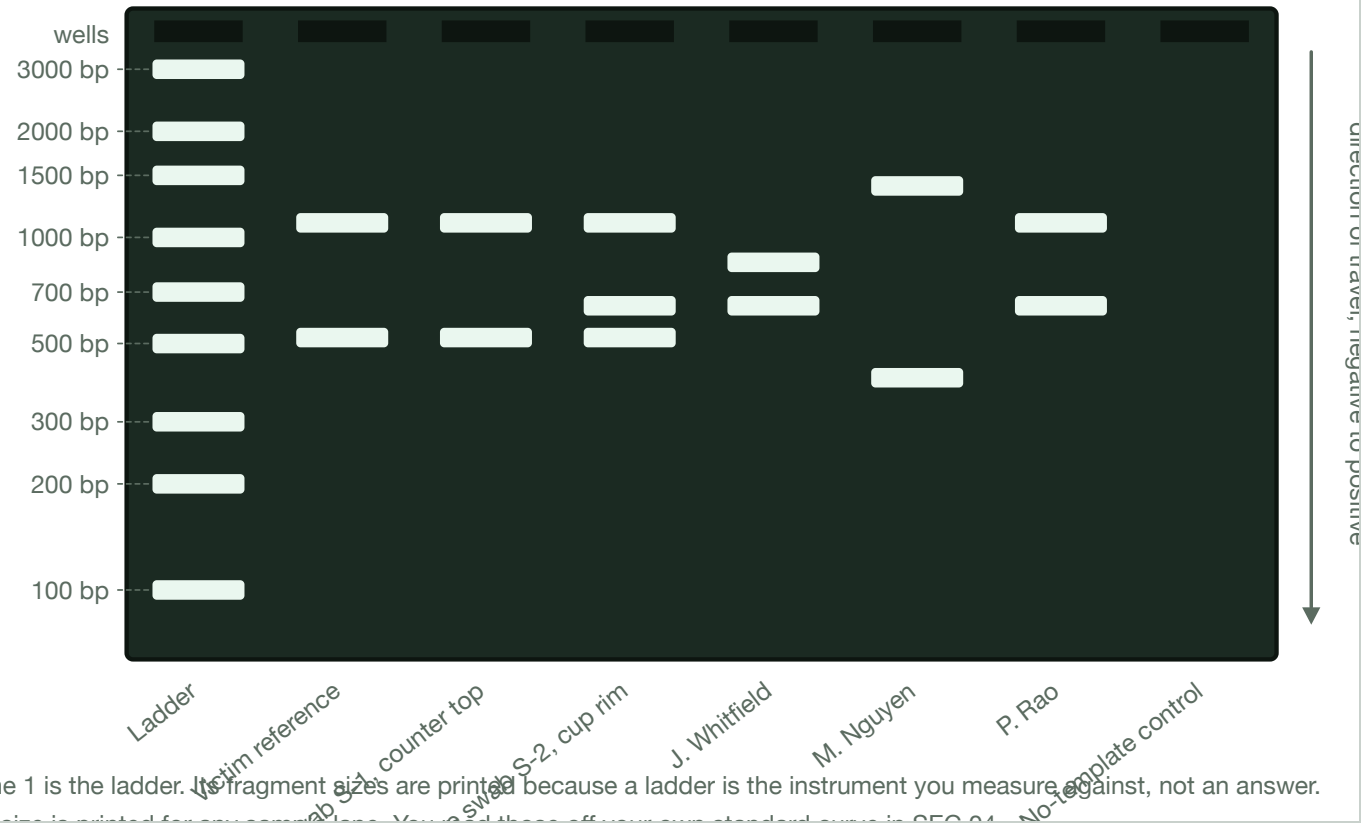
The two control lanes. It does not supply whether either control on your own gel passed; you check that yourself in step 1.

DO THIS

1. Check the no-template control lane is empty and the positive control shows its band. Record both. If either fails, the gel is void and you write that instead of results.
2. With a ruler, measure from the bottom of each well to the centre of each band, in millimetres. Record every distance.
3. Plot the ladder on the graph: distance travelled on the x axis, fragment size on the y axis. The y axis is already spaced by powers of ten.
4. Draw the best straight line you can through the ladder points. That line is your standard curve.
5. For each sample band, find its distance on the x axis, go up to your line, and read the size across. Record the sizes.

6 Compare the scene lanes to the reference lanes band by band, and fill in the green block.

EXHIBIT GEL-1: the evidence gel, as it came off the imager

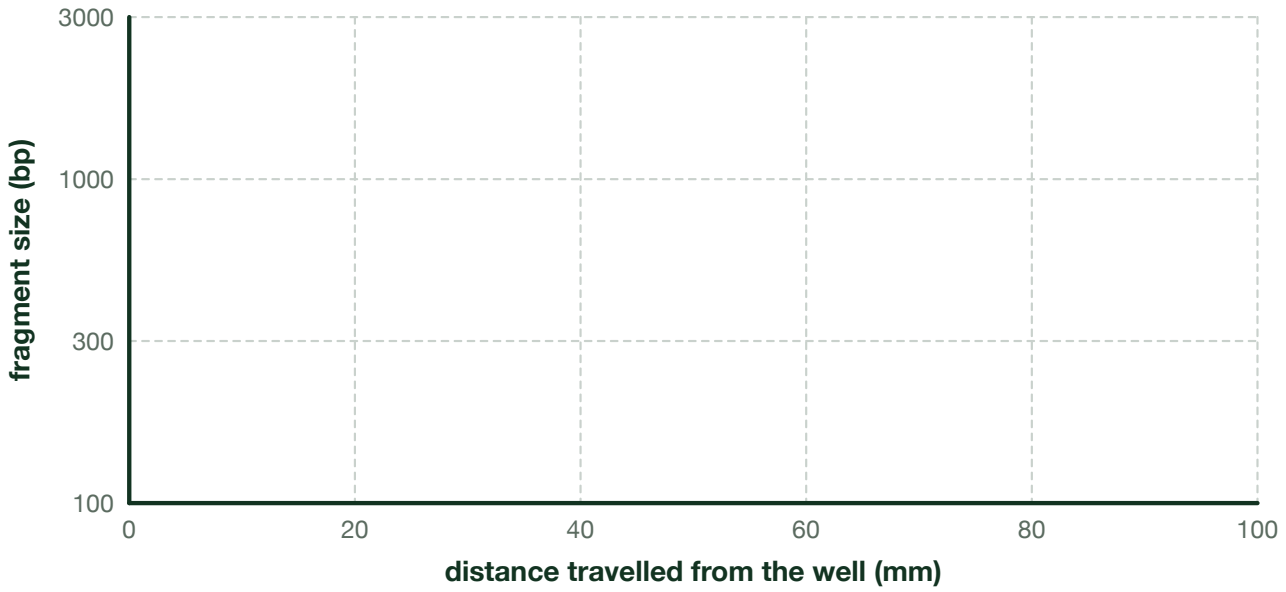


Lane 1 is the ladder. Its fragment sizes are printed because a ladder is the instrument you measure against, not an answer. No size is printed for any sample lane. You read those off your own standard curve in SEG-04.

The evidence gel. Ladder sizes are printed because the ladder is the instrument. It does not supply the size of any sample band, and it does not mark any lane as a match.

MINI LAB 3 · READ YOUR GEL

Lane	**Distance to band 1** mm	**Distance to band 2** mm	**Size of band 1** bp	**Size of band 2** bp
Victim reference				
Scene swab S-1, counter top				
Scene swab S-2, cup rim				
J. Whitfield				
M. Nguyen				
P. Rao				
No-template control				



Plot the nine ladder bands first, draw one straight line through them, then read your unknowns off it.

Build the standard curve here. It does not supply a single ladder point or the line.

YOUR WORK · YOU COMPLETE THIS

Do the two scene swabs share every band with the victim reference? Write which bands match and which do not.

One scene lane carries an extra band that the victim does not have. Which references also carry that band? Name every one of them.

You have one shared band and more than one person who carries it. Write the one sentence that says honestly what this gel can and cannot establish about who else touched that item.

SEC 05 Mini lab 4 · Bloodstain shape and angle of impact

12 min

WHY THIS MATTERS

Bloodstain pattern analysis answers a question no other evidence at a scene can: where in the room was the person when it happened, and how high off the floor. That single number, the height of the origin, is often the difference between a fall and a blow.

READ THIS

A drop that falls straight down lands round. A drop that arrives at a shallow angle lands stretched into a long ellipse, and it stretches in a predictable way. Measure the short axis and the long axis and the ratio gives you the angle it arrived at.

The four stains in EXHIBIT BS-1 were recorded on the tile beside the smoothie counter and are drawn at the scale they were measured at, so your ruler works directly on the page.

CONTROL GROUP · ALREADY SET UP FOR YOU

Three control stains were dropped on purpose, from one fixed height, onto the same surface, at angles we set to 90, 60 and 30 degrees. Only the angle changed, so the angle is the independent variable and the shape of the stain is the dependent variable. Their measurements are printed for you. Check the formula against these three before you measure a single stain from the scene.

CONTROL SET: three drops released at angles we set on purpose

Same fluid, same height, same surface. Only the angle changed. Check the formula on these before you touch the evidence.



angle set: 90 deg

width: 26 mm
length: 26 mm
w / l = 1.00

sin of your angle should match w / l



angle set: 60 deg

width: 24 mm
length: 28 mm
w / l = 0.86

sin of your angle should match w / l



angle set: 30 deg

width: 16 mm
length: 32 mm
w / l = 0.50

sin of your angle should match w / l

The control set. Widths and lengths are printed because a control is given. It does not supply the angle of any scene stain.

DO THIS

1. Measure the width and length of each control stain and check that width divided by length matches the sine of the angle we set. Use the sine table in the index.
2. Measure the width and the length of stains A, B, C and D with your ruler, in millimetres.
3. For each stain, divide width by length. Record the ratio to two decimal places.
4. Look each ratio up in the sine table in the index and record the angle of impact.
5. Plot ratio against angle on the graph so you can see the relationship, not just four numbers.
6. Answer the green block. The last question is the one your verdict rests on.

EXHIBIT BS-1: four stains from the scene, drawn at actual measured scale

Measure the width (the short axis) and the length (the long axis) of each stain with your ruler, in millimetres.

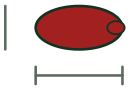
STAIN A



length = _____ mm

width = _____ mm

STAIN B



length = _____ mm

width = _____ mm

STAIN C



length = _____ mm

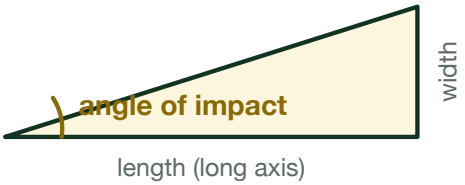
width = _____ mm

STAIN D



length = _____ mm

width = _____ mm



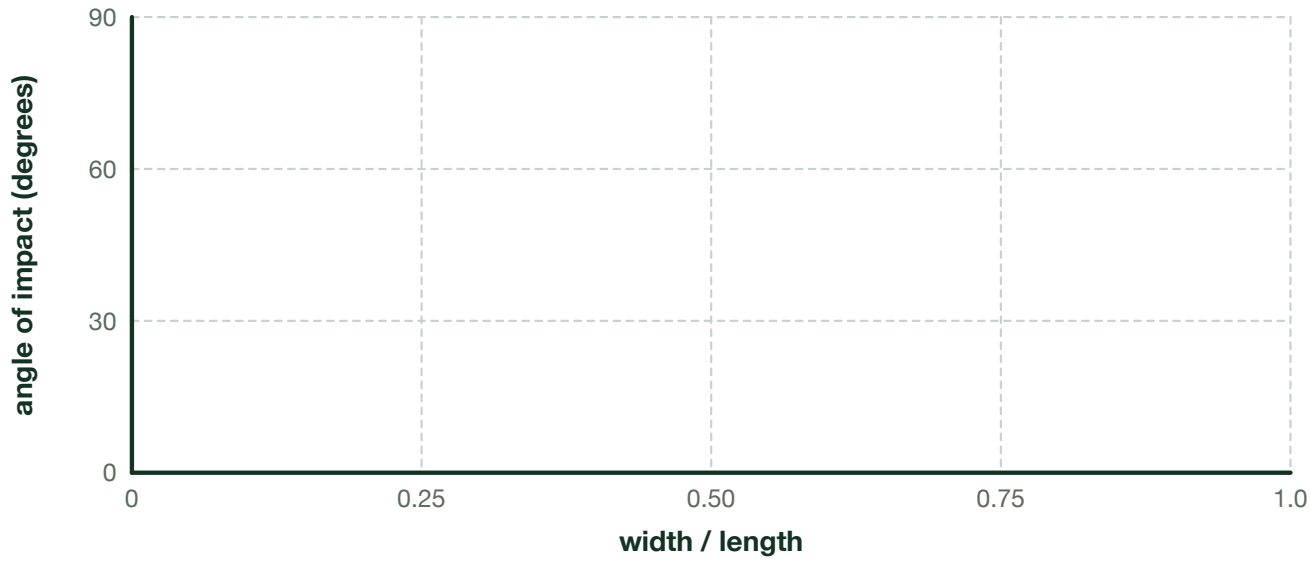
sin (angle of impact) = width / length

A round stain means the drop fell straight down, near 90 degrees. A long thin stain arrived at a shallow angle.

The four scene stains, drawn at measured scale. It does not supply a width, a length, a ratio or an angle for any of the four.

MINI LAB 4 · MEASURE THE STAINS

Stain	**Width** mm	**Length** mm	**Width / length** to 2 dp	**Angle of impact** degrees
Control 90				
Control 60				
Control 30				
A				
B				
C				
D				



Plot your three controls first. If they do not sit on a smooth curve, your measuring is off before the evidence is touc

Ratio against angle. It does not supply any point or the curve.

YOUR WORK · YOU COMPLETE THIS

Which stain arrived closest to straight down, and which arrived at the shallowest angle? Give the stain letter and its angle for each.

Your case pack records that these stains sit between 1.3 and 1.5 metres above the floor. Was the person upright or already on the floor when these stains were made? Answer, then give the measurement that made you say so.

Write the one thing this mini lab cannot tell you, no matter how carefully you measured.

SEC 06 Mini lab 5 · Force, fall height and injury

12 min

WHY THIS MATTERS

Emergency physicians and crash investigators use the same energy arithmetic you are about to use, because the human body responds to energy delivered, not to how frightening an object looks. An object that seems harmless can carry enough energy to break bone, and a heavy object that barely moved cannot.

READ THIS

The supply shelf at this scene ended up on the floor across part of the body. The question is whether it could have caused the fatal injury, and that is an arithmetic question before it is anything else.

An object held above the floor stores energy. When it falls, that stored energy is delivered on impact. **Energy equals mass times gravity times height.** Mass and height come from the case record. The multiplication is yours.

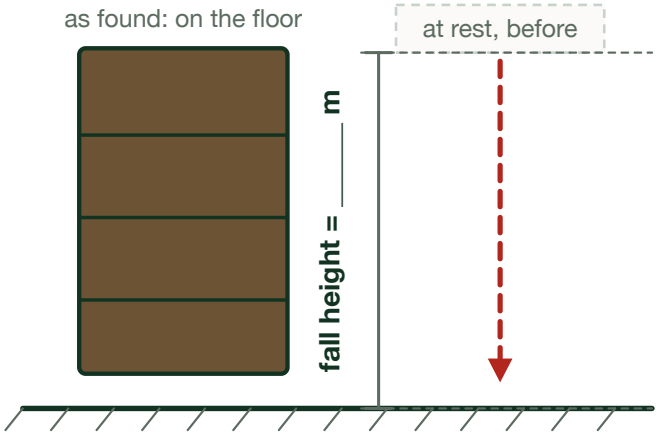
CONTROL GROUP · ALREADY SET UP FOR YOU

These two numbers are from the case record and are given to you. Do not estimate them and do not re-derive them.

- **Mass of the supply shelf:** 14.5 kg, weighed by the evidence unit.
- **Height it fell:** 0.85 m, measured at the scene from its mounting to the floor.
- **Gravity:** 9.8 m/s squared.

The reference band of published injury thresholds is also given. You place your own answer on it.

EXHIBIT FR-1: the supply shelf and the distance it fell



ENERGY AT THE MOMENT OF IMPACT

E = m x g x h

m = mass of the object, in kilograms
g = 9.8 metres per second squared
h = height it fell, in metres
E comes out in joules

Mass is printed in your case pack.
Height is yours to measure from the scene photograph scale. Both go in SEC 06.

What this exhibit can establish: how much energy the falling object carried. Not whether it fell on its own.
That second question is the one your whole case turns on, and it takes more than this one number to answer.

The supply shelf and its fall. It does not supply the energy; that is the calculation you do in the table below.

DO THIS

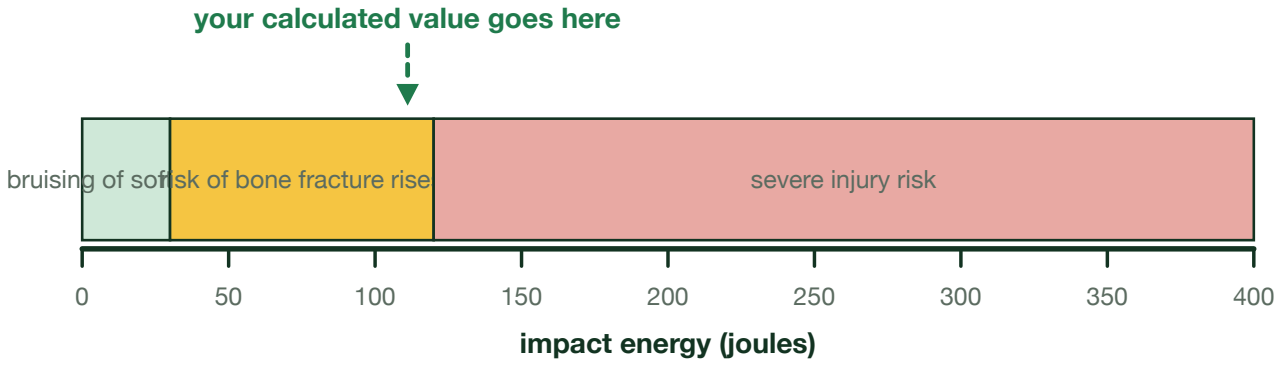
1. Write the mass and the height from the case record into the table.
2. Multiply mass by 9.8 by height. Write the answer in joules. Show the multiplication, not just the result.
3. Mark your answer on the reference band with an arrow.
4. Read across to the injury range your value lands in and write that range down.
5. Plot the energy that this object would carry from four different heights on the graph, so you can see how fast energy grows with height.
6. Answer the green block.

MINI LAB 5 · THE ENERGY ARITHMETIC

Quantity	Value	Unit
Mass of the supply shelf	**('14.5',)**	**('kg',)**
Gravity	**('9.8',)**	**('m/s squared',)**
Height of fall	**('0.85',)**	**('m',)**
Energy delivered (m x g x h)		**('joules',)**
Injury range this lands in		**('from the band',)**

REFERENCE BAND: published injury research, by energy range

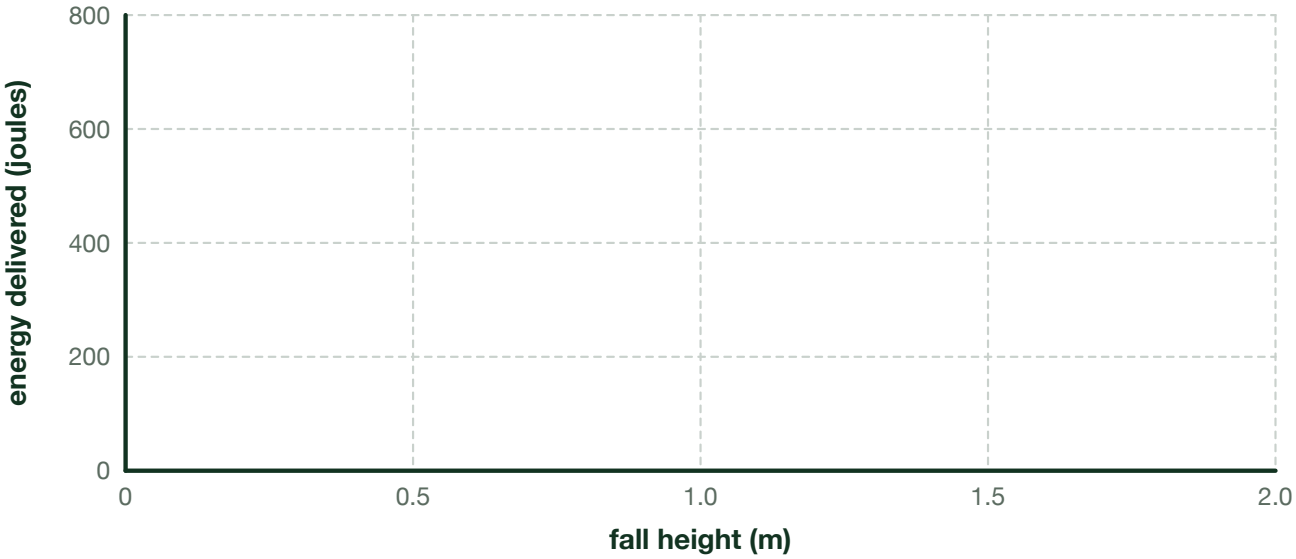
Given to you. You do not derive these. You place your own calculated value on the same scale and read across.



These ranges come from published biomechanics reviews and are printed in the index at the back of this packet.

A range is a risk, never a verdict: the same energy injures two people differently.

Published injury threshold bands. Given to you, with the sources in the index. It does not supply your calculated energy or where it lands.



Use the same mass for all four points. Change only the height. That makes height your independent variable.

Energy against fall height. It does not supply any point or the shape of the line.

YOUR WORK · YOU COMPLETE THIS

Write your energy value and the injury range it landed in.

Look at your graph. When you doubled the height, what happened to the energy? Write the relationship in one sentence.

Can this object have caused a fatal injury? Answer yes, no, or cannot tell from this alone, and give the number that decided it.

SEC 07 The verdict

6 min, finish at home if needed

WHY THIS MATTERS

A medical examiner has to put one word on a death certificate: natural, accident, suicide, homicide, or undetermined. Undetermined is a real and honest answer, and using it when the evidence has run out is a professional act, not a failure.

READ THIS

You now have five results. Put them together. The question this case has been asking since Day 1 is the one printed below.

DID THE SUPPLY SHELF CAUSE THE FATAL INJURY AS IT TOPPLED, OR DID SOMETHING ELSE HAPPEN AND THE SHELF COME DOWN AFTERWARDS?

The rule for your verdict paragraph: at least four exhibits, drawn from at least three different evidence types, and every claim stops where the evidence stops. If two exhibits disagree, say so. A disagreement you name is worth more than a conclusion you force.

CONTROL GROUP · ALREADY SET UP FOR YOU

The claim ceilings for this case, unchanged since Day 1. Every one of them limits something you produced today.

- Classroom evidence supports a classroom finding. It cannot convict a real person.
- A fingerprint proves touch, not when and not why.
- One shared band is not a profile. It narrows a crowd. It does not name a person.
- A presumptive test says maybe. Only a confirmatory test says blood, and only DNA says whose.
- An injury range is a risk, not a verdict. The same energy injures two people differently.

YOUR VERDICT · YOU COMPLETE THIS · THIS IS THE GRADED PIECE

Fill the evidence line first. One row per exhibit you are going to use.

Exhibit	Evidence type	What it establishes	What it cannot establish

Your verdict, in one sentence. Accident, foul play, or undetermined.

Your reasoning. Name each exhibit as you use it. If two exhibits pull in different directions, say which and why you weighted one over the other.

The one test you would run next, and exactly what result would change your mind.

INDEX References, tables and sources

Sine table, for the bloodstain angles in SEC 05

width / length	angle of impact (degrees)
0.17	10
0.26	15
0.34	20
0.42	25
0.50	30
0.57	35
0.64	40
0.71	45
0.77	50
0.82	55
0.87	60
0.91	65
0.94	70
0.97	75
0.98	80
1.00	90

Round your ratio to the nearest value in the table.

Words used in this packet

- **Minutia** (plural minutiae): a point where a ridge stops or splits. Their relative positions are what identify a finger.
- **Serial dilution**: the same dilution repeated, so each step is a fixed fraction of the one before it.
- **Detection limit**: the weakest concentration a test can still find. Below it, a negative result means nothing.
- **Standard curve**: a line built from knowns, used to read unknowns.
- **Presumptive test**: a fast test that says maybe. A confirmatory test says yes.
- **Angle of impact**: the angle at which a drop met the surface, found from the shape it left.
- **Joule**: the unit of energy. One joule is roughly the energy of a small apple falling one metre.

Where the given numbers come from

- Injury threshold bands in SEC 06 are drawn from published biomechanics reviews of blunt impact tolerance. They are ranges of risk across a population, not thresholds for one person.

- The colour change point of phenolphthalein, pH 8.2, is the standard value for the indicator.
- Ladder fragment sizes in SEC 04 are the sizes printed by the supplier of a standard 100 bp ladder.
- Mass and fall height in SEC 06 are from the RESPAWN case record.

What this case is, and is not

RESPAWN (JH-26-0831-B) is a John Hay original teaching case written for this classroom. The scene, the persons of interest, the statements and every measurement in this packet were authored for instruction. No part of it is a real person, a real record, or a real death. Nothing produced in this packet can be used to make a claim about anyone outside this case.

PBS UNIT 1 · CASE B · RESPAWN

Guided Notes

The nine ideas from Thursday's circuit that are on next week's exam. Fill the blanks as we go.

DATE	USE	EXAM
Thursday, September 17, 2026	**Study from this**	**Next week**
COPY	**PAGES**	**CASE**
Student	**3**	**JH-26-0831-B**

YOUR CHARGE TODAY

These nine ideas are the ones a question can be built from. If you can explain all nine out loud without the page, you are ready for the exam.

YOU TURN IN

- Every blank filled.
- Your own example written in the last box of each idea.

Time: Filled in during class, studied from at home.

GREEN RULE	GOLD GROUND	GREY GROUND	RED GROUND
You write here. Nothing else on the page is yours to fill in.	Given to you. Do not re-derive it. Controls and reference values live here.	Instructions from Mr. Mendoza. Read before you start the step.	Safety. Read it before you touch any material.

SEC 01 A control group

READ THIS

Idea 1 of 9. This is one of the nine. Expect to see it on the exam.

A control group is _____.

If the control fails, every other result in that run is void.

YOU COMPLETE THIS

Your own example, from today, in one sentence:

SEC 02 The independent variable

READ THIS

Idea 2 of 9. This is one of the nine. Expect to see it on the exam.

The independent variable is _____.

In the bloodstain control set, it was the angle we dropped from.

YOU COMPLETE THIS

Your own example, from today, in one sentence:

SEC 03 The dependent variable

READ THIS

Idea 3 of 9. This is one of the nine. Expect to see it on the exam.

The dependent variable is _____.

In the bloodstain control set, it was the shape of the stain.

YOU COMPLETE THIS

Your own example, from today, in one sentence:

SEC 04 The ridge pattern

READ THIS

Idea 4 of 9. This is one of the nine. Expect to see it on the exam.

The ridge pattern is _____.

Naming it narrows a crowd. It can never name one person.

YOU COMPLETE THIS

Your own example, from today, in one sentence:

SEC 05 Minutiae

READ THIS

Idea 5 of 9. This is one of the nine. Expect to see it on the exam.

Minutiae is _____.

Their positions relative to each other are what identify one finger.

YOU COMPLETE THIS

Your own example, from today, in one sentence:

SEC 06 Serial dilution

READ THIS

Idea 6 of 9. This is one of the nine. Expect to see it on the exam.

Serial dilution is _____.

It is how you find the weakest thing a test can still detect.

YOU COMPLETE THIS

Your own example, from today, in one sentence:

SEC 07 Detection limit

READ THIS

Idea 7 of 9. This is one of the nine. Expect to see it on the exam.

Detection limit is _____.

Below it, a negative result tells you nothing at all.

YOU COMPLETE THIS

Your own example, from today, in one sentence:

SEC 08 A standard curve

READ THIS

Idea 8 of 9. This is one of the nine. Expect to see it on the exam.

A standard curve is _____.

On a gel, the ladder builds it and every unknown band is read off it.

YOU COMPLETE THIS

Your own example, from today, in one sentence:

SEC 09 Angle of impact

READ THIS

Idea 9 of 9. This is one of the nine. Expect to see it on the exam.

Angle of impact is _____.

A round stain fell straight down. A long stain arrived shallow.

YOU COMPLETE THIS

Your own example, from today, in one sentence:

PBS UNIT 1 · CASE B · RESPAWN · PERIOD 6A-7B

Investigation Notebook

The pages you keep for the RESPAWN investigation. Everything in green is yours to write.

CASE **JH-26-0831-B**	DATE **Thursday, September 17, 2026**	PAGES **Entry 14 to Entry 19**
KEPT **In your notebook, all year**	GRADED **On completeness and honesty**	RULE **Date every entry**

YOUR CHARGE TODAY

A laboratory notebook is a dated record of what you actually did, written while you did it. It is the difference between a result and a claim. Yours will be read by someone who was not there.

YOU TURN IN

- **Six dated entries**, one per mini lab plus the verdict.
- **Every heading printed here** filled in with your own record.
- **One honest line** per entry about what went wrong or what you are unsure of.

Time: Written during the block, not after it.

GREEN RULE	GOLD GROUND	GREY GROUND	RED GROUND
You write here. Nothing else on the page is yours to fill in.	Given to you. Do not re-derive it. Controls and reference values live here.	Instructions from Mr. Mendoza. Read before you start the step.	Safety. Read it before you touch any material.

SEC 14 Entry 14: Experimental design

READ THIS

Entry 14 records SEC 01. Head the page with the date, the case number JH-26-0831-B, and the entry number before you write anything else.

ENTRY 14 · YOU COMPLETE THIS

The independent variable in mini lab 1 was

The dependent variable was

One variable I had to hold the same was

READ THIS

Close the entry with one line: something that did not go the way you expected, or something you are still unsure of. An entry with nothing unsure in it is usually an entry written afterwards.

HONESTY LINE · YOU COMPLETE THIS

What I am unsure of

SEC 15 Entry 15: The print on the surface

READ THIS

Entry 15 records SEC 02. Head the page with the date, the case number JH-26-0831-B, and the entry number before you write anything else.

ENTRY 15 · YOU COMPLETE THIS

Which ridge pattern the scene print is

References I ruled out on the ridge pattern alone, and why

Minutiae agreement for each remaining reference

What this print proves, and what it does not

READ THIS

Close the entry with one line: something that did not go the way you expected, or something you are still unsure of. An entry with nothing unsure in it is usually an entry written afterwards.

HONESTY LINE · YOU COMPLETE THIS

What I am unsure of

SEC 16 Entry 16: Serial dilution

READ THIS

Entry 16 records SEC 03. Head the page with the date, the case number JH-26-0831-B, and the entry number before you write anything else.

ENTRY 16 · YOU COMPLETE THIS

C1 and C2 at the start

Drop counts, tubes 1 to 5

C1 and C2 at the end

My detection limit, and how I decided it

Anything that went wrong, and what I did about it

READ THIS

Close the entry with one line: something that did not go the way you expected, or something you are still unsure of. An entry with nothing unsure in it is usually an entry written afterwards.

HONESTY LINE · YOU COMPLETE THIS

What I am unsure of

SEC 17 Entry 17: The evidence gel

READ THIS

Entry 17 records SEC 04. Head the page with the date, the case number JH-26-0831-B, and the entry number before you write anything else.

ENTRY 17 · YOU COMPLETE THIS

Did both control lanes pass?

My standard curve, in words

Sizes I read for each scene band

Which references share a band with the scene, and what that does and does not mean

READ THIS

Close the entry with one line: something that did not go the way you expected, or something you are still unsure of. An entry with nothing unsure in it is usually an entry written afterwards.

HONESTY LINE · YOU COMPLETE THIS

What I am unsure of

SEC 18 Entry 18: Bloodstains and angle

READ THIS

Entry 18 records SEC 05. Head the page with the date, the case number JH-26-0831-B, and the entry number before you write anything else.

ENTRY 18 · YOU COMPLETE THIS

My three control checks

Ratios and angles for A, B, C, D

Height of origin, and what it says about whether the person was upright

What I could not determine

READ THIS

Close the entry with one line: something that did not go the way you expected, or something you are still unsure of. An entry with nothing unsure in it is usually an entry written afterwards.

HONESTY LINE · YOU COMPLETE THIS

What I am unsure of

SEC 19 Entry 19: Force and the verdict

READ THIS

Entry 19 records SEC 06 and 07. Head the page with the date, the case number JH-26-0831-B, and the entry number before you write anything else.

ENTRY 19 · YOU COMPLETE THIS

My energy calculation, written out

The injury range it landed in

My verdict in one sentence

The four exhibits I used and their types

The next test I would run, and what result would change my mind

READ THIS

Close the entry with one line: something that did not go the way you expected, or something you are still unsure of. An entry with nothing unsure in it is usually an entry written afterwards.

HONESTY LINE · YOU COMPLETE THIS

What I am unsure of

JOHN HAY BIOMEDICAL | PERSON OF INTEREST



JAE WHITFIELD

JH-26-0831-B-POI-1

AGE	**24**
ROLE IN THE CASE	**fired employee**

STATEMENT ON THE RECORD

Says they were fired two weeks ago and are furious about it, and that they have not been back since.

A statement is what a person said. It is not evidence that what they said is true.

Likeness generated for this teaching case. Not a photograph of any real person.

The likeness is generated for this teaching case. It is not a photograph of any real person. A person of interest is someone with a reason to be asked a question, not someone accused of anything.

JOHN HAY BIOMEDICAL | PERSON OF INTEREST



MARCUS NGUYEN

JH-26-0831-B-POI-2

AGE	**26**
ROLE IN THE CASE	**shift lead, found her**

STATEMENT ON THE RECORD

Says he unlocked at 7:15, found Dana behind the counter, and called 911. Works this counter on most shifts.

A statement is what a person said. It is not evidence that what they said is true.

Likeness generated for this teaching case. Not a photograph of any real person.

The likeness is generated for this teaching case. It is not a photograph of any real person. A person of interest is someone with a reason to be asked a question, not someone accused of anything.

JOHN HAY BIOMEDICAL | PERSON OF INTEREST



PRIYA RAO

JH-26-0831-B-POI-3

AGE	**41**
ROLE IN THE CASE	**plaza manager**

STATEMENT ON THE RECORD

Says there is a lease dispute and she wants the unit back, and that she has only been in the lobby.

A statement is what a person said. It is not evidence that what they said is true.

Likeness generated for this teaching case. Not a photograph of any real person.

The likeness is generated for this teaching case. It is not a photograph of any real person. A person of interest is someone with a reason to be asked a question, not someone accused of anything.

JOHN HAY BIOMEDICAL | PERSON OF INTEREST



VICTOR BOONE

JH-26-0831-B-POI-4

AGE **33**

ROLE IN THE CASE **rival lounge owner**

STATEMENT ON THE RECORD

Says he lost the regional tournament contract to Dana and that losing a contract is not a reason to hurt anyone.

A statement is what a person said. It is not evidence that what they said is true.

Likeness generated for this teaching case. Not a photograph of any real person.

The likeness is generated for this teaching case. It is not a photograph of any real person. A person of interest is someone with a reason to be asked a question, not someone accused of anything.

ASSIGNMENT 19 OF 29 Fri, Sep 18 about 80 minutes

Whose Blood, Whose DNA

Today we need to accomplish use supplied classroom typing observations to make limited comparisons, explain a reported collection plan and accurately log a case-specific late record.

Our goal is making only the claims your evidence supports.

You have to turn in Serology worksheet, Parts A–E plus your case's late-record log, in one worksheet.

Schoology assignment: Wk4 D09 · Whose Blood, Whose DNA

1 READ

Your materials for this assignment start on the very next page, in this order: **Fri antibody and ELISA lecture** (10 pages); then **student handout and response sheet (write on this)** (22 pages); then **Fri ELISA debate preparation manual** (7 pages); then **Fri guided notes STUDENT** (6 pages); then **Week4 study guide for the exam** (6 pages). Read the briefing first. Write your answers on the sheet. Everything you need for this assignment is in those pages.

2 DO

Start in Part 1. Put your period and investigator code on the worksheet and label it supplied illustrative case record. Read R1 to R4, then answer Part A. A1 uses the ABO typing rule in R2, and you copy the first three words of the sentence you used. A2 uses R1 and R3.

3 READ

Read the worked example in Part 3 before your own case. Sample P shows one type call made from two supplied observations, and two comparisons written with their limits, on a practice sample that is not your case. Then go to Part 4 and complete B1: fill in the model type call for each observation row from its supplied anti-A and anti-B results, then compare each of your two stain calls with all five reference summaries. Keep every evidence ID, and keep an other-than category when that is all the record gives.

4 DO

Still in Part 4, write B2 and C1. B2 is a hypothetical, two sentences on what a same-type match agrees on and what it does not establish. C1 is a four-to-six-sentence explanation of one swab entry from your case's reported collection plan, using R4 for the preservation reason and the reported custody roles. Write not reported where a name or time is missing, and never invent a signature.

5 WRITE

Finish the practice calculation and the checks: B3, the 180 practice value shown with the subtraction and 180 ÷ 99 × 100 and labeled percent of the upper limit; D1, one or two sentences using agglutination and toxicology; and E1 to E3. The 180 value and the B and O hypothetical are practice, not case evidence. Check that all ten task IDs are complete.

6 DO

In the final ten minutes, log your case's late record on the last page of the worksheet, copying exactly what the record supplies and stating what it does not, then hand in the one worksheet on paper or as one PDF to your section assignment. Record route: Supplied illustrative case record, available to all students . Complete one serology worksheet: Parts A–E plus your case's late-record log. Use your class's supplied illustrative records. Your work explains a classroom comparison and a reported collection plan; it does not claim that you collected or tested a sample. Guided notes and the separate worked model are support, not extra submissions.

7
TURN IN

Now we turn it in. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Principles of Biomedical Technology, and open the assignment named **Wk4 D09 · Whose Blood, Whose DNA**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

MEDICAL INTERVENTIONS AND PRINCIPLES OF BIOMEDICAL SCIENCE

Antibodies, and the Test Built From Them

Friday's lecture: what a protein is, what an antibody is, how your body makes the right one, and how an ELISA turns all of that into a number.

