

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.

JOHN HAY HIGH SCHOOL · PLTW BIOMEDICAL SCIENCE · MR. MENDOZA · ROOM 381

Genetics of Disease

Complete Assignment Packet

Medical Interventions · All 33 assignments from Monday, August 24 to Friday, October 2, 2026, in order by date, then title. Everything you need is printed inside, right next to the step that uses it.

From Mr. Mendoza. This packet holds every assignment we have done this year, up to the Unit 1 take-home exam. I rewrote each one step by step. Each step has a color that tells you what kind of work it is, a sentence telling you what we are doing and why, and any data you need printed right under it. When a table is needed twice, it is printed twice, so you never have to flip back.

Read the next two pages first. They explain why this course can feel overwhelming and exactly how to keep it clear.

The step colors

1

READ

READ. Take in the information printed right under the step. Do not write yet.

2

DO

DO. An action: set up a page, draw, calculate, search, or measure.

3

WRITE

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

4

CHECK

CHECK. Compare your work to the rule given. Fix it before moving on.

5

TURN IN

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

HINT Yellow boxes like this one are hints. Read them when a step feels hard.

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

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- Sweller, J., van Merriënboer, J. J. G., and Paas, F. (2019). Cognitive architecture and instructional design: 20 years later. *Educational Psychology Review*, 31, 261 to 292. <https://doi.org/10.1007/s10648-019-09465-5>
- 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 33 assignments, in order

Check off each one when it shows as submitted in Schoology. Already turned in? Check it now and skip it. Then start with the first unchecked row. The Unit 1 take-home exam is a separate paper packet, handed out Friday, October 2 and due Monday, October 5. It 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	Wed, Aug 26	Cornell notes and the 6 Rs	Wk1 Lab notebook: Cornell notes and the 6 Rs
☐	4	Wed, Aug 26	Cornell notes and the 6 Rs: the lab record	Wk1 Lab: Cornell notes 6 Rs
☐	5	Thu, Aug 27	Lab safety, myPLTW, and how to submit: PLTW course orientation	Wk1 PLTW: Lab safety, myPLTW, and how to submit
☐	6	Thu, Aug 27	Lab safety, myPLTW, and how to submit: safety check	Wk1 Pre-lab: Lab safety, myPLTW, and how to submit
☐	7	Fri, Aug 28	WebXam pretest and goal setting	Wk1 WebXam: WebXam pretest and goal setting
☐	8	Mon, Aug 31	Lab safety and SDS practical	Wk2 Exit ticket: Lab safety and SDS practical
☐	9	Tue, Sep 1	Lab notebook and portfolio	Wk2 Lab notebook: Lab notebook and portfolio
☐	10	Wed, Sep 2	Bioethics debate: isolation versus personal freedom	Wk2 CER: Bioethics debate, isolation vs autonomy
☐	11	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)
☐	12	Fri, Sep 4	WebXam baseline graphing and growth projection	Wk2 WebXam: Baseline graphing and growth projection
☐	13	Tue, Sep 8	Investigating an outbreak: evidence and connections (Checkpoint A)	Wk3 Investigating an outbreak: Day 1 evidence and connections
☐	14	Wed, Sep 9	Investigating an outbreak: research possible explanations (Checkpoint B)	Wk3 Investigating an outbreak: research possible explanations
☐	15	Thu, Sep 10	Investigating an outbreak: explain and revise (Checkpoint C)	Wk3 Investigating an outbreak: explain and revise
☐	16	Fri, Sep 11	DNA sequencing basics	Wk3 Vocabulary: DNA sequencing basics
☐	17	Mon, Sep 14	BLAST computer lab: lab report	Wk4 Lab report: BLAST computer lab
☐	18	Mon, Sep 14	BLAST computer lab: PLTW activity record	Wk4 PLTW: BLAST computer lab
☐	19	Tue, Sep 15	Compare two BLAST hits	Compare two BLAST hits (assignment 8520302476)
☐	20	Wed, Sep 16	Allocation CER: who gets the test?	Who gets the test? CER (assignment 8520302515)

Done	#	Date	Assignment	Schoology assignment name
[]	21	Wed, Sep 16	Progress record	Progress record (assignment 8520302557)
[]	22	Thu, Sep 17	Concentration and serial dilution	Wk4 Data table: Concentration and serial dilution
[]	23	Fri, Sep 18	Antigen-antibody and ELISA model	Wk4 Data table: Antigen-antibody and ELISA model
[]	24	Mon, Sep 21	Dilution and ELISA model report	Wk5 Lab report: Dilution and ELISA model submission
[]	25	Tue, Sep 22	Bioethics debate: false results (CER)	Wk5 CER: Bioethics debate, false results
[]	26	Wed, Sep 23	Wet ELISA data table record	Wk5 Data table: Wet ELISA lab
[]	27	Thu, Sep 24	John Carroll bioethics debate 1: should ELISA testing be mandatory?	Wk5 CER: JCU bioethics 1, should ELISA testing be mandatory?
[]	28	Fri, Sep 25	Sensitivity and specificity data table	Wk5 Data table: Specificity vs sensitivity
[]	29	Mon, Sep 28	ELISA lab report	Wk6 Lab report: ELISA lab report submission
[]	30	Tue, Sep 29	Bioethics debate: antibiotic stewardship (CER)	Wk6 CER: Bioethics debate, antibiotic stewardship
[]	31	Wed, Sep 30	Disk diffusion and MIC lab: setup record	Wk6 Data table: Disk diffusion and MIC lab
[]	32	Thu, Oct 1	John Carroll bioethics debate 2: should we ban antibiotic use in livestock? (with your zone table)	Wk6 CER: JCU bioethics 2, should we prohibit antibiotic use in livestock?
[]	33	Fri, Oct 2	Aseptic technique pre-lab	Wk6 Pre-lab: Aseptic technique

CHUNK 1 OF 7

Getting Started

Monday, August 24 to Tuesday, September 1

These first nine assignments build the routines that let us do real science later. Each one is short, 15 to 30 minutes. Do them in order.

ASSIGNMENT 1 OF 33 Mon, Aug 24 about 15 minutes

Welcome, expectations, and how this class works

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

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

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

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

1

READ

First, we learn what this course is. Medical Interventions is about how medicine fights infection and how doctors diagnose and treat disease, including diseases with genetic causes. 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

READ

Next, we learn how grading works. Your grade shows what you can do (mastery), not how many boxes you checked. The WebXam is Ohio's end-of-course test for this course, test 072130, Genetics of Disease.

3

WRITE

Now write your semester goal in one specific sentence.

HINT Specific means you could check it later. "Do better" is not checkable. "Turn in every lab report within two days" is.

4

WRITE

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

5

WRITE

Write one real question you have about this class.

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 Medical Interventions (Genetics of Disease), 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 33 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 the matching 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 this is the only time the packet sends you there. Every day page has four parts: Part 1 background, Part 2 directions, Part 3 a worked example, Part 4 your work and how to turn it in.

2

DO

Go to mendozabiomed.org/learn, choose Genetics of Disease (Medical Interventions), and open any day page.

HINT No computer today? Skip to step 5.

3

WRITE

Copy that day's objective, the goal sentence at the top of the page.

4

WRITE

Open one resource from Part 2 and write its name. Then scroll to Part 4 and write the name of the Schoology assignment for that day.

5

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."

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 Medical Interventions (Genetics of Disease), 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 33 Wed, Aug 26 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, not notes that sit in a binder.

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

First, we set up the page. Draw a line down the page about 2.5 inches from the left. Leave a strip about 2 inches tall at the bottom. Right side = notes. Left side = cue questions. Bottom = summary.

2

READ

Read this short reading once all the way through before writing anything.

Reading: how the body tells a germ from itself. Your immune system works by recognizing shapes. Germs such as bacteria and viruses carry molecules on their surfaces that are different from the molecules on your own cells. Any molecule the immune system can recognize is called an **antigen**. White blood cells called B cells make **antibodies**, Y-shaped proteins whose tips fit one antigen shape, the way one key fits one lock. When an antibody binds its antigen, it marks the germ for destruction. Because each antibody fits only its own target, the body can attack a germ without attacking itself. Lab scientists use the same lock-and-key fit to build tests that detect germs.

3

WRITE

Now take notes on the reading in the right column. Write the key facts in short phrases, not full copied sentences.

Reading: how the body tells a germ from itself. Your immune system works by recognizing shapes. Germs such as bacteria and viruses carry molecules on their surfaces that are different from the molecules on your own cells. Any molecule the immune system can recognize is called an **antigen**. White blood cells called B cells make **antibodies**, Y-shaped proteins whose tips fit one antigen shape, the way one key fits one lock. When an antibody binds its antigen, it marks the germ for destruction. Because each antibody fits only its own target, the body can attack a germ without attacking itself. Lab scientists use the same lock-and-key fit to build tests that detect germs.

HINT Good notes for this reading include: antigen, antibody, B cells, lock and key, binds only its own target.

4

WRITE

In the left column, write two or three questions your notes answer, for example "What is an antigen?"

5

WRITE

At the bottom, write a two-sentence summary that answers: *How does the body tell a germ apart from its own cells?*

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 Medical Interventions (Genetics of Disease), 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.

LAST LOOK BEFORE YOU SUBMIT

- [] Notes, cue questions, and summary are all filled in.
- [] My summary answers the question in two sentences.

ASSIGNMENT 4 OF 33 Wed, Aug 26 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 the Cornell page you just made.

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

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

Schoology assignment: Wk1 Lab: Cornell notes 6 Rs

1**READ**

Here are the 6 Rs and where each one happens.

R	What you do	Where on the page
Record	Take notes on the reading	Right column
Reduce	Turn the notes into 2 or 3 short questions	Left column
Review	Cover the right column; answer from the questions	Left column
Reflect	Write what still confuses you	Bottom strip
Recite	Explain it out loud without looking	Out loud
Revise	Fix or add to your notes	Right column

2**DO**

Record and Reduce are already done if you finished the Cornell page. Write "Record: done" and "Reduce: done" on a new page.

R	What you do	Where on the page
Record	Take notes on the reading	Right column
Reduce	Turn the notes into 2 or 3 short questions	Left column
Review	Cover the right column; answer from the questions	Left column
Reflect	Write what still confuses you	Bottom strip
Recite	Explain it out loud without looking	Out loud
Revise	Fix or add to your notes	Right column

3**DO**

Review: cover the right column of your Cornell page and answer each cue question from memory. Write how many you got right.