DATE **Friday, September 18, 2026**	CLASSES **All three**	FORMAT **Lecture, then the model ELISA**
FIGURES **8, all labelled**	NOTES **Guided notes, separate sheet**	EXAM **Next week**

YOUR CHARGE TODAY

By the end of this lecture you will be able to draw an antibody from memory, label five parts, explain in your own words why it binds one target and not another, and say what each step of an ELISA is for.

YOU TURN IN

- **Your guided notes**, completed, with every diagram labelled.
- **The debate preparation manual**, started. It is the week's last handout.

Time: One 80 minute block.

SEC 01 What a protein is, and why that is the whole story

8 min

WHY THIS MATTERS

Every drug you have ever taken works by changing what a protein does, or by being one. Insulin is a protein. So is every antibody in your blood right now, and so is the enzyme that will turn an ELISA well from clear to coloured in front of you.

WHERE ANTIBODIES COME FROM: a protein is a folded chain

An antibody is a protein. Everything on this page is true of every protein you have ever met.

1. AMINO ACIDS

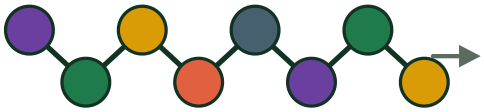
Twenty kinds. Each has a different shape and chemistry.



different side chains

2. A CHAIN

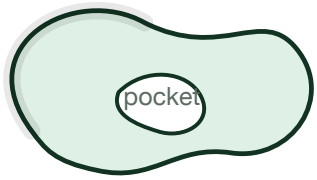
Joined in the order the gene specifies. This order is fixed.



the sequence is the instruction

3. FOLDED

The chain folds into one shape, and that shape is the job.



a pocket shaped for one partner

THE ONE SENTENCE THIS WHOLE LECTURE RESTS ON

A protein's shape decides what it can bind to, and its shape comes from the order of its amino acids. Change the order and you change the shape. Change the shape and you change what it can hold.

WHY THAT MATTERS IN A MOMENT

An antibody is a protein whose pocket is shaped for one specific piece of one specific invader. Nothing else about it is unusual. It is an ordinary protein doing an extraordinary job.

A protein is a folded chain. Amino acids in a fixed order, folded into one shape, and the shape is the job. It does not supply the sequence of any real protein.

THE POINTS, IN ORDER

- An amino acid is one link. There are twenty kinds, each with a different side chain.
- A gene gives the order. The order never varies for a given protein.
- The chain folds into one shape, and that shape decides what it can bind.
- Change the order, change the shape, change the job. That sentence is the rest of this lecture.

SEC 02 What an antibody is

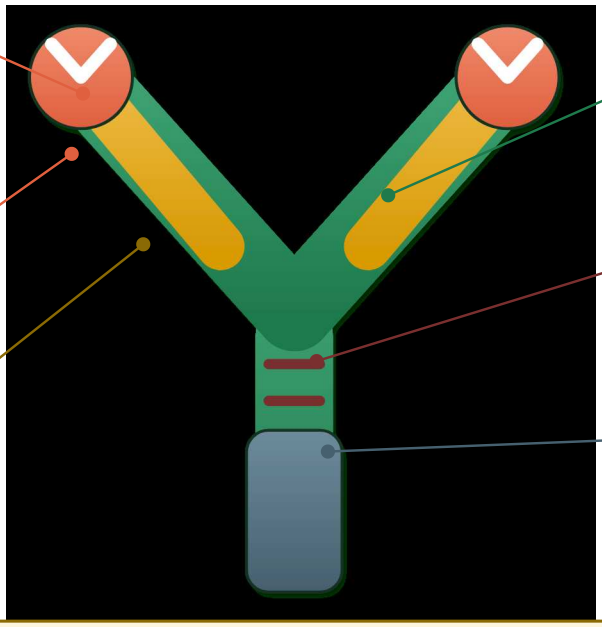
12 min

WHY THIS MATTERS

Your body is carrying somewhere near a hundred billion antibody molecules as you read this sentence, in millions of different shapes, and almost all of them will never be used. That apparent waste is the reason you survive meeting something nobody has ever met before.

THE ANTIBODY, PART BY PART

Same colours on every diagram from here on. Learn them once.



TWO ENDS, TWO JOBS. The top finds the invader. The bottom tells the rest of the immune system what to do about it.

That is why the top varies between antibodies and the bottom does not.

The antibody, part by part. Two heavy chains, two light chains, a variable tip that recognises and a constant stem that signals. It does not show atoms or a real molecular structure; it is a teaching drawing.

THE POINTS, IN ORDER

- An antibody is a protein shaped like a Y, built from four chains.
- Two heavy chains make both arms and the stem. Two light chains sit on the outside of the arms.
- Disulfide bonds, sulfur to sulfur, hold the four chains together.
- The tips of the arms are the VARIABLE region. They differ between antibodies, and they carry the binding site.
- The stem is the CONSTANT region. It is the same across antibodies of a class, and it is what immune cells read.
- Two arms means one antibody can hold two copies of its target at once.

SEC 03 How specific an antibody is

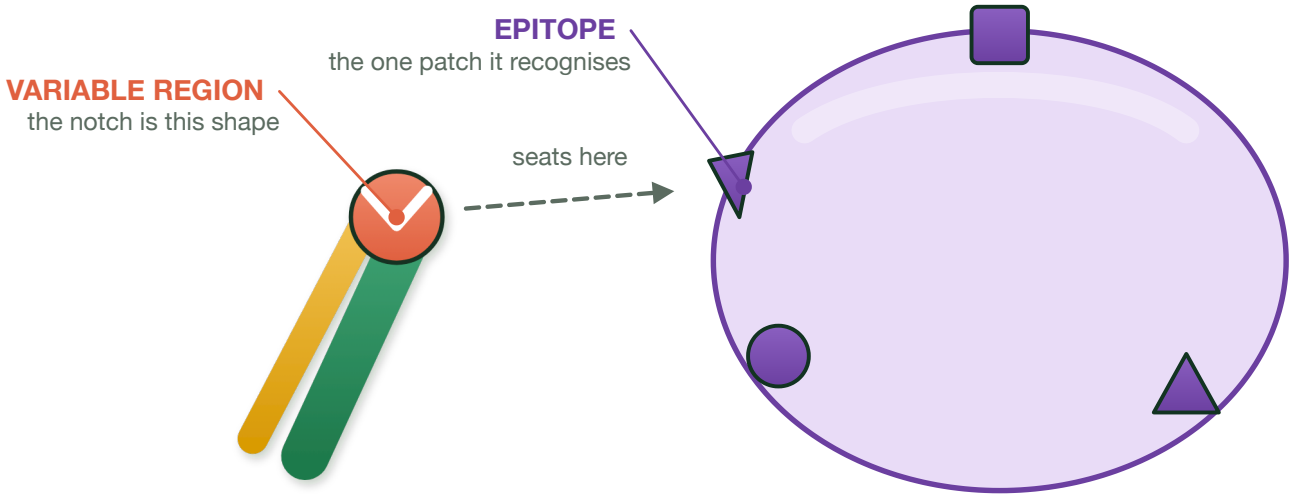
10 min

WHY THIS MATTERS

Specificity is why a pregnancy test does not react to coffee, why a blood bank can hand over the right unit, and why an allergy test can tell peanut from pollen. A test that binds almost anything tells a clinician almost nothing.

THE MOMENT OF BINDING, CLOSE UP

Two shapes meeting. No cutting, no killing, just holding on to one patch.



ONE GERM CARRIES MANY DIFFERENT EPITOPES, and your body makes a different antibody for each one.

The moment of binding. One antibody arm meeting one epitope. It does not show scale; an antibody is far smaller than the germ it is drawn beside.

THE POINTS, IN ORDER

- The patch an antibody recognises is called an EPITOPE. It is one small area, not the whole germ.
- One germ carries many different epitopes, so your body raises many different antibodies against it.
- Binding is shape plus chemistry. A shape that nearly fits usually does not bind at all.
- This is why a test built on an antibody can pick one molecule out of blood containing thousands of others.

SEC 04 How your body makes the right one

12 min

WHY THIS MATTERS

This is why vaccination works and why it is one of the two public health measures that has saved the most lives in history, alongside clean water. A vaccine gives your body the practice run without the disease.

HOW YOUR BODY MAKES THE RIGHT ANTIBODY

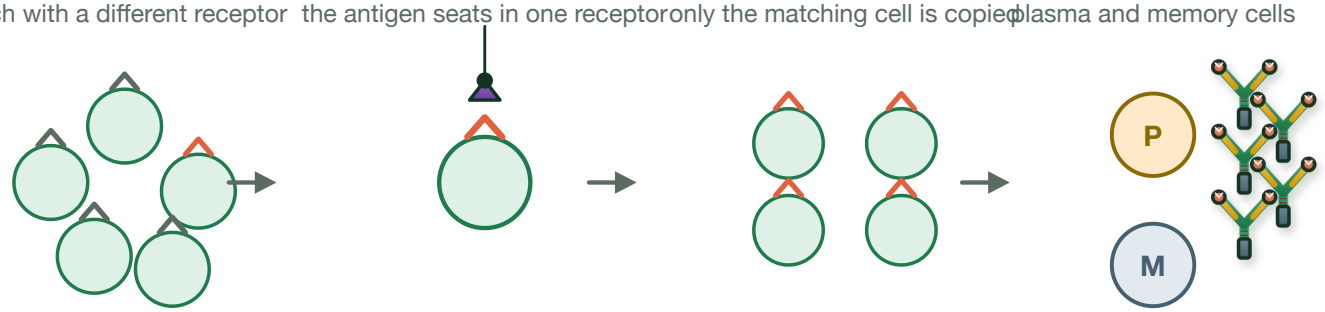
It does not design one to order. It already has millions, and the invader picks which one gets copied.

1. MANY B CELLS
each with a different receptor

2. ONE MATCHES
the antigen seats in one receptor

3. THAT ONE DIVIDES
only the matching cell is copied

4. TWO FATES
plasma and memory cells



plasma cell: makes antibody now

memory cell: waits for next time

THIS IS WHY A VACCINE WORKS, AND WHY YOU USUALLY GET CHICKENPOX ONCE.

The memory cells from step 4 are still there years later, so the second meeting is answered in days instead of weeks.

THE NAME FOR THIS: clonal selection. The invader selects which B cell gets cloned.

Nothing designs the antibody. The right one already existed, and it got copied.

Clonal selection. The invader picks which B cell gets copied. It does not show the timescale, which is days for a first response and hours for a second.

THE POINTS, IN ORDER

- You do not design an antibody on demand. You already carry millions of different B cells.
- Each B cell displays one receptor shape on its surface.
- When an invader seats into one of those receptors, THAT cell divides. This is called CLONAL SELECTION.
- The clone splits into two jobs: PLASMA cells, which pour out antibody now, and MEMORY cells, which wait.
- Memory is why a second meeting is answered in days instead of weeks, and why a vaccine works.

SEC 05 Where antibodies sit in the immune system

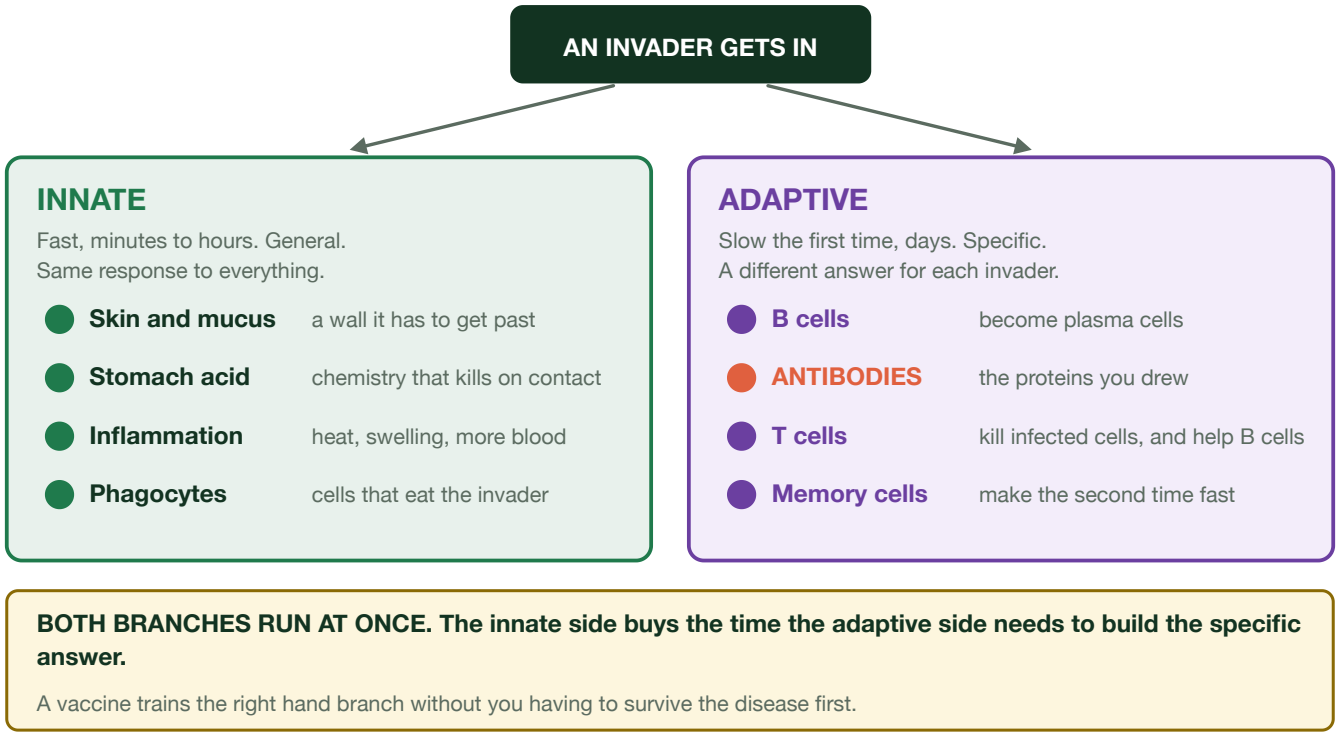
10 min

WHY THIS MATTERS

Roughly one in every two hundred people is born with an immune system missing a part. Which part is missing predicts which infections keep coming back, which is how doctors work backwards from an illness pattern to a diagnosis.

WHERE ANTIBODIES SIT IN THE WHOLE IMMUNE SYSTEM

Two branches. Antibodies belong to the right hand one only.



Two branches. Antibodies belong to the adaptive side only. It does not show every cell type, and it does not show how the two branches signal to each other.

THE POINTS, IN ORDER

- INNATE immunity is fast and general: skin, stomach acid, inflammation, phagocytes. Same answer to everything.
- ADAPTIVE immunity is slower the first time and specific: B cells, antibodies, T cells, memory.
- Antibodies belong to the adaptive branch only.
- Both run at once. The innate branch buys the days the adaptive branch needs.

SEC 06 How an ELISA works

14 min

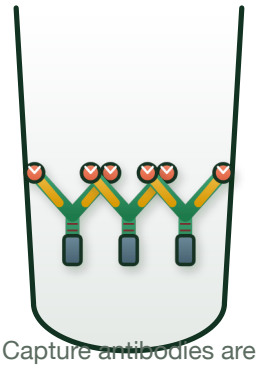
WHY THIS MATTERS

The ELISA is one of the most used tests in all of medicine. It screens donated blood, confirms infections, measures hormones, and finds allergies. When a test result comes back as a number rather than a yes or no, an assay like this one usually produced it.

HOW AN ELISA TURNS BINDING INTO A COLOUR YOU CAN MEASURE

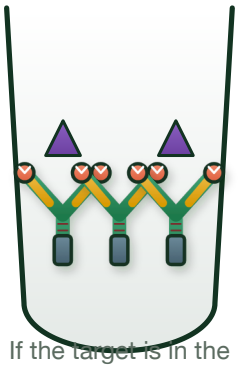
Read left to right. The wash step between each one is the step that makes the result mean anything.

1. COAT



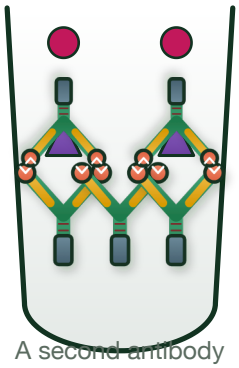
Capture antibodies are stuck to the bottom of the well.

2. ADD SAMPLE



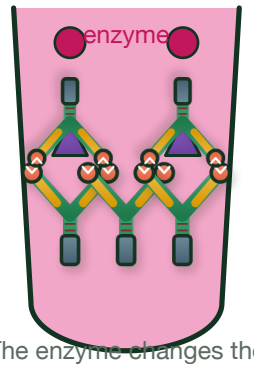
If the target is in the sample, it seats into a capture antibody. Then WASH.

3. ADD DETECTOR



A second antibody carrying an enzyme binds the other side. Then WASH.

4. ADD SUBSTRATE



The enzyme changes the substrate and the well turns colour.

THE WASH IS THE WHOLE TEST.

Anything that did not specifically bind gets washed away. What is left is only what bound, so the colour at the end is a measure of how much target was in the sample. No wash, no meaning.

WHAT AN ELISA IS USED FOR

Detecting an infection by finding either the germ's antigen or your antibodies against it. Screening donated blood. Allergy testing. Pregnancy tests. Any question shaped like: is this specific molecule here, and how much of it?

How binding becomes colour. Coat, capture, detect, develop, with a wash between each. It does not supply a result, a cut-off or a concentration.

THE POINTS, IN ORDER

- ELISA stands for enzyme-linked immunosorbent assay. Read it backwards: an assay, using something stuck to a surface, linked to an enzyme.
- STEP 1, COAT. Capture antibodies are fixed to the bottom of a well.
- STEP 2, ADD SAMPLE. If the target is present it seats into a capture antibody. Then WASH.
- STEP 3, ADD DETECTION ANTIBODY, which carries an enzyme and binds the other side of the target. Then WASH.

- STEP 4, ADD SUBSTRATE. The enzyme changes it, and the well changes colour.
- The washes are the test. Anything that did not specifically bind is removed, so the colour only reports specific binding.
- More target means more enzyme held in the well, which means more colour. Colour is a measurement, not a yes or no.

SEC 07 What an ELISA is for, and where it stops

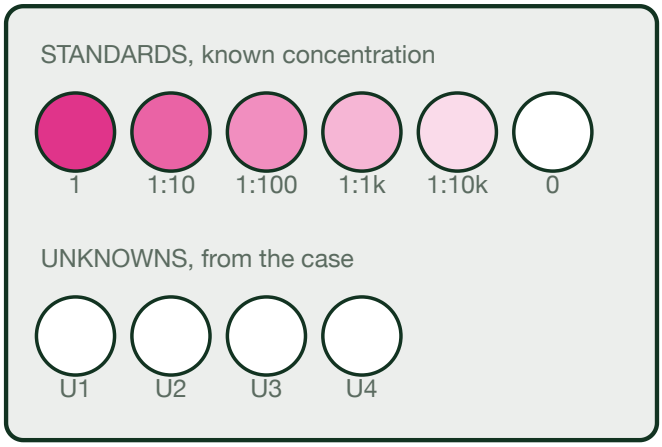
10 min

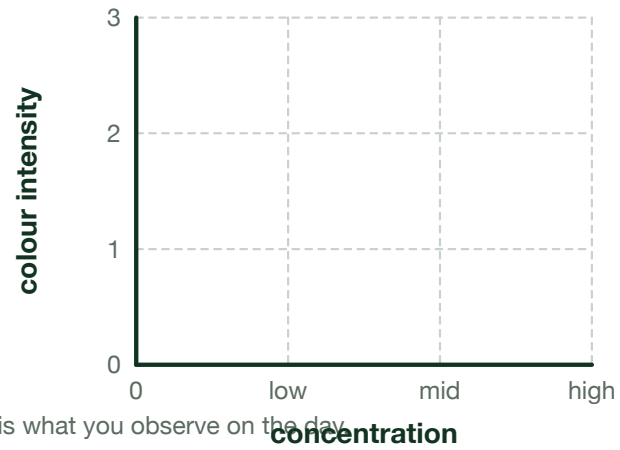
WHY THIS MATTERS

A test used on people who are unlikely to have a condition produces mostly false alarms, even when the test itself is excellent. That is not a flaw in the chemistry. It is arithmetic, and it is the single most misunderstood idea in diagnostic testing.

READING A PLATE: the standard curve does the work

The standards are your dilution series from Thursday. The unknowns are read off the line they make.





The unknown wells are left blank here because their colour is what you observe on the day. Plot the five standards, draw the line, then read each unknown colour across to a concentration.

WHY A DARKER WELL IS NOT AUTOMATICALLY A SICKER PATIENT

Colour measures how much of the target molecule is in the well. Turning that into a statement about a person needs a validated assay, a cut-off decided in advance, and controls on the same plate. A classroom ELISA has none of those.

A plate and its standard curve. The standards are your dilution series from Thursday. It does not supply the colour of any unknown well.

THE POINTS, IN ORDER

- Used for: screening donated blood, confirming infections, measuring hormones, allergy testing, pregnancy tests.
- A standard curve turns colour into a concentration. Without one, colour is only darker or lighter.
- A POSITIVE and a NEGATIVE control belong on every plate. Without them a colour means nothing.
- A screening test is tuned to miss almost nothing, which means it accepts false alarms it expects a confirmatory test to clear.
- The same test used on a group unlikely to have the condition produces mostly false alarms. That is arithmetic, not bad chemistry.

INDEX Words, sources and where to read more

The words from this lecture

- **Amino acid**: one link in a protein chain. Twenty kinds.
- **Antibody**: a Y-shaped protein that binds one specific target.
- **Antigen**: anything an antibody binds to.
- **Epitope**: the small patch on an antigen that one antibody actually recognises.
- **Variable region**: the arm tips, different in every antibody, carrying the binding site.
- **Constant region**: the stem, the same within a class, read by immune cells.
- **Clonal selection**: the invader selects which B cell is copied.
- **Plasma cell**: a B cell making antibody now. **Memory cell**: one waiting for next time.
- **Innate immunity**: fast, general. **Adaptive immunity**: slower, specific, remembers.
- **ELISA**: enzyme-linked immunosorbent assay.
- **Standard curve**: knowns plotted so unknowns can be read off the line.

Where to read more, all free and reliable

- **MedlinePlus** (National Library of Medicine), medlineplus.gov, for plain-language explanations.
- **CDC**, cdc.gov, for how a disease spreads and what a test is used for.
- **NCBI Bookshelf**, ncbi.nlm.nih.gov/books, for immunology at more depth than today.

What the figures are, and are not

All eight figures are teaching drawings made for this lecture. None of them is a photograph, a microscope image, or a structural model of a real molecule. Shapes are drawn to make a relationship visible, not to scale: a real antibody is vastly smaller than the germ it is drawn beside, and real binding depends on chemistry as well as shape.

Whose Blood, Whose DNA

RESPAWN · Period 6A-7B · Supplied illustrative case record, available to all students

Read me first: how this handout is organized

Complete one serology worksheet: Parts A–E plus your case's late-record log. Use your class's supplied illustrative records. Your work explains a classroom comparison and a reported collection plan; it does not claim that you collected or tested a sample.

1. **Part 1. Background and definitions.** Six short readings and the terms. Read R1 to R4 before you write, and R5 and R6 when a task sends you there.
2. **Part 2. Directions in plain English.** Five steps, one per part of the worksheet, and the 80-minute plan.
3. **Part 3. Worked example.** The F1 workflow and Sample P, a comparison done once on a practice sample that is not your case.
4. **Part 4. Your work.** Your Case B observations, references and collection plan, then the response sheet for Parts A to E, then the late-record page for the final ten minutes.

Start with Part 1, then follow the steps in Part 2. Everything you write goes in the one worksheet in Part 4.

Supplied illustrative case record, available to all students. The source supplies reference summaries, not newly inspected original reference cards. A label other than a type does not supply the exact alternative type. Do not invent it.

Your Case B D09 assignment · Daily directions on the portal

Part 1. Reading R1 and R2

Why today matters: Two records can match on a shared feature without identifying a person. What must your worksheet show so another reader can see that limit?

Everything in your worksheet comes from these six readings. A1 uses R2 and A2 uses R1 and R3. B1 uses R2 and R3. B2 uses R3. B3 uses R5. C1 uses R4. D1 uses R2 and R6. E1 to E3 check R2, R3 and R4.

R1. Your one worksheet

Complete the serology worksheet, Parts A–E and your case's late-record log. Serology is the study of blood and other body fluids. Use the supplied illustrative records for your class's case. You are interpreting these records, not reporting tests or collection work you performed. Yesterday's screening classification does not establish a confirmed material identity. No DNA profile is supplied today.

Keep each evidence ID beside its observations and comparison. The reference summaries are supplied records, not reference cards you independently inspected. A record may give less information than you would like. Preserve that limit instead of filling the gap.

R2. The ABO typing rule

An antigen is a marker an antibody can bind. Here, A and B antigens are markers on red blood cells. An antibody is a protein that binds a particular target. Agglutination means visible cell clumping caused by antibody binding. In this classroom model, anti-A serum contains antibodies to A markers; anti-B serum contains antibodies to B markers. These are the model's testing liquids, not the person's blood-type name.

Supplied anti-A observation	Supplied anti-B observation	Classroom ABO call
Clumping	No clumping	A
No clumping	Clumping	B
Clumping	Clumping	AB
No clumping	No clumping	O

The table above is the ABO typing rule. Use it only to interpret the supplied model. It does not validate a real blood-typing test. Type O means neither A nor B marker under the ABO typing rule, not that a red blood cell has no markers at all. NCBI ABO background [S1].

Part 1. Reading R3 and R4

R3. Compare one feature and state its limit

ABO types are shared by many people. A matching type does not identify a donor. Compare the stain's classroom call with each supplied reference. The same call means they match on this one feature. A different call means they do not match under the ABO typing rule. Neither statement establishes where a person was, when material arrived, innocence or guilt.

If a reference says only other than B or other than O, keep those words. The exact alternative type is not supplied. A categorical summary can support a same/different comparison without supplying a more precise type.

DNA results can support a comparison with a reference, but conclusions depend on the actual results and their limits. No DNA profile is supplied for this worksheet, so do not make a DNA identification. NIJ comparison-result background [S2].

R4. Explain the reported collection plan

Moisture and storage conditions can affect how well biological evidence is preserved. Packaging requirements depend on the material and the approved procedure. For this paper exercise, describe the packaging and custody steps reported in your case. Do not say you performed them. Custody means the record of who handled an item. Use the collector and receiver roles, and mark unreported names or times not reported. The reported paper-envelope state is case information, not a universal packaging instruction. NIJ preservation background [S3].

Attached follicular tissue may provide DNA for testing. Follicular tissue is tissue from around a growing hair. Hairs without attached tissue can also contain DNA, but useful results depend on the sample and method. Appearance alone does not provide a DNA result. Record the tissue condition and plan stated in your own case; do not claim you inspected a specimen or established test success. NIJ-supported rootless-hair research [S4].

Part 1. Reading R5 and R6

R5. Keep practice arithmetic separate

A reference range is a stated comparison interval. Keep its label and context attached. For the separate practice numbers, compare the given value with the lower and upper limits. To find points above the upper limit, subtract that upper limit from the value. To find percent of the upper limit, divide the value by the upper limit and multiply by 100.

Percent of the upper limit = practice value ÷ upper limit × 100.

This differs from percent above the upper limit. Use the requested label. The practice values have no supplied measurement unit, so do not add mg/dL. Sample P's 150 example and your 180 calculation are separate from the case's late record. The calculation does not diagnose a person.

R6. Record the late information, without a clinical conclusion

A useful log keeps the sample ID, record label, units when supplied and relevant context. Some results are numbers; others are categories. Toxicology is the study of drugs and poisons. A glucose meter memory or a food-test category does not become a complete toxicology or cause-of-death conclusion.

Your case's late record is used in the final ten minutes. Follow only the matching case note below.

PLTW connection and preparation

This John Hay original worksheet practices model comparisons, careful record keeping and evidence limits connected to PLTW Activities 1.1.4 Blood Evidence and 1.1.5 DNA Evidence. It does not certify official activity completion. The complete required explanation is here; background links are support, not extra assignments.

Optional help

F1 shows the paper-record workflow. The separate Sample P example models a comparison, and its 150 example models the arithmetic. Guided notes can support your work but are not another submission. Before any separate teacher-directed physical collection, complete the existing preparation requirement and use the approved instructions. This worksheet does not grant a practical pass. Carry your record to the next assigned case lesson, without assuming that it already has a DNA or clinical result.

Part 1. Plain-English terms and the limit

Part D asks you to use two of these correctly: agglutination and toxicology.

Serology
The study of blood and other body fluids.

Supplied illustrative case record
You are interpreting these records, not reporting tests or collection work you performed.

Antigen
A marker an antibody can bind. Here, A and B antigens are markers on red blood cells.

Antibody
A protein that binds a particular target.

Agglutination
Visible cell clumping caused by antibody binding.

Anti-A and anti-B serum
In this classroom model, anti-A serum contains antibodies to A markers; anti-B serum contains antibodies to B markers. These are the model's testing liquids, not the person's blood-type name.

Classroom ABO call
The type the ABO typing rule (the R2 table) gives from two supplied observations. Use it only to interpret the supplied model. It does not validate a real blood-typing test. Type O means neither A nor B marker under the ABO typing rule, not that a red blood cell has no markers at all.

Other than B or other than O
If a reference says only other than B or other than O, keep those words. The exact alternative type is not supplied.

Same call and different call
The same call means they match on this one feature. A different call means they do not match under the ABO typing rule. Neither statement establishes where a person was, when material arrived, innocence or guilt.

Custody
The record of who handled an item. Use the collector and receiver roles, and mark unreported names or times not reported.

Follicular tissue
Tissue from around a growing hair. Hairs without attached tissue can also contain DNA, but useful results depend on the sample and method.

Reference range
A stated comparison interval. Keep its label and context attached.

Percent of the upper limit
Practice value ÷ upper limit × 100. This differs from percent above the upper limit.

Toxicology
The study of drugs and poisons. A glucose meter memory or a food-test category does not become a complete toxicology or cause-of-death conclusion.

The limit that applies to everything today

A matching type does not identify a donor. No DNA profile is supplied for this worksheet, so do not make a DNA identification. The finished worksheet does not claim a test, collection, DNA identity or clinical conclusion.

Before any separate teacher-directed actual collection, complete the existing DNA Evidence from the Scene preparation requirement and use the approved instructions. The paper worksheet does not certify that practical work.

Part 2. Directions in plain English

Use supplied classroom typing observations to make limited comparisons, explain a reported collection plan and accurately log a case-specific late record.

You fill in one worksheet with five parts, A to E, plus the late-record log in the final ten minutes. The five steps below match that order. Each step says what to do, what to use and where to find it.

1. Start in Part 1. Put your period and investigator code on the worksheet and label it supplied illustrative case record. Read R1 to R4, then answer Part A. A1 uses the ABO typing rule in R2, and you copy the first three words of the sentence you used. A2 uses R1 and R3.
2. Read the worked example in Part 3 before your own case. Sample P shows one type call made from two supplied observations, and two comparisons written with their limits, on a practice sample that is not your case. Then go to Part 4 and complete B1: fill in the model type call for each observation row from its supplied anti-A and anti-B results, then compare each of your two stain calls with all five reference summaries. Keep every evidence ID, and keep an other-than category when that is all the record gives.
3. Still in Part 4, write B2 and C1. B2 is a hypothetical, two sentences on what a same-type match agrees on and what it does not establish. C1 is a four-to-six-sentence explanation of one swab entry from your case's reported collection plan, using R4 for the preservation reason and the reported custody roles. Write not reported where a name or time is missing, and never invent a signature.
4. Finish the practice calculation and the checks: B3, the 180 practice value shown with the subtraction and 180 ÷ 99 × 100 and labeled percent of the upper limit; D1, one or two sentences using agglutination and toxicology; and E1 to E3. The 180 value and the B and O hypothetical are practice, not case evidence. Check that all ten task IDs are complete.
5. In the final ten minutes, log your case's late record on the last page of the worksheet, copying exactly what the record supplies and stating what it does not, then hand in the one worksheet on paper or as one PDF to your section assignment.

The 80-minute plan is on the portal page and the slides.

The model and these checks do not require another upload. Complete Parts A–E and your late-record log in the one serology worksheet.

Before you submit

Your worksheet needs the model calls from the supplied observation rows, comparisons for both stain IDs, B2's two sentences, B3's calculations, C1's plan explanation, D1 and E1–E3, plus the correct late-record log. No unreported exact reference type, time, unit, signature or clinical conclusion should be added.

Hand the paper worksheet to Mr. Mendoza before leaving, or submit one PDF in Wk4 D09 · Whose Blood, Whose DNA (PLTW 1.1.4) by September 18 at 11:59 PM. Use your period and investigator code. Do not submit the same worksheet twice. Keep notebook pages in your notebook.

If you were absent or need help

Use the same supplied-record handout and complete the same product. Its late-record section is included; work on that section after Parts A–E. You do not need to collect a new specimen or invent a missing observation. If your teacher separately assigns actual collection, follow the applicable preparation and

approved instructions. This paper worksheet does not complete that practical requirement.

Lost your place? Find the next unanswered task ID and use F1's restart cue. Guided notes and the separate worked model are support, not extra submissions.

If your teacher is absent: Complete the supplied paper-record worksheet using the required briefing and models. Do not begin unassigned physical collection. Use the late-record section after Parts A–E.

Part 3. Sample P: separate practice, not your case

Sample P is a training-kit sample, not evidence in either case. Read it for the order of the work, because B1 asks for the same order with your own rows: read the two supplied observations, apply the ABO typing rule (R2), compare with each reference, state the limit.

This worked model uses the existing training-kit Sample P and two practice reference labels. It is not evidence for Case A or Case B. Use the structure, not these labels or answers, in your worksheet.

Read the supplied observations

The Sample P record describes grainy liquid with small dark clumps in the anti-A well, and smooth, even liquid in the anti-B well. In the supplied record that is anti-A yes, anti-B no. This is text describing the practice wells, not an image you personally examined or a test you ran.

Using the ABO typing rule in R2, anti-A clumping only gives the model call A. Practice Person 1's reference card is labeled A; Practice Person 2's card is labeled O.

Model the comparison and its limit

Practice comparison	Supplied information	Model conclusion
Sample P and Person 1	A compared with A	Same on this one classroom ABO feature; donor not identified
Sample P and Person 2	A compared with O	Different under the ABO typing rule; no conclusion about presence, timing, innocence or guilt

A complete comparison statement keeps both sides visible: “Sample P and Person 1 match on the supplied classroom ABO type A. That shared type does not identify the donor.” For Person 2: “Sample P's model type A differs from Person 2's stated type O. This is a mismatch in this one comparison, not proof about a person's actions.”

Your case may give a reference only as “other than B” or “other than O.” Keep that category in your comparison. Do not invent a specific replacement type.

Part 3. Sample P: the practice arithmetic and the hypotheticals

The existing made-up practice value is 150, with a supplied comparison range of 70 to 99. No measurement unit is supplied.

1. Compare with the interval: 150 is above its upper limit of 99.
2. Find the difference: 150 − 99 = 51 points above.
3. Find percent of the upper limit: 150 ÷ 99 × 100 = about 152% of the upper limit.

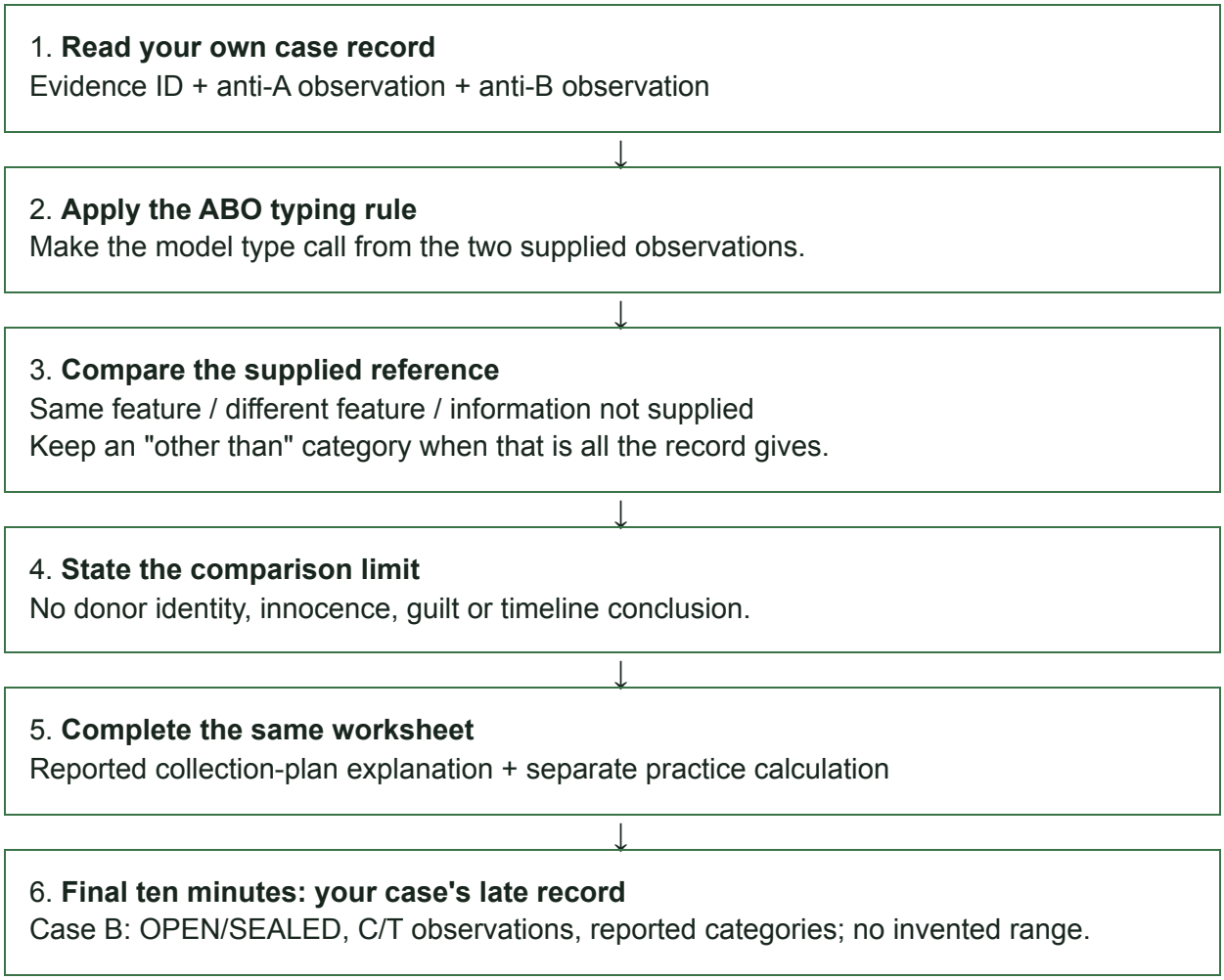
The last label is “percent of,” not “percent above.” Your B3 task uses 180, not 150. Show your own calculation and keep this generic practice separate from any case reading or clinical interpretation.