4

WRITE

Reflect: write one thing about antigens or antibodies that still confuses you.

5

DO

Recite: explain the reading out loud for one minute without looking. Write "Recited" and one thing you left out.

6

WRITE

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

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 Medical Interventions (Genetics of Disease), 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 33 Thu, Aug 27 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 that everything you need for the year is set up before we start labs.

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

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

1

READ

This checklist makes sure every part of the course is ready for you. Copy it onto a page.

Orientation item	Done? (yes or no)
I know our daily 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 Microsoft 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 one word about 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 Medical Interventions (Genetics of Disease), 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 33 Thu, Aug 27 about 20 minutes

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

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

Our goal is that nobody gets hurt and nobody loses credit because work went to the wrong place.

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

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

1

READ

First, three safety words.

Word	Meaning
PPE	Personal protective equipment: goggles, gloves, lab coat.
SDS	Safety data sheet: the official sheet listing 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. Find each item and write where it is: the eyewash, the fire blanket, the SDS binder, the goggles and gloves.

3

DO

Ask me for the safety contract. Read it, sign it, and hand it to me. Take the parent copy home for a signature.

4

WRITE

Course access note: write whether myPLTW "opens" or is "access unavailable."

5

TURN IN

Now we turn it in. Hand me the signed contract first. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Medical Interventions (Genetics of Disease), 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 33 Fri, Aug 28 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 how much you grow.

You have to turn in your written mastery goal and a reflection naming two routines you will keep. The pretest records on its own.

Schoology assignment: Wk1 WebXam: WebXam pretest and goal setting

1
READ

The WebXam is Ohio's end-of-course test for this course (072130, Genetics of Disease). The pass line is 65 percent. The pretest is not graded for right answers. It is a starting point.

2
DO

If you have not taken the pretest, tell me and I will set up a time. Skip what you do not know yet.

3
READ

Find your Total percent on your private report. No report yet? Use the practice values below and write "SIMULATED."

Domain	Practice score (use only if you have no report)
1. Molecular and Genetic Technology	46%
2. Laboratory Standard Operational Procedures	55%
3. Culturing	60%
4. Biotechnology Research and Experiments	50%
Total	49%

4
WRITE

Write one mastery goal for the semester, for example "Raise my Total from 49 to 65 by November."

Domain	Practice score (use only if you have no report)
1. Molecular and Genetic Technology	46%
2. Laboratory Standard Operational Procedures	55%
3. Culturing	60%
4. Biotechnology Research and Experiments	50%
Total	49%

5
WRITE

Write two routines from the first week that you will keep, and one thing you still have a question about.

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 Medical Interventions (Genetics of Disease), and open the assignment named **Wk1 WebXam: WebXam pretest and goal setting**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

ASSIGNMENT 8 OF 33 Mon, Aug 31 about 20 minutes**Lab safety and SDS practical**

Today we need to accomplish practicing safety with real equipment and reading an SDS.

Our goal is that in an emergency you know where to go and what to do without stopping to think.

You have to turn in an exit ticket: two safety rules and where one piece of emergency equipment is, written from memory.

Schoology assignment: Wk2 Exit ticket: Lab safety and SDS practical

1

DO

Walk the room and find the eyewash, fire blanket, sharps container, and chemical spill kit. Sketch a quick map of Room 381 showing each one.

2

DO

Practice removing gloves safely: pinch the outside of one glove at the wrist and peel it off inside out. Slide a clean finger under the second glove and peel it off over the first. Wash your hands.

3

READ

Ask me for one SDS from our binder. Every SDS has 16 numbered sections. Section 2 lists hazards. Section 4 lists first aid.

4

WRITE

Using Section 4, write what to do if that chemical splashes in your eyes.

5

DO

With me, walk the clear path to the eyewash at a normal pace.

6

TURN IN

Now we turn it in. Write two safety rules and the location of one piece of emergency equipment from memory on one card or page. You may also hand me the card. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Medical Interventions (Genetics of Disease), and open the assignment named **Wk2 Exit ticket: Lab safety and SDS practical**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

ASSIGNMENT 9 OF 33 Tue, Sep 1 about 20 minutes**Lab notebook and portfolio**

Today we need to accomplish setting up your lab notebook so every investigation this year is recorded the same way.

Our goal is an entry so clear that a stranger could repeat what you did.

You have to turn in a photo or scan of one complete six-part entry about the safety lesson. Keep the original in your notebook.

Schoology assignment: Wk2 Lab notebook: Lab notebook and portfolio

1

DO

Number the first ten pages of your notebook. Save page 1 for a table of contents.

2

READ

Every entry this year uses these six parts.

Part	What goes there
Date	Today's date
Question	What we were trying to find out
What I did	The steps, in order
Data	What I saw or measured
What it means	My conclusion
Next step	What I would do next

3

WRITE

Write a practice entry about the lab safety lesson using all six parts. For Data, use your room map and where each piece of equipment is.

4

CHECK

Could a stranger repeat what you did from this entry alone? If not, add one missing detail.

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 Medical Interventions (Genetics of Disease), and open the assignment named **Wk2 Lab notebook: Lab notebook and portfolio**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

CHUNK 2 OF 7

First Debate and Your WebXam Plan

Wednesday, September 2 to Friday, September 4

Three assignments. The study plan on September 3 is a 100-point take-home exam. All the numbers it needs are printed inside it.

ASSIGNMENT 10 OF 33 Wed, Sep 2 about 30 minutes

Bioethics debate: isolation versus personal freedom

Today we need to accomplish taking a position on whether officials should be able to require isolation during an outbreak.

Our goal is an argument that weighs community safety against personal freedom and holds up when someone disagrees.

You have to turn in a written CER: claim, evidence, reasoning, and a rebuttal.

Schoology assignment: Wk2 CER: Bioethics debate, isolation vs autonomy

1

READ

First, we read the scenario so we all start from the same facts.

Scenario (made up for this debate). A contagious respiratory illness begins spreading in a city. A person can spread it for about two days before they feel sick. Most people recover, but some become seriously ill. Health officials are deciding whether to **require** sick people to isolate at home, or only **ask** them to.

Words. *Isolation* separates people who are sick. *Quarantine* separates people who were exposed but are not sick yet. *Autonomy* is your right to make decisions about your own body and life.

A fact. In the United States, health departments have legal authority to isolate and quarantine people to stop serious contagious diseases (CDC, Quarantine and Isolation, [cdc.gov/quarantine](https://www.cdc.gov/quarantine)).

2

WRITE

Write your **claim** in one sentence: should isolation be required, voluntary, or never forced?

Scenario (made up for this debate). A contagious respiratory illness begins spreading in a city. A person can spread it for about two days before they feel sick. Most people recover, but some become seriously ill. Health officials are deciding whether to **require** sick people to isolate at home, or only **ask** them to.

Words. *Isolation* separates people who are sick. *Quarantine* separates people who were exposed but are not sick yet. *Autonomy* is your right to make decisions about your own body and life.

A fact. In the United States, health departments have legal authority to isolate and quarantine people to stop serious contagious diseases (CDC, Quarantine and Isolation, [cdc.gov/quarantine](https://www.cdc.gov/quarantine/)).

3

WRITE

Add one **reason** and one piece of **evidence** from the scenario.

HINT The fact that people spread the illness before they feel sick is strong evidence. Ask yourself: who does that fact help, the "require" side or the "ask" side?

4

DO

Find a partner who disagrees and trade your strongest reasons. Working alone? Write the strongest argument for the other side yourself.

5

WRITE

Write a **rebuttal**: one or two sentences that answer that strongest opposing point directly.

6

TURN IN

Now we turn it in. If the Schoology item is a discussion, paste your CER as your post instead. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Medical Interventions (Genetics of Disease), and open the assignment named **Wk2 CER: Bioethics debate, isolation vs autonomy**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

ASSIGNMENT 11 OF 33 Thu, Sep 3 about 90 minutes**WebXam Pretest Debrief and Study Plan (Take-Home Exam, 100 points)**

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

Our goal is a plan where every piece connects: your scores point to three priorities, the priorities to weekly actions, the actions to proof at each checkpoint. It is graded on the plan, never on your pretest 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
DO

Set up your document. Header line: date | WebXam Pretest Debrief and Study Plan | your first and last name. Make five headings: Part 1 to Part 5.

HINT Do one Part per sitting if that helps. Five short sittings beat one long one.

2
WRITE

Part 1, my baseline (15 points). Make a table with five rows: the four domains and Total. Fill in your score (from your private report, or the practice values below marked SIMULATED), the weight, and points to 65 (65 minus your score, or "above" if 65 or more). Write "not reported" for any missing score; never write zero.

Domain	Practice score (use only if you have no report)
1. Molecular and Genetic Technology	46%
2. Laboratory Standard Operational Procedures	55%
3. Culturing	60%
4. Biotechnology Research and Experiments	50%
Total	49%

Domain	Weight on the WebXam
1. Molecular and Genetic Technology	about 58 of 100
2. Laboratory Standard Operational Procedures	about 14 of 100
3. Culturing	about 16 of 100
4. Biotechnology Research and Experiments	about 11 of 100

3
WRITE

Still in Part 1, finish three sentences: "My lowest domain is ____." "The domain with the biggest weight is ____." "Compared with the class tally below, my Total falls in the ____ bin, and the median bin is 40 to 59, so ____."

Score bin	0 to 19	20 to 39	40 to 59	60 to 79	80 to 100
Number of students	0	4	10	5	1

Practice class tally: 20 students in total. It is made up for practice, not our real class.

HINT The median is the middle student. With 20 students, count up from the lowest bin to the 10th and 11th student: $0 + 4 = 4$, then $4 + 10 = 14$, so both fall in the 40 to 59 bin.

4

WRITE

Part 2, three priority concepts (20 points). Choose three broad concepts from the list below. For each, write the concept, its domain, and one sentence of evidence from your scores or class work. Never write a test question.

Concept	Domain
How an ELISA works	1. Molecular and Genetic Technology
Reading BLAST results	1. Molecular and Genetic Technology
Serial dilution	4. Biotechnology Research and Experiments
Culturing and aseptic technique	3. Culturing
Lab safety and SDS	2. Laboratory Standard Operational Procedures

5

WRITE

Part 3, my weekly routine (30 points). Make a table: Concept, Resource, 6 Rs action, Day and time each week, Minutes (at least 20). The plan runs 12 weeks, September 4 to November 27. Then write one sentence per concept on why that action fits it.

6 Rs action	What it looks like
Record	One Cornell page from the resource
Reduce	Ten flashcards
Review	Flashcards from memory
Reflect	Write what still confuses you
Recite	Teach it aloud in two minutes
Revise	Redo a practice set and fix errors

HINT Match the action to the concept: vocabulary fits flashcards (Reduce, Review); a procedure fits Recite or Revise.

6

DO

Part 4, graphs (20 points). If you already made the three September 4 graphs, put photos of them here. If not, draw them now with these numbers: (1) a bar for each domain and Total, axis from 0 to 100, a line across at 65; (2) the class histogram, one bar per bin; (3) a straight line from your Total at week 0 to your target at week 12.

Domain	Practice score (use only if you have no report)
1. Molecular and Genetic Technology	46%
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4. Biotechnology Research and Experiments	50%
Total	49%

Score bin	0 to 19	20 to 39	40 to 59	60 to 79	80 to 100
Number of students	0	4	10	5	1

Practice class tally: 20 students in total. It is made up for practice, not our real class.

Week	0	4	8	12
Date	Sep 4	Oct 2	Oct 30	Nov 27

7

WRITE

Still in Part 4, fill in: baseline Total ____; target at week 12 (at least 65) ____; rate = (target minus baseline) divided by 12 = ____ points per week; week 4 prediction (October 2) = baseline + 4 x rate = ____; week 8 prediction (October 30) = baseline + 8 x rate = _____. Show the math.

HINT Example with the practice Total: target 65. Rate = (65 minus 49) divided by 12 = 1.33 points per week. Week 4 = 49 + 4 x 1.33 = about 54.3.

8

WRITE

Part 5, checkpoints (15 points). For October 2 and October 30 write: the score your line predicts, one proof of learning you will show (a practice score, corrected flashcards, a teach-back), and which concept it proves. Then finish: "My line assumes I grow the same amount every week. If October 2 comes in below my line, I will ____." End with one paragraph explaining the chain: scores led to priorities, priorities to actions, actions to proof.

9

CHECK

Every number says where it came from (my report, or SIMULATED). All three graphs are in Part 4. No test question appears anywhere.

10

TURN IN

Now we turn it in. Open the PDF and check every page first. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Medical Interventions (Genetics of Disease), 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.

ASSIGNMENT 12 OF 33 Fri, Sep 4 about 60 minutes**WebXam baseline graphing and growth projection**

Today we need to accomplish graphing your starting scores, reading the class pattern, and drawing a growth line you can check later.

Our goal is a study target you can measure yourself against.

You have to turn in the completed activity, Parts A to E.

Schoology assignment: Wk2 WebXam: Baseline graphing and growth projection

1

WRITE

Part A, your table. Copy your score for each domain and Total from your private report. No report yet? Use the practice values below and write "SIMULATED." For each row, compute points to 65: 65 minus your score, or "above" if 65 or more.

Domain	Practice score (use only if you have no report)
1. Molecular and Genetic Technology	46%
2. Laboratory Standard Operational Procedures	55%
3. Culturing	60%
4. Biotechnology Research and Experiments	50%
Total	49%

HINT Missing score? Write "not reported." A blank is honest; a zero is wrong.

2

DO

Part B, bar graph. Draw five bars, one per row of your Part A table. Start the axis at 0 and go to 100. Draw a line across at 65, the pass line. Under the graph write one sentence about what it shows.

Domain	Practice score (use only if you have no report)
1. Molecular and Genetic Technology	46%
2. Laboratory Standard Operational Procedures	55%
3. Culturing	60%
4. Biotechnology Research and Experiments	50%
Total	49%

3

DO

Part C, class histogram. Draw one bar per score bin using the tally below. Mark the median bin and write the occupied range (the lowest and highest bins that have students). Write one sentence on why the median is a fair summary.

Score bin	0 to 19	20 to 39	40 to 59	60 to 79	80 to 100
Number of students	0	4	10	5	1

Practice class tally: 20 students in total. It is made up for practice, not our real class.

HINT Count up to the 10th and 11th student: $0 + 4 = 4$, $4 + 10 = 14$. Both are in 40 to 59, so that is the median bin.

4
DO

Part D, growth line. Plot your Total at week 0. Choose a target of at least 65 at week 12. Connect them with a straight line. Compute rate = (target minus baseline) divided by 12, then week 4 prediction = baseline + 4 x rate.

Week	0	4	8	12
Date	Sep 4	Oct 2	Oct 30	Nov 27

Domain	Practice score (use only if you have no report)
1. Molecular and Genetic Technology	46%
2. Laboratory Standard Operational Procedures	55%
3. Culturing	60%
4. Biotechnology Research and Experiments	50%
Total	49%

5

WRITE

Part E, make the call. Write five to seven sentences: your target and date, your baseline, your rate, two study actions, the assumption that you grow the same amount every week, and what you will change if October 2 comes in below your line.

6

TURN IN

Now we turn it in. Keep a copy: the study plan uses these graphs. Do not upload your private WebXam report itself. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Medical Interventions (Genetics of Disease), and open the assignment named **Wk2 WebXam: Baseline graphing and growth projection**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

LAST LOOK BEFORE YOU SUBMIT

- [] Every graph starts at 0 and matches my table.
- [] I used the 65 line.
- [] Part E names the straight-line assumption.

CHUNK 3 OF 7

Investigating an Outbreak

Tuesday, September 8 to Thursday, September 10

Three checkpoints on one investigation. You build one record and improve it each day. The case histories and reference cards are printed inside each assignment that uses them.

ASSIGNMENT 13 OF 33 Tue, Sep 8 about 60 minutes

Investigating an outbreak: evidence and connections (Checkpoint A)

Today we need to accomplish organizing seven case histories and drawing a map of how the people are connected.

Our goal is a clean evidence record anyone could check, before anyone guesses a cause.

You have to turn in seven case notes and a labeled contact map.

Schoology assignment: Wk3 Investigating an outbreak: Day 1 evidence and connections

1

READ

First, our two rules for the whole investigation.

Rule 1. Record the clue before you explain it. Write what the history says first. Your idea about it comes later.

Rule 2. A connection is not proof. Two people who share a room are connected. That does not prove one infected the other.

Words. A **sign** is observed or measured by someone else (a temperature). A **symptom** is felt and reported by the person (a headache). An **exposure** is contact with a possible source of illness, not proof of infection.

Now read all seven histories once, slowly, before writing anything.

The seven case histories (short versions of the PLTW Activity 1.1.2 Day 1 sheet, pages 1 to 3).

Sue (page 1): 18, soccer player. Headache that will not go away; extreme tiredness. Little sleep, energy drinks and coffee. Visited a friend at another university last weekend. Temperature 100.6 F.

Jill (page 1): Sue's roommate and teammate. Run down; whole body tight and sore. Slight fever, 99.7 F (says she always runs warm). An occasional cigarette at parties.

Anthony (page 2): sports reporter; takes shortcuts through the campus woods. Dry cough that will not go away, tired, muscle aches, sinus trouble. About 100 F for days. His friend Maria gave him cold medicine.

Wanda (page 2): fever for days, swollen neck glands, sore throat this morning. Her boyfriend Ray has the same symptoms and has not seen a doctor. Pledging the same sorority as Jill; long nightly meetings, concerts and parties.

Maggie (page 2): same dorm floor as Sue and Jill; chemistry class together. Sings in a campus band. Scratchy throat for days; this morning it felt on fire. Head feels heavy; hot, then cold.

Maria (page 3): lives down the hall from Jill and Sue; always in their room, eats their food, drinks from Jill's glass. Run down for days; could barely get out of bed. Fever almost 103 F.

Arnie (page 3): photography student; Anthony lives on his floor and helps pick his photos. Coughing and runny nose all week. 100.5 F, though he thought he had no fever.

3

WRITE

Make one note per person with five lines: Name and page; Signs (measured); Symptoms (reported); Stated contacts or exposures; Not stated (what the history does not tell you).

The seven case histories (short versions of the PLTW Activity 1.1.2 Day 1 sheet, pages 1 to 3).

Sue (page 1): 18, soccer player. Headache that will not go away; extreme tiredness. Little sleep, energy drinks and coffee. Visited a friend at another university last weekend. Temperature 100.6 F.

Jill (page 1): Sue's roommate and teammate. Run down; whole body tight and sore. Slight fever, 99.7 F (says she always runs warm). An occasional cigarette at parties.

Anthony (page 2): sports reporter; takes shortcuts through the campus woods. Dry cough that will not go away, tired, muscle aches, sinus trouble. About 100 F for days. His friend Maria gave him cold medicine.

Wanda (page 2): fever for days, swollen neck glands, sore throat this morning. Her boyfriend Ray has the same symptoms and has not seen a doctor. Pledging the same sorority as Jill; long nightly meetings, concerts and parties.

Maggie (page 2): same dorm floor as Sue and Jill; chemistry class together. Sings in a campus band. Scratchy throat for days; this morning it felt on fire. Head feels heavy; hot, then cold.

Maria (page 3): lives down the hall from Jill and Sue; always in their room, eats their food, drinks from Jill's glass. Run down for days; could barely get out of bed. Fever almost 103 F.

Arnie (page 3): photography student; Anthony lives on his floor and helps pick his photos. Coughing and runny nose all week. 100.5 F, though he thought he had no fever.

HINT Sue's note starts: Sue, page 1. Signs: 100.6 F. Symptoms: headache, extreme tiredness. Exposures: visited another university. Not stated: when symptoms started, any test result.

4

DO

Draw the contact map. Put each name in a circle. Draw a plain line, no arrows, only between people a history says are connected. Label each line with the fact and page, for example "roommates, p.1."

HINT No arrows. An arrow claims who infected whom, and Rule 2 says we cannot know that yet.

5

CHECK

Do all seven people have a note with a page? Are signs and symptoms separate? Does every line have a label and a page? Did I write "not stated" instead of guessing?

6

TURN IN

Now we turn it in. Keep your copy: tomorrow you add to it. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Medical Interventions (Genetics of Disease), and open the assignment named **Wk3 Investigating an outbreak: Day 1 evidence and connections**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

ASSIGNMENT 14 OF 33 Wed, Sep 9 about 60 minutes**Investigating an outbreak: research possible explanations (Checkpoint B)**

Today we need to accomplish comparing each person's clues to reference cards and improving your map.

Our goal is possible explanations backed by evidence, with the gaps named honestly.

You have to turn in seven research notes and your updated map with one testable explanation under it.