A separate hypothetical check

B2 imagines a stain and a reference with the same type. It is not another observation in your case. E2 imagines a type-B stain and a type-O reference; this is practice for both sections. Apply R3's one-feature comparison limit rather than using either hypothetical to change your case rows.

The model and these checks do not require another upload. Complete Parts A–E and your late-record log in the one serology worksheet.

Part 3. F1. Read, compare, record, the workflow



Paper-record workflow. This is a teaching diagram, not a specimen image, blood-typing procedure or collection protocol.

Find your own-case evidence ID and both supplied clumping observations. Use the ABO typing rule in R2 to make the model type call. Compare that call with the supplied reference information. State agreement or disagreement only for this one feature. If information is missing, say so; do not fill an “other than” category with a guessed exact type. Add the comparison limit. Then finish the collection-plan explanation and separate arithmetic practice in the same worksheet. In the final ten minutes, log only your own case's late record. Preserve its display or category, source and missing context. The finished worksheet does not claim a test, collection, DNA identity or clinical conclusion.

Optional restart cue

Find the next unanswered task ID. Use R2 for the typing grid, R3 for comparisons, R4 for the collection-plan explanation, R5 for the practice calculation and R6 for the late record. Do not switch to the other case or create a second product.

Part 4. Your Case B observation rows and reference summaries

Everything from here on is yours to write. These records are the inputs for B1 and C1.

Supplied illustrative case record, available to all students. The source supplies reference summaries, not newly inspected original reference cards. A label other than a type does not supply the exact alternative type. Do not invent it.

Setting: Respawn, an e-sports lounge with a smoothie counter. Case number JH-26-0831-B.

Observation grid: 3 supplied rows, model type call left blank

Row label	Supplied anti-A	Supplied anti-B	Model type call
E2-counter: Counter-edge stain	No (smooth well)	No (smooth well)	
E2-floor: Floor stain	No (smooth well)	No (smooth well)	
Victim, medical record (reference)	No	No	

All five reference summaries, used for each stain

- Victim, medical record (reference): anti-A No, anti-B No; type O reported in the case record.
- Whitfield: OTHER than O; exact type: not supplied.
- Nguyen: OTHER than O; exact type: not supplied.
- Rao: OTHER than O; exact type: not supplied.
- Boone: OTHER than O; exact type: not supplied.

Same-type stain/reference comparison is a hypothetical prompt, not an additional match in either supplied case.

Part 4. Your Case B reported collection plan and custody state

- Counter stain swab; evidence ID E2-counter.
- Floor stain swab; evidence ID E2-floor.
- straw swab from the smoothie cup; evidence ID E3.
- storeroom hair root; evidence ID: not supplied; root tissue reported available: yes; recorded plan: it goes to DNA.
- protein container lid swab; evidence ID: not supplied.

References reported on file: reference swabs already on file for the victim and all four persons of interest.

The tissue status is supplied narrative, not an independently inspected specimen or a guaranteed DNA result. The sheet does not give an exact hair/lid evidence ID here. Do not invent one or infer E4/E5 for the lid.

Reported custody state: Swab air-dried, sealed in a paper envelope (not plastic), labeled with the E-number, first custody row signed by the collector and the receiver.

Reported roles: collector and receiver. Collector identity: not reported. Receiver identity: not reported. Collection time: not reported. Transfer time: not reported. Actual signatures: not reported.

Reported illustrative packaging/custody state, not proof the student performed it or a complete approved collection protocol.

Practice numbers, not from the case

Value 180, supplied range 70 to 99, measurement unit: not supplied. Requested: inside the supplied range?; points above the upper limit; percent of the upper limit: 180 / 99 × 100.

Part 4. Response sheet, Part A: use the reading

Case B, RESPAWN, Period 6A-7B. Investigator code, not name:

Record route label: Supplied illustrative case record, available to all students.

Date: September 18, 2026

Complete the serology worksheet, Parts A–E and your case's late-record log. Serology is the study of blood and other body fluids. Use the supplied illustrative records for your class's case. You are interpreting these records, not reporting tests or collection work you performed. Yesterday's screening classification does not establish a confirmed material identity. No DNA profile is supplied today.

A1 PBS-U1-D09-A1

In one sentence, explain why clumping can occur with anti-A serum in this classroom model. Use the terms antibody and A marker. Copy the first three words of a supporting sentence in R2.

Explanation

Supporting sentence starts

A2 PBS-U1-D09-A2

Explain one limit of a same-type comparison and why today's worksheet cannot make a DNA identification.

Same-type limit

DNA-input limit

Part 4. Response sheet, B1: observation grid

B1 PBS-U1-D09-B1

Use the supplied anti-A and anti-B observations to fill the model type call for each observation row. Then compare each of your two stain calls with all five supplied reference summaries. Keep the stain ID, reference label, reported pattern or category, same/different result and limit together. Do not invent an exact type for an other-than category.

Four observation rows are supplied in A and three in B, including references with well observations. All five reference summaries are still used for each stain. Missing exact types remain categorical.

Observation grid: row label, supplied anti-A, supplied anti-B, blank model type call

Row label	Supplied anti-A	Supplied anti-B	Model type call (blank for your call)
E2-counter: Counter-edge stain	No (smooth well)	No (smooth well)	
E2-floor: Floor stain	No (smooth well)	No (smooth well)	
Victim, medical record (reference)	No	No	

Part 4. Response sheet, B1: comparison grid for E2-counter

B1 PBS-U1-D09-B1

E2-counter: Counter-edge stain. Supplied anti-A No (smooth well); supplied anti-B No (smooth well). Your model type call from the observation grid:

Comparison grid: stain ID, reference label, supplied reference pattern/category, blank same/different call, reason and limit

Reference label and supplied pattern or category	Same or different (blank for your call)
Victim, medical record (reference): anti-A No, anti-B No; type O reported in the case record.	
Reason and limit	
Whitfield: OTHER than O; exact type: not supplied.	
Reason and limit	
Nguyen: OTHER than O; exact type: not supplied.	
Reason and limit	
Rao: OTHER than O; exact type: not supplied.	
Reason and limit	
Boone: OTHER than O; exact type: not supplied.	
Reason and limit	

Part 4. Response sheet, B1: comparison grid for E2-floor

B1 PBS-U1-D09-B1

E2-floor: Floor stain. Supplied anti-A No (smooth well); supplied anti-B No (smooth well). Your model type call from the observation grid:

Comparison grid: stain ID, reference label, supplied reference pattern/category, blank same/different call, reason and limit

Reference label and supplied pattern or category	Same or different (blank for your call)
Victim, medical record (reference): anti-A No, anti-B No; type O reported in the case record.	
Reason and limit	
Whitfield: OTHER than O; exact type: not supplied.	
Reason and limit	
Nguyen: OTHER than O; exact type: not supplied.	
Reason and limit	
Rao: OTHER than O; exact type: not supplied.	
Reason and limit	
Boone: OTHER than O; exact type: not supplied.	
Reason and limit	

Part 4. Response sheet, B2 and B3: a hypothetical and practice numbers

B2 PBS-U1-D09-B2

Hypothetical practice, not a new case result: a stain and a person-of-interest reference have the same classroom ABO type. In two sentences, state what agrees and what that agreement does not establish.

Do not add this hypothetical match to your case matrix.

Two-sentence comparison and limit

B3 PBS-U1-D09-B3

Practice numbers, not from the case: a value is 180 and the supplied range is 70 to 99. Is it inside that interval? How many points above the upper limit is it? What percent of the upper limit is 180? Show the subtraction and 180 ÷ 99 × 100. Label percent of the upper limit, not percent above. No measurement unit is supplied.

Use 99 as the upper limit for this practice. Do not use the case reference card or add mg/dL.

Inside/outside

Difference calculation

Percent-of-upper-limit calculation and label

Part 4. Response sheet, Part C: the reported collection plan

C1 PBS-U1-D09-C1

Choose one swab entry from your case's supplied collection-plan record. In four to six sentences, explain the reported item and location; its reported packaging and the preservation reason from R4; the collector/receiver roles and any unreported names or times; and the reference samples reported on file. This is a paper-record explanation, not instructions for performing collection or a claim that you packaged the sample.

Do not invent an evidence ID for a lid or hair entry whose ID is not supplied, and do not write an actual signature. Use a listed swab entry for this response.

Chosen source label and existing evidence ID if supplied

Four-to-six-sentence explanation covering the four components

Part 4. Response sheet, Parts D and E: vocabulary, then practice checks

D1 PBS-U1-D09-D1

Use agglutination and toxicology in one or two sentences about this worksheet. Explain their roles without treating the late record as a diagnosis or a complete toxicology conclusion.

The typing model and the study of drugs/poisons are different concepts. Do not invent a toxicology result.

One or two applied sentences

E1 PBS-U1-D09-E1

Practice check: the supplied observation says clumping with anti-A only. What is the classroom model call?

This is a check of the ABO typing rule, not another assigned stain.

Model type call

E2 PBS-U1-D09-E2

Hypothetical practice for both cases: a stain has classroom type B and a reference has type O. Write the same/different comparison and one limit. Do not change your case records.

Limit the statement to this feature comparison, not a person's actions.

Comparison and limit

E3 PBS-U1-D09-E3

Why can moisture matter when preserving biological evidence? State the reason from R4 and keep real packaging decisions tied to the material and approved procedure.

Do not claim that one package is suitable for every specimen or that you performed the reported steps.

Preservation reason and limit

Your worksheet needs the model calls from the supplied observation rows, comparisons for both stain IDs, B2's two sentences, B3's calculations, C1's plan explanation, D1 and E1–E3, plus the correct late-record log. No unreported exact reference type, time, unit, signature or clinical conclusion should be added.

Optional single comparison check, not alternate work plans

A reference is labeled only other than B. What should the worksheet preserve?

1. Choose a likely exact alternative type.
2. Keep other than B and make only the supported classroom comparison.
3. Use Sample P's reference type in its place.

The model and these checks do not require another upload. Complete Parts A–E and your late-record log in the one serology worksheet.

Notebook support, not another submission

Keep notebook pages in your notebook.

Optional support

- Optional Guided Notes
- Separate Sample P and 150 worked models
- Existing voluntary vocabulary extra credit, kept separate from required D1

Turn in, PLTW and sources

Complete one serology worksheet, Parts A–E plus your case's late-record log. Hand the paper worksheet to Mr. Mendoza before leaving, or submit one PDF to this section's assignment by September 18 at 11:59 PM. Use your period and investigator code. Do not submit twice; keep notebook pages in your notebook.

Keep today's worksheet for the next assigned case lesson. Later evidence must be supplied before you use it; do not assume a DNA or clinical result already exists.

This John Hay original worksheet practices model comparisons, careful record keeping and evidence limits connected to PLTW Activities 1.1.4 Blood Evidence and 1.1.5 DNA Evidence. It does not certify official activity completion.

John Hay original local work connected by title; no official completion claim. The complete required explanation is here; background links are support, not extra assignments.

Case B D09 assignment · Official PLTW section hub · Activity 1.1.4 Blood Evidence · Activity 1.1.5 DNA Evidence

Sources and optional background

- S1. NCBI ABO background

  cited in R2.
- S2. NIJ comparison-result background

  cited in R3.
- S3. NIJ preservation background

  cited in R4.
- S4. NIJ-supported rootless-hair research

  cited in R4.
- S5. FDA display explanation

  cited in R6.
- S6. FDA fasting-context explanation

  cited in R6.
- S7. Antibody-binding background

  cited in R6.

A matching type does not identify a donor. No DNA profile is supplied for this worksheet, so do not make a DNA identification. The finished worksheet does not claim a test, collection, DNA identity or clinical conclusion.

Part 4. Late record: use in the final ten minutes

Use only your case's released record and support card. Copy exact displays or line observations and reported categories, then state the limit.

Log E4 OPEN and E5 SEALED / Exhibit 012 separately. Copy the reported C/T observations, classifications and any supplied qualifier. State that these qualitative records do not establish test accuracy, exposure, intent or cause of death. Do not invent a numerical range or label the sealed contents known-clean.

Case B support: a qualitative line record

C labels the control line and T labels the test line in the supplied record. Copy the line observations and the classifications the source reports. A control line is a check built into a test; it does not by itself prove every part worked or that a result is accurate. Antibody binding can sometimes involve another target. The record lacks enough test-specific information to check that possibility here. Antibody-binding background [S7].

These are qualitative records: line patterns and reported categories, not amounts or numerical ranges. OPEN and SEALED describe the supplied container states. SEALED does not establish that contents are analytically clean. These records do not establish exposure, an allergy outcome, the source of material, intent or cause of death.

Peanut lateral-flow cassettes, positive and negative (SIMULATED)

Exhibit 012. Record type: qualitative line observations and reported classifications.

Evidence ID	Container	Description	Reported lines	Reported classification	Reported qualifier
E4	OPEN	counter container	two lines, the control line (C) and the test line (T)	POSITIVE	strong
E5	SEALED	stock container	one line, control only	NEGATIVE	none supplied

Posting record: Side by side on the board with the words OPEN and SEALED beneath the cassettes, and nothing else said.

Numerical reference range: not supplied. Measurement unit: not supplied. Assay identity: not supplied. Elapsed test time: not supplied. Validation or performance record: not supplied. Clinical interpretation: none supplied. Exposure, cause or intent: none supplied.

Your Case B late-record log (left blank for your log)

Evidence/exhibit	OPEN or SEALED	Reported C/T lines	Reported classification/qualifier	Source and limit

Continue your late-record log here

ALL THREE CLASSES · WEEK 4 CLOSING HANDOUT

Debate Preparation Manual

Should ELISA screening be mandatory? Everything you need to argue either side, and the science you must get right to argue either one.

DATE	CLASSES	QUESTION
Friday, September 18, 2026	**All three**	**Should ELISA screening be mandatory?**
SIDES	**PREPARE**	**BRING**
You will be assigned one	**Both sides**	**This manual, completed**

YOUR CHARGE TODAY

You will be assigned a side on the day, which means you prepare both. An argument you cannot state in its strongest form is an argument you do not understand.

YOU TURN IN

- **Two prepared arguments** for each side, filled in below.
- **One counterargument** you genuinely find hard to answer.
- **Your own position**, written before the debate and again after.

Time: Prepared at home, argued in class.

GREEN RULE	GOLD GROUND	GREY GROUND	RED GROUND
You write here. Nothing else on the page is yours to fill in.	Given to you. Do not re-derive it. Controls and reference values live here.	Instructions from Mr. Mendoza. Read before you start the step.	Safety. Read it before you touch any material.

SEC 01 You cannot debate a test you cannot describe

15 min

WHY THIS MATTERS

The ELISA is one of the most used tests in all of medicine. It screens donated blood, confirms infections, measures hormones, and finds allergies. When a test result comes back as a number rather than a yes or no, an assay like this one usually produced it.

READ THIS

You cannot argue about a test you cannot describe. Before any position, you have to be able to say what an ELISA actually does. Fill this in from Friday's lecture without looking it up.

THE SCIENCE FIRST · YOU COMPLETE THIS

In four steps, what happens in an ELISA well?

What is the wash step for, and what happens to the result without it?

What does the colour at the end actually measure?

SEC 02 The arithmetic both sides get wrong

20 min

WHY THIS MATTERS

A test used on people who are unlikely to have a condition produces mostly false alarms, even when the test itself is excellent. That is not a flaw in the chemistry. It is arithmetic, and it is the single most misunderstood idea in diagnostic testing.

READ THIS

This is the part both sides get wrong, so whichever side you are given, knowing it is an advantage.

Sensitivity is how good a test is at catching people who do have the condition. **Specificity** is how good it is at clearing people who do not. A screening test is usually tuned for high sensitivity, which means it accepts some false alarms on purpose.

Now the part that surprises people. If a condition is rare, then even an excellent test produces **more false positives than true positives**, because there are so many more people without the condition than with it. Nothing is wrong with the test. It is arithmetic.

CONTROL GROUP · ALREADY SET UP FOR YOU

A worked example, given to you. Suppose a condition affects 1 person in 1,000, and the test catches 99 out of 100 true cases and wrongly flags 2 out of 100 healthy people.

Test 100,000 people. About 100 have the condition, and the test finds about 99 of them. About 99,900 do not, and the test wrongly flags about 2 percent of them, which is about 1,998 people.

So about 2,097 people get a positive result, and only 99 of them actually have it. Roughly one positive in twenty-one is real. This is exactly why a positive screen is followed by a confirmatory test and is never, on its own, a diagnosis.

YOUR TURN · YOU COMPLETE THIS

Redo that arithmetic for a condition affecting 1 person in 100 instead of 1 in 1,000. How many of the positives are real now?

What does your answer suggest about WHO a screening programme should be offered to?

SEC 03 The case for mandatory screening

15 min

READ THIS

Build the **FOR** case. Write the strongest version, whether or not you agree with it. You will not know your assigned side until the day.

THE FOR CASE · YOU COMPLETE THIS

Early detection: what changes for a patient found early rather than late?

Protecting others: which conditions affect people beyond the patient, and how?

Fairness of access: how can a mandatory programme reach people a voluntary one misses?

Cost: what does a late diagnosis cost, in money and in life, compared to a screening programme?

SEC 04 The case against mandatory screening

15 min

READ THIS

Build the **AGAINST** case. Write the strongest version, whether or not you agree with it. You will not know your assigned side until the day.

THE AGAINST CASE · YOU COMPLETE THIS

Consent: what does mandatory mean for a person's right to decide about their own body?

False positives: using your arithmetic from SEC 02, what happens to the people wrongly flagged?

Privacy: who else learns the result, and what could they do with it?

Trust: what happens to people's willingness to seek care if testing stops being a choice?

SEC 05 The hardest objection, and where you stand

15 min

READ THIS

Finish with the two things that actually get graded: the objection you find hardest, and where you stand.

YOUR POSITION · YOU COMPLETE THIS

The single strongest point against your own view, written in its best form:

Your honest answer to it, or an honest statement that you do not have one yet:

Where you stand BEFORE the debate:

Where you stand AFTER the debate. Changing your mind in response to evidence is worth full marks:

CONTROL GROUP · ALREADY SET UP FOR YOU

The rule for the debate itself. You may attack an argument. You may not attack a person. Every claim about what a test can do must match what we learned it does on Friday, and I will stop the debate to correct a science error on either side.

INDEX Terms and sources for the debate

Terms you will need

- **Sensitivity**: of the people who have it, the share the test catches.
- **Specificity**: of the people who do not have it, the share the test clears.
- **False positive**: a positive result in someone who does not have the condition.
- **False negative**: a negative result in someone who does.
- **Screening test**: cast wide, tuned to miss little, expects confirmation.
- **Confirmatory test**: run after a positive screen, more specific, slower or costlier.
- **Informed consent**: agreeing to a procedure after being told what it involves and what it risks.

Where to read more

- CDC, cdc.gov, on screening programmes and what each one is for.
- MedlinePlus, medlineplus.gov, on what a specific lab test means.
- NHGRI, genome.gov, on genetic discrimination and the protections that exist.

The claim ceiling for this debate

Everything argued in this room is a classroom argument about policy. Nobody in this debate diagnoses anybody, and no position taken here is medical advice or a statement about any real person's health.

MEDICAL INTERVENTIONS AND PRINCIPLES OF BIOMEDICAL SCIENCE

Guided Notes

Antibodies and ELISA. Fill these in as we go, and label every diagram.

DATE **Friday, September 18, 2026**	COPY **Student**	DIAGRAMS **Label all 4**
EXAM **Next week**	USE **Study from this**	CLASSES **All three**

YOUR CHARGE TODAY

These notes are the exam. Everything a question can be built from is on these pages, and the four diagrams are the four most likely places a question starts.

YOU TURN IN

- Every blank filled.
- All four diagrams labelled in your own hand.

Time: During the lecture.

GREEN RULE	GOLD GROUND	GREY GROUND	RED GROUND
You write here. Nothing else on the page is yours to fill in.	Given to you. Do not re-derive it. Controls and reference values live here.	Instructions from Mr. Mendoza. Read before you start the step.	Safety. Read it before you touch any material.

SEC 01 The twenty lines

READ THIS

Fill each blank as we reach it. Do not write ahead; the order is the argument.

THE TWENTY LINES · YOU COMPLETE THESE

1. A protein's _____ decides what it can bind to.

2. A protein's shape comes from the _____ which a gene specifies.

3. An antibody is shaped like a _____ and is built from four chains.

4. The two long chains are the _____ and they form both arms and the stem.

5. The two short chains are the _____ and they sit on the outside of the arms.

6. The arm tips are the _____ which differs between antibodies and carries the binding site.

7. The stem is the _____ which immune cells read to know what to do.

8. The chains are held together by _____ which are sulfur to sulfur links.

9. The small patch an antibody recognises is called an _____ and one germ carries many of them.

10. A B cell displays _____ receptor shape on its surface.

11. When an invader seats into a receptor, that cell divides. This is called _____ .

12. A _____ cell makes antibody now. A _____ cell waits for next time.

13. Memory cells are the reason a _____ works.

14. The fast, general branch of the immune system is _____ immunity.

15. The slower, specific branch that remembers is _____ immunity.

16. ELISA stands for _____ .

17. In an ELISA the step that makes the result mean anything is the _____ .

18. More target in the sample means more _____ in the well.

19. Colour is turned into a concentration using a _____ .

20. A screening test is tuned to miss almost nothing, so it accepts _____ that a confirmatory test clears.

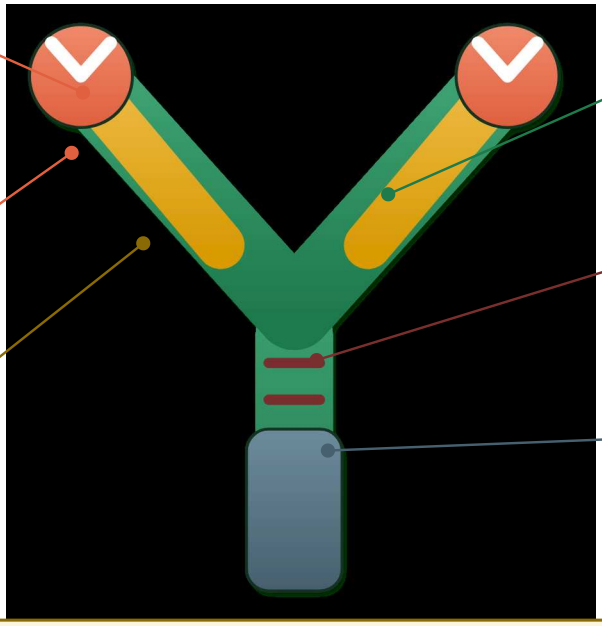
SEC 02 Diagram 1: The antibody

READ THIS

The antibody. Label: heavy chain, light chain, variable region, constant region, binding site, disulfide bond.

THE ANTIBODY, PART BY PART

Same colours on every diagram from here on. Learn them once.



VARIABLE REGION
different in every antibody
this is the part that recognises

BINDING SITE
the notch. Two per antibody

LIGHT CHAIN
two of them, the short ones

HEAVY CHAIN
two of them, the long ones
they make both arms and the stem

DISULFIDE BONDS
sulfur to sulfur, holding
the four chains together

CONSTANT REGION
the same in every antibody
of a class. This end talks
to immune cells

TWO ENDS, TWO JOBS. The top finds the invader. The bottom tells the rest of the immune system what to do about it.

That is why the top varies between antibodies and the bottom does not.

Label this diagram yourself. The printed labels are your check, not your answer; cover them and name the parts first.

YOU COMPLETE THIS

Write the sentence the task above asks for:

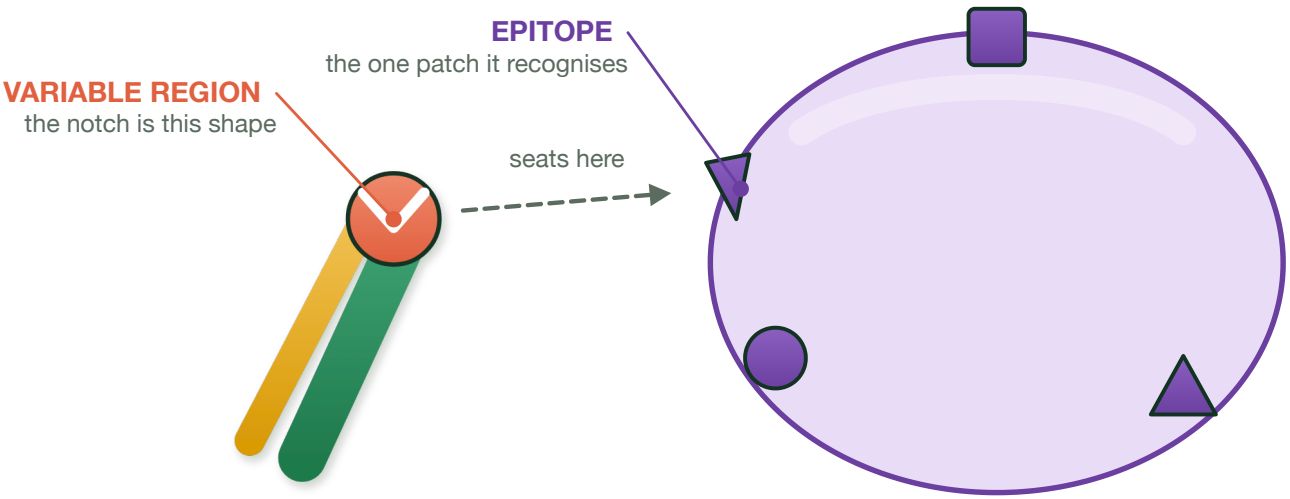
SEC 03 Diagram 2: Binding

READ THIS

Binding. Label: epitope, variable region, and write one sentence on why the other three bumps do not bind here.

THE MOMENT OF BINDING, CLOSE UP

Two shapes meeting. No cutting, no killing, just holding on to one patch.



ONE GERM CARRIES MANY DIFFERENT EPITOPES, and your body makes a different antibody for each one.

Label this diagram yourself. The printed labels are your check, not your answer; cover them and name the parts first.

YOU COMPLETE THIS

Write the sentence the task above asks for:

SEC 04 Diagram 3: Making the right antibody

READ THIS

Making the right antibody. Label: B cell, antigen, plasma cell, memory cell. Then write what clonal selection means in one sentence.

HOW YOUR BODY MAKES THE RIGHT ANTIBODY

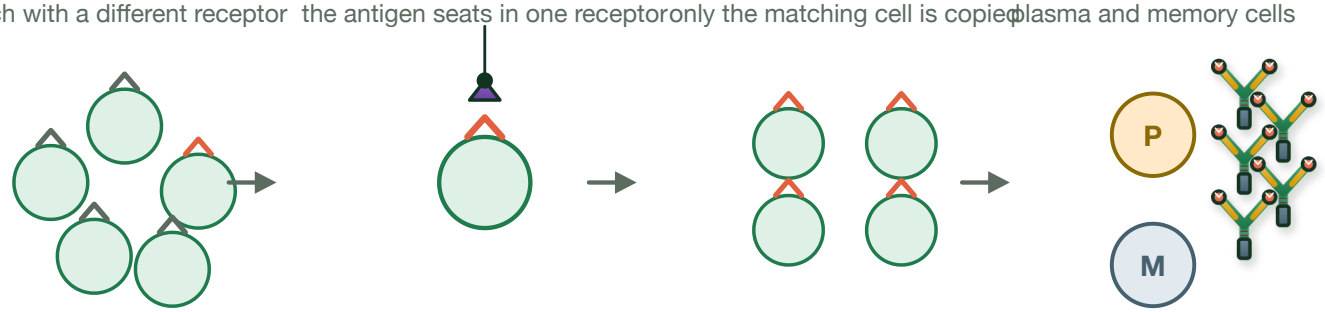
It does not design one to order. It already has millions, and the invader picks which one gets copied.

1. MANY B CELLS
each with a different receptor

2. ONE MATCHES
the antigen seats in one receptor

3. THAT ONE DIVIDES
only the matching cell is copied

4. TWO FATES
plasma and memory cells



plasma cell: makes antibody now

memory cell: waits for next time

THIS IS WHY A VACCINE WORKS, AND WHY YOU USUALLY GET CHICKENPOX ONCE.

The memory cells from step 4 are still there years later, so the second meeting is answered in days instead of weeks.

THE NAME FOR THIS: clonal selection. The invader selects which B cell gets cloned.

Nothing designs the antibody. The right one already existed, and it got copied.

Label this diagram yourself. The printed labels are your check, not your answer; cover them and name the parts first.

YOU COMPLETE THIS

Write the sentence the task above asks for:

SEC 05 Diagram 4: The ELISA

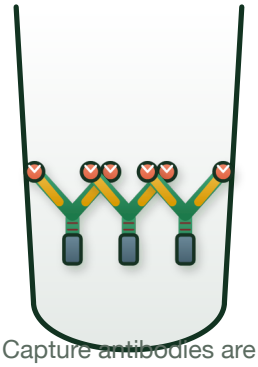
READ THIS

The ELISA. Label: capture antibody, target, detection antibody, enzyme, substrate. Then mark every place a wash happens.

HOW AN ELISA TURNS BINDING INTO A COLOUR YOU CAN MEASURE

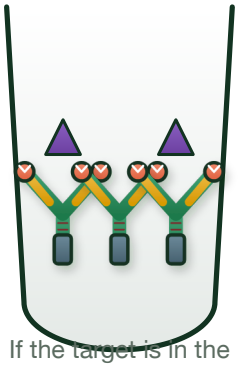
Read left to right. The wash step between each one is the step that makes the result mean anything.

1. COAT



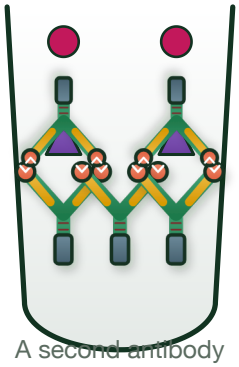
Capture antibodies are stuck to the bottom of the well.

2. ADD SAMPLE



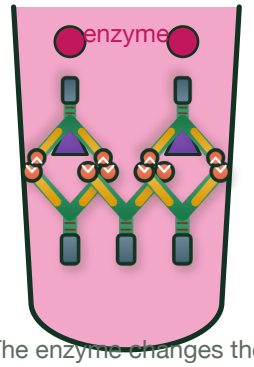
If the target is in the sample, it seats into a capture antibody. Then WASH.

3. ADD DETECTOR



A second antibody carrying an enzyme binds the other side. Then WASH.

4. ADD SUBSTRATE



The enzyme changes the substrate and the well turns colour.

THE WASH IS THE WHOLE TEST.

Anything that did not specifically bind gets washed away. What is left is only what bound, so the colour at the end is a measure of how much target was in the sample. No wash, no meaning.

WHAT AN ELISA IS USED FOR

Detecting an infection by finding either the germ's antigen or your antibodies against it. Screening donated blood. Allergy testing. Pregnancy tests. Any question shaped like: is this specific molecule here, and how much of it?

Label this diagram yourself. The printed labels are your check, not your answer; cover them and name the parts first.

YOU COMPLETE THIS

Write the sentence the task above asks for:

ALL THREE CLASSES

Study Guide

Everything on next week's exam, in the order we learned it, with what to be able to DO for each idea.

DATE	EXAM	COVERS
Friday, September 18, 2026	**Next week**	**Thursday's circuit and Friday's lecture**
SECTIONS	FORMAT	CLASSES
5	**Know it, do it, likely question**	**All three**

YOUR CHARGE TODAY

Every idea below appeared in a mini lab or in Friday's lecture. If you can do the DO line for all of them without your notes, you are ready.

YOU TURN IN

- Nothing to hand in. This one is for you.

Time: Study at home.

SEC 01 Experimental design

WHY THIS MATTERS

Every result you will ever be asked to trust, in any science class or any hospital, rests on whether somebody ran the right control. This is the most transferable idea in the whole unit.

READ THIS

For each line: the left column is what to **know**. The right column is what you must be able to **do** with it. Exam questions are written from the right column.

Know this	Be able to do this
A control group is a run where you already know what should happen.	Given any mini lab from Thursday, name its control and say what a failed control would mean.
The independent variable is what you change on purpose.	Name the independent and dependent variable in the bloodstain control set and the dilution series.
Controlled variables are what you hold the same.	List two things held the same in the dilution series and say why each one matters.

YOU COMPLETE THIS

Which line on this page are you least sure about? Write it, then go back to that mini lab.

SEC 02 Dilution, concentration and detection

WHY THIS MATTERS

Every test that reports a number instead of a yes or no is standing on a dilution series somebody made carefully.

READ THIS

For each line: the left column is what to **know**. The right column is what you must be able to **do** with it. Exam questions are written from the right column.

Know this	Be able to do this
A serial dilution repeats the same dilution, so each step is ten times weaker.	Given a stock and five 1:10 steps, state the concentration at each step.
A standard curve is built from knowns and used to read unknowns.	Explain why you cannot read an unknown without plotting the knowns first.
A detection limit is the weakest thing a test can still find.	Explain what a negative result means BELOW the detection limit. The answer is not 'it is not there'.

YOU COMPLETE THIS

Which line on this page are you least sure about? Write it, then go back to that mini lab.

SEC 03 Reading evidence

WHY THIS MATTERS

A laboratory result that cannot be checked by somebody else is an opinion with equipment.

READ THIS

For each line: the left column is what to **know**. The right column is what you must be able to **do** with it. Exam questions are written from the right column.

Know this	Be able to do this
On a gel, short fragments travel further than long ones.	Read a band size off a standard curve, and say why the ladder is printed but the samples are not.
A pattern class narrows a crowd; only minutiae point at one finger.	Given a scene print and five references, say which step eliminates and which step identifies.
A shared band is not a profile.	Given a scene lane sharing one band with two references, write what that can and cannot establish.
The shape of an epidemic curve suggests how exposure happened.	Tell a single shared exposure from person to person spread, and say which feature told you.

YOU COMPLETE THIS

Which line on this page are you least sure about? Write it, then go back to that mini lab.

SEC 04 Antibodies

WHY THIS MATTERS

Your immune system solves, every day, a problem no engineer has solved: recognising something it has never seen before, without damaging you.

READ THIS

For each line: the left column is what to **know**. The right column is what you must be able to **do** with it. Exam questions are written from the right column.

Know this	Be able to do this
A protein's shape comes from its amino acid order, and the shape is the job.	Explain in one sentence why changing the order changes what a protein can bind.
An antibody has two heavy chains, two light chains, a variable region and a constant region.	Draw one from memory and label five parts.
An epitope is the small patch an antibody recognises.	Explain why one germ leads to many different antibodies.
Clonal selection: the invader selects which B cell is copied.	Explain why this means your body does not design an antibody to order.
Plasma cells make antibody now; memory cells make the second response fast.	Explain why a vaccine works using those two cell types.

YOU COMPLETE THIS

Which line on this page are you least sure about? Write it, then go back to that mini lab.

SEC 05 ELISA and what a test result means

WHY THIS MATTERS

Most people, including many adults, believe a positive test means you have the thing. For a rare condition that is usually false, and understanding why will serve you for the rest of your life.

READ THIS

For each line: the left column is what to **know**. The right column is what you must be able to **do** with it. Exam questions are written from the right column.

Know this	Be able to do this
ELISA: coat, add sample, add detection antibody with an enzyme, add substrate. Wash between each.	Name all four steps in order and say what the wash is for.
More target means more colour, and a standard curve turns colour into concentration.	Explain why a darker well is not automatically a sicker patient.
Sensitivity catches the sick; specificity clears the well.	Say which one a screening test is tuned for, and what it accepts in exchange.
When a condition is rare, most positives are false positives.	Work the arithmetic for a condition affecting 1 in 1,000 and say what follows a positive screen.

YOU COMPLETE THIS

Which line on this page are you least sure about? Write it, then go back to that mini lab.

ASSIGNMENT 20 OF 29 Mon, Sep 21 about 45 minutes

John Carroll bioethics debate 1: should ELISA testing be mandatory?

Today we need to accomplish debating an assigned side, then writing one CER.

Our goal is answering the other side's best argument, not its weakest.

You have to turn in one CER with five parts, J1 to J5.

Schoology assignment: Wk5 CER: JCU bioethics 1, should ELISA testing be mandatory?

1 READ

First, the scenario and the first argument on each side.

Scenario. A new infectious disease called Novel Flu Syndrome (NFS, made up) spreads with many carriers who have no symptoms, but it causes severe complications in some people, including long-term organ damage. A fast, cheap ELISA detects antibodies to NFS, which shows past or current infection.

The case for: Mandatory testing finds infected people, including carriers with no symptoms, so isolation, contact tracing and treatment can stop the spread.

The case against: Mandatory testing overrides the right to privacy and bodily autonomy. The choice to be tested should belong to the person.

2 WRITE

J1. Your assigned side and its claim in one sentence. **J2.** Your three strongest arguments, each with its source.

Scenario. A new infectious disease called Novel Flu Syndrome (NFS, made up) spreads with many carriers who have no symptoms, but it causes severe complications in some people, including long-term organ damage. A fast, cheap ELISA detects antibodies to NFS, which shows past or current infection.

The case for: Mandatory testing finds infected people, including carriers with no symptoms, so isolation, contact tracing and treatment can stop the spread.

The case against: Mandatory testing overrides the right to privacy and bodily autonomy. The choice to be tested should belong to the person.

HINT A preference is not evidence. Name where each argument comes from.

3 WRITE

J3. Reasoning: which error matters more here, a false positive or a false negative, and who carries that harm? One limit of an antibody test: it shows the immune response, not the germ, and antibodies take days to weeks to appear.

4 WRITE

J4. The other side's strongest point and your answer. **J5.** Where you stand now and one condition that would change your mind.

5
TURN IN

Now we turn it in. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Principles of Biomedical Technology, and open the assignment named **Wk5 CER: JCU bioethics 1, should ELISA testing be mandatory?**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

ASSIGNMENT 21 OF 29 Tue, Sep 22 about 80 minutes

Barcodes and Panels

Today we need to accomplish use supplied band positions to make the three allowed STR calls with their limits, log every panel value beside its supplied range and read the pattern without naming a cause, and log your case's twist record in three labeled parts.

Our goal is making only the claims your evidence supports.

You have to turn in Match matrix and panel sheet, Parts A to E in one sheet: the STR match matrix (B1), the panel grid and pattern sentence (B2), and your case's twist note (C1).

Schoology assignment: Wk5 D10 · Barcodes and Panels

1 READ	Your materials for this assignment start on the very next page, in this order: **student handout and response sheet (write on this)** (20 pages). Read the briefing first. Write your answers on the sheet. Everything you need for this assignment is in those pages.
2 DO	A panel number means nothing without its reference range, and a gel band means nothing by itself. What must your sheet show so another reader can see every band you compared and every range you used?
3 DO	What can the supplied lanes and panel values support, and what stays open after today?
4 DO	A DNA profile names a source. A panel names a body state. Neither one, alone, names what happened.
5 READ	Open your own-case handout. Add your period and investigator code. Label it "Supplied illustrative case record." Read R1 and R2, answer A1 and A2, and keep the practice gel model beside you.
6 WRITE	Complete B1's match matrix. Compare each questioned lane with each reference lane band by band from the supplied band positions. Write one of the three allowed calls and its limit in every row. Copy the two request-card summaries and label them Reported.
7 WRITE	Complete B2 and B3. Log every panel value beside its supplied range and unit, flag ABOVE or BELOW or mark it inside, keep the screen rows as reported categories, and write one pattern sentence with no cause word. Then do B3 with the practice numbers only.
8 DO	At minute 60, use only your case's twist card. Write C1 in three labeled parts (OBSERVATION, INFERENCE, NOT SETTLED) and end with the ceiling sentence. Complete D1.
9 WRITE	Complete E1 to E3, check and submit. Check all ten task IDs. Hand in the one sheet on paper or as one PDF in your section assignment.
10 DO	Supplied illustrative case record (paper-record route), available to all students including absent students .
11 DO	Keep each lane number beside its band positions, each panel value beside its range and unit, and each record beside its evidence or exhibit number. A record may say less than you would like. Keep that limit instead of filling the gap.

12 DO

Your sheet needs nine own-call matrix rows with a call and a limit each, two Reported rows, the panel grid with every row flagged or copied, one pattern sentence, B3's two decimals with the division shown, C1's three labeled parts and ceiling sentence, D1, and E1 to E3. No invented band position, rarity number, range, exhibit number, cause or person's action should be added.

13 DO

Hand the paper sheet to Mr. Mendoza before leaving, or submit one PDF in Wk5 D10 · Barcodes and Panels (PLTW 1.1.6) by September 22 at 11:59 PM. Use your period and investigator code. Do not submit the same sheet twice. Keep notebook pages in your notebook.

14 TURN IN

Now we turn it in. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Principles of Biomedical Technology, and open the assignment named **Wk5 D10 · Barcodes and Panels**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

Barcodes and Panels

RESPAWN · Period 6A-7B · Supplied illustrative case record (paper-record route), available to all students including absent students

One match matrix and panel sheet

Complete one match matrix and panel sheet: Parts A to E including your case's twist note. Use your class's supplied illustrative records. Your work reads a supplied strip record and a supplied panel record; it does not claim that you ran a gel or a test.

Complete one match matrix and panel sheet, Parts A to E including the twist note. Hand the paper sheet to Mr. Mendoza before leaving, or submit one PDF to Wk5 D10 · Barcodes and Panels (PLTW 1.1.6) by September 22 at 11:59 PM. Use your period and investigator code. Do not submit twice; keep notebook pages in your notebook.

Supplied illustrative case record (paper-record route), available to all students including absent students. Keep each lane number beside its band positions, each panel value beside its range and unit, and each record beside its evidence or exhibit number. A record may say less than you would like. Keep that limit instead of filling the gap.

Your Case B D10 assignment · Daily directions

Five steps

1. Open your own-case handout. Add your period and investigator code. Label it "Supplied illustrative case record." Read R1 and R2, answer A1 and A2, and keep the practice gel model beside you.
2. Complete B1's match matrix. Compare each questioned lane with each reference lane band by band from the supplied band positions. Write one of the three allowed calls and its limit in every row. Copy the two request-card summaries and label them Reported.
3. Complete B2 and B3. Log every panel value beside its supplied range and unit, flag ABOVE or BELOW or mark it inside, keep the screen rows as reported categories, and write one pattern sentence with no cause word. Then do B3 with the practice numbers only.
4. At minute 60, use only your case's twist card. Write C1 in three labeled parts (OBSERVATION, INFERENCE, NOT SETTLED) and end with the ceiling sentence. Complete D1.
5. Complete E1 to E3, check and submit. Check all ten task IDs. Hand in the one sheet on paper or as one PDF in your section assignment.

This model and the B3 practice numbers do not require another upload. Complete Parts A to E and your twist note in the one match matrix and panel sheet.

Check and hand in

Your sheet needs nine own-call matrix rows with a call and a limit each, two Reported rows, the panel grid with every row flagged or copied, one pattern sentence, B3's two decimals with the division shown, C1's three labeled parts and ceiling sentence, D1, and E1 to E3. No invented band position, rarity number, range, exhibit number, cause or person's action should be added.

Hand the paper sheet to Mr. Mendoza before leaving, or submit one PDF in Wk5 D10 · Barcodes and Panels (PLTW 1.1.6) by September 22 at 11:59 PM. Use your period and investigator code. Do not submit the same sheet twice. Keep notebook pages in your notebook.

R1 / R2. Reading

R1. Your one sheet

Complete the match matrix and panel sheet, Parts A to E, including your case's twist note. Use the supplied illustrative records for your class's case: a six-lane STR strip record given as band positions, a panel record with its reference ranges, and one twist record released during class. You are reading these records, not reporting a gel you ran or a test you performed. The previous case lesson (D09) supplied no DNA profile. Today's strip record is the first DNA record in your case, and it is still a supplied record.

Keep each lane number beside its band positions, each panel value beside its range and unit, and each record beside its evidence or exhibit number. A record may say less than you would like. Keep that limit instead of filling the gap.

R2. Read the classroom STR rule

STR stands for short tandem repeat: a stretch of DNA where a short pattern repeats, and the number of repeats varies from person to person. Measure the repeat count at several sites and you get a DNA profile, a set of numbers so unlikely to repeat by chance that it works like a barcode. On the supplied gel record, longer repeats sit higher. A lane is one column of bands; questioned lanes come from scene samples and reference lanes come from named people. A band is one dark stripe, and its number on the migration scale is its position, standing in for the repeat count at one STR site. A real profile shows two bands per site, one from each parent; this strip prints one to keep it readable. The migration scale is the ruler printed beside the gel, from 10 at the top to 0 at the bottom; two bands at the same number are aligned.

What the supplied positions show	Classroom call
Every band in the questioned lane aligns with the reference lane	MATCH
Every readable band aligns, and at least one band is unreadable	CANNOT EXCLUDE
At least one band clearly differs	EXCLUDED

Three calls are allowed in this classroom model:

Write the limit in every row: a match names the source of the DNA, whose cells, not when they got there or what that person did. DNA on an item shows that someone's cells reached it. Mixtures put two barcodes in one lane, and partial profiles fade stripes, so a partial read is inconclusive under this rule rather than an identification. This three-band classroom rule stands in for the real laboratory process, which reads many sites and reports results with statistical weight. The three calls line up with the three result types a real report can give: inclusion, exclusion, or inconclusive. NIJ, possible results from DNA testing [S1].

Two references in your case appear only on request cards, with no band positions supplied. For those, copy the record's reported summary and label it Reported. Do not write a band-by-band call you could not make.

R3 / R4. Reading

R3. Match strength as a decimal

A lab can state how often a full match would happen by chance among unrelated people, as 1 in some number. Write it as a decimal by dividing 1 by that number. The smaller decimal is the rarer match, so it is the stronger identification. The numbers in the worked model and in B3 are practice numbers. No rarity number is supplied for your case, so do not attach one to your lanes.

R4. Read a panel value beside its range

A toxicology screen checks for classes of drugs and poisons, usually by immunoassay: a fast screening test that uses antibodies to detect one target class of chemical. A chemistry panel measures the body's own numbers. Read each value the same way: value beside its supplied range, with the unit attached; flag it ABOVE or BELOW, or mark it inside; then look for a pattern across values. One flag is a question; a pattern of flags is a lead. Write the pattern as a direction only: no cause word, no diagnosis, no person.

A reported negative screen means the screen found none of its listed classes at its own limits. It is a screening result, not proof that nothing was present, and an antibody screen can sometimes be tripped by a related target. "No specific poison indicated" is a reported result of the targeted testing named in the record; the record does not list what was targeted. The reference ranges are the exhibit's own. Some ranges have only one limit, such as the practice range below 10 mg/L. Ordered classes, such as a practice class 2 of 4, are categories, not a measuring scale, so do not subtract them. Both are practice examples; flag the ranges and classes your own case's panel supplies.

Case B panel key

Tryptase, in the exhibit's key, is a chemical stored in mast cells, the body's allergy-alarm cells; a severe allergic reaction makes them dump it into the blood. The examiner's honesty note stays with the value: a high postmortem tryptase supports but does not by itself prove a severe allergic reaction. A specific IgE class measures how primed the immune system already is against one trigger; class 5 of 6 is strongly primed against peanut. Primed is not the same as reacted on a given day. The D09 cassette record reported POSITIVE (strong) for the OPEN container and NEGATIVE for the SEALED container; that record did not establish how much peanut protein was present or that anyone was exposed. Flag each value against its supplied range. The pattern sentence names a direction, not a cause.

R5 / R6. Reading

R5. Weigh a twist record

New evidence does not restart the case. It joins the matrix and the timeline and gets weighed like every other record. Write it in three labeled parts. OBSERVATION: what the record states, copied exactly with its evidence or exhibit number. INFERENCE: what it changes about an earlier assumption, labeled as inference. NOT SETTLED: what the record does not establish. A record that shows where an item was, or when a message was sent, does not show who did something, why, or what happened. An absence in one record, such as no messages from one account, is not proof of absence everywhere.

Your case's twist card is released at minute 60. Follow only the matching case card below.

Your Case B twist card is printed on the last page of this handout, under "Twist record: use at minute 60". Do not use it before minute 60.

R6. Keep source, state and event apart

The matrix says whose DNA is on what. The panel says what state the body was in. What happened is still a Day 16 question. Use the vocabulary about real rows on your sheet: STR and DNA profile belong to the lanes and calls; immunoassay belongs to the drug-screen row. A definition alone does not count.

PLTW connection and optional help

This John Hay original sheet practices record reading, the three-call rule and range-then-pattern interpretation, connected to PLTW Activities 1.1.6 DNA Analysis and 1.2.3 Forensic Toxicology, referenced by title. It does not certify official activity completion; myPLTW student access is reported down. The complete required explanation is here; the background link is support, not an extra assignment.

myPLTW student access is down for technical reasons. When it is restored, this day's PLTW anchor is completed online; until then the portal simulation and these printed materials carry the day.

F1 shows the workflow. The separate practice gel and sodium row model the calls and the flag. Guided notes support your work but are not another submission. The DNA Fingerprinting and Toxicology and Drug Delivery simulations prepare you for any later teacher-directed bench work; this sheet does not require them and does not certify them. Carry your sheet to the next assigned case lesson. What happened is still open.

Plain-English terms

STR
Short tandem repeat: a stretch of DNA whose repeat count varies person to person. Think of a barcode stripe width.

DNA profile
The set of STR lengths that identifies one person. Think of the whole barcode.

immunoassay
A fast screening test that uses antibodies to detect one target class of chemical. Think of a lock that only one key trips.

lane
one column of bands on the strip sheet. Questioned lanes come from scene samples; reference lanes come from named people.

band
one dark stripe in a lane. Its position is the repeat count at one STR site.

flag
a panel value outside its reference range. One flag is a question; a pattern of flags is a lead.

migration scale
The ruler printed beside the gel. A band's number on it is its position; two bands at the same number are aligned. Longer repeats sit higher on this gel.

Immunoassay limit
A screen is not a confirmation, and an antibody screen can sometimes be tripped by a related target.

Supplied illustrative case record
You are reading these records, not reporting a gel you ran or a test you performed.

Reported
Copy the record's reported summary and label it Reported. Do not write a band-by-band call you could not make.

Reference range
The reference ranges are the exhibit's own. Some ranges have only one limit, such as the practice range below 10 mg/L.

Ordered class
Ordered classes, such as a practice class 2 of 4, are categories, not a measuring scale, so do not subtract them.

Twist record
New evidence does not restart the case. It joins the matrix and the timeline and gets weighed like every other record.

The DNA Fingerprinting and Toxicology and Drug Delivery simulations prepare you for any later teacher-directed bench work. This paper sheet does not require them and does not certify them.

Practice gel and practice row: separate practice, not your case

This worked model uses the evidence sheet's training gel (one questioned lane Q, a swab from a practice water bottle, and three reference lanes R1, R2 and R3, four bands each) and one made-up panel row. It is not evidence for Case A or Case B. Use the structure, not these lanes or answers, on your sheet.

Read the questioned lane first

Lay a straightedge across the gel at each band in lane Q and read the scale. Q's bands sit at 8.0, 6.0, 3.5 and 1.5. Write them down before looking at any reference lane. This is a description of practice positions, not a gel you personally ran.

Make the three allowed calls

Practice comparison	Supplied positions	Bands aligned?	Call	Limit
Q and R1	R1 at 8.0, 6.0, 3.5, 1.5	Four of four	MATCH	R1 is the source of the cells on the bottle; the gel does not say when or why
Q and R2	R2 at 8.0, 5.0, 3.5, 1.5	Second band sits at 5.0, not 6.0; one band clearly differs	EXCLUDED	R2 is ruled out as the source of this swab only, not ruled out of anything else
Q and R3	R3 at 8.0, 6.0, [unreadable near 3.5], 1.5	Three readable bands align; one is unreadable	CANNOT EXCLUDE	Not a match; a match needs every band. A partial read is an inconclusive call here, not an identification

A match is a whole-column judgment. Two lanes that line up at every band look the same top to bottom; one band out of place is what an exclusion looks like; a band you cannot place leaves the call open.

Practice gel. Match strength, the practice panel row and the finished product

Match strength with practice numbers

The practice lab says a full 4-site match like R1's happens by chance in about 1 of 60,000 unrelated people: 1 ÷ 60,000 = 0.0000167, about 0.00002. R3's 3-site partial is 1 in 4,000: 1 ÷ 4,000 = 0.00025. The smaller decimal is the rarer match, so R1 is the stronger identification. Your B3 task uses 1 in 10,000,000 and 1 in 800,000, not these numbers, and needs its own division. No rarity number is supplied for your case.

Practice panel row

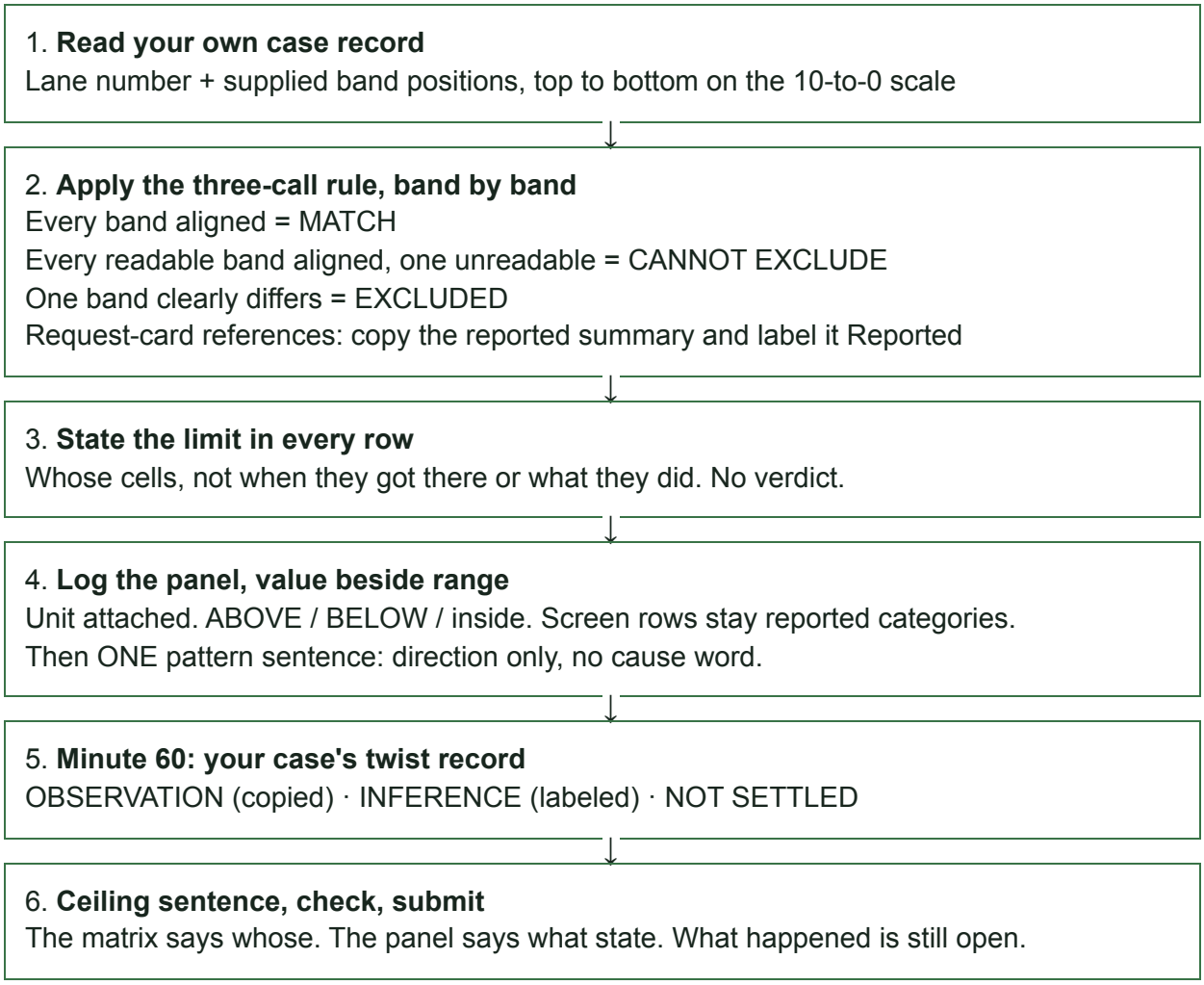
Made-up value: sodium 128 mmol/L, with a reference range of 135 to 145 mmol/L. Inside? No, below. How far? 135 minus 128 = 7 mmol/L below the bottom of the range. Flag it BELOW and write the number beside the range. Interpretation waits for the pattern; one row names no cause.

Finished practice product

Q matches R1 (four of four bands), excludes R2 (one band differs), and cannot exclude R3 (one band unreadable). The full match is rarer by chance (0.0000167) than the partial (0.00025), so it is the stronger identification. The practice sodium value sits 7 mmol/L below its range.

This model and the B3 practice numbers do not require another upload. Complete Parts A to E and your twist note in the one match matrix and panel sheet.

F1. Read, call, flag, weigh



Paper-record workflow. This is a teaching diagram, not a gel image, a laboratory procedure or a test protocol.

Find your own-case lane table and the migration-scale rule. For each questioned lane, compare its three band positions with each reference lane on the strip sheet, band by band. If every band aligns, write MATCH. If every readable band aligns and a band is unreadable, write CANNOT EXCLUDE. If at least one band clearly differs, write EXCLUDED. For the two request-card references, copy the reported summary and label it Reported, because no band positions are supplied. In every row, write the limit: a match names whose cells, not when they arrived or what the person did. Then log every panel value beside its supplied range with the unit attached, flag it ABOVE or BELOW or mark it inside, copy the screen rows as reported categories, and write one pattern sentence that names a direction and no cause. At minute 60, log only your own case's twist record in three labeled parts: what it states, what earlier assumption it changes, and what it does not settle. End with the ceiling sentence. The finished sheet does not claim a test you ran, a person's actions, a diagnosis or a cause of death.

Optional restart cue

Find the next unanswered task ID. Use R2 for the matrix, R3 for the practice decimals, R4 for the panel grid, R5 for the twist note and R6 for the vocabulary. Do not switch to the other case or create a second product.

Case B. Six supplied lanes, Exhibit 013

Supplied illustrative case record (paper-record route), available to all students including absent students. Keep each lane number beside its band positions, each panel value beside its range and unit, and each record beside its evidence or exhibit number. A record may say less than you would like. Keep that limit instead of filling the gap.

Setting: Respawn, an e-sports lounge with a smoothie counter. Case number JH-26-0831-B.

The gel's left edge carries a migration scale from 10 (top) to 0 (bottom); band positions are read off that scale.

Lane	What it is	Role	Supplied band positions
L1	Counter stain	questioned	7.0, 5.0, 2.5
L2	Straw from the smoothie cup	questioned	7.0, 5.0, 2.5
L3	Storeroom hair (rooted)	questioned	8.0, 4.0, 1.5
L4	Victim reference	reference	7.0, 5.0, 2.5
L5	Nguyen reference	reference	8.5, 6.0, 3.5
L6	Whitfield reference	reference	8.0, 4.0, 1.5

A match names the SOURCE of the DNA (whose cells), not when they got there or what that person did.

Rarity number: not supplied. Lane-to-evidence-ID map: not supplied. Specimen for the reported values: not supplied.

Case B. Request cards and the panel record

Two request-card references

- Rao: band positions not supplied. Reported: Reference lane on request card; does not align with L1, L2, or L3. EXCLUDED for the stains, the straw, and the hair. Copy this row as Reported; do not write your own band-by-band call.
- Boone: band positions not supplied. Reported: Reference lane on request card; does not align with L1, L2, or L3. EXCLUDED for the stains, the straw, and the hair. Copy this row as Reported; do not write your own band-by-band call.

Panel record E10: 5 rows

Exhibit number: not supplied.

- Drug screen: Immunoassay screen negative in every class (opioids, stimulants, sedatives, cocaine, cannabinoids); supplied range: none, this row is a reported category; reported category: left blank for your copy.
- Ethanol: negative; supplied range: none, this row is a reported category; reported category: left blank for your copy.
- Targeted testing: No specific poison indicated; supplied range: none, this row is a reported category; reported category: left blank for your copy. The record does not list what the targeted testing targeted, so mark that not supplied.
- Serum tryptase: 38 ng/mL; supplied range below 11 ng/mL; flag: left blank for your flag. Specimen: not supplied. The exhibit's own key: tryptase is a chemical stored in mast cells, the body's allergy-alarm cells; a severe allergic reaction makes them dump it into the blood. The examiner's note stays with the value: a high postmortem tryptase supports but does not by itself prove a severe allergic reaction.
- Specific IgE, peanut: Class 5 of 6; supplied range class 0 to 1; flag: left blank for your flag. This is an ordered class, not a measuring scale, so do not subtract it. Specimen: not supplied. The exhibit's own key: IgE class measures how primed the immune system already is against one trigger; class 5 of 6 is strongly primed against peanut.

Reported screening results at the screen's own limits; not proof that no substance was present; the record does not list what the targeted testing targeted.

The D09 cassette record reported OPEN counter container, two lines C and T, reported POSITIVE, qualifier strong and SEALED stock container, one control line C only, reported NEGATIVE, no qualifier. Preserve reported classifications without claiming validated positivity, amount, exposure, allergy outcome, source, intent or cause of death.

Practice numbers (not from the case)

A full 6-site match: 1 in 10,000,000. A 5-site match with one site unreadable: 1 in 800,000. Requested: both as decimals (1 divided by the number); which lane is the stronger identification; what allowed call the 5-site lane gets.

Your Parts A to E match matrix and panel sheet

Case B, RESPAWN, Period 6A-7B. Investigator code, not name:

Record route label: Supplied illustrative case record (paper-record route), available to all students including absent students.

Date: September 22, 2026

PBS-U1-D10-A1

What does STR stand for, and what about it varies from person to person? Copy the first three words of the sentence you used, in quotation marks.

The answer is in R2's first paragraph. The citation is the first three words of one sentence, not a summary.

Sentence frame: STR stands for ____. The ____ varies from person to person. Sentence: "___ ___ ___".

What STR stands for

What varies from person to person

Supporting sentence starts

PBS-U1-D10-A2

The reading says a DNA match names a source, not a time or an action. In your own words, why does that limit matter for this case?

Name what a match on a scene item can tell you and what it cannot. Do not name anyone as guilty or innocent.

Sentence frame: A match would tell us whose ____. It would not tell us ____ or ____, so ____.

Why the limit matters, in your own words

B1. The match matrix

PBS-U1-D10-B1

Use the supplied band positions to compare each questioned lane (L1, L2, L3) with each reference lane on the strip sheet (L4, L5, L6), band by band. For each of the nine pairs write the two sets of positions, whether all bands align, some align with the rest unreadable, or at least one band clearly differs; write one of the three allowed calls (MATCH, CANNOT EXCLUDE, EXCLUDED); and write what that call shows and does not show. Then add the two request-card rows exactly as the record states them and label them Reported; they are supplied summaries, not your reads.

All three bands must align for MATCH. One band that clearly differs is EXCLUDED. If a band is unreadable and every readable band aligns, the call is CANNOT EXCLUDE. In the supplied tables every band is readable. Do not make a band-by-band call for a request card; the record supplies only its summary.

Matrix grid: questioned lane vs reference lane, band positions compared (Q / R), bands aligned?, call, what the call shows and does not show

Pair	Band positions compared (Q / R)	Bands aligned?	Call	What the call shows and does not show
L1 vs L4	7.0, 5.0, 2.5 / 7.0, 5.0, 2.5			
L1 vs L5	7.0, 5.0, 2.5 / 8.5, 6.0, 3.5			
L1 vs L6	7.0, 5.0, 2.5 / 8.0, 4.0, 1.5			
L2 vs L4	7.0, 5.0, 2.5 / 7.0, 5.0, 2.5			
L2 vs L5	7.0, 5.0, 2.5 / 8.5, 6.0, 3.5			
L2 vs L6	7.0, 5.0, 2.5 / 8.0, 4.0, 1.5			
L3 vs L4	8.0, 4.0, 1.5 / 7.0, 5.0, 2.5			
L3 vs L5	8.0, 4.0, 1.5 / 8.5, 6.0, 3.5			
L3 vs L6	8.0, 4.0, 1.5 / 8.0, 4.0, 1.5			

Two Reported rows: reference label, reported summary copied, band positions not supplied

Reference label	Reported summary, copied	Band positions
Rao		not supplied
Boone		not supplied

B2. The panel grid and one pattern sentence

PBS-U1-D10-B2

Log every row of your case's supplied panel record beside its supplied reference range and unit. Flag each numerical value ABOVE, BELOW or inside. For each qualitative row copy the reported category (screen negative, ethanol negative, no specific poison indicated). Then write ONE sentence about the pattern the flags make together, without naming a cause, a diagnosis or a person.

Keep the unit with the number. A one-sided range like the practice range below 10 mg/L has only an upper limit. Do not subtract ordered classes; a practice class 2 of 4 is a category, not a measurement. A negative screen means the screen found none of its listed classes at its own limits; it is not proof that nothing was present.

Sentence frame: ____ is ____ (range ____), ABOVE/BELOW/inside. Pattern: ____ sit ____ their ranges while ____; direction only.

Panel grid: record row, supplied value and unit, supplied range, flag or reported category

Record row	Supplied value and unit	Supplied range	Flag or reported category
Drug screen	Immunoassay screen negative in every class (opioids, stimulants, sedatives, cocaine, cannabinoids)	none, reported category	
Ethanol	negative	none, reported category	
Targeted testing	No specific poison indicated	none, reported category	
Serum tryptase	38 ng/mL	below 11 ng/mL	
Specific IgE, peanut	Class 5 of 6	class 0 to 1	

Pattern sentence, direction only

B3. Match strength with practice numbers

PBS-U1-D10-B3

Practice numbers, not from the case. A lab reports that a full 6-site STR match would occur by chance in about 1 of 10,000,000 unrelated people; with one site unreadable, a 5-site match is about 1 in 800,000. Write both as decimals (1 divided by the number). Which lane is the stronger identification, and what allowed call does the 5-site lane get?

Write the division, then the decimal, and count the zeros after the decimal point. The smaller decimal is the rarer match. Do not attach these numbers to your case's lanes; no rarity number is supplied for the case.

Sentence frame: 1 ÷ 10,000,000 = ____. 1 ÷ 800,000 = ____. The ____ match is rarer, so it is the stronger identification. The 5-site lane gets ____.

Two decimals with the division shown

Stronger identification and why

Allowed call for the 5-site lane

D/E. Finish the same sheet

PBS-U1-D10-D1

Use STR, DNA profile and immunoassay correctly in one or two sentences about today's work. A definition alone does not count; use the words about something real on your sheet.

Use each word about a real row: a lane, a call or the drug-screen row. Immunoassay belongs to the screen row, not the gel.

Sentence frame: Reading lane ____ against ____, the STR bands ____, so the DNA profile ____; the immunoassay screen row ____.

One or two applied sentences

PBS-U1-D10-E1

One band matches between a questioned and a reference lane. Match?

Rule check, not a case row.

Call and reason

PBS-U1-D10-E2

What can a full STR match on the scene stain prove, and not prove?

Whose cells, not when or what they did.

Proves

Does not prove

PBS-U1-D10-E3

Why do we read panel patterns instead of celebrating single flags?

One flag is a question. Say what a pattern adds and what it still does not name.

Reason

Optional check, help and support

Optional single call check, not alternate work plans

A questioned lane and a reference lane align at two bands, and the third band in the questioned lane is too faint to place. What call does the matrix get?

1. MATCH, because most bands align.
2. CANNOT EXCLUDE, because every readable band aligns and one band is unreadable.
3. EXCLUDED, because one band is missing.

This model and the B3 practice numbers do not require another upload. Complete Parts A to E and your twist note in the one match matrix and panel sheet.

If you were absent or need help

Use the same supplied-record handout and complete the same product. Its twist card is included; use it after Parts A and B. You do not need a strip sheet exhibit, a team, or a bench to complete it. If your teacher separately assigns bench work, follow its preparation and approved instructions; this paper sheet does not complete that requirement.

Lost your place? Find the next unanswered task ID and use F1's restart cue. Guided notes and the practice model are support, not extra submissions.

If your teacher is absent: Complete the supplied paper-record sheet using the required briefing and the practice models. Do not begin unassigned bench work. Use the twist card after Parts A and B.

Notebook support, not another submission

Keep notebook pages in your notebook.

Optional support

- Optional Guided Notes
- Separate practice gel and sodium-row worked model
- Existing voluntary vocabulary extra credit, kept separate from required D1
- Team roles as in-class facilitation only

Handoff, PLTW and sources

Complete one match matrix and panel sheet, Parts A to E including the twist note. Hand the paper sheet to Mr. Mendoza before leaving, or submit one PDF to Wk5 D10 · Barcodes and Panels (PLTW 1.1.6) by September 22 at 11:59 PM. Use your period and investigator code. Do not submit twice; keep notebook pages in your notebook.

Keep today's sheet for the next assigned case lesson, Wk5 D12 · The Clock in the Body (PLTW 1.2.2). What happened is still open; do not carry a verdict forward.

This John Hay original sheet practices record reading, the three-call rule and range-then-pattern interpretation, connected to PLTW Activities 1.1.6 DNA Analysis and 1.2.3 Forensic Toxicology, referenced by title. It does not certify official activity completion; myPLTW student access is reported down. The complete required explanation is here; the background link is support, not an extra assignment.

John Hay original local work connected by title; no official completion claim. The complete required explanation is here; the background link is support, not an extra assignment.

Case B D10 assignment

Official PLTW section hub: not supplied for this week.

Related PLTW activities

- Activity 1.1.6 DNA Analysis (page link not supplied)
- Activity 1.2.3 Forensic Toxicology (page link not supplied)

Sources and optional background

- S1. NIJ, possible results from DNA testing

  cited in R2.

A match names the source of the DNA, whose cells, not when they got there or what that person did. A panel flag is a record flag beside a supplied range, not a diagnosis. The finished sheet does not claim a test you ran, a person's actions, a diagnosis or a cause of death.

WEBXAM · DOMAIN 2 BIOTECHNOLOGY RESEARCH AND EXPERIMENTS · OHIO OUTCOMES 5.8, 5.4, AND 5.3. Standards: Ohio Health Science 5.4.13; Ohio Health Science 5.4.9; Ohio Health Science 5.3.14; Ohio Health Science 5.8.8; Ohio Health Science 5.8.11; PLTW PBS framework EXD-B.4; PLTW PBS framework CCP-B.1; Common Core RST.9-10.7; Common Core WHST.9-10.1; Common Core HSN-Q.A.1; NGSS SEP-4.

Twist record: use at minute 60

Use only your case's released twist card. Copy what it states, label your inference, list what it does not settle, and write the ceiling sentence. Complete D1.

Rule for twists: same discipline as everything else. New evidence does not restart the case; it joins the matrix and the timeline and gets weighed like every other exhibit.

Case B twist card

Evidence E6, Exhibit 014. During office inventory, the victim's epinephrine auto-injector, in date and unused, was found on the BACK OFFICE shelf. Every staff statement and the Day 4 background card say it lived in the counter drawer. The drawer measured on Day 5 is open and empty. An auto-injector is the spring-loaded pen that delivers the emergency allergy drug epinephrine. Not established by this record: who moved the injector, when, why, or whether its position changed the outcome.

Epinephrine auto-injector found on the office shelf

E6 / Exhibit 014. Released at minute 60.

During office inventory: the victim's epinephrine auto-injector, in date, unused, found on the BACK OFFICE shelf. Every staff statement and the Day 4 background card say it lived in the counter drawer. The drawer measured on Day 5 is open and empty. An auto-injector is the spring-loaded pen that delivers the emergency allergy drug epinephrine.

Earlier assumption this record touches: Staff statements and the Day 4 background card placed the injector in the counter drawer.

Not established by this record: who moved the injector; when it was moved; why; whether its position changed the outcome.

PBS-U1-D10-C1. Your three-part twist note

At minute 60, log E6 / Exhibit 014, the epinephrine auto-injector, exactly as supplied: the victim's auto-injector, in date and unused, found on the BACK OFFICE shelf during office inventory; every staff statement and the Day 4 background card say it lived in the counter drawer; the drawer measured on Day 5 is open and empty. Label your inference about where the injector was assumed to be. State what the record does not establish: who moved it, when, why, or whether its position changed the outcome.

Copy what the record states before you interpret it. An inference is labeled INFERENCE. Do not name who moved an item, who benefits, or who is guilty.

Sentence frame: OBSERVATION: The record (____) states ____. INFERENCE: This changes the earlier assumption that ____. NOT SETTLED: It does not establish ____ or ____. The matrix says whose, the panel says what state, and what happened is still open.

Evidence ID and exhibit (E6 / Exhibit 014)

OBSERVATION: what the record states, copied

INFERENCE: what earlier assumption it changes, labeled

NOT SETTLED: what the record does not establish

Ceiling sentence

ASSIGNMENT 22 OF 29 Wed, Sep 23 about 80 minutes

The Clock in the Body

Today we need to accomplish use your case's supplied body-clock records to make one window per clock with its assumption, intersect the windows, state the claim ceiling, and log your case's door access record without concluding.

Our goal is making only the claims your evidence supports.

You have to turn in Time-of-death worksheet, Parts A to E plus your case's door-log timeline check, in one worksheet.

Schoology assignment: Wk5 D12 · The Clock in the Body

1 READ	Your materials for this assignment start on the very next page, in this order: **student handout and response sheet (write on this)** (19 pages). Read the briefing first. Write your answers on the sheet. Everything you need for this assignment is in those pages.
2 DO	Three clocks can each be wrong on their own. Why does the window become more believable when three independent clocks agree, and what does it still not tell you?
3 DO	What can three supplied body clocks and one door log say about when this person died, and what can they not say?
4 READ	Open your case's handout, add your period and code, label the supplied-record route, read R1 and R2, and complete A1 and A2.
5 WRITE	Complete B1: one window per clock from your case's supplied rows, with units and the assumption, then the intersection row. Answer B2.
6 WRITE	Complete B3 with the 30.5 °C practice values, then D1 and E1 to E3. Keep the practice numbers separate from your case.
7 DO	At minute 60, read your case's door log. Copy every row exactly into the timeline log and flag the open-question rows.
8 WRITE	Write C1 and submit the one worksheet on paper or as one PDF in your section assignment.
9 DO	Supplied illustrative case record, available to all students; no student measures a body, a scene model or a room, examines anything, or inspects a specimen or slide .
10 DO	Keep each observation beside the window you make from it and the assumption that could throw it off. A record may give less than you would like. A window that says "at least" with no upper limit is an honest answer when that is all the clock allows.
11 DO	Your worksheet needs four B1 rows with units and assumptions, B2's clock and record condition, B3's calculations, C1's paragraph, D1 and E1 to E3, plus the timeline log with every row copied and the open questions flagged. No invented measurement, room number, role, motive or conclusion should be added.

12
DO

Hand the paper worksheet to Mr. Mendoza before leaving, or submit one PDF in Wk5 D12 · The Clock in the Body (PLTW 1.2.2) by 11:59 PM on your class day. Use your period and investigator code. Do not submit the same worksheet twice. Keep notebook pages in your notebook.

13
TURN IN

Now we turn it in. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Principles of Biomedical Technology, and open the assignment named **Wk5 D12 · The Clock in the Body**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

The Clock in the Body

RESPAWN · Period 6A-7B · Supplied illustrative case record, available to all students; no student measures a body, a scene model or a room, examines anything, or inspects a specimen or slide

One time-of-death worksheet

Complete one time-of-death worksheet: Parts A to E plus your case's door-log timeline check. Use your class's supplied illustrative records. Your work turns printed observations into windows and states what they cannot say; it does not claim that you measured a body, a scene model or a room.

Complete one time-of-death worksheet, Parts A to E plus your case's door-log timeline check. Hand the paper worksheet to Mr. Mendoza before leaving, or submit one PDF to this section's assignment by September 24 at 11:59 PM. Use your period and investigator code. Do not submit twice; keep notebook pages in your notebook.