Schoology assignment: Wk3 Investigating an outbreak: research possible explanations

1

READ

Have your Checkpoint A notes and map in front of you. Here are the histories again, and the eight reference cards.

The seven case histories (short versions of the PLTW Activity 1.1.2 Day 1 sheet, pages 1 to 3).

Sue (page 1): 18, soccer player. Headache that will not go away; extreme tiredness. Little sleep, energy drinks and coffee. Visited a friend at another university last weekend. Temperature 100.6 F.

Jill (page 1): Sue's roommate and teammate. Run down; whole body tight and sore. Slight fever, 99.7 F (says she always runs warm). An occasional cigarette at parties.

Anthony (page 2): sports reporter; takes shortcuts through the campus woods. Dry cough that will not go away, tired, muscle aches, sinus trouble. About 100 F for days. His friend Maria gave him cold medicine.

Wanda (page 2): fever for days, swollen neck glands, sore throat this morning. Her boyfriend Ray has the same symptoms and has not seen a doctor. Pledging the same sorority as Jill; long nightly meetings, concerts and parties.

Maggie (page 2): same dorm floor as Sue and Jill; chemistry class together. Sings in a campus band. Scratchy throat for days; this morning it felt on fire. Head feels heavy; hot, then cold.

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Arnie (page 3): photography student; Anthony lives on his floor and helps pick his photos. Coughing and runny nose all week. 100.5 F, though he thought he had no fever.

Card	Illness	Key facts
R1	Common cold	Viruses. Runny or blocked nose, cough, sneezing, sore throat, mild aches; builds gradually.
R2	COVID-19	SARS-CoV-2 virus. Fever, cough, tiredness, sore throat, nasal symptoms; sometimes a change in smell or taste.
R3	Influenza (flu)	Influenza viruses. Often starts suddenly: cough, body aches, headache, tiredness; fever is common.

Card	Illness	Key facts
R4	Meningococcal disease	Neisseria meningitidis bacteria. Fever and headache; neck stiffness can occur. Spreads by close contact with throat secretions. Can worsen quickly.
R5	Mono	Usually Epstein-Barr virus. Marked tiredness, fever, sore throat, swollen lymph nodes. Spreads through saliva.
R6	Pneumonia	Lung infection caused by bacteria or viruses. Cough, fever, tiredness, shortness of breath, chest pain.
R7	Strep throat	Group A Streptococcus bacteria. Sore throat that starts quickly, painful swallowing, fever, swollen neck lymph nodes.
R8	Sleep deficiency	Not an infection. Trouble staying alert and concentrating; can add to tiredness.

2**WRITE**

For each person, write a research note with three parts: one clue (with page), one reference card that fits it (with the matching fact), and one missing or conflicting fact.

Card	Illness	Key facts
R1	Common cold	Viruses. Runny or blocked nose, cough, sneezing, sore throat, mild aches; builds gradually.
R2	COVID-19	SARS-CoV-2 virus. Fever, cough, tiredness, sore throat, nasal symptoms; sometimes a change in smell or taste.
R3	Influenza (flu)	Influenza viruses. Often starts suddenly: cough, body aches, headache, tiredness; fever is common.
R4	Meningococcal disease	Neisseria meningitidis bacteria. Fever and headache; neck stiffness can occur. Spreads by close contact with throat secretions. Can worsen quickly.
R5	Mono	Usually Epstein-Barr virus. Marked tiredness, fever, sore throat, swollen lymph nodes. Spreads through saliva.
R6	Pneumonia	Lung infection caused by bacteria or viruses. Cough, fever, tiredness, shortness of breath, chest pain.
R7	Strep throat	Group A Streptococcus bacteria. Sore throat that starts quickly, painful swallowing, fever, swollen neck lymph nodes.
R8	Sleep deficiency	Not an infection. Trouble staying alert and concentrating; can add to tiredness.

HINT Example: "Maggie, p.2: throat felt on fire. R7: strep throat starts quickly with a sore throat. Missing: no throat culture result."

3**WRITE**

If two cards fit equally, list both. If none fits well, write that the evidence is not enough. Do not invent an answer.

4**CHECK**

Check your map against the histories. Erase any line that is not backed by a stated fact.

5

WRITE

Under the map, write one testable explanation about a possible connection, and name one new record that could support or weaken it (a throat culture, or the date each person's symptoms started).

HINT Testable means new evidence could change it. "Wanda and Ray may share the same illness because both have swollen neck glands and sore throats; a throat culture for both would test this."

6

TURN IN

Now we turn it in. Keep your copy for tomorrow. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Medical Interventions (Genetics of Disease), and open the assignment named **Wk3 Investigating an outbreak: research possible explanations**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

ASSIGNMENT 15 OF 33 Thu, Sep 10 about 70 minutes

Investigating an outbreak: explain and revise (Checkpoint C)

Today we need to accomplish testing your explanation against a challenge, writing one CER, and answering three conclusion questions.

Our goal is an explanation you can defend that still says honestly what it cannot prove.

You have to turn in your revised record and map, one CER, and three conclusion answers.

Schoology assignment: Wk3 Investigating an outbreak: explain and revise

1

READ

Have your Checkpoint B notes and map in front of you. Read the two facts below; you will use both today.

Contact tracing. Public health workers ask sick people who they were near, where, and when. Timing matters: who got sick first, and how many days apart. Without the dates symptoms started, you can show a connection but not the order of spread.

Interventions. An intervention is an action that prevents, treats, or slows a disease. Examples: isolating sick people, handwashing, not sharing cups, vaccines, testing to confirm the cause, antibiotics for bacterial infections only (they do not work on viruses), and rest and fluids for viral illness.

2

DO

Share your testable explanation with a partner and ask: which clue supports it, and what is missing? Working alone? Write the strongest challenge to your explanation and answer it.

3

WRITE

Revise one statement in your record based on that challenge. Write what changed and why. Name one missing timing or contact detail.

Contact tracing. Public health workers ask sick people who they were near, where, and when. Timing matters: who got sick first, and how many days apart. Without the dates symptoms started, you can show a connection but not the order of spread.

Interventions. An intervention is an action that prevents, treats, or slows a disease. Examples: isolating sick people, handwashing, not sharing cups, vaccines, testing to confirm the cause, antibiotics for bacterial infections only (they do not work on viruses), and rest and fluids for viral illness.

4

WRITE

Write one CER. **Claim:** your explanation, still tentative. **Evidence:** at least three points, each with its page or card number. **Reasoning:** why they support the claim. **Limit:** what this cannot prove, and one new record that could test it.

The seven case histories (short versions of the PLTW Activity 1.1.2 Day 1 sheet, pages 1 to 3).

Sue (page 1): 18, soccer player. Headache that will not go away; extreme tiredness. Little sleep, energy drinks and coffee. Visited a friend at another university last weekend. Temperature 100.6 F.

Jill (page 1): Sue's roommate and teammate. Run down; whole body tight and sore. Slight fever, 99.7 F (says she always runs warm). An occasional cigarette at parties.

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R2	COVID-19	SARS-CoV-2 virus. Fever, cough, tiredness, sore throat, nasal symptoms; sometimes a change in smell or taste.
R3	Influenza (flu)	Influenza viruses. Often starts suddenly: cough, body aches, headache, tiredness; fever is common.

Card	Illness	Key facts
R4	Meningococcal disease	Neisseria meningitidis bacteria. Fever and headache; neck stiffness can occur. Spreads by close contact with throat secretions. Can worsen quickly.
R5	Mono	Usually Epstein-Barr virus. Marked tiredness, fever, sore throat, swollen lymph nodes. Spreads through saliva.
R6	Pneumonia	Lung infection caused by bacteria or viruses. Cough, fever, tiredness, shortness of breath, chest pain.
R7	Strep throat	Group A Streptococcus bacteria. Sore throat that starts quickly, painful swallowing, fever, swollen neck lymph nodes.
R8	Sleep deficiency	Not an infection. Trouble staying alert and concentrating; can add to tiredness.

5

WRITE

Answer the three conclusion questions in your own words.

- (1) Which people in this outbreak do you think share the same illness, and what evidence supports grouping them?
- (2) What information or test would you ask for first to confirm or rule out your explanation, and why?
- (3) Name two interventions you would recommend to the campus to slow the spread, and explain how each works.

Contact tracing. Public health workers ask sick people who they were near, where, and when. Timing matters: who got sick first, and how many days apart. Without the dates symptoms started, you can show a connection but not the order of spread.

Interventions. An intervention is an action that prevents, treats, or slows a disease. Examples: isolating sick people, handwashing, not sharing cups, vaccines, testing to confirm the cause, antibiotics for bacterial infections only (they do not work on viruses), and rest and fluids for viral illness.

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 Medical Interventions (Genetics of Disease), and open the assignment named **Wk3 Investigating an outbreak: explain and revise**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

CHUNK 4 OF 7

Naming a Germ from Its DNA

Friday, September 11 to Tuesday, September 15

Doctors cannot always tell germs apart by symptoms. A lab can read a germ's DNA and compare it with known DNA. Four assignments.

ASSIGNMENT 16 OF 33 Fri, Sep 11 about 30 minutes

DNA sequencing basics

Today we need to accomplish learning what DNA sequencing measures and practicing base pairing.

Our goal is understanding that a read is the order of bases, and that naming a germ takes a second step: comparison.

You have to turn in a notebook entry: bases and pairing rules, a two-sentence summary, a partner strand, and one question.

Schoology assignment: Wk3 Vocabulary: DNA sequencing basics

1

READ

First, read how sequencing works.

How sequencing works. DNA is a chain of four bases: A (adenine), T (thymine), C (cytosine), G (guanine). A sequencer reads the order of the bases in a piece of DNA and reports it as letters. That list of letters is a **read**. When the machine cannot tell which base is at a spot, it writes **N**.

The letters alone do not name the organism. To name it, a scientist compares the read with huge databases of known DNA.

Pairing rules: A pairs with T. C pairs with G.

2

WRITE

Write the four bases and the two pairing rules. Then summarize how sequencing works in two sentences.

How sequencing works. DNA is a chain of four bases: A (adenine), T (thymine), C (cytosine), G (guanine). A sequencer reads the order of the bases in a piece of DNA and reports it as letters. That list of letters is a **read**. When the machine cannot tell which base is at a spot, it writes **N**.

The letters alone do not name the organism. To name it, a scientist compares the read with huge databases of known DNA.

Pairing rules: A pairs with T. C pairs with G.

3

DO

Write the partner strand for this practice read, base by base: TACGGATC

HINT Go one letter at a time: T pairs with A, A pairs with T, C pairs with G, G pairs with C.

4

WRITE

Write one sentence on what an N in a read means.

5

WRITE

Write one sentence on what comparing a read to known DNA could add, and one thing it still cannot prove.

HINT A match can show the DNA is very similar to a known germ. It cannot prove that germ caused a person's illness.

6

WRITE

Write one question you have about turning a read into a germ's name.

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 Medical Interventions (Genetics of Disease), and open the assignment named **Wk3 Vocabulary: DNA sequencing basics**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

ASSIGNMENT 17 OF 33 Mon, Sep 14 about 60 minutes

BLAST computer lab: lab report

Today we need to accomplish running a real DNA comparison with NCBI BLAST and recording what it shows.

Our goal is reading a results table correctly and writing a claim that stays within the evidence.

You have to turn in a one-page lab report: your top three hits with the numbers labeled, one careful sentence, and a note on how the search went.

Schoology assignment: Wk4 Lab report: BLAST computer lab

1

READ

First, the words you need to read a results table.

Word	Meaning
Query	The DNA read you submit.
Hit	A known sequence in the database that matches your read.
Per. Ident (percent identity)	Of the bases that lined up, the percent that matched exactly.
Query Cover (query coverage)	The percent of your read that lined up with the hit.
E value	How many matches this good you would expect by chance alone. Smaller is stronger. 0.0 means too small to show.

2
DO

Go to blast.ncbi.nlm.nih.gov and click **Nucleotide BLAST**, not Protein BLAST, because our read is DNA. No computer? Skip to step 6.

3
DO

Make sure the **blastn** tab is selected. Click in the box labeled "Enter accession number(s), gi(s), or FASTA sequence(s)" and type or paste Sample 1.

Sample 1, practice read. 500 DNA bases from the 16S rRNA gene, a gene every bacterium has. Prepared from a public reference sequence, not from any patient. Type it without the spaces and without the position numbers on the left.

```
>S1_practice_isolate
1  TGAACGCTGG  CGGCAGGCCT  AACACATGCA  AGTCGAGCGG  ATGAAGGGAG
51  CTTGCTCCTG  GATTCAGCGG  CGGACGGGTG  AGTAATGCCT  AGGAATCTGC
101 CTGGTAGTGG  GGGATAACGT  CCGGAAACGG  GCGCTAATAC  CGCATACGTC
151 CTGAGGGAGA  AAGTGGGGGA  TCTTCGGACC  TCACGCTATC  AGATGAGCCT
201 AGGTCGGATT  AGCTAGTTGG  TGGGGTAAAG  GCCTACCAAG  GCGACGATCC
251 GTAAGTGGTC  TGAGAGGATG  ATCAGTCACA  CTGGAAGTGA  GACACGGTCC
301 AGACTCCTAC  GGGAGGCAGC  AGTGGGGAAT  ATTGGACAAT  GGGCGAAAGC
351 CTGATCCAGC  CATGCCGCGT  GTGTGAAGAA  GGTCTTCGGA  TTGTAAAGCA
401 CTTTAAGTTG  GGAGGAAGGG  CAGTAAGTTA  ATACCTTGCT  GTTTTGACGT
451 TACCAACAGA  ATAAGCACCG  GCTAACTTCG  TGCCAGCAGC  CGCGGTAATA
```

HINT Check your typing: it must start TGAACGCTGG and end GCGGTAATA. One wrong letter changes the result.

4
DO

Leave the database as "Core nucleotide database (core_nt)" and leave "Highly similar sequences (megablast)" selected. Click the blue BLAST button once. Wait 1 to 3 minutes; the page updates by itself.

5
DO

In the Descriptions tab, copy rows 1 to 3: Scientific Name, Query Cover, E value, Per. Ident, Accession. Take a screenshot and label the three numbers.

Word	Meaning
Query	The DNA read you submit.
Hit	A known sequence in the database that matches your read.
Per. Ident (percent identity)	Of the bases that lined up, the percent that matched exactly.
Query Cover (query coverage)	The percent of your read that lined up with the hit.
E value	How many matches this good you would expect by chance alone. Smaller is stronger. 0.0 means too small to show.

6
DO

No computer, or the search did not work? Use the printed results below and write "printed results" on your report. Same points.

Row	Scientific Name	Query Cover	E value	Per. Ident	Accession
1	Pseudomonas aeruginosa	100%	0.0	100%	CP194187.1
2	Pseudomonas aeruginosa	100%	0.0	100%	CP173124.1
3	Pseudomonas aeruginosa	100%	0.0	100%	CP194364.1
4	Pseudomonas aeruginosa	100%	0.0	100%	PV660318.1
5	Pseudomonas aeruginosa	100%	0.0	100%	CP191352.1

Printed results: Mr. Mendoza's search of Sample 1 on October 1, 2026. All 15 rows checked named Pseudomonas aeruginosa with the same numbers. NCBI adds sequences often, so a new search can list different rows.

7
WRITE

Write one careful sentence: "My read is highly similar to the ____ reference sequences (____% identity, ____% coverage, E value ____). This supports a close DNA match, not proof that this germ caused anyone's illness."

Row	Scientific Name	Query Cover	E value	Per. Ident	Accession
1	Pseudomonas aeruginosa	100%	0.0	100%	CP194187.1
2	Pseudomonas aeruginosa	100%	0.0	100%	CP173124.1
3	Pseudomonas aeruginosa	100%	0.0	100%	CP194364.1
4	Pseudomonas aeruginosa	100%	0.0	100%	PV660318.1
5	Pseudomonas aeruginosa	100%	0.0	100%	CP191352.1

Printed results: Mr. Mendoza's search of Sample 1 on October 1, 2026. All 15 rows checked named Pseudomonas aeruginosa with the same numbers. NCBI adds sequences often, so a new search can list different rows.

8
WRITE

Write one sentence on how the search went: what worked, and anything that failed or confused you.

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 Medical Interventions (Genetics of Disease), and open the assignment named **Wk4 Lab report: BLAST computer lab**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

ASSIGNMENT 18 OF 33 Mon, Sep 14 about 10 minutes

BLAST computer lab: PLTW activity record

Today we need to accomplish turning in your official PLTW Activity 1.1.3 record.

Our goal is that your PLTW record matches the work you did.

You have to turn in your Activity 1.1.3 pages, or a short access note.

Schoology assignment: Wk4 PLTW: BLAST computer lab

1

READ

This is a separate item from the lab report. It holds the official PLTW activity pages, not your lab report.

2

DO

If you completed Activity 1.1.3 pages in class, scan them into one PDF.

3

WRITE

If you could not open PLTW or did not get the pages, write one line: "No Activity 1.1.3 record: [the reason]." I will give you the pages.

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 Medical Interventions (Genetics of Disease), and open the assignment named **Wk4 PLTW: BLAST computer lab**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

ASSIGNMENT 19 OF 33 Tue, Sep 15 about 40 minutes

Compare two BLAST hits

Today we need to accomplish comparing two hits using all three numbers together.

Our goal is knowing that one strong-looking number can fool you; identity, coverage, and E value must be read together.

You have to turn in a two-row table and a careful statement citing all three numbers.

Schoology assignment: Compare two BLAST hits (assignment 8520302476, tap to open)

1

READ

First, the three numbers again.

Word	Meaning
Query	The DNA read you submit.
Hit	A known sequence in the database that matches your read.
Per. Ident (percent identity)	Of the bases that lined up, the percent that matched exactly.
Query Cover (query coverage)	The percent of your read that lined up with the hit.
E value	How many matches this good you would expect by chance alone. Smaller is stronger. 0.0 means too small to show.

2

READ

Choose your two hits. Use two rows from your September 14 search, or use practice Hits A and B below and write "practice values."

Practice hit	Percent identity	Query coverage	E value
Hit A	99%	98%	2e-60
Hit B	99%	11%	0.4

HINT Reading 2e-60: 2 times 10 to the negative 60th power, a number extremely close to zero. 0.4 is far larger, so a match like Hit B could easily happen by chance.

3

DO

Make a table: Hit, Percent identity, Query coverage, E value, Source. Fill both rows. Never invent a missing value.

Practice hit	Percent identity	Query coverage	E value
Hit A	99%	98%	2e-60
Hit B	99%	11%	0.4

4

WRITE

Compare all three numbers. Which hit lines up with more of the read? Which has the smaller E value? Are they tied on anything?

5

WRITE

Write your statement: "From [my search / practice values], Hit A has ___ identity, ___ coverage and E value ___, and Hit B has ___, ___ and ___. These numbers support ___. [One limit.]"

Practice hit	Percent identity	Query coverage	E value
Hit A	99%	98%	2e-60
Hit B	99%	11%	0.4

HINT Both hits are 99% identical, so identity alone cannot pick a winner. Coverage and E value can.

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 Medical Interventions (Genetics of Disease), and open the assignment named **Compare two BLAST hits, assignment 8520302476 (tap to open)**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

CHUNK 5 OF 7

Who Gets the Test, Dilutions, and the ELISA Model

Wednesday, September 16 to Monday, September 21

Five assignments. The September 21 report reuses your September 17 and 18 pages, and every rule and table it needs is printed inside it.

ASSIGNMENT 20 OF 33 Wed, Sep 16 about 40 minutes

Allocation CER: who gets the test?

Today we need to accomplish deciding how a clinic should hand out tests when there are not enough.

Our goal is a rule you can defend, with its cost stated honestly.

You have to turn in one CER with five parts: claim, evidence, reasoning, limitation, rebuttal. 15 points, Assessments.

Schoology assignment: [Who gets the test? CER \(assignment 8520302515, tap to open\)](#)

1

READ

First, the clinic and the three ways to decide.

The clinic (made up). A clinic has **50 test kits** and **400 people** asking for a test. These numbers show a shortage. They do not tell us who is infected or how accurate the test is.

Framework	Who goes first	Tradeoff
Most need	People with the greatest need, by a criterion you state (for example, the sickest)	Takes need seriously, but need alone may leave out other values.
Most benefit	Where a test is expected to help most (for example, people in contact with many others)	Needs information we may not have, so it is uncertain.
First come	In order of arrival	Clear and simple, but not everyone can arrive early.

2

WRITE

Claim: state your rule for giving out the 50 tests and name which framework it uses.

Framework	Who goes first	Tradeoff
Most need	People with the greatest need, by a criterion you state (for example, the sickest)	Takes need seriously, but need alone may leave out other values.
Most benefit	Where a test is expected to help most (for example, people in contact with many others)	Needs information we may not have, so it is uncertain.
First come	In order of arrival	Clear and simple, but not everyone can arrive early.