Supplied illustrative case record, available to all students; no student measures a body, a scene model or a room, examines anything, or inspects a specimen or slide. Keep each observation beside the window you make from it and the assumption that could throw it off. A record may give less than you would like. A window that says "at least" with no upper limit is an honest answer when that is all the clock allows.

The window is an estimate with stated assumptions, not a fact. It constrains the timeline; it does not convict anyone inside it.

Your Case B D12 assignment · Daily directions

Five steps

1. Open your own-case handout. Add your period and investigator code. Label it "Supplied illustrative case record." Read R1 and R2, answer A1 and A2, and use the separate practice case if helpful.
2. Complete B1's windows table. One row per clock from your case's supplied rows: the measurement you used, the window with units, the assumption. If a clock gives only a floor, write "at least" and no upper limit. Fill the intersection row, then answer B2.
3. Finish the practice numbers and checks. Complete B3 with the 30.5 °C practice values, then D1 and E1 to E3. Keep the practice numbers out of your case rows.
4. At minute 60, read your case's door log. Copy every row exactly into the timeline log. Flag the open-question rows and leave them questions. Mark each row inside, outside or cannot tell against your intersection.
5. Write C1 and submit. Three windows in one sentence each with their assumption, the intersection, the least-trusted clock and why, and what the window does and does not do to any name or code in the log. Hand in the one worksheet on paper or as one PDF in your section assignment.

The practice case, the optional check and the short check do not require another upload. Complete Parts A to E and the door-log timeline check in the one worksheet.

The 80-minute plan

- 0–10 min (from 0:00), Teacher launch: Identify the one worksheet, your case and the paper-record boundary. If your record prints a supplied authorization line, read it. Begin R1 and R2 and start A1 and A2. Tasks A1, A2.
- 10–25 min (from 0:10), One guided example: Walk the practice case (33.0 °C, 20 °C room, 10:00 PM) through its six steps. Finish A1 and A2. Tasks A1, A2.
- 25–45 min (from 0:25), Individual work with teacher support: Complete B1's four rows from your case's supplied observations: measurement used, window with units, assumption, then the intersection. Answer B2. Tasks B1, B2.
- 45–60 min (from 0:45), Continue the same worksheet: Complete B3, D1 and E1 to E3. Check every task ID except C1 and prepare the timeline-log area. Tasks B3, D1, E1, E2, E3.
- 60–77 min (from 1:00), Door log, then C1: Use only your case's released door log and support note. Copy each row exactly, flag the open questions, mark each row against your intersection, then write C1. Tasks timeline-log, C1.
- 77–80 min (from 1:17), Check and submit: Check the timeline log and all Parts A to E. Hand in paper or one PDF; keep notebook support in your notebook. Tasks handoff.

Check and hand in

Your worksheet needs four B1 rows with units and assumptions, B2's clock and record condition, B3's calculations, C1's paragraph, D1 and E1 to E3, plus the timeline log with every row copied and the open questions flagged. No invented measurement, room number, role, motive or conclusion should be added.

Hand the paper worksheet to Mr. Mendoza before leaving, or submit one PDF in Wk5 D12 · The Clock in the Body (PLTW 1.2.2) by 11:59 PM on your class day. Use your period and investigator code. Do not submit the same worksheet twice. Keep notebook pages in your notebook.

If you were absent or need help

Use the same supplied-record handout and complete the same product. The door-log page is included; use it after B1 and B2. You do not need to measure anything or invent a missing value. If your teacher separately assigns a physical activity, follow the Vital Signs simulation preparation gate and the approved instructions. This paper worksheet does not complete that requirement.

Lost your place? Find the next unanswered task ID and use F1's restart cue. Guided notes and the practice case are support, not extra submissions.

Use the same own-case supplied records and complete the same worksheet. The door-log page is included; use it after B1 and B2. Do not invent a measurement, a room number, a role for a name or code in the log, or a conclusion about an open-question row.

If your teacher is absent: Complete the supplied paper-record worksheet using the required briefing and the practice case model. Do not begin any physical activity. Use the door-log section after B1 and B2.

R1 / R2. The required briefing

A DNA profile names a source. A panel names a body state. Neither one, alone, names what happened.

R1. Your one worksheet

Complete the time-of-death worksheet, Parts A to E and your case's door-log timeline check. Use the supplied illustrative records for your class's case. You are reading records that were printed for you: a body temperature, a room temperature, one stiffness observation, one blood-settling observation, and a door access log. You did not measure a body, a scene model or a room, and this worksheet never says you did. All values are simulated.

Keep each observation beside the window you make from it and the assumption that could throw it off. A record may give less than you would like. A window that says "at least" with no upper limit is an honest answer when that is all the clock allows.

R2. Read the three body clocks

After death, the body changes on schedules, and a schedule can be read backward. Your case uses three clocks.

Algor mortis is body cooling after death, roughly on a schedule. Analogy to hold onto: the coffee cup; touch it and you know roughly when it was poured. In this course's working rule, the body cools from its normal living temperature, about 37 °C (98.6 °F), toward room temperature at roughly 1 to 1.5 °C per hour early on. Real examiners use tables that adjust for body size, clothing and the room. Limit: the room writes the schedule too. A warm room, clothing or body size bends the curve, so every algor estimate carries its assumptions, starting with that 37 °C normal.

Rigor mortis is temporary muscle stiffening after death; it comes and goes on a schedule. Analogy to hold onto: a timer you read backward. Muscles stiffen as their chemistry runs down, beginning in small muscles within a few hours, peaking around 12 hours, releasing over the next day. You read it backward from where the stiffness is. Limit: temperature and exertion before death shift it.

Livor mortis is blood settling to the lowest points after death, fixed after hours. Analogy to hold onto: sediment settling in a bottle. Blood settles to the lowest surfaces and shows as fixed purple discoloration after several hours. Livor tells time and position: if the settled pattern does not match the found position, the body was moved, and that is a case-changing fact. Limit: dark skin tones and pressure points complicate the read.

The method: estimate a window from each clock separately, then intersect the windows. One clock persuades; three clocks corroborate.

R3. Turn each observation into a window

R3. Turn each observation into a window

A window is the earliest and latest time a clock allows. A single number pretends to a precision no clock has. Write units every time.

Algor. Subtract the measured body temperature from 37 °C to get the drop. Divide the drop by 1 °C per hour and by 1.5 °C per hour; the two answers are the two ends of the window, in hours before the reading. Write the assumption: a 37 °C start and a steady room. If the body has reached room temperature (within about 1 °C of the room), the cooling clock has run out: write "at least" the hours from both rates, and no upper limit from this clock. Anything covering the body slows cooling, so the true time is longer than the bare-body estimate, not shorter.

Rigor. Stiffness in the small muscles only (jaw, fingers) means the clock is in its first few hours: window under about 4 hours. Stiffness fully passed, none anywhere, means roughly 24 to 36 hours or more, but only once rigor has had time to come and go. No stiffness also reads as the first hour or two, before rigor has started, so no stiffness on its own does not pick an end. Let algor decide which end you are at before you write the window. Write the assumption: normal body temperature and no heavy exertion before death, both of which shift the schedule.

Livor. Settled blood that fades when pressed is not fixed: under several hours, call it under about 8. Settled blood that does not fade when pressed is fixed: at least about 8 to 12 hours on most schedules. A fixed reading gives a floor, not a ceiling. Then check position: if the settled surfaces are the lowest surfaces in the found position, nothing in this clock says the body was moved. That is not proof it was never moved.

R4 / R5 / R6. Intersect, keep practice separate, read the log

R4. Intersect the windows and state the ceiling

The intersection is the overlap of all the windows. Time inside every window is possible; time outside any one window is ruled out by that clock. A window that gives only a floor still counts: it rules out times that are too recent. When every clock gives only a floor, the honest intersection is a floor, and saying that no clock can pin an hour is the correct finding.

Claim ceiling: the window is an estimate with stated assumptions, not a fact. It constrains the timeline; it does not convict anyone inside it. Name the clock you trust least in your case and the record condition that weakens it.

R5. Keep practice arithmetic separate

To convert °C to °F, multiply by 1.8 and add 32. The B3 practice numbers (30.5 °C, normal 37 °C, a normal room) are not from your case. Show the drop with units, the hours at each rate, the window, and the conversion. Do not use your case temperatures in B3, and do not use the B3 numbers in your case rows. The practice case's 33.0 °C example models the steps; its numbers are not yours either.

R6. Read the door log without concluding

Your case's door access log is a supplied simulated record. Each row is a credential or alarm event as the system printed it: a fob IN or OUT, a key code, an alarm, a call. A row records that a credential or alarm fired. It does not by itself establish that a named person was present, absent, alone or elsewhere. Copy each row exactly. Mark any row the case flags as an open question and leave it a question. The log's names and codes are printed as supplied; this handout does not give their roles, and you do not add one.

Use the log in the final part of the period, after your windows are done. Follow only the matching case note below.

PLTW connection and optional help

This John Hay original worksheet practices reading a rate, stating an assumption and intersecting independent estimates. It connects by title to PLTW Activities 1.2.1 Anatomy of an Autopsy and 1.2.2 Time of Death; it does not certify official activity completion. The complete required explanation is here; background links are support, not extra assignments.

F1 shows the workflow. The separate practice case (33.0 °C in a 20 °C room, read at 10:00 PM) models the six steps. Guided notes can support your work but are not another submission. Before any separate teacher-directed physical activity, complete the existing Vital Signs simulation preparation and use the approved instructions. This worksheet does not grant a practical pass. Carry your window to the next assigned case lesson, the full examination, without assuming a cause or manner of death already exists.

Plain-English terms

Algor mortis
Body cooling after death, roughly on a schedule. Analogy to hold onto: the coffee cup cooling.

Livor mortis
Blood settling to the lowest points after death, fixed after hours. Analogy to hold onto: sediment settling in a bottle.

Intersection
The overlap of all the windows. Time inside every window is possible; time outside any one window is ruled out by that clock.

Rigor mortis
Temporary muscle stiffening after death, comes and goes on a schedule. Analogy to hold onto: a timer you read backward.

Window
The earliest and latest time a clock allows. A single number pretends to a precision no clock has.

Before any separate teacher-directed physical activity, complete the existing Vital Signs simulation preparation and use the approved instructions. The paper worksheet does not certify that practical work.

Practice case: three clocks, one intersection (not your case)

This worked model uses the practice values printed on both evidence sheets (pages 2 to 3, "a practice case, not ours"). It is not evidence for Case A or Case B. Use its steps, not its numbers, in your worksheet.

The supplied practice record

A body measured at 10:00 PM reads 33.0 °C in a 20 °C room. Stiffness is present only in the jaw and fingers. The settled blood fades when pressed.

What to notice: the two thermometers. Every cooling estimate needs both numbers, the body's and the room's, and the room's is the one people forget to write down.

Steps 1 to 3

1. Algor, the drop: 37 minus 33.0 = 4.0 °C dropped. Write the unit every time.
2. Algor, the two rates: at 1 °C per hour, 4.0 ÷ 1 = 4.0 hours. At 1.5 °C per hour, 4.0 ÷ 1.5 = about 2.7 hours. Window: 2.7 to 4.0 hours before 10:00 PM, which is about 6:00 PM to 7:20 PM. Assumption: the person started at 37 °C and the room stayed at 20 °C.
3. Rigor: stiffness in small muscles only means the clock is in its first few hours. Window: under about 4 hours, so after about 6:00 PM. Assumption: normal temperature and no hard exertion before death.

The practice case. Steps 4 to 6, the finished product and what may differ

Steps 4 to 6

4. Livor: blood settled but fades when pressed means not fixed, so under several hours, call it under 8. Window: after about 2:00 PM. Assumption: a light skin tone and no pressure points hiding the pattern. Position check: the settled blood is on the surfaces that were lowest in the found position, so nothing says moved.
5. Intersect: time inside every window. Algor says 6:00 to 7:20 PM, rigor says after 6:00 PM, livor says after 2:00 PM. Overlap: about 6:00 to 7:20 PM. Algor set both ends; the other two agreed and did not narrow it.
6. Least-trusted clock and why: livor, because "fades when pressed" is a soft yes-or-no read with a wide schedule. Then the conversion: 33.0 × 1.8 = 59.4, plus 32 = 91.4 °F.

Finished practice product

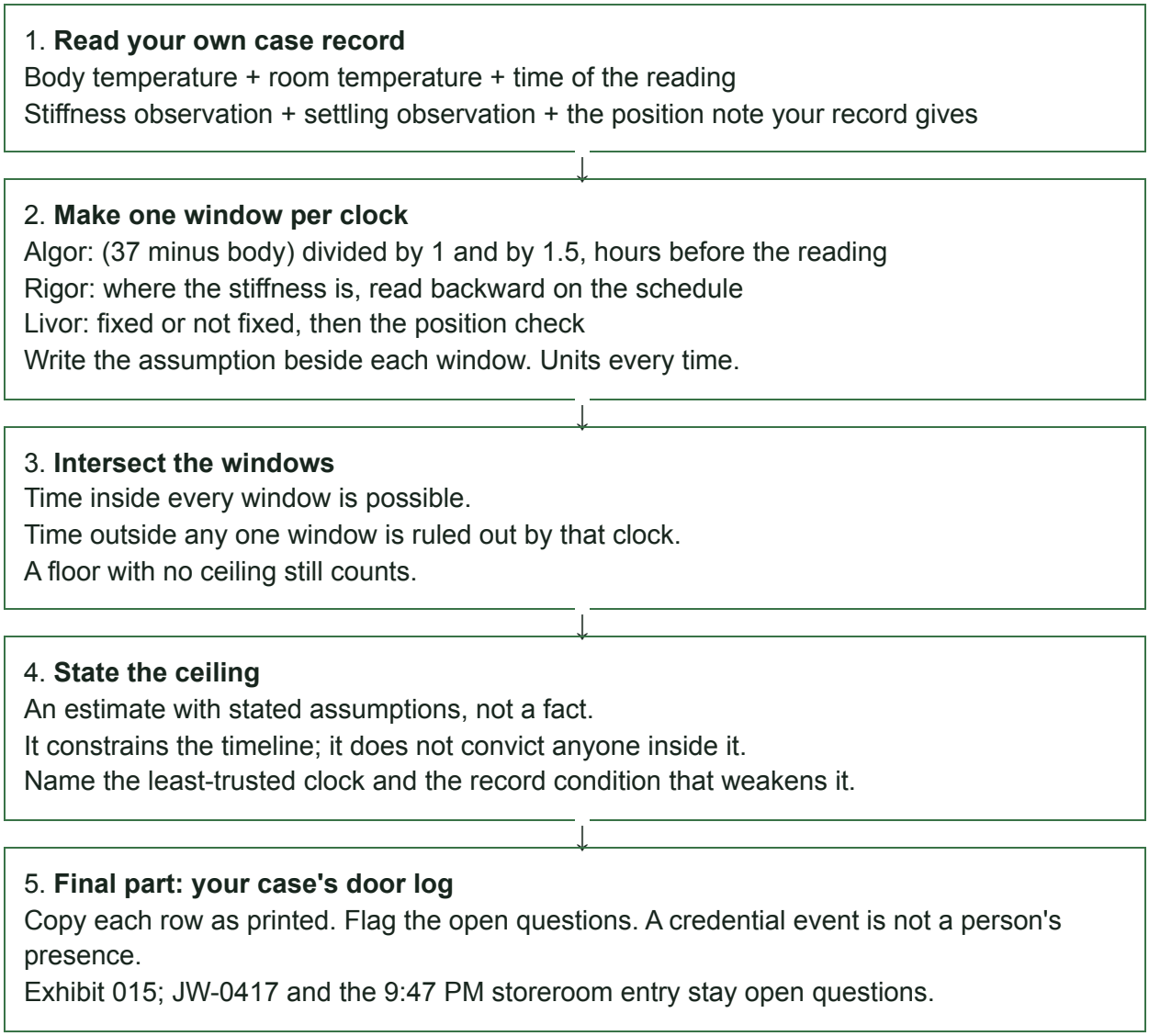
Practice window: death about 6:00 to 7:20 PM (2.7 to 4.0 hours before the 10:00 PM reading), with the 37 °C start as the load-bearing assumption; rigor and livor agree without narrowing it, and 33.0 °C is 91.4 °F.

What may differ in your case

Your case's clocks may not all give two ends. A body that has reached room temperature gives "at least" and no upper limit. A fixed livor gives a floor. A fully passed rigor gives a floor with a wide schedule behind it. Write the assumption anyway, and let the intersection be a floor if that is all the clocks allow. The practice case had no door log; yours does, in the final part of the period.

The model and these checks do not require another upload. Complete Parts A to E and your door-log timeline check in the one time-of-death worksheet.

F1. Read, window, intersect, log



Paper-record workflow. This is a teaching diagram, not an examination procedure, a specimen image or an instruction to measure anything.

Full text equivalent

Find your own-case body temperature, room temperature and the time of the reading, then the stiffness observation, the settling observation and the position note your record gives. Use R3 to make one window per clock: for algor, subtract the body temperature from 37 °C and divide by 1 and by 1.5 to get hours before the reading; for rigor, read where the stiffness is against the schedule; for livor, decide fixed or not fixed and check the settled surfaces against the position note your record gives. Write the assumption beside each window with units. Use R4 to intersect: time inside every window is possible, time outside any one window is ruled out, and a floor with no ceiling still counts. State the ceiling: an estimate with stated assumptions that constrains the timeline and convicts no one inside it, and name the least-trusted clock. In the final part of the period, copy your own case's door log exactly, flag the open questions and leave them questions, and note that a credential event is not proof of a person's presence. The finished worksheet does not claim a measurement, an examination, a role for any name, or a cause of death.

Optional restart cue

Find the next unanswered task ID. Use R2 for the clocks, R3 for each window, R4 for the intersection and ceiling, R5 for the practice numbers and R6 for the door log. Do not switch to the other case or create a second product.

Your supplied time-of-death record

Supplied illustrative case record, available to all students; no student measures a body, a scene model or a room, examines anything, or inspects a specimen or slide. Keep each observation beside the window you make from it and the assumption that could throw it off. A record may give less than you would like. A window that says "at least" with no upper limit is an honest answer when that is all the clock allows.

Your case: RESPAWN, case number JH-26-0831-B. Setting: Respawn, an e-sports lounge with a smoothie counter.

External exam and the three body clocks, opened by the autopsy-authorization warm-up. The records pull also lands: the door access log, and one row of it will own the room.

Row	What the record says
When and where the temperature was taken	Body temperature taken at 8:20 AM behind the counter.
Ambient (room) temperature	22 degrees C.
Body temperature	34.7 degrees C, still warm.
Rigor observation	Early: stiffness in the small muscles only (jaw, fingers), large muscles still loose.
Livor observation	Present but not yet fixed (fades when pressed), on the anterior (front) surfaces, which matches the found position.
Supplied authorization line	The examination was ordered and next of kin consented.

These rows are the whole supplied record. If a value is not printed here, it is not supplied: write that, and do not fill the gap.

What B1 asks you to build from them

- Algor window with units and assumption
- Rigor window with units and assumption
- Livor window with units, position check and assumption
- Intersection
- Least-trusted clock and record condition

Your Parts A to E worksheet

Case B, RESPAWN, Period 6A-7B. Investigator code, not name:

Header label: Supplied illustrative case record.

Date: Wednesday, September 23

PBS-U1-D12-A1

State the course's working cooling rate and the starting temperature it assumes. Copy the first three words of the R2 sentence you used, in quotation marks. Label the rate as this course's working rule.

The rate is a rule for this worksheet, not how real cases are decided. R2 says what real examiners use instead.

Rate with units, labeled as this course's working rule

Assumed start temperature with units

Supporting sentence starts

PBS-U1-D12-A2

Livor tells time and position. In one or two sentences, what would a mismatch between the settled blood pattern and the found position mean, and what limit does R2 put on reading livor?

A matching pattern is not the same as proof the body was never moved; see R3.

Meaning of a mismatch

Limit on the read

B1. The windows table

PBS-U1-D12-B1

Fill one row per clock from your case's supplied record: the measurement or observation you used, the window as earliest to latest hours since death with units, and the assumption that could throw it off. Then fill the intersection row. If a clock gives only a floor, write 'at least' and no upper limit. Do not use the practice case's numbers.

Both thermometer numbers matter: the body's and the room's. Write units every time. A single number is not a window.

CLOCK	MEASUREMENT YOU USED	WINDOW (EARLIEST TO LATEST HOURS SINCE DEATH)	THE ASSUMPTION THAT COULD THROW IT OFF
Algor mortis (cooling)			
Rigor mortis (stiffening)			
Livor mortis (settling)			
Intersection of all three			

If a clock gives only a floor, write "at least" and no upper limit. Do not use the practice case numbers.

B2 / B3. The least-trusted clock, then the practice numbers

PBS-U1-D12-B2

Which clock do you trust least in your case, and why? Name the specific condition in your record that weakens it.

Look at the notes in your record: what is covering the body, how close the body is to room temperature, how soft the observation is.

Clock

Record condition and reason

PBS-U1-D12-B3

Practice numbers, not from the case. A body measures 30.5 °C in a normal room. Normal living temperature is 37 °C. How many degrees has it dropped? At 1 °C per hour, how many hours? At 1.5 °C per hour? Write the window those two rates give. Then convert 30.5 °C to Fahrenheit: multiply by 1.8 and add 32. Show every step with units.

Use 37 °C as the start. Do not use your case temperatures here.

Drop with units

Hours at 1 °C per hour

Hours at 1.5 °C per hour

Window

Fahrenheit conversion

D / E. Finish the same worksheet

PBS-U1-D12-D1

Use algor mortis, rigor mortis and livor mortis correctly in one or two sentences about today's work. A definition alone does not count; use the words about something in your case record.

Say what each clock did in your case: gave a floor, gave a window, matched the found position.

One or two applied sentences

PBS-U1-D12-E1

Practice check: a body's temperature is 8 °C below normal in a normal room. Rough time estimate and its biggest assumption?

Two rates, two ends. This is a rule check, not your case.

Rough window

Assumption

PBS-U1-D12-E2

Practice check: a livor pattern is fixed on the back, and the body is found face down. Meaning?

Compare the settled surfaces with the lowest surfaces in the found position.

Meaning

PBS-U1-D12-E3

Why intersect three windows instead of trusting the tightest one?

One clock persuades; three corroborate. Say what a wide window still rules out.

Reason

Optional single check, not alternate work plans

One of your clocks gives only a floor: 'at least 8 hours' with no upper limit. What does the intersection do with it?

1. Ignore it, because it has no upper limit.
2. Keep it: it rules out times that are too recent, and the other clocks may set the other end.
3. Treat the floor as the exact time of death.

The practice case, the optional check and the short check do not require another upload. Complete Parts A to E and the door-log timeline check in the one worksheet.

Short check

Rigor: stiffness in the jaw and fingers only. Livor: fades when pressed. Which of these two clocks sets a floor and which sets a ceiling?

Notebook support, not another submission

Keep the Time-of-death worksheet organizer, the Manner-of-death logic tree (opens today, all branches live), the Day 12 Cornell page in your notebook.

Optional support

- Optional Guided Notes
- Separate practice case model
- Existing voluntary vocabulary extra credit, kept separate from required D1

Handoff, PLTW and the claim ceiling

Complete one time-of-death worksheet, Parts A to E plus your case's door-log timeline check. Hand the paper worksheet to Mr. Mendoza before leaving, or submit one PDF to this section's assignment by September 24 at 11:59 PM. Use your period and investigator code. Do not submit twice; keep notebook pages in your notebook.

Keep today's worksheet for the next assigned case lesson, the full examination. Its records must be supplied before you use them; do not assume a cause or manner of death already exists.

This John Hay original worksheet practices reading a rate, stating an assumption and intersecting independent estimates. It connects by title to PLTW Activities 1.2.1 Anatomy of an Autopsy and 1.2.2 Time of Death; it does not certify official activity completion. The complete required explanation is here; background links are support, not extra assignments.

John Hay original local work connected by title; no official completion claim. The complete required briefing, practice case model and supplied records are here.

Your Case B D12 assignment · Daily directions · Official PLTW section hub link: not supplied.

The window is an estimate with stated assumptions, not a fact. It constrains the timeline; it does not convict anyone inside it. Nothing today claims that you measured a body, a scene model or a room, examined anything, or established a role, a motive or a cause of death.

No public background reference is printed for this day; the briefing carries the whole required explanation.

Door log: use after B1 and B2

Use only your case's released door log and support note. Copy each row exactly, flag the open questions, mark each row against your intersection, then write C1.

Case B support: the door and key-code log

Exhibit 015, also labeled DOC-6 in the records set. Five rows and a closing line: no other entries. Two open questions the case logs and does not answer: whose code is JW-0417, and what business any code had in the storeroom at 9:47 PM. Log both with the exhibit number. In C1, say what your window does and does not do to any name or code whose events sit inside or outside it.

Exhibit 015 (DOC-6): Door and key-code access log (SIMULATED)

Row as printed	Inside, outside or cannot tell
8:41 PM: cleaner code OUT.	
9:47 PM: storeroom entry, key code JW-0417. OPEN QUESTION.	
9:58 PM: storeroom exit, same code.	
6:05 AM: Okafor fob IN.	
7:14 AM: Nguyen fob IN.	
No other entries.	

Open questions, logged and not answered: whose code is JW-0417; what business any code had in the storeroom at 9:47 PM. Two open questions logged, not answered.

PBS-U1-D12-C1

Copy Exhibit 015 (DOC-6) exactly as supplied: one row per printed event with its time, event and credential or code as printed, then the closing line. Log the two open questions with the exhibit number: whose code is JW-0417, and what business any code had in the storeroom at 9:47 PM. Beside each row, write inside, outside or cannot tell against your intersection. Do not add a role or a conclusion.

Space: Five event rows, one closing-line row, two open-question lines, plus two limit lines.

- Exhibit label
- Time as printed (day not supplied)
- Event and credential or code as printed
- Inside / outside / cannot tell against your intersection
- Two open questions with the exhibit number
- What the row does not establish

Write the time-of-death paragraph for the timeline. Include: each of the three windows in one sentence with its assumption; the intersection; the clock you trust least and why; and what your window does and does not do to any name or code in your case's supplied door log whose events sit inside or outside it. Stay inside the

ceiling: the window constrains, it does not convict.

Use names and codes only as the log prints them. Do not add a role, a motive or a conclusion about the open-question rows.

ASSIGNMENT 23 OF 29 Thu, Sep 24 about 80 minutes

Autopsy Day

Today we need to accomplish read the supplied examiner's record, copy each finding exactly, call vital response with a sign, write interpretations that cite a finding, trace the path of blood through the heart, and keep the manner open.

Our goal is making only the claims your evidence supports.

You have to turn in Autopsy findings sheet, Parts A to E plus your case's exhibit log and open question, in one sheet.

Schoology assignment: Wk5 D13 · Autopsy Day

1 READ	Your materials for this assignment start on the very next page, in this order: **student handout and response sheet (write on this)** (18 pages). Read the briefing first. Write your answers on the sheet. Everything you need for this assignment is in those pages.
2 DO	A training card lists two scrapes. One has purple under it; one is pale. Which one happened while the heart was still beating, and what does that still not tell you?
3 DO	What do these supplied findings support or weaken, and what must stay open?
4 READ	Open your own-case handout. Add your period and investigator code, label it Supplied illustrative examiner's record, read R1 to R3 and answer A1 and A2 from the text.
5 WRITE	Complete B1's findings table from the supplied record: keep each finding exactly as written, make the vital-response call with its sign, and write an interpretation that cites the finding.
6 WRITE	Answer B2 from a row you marked Yes. Complete B3's heart checkpoint: the path of blood from R3 and the 350 g in 70 kg practice number, converting kilograms to grams first.
7 WRITE	Write C1's case-conference summary: three findings, their calls, one interpretation each and the sentence that keeps the manner open. Then D1 and E1 to E3.
8 DO	In the final ten minutes, complete your own case's exhibit log and open question, check all ten task IDs and submit the one sheet on paper or as one PDF.
9 DO	Supplied illustrative examiner's record (E11), available to all students; nothing claims a student examined a body, an organ, a specimen or ran a station .
10 DO	You are reading a supplied illustrative examiner's record. A record may say less than you would like. Preserve that limit instead of filling the gap.
11 DO	The same five steps, in full
12 READ	Open your own-case handout. Add your period and investigator code. Label it Supplied illustrative examiner's record. Read R1 to R3, answer A1 and A2 from the text, and use the separate practice card if helpful.

13 WRITE	Complete B1's findings table. The region and the finding are supplied; keep them exactly as written. Write the vital-response call with its sign (Yes, No, Cannot tell, Not applicable) and an interpretation that names the finding it rests on and says what it does not say.
14 WRITE	Answer B2 and the heart checkpoint. B2 uses a row you marked Yes. B3 traces the path of blood from R3 and works the 350 g in 70 kg practice number, kilograms to grams first, logged as a number without a normal or enlarged label.
15 WRITE	Write the conference summary and the checks. C1 names three findings, their calls, one citing interpretation each and the sentence that keeps the manner open. Then D1 and E1 to E3. Check that all ten task IDs are complete.
16 DO	In the final ten minutes, complete your exhibit log and submit. Case B writes none released today and the record's open question. Questions, not answers. Hand in the one sheet on paper or as one PDF in your section assignment.
17 DO	Your sheet needs six rows with verbatim findings, a call with a sign in every row, an interpretation that cites its finding in every row, B2's time-stamp and limit, B3's path and percent, C1's three findings and open-manner sentence, D1, E1 to E3, and your exhibit log. No invented finding, call, signature, station result, diagnosis or cause of death should be added.
18 DO	Use your period and investigator code. Do not submit the same sheet twice. Keep notebook pages in your notebook.
19 DO	hand the paper sheet to Mr. Mendoza before leaving, or submit one PDF in Wk5 D13 · Autopsy Day (PLTW 1.2.4 and 1.2.5) by September 24 at 11:59 PM.
20 TURN IN	Now we turn it in. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Principles of Biomedical Technology, and open the assignment named **Wk5 D13 · Autopsy Day**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

Autopsy Day

RESPAWN · Period 6A-7B · Supplied illustrative examiner's record (E11), available to all students; nothing claims a student examined a body, an organ, a specimen or ran a station

One autopsy findings sheet

Complete one autopsy findings sheet: Parts A to E plus your case's exhibit log and open question. Use your class's supplied examiner's record. Your work reads a record, calls vital response and keeps interpretation in its own column; it does not claim that you examined a body, an organ or a specimen.

Complete one autopsy findings sheet, Parts A to E plus your case's exhibit log and open question. Hand the paper sheet to Mr. Mendoza before leaving, or submit one PDF to this section's assignment by September 24 at 11:59 PM. Use your period and investigator code. Do not submit twice; keep notebook pages in your notebook.

Supplied illustrative examiner's record (E11), available to all students; nothing claims a student examined a body, an organ, a specimen or ran a station. You are reading a supplied illustrative examiner's record. A record may say less than you would like. Preserve that limit instead of filling the gap.

Findings support or weaken causes of death; the manner still waits for the full picture. One organ's finding is a voice, not a verdict.

Your Case B D13 assignment · Daily directions

Five steps

1. Open your own-case handout. Add your period and investigator code. Label it Supplied illustrative examiner's record. Read R1 to R3, answer A1 and A2 from the text, and use the separate practice card if helpful.
2. Complete B1's findings table. The region and the finding are supplied; keep them exactly as written. Write the vital-response call with its sign (Yes, No, Cannot tell, Not applicable) and an interpretation that names the finding it rests on and says what it does not say.
3. Answer B2 and the heart checkpoint. B2 uses a row you marked Yes. B3 traces the path of blood from R3 and works the 350 g in 70 kg practice number, kilograms to grams first, logged as a number without a normal or enlarged label.
4. Write the conference summary and the checks. C1 names three findings, their calls, one citing interpretation each and the sentence that keeps the manner open. Then D1 and E1 to E3. Check that all ten task IDs are complete.
5. In the final ten minutes, complete your exhibit log and submit. Case B writes none released today and the record's open question. Questions, not answers. Hand in the one sheet on paper or as one PDF in your section assignment.

The practice card, the optional check and the short check do not require another upload. Complete Parts A to E and the exhibit log in the one findings sheet.

The 80-minute plan

- 0–10 min (from 0:00), Teacher launch: Identify the one sheet, your case and the paper-record boundary: you read an examiner's record; you did not examine anyone. Begin A1 and A2. Tasks A1, A2.
- 10–25 min (from 0:10), One guided example: Walk the practice card: region in diagram terms, finding copied word for word, call with a sign, interpretation that cites the finding, heart number without a judgment. Finish A1 and A2. Tasks A1, A2.
- 25–50 min (from 0:25), Individual work with teacher support: Complete B1's six-row findings table from your supplied record. Findings stay verbatim. Calls get a sign. Interpretations cite a finding and say what it does not say. Tasks B1.
- 50–70 min (from 0:50), Continue the same sheet: Answer B2, complete the B3 heart checkpoint (the simulation station is open for orientation; R3 is enough to answer) and write C1's conference summary. Tasks B2, B3, C1.
- 70–77 min (from 1:10), Close the record: Complete D1 and E1 to E3. Then log your own case's exhibit exactly as supplied, or write none released today, and write the one open question as a question, not an answer. Tasks D1, E1, E2, E3, exhibit-log.
- 77–80 min (from 1:17), Check and submit: Check all ten task IDs and the exhibit log. Hand in paper or one PDF; keep notebook pages in your notebook. Tasks handoff.

Check and hand in

Your sheet needs six rows with verbatim findings, a call with a sign in every row, an interpretation that cites its finding in every row, B2's time-stamp and limit, B3's path and percent, C1's three findings and open-manner sentence, D1, E1 to E3, and your exhibit log. No invented finding, call, signature, station result, diagnosis or cause of death should be added.

Use your period and investigator code. Do not submit the same sheet twice. Keep notebook pages in your notebook.

Case B: hand the paper sheet to Mr. Mendoza before leaving, or submit one PDF in Wk5 D13 · Autopsy Day (PLTW 1.2.4 and 1.2.5) by September 24 at 11:59 PM.

If you were absent or need help

Use the same supplied-record handout and complete the same product. Its exhibit log is included; work on that section after Parts A to E. You do not need station time, a simulation pass or a specimen to complete the sheet; B3 can be answered from R3. If your teacher separately assigns physical heart or tissue work, complete the Sheep Heart Dissection simulation first and follow the approved instructions. This paper sheet does not complete that practical requirement.

Lost your place? Find the next unanswered task ID and use F1's restart cue. Guided notes and the separate practice card are support, not extra submissions.

Use the same own-case supplied examiner's record and complete the same sheet. Work on the exhibit log after Parts A to E. The heart simulation is optional orientation; B3 can be answered from R3. Do not invent findings, calls, station work, signatures or a cause of death.

If your teacher is absent: Complete the supplied paper-record sheet using the briefing and the practice-card model. Do not begin any physical specimen work. Use the exhibit log after Parts A to E.

R1 / R2. The required briefing

R1. Your one sheet

Complete the autopsy findings sheet, Parts A to E and your case's exhibit log. An autopsy is a medical examination of a body after death. Your class's examiner's record (E11) is supplied on paper. You are reading that record, not examining anyone. The record reports the external documentation as complete; today's pages are the internal examination, organ by organ, with every finding described before it is interpreted.

Read every finding the way you read every exhibit: what does it say, then what does it mean, then what can it not mean. Keep the body region beside its finding. A record may say less than you would like. Preserve that limit instead of filling the gap.

R2. Vital response and the two columns

A finding is what the examiner saw, measured or weighed, written before any meaning is attached. An interpretation is what a finding might mean. It lives in its own column and always names the finding it rests on.

Vital response means signs a wound happened while the person was alive: swelling, bleeding into tissue. A living body responds to injury: it bleeds into tissue, swells, sends inflammatory cells. A wound inflicted after death shows little bleeding and no tissue reaction. Analogy to hold onto: only a running engine leaks oil when punctured. So the wound margins carry a time stamp: with vital response, the injury happened in life; without, after death. That one distinction separates injured and then died from died and then damaged.

Use these four calls in the table:

Two limits stay attached to every call. First, the time stamp says before or after circulation stopped; it does not say how long before death, and it does not say the injury caused death. The practice card's own wording is "consistent with", and yours should be too: the finding fits that explanation and could fit others. Second, an absence finding weakens an idea; it does not prove the opposite. No defensive wounds means no evidence of fending off a person; it cannot prove nobody was present.

Call	When to use it
Yes, with the sign	A wound with bleeding into tissue, swelling or tissue reaction. Name the sign.
No, with the sign	A wound with little bleeding and no tissue reaction. Name the sign.
Cannot tell (not a wound)	An organ state such as swelling, congestion or over-full lungs. It is not a wound, so it has no wound margin to read.
Not applicable (no injury found)	A finding that reports nothing found, such as no fracture or no defensive wounds.

R3 / R4. The heart and the words

R3. The heart you need to know

You cannot judge findings in an organ you have never navigated. The heart has four chambers: right atrium, right ventricle, left atrium, left ventricle. Valves sit between them. The great vessels leave the heart: the aorta from the left ventricle, the pulmonary artery from the right ventricle. The coronary arteries run on the surface and feed the heart muscle itself.

For the checkpoint, trace blood from the body back to the body: it enters the two chambers on the right, goes to the lungs, returns to the two chambers on the left and leaves through the vessel that comes off the left ventricle. Name each stop in order.

The Sheep Heart Dissection simulation on the portal walks this anatomy. It is a digital model for orientation, not a specimen you examined. What you need for this case is orientation: enough anatomy to read the examiner's findings and know which findings matter.

R4. Words in the record

Shared words:

Vital response
Signs a wound happened while the person was alive: swelling, bleeding into tissue. Analogy to hold onto: only a running engine leaks oil.

Edema
Swelling from fluid where it should not be.

Defensive wounds
Cuts or bruises on the hands and forearms from blocking a blow.

Edge-patterned
The wound's shape copies the straight edge that made it. A shared pattern links a wound to a kind of edge; it does not by itself identify one object.

Laryngeal cartilages
The firm rings of the larynx, the voice box at the top of the windpipe.

Mucus plugging
Thick mucus blocking the small air passages.

Laceration
A tear in the skin from a blunt edge.

Grossly unremarkable
Normal to the naked eye, before the microscope.

Consistent with
The finding fits that explanation and could fit others. It is not proof.

Hyoid
The small U-shaped bone high in the front of the neck that a squeezed neck can break. An intact hyoid weakens the idea of a squeezed neck; it does not rule it out.

Ligature furrow
The groove a cord or strap leaves around a neck.

Hyperinflated
Over-full of air.