3

WRITE

Evidence: at least one sentence using the supplied facts.

The clinic (made up). A clinic has **50 test kits** and **400 people** asking for a test. These numbers show a shortage. They do not tell us who is infected or how accurate the test is.

HINT Only two facts are given: 50 kits and 400 people. Do not invent patient facts.

4

WRITE

Reasoning: explain why your rule is fair, naming the value that matters most to you.**Limitation:** one sentence on what your rule costs.**5**

WRITE

Rebuttal: pick a different framework, state its strongest point, and answer it.

Framework	Who goes first	Tradeoff
Most need	People with the greatest need, by a criterion you state (for example, the sickest)	Takes need seriously, but need alone may leave out other values.
Most benefit	Where a test is expected to help most (for example, people in contact with many others)	Needs information we may not have, so it is uncertain.
First come	In order of arrival	Clear and simple, but not everyone can arrive early.

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 Medical Interventions (Genetics of Disease), and open the assignment named **Who gets the test? CER, assignment 8520302515 (tap to open)**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

ASSIGNMENT 21 OF 33 Wed, Sep 16 about 10 minutes**Progress record**

Today we need to accomplish keeping a short record of where you are in our official activity.

Our goal is that you and I can always see what is done and what comes next.

You have to turn in one short Google Doc with three entries.

Schoology assignment: [Progress record \(assignment 8520302557, tap to open\)](#)

1

DO

Open a new Google Doc titled with your name and "Progress record."

2

WRITE

Entry 1, source: "PLTW Activity 1.1.3, Using DNA to Identify Pathogens."

3

WRITE

Entry 2, progress: what you have actually finished, or what stopped you (for example, "myPLTW would not open").

4

WRITE

Entry 3, next step: the next thing you will do, or "I need directions from Mr. Mendoza."

5

TURN IN

Now we turn it in. Open [Progress record, assignment 8520302557 \(tap to open\)](#), attach the Google Doc, and select Submit.

ASSIGNMENT 22 OF 33 Thu, Sep 17 about 30 minutes**Concentration and serial dilution**

Today we need to accomplish planning a series of dilutions on paper and predicting what happens to the signal.

Our goal is that you can follow how a concentration changes step by step, a skill every lab test uses.

You have to turn in your dilution table and one prediction sentence. 5 points, Daily Work.

Schoology assignment: Wk4 Data table: Concentration and serial dilution

1

READ

First, three words.

Concentration: amount of a substance per volume, here in units/mL. **Stock:** the starting solution. **1:10 dilution:** 1 part of the previous solution plus 9 parts liquid, 10 parts total, so the concentration is divided by 10.

2
DO

Copy this table. The stock is 1000 units/mL, labeled "illustrative" because it is a given number, not a measurement.

Step	Starts from	Calculation	Concentration (units/mL)
Stock (illustrative)	given	given	1000
Step 1	Stock	$1000 / 10$	_____
Step 2	Step 1	_____ / 10	_____
Step 3	Step 2	_____ / 10	_____
Step 4	Step 3	_____ / 10	_____

3
DO

Fill each step: start from the row just above, divide by 10, show the math, and write units/mL on every answer.

Step	Starts from	Calculation	Concentration (units/mL)
Stock (illustrative)	given	given	1000
Step 1	Stock	$1000 / 10$	_____
Step 2	Step 1	_____ / 10	_____
Step 3	Step 2	_____ / 10	_____
Step 4	Step 3	_____ / 10	_____

HINT Each answer is one tenth of the row above it. The first is $1000 / 10 = 100$ units/mL.

4

CHECK

Four steps after the stock? Each starts from the row above? Every answer has units/mL?

5

WRITE

Write one if-then prediction: "If darker color means more target in this test, then as the concentration goes down, the color should ____."

6

TURN IN

Now we turn it in. Do not draw a graph. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Medical Interventions (Genetics of Disease), and open the assignment named **Wk4 Data table: Concentration and serial dilution**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

ASSIGNMENT 23 OF 33 Fri, Sep 18 about 40 minutes**Antigen-antibody and ELISA model**

Today we need to accomplish learning what an antibody is and how an ELISA turns binding into color.

Our goal is reading four model wells correctly and saying what the model can and cannot tell us.

You have to turn in one page with Parts A, B, and C. 5 points, Daily Work.

Schoology assignment: Wk4 Data table: Antigen-antibody and ELISA model

1

READ

First, read how antibodies and the ELISA work.

Proteins and antibodies. A protein is a folded chain whose shape decides its job. An **antibody** is a Y-shaped protein made of four chains. The tips of its two arms hold **binding sites** whose shape fits one small patch on a target, the **antigen**. A shape that only nearly fits usually does not bind.

The ELISA (enzyme-linked immunosorbent assay) is a test built in layers inside a small plastic well. An antibody attached to an enzyme binds only if the target is there. A colorless chemical, the substrate, is added, and the enzyme turns it into color. Washing between layers removes anything that did not bind, so color means binding happened (StatPearls, Enzyme Linked Immunosorbent Assay, ncbi.nlm.nih.gov/books/NBK555922).

2

DO

Part A. Draw an antibody (a Y) binding an antigen. Label the antigen, the antibody, and the binding site. Write two sentences: why the antibody binds only its own target, and how binding connects to color.

Proteins and antibodies. A protein is a folded chain whose shape decides its job. An **antibody** is a Y-shaped protein made of four chains. The tips of its two arms hold **binding sites** whose shape fits one small patch on a target, the **antigen**. A shape that only nearly fits usually does not bind.

The ELISA (enzyme-linked immunosorbent assay) is a test built in layers inside a small plastic well. An antibody attached to an enzyme binds only if the target is there. A colorless chemical, the substrate, is added, and the enzyme turns it into color. Washing between layers removes anything that did not bind, so color means binding happened (StatPearls, Enzyme Linked Immunosorbent Assay, ncbi.nlm.nih.gov/books/NBK555922).

3

WRITE

Part B. For each well below, write one short statement of what that row tells you. Keep the exact color words and labels, including the ~ on Well 4.

Well	Color (supplied)	Concentration label (supplied)
Well 1	Dark blue	100 ng/mL
Well 2	Medium blue	10 ng/mL
Well 3	Light blue	1 ng/mL
Well 4	Nearly clear	~0.1 ng/mL

ng/mL means nanograms per milliliter. The ~ means "approximately." In this model only, darker blue goes with a higher concentration.

HINT These are supplied model labels, not your measurements. Write "Well 1 is supplied as dark blue at 100 ng/mL," not "I measured."

4

WRITE

Part C. Compare two wells in one sentence using the model rule (darker blue = more target in this model). Then write one limit: something this record does not tell you.

Well	Color (supplied)	Concentration label (supplied)
Well 1	Dark blue	100 ng/mL
Well 2	Medium blue	10 ng/mL
Well 3	Light blue	1 ng/mL
Well 4	Nearly clear	~0.1 ng/mL

ng/mL means nanograms per milliliter. The ~ means "approximately." In this model only, darker blue goes with a higher concentration.

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 Medical Interventions (Genetics of Disease), and open the assignment named **Wk4 Data table: Antigen-antibody and ELISA model**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

ASSIGNMENT 24 OF 33 Mon, Sep 21 about 40 minutes

Dilution and ELISA model report

Today we need to accomplish checking your September 17 and 18 pages and adding one page on what they can and cannot support.

Our goal is a report so clear and honest that a stranger could trust it.

You have to turn in one report: Part 1 (your dilution page), Part 2 (your ELISA model page), Part 3 (one new page).

Schoology assignment: Wk5 Lab report: Dilution and ELISA model submission

1

DO

Gather your September 17 dilution page and September 18 ELISA model page. Missing one? Do it now; everything is below.

2

CHECK

Check Part 1 against this table: stock 1000 labeled illustrative; four 1:10 steps; each divided by 10 from the row above; units/mL on every result; one if-then prediction. Cross out and fix neatly.

Step	Starts from	Calculation	Concentration (units/mL)
Stock (illustrative)	given	given	1000
Step 1	Stock	1000 / 10	_____
Step 2	Step 1	_____ / 10	_____
Step 3	Step 2	_____ / 10	_____
Step 4	Step 3	_____ / 10	_____

3

CHECK

Check Part 2: three labels on your drawing; an explanation with a limit; four statements that report only the supplied colors and labels; a two-well comparison; one limit.

Well	Color (supplied)	Concentration label (supplied)
Well 1	Dark blue	100 ng/mL
Well 2	Medium blue	10 ng/mL
Well 3	Light blue	1 ng/mL
Well 4	Nearly clear	~0.1 ng/mL

ng/mL means nanograms per milliliter. The ~ means "approximately." In this model only, darker blue goes with a higher concentration.

4

WRITE

Part 3A: three sentences in your own words. (1) The dilution values were calculated from a given number by a rule; no solution was made. (2) The four wells are supplied model labels, not things I observed. (3) Neither page can call a sample positive or negative, because that needs the test's decision rule and control results.

5

WRITE

Part 3B: one sentence naming the first thing you would check before trusting a record like this, and why. Choose: does each step use the row above; does every result have a unit; is the given number labeled illustrative; are labels kept separate from observations; are a decision rule and control results present.

6

TURN IN

Now we turn it in. Put the parts in order 1, 2, 3, with your period, code and the date on page 1. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Medical Interventions (Genetics of Disease), and open the assignment named **Wk5 Lab report: Dilution and ELISA model submission**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

CHUNK 6 OF 7

Test Accuracy

Tuesday, September 22 to Monday, September 28

Every medical test can be wrong in two ways. Five assignments about those two errors and how labs check their tests.

ASSIGNMENT 25 OF 33 Tue, Sep 22 about 50 minutes

Bioethics debate: false results (CER)

Today we need to accomplish deciding whether a clinic should use a fast screen that is sometimes wrong.

Our goal is weighing a false positive against a false negative using only the facts given, then answering the other side.

You have to turn in one record with Parts A, B, and C.

Schoology assignment: Wk5 CER: Bioethics debate, false results

1

READ

First, the scenario and its numbers.

Infection Q (made up for practice). A clinic tries a new rapid screen on 1,000 people. A confirmatory lab test, treated as the best answer, shows 100 people have Infection Q and 900 do not.

What happens next. After a positive screen, the person takes the confirmatory test and stays home about three days until the result comes back. After a negative screen, nothing more happens unless symptoms appear. Infection Q spreads while a person has it, and it is treatable once confirmed. **A screen is never a confirmation.**

	Screen positive	Screen negative	Row total
Has Infection Q	95 true positives (TP)	5 false negatives (FN)	100
Does not have Infection Q	90 false positives (FP)	810 true negatives (TN)	900

2

WRITE

Part A1. In your own words, define the four labels, using Infection Q.

Label	True status	Screen said	In plain words
TP (true positive)	Has it	Positive	Caught correctly
FN (false negative)	Has it	Negative	A missed case
FP (false positive)	Does not have it	Positive	A false alarm
TN (true negative)	Does not have it	Negative	Cleared correctly

3

DO

Part A2. Copy the table. Check each row adds up: $95 + 5 = 100$ and $90 + 810 = 900$.

	Screen positive	Screen negative	Row total
Has Infection Q	95 true positives (TP)	5 false negatives (FN)	100
Does not have Infection Q	90 false positives (FP)	810 true negatives (TN)	900

4

WRITE

Part B1, claim: should the clinic use the screen, and under what condition? **B2, evidence:** at least two numbers from the table, with their labels.

	Screen positive	Screen negative	Row total
Has Infection Q	95 true positives (TP)	5 false negatives (FN)	100
Does not have Infection Q	90 false positives (FP)	810 true negatives (TN)	900

HINT A claim with a condition sounds like "The clinic should use the screen as long as every positive gets the confirmatory test."

5

WRITE

Part B3, reasoning: four to six sentences comparing the harm of a false positive with the harm of a false negative, using only what the scenario says happens next.

Infection Q (made up for practice). A clinic tries a new rapid screen on 1,000 people. A confirmatory lab test, treated as the best answer, shows 100 people have Infection Q and 900 do not.

What happens next. After a positive screen, the person takes the confirmatory test and stays home about three days until the result comes back. After a negative screen, nothing more happens unless symptoms appear. Infection Q spreads while a person has it, and it is treatable once confirmed. **A screen is never a confirmation.**

6

WRITE

Part C1: a partner's strongest opposing point (the point, not their name); alone, write it yourself. **C2:** answer it directly in two to four sentences. **C3:** your claim now, in one line.

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 Medical Interventions (Genetics of Disease), and open the assignment named **Wk5 CER: Bioethics debate, false results**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

ASSIGNMENT 26 OF 33 Wed, Sep 23 about 50 minutes**Wet ELISA data table record**

Today we need to accomplish recording an ELISA strip and checking its controls before trusting anything else.

Our goal is learning that the controls decide whether a run can be read at all.

You have to turn in one record with six tasks, T1 to T6.

Schoology assignment: Wk5 Data table: Wet ELISA lab

1

READ

Write your route at the top. Route W: you ran a classroom kit, so use your own wells. Route P: you use supplied Strip 1 below. A **positive control** (PC) should develop color. A **negative control** (NC) has no antigen and should stay nearly clear.

2

WRITE

T1, before reading any color: what should PC look like at the end, and NC? One sentence: why does a run need both?

HINT Expected is not observed. Write T1 before you look at the colors.

3

DO

T2. Make a six-row table: well, color word, and more, about the same, or less color than NC. Do not call any sample positive or negative.

Well	Contents	Strip 1 color
PC	Positive control	Dark
NC	Negative control	Nearly clear
S1	Sample 1	Dark
S2	Sample 2	Nearly clear
S3	Sample 3	Light
S4	Sample 4	Medium

Strip 1 is a supplied practice record. Hue: blue. Color words, least to most: Nearly clear, Light, Medium, Dark.

4

WRITE

T3. List the steps in order with a wash between each. Then: "The wash removes ____, so a skipped wash would ____."

Step	What is added	What it binds
1	Antigen or sample	The well surface
wash		
2	Primary antibody	The antigen, if present
wash		
3	Enzyme-linked antibody	The antibody layer below
wash		
4	Substrate	The enzyme turns it into color
read		

HINT Each layer binds only the layer before it. A skipped wash leaves loose enzyme-linked antibody that can make color where there is no antigen.

5

WRITE

T4. Did PC develop color? Did NC stay nearly clear? One sentence: can the sample wells be read from this run, and why?

Well	Contents	Strip 1 color
PC	Positive control	Dark
NC	Negative control	Nearly clear
S1	Sample 1	Dark
S2	Sample 2	Nearly clear
S3	Sample 3	Light
S4	Sample 4	Medium

Strip 1 is a supplied practice record. Hue: blue. Color words, least to most: Nearly clear, Light, Medium, Dark.

6

WRITE

T5. Strip 2's negative control is Medium. In two sentences: what that means for reading S1 to S4, and what should happen next with the run.

Well	Contents	Strip 2 color (flagged)
PC	Positive control	Dark
NC	Negative control	Medium
S1	Sample 1	Dark
S2	Sample 2	Medium
S3	Sample 3	Light
S4	Sample 4	Medium

7

WRITE

T6. One sentence naming something this record cannot establish, and what information that would need.

HINT More color than NC is a comparison. A positive call needs the test's decision rule.

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 Medical Interventions (Genetics of Disease), and open the assignment named **Wk5 Data table: Wet ELISA lab**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

ASSIGNMENT 27 OF 33 Thu, Sep 24 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 that separates what the evidence shows from what you believe.

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. Do not know your side? Pick the side you find harder and say so.

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.

3

WRITE

J2. Your three strongest arguments, each with its source: the scenario, your preparation assignment, or a public source you name.

HINT A preference is not evidence. If you cannot name where an argument comes from, it is not ready.

4

WRITE

J3. Reasoning: how your evidence supports the claim. Which error matters more here, a false positive or a false negative, and who carries that harm? One limit of an antibody test in your own words.

Antibody test limits. It reports the immune response, not the germ. Antibodies take days to weeks to appear, so someone infected this week can test negative while spreading NFS. A positive can mark an infection that is already over. No error rate is given, so do not invent one.

5

WRITE

J4. The other side's strongest point, then your direct answer. **J5.** Where you stand now, what moved you, and one condition that would change your mind.

HINT "Nothing would change my mind" earns zero, because it is an assertion, not an argument.

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 Medical Interventions (Genetics of Disease), 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 28 OF 33 Fri, Sep 25 about 45 minutes

Sensitivity and specificity data table

Today we need to accomplish calculating the two numbers that describe how accurate a test is.

Our goal is knowing that sensitivity is about catching true cases and specificity is about clearing people who are not sick.

You have to turn in one data table with Parts A to E. A calculator is allowed.

Schoology assignment: Wk5 Data table: Specificity vs sensitivity

1

WRITE

Part A. Define **sensitivity** (how well a test catches people who have it) and **specificity** (how well it clears people who do not). Copy the formulas: sensitivity = $TP / (TP + FN)$; specificity = $TN / (TN + FP)$.

Label	True status	Screen said	In plain words
TP (true positive)	Has it	Positive	Caught correctly
FN (false negative)	Has it	Negative	A missed case
FP (false positive)	Does not have it	Positive	A false alarm
TN (true negative)	Does not have it	Negative	Cleared correctly

2
DO

Part B. For each row, read the true status first, then the screen result, and label it TP, FN, FP, or TN. Count each label. The four counts must add to 10.

Row	True status (confirmatory test)	Screen result	Your label (TP, FN, FP, TN)
S01	Has Infection Q	Positive	
S02	Does not have Infection Q	Negative	
S03	Has Infection Q	Negative	
S04	Does not have Infection Q	Positive	
S05	Does not have Infection Q	Negative	
S06	Has Infection Q	Positive	
S07	Does not have Infection Q	Negative	
S08	Has Infection Q	Positive	
S09	Does not have Infection Q	Negative	
S10	Does not have Infection Q	Negative	

Label	True status	Screen said	In plain words
TP (true positive)	Has it	Positive	Caught correctly
FN (false negative)	Has it	Negative	A missed case
FP (false positive)	Does not have it	Positive	A false alarm
TN (true negative)	Does not have it	Negative	Cleared correctly

3
DO

Part C. Compute sensitivity and specificity from your Part B counts. Write each as a fraction, a decimal, and a percent.

HINT Sensitivity only uses the people who have Infection Q (S01, S03, S06, S08). Specificity only uses the people who do not.

4
DO

Part D. Compute both rates for 1,000 people from this table. Count all positive screens and how many are true positives. One sentence: why is a positive screen not a confirmation?

	Screen positive	Screen negative	Row total
Has Infection Q	95 true positives (TP)	5 false negatives (FN)	100
Does not have Infection Q	90 false positives (FP)	810 true negatives (TN)	900

5

WRITE

Part E. Two sentences: which error the Infection Q clinic should most avoid and why; and why a classroom ELISA run cannot fill this table by itself.

Infection Q (made up for practice). A clinic tries a new rapid screen on 1,000 people. A confirmatory lab test, treated as the best answer, shows 100 people have Infection Q and 900 do not.

What happens next. After a positive screen, the person takes the confirmatory test and stays home about three days until the result comes back. After a negative screen, nothing more happens unless symptoms appear. Infection Q spreads while a person has it, and it is treatable once confirmed. **A screen is never a confirmation.**

HINT To fill this table you must know each person's true status from a confirmatory test. A classroom run does not have that.

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 Medical Interventions (Genetics of Disease), and open the assignment named **Wk5 Data table: Specificity vs sensitivity**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

ASSIGNMENT 29 OF 33 Mon, Sep 28 about 45 minutes

ELISA lab report

Today we need to accomplish writing a full lab report on an ELISA run.

Our goal is a report where every claim is checked against the controls first.

You have to turn in a photo or sketch of the strip, a data table, a claim, reasoning, a sensitivity and specificity paragraph, and one limitation.

Schoology assignment: Wk6 Lab report: ELISA lab report submission

1

DO

Choose your data. If you ran the class ELISA, use your plate photo and color table. If not, sketch Strip 1 below and write "practice data."

Well	Contents	Strip 1 color
PC	Positive control	Dark
NC	Negative control	Nearly clear
S1	Sample 1	Dark
S2	Sample 2	Nearly clear
S3	Sample 3	Light
S4	Sample 4	Medium

Strip 1 is a supplied practice record. Hue: blue. Color words, least to most: Nearly clear, Light, Medium, Dark.

2

CHECK

Control check first. Did PC develop strong color? Did NC stay nearly clear? If not, the run cannot be read: say so and stop your claim there.