R5 / R6. The number, the log and the ceiling

R5. The heart number

The record may give an organ mass. Log it as a number. To compare it with body mass, convert kilograms to grams first (1 kg = 1,000 g), then divide the organ mass by the body mass and multiply by 100.

Percent of body mass = organ mass in grams ÷ body mass in grams × 100.

The practice card's 330 g heart in a 55 kg person is the model: 55 × 1,000 = 55,000 g; 330 ÷ 55,000 = 0.006 = 0.6 percent. Your B3 checkpoint uses 350 g and 70 kg and needs its own work. Write the percent as a number, not as normal or enlarged; that judgment needs a reference range you were not given. Percent of body mass carries no unit.

R6. The exhibit log, the open question and the ceiling

A useful log keeps the exhibit ID, where it was found and what the record reports, in the record's words. Some days release a new exhibit; some days release none. Either way, the log is a record, not a conclusion.

The claim ceiling for the whole sheet: findings support or weaken causes of death; the manner still waits for the full picture. One organ's finding is a voice, not a verdict. Nothing on your sheet says how the person died.

Your case's exhibit log is completed in the final ten minutes. Follow only the case note that matches your own case; it is printed with your exhibit log.

Case B support: no exhibit today

No exhibit is released today. Write none released today on the log line. The record's own open question is how the airway came to swell; that is not a question today's record answers. Write it as a question. Severe swelling of the larynx and airway lining, mucus plugging and over-full lungs describe an airway narrowed from the inside; they do not establish what triggered it, an exposure, a source, intent or a manner of death. The neck findings report no sign of the airway being closed from the outside; that weakens the idea and does not exclude it.

PLTW connection and optional help

This John Hay original sheet practices reading an examination record, calling vital response, keeping findings and interpretations apart and tracing blood through the heart, connected to PLTW Activities 1.2.4 Histology and 1.2.5 Gross Anatomy of the Heart. It does not certify official activity completion. The complete required explanation is here; the simulation and guided notes are support, not extra assignments.

F1 shows the paper-record workflow. The separate practice card models the table, and its 330 g example models the arithmetic. Before any separate teacher-directed physical heart or tissue work, complete the Sheep Heart Dissection simulation and use the approved instructions. This sheet does not grant a practical pass. Carry your sheet to the next assigned case lesson, where the microscope adds tissue-level findings; do not assume slide results already exist.

Before any separate teacher-directed physical heart or tissue work, complete the Sheep Heart Dissection simulation and use the approved instructions. The paper findings sheet does not certify that practical work.

The practice card: separate practice, not your case

This worked model uses the training findings card from the evidence sheet: a person found at the foot of a stepladder in a garage, with two skin injuries and a heart mass listed. It is not evidence for Case A or Case B. Use the structure, not these findings or answers, in your sheet.

The card's photo shows a training pad on a metal tray: a purple-red simulated scrape on the left, a ruler, a pale simulated scrape on the right. Caption it: training pad, simulated injuries, not a person. Read the card's text for the findings; the photo is a picture of a practice pad, not a measurement you took.

Training pad, simulated injuries, not a person. The photograph is not reproduced here; read the card's text for the findings.

Step 1. Region in the diagram's terms

The card says left forearm, palm side: write left forearm, anterior (front) surface. The card says right shin: write right lower leg, anterior surface.

Step 2. Copy each finding word for word

Finding 1: Abrasion (a scrape that removes the top skin layer), 4 cm, with bruising in the tissue beneath.

Finding 2: Abrasion, 2 cm, pale, with no bleeding into the tissue beneath.

No additions in the finding column.

Step 3. Call vital response, with the sign

Finding 1: YES, sign: bruising means blood leaked into living tissue.

Finding 2: NO, sign: pale with no bleeding into tissue, the way a scrape looks when the circulation had already stopped.

The practice card. Steps 4 to 6, the finished product and its limits

Step 4. Interpretation, in its own column, citing the finding

Finding 1: Consistent with an injury in life (cites the bruising); does not say how long before death, and does not say it caused death.

Finding 2: Consistent with an injury after death, for example during moving by responders (cites the pale, bloodless margin); does not say who or how.

Step 5. The heart number, logged without a judgment

The card lists a heart mass of 330 g in a 55 kg person. Convert kilograms to grams first: 55 × 1,000 = 55,000 g. Then 330 ÷ 55,000 = 0.006 = 0.6 percent of body mass. Write it in the finding column as a number, not as normal or enlarged; that judgment needs a reference range you were not given.

Your B3 checkpoint uses 350 g and 70 kg, not 330 and 55. Show your own conversion and division.

Step 6. Read the columns back

Every finding is verbatim, every call has a sign, every interpretation names its finding, and nothing in the table says how the person died. That last check is the ceiling.

Practice row	Finding, verbatim	Call and sign	Interpretation citing the finding
Left forearm, anterior surface	Abrasion, 4 cm, with bruising in the tissue beneath	Yes; bruising, blood leaked into living tissue	Consistent with an injury in life; not how long before death; not that it caused death
Right lower leg, anterior surface	Abrasion, 2 cm, pale, with no bleeding into the tissue beneath	No; pale, no bleeding into tissue	Consistent with an injury after death; not who or how

Finished product

Finished product: Finding 1 (left forearm abrasion with bruising) shows vital response, so it happened in life; Finding 2 (pale right lower leg abrasion, no bleeding) does not, so it is consistent with an injury after death. The 330 g heart in a 55 kg person is 0.6 percent of body mass, a number logged without a judgment.

What the card does and does not claim

Now do the same steps on your own case's supplied record in Part B. Every student uses the same supplied record; there is no separate team data set.

The model does not require another upload. Complete Parts A to E and your exhibit log in the one autopsy findings sheet.

F1. Read, call, cite, keep the manner open

1. **Read your own case record (E11)**
Body region + finding, exactly as the examiner wrote it

↓

2. **Copy the finding, word for word**
Finding column only. Add nothing.

↓

3. **Call vital response, with the sign**
Yes (bleeding into tissue / swelling / tissue reaction)
No (little bleeding, no reaction)
Cannot tell (not a wound) | Not applicable (no injury found)

↓

4. **Interpret in the other column, citing the finding**
Consistent with ... (names the finding)
Does not say how long before death. Does not say it caused death.
An absence weakens an idea; it does not prove the opposite.

↓

5. **Complete the same sheet**
Heart checkpoint (path of blood + 350 g in 70 kg, no normal/enlarged label)
Conference summary: three findings, three calls, three citing interpretations

↓

6. **Final ten minutes: your case's exhibit log and open question**
none released today; the open question, not the answer.

↓

7. **The ceiling**
Findings support or weaken causes of death; the manner still waits.
Nothing on the sheet says how the person died.

Paper-record workflow. This is a teaching diagram, not a body diagram, an autopsy procedure or a specimen image.

Full text equivalent

Find your own-case record and read one row: the body region and the finding. Copy the finding word for word into the finding column and add nothing. Decide the vital-response call: Yes with the sign when the wound bled into tissue, swelled or reacted; No with the sign when the wound shows little bleeding and no reaction; Cannot tell when the finding is an organ state rather than a wound; Not applicable when the finding reports nothing found. Write the interpretation in its own column, name the finding it rests on, and say what it does not say. Repeat for all six rows. Then complete the heart checkpoint and the conference summary in the same sheet. In the

final ten minutes, log only your own case's exhibit, or write none released today, and write the open question as a question. The finished sheet does not claim an examination you performed, a specimen you handled or a cause of death.

Optional restart cue

Find the next unanswered task ID. Use R2 for the calls and the two columns, R3 for the heart, R4 for the words, R5 for the heart number and R6 for the exhibit log and the ceiling. Do not switch to the other case or create a second product.

Your supplied examiner's record

Supplied illustrative examiner's record (E11). You are reading a supplied illustrative examiner's record. A record may say less than you would like. Preserve that limit instead of filling the gap.

Your case: RESPAWN, case number JH-26-0831-B. Setting: Respawn, an e-sports lounge with a smoothie counter. The region and the finding are supplied exactly as the record gives them.

Body region (diagram term)	Finding, exactly as written in the packet
Face, right brow (the ridge above the right eye)	Laceration at the right brow, 2.4 cm, edge-patterned, consistent with the counter edge, with bleeding into surrounding tissue.
Hands and forearms	No defensive wounds.
Neck (outside and inside)	Hyoid bone and laryngeal cartilages intact, no ligature furrow, no neck bruising.
Larynx and airway lining	Severe swelling (edema) of the larynx and airway lining; mucus plugging in the airways.
Lungs	Hyperinflated.
Heart and vessels	Grossly unremarkable.

Use only these four calls in B1: Yes (with the sign); No (with the sign); Cannot tell (not a wound); Not applicable (no injury found). Nothing beyond these rows is supplied; if the record is silent, write that it is not supplied.

Your Parts A to E sheet

Case B, RESPAWN, Period 6A-7B. Investigator code, not name:

Header label: Supplied illustrative examiner's record (E11).

Date: 2026-09-24

Answer from the reading above. Cite the sentence you used by copying its first three words in quotation marks.

PBS-U1-D13-A1

The reading says a living body responds to injury in three ways. Name them and copy the first three words of the sentence you used, in quotation marks.

The three responses are in one sentence of R2. Copy that sentence's first three words, not the whole sentence.

Three responses

Supporting sentence starts

PBS-U1-D13-A2

Why does the reading say you cannot judge findings in an organ you have never navigated?

Orientation means knowing where a finding sits. Say why that matters for reading the examiner's findings.

Explanation from the text

B1. The findings table

PBS-U1-D13-B1

Complete the findings table for your case. The body region and the finding are supplied exactly as the examiner's record gives them; do not change a word. For each row, write the vital-response call with its sign: Yes, No, Cannot tell (not a wound) or Not applicable (no injury found). Then write an interpretation in its own column that names the finding it rests on and says what it does not say.

A wound with bleeding into tissue is Yes with that sign. An organ state that is not a wound is Cannot tell. A finding that reports nothing found is Not applicable. An absence weakens an idea; it does not prove the opposite.

Body region (diagram term)	Finding, exactly as written in the packet	Vital response present? and the sign	Interpretation, citing the finding
Face, right brow	Laceration at the right brow, 2.4 cm, edge-patterned, consistent with the counter edge, with bleeding into surrounding tissue.		
Hands and forearms	No defensive wounds.		
Neck	Hyoid bone and laryngeal cartilages intact, no ligature furrow, no neck bruising.		
Larynx and airway lining	Severe swelling (edema) of the larynx and airway lining; mucus plugging in the airways.		
Lungs	Hyperinflated.		
Heart and vessels	Grossly unremarkable.		

Write findings (what is SEEN) in one column and interpretations (what it MEANS) in a separate column, never mixed.

B2 / B3. One Yes row, then the heart checkpoint

PBS-U1-D13-B2

Pick one finding from your table with vital response present. What does that time-stamp, and what does it still not tell you?

Time-stamp means before or after circulation stopped. Then name what the finding leaves open.

Finding named by region

What it time-stamps

What it does not say

PBS-U1-D13-B3

Heart checkpoint. In order, list the path of blood from the body back to the body through the heart: the two chambers on the right, the lungs, the two chambers on the left and the vessel that leaves the heart. Then the practice number: a heart of 350 grams in a person of 70 kilograms is what percent of body mass? Convert kilograms to grams first, show the division and log the percent as a number. Do not label it normal or enlarged; no reference range is supplied.

The model uses 330 g and 55 kg. Your checkpoint uses 350 g and 70 kg. Percent of body mass carries no unit.

Six-step path in order

Kilograms to grams conversion

Division

Percent of body mass

C1. The case-conference summary

PBS-U1-D13-C1

Write the examination summary for the case conference: the three findings from your supplied record that matter most today, each with its vital-response call, one interpretation per finding that cites it and one sentence that keeps the manner open. Plain words; anatomical terms where the record uses them. This is a summary of a supplied record, not a report of an examination you performed.

Choose from your B1 rows. The ceiling sentence: findings support or weaken causes of death; the manner still waits for the full picture.

Findings support or weaken causes of death; the manner still waits for the full picture. One organ's finding is a voice, not a verdict.

Your writing

D / E. Finish the same sheet

PBS-U1-D13-D1

Use vital response correctly in one or two sentences about today's work. A definition alone does not count; use the words about something real in your case record.

Name the finding and the sign, then use the term.

One or two applied sentences

PBS-U1-D13-E1

A laceration shows bleeding into surrounding tissue. What does that time-stamp?

This is a rule check, not another assigned finding.

One line

PBS-U1-D13-E2

Why learn heart anatomy to read an autopsy report?

Answer from memory first, then check R3.

One line

PBS-U1-D13-E3

Findings column versus interpretation column: why keep them apart?

Think about who reads the table after you.

One line

Optional single check, not alternate work plans

A finding reads: no defensive wounds on hands or forearms. What does the sheet preserve?

1. Write that it proves no one else was there.
2. Write no evidence of fending off a person, and that it cannot prove nobody was present.
3. Leave the row out because nothing was found.

The practice card, the optional check and the short check do not require another upload. Complete Parts A to E and the exhibit log in the one findings sheet.

Short check

Which column holds what the examiner saw, measured or weighed, and which column holds what it might mean?

Notebook support, not another submission

Keep the Body diagram, front and back and the Logic tree pruning notes and the Day 13 Cornell page in your notebook.

Optional support

- Optional Guided Notes
- Separate practice-card and 330 g in 55 kg worked model
- Sheep Heart Dissection simulation as an orientation station
- Existing voluntary vocabulary extra credit, kept separate from required D1

Handoff, PLTW and the claim ceiling

Complete one autopsy findings sheet, Parts A to E plus your case's exhibit log and open question. Hand the paper sheet to Mr. Mendoza before leaving, or submit one PDF to this section's assignment by September 24 at 11:59 PM. Use your period and investigator code. Do not submit twice; keep notebook pages in your notebook.

Keep today's sheet for the next assigned case lesson, where tissue-level findings under the microscope explain today's organ-level ones. Do not assume slide results already exist; where the record says histology is pending, it is pending.

This John Hay original sheet practices reading an examination record, calling vital response, keeping findings and interpretations apart and tracing blood through the heart, connected to PLTW Activities 1.2.4 Histology and 1.2.5 Gross Anatomy of the Heart. It does not certify official activity completion. The complete required explanation is here; the simulation and guided notes are support, not extra assignments.

John Hay original local work connected by title; no official PLTW completion and no practical clearance. The complete required briefing, supplied record and practice card are here.

Your Case B D13 assignment · Daily directions

Findings support or weaken causes of death; the manner still waits for the full picture. One organ's finding is a voice, not a verdict. Nothing today claims that you examined a body, an organ or a specimen, rotated through a station or produced team data, and nothing establishes a cause or a manner of death.

No public background reference is printed for this day; the briefing cites the supplied record only.

Your exhibit log and open question

Work from your own case's support note, printed with this task. Fill the log line it gives, then write the one open question as a question rather than an answer, and state what the airway findings do not establish. Do not answer it, name a trigger or name a cause of death.

Exhibit released today: none released today.

No exhibit is released today. Write none released today on the log line. The record's own open question is how the airway came to swell; that is not a question today's record answers. Write it as a question. Severe swelling of the larynx and airway lining, mucus plugging and over-full lungs describe an airway narrowed from the inside; they do not establish what triggered it, an exposure, a source, intent or a manner of death. The neck findings report no sign of the airway being closed from the outside; that weakens the idea and does not exclude it.

Your exhibit log

Exhibit released today

The one open question

What the airway findings do not establish

Space: One log row plus three writing lines. The practice card, the optional check and the short check do not require another upload. Complete Parts A to E and the exhibit log in the one findings sheet.

ASSIGNMENT 24 OF 29 Fri, Sep 25 about 40 minutes

Week 5 review: the profile, the clock, and the two errors

Today we need to accomplish reviewing the week's three big ideas before we move on.

Our goal is that the DNA profile, time of death, and test errors make sense together.

You have to turn in the Week 5 Review Record.

Schoology assignment: Wk5 Review · The profile, the clock, and the two errors

1 READ

The Week 5 figure sheet starts on the very next page. Read each figure and its caption.

2 WRITE

Answer every review item on the sheet. For each, name the figure you used.

HINT The two errors are a false positive (a result says yes when the truth is no) and a false negative (a result says no when the truth is yes).

3 TURN IN

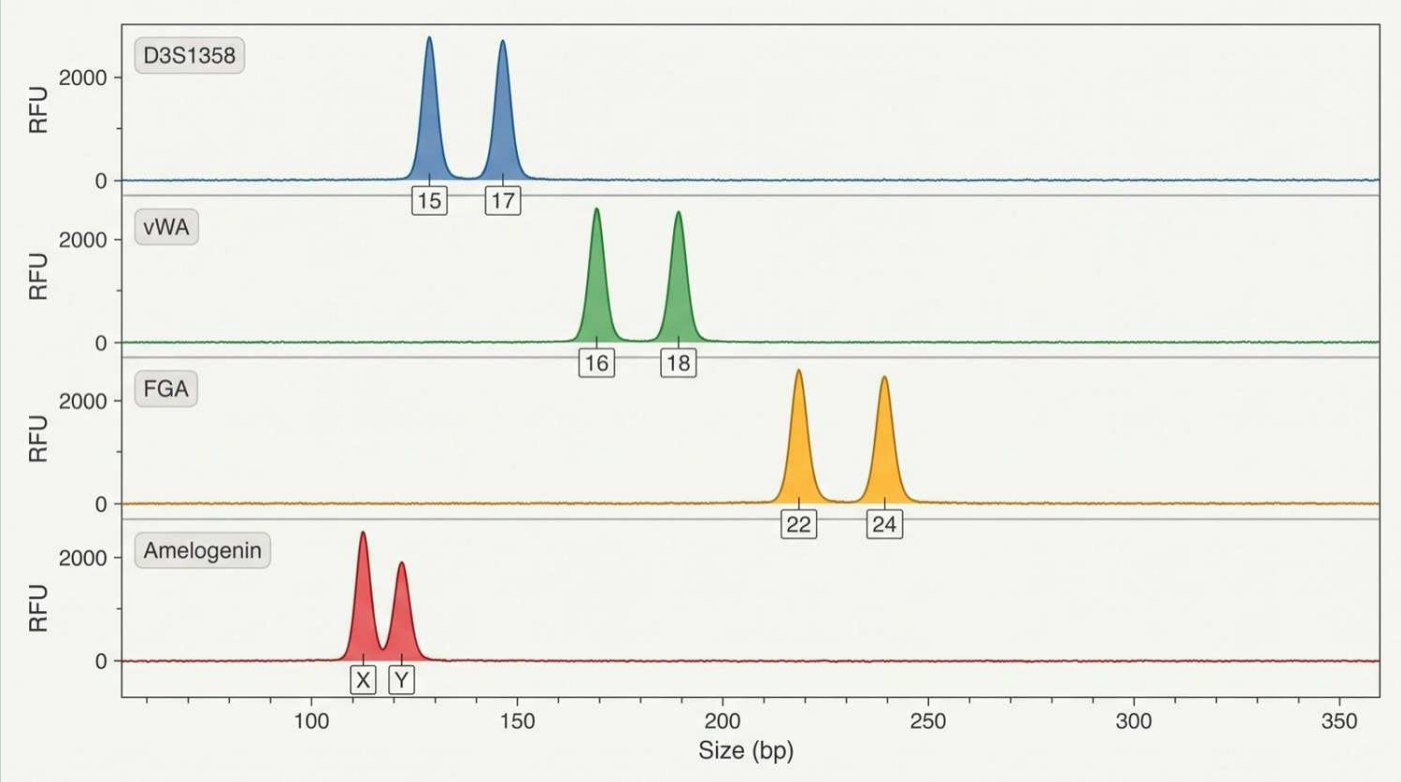
Now we turn it in. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Principles of Biomedical Technology, and open the assignment named **Wk5 Review · The profile, the clock, and the two errors**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

JOHN HAY BIOMEDICAL · WEEK 5 · SEPTEMBER 21 TO 25, 2026

Week 5 figure sheet: PBS

The profile, the clock, and the two errors. Periods 1-2 and 6A-7B.

Figure 1. A DNA profile drawn as peaks

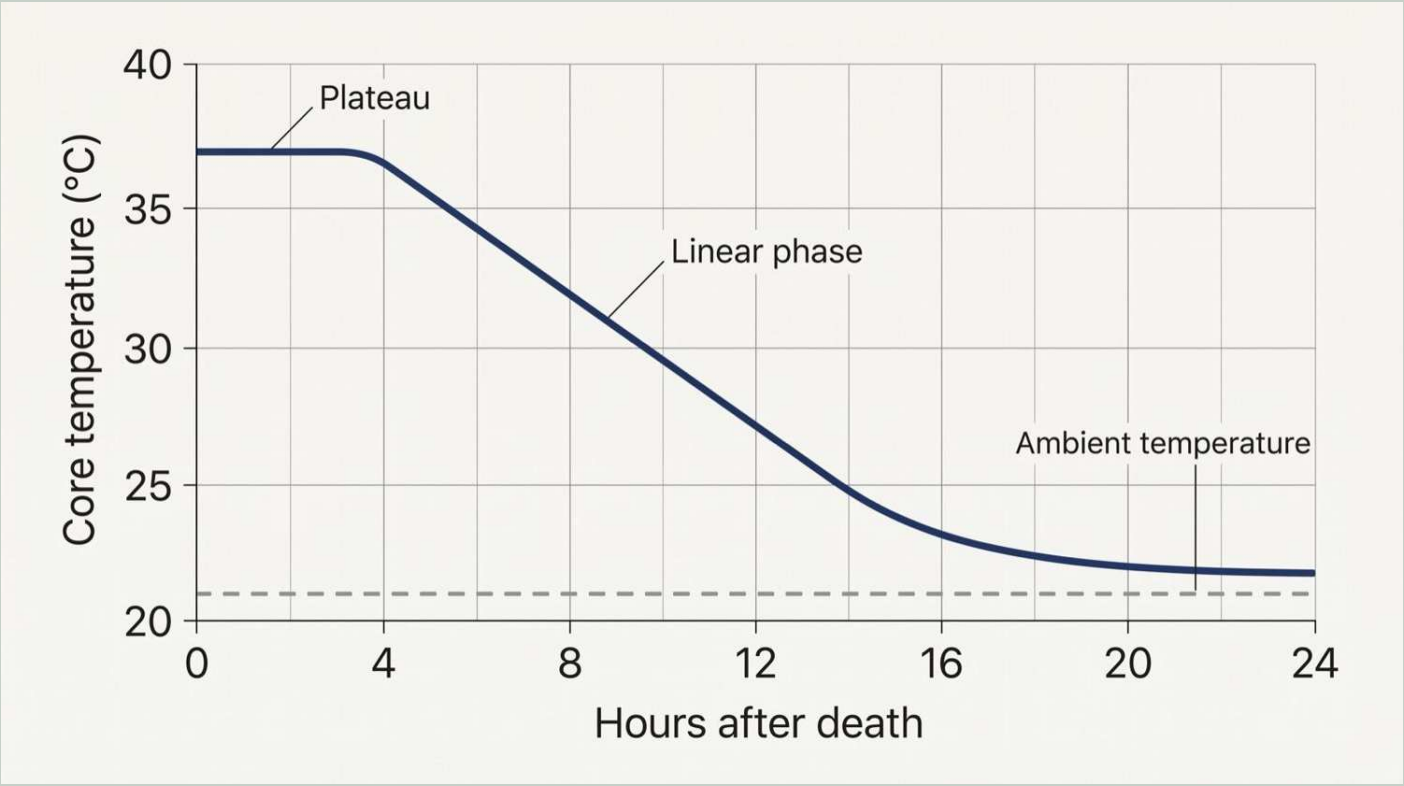


How to read it

This is the same kind of DNA profile as a gel, drawn a second way, as peaks on a machine readout instead of bands. Each row is one STR locus, and the number printed under each peak is a repeat count. Amelogenin is not an identity locus: X and Y is the male pattern, and a single X is the female pattern. Part A does not use this figure. Part A uses the gel bands in the Case record on today's class page: compare your questioned lane with each reference lane, band by band.

> ### What this figure does not supply
>
> This figure does not supply a rarity figure, so it cannot tell you how strong a match is. The spacing between paired peaks is stretched for legibility, so read the allele NUMBERS, never the base-pair positions.

Figure 2. Body cooling after death



How to read it

Read the shape, not a single number. The temperature holds nearly flat at first, then falls steadily, then flattens again as it approaches the room. Find where the flat part ends and the steady fall begins.

> **What this figure does not supply**
>
> This figure does not supply a time of death. It shows one cooling curve under one set of conditions. Body size, clothing, covering, moving air and a wet or cold surface all change the rate, which is why an examiner uses adjusted tables rather than a single curve.

Figure 3. Three clocks, three schedules

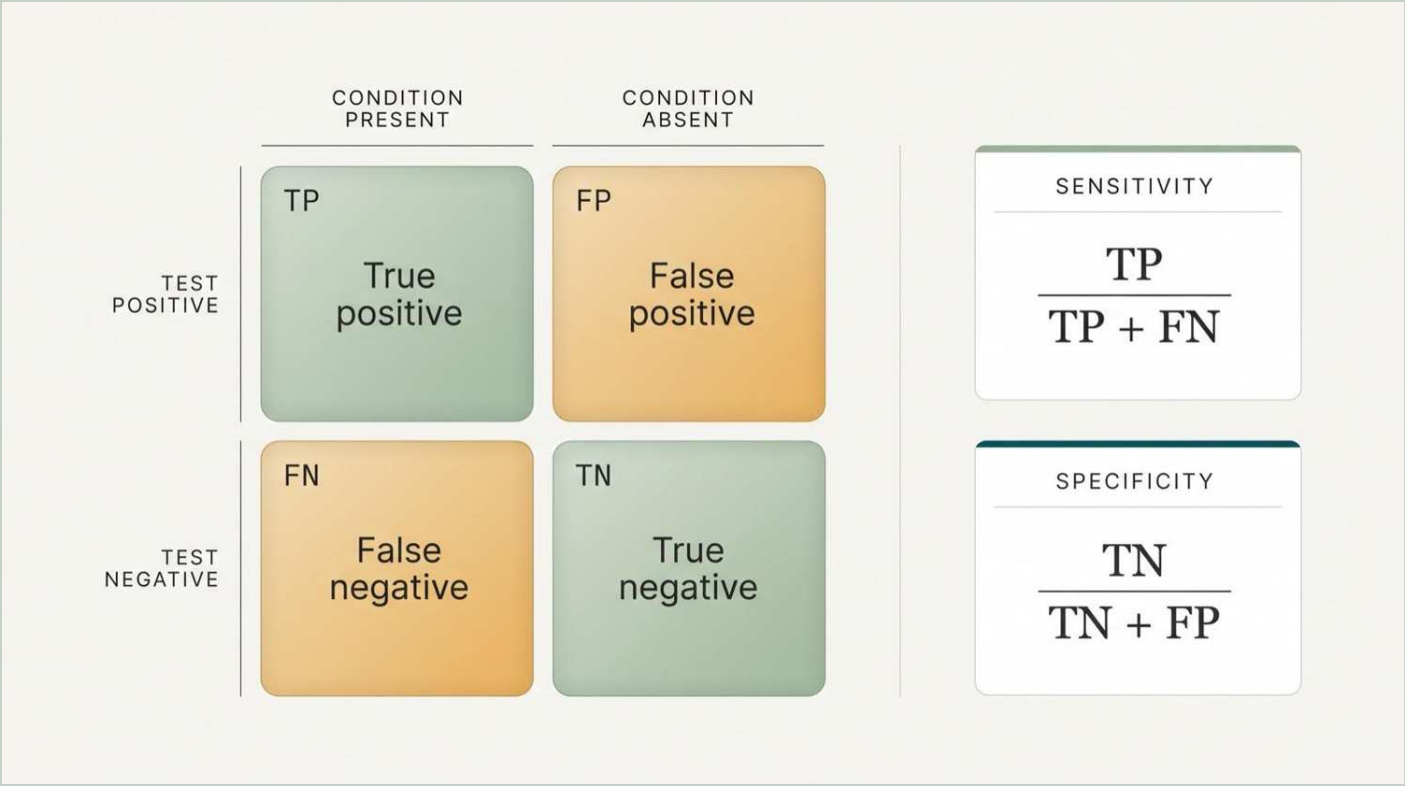


How to read it

Each band is one postmortem change and the hours it covers. Read across to see which changes overlap at a given hour. Where all three bands agree is where your window sits.

> **What this figure does not supply**
>
> These are approximate ranges under average conditions, not fixed rules. Heat, cold and heavy activity before death all shift them. This figure does not supply your case's observations; those come from your own record.

Figure 4. The four outcomes of any test



How to read it

Columns are what is actually true. Rows are what the test said. Read the cell where the two meet. The two formulas underneath show which cells each rate is built from.

> **What this figure does not supply**
>
> This figure does not supply any error rate for the Novel Flu Syndrome test in the debate case. None was given, so none may be invented or calculated.

Using these figures

Every figure here is a teaching illustration drawn for this course. Each one is accurate in the relationship it shows, and each caption names what it cannot tell you.

The rule that applies to all four

A figure narrows what is possible. It does not close a question. When you write a claim from any figure on this sheet, write the limit underneath it in the same breath: this shows ___, it does not show ___.

Generated 2026-09-21 for John Hay High School, Cleveland Metropolitan School District. Figures are original illustrations produced for this class and checked against the science they name before publication.

ASSIGNMENT 25 OF 29 Fri, Sep 25 about 25 minutes

Body systems and tissues: the lab record

Today we need to accomplish recording what you learned about body systems and tissue types.

Our goal is connecting each tissue type to the organ systems it builds.

You have to turn in your body systems and tissues lab record.

Schoology assignment: Wk5 Lab: Body systems tissues

1 READ

The four tissue families are below.

Tissue	Job	Example
Epithelial	Covers and lines surfaces	Skin surface, lining of the stomach
Connective	Supports and connects	Bone, blood, fat
Muscle	Moves the body and organs	Heart muscle, skeletal muscle
Nervous	Sends signals	Brain, nerves

2 WRITE

For each tissue, name one organ system it belongs to and one sentence on why that system needs it.

3 WRITE

Name the tissue you would expect most in the heart wall, and explain why.

HINT The heart pumps by squeezing. Which tissue squeezes?

4 TURN IN

Now we turn it in. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Principles of Biomedical Technology, and open the assignment named **Wk5 Lab: Body systems tissues**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

ASSIGNMENT 26 OF 29 Mon, Sep 28 about 45 minutes

John Carroll bioethics debate 2: should we ban antibiotic use in livestock?

Today we need to accomplish debating an assigned side on a real public health question.

Our goal is arguing from evidence and answering the strongest opposing point.

You have to turn in your five-box debate worksheet.

Schoology assignment: Wk6 CER: JCU bioethics 2, should we prohibit antibiotic use in livestock?

1 READ

First, the scenario and the first argument on each side.

Scenario. An isolated mountain valley has clear streams and no industry. A bacterial outbreak hits the local livestock, so the community treats the herds with a large course of antibiotics. Weeks later, researchers find antibiotic traces in the stream water, a shifted bacterial population, and new antibiotic resistance genes.

The case for a ban: Even low concentrations of antibiotics favor resistant strains and spread resistance genes through the environment and into the food chain.

The case against: Antibiotics do break down in the environment through biodegradation, hydrolysis and sunlight, at rates that depend on pH, temperature and light.

2 WRITE

Box 1: your side. Box 2: your three strongest arguments, each with a reason someone could check.

Scenario. An isolated mountain valley has clear streams and no industry. A bacterial outbreak hits the local livestock, so the community treats the herds with a large course of antibiotics. Weeks later, researchers find antibiotic traces in the stream water, a shifted bacterial population, and new antibiotic resistance genes.

The case for a ban: Even low concentrations of antibiotics favor resistant strains and spread resistance genes through the environment and into the food chain.

The case against: Antibiotics do break down in the environment through biodegradation, hydrolysis and sunlight, at rates that depend on pH, temperature and light.

HINT Selective pressure: an antibiotic kills the bacteria it can, so the resistant ones survive and multiply.

3 WRITE

Box 3: the opposing point. Box 4: your direct answer to it. Box 5: where you stand now and what moved you.

4 TURN IN

Now we turn it in. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Principles of Biomedical Technology, and open the assignment named **Wk6 CER: JCU bioethics 2, should we prohibit antibiotic use in livestock?**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

ASSIGNMENT 27 OF 29 Wed, Sep 30 about 80 minutes

Investigation Day 14: The Fabric Under the Lens

Today we need to accomplish compare the Case B tissue slides with healthy references and explain the supported patterns and limits in Parts A to E of the Day 14 sheet.

Our goal is tissue findings can support a mechanism; they do not establish the manner of death. State what remains uncertain.

You have to turn in Daily Evidence Sheet, Day 14: complete Parts A to E. Submit one PDF of your complete Day 14 Daily Evidence Sheet to Wk6 D14 · The Fabric Under the Lens (PLTW 1.2.4) in Schoology by 11:59 PM tonight. Keep the named notebook pages in your Investigative Notebook.

Schoology assignment: Wk6 D14 · The Fabric Under the Lens (PLTW 1.2.4)

1 READ

This is our Case B investigation for Period 6A-7B. Your materials for this assignment start on the very next page, in this order: **D14 Case B briefing pack (read this)** (7 pages); then **D14 Case B Daily Evidence Sheet (write on this)** (8 pages). Read the briefing first. Write your answers on the sheet. Everything you need for this assignment is in those pages.

2 DO

Part A: read the briefing and answer A1 and A2, citing the reading as the sheet asks.

3 DO

Part B: complete the slide call table (B1); compare visible differences with the healthy reference (B2); calculate the cell width in millimeters and micrometers and state its precision (B3).

HINT Tissue findings can support a mechanism; they do not establish the manner of death. State what remains uncertain.

4 DO

Part C: write the histology paragraph for two slides: description, pattern and Day 13 finding, followed by the mechanism-versus-manner limit.

5 DO

Part D: use histology and edema in sentences about your work.

6 DO

Part E: answer all three self-check questions, then check every Part of your sheet.

7 CHECK

Before you turn it in, check your claims against these limits: A hair consistent with a person proves a hair like theirs was present, not that the person was, and never when. A fingerprint proves touch, not when or why. A pattern class narrows a crowd; only minutiae can name one finger. A presumptive test says maybe. Only a confirmatory test says blood, and only DNA says whose.

8 TURN IN

Now we turn it in. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Principles of Biomedical Technology, and open the assignment named **Wk6 D14 · The Fabric Under the Lens (PLTW 1.2.4)**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

DAILY INVESTIGATION PACKET

Sep 30 · Investigation Day 14 of 18

OFFICIAL

THE BRIEFING: WHAT YOU ARE DOING TODAY, AND HOW THE PROS DO IT — SEC 00

Picking up from Day 13: you learned that a wound that bled tells you the person was alive when it happened. Vital response is the body time-stamping its own injuries.

Real pathologists put tissue under a microscope to name the process behind an organ finding, because the weave of the tissue tells a truth the naked eye misses. Today you read the case slides the same way: describe, name the pattern, then connect it to the finding it explains.

OBJECTIVE

Today you will read the case's tissue slides: learn the four tissue families, then make the histology calls that explain the organ findings from Day 13.

Take-home (the ten-year idea): Organs are built from four tissue families. Disease and injury change the weave, and the microscope reads the weave.

CASE FILE UPDATE — SEC 01

The histology slides come back: the airway under the lens, and the immune cells that name the mechanism.

BACKGROUND AND BRIEFING (READ THIS FIRST) SEC 02

Every organ in the body is woven from four tissue families: EPITHELIAL (covering and lining sheets), CONNECTIVE (support and transport: bone, blood, the fibrous packing), MUSCLE (contraction), NERVOUS (signaling). Analogy: check the fabric, not just the shirt: two shirts can look alike on the rack while one is cotton and one is polyester; the weave tells the truth. LIMIT: real slides mix families in one field, and staining quality varies; histologists read patterns, not single cells.

What changes under the lens in disease and injury: fluid where it should not be (edema: a waterlogged sponge look, widened spaces), inflammatory cells arriving (small dark nuclei crowding in: the body's response crew on site), tissue architecture collapsing or scarring. Each is a mechanism footprint. The organ findings from Day 13 said WHERE; today's slides say WHAT PROCESS.

The case slides in this pack were selected by the examiner to answer the open questions from day 13. Your call sheet works like every comparison so far: describe the field first (what you SEE), then name the pattern (what it MATCHES), then connect it to the finding it explains (what it MEANS for the cause tree). Name first and you start seeing what the name predicts. Three columns, same discipline as day one.

NEW VOCABULARY (RECORD IN YOUR NOTEBOOK BANK) SEC 04

TERM	PLAIN-LANGUAGE DEFINITION	ANALOGY TO HOLD ONTO
histology	reading tissue under a microscope	checking the fabric weave, not just the shirt
edema	swelling from fluid where it should not be	a waterlogged sponge

THE DECISION OF THE DAY — SEC 03

YOUR ROLE

Team E leads; everyone reads.

THE SITUATION

The case slide set (printed micrograph cards with magnification noted) plus reference cards for healthy tissue of each family.

THE RULE YOU APPLY

Describe before naming; name before connecting. Every call cites a visible feature, and reference cards stay on the table.

WHAT YOU PRODUCE

Histology call sheet: per slide, the description, the pattern call, and the cause-tree connection.

> **Claim ceiling.** Tissue findings support mechanisms; they do not name manners. The tree prunes further today, but it does not resolve.

WHAT THIS UNLOCKS

The evidence phase is complete. What remains is reasoning: the synthesis days.

PLTW ANCHOR AND INTERACTIVE LAYER — REF

Activity 1.2.4 Histology (referenced by title only; all materials in this file are John Hay original work)

- **Histology: Four Tissue Types simulation** `mendozabiomed.org/learn/lab-sim/pbs-histology-four-tissue`
- Portal: Histology Four Tissue Types simulation (pre-lab gate), day page, guided notes

Hand out only the exhibits listed for this day.