Well	Contents	Strip 1 color
PC	Positive control	Dark
NC	Negative control	Nearly clear
S1	Sample 1	Dark
S2	Sample 2	Nearly clear
S3	Sample 3	Light
S4	Sample 4	Medium

Strip 1 is a supplied practice record. Hue: blue. Color words, least to most: Nearly clear, Light, Medium, Dark.

3

WRITE

Claim: name which samples count as positive using the practice decision rule below (or your kit's rule), and name any borderline sample.

Practice decision rule, for this report only. Use it only if PC is Dark and NC is Nearly clear. Medium or Dark = positive. Nearly clear = negative. Light = borderline, repeat the test.

Well	Contents	Strip 1 color
PC	Positive control	Dark
NC	Negative control	Nearly clear
S1	Sample 1	Dark
S2	Sample 2	Nearly clear
S3	Sample 3	Light
S4	Sample 4	Medium

Strip 1 is a supplied practice record. Hue: blue. Color words, least to most: Nearly clear, Light, Medium, Dark.

4

WRITE

Reasoning: one paragraph explaining why color means binding happened, using your color words and the controls.

5

WRITE

Sensitivity and specificity: explain why your run cannot give a number for either (you do not know each sample's true status), and what the controls do show. **Limitation:** one sentence, such as judging color by eye.

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 Medical Interventions (Genetics of Disease), and open the assignment named **Wk6 Lab report: ELISA lab report submission**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

CHUNK 7 OF 7

Antibiotics

Tuesday, September 29 to Friday, October 2

Antibiotics kill bacteria or stop them from growing. They do nothing against viruses. Overuse helps resistant bacteria survive and spread; the World Health Organization calls antimicrobial resistance a major global public health threat (WHO, Antimicrobial resistance fact sheet, who.int/news-room/fact-sheets/detail/antimicrobial-resistance). Four assignments.

ASSIGNMENT 30 OF 33 Tue, Sep 29 about 35 minutes

Bioethics debate: antibiotic stewardship (CER)

Today we need to accomplish deciding how strictly antibiotic use should be controlled.

Our goal is a specific rule that balances today's patient against future patients.

You have to turn in one CER: a specific rule, evidence, reasoning, and a rebuttal.

Schoology assignment: Wk6 CER: Bioethics debate, antibiotic stewardship

1

READ

First, the scenario.

Scenario. A clinic prescribes an antibiotic to every patient who asks for one, including for colds caused by viruses. Within a few years the same drug fails for the patients who need it most, because overuse helped resistant bacteria survive and multiply.

Stewardship means using antibiotics only when needed, at the right dose, for the right length of time.

2

WRITE

Claim: a specific rule for antibiotic use.

HINT Specific: "Antibiotics only after a test shows a bacterial infection." Not specific: "Use them less."

3

WRITE

Evidence and reasoning: use the scenario and what you know about resistance and patient need.

Scenario. A clinic prescribes an antibiotic to every patient who asks for one, including for colds caused by viruses. Within a few years the same drug fails for the patients who need it most, because overuse helped resistant bacteria survive and multiply.

Stewardship means using antibiotics only when needed, at the right dose, for the right length of time.

4

WRITE

Write a partner's opposing point, or alone, the strongest opposing rule yourself. Then a **rebuttal** that answers it directly.

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 Medical Interventions (Genetics of Disease), and open the assignment named **Wk6 CER: Bioethics debate, antibiotic stewardship**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

ASSIGNMENT 31 OF 33 Wed, Sep 30 about 30 minutes

Disk diffusion and MIC lab: setup record

Today we need to accomplish setting up a disk diffusion plate and predicting what the zones will show.

Our goal is connecting the size of a clear zone to how well a drug stops a germ.

You have to turn in a setup record: a plate map, your plate labels, and a prediction for each disk.

Schoology assignment: Wk6 Data table: Disk diffusion and MIC lab

1

READ

First, four words.

Word	Meaning
Bacterial lawn	Bacteria spread evenly across a plate
Antibiotic disk	A paper disk that leaks drug into the agar around it
Zone of inhibition	The clear ring where bacteria could not grow
MIC	Minimum inhibitory concentration: the lowest amount of a drug that stops visible growth

2

DO

In class: goggles and gloves on. Label the bottom of the plate with your period and code, the date, and where each disk goes. Place disks with clean forceps. Tape the lid shut and incubate lid down. Never open it after it grows.

3

DO

Draw your plate map: a circle showing each disk's position and drug name. No plate? Draw the map for this practice plate.

Disk	Drug	Zone of inhibition (mm)	What the reader saw
1	Drug W	22	Clear circle, sharp edge
2	Drug X	6	Growth right up to the disk edge
3	Drug Y	15	Clear circle, sharp edge
4	Drug Z	11	Clear circle, sharp edge

Practice plate of Practice Organism P (made-up practice data). Each disk is 6 mm across. Zones were measured edge to edge through the center of the disk, disk included.

4

WRITE

For each disk, predict whether it will make a zone and which zone will be widest. One sentence on what a clear zone means.

Word	Meaning
Bacterial lawn	Bacteria spread evenly across a plate
Antibiotic disk	A paper disk that leaks drug into the agar around it
Zone of inhibition	The clear ring where bacteria could not grow
MIC	Minimum inhibitory concentration: the lowest amount of a drug that stops visible growth

5

TURN IN

Now we turn it in. Your zone measurements are not turned in here; they go on the last page of the October 1 debate PDF. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Medical Interventions (Genetics of Disease), and open the assignment named **Wk6 Data table: Disk diffusion and MIC lab**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.

ASSIGNMENT 32 OF 33 Thu, Oct 1 about 50 minutes

John Carroll bioethics debate 2: should we ban antibiotic use in livestock? (with your zone table)

Today we need to accomplish debating an assigned side, then finishing your disk diffusion zone table.

Our goal is arguing from evidence on a real public health question, and reading a plate honestly.

You have to turn in one PDF: your debate worksheet, with your zone table as the last page.

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

Worksheet: (1) the side you argued; (2) your three strongest arguments, each with a reason someone could check; (3) the other side's strongest point and your direct answer; (4) where you stand now and what moved you.

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 Do not know your assigned side? Choose one and write "side chosen by me."

3

DO

Zone table. If you set up a plate, read it through the taped lid (never open it) and measure each zone in millimeters, edge to edge through the center of the disk. No plate? Copy this practice record and write "practice data" at the top.

Disk	Drug	Zone of inhibition (mm)	What the reader saw
1	Drug W	22	Clear circle, sharp edge
2	Drug X	6	Growth right up to the disk edge
3	Drug Y	15	Clear circle, sharp edge
4	Drug Z	11	Clear circle, sharp edge

Practice plate of Practice Organism P (made-up practice data). Each disk is 6 mm across. Zones were measured edge to edge through the center of the disk, disk included.

4

DO

Rank the zones from largest to smallest. The chart has no cutoff for Practice Organism P, so write "no cutoff for this organism."

Disk	Drug	Zone of inhibition (mm)	What the reader saw
1	Drug W	22	Clear circle, sharp edge
2	Drug X	6	Growth right up to the disk edge
3	Drug Y	15	Clear circle, sharp edge
4	Drug Z	11	Clear circle, sharp edge

Practice plate of Practice Organism P (made-up practice data). Each disk is 6 mm across. Zones were measured edge to edge through the center of the disk, disk included.

HINT Rank the zones, not the drugs. Two different drugs cannot be compared by zone size, because disks hold different amounts and drugs spread differently.

5

WRITE

One sentence: for the same drug, a larger zone suggests a lower MIC, because the germ is stopped even far from the disk where the drug is weaker.

6

TURN IN

Now we turn it in. Put the zone table as the last page. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Medical Interventions (Genetics of Disease), 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 33 OF 33 Fri, Oct 2 about 35 minutes

Aseptic technique pre-lab

Today we need to accomplish learning to grow bacteria without contaminating the plate or yourself.

Our goal is a written procedure you can follow at the culturing lab on Monday, October 5.

You have to turn in a numbered procedure, contamination routes, why plates stay closed, safety rules, and a contamination sketch.

Schoology assignment: Wk6 Pre-lab: Aseptic technique

1

READ

Aseptic technique means working so that only the bacteria you intend to grow get onto your plate. Read the steps.

#	Aseptic technique step
1	Tie back hair; goggles and gloves on.
2	Wipe the bench with disinfectant and let it dry.
3	Label the bottom of the plate: period, code, date, organism.
4	Sterilize the loop: heat a metal loop in the flame until it glows red and let it cool a few seconds, or open a new sterile plastic loop.
5	Lift the lid only partway, like a clamshell, and only as long as needed.
6	Streak gently on the agar surface without digging in.
7	Close the lid, tape it, and incubate lid down so drips do not fall on the agar.
8	Re-sterilize or discard the loop.
9	Used plates and loops go in the biohazard container, never the trash.
10	Wipe the bench again and wash your hands.

2

WRITE

List at least four ways a culture could get contaminated.

HINT Think about where stray germs come from: the air, your hands, your breath, unclean tools, the bench top.

3

WRITE

Rewrite the procedure as a numbered list in your own words.

#	Aseptic technique step
1	Tie back hair; goggles and gloves on.
2	Wipe the bench with disinfectant and let it dry.
3	Label the bottom of the plate: period, code, date, organism.
4	Sterilize the loop: heat a metal loop in the flame until it glows red and let it cool a few seconds, or open a new sterile plastic loop.
5	Lift the lid only partway, like a clamshell, and only as long as needed.
6	Streak gently on the agar surface without digging in.
7	Close the lid, tape it, and incubate lid down so drips do not fall on the agar.
8	Re-sterilize or discard the loop.
9	Used plates and loops go in the biohazard container, never the trash.
10	Wipe the bench again and wash your hands.

4

WRITE

Two sentences: why keep the plate open as little as possible? Then two safety rules for cultures and culture waste. Never open a grown plate; never smell a culture.

5

DO

Sketch two plates side by side: a clean plate (growth only along your streak, one kind of colony) and a contaminated plate (stray colonies of other shapes and colors). Label what tells them apart.

6

TURN IN

Now we turn it in. Bring it to the culturing lab on Monday, October 5. Make your work one PDF (in Google Docs: File, Download, PDF Document; on a phone, scan the pages into one PDF). Open Schoology, choose Medical Interventions (Genetics of Disease), and open the assignment named **Wk6 Pre-lab: Aseptic technique**. Select Submit Assignment, attach the PDF, select Submit, and check that it says submitted.