EXHIBIT 016 · Medical thread — RELEASED DAY 14

Reference slide: healthy laryngeal lining (100x)

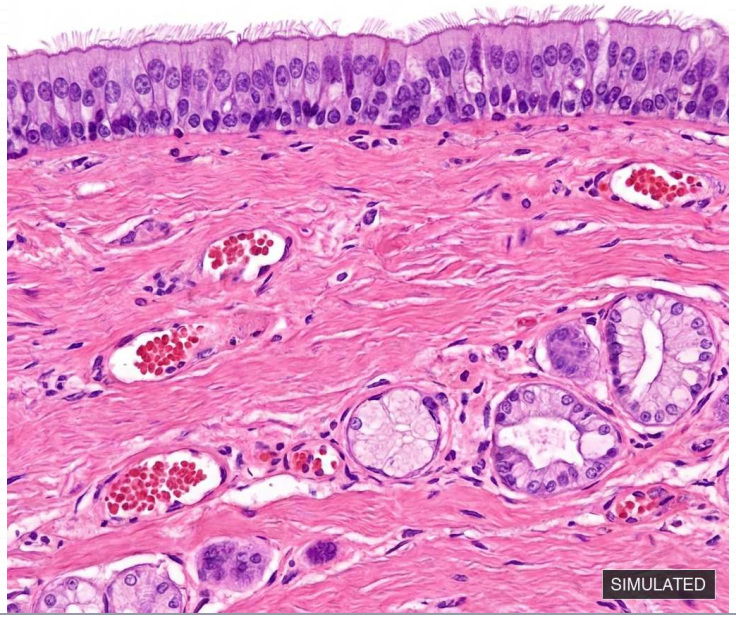


EXHIBIT 017 · Medical thread — RELEASED DAY 14

Case slide: larynx, submucosal edema (100x)

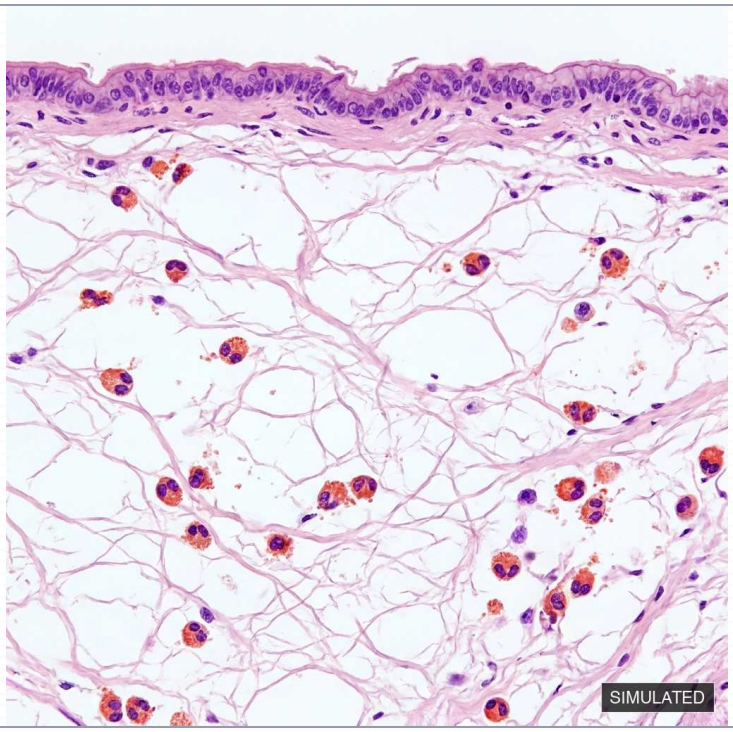


EXHIBIT 018 · Medical thread — RELEASED DAY 14

Reference slide: healthy lung (100x)

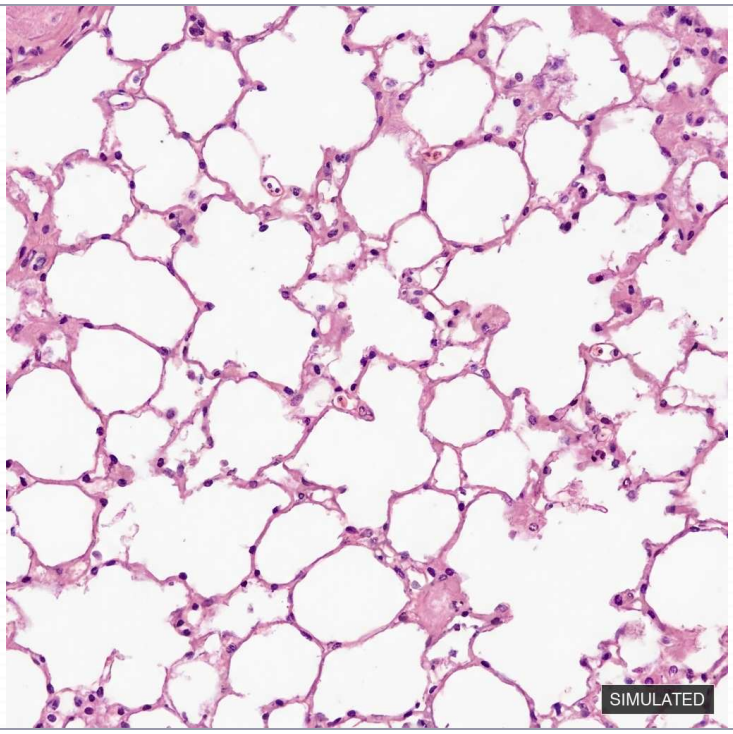


EXHIBIT 019 · Medical thread RELEASED DAY 14

Case slide: lung, airway plugging (100x)

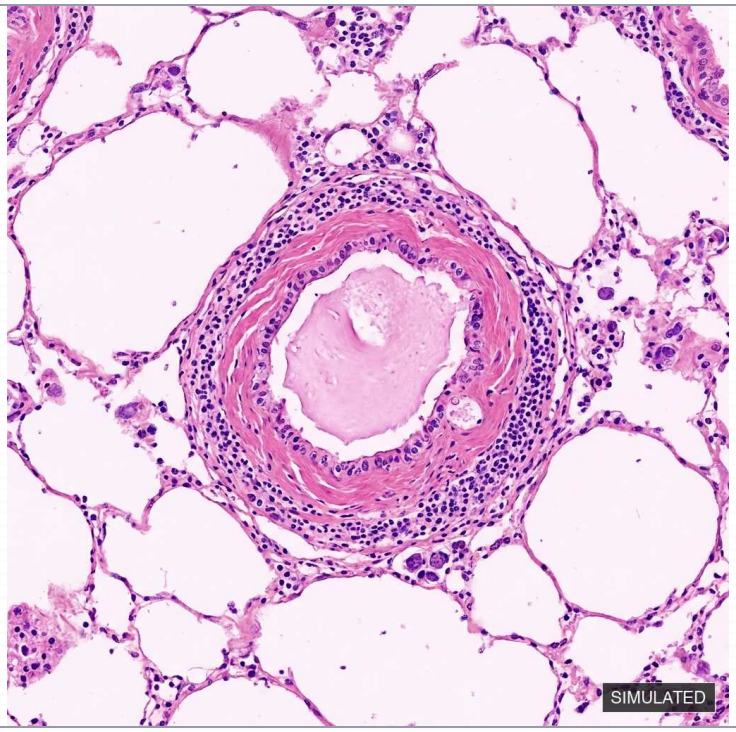
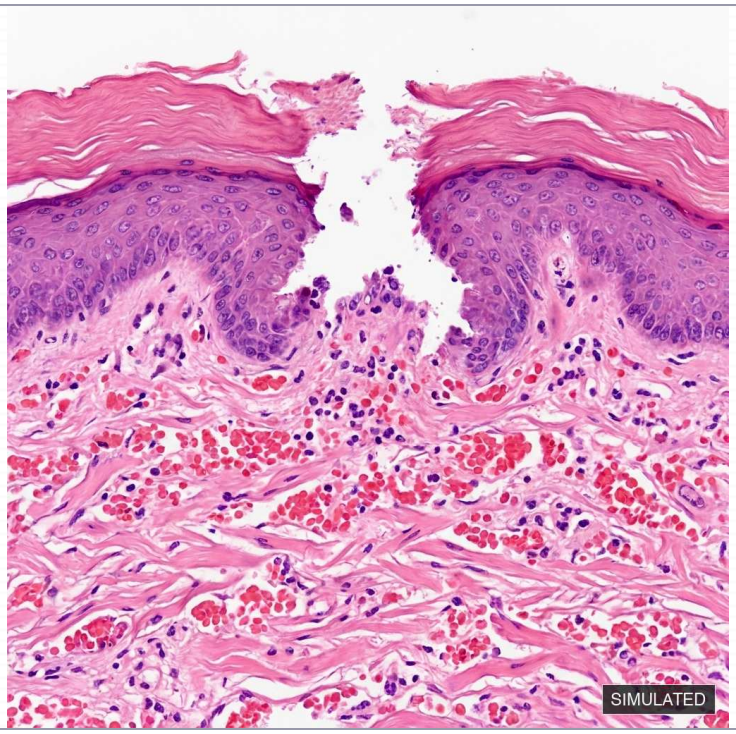


EXHIBIT 020 · Medical thread RELEASED DAY 14

Case slide: brow wound margin, vital response (200x)



INVESTIGATION TEAM ASSIGNMENTS — SEC 05

A **Scene and Documentation**
Log the slide set into the evidence log; reference numbers on every call sheet.

B **Trace**
Read the trace-relevant slide (wound margin) and brief it.

C **Serology and DNA**
Read the serology-relevant slide and brief it.

D **Toxicology and Chemistry**
Connect slide 1 to the panel and the cassettes: write the full mechanism chain in plain English for the conference.

E **Medical Examiner**
Lead the reads: describe, name, connect, against the healthy references.

F **Records and Timeline**
Tree bookkeeping: surviving branches and the evidence that would separate them.

NOTEBOOK PAGES IN USE TODAY — SEC 06

- Histology call cards organizer
- Logic tree update
- Day 14 Cornell page

DAILY SUBMISSION FORM: HISTOLOGY CALL SHEET

JH-26-0831-B / D14

- ☐ Per-slide: description, pattern, connection
- ☐ Logic tree pruning noted
- ☐ One remaining open question

INVESTIGATOR (PERIOD + CODE, NO NAMES)	TEAM	TIME SUBMITTED

Complete daily product. Complete Parts A to E of the Day 14 Daily Evidence Sheet. Submit one PDF to Wk6 D14 · The Fabric Under the Lens (PLTW 1.2.4) in Schoology by 11:59 PM. Keep notebook pages in your Investigative Notebook.

DAILY EVIDENCE SHEET

Sep 30 · Investigation Day 14 of 18 · The Fabric Under the Lens

OFFICIAL

WEBXAM · DOMAIN 1 HANDLING, PREPARATION, STORAGE AND DISPOSAL · OHIO OUTCOMES 5.5 AND 2.1

VOCABULARY IN BOLD IS DEFINED WHERE IT FIRST APPEARS

INVESTIGATOR CODE (PERIOD + CODE, NOT YOUR NAME)	TEAM	DATE
		Sep 30, 2026

WHY TODAY MATTERS, IN PLAIN ENGLISH — SEC 00

Real pathologists put tissue under a microscope to name the process behind an organ finding, because the weave of the tissue tells a truth the naked eye misses. Today you read the case slides the same way: describe, name the pattern, then connect it to the finding it explains.

Today you will: read the case's tissue slides: learn the four tissue families, then make the **histology** calls that explain the organ findings from Day 13.

The ten-year idea: Organs are built from four tissue families. Disease and injury change the weave, and the microscope reads the weave.

> **HISTOLOGY**: reading tissue under a microscope. Analogy to hold onto: checking the fabric weave, not just the shirt.

> **EDEMA**: swelling from fluid where it should not be. Analogy to hold onto: a waterlogged sponge.

PART A · READ THE BRIEFING, THEN ANSWER FROM THE TEXT — SEC 01

Every organ in the body is woven from four tissue families: EPITHELIAL (covering and lining sheets), CONNECTIVE (support and transport: bone, blood, the fibrous packing), MUSCLE (contraction), NERVOUS (signaling). Analogy: check the fabric, not just the shirt: two shirts can look alike on the rack while one is cotton and one is polyester; the weave tells the truth. LIMIT: real slides mix families in one field, and staining quality varies; histologists read patterns, not single cells.

What changes under the lens in disease and injury: fluid where it should not be (**edema**: a waterlogged sponge look, widened spaces), inflammatory cells arriving (small dark nuclei crowding in: the body's response crew on

site), tissue architecture collapsing or scarring. Each is a mechanism footprint. The organ findings from Day 13 said WHERE; today's slides say WHAT PROCESS.

The case slides in this pack were selected by the examiner to answer the open questions from day 13. Your call sheet works like every comparison so far: describe the field first (what you SEE), then name the pattern (what it MATCHES), then connect it to the finding it explains (what it MEANS for the cause tree). Name first and you start seeing what the name predicts. Three columns, same discipline as day one.

Answer from the reading above. Cite the sentence you used by copying its first three words in quotation marks.

PBS-U1-D14-A1 ☐

Name the four tissue families and one job each, from the reading. Copy the first three words of the sentence you used.

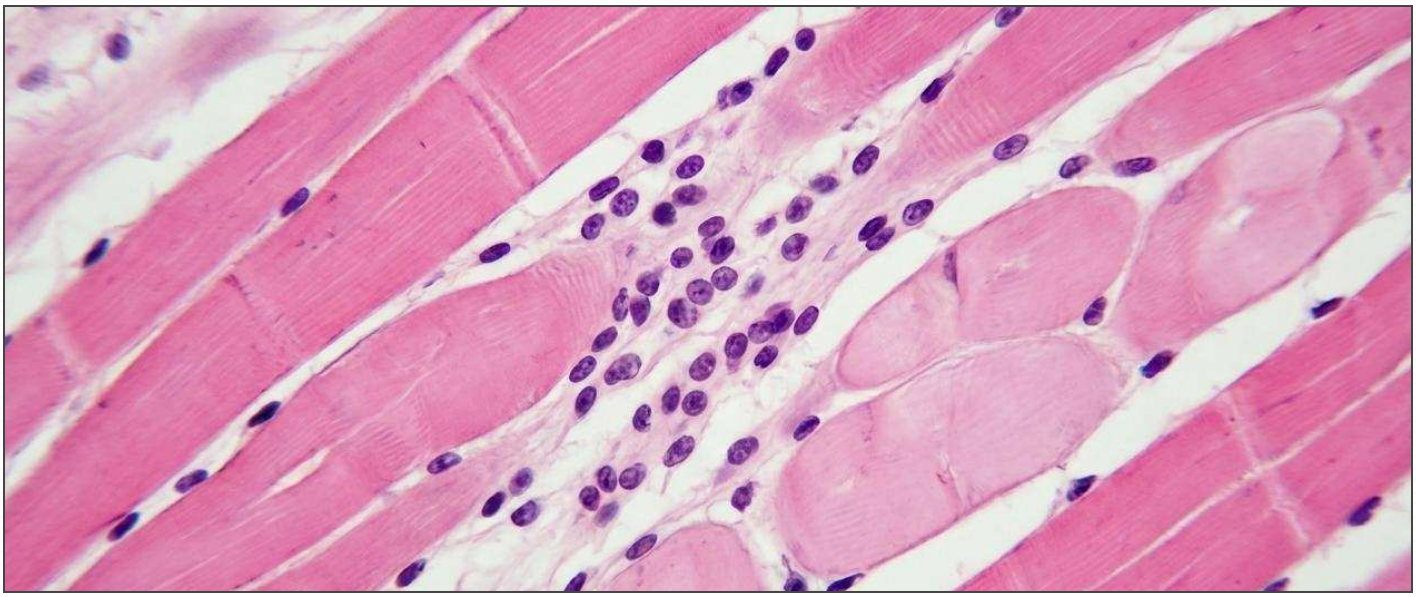
PBS-U1-D14-A2 ☐

The reading gives an order for reading a slide: describe, name, connect. Why that order and not the reverse?

WORKED EXAMPLE, STEP BY STEP (A PRACTICE CASE, NOT OURS) SEC 01A

A histology call on a practice slide (training case, not ours)

A training slide, card T-4, is labeled 'skeletal muscle, thigh, from a crush injury case' at 200x, and you must fill one call-sheet row for it.



What to notice: Notice the pale gaps between fibers (edema) and the crowd of small dark nuclei in those gaps (inflammatory cells), and compare both against the tight, evenly packed fibers a healthy reference would show.

1. Put the healthy reference for the same tissue family on the table first. Healthy skeletal muscle: long parallel fibers, fine repeating bands across them, nuclei pushed to the edges of each fiber. Result: you now know what 'normal' looks like before you look at the case card.
2. Read the magnification and turn it into a real size. At 200x the whole printed field is about 1 millimeter across in real life. Result: any feature you describe can be sized against that 1 millimeter.
3. Describe before you name. What you see: the fibers are pushed apart by wide, pale, watery spaces; many small dark nuclei crowd between the fibers; several fibers look pale and swollen. Result: three visible features written down with no pattern word yet.
4. Now name the pattern from the features. Wide pale spaces where tissue should be tight = edema (fluid where it should not be). Small dark nuclei crowding in = inflammatory cells, the body's response crew. Result: 'edema with inflammation' and each word points at a feature you already wrote.
5. Connect it to the organ finding it explains. The training case's exam sheet says 'thigh swollen and bruised.' The slide shows the process behind that: fluid and response cells in the muscle. Because a response crew only arrives in a living body, this is also a vital response: the crush happened while the person was alive. Result: the connection column names the exam finding and what the slide adds to it.
6. Estimate one size to prove the magnification step. One nucleus spans about one hundredth of the 1 millimeter field: 1 mm divided by 100 = 0.01 mm = 10 micrometers (1 mm = 1,000 micrometers), precise to about the nearest few micrometers on a printed image. Result: a number with a unit and an honest precision.
7. Write the ceiling sentence. Result: 'This slide supports a mechanism (crush injury with a living response). It cannot say what did the crushing, who was there, or the manner of death.'

Finished product: Call-sheet row: skeletal muscle (200x); healthy = tight parallel banded fibers; seen = fibers pushed apart by pale spaces, dark nuclei crowding in, swollen fibers; pattern = edema with inflammation, a vital response; connects to the exam finding 'thigh swollen and bruised'; supports a mechanism, not a manner.

Now do the same steps on today's real data in Part B. If you were in class, use your team's data. If you were absent or are new, use the canned data set below.

IF YOU WERE NOT IN CLASS: THE DATA YOU NEED

SEC 01B

ABSENT OR NEW TO THE CLASS? START HERE

The histology slide set (E12) came back: three case slides and two healthy reference cards, all marked SIMULATED. Team E led the reads (describe, then name, then connect), Team D connected slide 1 to the panel and the cassettes, and the class considered anaphylaxis as a medical hypothesis. The manner question stayed open.

Slide 1: larynx (E12, EXHIBIT 017; healthy reference EXHIBIT 016)	Tissue family: a thin fringed lining (epithelial) over a slim under-layer of connective tissue (the under-layer is called the submucosa). Healthy reference: a thin fringed surface over a slim, compact under-layer. Field: the under-layer is stretched wide and pale in a loose spidery mesh, with scattered cells full of reddish granules (allergy-associated immune cells). Pattern the class called: edema with allergy-type inflammation. Connects to: the Day 13 internal finding of severe swelling of the larynx and airway lining, and the Day 10 panel (tryptase 38 ng/mL, ref below 11; peanut IgE class 5 of 6). Magnification: 100x.
Slide 2: lung (E12, EXHIBIT 019; healthy reference EXHIBIT 018)	Tissue family: air sacs lined by very thin epithelial cells on connective-tissue walls. Healthy reference: open thin-walled air sacs like fine lace. Field: a small airway filled with a pale plug, its wall thickened and crowded with cells, the air sacs around it stretched. Pattern the class called: airway plugging with inflammation and over-inflation (air trapped behind the plug). Connects to: the Day 13 findings of mucus plugging in the airways and hyperinflated lungs.
Slide 3: brow wound margin (E12, EXHIBIT 020)	Tissue family: skin, a lining layer over connective-tissue packing (use the healthy epithelial and connective cards as references; there is no healthy skin card). Field: the surface layer is interrupted at the wound, with red blood cells and small dark immune cells in the tissue below. Pattern the class called: vital response, confirmed at tissue level. Connects to: the Day 13 external finding, a right brow laceration 2.4 cm, edge-patterned, consistent with the counter edge, with bleeding into surrounding tissue.
Mechanism chain written on the board (Day 14)	A primed immune system (peanut IgE class 5) plus peanut protein swallowed; mast cells (the body's allergy-alarm cells) dump their contents and the supplied tryptase value is elevated relative to the printed reference (E10); one value does not establish a measured rise; the airway lining swells and plugs (E11, E12); the airway closes. Working medical hypothesis: anaphylaxis following peanut exposure. The supplied sensitization, tryptase and airway findings support considering it; they do not alone establish the fatal trigger, complete sequence, manner or responsible person. The printed reference is not a validated postmortem confirming cutoff.
Tree state after today (medical hypothesis, manner open)	Recorded findings: E11 reports the hyoid bone and larynx cartilages intact, no ligature furrow, no neck bruising and no defensive wounds. E10 reports every listed drug class negative and ethanol negative. These findings do not exclude all assault mechanisms or all poisons. Screening depends on the substances tested, sample, timing and detection limits. Open: the manner branches, which turn on how peanut protein got into the open container (E4 positive, E5 sealed stock negative) and why the auto-injector was on the back office shelf (E6). Open until the records on Day 16: whose key code JW-0417 is, and what the 9:47 PM storeroom entry on DOC-6 was.

Use these values exactly as your team's data for Part B and Part E. Write "canned data set" at the top of Part B so Mr. Mendoza scores it as make-up work. Where the case file does not fix a number (room measurements,

clock times, hair features), the value here is a classroom placeholder; your room's real numbers replace it.

PART B · WORK THE EVIDENCE

SEC 02

One row per case slide. Keep the healthy reference card for that tissue family on the table while you read. Describe what you SEE before you name what it MATCHES.

FIELD: the circle you see through the microscope (or the printed micrograph). Describe the whole field, not one corner.

MAGNIFICATION: how many times larger the image is than the real tissue. At 100x, a feature 1 millimeter wide on the image is 0.01 millimeter in real life.

INFLAMMATORY CELLS: the body's response crew: small cells with dark nuclei that crowd into injured or infected tissue.

SLIDE (MAGNIFICATION)	TISSUE FAMILY AND WHAT THE HEALTHY REFERENCE LOOKS LIKE	DESCRIPTION: WHAT YOU SEE (SPACES, CELLS, STRUCTURE)	PATTERN CALL AND THE FINDING FROM DAY 13 IT CONNECTS TO

PBS-U1-D14-B1 ☐ Call sheet complete: every slide described before it is named, every call citing a visible feature, every connection naming a Day 13 finding. (Scored on the table.)

PBS-U1-D14-B2 ☐ Pick the slide that differs most from its healthy reference. Write the two visible differences and the pattern name they earn.

PBS–U1–D14–B3

Practice numbers. Through the microscope, the field you see is 2 millimeters across in real life. A cell spans one twentieth of the field. How wide is the cell in millimeters? In micrometers (1 millimeter = 1,000 micrometers)? State the precision your estimate deserves.

PART C · WRITE THE CALL SEC 03

Write the histology paragraph for the case file. For two slides, the description, the pattern, and the Day 13 finding it explains; then the sentence that says what tissue findings can support (a mechanism) and what they cannot name (a manner).

Claim ceiling. Tissue findings support mechanisms; they do not name manners. The tree prunes further today, but it does not resolve.

PBS–U1–D14–C1

Your writing:

PART D · VOCABULARY IN USE SEC 04

PBS–U1–D14–D1

Use **histology** and **edema** correctly in one or two sentences about today's work. A definition alone does not count; use the words about something real.

PART E · SELF-CHECK AND EXIT SEC 05

One line each. These come from today's pack; answer from memory first, then check.

PBS-U1-D14-E1 ☐ Widened, pale spaces in tissue that should be tight. Pattern?

PBS-U1-D14-E2 ☐ Why describe before naming?

PBS-U1-D14-E3 ☐ What are the four tissue families?

TURN IN — SLIP

Histology call sheet: Per-slide: description, pattern, connection; Logic tree pruning noted; One remaining open question.

Submit the complete Day 14 sheet as one PDF to Wk6 D14 · The Fabric Under the Lens (PLTW 1.2.4) in Schoology by 11:59 PM. The notebook pages named on today's pack stay in your Investigative Notebook. Pre-lab gate: Histology: Four Tissue Types simulation at mendozabiomed.org/learn/lab-sim/pbs-histology-four-tissue.

STANDARDS CITED ON THIS SHEET, AND HOW IT IS USED IN DATA-DRIVEN INSTRUCTION — REF

WebXam alignment. Principles and Practice of Biomedical Technology (code 072110), Handling, Preparation, Storage and Disposal (53.93 percent of the test), Ohio outcome 5.5 Laboratory Standard Operational Procedures.

Ohio Health Science	5.5.5	Explain the principles of microscopy and process a specimen for light microscopy.
Ohio Health Science	2.1.14	Describe the difference between pathology and physiology and the conditions typically observed during a disease state.
Ohio Health Science	2.1.15	Explain the pathophysiology changes associated with or resulting from disease or injury for each body system.
PLTW PBS framework	ANP-A.4	Demonstrate how a change in structure in the body impacts function.
PLTW PBS framework	GLP-B.5	Demonstrate proper use of a microscope to view biological samples.
PLTW PBS framework	EXD-B.4	Draw logical conclusions from experimental data.
Common Core	RST.9-10.4	Determine the meaning of symbols, key terms, and domain-specific words as used in a scientific or technical context.
Common Core	RST.9-10.7	Translate quantitative or technical information expressed in words into visual form (a table or chart) and translate information expressed visually or mathematically into words.
Common Core	WHST.9-10.2	Write informative or explanatory texts, including scientific procedures and technical processes, with precise language and domain-specific vocabulary.
Common Core	HSN-Q.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
NGSS	SEP-6	Constructing explanations: construct an explanation based on valid and reliable evidence.

How this sheet is used in DDI. Each item carries a code (for example PBS-U1-D14-B2). Mr. Mendoza scores every item 0, 1, or 2 (2 = complete and correct, 1 = partly, 0 = missing or wrong) and records the scores by period and investigator code, never by name. The scores roll up into these skills:

PBS.S.14a	Name the four tissue families and what each does	items A1, E3
PBS.S.14b	Describe a field before naming a pattern, and cite the visible feature	items B1, E2, C1
PBS.S.14c	Recognize edema and inflammation on a slide against a healthy reference	items B2, E1, D1
PBS.S.14d	Use magnification to estimate real size	items B3

Mastery rule. A skill is on track when at least two of its items score 2 (or its single item scores 2). A skill below that routes you to today's pack, SEC 02 (Background and briefing), and to the matching page on the portal, and it comes back as a warm-up question next week. These scores are Mr. Mendoza's instructional record for deciding what to reteach. They are not the report-card grade, which lives in Schoology.

ASSIGNMENT 28 OF 29 Thu, Oct 1 about 80 minutes

Investigation Day 16: The Tree Resolves

Today we need to accomplish bring every thread to one table, close the last open questions with the records exhibits you already hold, resolve the logic tree, and draft your manner-and-cause claim.

Our goal is compare the six evidence threads, assess their independence and limits, and draft a supported manner-and-cause claim in the Day 16 Daily Evidence Sheet.

You have to turn in Daily Evidence Sheet, Day 16: the worksheet linked at the top of this page, every Part complete. Submit one PDF of your Daily Evidence Sheet to Wk6 D16 · The Tree Resolves (PLTW 1.2.6). Complete every Part; finish any remaining work at home and submit by 11:59 PM tonight.

Schoology assignment: Wk6 D16 · The Tree Resolves (PLTW 1.2.6)

1 READ

This is our Case B investigation for Period 6A-7B. Your materials for this assignment start on the very next page, in this order: **D16 Case B briefing pack (read this)** (4 pages); then **D16 Case B Daily Evidence Sheet (write on this)** (10 pages). Read the briefing first. Write your answers on the sheet. Everything you need for this assignment is in those pages.

2 DO

Get your Unit 1 Take-Home Exam, do the 5-minute first try on packet page 2 in pen with no notes, and have Mr. Mendoza initial it. Go over the packet with him and start it. Turn in the paper packet at the start of class on Monday, October 5.

3 DO

Day 16, Part A: read the briefing and check the records with your team.

HINT Corroboration closes cases: independent evidence lines agreeing. One line persuades; three lines conclude.

4 DO

Part B: start the six-thread convergence table, cite exhibit numbers, and check independence with your team.

5 DO

Part C: begin your manner-and-cause draft; keep the claim within the evidence and name its strongest limit.

6 WRITE

Complete Part D, vocabulary in use, and Part E, self-check and exit. Check every Part of the Daily Evidence Sheet.

7 CHECK

Check what remains in Parts A to E. Take the sheet and case records home; finish every Part and submit one PDF by 11:59 PM.

8 CHECK

Before you turn it in, check your claims against these limits: A hair consistent with a person proves a hair like theirs was present, not that the person was, and never when. A fingerprint proves touch, not when or why. A pattern class narrows a crowd; only minutiae can name one finger. A presumptive test says maybe. Only a confirmatory test says blood, and only DNA says whose.

9
TURN IN

Now we turn it in. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Principles of Biomedical Technology, and open the assignment named **Wk6 D16 · The Tree Resolves (PLTW 1.2.6)**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

DAILY INVESTIGATION PACKET

OFFICIAL

Oct 1 · Investigation Day 16 of 18

THE BRIEFING: WHAT YOU ARE DOING TODAY, AND HOW THE PROS DO IT — SEC 00

Picking up from last class: you learned that organs are built from four tissue families. Disease and injury change the weave, and the microscope reads the weave.

Real cases close when independent lines of evidence agree: one line can persuade, but three independent lines that all point the same way are what let you conclude. Today you bring every thread to one table the same way and let the logic tree resolve.

OBJECTIVE

Today you will bring every thread to one table, close the last open questions with the records exhibits you already hold, resolve the logic tree, and draft your manner-and-cause claim.

Take-home (the ten-year idea): Corroboration closes cases: independent evidence lines agreeing. One line persuades; three lines conclude.

CASE FILE UPDATE — SEC 01

Warm-up first: four ways conclusions go wrong, and your claim ceiling written in advance. Then the records close every open question: the HR memo, the group chat, the delivery invoice, the livestream log. The tree resolves.

BACKGROUND AND BRIEFING (READ THIS FIRST) SEC 02

Synthesis has a method, and it is the day-12 method scaled up: lay every evidence line side by side, ask what each supports INDEPENDENTLY, and watch where independent lines converge. Scene, trace, serology and DNA, chemistry, medical findings, records: six threads. A conclusion that needs only one thread to be wrong is weak; a conclusion where three independent threads must ALL be wrong is strong. That is corroboration, and it is the difference between a theory and a finding.

Today the final records exhibits release and close the open threads. Records are evidence with a special power: they are time-stamped by machines and third parties, which makes them the skeleton the soft estimates hang on. Your time-of-death window bends; a door log does not.

Exoneration discipline, one last time: every suspect leaves this case in one of three states: cleared by evidence, implicated by evidence, or not established by evidence. 'We could not prove it was them' and 'the evidence shows it was not them' are different sentences, and your matrix must say which one you mean, suspect by suspect.

Then the tree: walk each manner branch and ask what the assembled evidence does to it. Prune with reasons, out loud, in writing. Whatever branch survives, with at least three independent threads holding it up (four exhibits across three threads), is your draft claim.

NEW VOCABULARY (RECORD IN YOUR NOTEBOOK BANK) SEC 04

TERM	PLAIN-LANGUAGE DEFINITION	ANALOGY TO HOLD ONTO
corroborate	when independent evidence lines agree	two witnesses who never met telling the same story
exonerate	to clear a suspect with evidence	the alibi that checks out

THE DECISION OF THE DAY — SEC 03

YOUR ROLE

Full unit at one table; F team chairs.

THE SITUATION

Everything: the matrix, the timeline, all worksheets, and the final records exhibits released today.

THE RULE YOU APPLY

A branch survives only with two independent threads supporting it; a suspect resolves only by evidence; every pruning cites its exhibits by E-number.

WHAT YOU PRODUCE

Draft manner-and-cause claim: one paragraph, at least four exhibits cited across at least three threads, plus the resolved suspect matrix.

Claim ceiling. Your claim names manner and cause AS THE EVIDENCE SUPPORTS THEM, states its strongest limitation, and stops there. Tomorrow's board and Thursday's report refine it; nothing is final tonight.

WHAT THIS UNLOCKS

The board build: your reasoning goes physical for cross-examination.

PLTW ANCHOR AND INTERACTIVE LAYER — REF

Project 1.2.6 Case Closed (referenced by title only; all materials in this file are John Hay original work)

- Portal: day page and guided notes

INVESTIGATION TEAM ASSIGNMENTS — SEC 05

A **Scene and Documentation**
Brief the scene thread's independent support in two minutes.

B **Trace**
Brief the trace thread.

C **Serology and DNA**
Brief the serology and DNA thread.

D **Toxicology and Chemistry**
Brief the chemistry thread.

E **Medical Examiner**
Brief the medical thread.

F **Records and Timeline**
Close the threads: E14 ties the 9:47 PM code to a name; E9 supplies intent minutes before it; E15 clears the stock at delivery and closes Boone's whereabouts. Chair the tree session; every suspect closes with the exact sentence the evidence earned.

NOTEBOOK PAGES IN USE TODAY — SEC 06

- Logic tree: final pruning inked
- Suspect matrix: resolution row
- Day 16 Cornell page

DAILY SUBMISSION FORM: DRAFT MANNER-AND-CAUSE CLAIM

JH-26-0831-B / D16

- ☐ One-paragraph claim
- ☐ Four exhibits cited across three threads
- ☐ Strongest limitation stated
- ☐ Matrix resolution sentences per suspect

INVESTIGATOR (PERIOD + CODE, NO NAMES)	TEAM	TIME SUBMITTED

DAILY EVIDENCE SHEET

Oct 1 · Investigation Day 16 of 18 · The Tree Resolves

OFFICIAL

WEBXAM · DOMAIN 2 BIOTECHNOLOGY RESEARCH AND EXPERIMENTS · OHIO OUTCOME 5.8

VOCABULARY IN BOLD IS DEFINED WHERE IT FIRST APPEARS

INVESTIGATOR CODE (PERIOD + CODE, NOT YOUR NAME)	TEAM	DATE
		Oct 1, 2026

WHY TODAY MATTERS, IN PLAIN ENGLISH — SEC 00

Real cases close when independent lines of evidence agree: one line can persuade, but three independent lines that all point the same way are what let you conclude. Today you bring every thread to one table the same way and let the logic tree resolve.

Today you will: bring every thread to one table, close the last open questions with the records exhibits you already hold, resolve the logic tree, and draft your manner-and-cause claim.

The ten-year idea: Corroboration closes cases: independent evidence lines agreeing. One line persuades; three lines conclude.

> **CORROBORATE**: when independent evidence lines agree. Analogy to hold onto: two witnesses who never met telling the same story.

> **EXONERATE**: to clear a suspect with evidence. Analogy to hold onto: the alibi that checks out.

PART A · READ THE BRIEFING, THEN ANSWER FROM THE TEXT — SEC 01

Synthesis has a method, and it is the day-12 method scaled up: lay every evidence line side by side, ask what each supports INDEPENDENTLY, and watch where independent lines converge. Scene, trace, serology and DNA, chemistry, medical findings, records: six threads. A conclusion that needs only one thread to be wrong is weak; a conclusion where three independent threads must ALL be wrong is strong. That is corroboration, and it is the difference between a theory and a finding.

Today the final records exhibits release and close the open threads. Records are evidence with a special power: they are time-stamped by machines and third parties, which makes them the skeleton the soft estimates hang on. Your time-of-death window bends; a door log does not.

Exoneration discipline, one last time: every suspect leaves this case in one of three states: cleared by evidence, implicated by evidence, or not established by evidence. 'We could not prove it was them' and 'the evidence shows it was not them' are different sentences, and your matrix must say which one you mean, suspect by suspect.

Then the tree: walk each manner branch and ask what the assembled evidence does to it. Prune with reasons, out loud, in writing. Whatever branch survives, with at least three independent threads holding it up (four exhibits across three threads), is your draft claim.

Answer from the reading above. Cite the sentence you used by copying its first three words in quotation marks.

PBS-U1-D16-A1 ☐

The reading says records are the skeleton the soft estimates hang on. What gives records that power? Copy the first three words of the sentence you used.

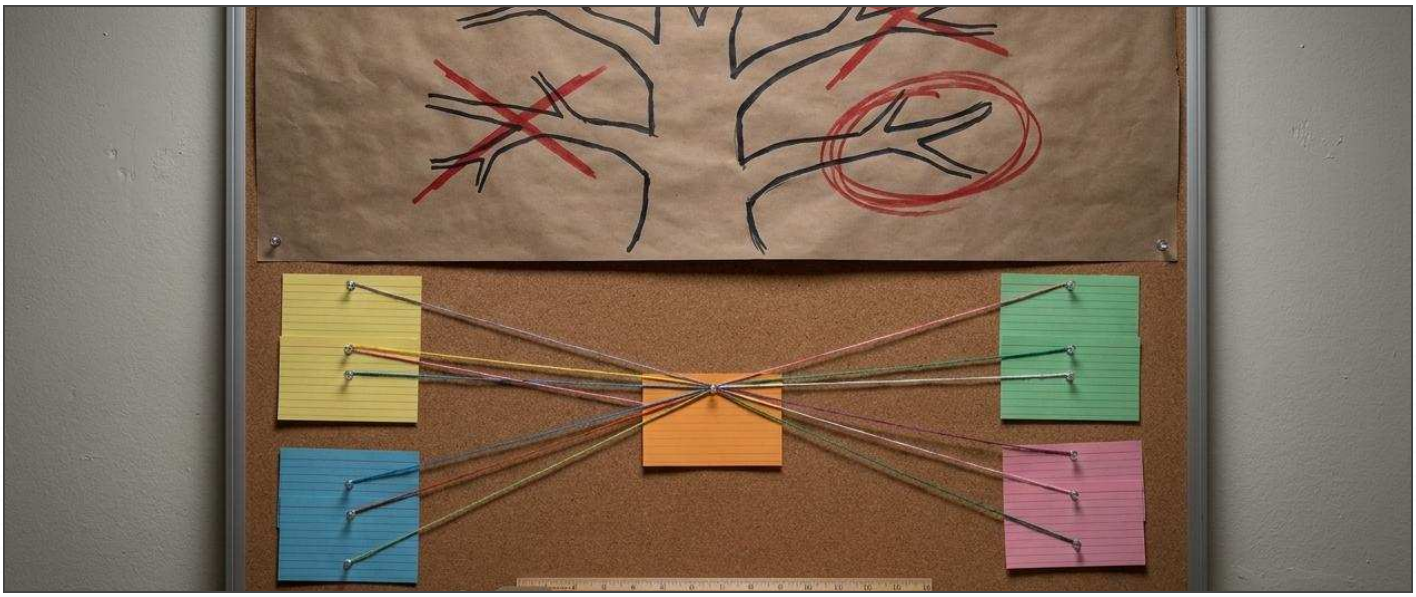
PBS-U1-D16-A2 ☐

What are the three states a person of interest can leave this case in, according to the reading, and why are cleared and not established not the same sentence?

WORKED EXAMPLE, STEP BY STEP (A PRACTICE CASE, NOT OURS) SEC 01A

Closing a logic tree on a practice case: the Larkspur greenhouse (made up)

A groundskeeper, 58, was found dead at 6:00 PM on the floor of a closed glass greenhouse on a 34 C July afternoon, and seven practice exhibits (P1 to P7) must resolve the tree: natural, accident, self-harm, homicide, undetermined.



What to notice: Notice the drawn tree with branches struck through in red and one branch circled: a tree closes only when every other branch has a named reason to fall, and the cards below it are the evidence that did the pruning.

1. Lay the threads side by side with their exhibits. Scene: P1 (door latched from the inside, no forced entry, no signs of struggle, body face down between the benches) and P6 (the vent fan motor burned out, the vent shutters jammed shut). Chemistry: P2 (drug and poison screens negative; blood sodium very high and blood concentrated, the pattern of severe dehydration). Medical: P3 (no injuries; old scar tissue in the heart muscle from a heart attack years earlier; no fresh heart damage). Records: P4 (thermostat log: 46 C inside from 1:00 PM to 4:30 PM), P5 (last text at 12:50 PM to a coworker: 'fixing the vent fan, out by 3'), P7 (site badge log: the coworker who argued with him that morning badged out at 11:30 AM and never returned). Result: four threads present; no trace or serology thread in this case.
2. Walk the homicide branch. What supports it: nothing. What cuts against it: P1 (latched from inside, no struggle), P3 (no injuries), P7 (the only person with a grudge left at 11:30). Result: zero threads for, three independent threads against; pruned, with those three P-numbers written as the reason.
3. Walk the self-harm branch. No exhibit shows intent, and P5 shows a plan to be out by 3. Result: zero threads; pruned. Note the honest wording: 'no exhibit supports it,' not 'proven impossible.'
4. Walk poisoning as a sub-branch under both accident and homicide. P2 is negative for drugs and poisons. Result: pruned by one chemistry exhibit, and that is enough because the branch has nothing FOR it.
5. Walk the natural branch. P3 shows old heart scarring but no fresh damage. Result: one thread only; under the pack's rule that a branch survives only with two independent threads, it cannot stand alone as the manner. It stays on the tree as a contributing condition.
6. Walk the accident branch (heat). P4 records the room at 46 C for hours; P2 shows severe dehydration; P6 shows why the room sealed and heated; P5 puts him inside working during that window. Count independent threads: records (P4, P5), chemistry (P2), scene (P6) = three. Count exhibits: four. Result: the four-across-three rule is met and this is the surviving branch.
7. Close every person of interest with the sentence type earned. The coworker: 'the evidence shows it was not them' (P7 badge out at 11:30, P1 latched from inside). Result: exonerated by evidence, not merely unproven. Then write the draft claim inside the ceiling.

Finished product: Draft claim: the evidence supports death by heat exposure inside a sealed greenhouse whose vent fan failed (manner: accident), with old heart disease as a contributing condition, cited P4 and P5 (records), P2 (chemistry), P6 (scene); the coworker is exonerated by P7 and P1; strongest limitation: nobody saw the collapse and the inside temperature rests on a single log.

Now do the same steps on today's real data in Part B. If you were in class, use your team's data. If you were absent or are new, use the canned data set below.

IF YOU WERE NOT IN CLASS: THE DATA YOU NEED

SEC 01B

ABSENT OR NEW TO THE CLASS? START HERE

Warm-up first (the failure-patterns one-pager and your advance claim ceiling), then the records released: E14, E9, E15. Team F logged them, each team summarized its thread, and the class pruned the logic tree branch by branch with cited reasons. Below is the evidence log as it read at the end of the period. The draft claim itself is your Part C to write.

E1 (Scene)	Body behind the smoothie counter; supply shelf toppled across the legs; rubber floor mat pulled over the lower body; counter drawer open and empty, within the outline's hand reach (Day 5 measurement). Layout: the storeroom opens by an interior door onto both the counter prep area and the back office without crossing the public floor.
E6 (Scene)	Epinephrine auto-injector found during office inventory on the back office shelf, in date, unused; every staff statement and the Day 4 background card say it lived in the counter drawer.
E7 (Trace)	One hair on the storeroom floor with a fresh root tag (recent shed or pull), consistent with Whitfield's elimination card; a fired employee has no work reason to be in that room.
E8 (Trace)	Blender: Nguyen's and the victim's daily-use prints. Protein-container lid: the victim's and Nguyen's daily-use prints UNDER broad glove-type smudges laid over them (the smudges came later).
E2 and E2b (Serology and DNA)	Counter-edge and floor stains: Kastle-Meyer presumptive positive; ABO type O, the victim's record type, and all four persons of interest carry other types; STR lane L1 matches the victim's reference (L4).
E3 (Serology and DNA)	Smoothie cup with straw: straw DNA (lane L2) matches the victim.
E-STR (Serology and DNA)	Storeroom hair (lane L3) matches Whitfield's reference (L6) at every band; Rao and Boone reference cards available on request; no other profile appears in any lane.
E4 and E5 (Chemistry)	Peanut-protein lateral-flow (a quick test strip): the OPEN counter container, E4, strongly positive; the SEALED stock container of the same lot, E5, negative. The sealed container is the control.
E10 (Chemistry)	Panel: drug screen negative in every class; ethanol negative; tryptase 38 ng/mL (ref below 11; tryptase is released by mast cells, the allergy-alarm cells); peanut-specific IgE class 5 of 6 (strongly primed). Examiner's note: postmortem tryptase supports anaphylaxis but does not alone prove it.
E11 (Medical)	Autopsy: right brow laceration 2.4 cm, edge-patterned, consistent with the counter edge, with vital response; no defensive wounds; hyoid bone and larynx cartilages intact, no ligature furrow, no neck bruising; severe swelling of the larynx and airway lining; mucus plugging; lungs hyperinflated.
E12 (Medical)	Histology: larynx under-layer widened with fluid and allergy-associated cells; a small airway plugged with a thickened wall; brow wound margin shows vital response.
E13 (Medical)	Time of death: 34.7 C at 8:20 AM in a 22 C room, early rigor in small muscles only, livor present and not yet fixed on the front surfaces (body not

	moved); death about 6:00 to 6:50 AM, minutes after the 6:05 AM entry and the first-smoothie routine.
DOC-6 (Records)	Door and key-code log: 8:41 PM cleaner code OUT; 9:47 PM storeroom entry, key code JW-0417; 9:58 PM storeroom exit, same code; 6:05 AM Okafor fob IN; 7:14 AM Nguyen fob IN; no other entries.
E14 (Records, released today)	HR memo: Whitfield terminated two weeks ago; storeroom key code JW-0417 issued to J. Whitfield; deactivation request submitted, marked PENDING, never processed.
E9 (Records, released today)	Former-staff group chat, 8:12 PM the evening before, from Whitfield's account: 'she'll get what's coming, I'll make it right.' Platform metadata: send time verified, account active.
E15 (Records, released today)	Supplier invoice: the protein-base lot is certified nut-free at delivery, lot number matching both containers. Streaming-platform log: Boone live on camera from his own lounge 8:00 to 11:30 PM, unbroken.
Mechanism chain (from Day 14)	Primed immune system plus peanut protein swallowed; mast cells dump their contents and tryptase spikes; the airway lining swells and plugs; the airway closes. Cause: anaphylaxis from peanut exposure.
Branches pruned at today's tree session, with the exhibits that pruned them	Attack by force or strangulation: E11 (neck intact, no ligature furrow, no bruising, no defensive wounds). Poisoning: E10 (negative in every class). Peanut arrived from the supplier (accident before delivery): E15 (lot certified nut-free) and E5 (same-lot sealed container negative). Accidental contamination inside the lounge: weakened by E8 (gloved handling laid over normal use, sequence shows order), DOC-6 (a storeroom entry after closing under a code that should have been dead, E14), and E6 (the rescue device moved to a room where it never lived); the class judged that this branch cannot explain E6 and E8 together. Self-harm: no exhibit supports it.
Per person of interest, what sits in the columns (for item B2)	Nguyen: DOC-6 (first entry 7:14 AM), E8 (daily-use prints under the smudges, expected background), DOC-1 (911 call 7:16 AM with correct scene detail). Rao: DOC-6 (master key unused), E7 and E8 (no trace). Boone: DOC-6 (no code or key on the log), E15 (live on camera 8:00 to 11:30 PM), E7 and E8 (no trace). Whitfield: E7 and E-STR (fresh-root hair, individual-level profile, in the storeroom), DOC-6 and E14 (9:47 PM entry under a code issued to Whitfield, deactivation pending), E8 (glove smudges over the daily prints on the one contaminated container), E9 (8:12 PM message), E4 and E5 with E15 (contamination after delivery, absent from the sealed control), E6 (moved injector: consistent with the same person, but no prints or touch DNA were taken from the injector, so it is not tied to a hand).
Ceiling note the examiner attached	Classroom exhibits do not fingerprint or touch-DNA the auto-injector. Who physically moved it is an inference from convergence, not a directly proven act. A real charge needs court-grade labs and counsel; this classroom convicts nobody.

Use these values exactly as your team's data for Part B and Part E. Write "canned data set" at the top of Part B so Mr. Mendoza scores it as make-up work. Where the case file does not fix a number (room measurements, clock times, hair features), the value here is a classroom placeholder; your room's real numbers replace it.

PART B · WORK THE EVIDENCE

SEC 02

Lay the six threads side by side. For each, write what it supports on its own. Then count how many INDEPENDENT threads hold up the branch of the logic tree that survived.

THREAD: one team's lane of evidence: scene, trace, serology and DNA, chemistry, medical findings, records.

INDEPENDENT: two threads are independent when neither one depends on the other's method or sample. Two cards from the same thread are one voice, not two.

THREAD	EXHIBITS FROM IT THAT MATTER FOR THE SURVIVING BRANCH (E-NUMBERS)	WHAT THIS THREAD SUPPORTS ON ITS OWN, IN ONE SENTENCE	DOES IT ALSO WEAKEN ANY OTHER BRANCH? WHICH?
Scene			
Trace			
Serology and DNA			
Chemistry			
Medical findings			
Records			

PBS-U1-D16-B1 ☐ Convergence table complete: six threads, E-numbers, a one-sentence independent contribution each. (Scored on the table.)

PBS-U1-D16-B2 ☐ For each person of interest, write which closing sentence applies (the evidence shows it was not them; the evidence does not establish it was them; or the evidence implicates them) and the E-number that decides it.

PBS–U1–D16–B3

Count. How many independent threads support the surviving branch? If two of your supporting exhibits come from the same thread, how many independent threads is that? Does your draft claim meet the rule of at least four exhibits across at least three threads? Show the count.

PART C · WRITE THE CALL — SEC 03

Draft the manner-and-cause claim as one paragraph: the claim as the evidence supports it, at least four exhibits by E-number across at least three threads, the pruning reason for the branches that fell, and the strongest limitation. Stop there. Nothing is final tonight.

Claim ceiling. Your claim names manner and cause as the evidence supports them, states its strongest limitation, and stops there. The board and the report refine it; nothing is final tonight.

PBS–U1–D16–C1

Your writing:

PART D · VOCABULARY IN USE — SEC 04

PBS–U1–D16–D1

Use **corroborate** and **exonerate** correctly in one or two sentences about today's work. A definition alone does not count; use the words about something real.

PART E · SELF-CHECK AND EXIT — SEC 05

One line each. These come from today's pack; answer from memory first, then check.

PBS-U1-D16-E1 ☐ Why do records anchor the timeline more firmly than the time-of-death window?

PBS-U1-D16-E2 ☐ Write the two different suspect-closing sentences.

PBS-U1-D16-E3 ☐ What does a claim need before you may write it?

TURN IN SLIP

Draft manner-and-cause claim: One-paragraph claim; Four exhibits cited across three threads; Strongest limitation stated; Matrix resolution sentences per suspect.

Hand this sheet to Mr. Mendoza before you leave. The notebook pages named on today's pack stay in your Investigative Notebook.

STANDARDS CITED ON THIS SHEET, AND HOW IT IS USED IN DATA-DRIVEN INSTRUCTION REF

WebXam alignment. Principles and Practice of Biomedical Technology (code 072110), Biotechnology Research and Experiments (46.07 percent of the test), Ohio outcome 5.8 Biotechnology Research and Experiments.

Ohio Health Science	5.8.11	Draw conclusions and propose next steps based on observations and data analysis, recognizing that experimental results must be open to the scrutiny of others.
Ohio Health Science	5.8.9	Describe the relationships between variables using correlations and draw conclusions.
Ohio Health Science	1.2.7	Use problem-solving and consensus-building techniques to draw conclusions and determine next steps.
PLTW PBS framework	EXD-B.4	Draw logical conclusions from experimental data.
PLTW PBS framework	CCP-A.1	Synthesize information from multiple credible sources, such as literature, databases, policy documents, and diverse perspectives from multiple disciplines, to explore causes and solutions to problems.
PLTW PBS framework	CCP-B.2	Conduct research using credible resources to craft explanations and draw conclusions while acknowledging the limitations, opposing views, and biases.
Common Core	RST.9-10.8	Assess the extent to which the reasoning and evidence in a text support the author's claim or recommendation.
Common Core	WHST.9-10.1	Write arguments focused on discipline-specific content: precise claims, relevant evidence, and reasoning that connects them.
Common Core	WHST.9-10.9	Draw evidence from informational texts to support analysis, reflection, and research.
Common Core	HSN-Q.A.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently, and choose and interpret the scale and the origin in graphs and data displays.
NGSS	SEP-7	Engaging in argument from evidence: evaluate the claims, evidence, and reasoning behind currently accepted explanations.

How this sheet is used in DDI. Each item carries a code (for example PBS-U1-D16-B2). Mr. Mendoza scores every item 0, 1, or 2 (2 = complete and correct, 1 = partly, 0 = missing or wrong) and records the scores by period and investigator code, never by name. The scores roll up into these skills:

PBS.S.16a	Lay evidence lines side by side and find where independent lines converge	items B1, B3, E3
PBS.S.16b	Use records as the timeline's skeleton and explain why	items A1, E1
PBS.S.16c	Close every person of interest by evidence, in the right sentence	items A2, B2, E2, D1
PBS.S.16d	Draft a claim with four exhibits across three threads and a stated limitation	items C1

Mastery rule. A skill is on track when at least two of its items score 2 (or its single item scores 2). A skill below that routes you to today's pack, SEC 02 (Background and briefing), and to the matching page on the portal, and it comes back as a warm-up question next week. These scores are Mr. Mendoza's instructional record for deciding what to reteach. They are not the report-card grade, which lives in Schoology.

ASSIGNMENT 29 OF 29 Fri, Oct 2 about 80 minutes

Investigation Day 17: Build the Board

Today we need to accomplish build and map the Case B evidence board, test its reasoning through peer cross-examination, and complete Parts A to E of the Day 17 sheet.

Our goal is a labeled connection must be supported by its cited record. Thread colors organize evidence; check sources and methods before treating support paths as independent.

You have to turn in Daily Evidence Sheet, Day 17: complete Parts A to E. Include this week's 6 Rs reflection and check your submissions. Hand in the complete Day 17 sheet and this week's 6 Rs reflection on paper, or submit one combined PDF to Wk6 D17 · Build the Board (PLTW 1.2.6) in Schoology by 11:59 PM tonight. Submit once, not twice. Check this week's submissions and keep the named notebook pages in your Investigative Notebook.

Schoology assignment: Wk6 D17 · Build the Board (PLTW 1.2.6)

1 READ

This is our Case B investigation for Period 6A-7B. Your materials for this assignment start on the very next page, in this order: **D17 Case B briefing pack (read this)** (3 pages); then **D17 Case B Daily Evidence Sheet (write on this)** (8 pages). Read the briefing first. Write your answers on the sheet. Everything you need for this assignment is in those pages.

2 DO

Part A: read the briefing and answer A1 and A2, citing the reading as the sheet asks.

3 DO

Part B: map the board with E-numbers and thread colors; label every line supports, excludes, times or locates (B1). Identify a single point of failure and a repair (B2); count thread colors and support paths and show the required fraction (B3).

HINT A labeled connection must be supported by its cited record. Thread colors organize evidence; check sources and methods before treating support paths as independent.

4 DO

Part C: record the strongest peer attack, your answer with its E-number, an attack you could not fully answer, and your repair or qualified sentence.

5 DO

Part D: use single point of failure and cross-examination in sentences about your work.

6 DO

Part E: answer all three self-check questions, then check every Part of your sheet.

7 CHECK

Before you turn it in, check your claims against these limits: A hair consistent with a person proves a hair like theirs was present, not that the person was, and never when. A fingerprint proves touch, not when or why. A pattern class narrows a crowd; only minutiae can name one finger. A presumptive test says maybe. Only a confirmatory test says blood, and only DNA says whose.

8
TURN IN

Now we turn it in. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Principles of Biomedical Technology, and open the assignment named **Wk6 D17 · Build the Board (PLTW 1.2.6)**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

DAILY INVESTIGATION PACKET

Oct 2 · Investigation Day 17 of 18

OFFICIAL

THE BRIEFING: WHAT YOU ARE DOING TODAY, AND HOW THE PROS DO IT — SEC 00

Picking up from yesterday: you learned that corroboration means evidence supports the same explanation. Check quality, dependencies and limits; no fixed number of lines makes a conclusion certain.

Real detectives build an evidence board so that anyone can follow the reasoning and attack its weakest link, because a claim that cannot survive a hard question is not ready. Today you build your board and defend it under cross-examination.

OBJECTIVE

Today you will build the evidence board from the card kit: your case's reasoning made physical, then defended under peer cross-examination.

Take-home (the ten-year idea): If the board cannot show it, the report cannot claim it. A conclusion you cannot diagram is a conclusion you do not understand.

CASE FILE UPDATE — SEC 01

The board goes up: six threads, one center, each person's card shown with the supporting records and unresolved limits.

BACKGROUND AND BRIEFING (READ THIS FIRST) SEC 02

An evidence board is not decoration; it is an argument with geography. The center holds the finding. Around it: the evidence cards, each connected to what it supports, with thread-colored lines showing WHICH kind of evidence carries each link. A board where every line runs through one card is a confession of weakness; a board can show corroborating paths, but their independence must be checked against sources and methods.

Build standard: every card carries its E-number; every connection line has a one-word label (supports, excludes, times, locates); all person-of-interest cards stay ON the board with their records and limits attached, including records that count against involvement.

Then cross-examination: another team reads your board cold and attacks: which line is weakest, which card is carrying too much, what alternative explanation survives your layout. The protocol is professional: attack the reasoning, never the people; every attack cites the board itself; the defending team answers from exhibits or concedes honestly. Concessions get repaired tonight, and a repaired board is a stronger board.

THE DECISION OF THE DAY SEC 03

YOUR ROLE

Teams build together; F team runs the layout.

THE SITUATION

The board kit (case plaque, thread labels, E-number cards, line labels), your resolved matrix and tree, one period, then cross-examination.

THE RULE YOU APPLY

Connect each claim to its cited cards and label every line. Colors identify evidence types. Check shared samples, sources, methods and assumptions before treating lines as independent.

WHAT YOU PRODUCE

The completed board, plus the board rubric self-check signed by the team.

> **Claim ceiling.** The board shows what the evidence supports. Decoration, drama, and red string with no label add nothing; the rubric scores connections, not aesthetics.

WHAT THIS UNLOCKS

On October 6: the individual report. October 5 is the JCU debate. The board is the class's argument; the report is yours.

PLTW ANCHOR AND INTERACTIVE LAYER REF

Project 1.2.6 Case Closed (referenced by title only; all materials in this file are John Hay original work)

- Portal: day page and guided notes

INVESTIGATION TEAM ASSIGNMENTS — SEC 05

A **Scene and Documentation**
Scene thread cards and lines; photograph the final board.

B **Trace**
Trace thread cards and lines.

C **Serology and DNA**
Serology and DNA thread cards and lines.

D **Toxicology and Chemistry**
Chemistry thread cards and lines.

E **Medical Examiner**
Medical thread cards and lines.

F **Records and Timeline**
Chair layout; run cross-examination protocol; log concessions.

NOTEBOOK PAGES IN USE TODAY — SEC 06

- Evidence board map (draw your final layout)
- Day 17 Cornell page

DAILY SUBMISSION FORM: BOARD RUBRIC SELF-CHECK

JH-26-0831-B / D17

- ☐ Rubric scored with team signatures
- ☐ Weakest-link named honestly
- ☐ Repair completed or scheduled

INVESTIGATOR (PERIOD + CODE, NO NAMES)	TEAM	TIME SUBMITTED

Complete daily product. Complete Parts A to E of the Day 17 Daily Evidence Sheet and this week's 6 Rs reflection. Hand in paper or one combined PDF to Wk6 D17 · Build the Board (PLTW 1.2.6) in Schoology by 11:59 PM. Submit once, not twice; check this week's submissions. If absent, use the supplied practice record and complete the reflection for the next class. Keep notebook pages in your Investigative Notebook.

DAILY EVIDENCE SHEET

OFFICIAL

Oct 2 · Investigation Day 17 of 18 · Build the Board

WEBXAM · DOMAIN 2 BIOTECHNOLOGY RESEARCH AND EXPERIMENTS · OHIO OUTCOMES 5.8 AND 1.2

VOCABULARY IN BOLD IS DEFINED WHERE IT FIRST APPEARS

INVESTIGATOR CODE (PERIOD + CODE, NOT YOUR NAME)	TEAM	DATE
		Oct 2, 2026

WHY TODAY MATTERS, IN PLAIN ENGLISH — SEC 00

Real detectives build an evidence board so that anyone can follow the reasoning and attack its weakest link, because a claim that cannot survive a hard question is not ready. Today you build your board and defend it under **cross-examination**.

Today you will: build the evidence board from the card kit: your case's reasoning made physical, then defended under peer **cross-examination**.

The ten-year idea: If the board cannot show it, the report cannot claim it. A conclusion you cannot diagram is a conclusion you do not understand.

> **SINGLE POINT OF FAILURE**: one card that carries several links by itself, so if it falls, everything hanging on it falls too. Analogy to hold onto: one bolt holding the whole shelf.

> **CROSS-EXAMINATION**: another team reads your board cold and attacks the reasoning, never the people, so the weak link shows before the report is written. Analogy to hold onto: a practice scrimmage.

PART A · READ THE BRIEFING, THEN ANSWER FROM THE TEXT — SEC 01

An evidence board is not decoration; it is an argument with geography. The center holds the finding. Around it: the evidence cards, each connected to what it supports, with thread-colored lines showing WHICH kind of evidence carries each link. A board where every line runs through one card is a confession of weakness; a board can show corroborating paths, but their independence must be checked against sources and methods.

Build standard: every card carries its E-number; every connection line has a one-word label (supports, excludes, times, locates); all person-of-interest cards stay ON the board with their records and limits attached, including records that count against involvement.

Then **cross-examination**: another team reads your board cold and attacks: which line is weakest, which card is carrying too much, what alternative explanation survives your layout. The protocol is professional: attack the reasoning, never the people; every attack cites the board itself; the defending team answers from exhibits or concedes honestly. Concessions get repaired tonight, and a repaired board is a stronger board.

Answer from the reading above. Cite the sentence you used by copying its first three words in quotation marks.

PBS–U1–D17–A1 ☐

The reading calls a board an argument with geography. What sits at the center, and what surrounds it? Copy the first three words of the sentence you used.

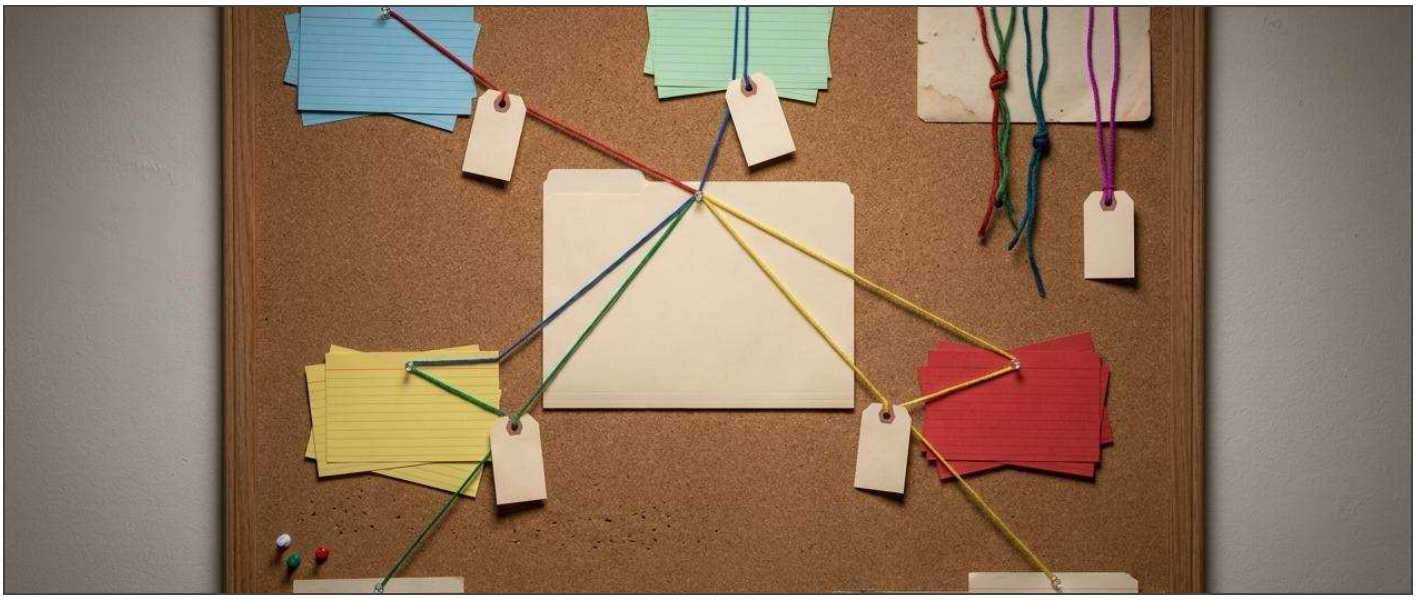
PBS–U1–D17–A2 ☐

What is the protocol for cross-examination, according to the reading, and what does every attack have to name?

WORKED EXAMPLE, STEP BY STEP (A PRACTICE CASE, NOT OURS) SEC 01A

Mapping a practice board: the Larkspur greenhouse (made up)

The greenhouse case from the Day 16 example (exhibits P1 to P7, draft claim: possible heat-related death in a greenhouse with a failed fan; old heart disease is a possible contributor, and the manner remains a hypothesis) goes onto a board, and you must map its lines, find the single point of failure, and repair it.



What to notice: Trace each path to the center and identify shared cards or assumptions. A new color or separate drawn line does not by itself add independent evidence.

1. Pin the center card (the draft claim) and one color per thread around it: scene P1 and P6, chemistry P2, medical P3, records P4, P5, P7. Pin the alternative-explanation cards (homicide, self-harm) and the coworker's card off to the side, because every person-of-interest card stays on the board with records and limits. Result: every card has an E-number-style label and a color.
2. Draw and label each line with one word. P4 to center: supports. P5 to P4: times (the 12:50 PM message precedes the logged 1:00 to 4:30 PM hot window and does not establish how long he stayed). P6 to P4: supports (the failed fan supports impaired ventilation but does not measure temperature). P2 to center: supports. P3 to center: supports (contributing condition). P1 to 'forced entry': supports the observation that no forced-entry signs were recorded. P3 to 'visible injury': supports the observation that no injuries were recorded. P7 to 'recorded badge use': times the recorded departure at 11:30 AM. These records do not exclude every homicide scenario or every way the coworker might have been involved. Result: eight labeled lines; nothing unlabeled stays up.
3. Count colors reaching the center directly. Records (P4), chemistry (P2), medical (P3) touch it; scene arrives only through P4. Result: three colors at the center.
4. Count drawn evidence paths to the center and how many pass through one card. Paths: P4; P5 via P4; P6 via P4; P2; P3 = five. Three of five run through P4: 3 divided by 5 = 0.6 = 60 percent. Result: P4, the thermostat log, is the single point of failure; if the log is wrong, three of five paths fall at once.
5. Revise the diagram to show what each record supports; redrawing a path does not create independent evidence. Connect P6 directly to the center with its own 'supports' line (a burned-out fan and jammed shutters support impaired ventilation but do not measure the room temperature) and P5 directly with 'times' (the text stands on the phone record, not on the thermostat). Result: five paths, one through P4: 1 divided by 5 = 20 percent, and four colors now reach the center.
6. Write the softer sentence the cross-examiner earned. Result: 'The temperature estimate rests on P4. P6 supports impaired ventilation and P2 is consistent with dehydration. These findings support a heat-exposure hypothesis but do not independently verify the logged temperature or establish the manner of death.'

Finished product: Board map: eight labeled lines, four thread colors reaching the center after repair, the share of five drawn paths through P4 changes from 60 percent to 20 percent. P4 remains the only supplied temperature measurement; the new layout alone does not establish stronger or independent scientific support.

Now do the same steps on today's real data in Part B. If you were in class, use your team's data. If you were absent or are new, use the canned data set below.

IF YOU WERE NOT IN CLASS: THE DATA YOU NEED

SEC 01B

ABSENT OR NEW TO THE CLASS? START HERE

The board kit came out (case plaque RESPAWN, JH-26-0831-B; six thread labels; an E-number card for every exhibit; line labels; the layout rubric). F team chaired a paper layout first, then the board went up, then

another team cross-examined it. Below is what was on the board and what each card carries, so you can map it in Part B.

Center card (the class's Day 16 draft claim, inside its ceiling)	Working medical hypothesis: anaphylaxis following peanut exposure. Working activity hypothesis: deliberate contamination may explain the open-container findings. Compare Whitfield and each other person against that hypothesis and competing explanations. These summaries do not establish who contaminated the container, who moved the injector, or that every other person is excluded. Ceiling: the moved injector is consistent with the same person but is not independently tied to a hand; this classroom convicts nobody.
Scene thread cards	E1 (body behind the counter, shelf across the legs, drawer open and empty within reach, storeroom connects to the counter and office by interior doors), E6 (auto-injector on the back office shelf, in date, unused).
Trace thread cards	E7 (storeroom hair, fresh root tag, consistent with Whitfield's card), E8 (blender: Nguyen and victim daily use; lid: daily-use prints UNDER glove-type smudges).
Serology and DNA thread cards	E2 and E2b (presumptive positive; type O; STR L1 = victim), E3 (straw DNA = victim), E-STR (hair lane L3 = Whitfield reference L6 at every band).
Chemistry thread cards	E4 (open container: peanut strongly positive), E5 (sealed same-lot stock: negative, the control), E10 (screens negative; tryptase 38 vs ref below 11; peanut IgE class 5 of 6).
Medical thread cards	E11 (airway swelling and mucus plugging; lungs hyperinflated; neck intact, no ligature furrow, no bruising; brow laceration with vital response; no defensive wounds), E12 (larynx edema with allergy-associated cells; plugged airway; wound vital response), E13 (death about 6:00 to 6:50 AM).
Records thread cards	DOC-6 (9:47 PM storeroom entry under JW-0417; 9:58 PM exit; 6:05 AM Okafor IN; 7:14 AM Nguyen IN), E14 (code JW-0417 issued to J. Whitfield, deactivation pending), E9 (8:12 PM message, metadata verified), E15 (lot certified nut-free at delivery; Boone live 8:00 to 11:30 PM).
Suspect cards that stay on the board with their evidence	Nguyen (records to assess against involvement): DOC-6, E8, DOC-1. Rao (records to assess against involvement): DOC-6 master key unused, no trace. Boone (records to assess against involvement): E15, DOC-6, no trace. Whitfield (records to assess for possible involvement): E7 and E-STR, DOC-6 and E14, E8, E9, E4 and E5 with E15, E6 (consistent, not tied to a hand).
Line labels and what each means	supports = this card is evidence FOR the finding it connects to. excludes = under stated conditions, this result rules out the specific proposition on the connected card; it does not automatically rule out a person or every alternative. times = this card fixes a moment or a window. locates = this card fixes a place or a position.

Thread colors	The kit does not fix colors; write the color your class assigned to each thread label (ask a teammate or check the board photo at the teacher station).
Independence reminder for the count	E7 and E-STR examine the same hair; do not count them as two independent samples. DOC-6 records code use and E14 assigns the code; the identification inference depends on both and on who used it. Count colors separately from independence; record shared samples and assumptions.
Canned cross-examination attack (for Part C if you were absent)	"Your board says the container was tampered with, but the hair result concerns the possible source of the hair, not when or how it arrived or who handled the container. Which exhibit connects the person to the container itself?"

Use these values exactly as your team's data for Part B and Part E. Write "canned data set" at the top of Part B so Mr. Mendoza scores it as make-up work. Where the case file does not fix a number (room measurements, clock times, hair features), the value here is a classroom placeholder; your room's real numbers replace it.

PART B · WORK THE EVIDENCE

SEC 02

Map your own board. Every line gets one label word: supports, excludes, times, or locates. Then count how many thread colors reach the center.

> **LINE LABEL**: the one word that says what a connection does: supports, excludes, times, or locates. A line with no label is decoration.

CARD (E-NUMBER)	CONNECTED TO	LINE LABEL (SUPPORTS, EXCLUDES, TIMES, LOCATES)	THREAD COLOR

PBS-U1-D17-B1 ☐ Board map complete: every listed line labeled, every card with a thread color. (Scored on the table.)

PBS–U1–D17–B2

Which card on your board carries the most links alone? What happens to the claim if that card is wrong, and what is your repair?

PBS–U1–D17–B3

Count. How many thread colors reach the center? How many drawn evidence paths reach the center in total? How many of those paths run THROUGH your single-point-of-failure card, and what fraction of the drawn paths is that (show the division)? This is a diagram count, not a percentage of evidential strength or certainty.

PART C · WRITE THE CALL

SEC 03

Write the cross-examination record. Include four parts: the strongest attack the other team made on your board, in their words; your answer with the E-number that holds it; the attack you could NOT fully answer; and the repair or the softer sentence you will carry into the report because of it.

Claim ceiling. The board shows what the evidence supports. Decoration, drama, and red string with no label add nothing; the rubric scores connections, not aesthetics.

PBS–U1–D17–C1

Your writing:

PART D · VOCABULARY IN USE

SEC 04

PBS–U1–D17–D1 ☐

Use **single point of failure** and **cross-examination** correctly in one or two sentences about today's work. A definition alone does not count; use the words about something real.

PART E · SELF-CHECK AND EXIT — SEC 05

One line each. These come from today's pack; answer from memory first, then check.

PBS–U1–D17–E1 ☐

Why do person-of-interest cards stay on the board with records that count against involvement?

PBS–U1–D17–E2 ☐

What makes a board's center strong?

PBS–U1–D17–E3 ☐

A cross-examiner finds a card carrying three links alone. What did they find?

TURN IN — SLIP

Board rubric self-check: Rubric scored with team signatures; Weakest-link named honestly; Repair completed or scheduled.

Hand in the complete Day 17 sheet and this week's 6 Rs reflection on paper, or submit one combined PDF to Wk6 D17 · Build the Board (PLTW 1.2.6) in Schoology by 11:59 PM. Submit once, not twice. Check this week's submissions. If absent, use the supplied practice record and complete the reflection for the next class. The notebook pages named on today's pack stay in your Investigative Notebook.

STANDARDS CITED ON THIS SHEET, AND HOW IT IS USED IN DATA-DRIVEN INSTRUCTION — REF

WebXam alignment. Principles and Practice of Biomedical Technology (code 072110), Biotechnology Research and Experiments (46.07 percent of the test), Ohio outcome 5.8 Biotechnology Research and Experiments.

Ohio Health Science	5.8.12	Prepare and present findings using scientific reports.
Ohio Health Science	1.2.2	Deliver formal and informal presentations.
Ohio Health Science	1.2.4	Use negotiation and conflict-resolution skills to reach solutions.

Ohio Health Science	1.2.10	Use interpersonal skills to provide group leadership, promote collaboration and work in a team.
PLTW PBS framework	COL-A.4	Employ a peer review process to give effective and constructive feedbackto meet given outcomes.
PLTW PBS framework	COL-A.2	Demonstrate teamwork and describe the importance of each team member's contribution to the project.
PLTW PBS framework	EXD-A.8	Communicate experimental findings with appropriate audiences both orally and in writing.
Common Core	RST.9-10.7	Translate quantitative or technical information expressed in words into visual form (a table or chart) and translate information expressed visually or mathematically into words.
Common Core	WHST.9-10.1	Write arguments focused on discipline-specific content: precise claims, relevant evidence, and reasoning that connects them.
Common Core	MP.3	Construct viable arguments and critique the reasoning of others.
NGSS	SEP-7	Engaging in argument from evidence: evaluate the claims, evidence, and reasoning behind currently accepted explanations.

How this sheet is used in DDI. Each item carries a code (for example PBS-U1-D17-B2). Mr. Mendoza scores every item 0, 1, or 2 (2 = complete and correct, 1 = partly, 0 = missing or wrong) and records the scores by period and investigator code, never by name. The scores roll up into these skills:

PBS.S.17a	Build an argument with geography: cards, labeled lines, documented dependencies and limits	items A1, B1, E2
PBS.S.17b	Find the weakest link and the single point of failure	items B2, B3, E3, D1
PBS.S.17c	Give and take a cross-examination professionally	items A2, C1
PBS.S.17d	Keep records that count against involvement on the board and explain their limits	items E1

Mastery rule. A skill is on track when at least two of its items score 2 (or its single item scores 2). A skill below that routes you to today's pack, SEC 02 (Background and briefing), and to the matching page on the portal, and it comes back as a warm-up question next week. These scores are Mr. Mendoza's instructional record for deciding what to reteach. They are not the report-card grade, which lives in Schoology.