



OHIO CSI FORENSIC DIVISION

UNIT 1 · MEDICAL INVESTIGATION · CASE STATIC

Period 1-2 · Statik Sound, a neighborhood recording studio

FORM NO. CSI-1-D12-S
CASE NO. JH-26-0831-A
REV. 2026-27
PAGE ____ OF ____

FOR EDUCATIONAL USE

OHIO CSI FORENSIC DIVISION

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DAILY EVIDENCE SHEET

Sep 25 · Investigation Day 12 of 18 · The Clock in the Body

OFFICIAL

WEBXAM · DOMAIN 2 BIOTECHNOLOGY RESEARCH AND EXPERIMENTS · OHIO OUTCOMES 5.8 AND 2.1

VOCABULARY IN BOLD IS DEFINED WHERE IT FIRST APPEARS

INVESTIGATOR CODE (PERIOD + CODE, NOT YOUR NAME)	TEAM	DATE
		Sep 25, 2026

WHY TODAY MATTERS, IN PLAIN ENGLISH

SEC 00

Real examiners estimate the time of death from three separate body clocks, how far it has cooled, how stiff it has become, and where the blood has settled, and they trust the window only where the three clocks agree. Today you read those same three clocks and state honestly what they cannot tell you.

Today you will: run the external examination and estimate time of death from three body clocks: cooling, stiffening, and blood settling.

The ten-year idea: Three independent clocks, one window. When independent estimates agree, confidence is earned, not assumed.

ALGOR MORTIS: body cooling after death, roughly on a schedule. Analogy to hold onto: the coffee cup cooling.

RIGOR MORTIS: temporary muscle stiffening after death, comes and goes on a schedule. Analogy to hold onto: a timer you read backward.

LIVOR MORTIS: blood settling to the lowest points after death, fixed after hours. Analogy to hold onto: sediment settling in a bottle.

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

SEC 01

After death, the body changes on schedules, and schedules can be read backward. **ALGOR MORTIS:** the body cools from its normal living temperature (about 37 degrees C, 98.6 degrees F) toward room temperature, roughly 1 to 1.5 degrees C per hour early on (this course's working rule; real examiners use tables that adjust for body size, clothing, and the room). So the math is: (normal 37 minus the measured temperature) divided by the cooling rate

gives roughly how many hours since death. Analogy: the coffee cup; touch it and you know roughly when it was poured. LIMIT: the room writes the schedule too: a warm room, clothing, or body size all bend the curve, so every algor estimate carries its assumptions, starting with that 37 degree normal.

RIGOR MORTIS: muscles stiffen as their chemistry runs down, beginning in small muscles within a few hours, peaking around 12, releasing over the next day. It is a timer you read backward from stiffness distribution. LIMIT: temperature and exertion before death shift it.

LIVOR MORTIS: blood settles to the lowest surfaces, showing as fixed purple discoloration after several hours. Livor tells time AND position: if the settled pattern does not match the found position, the body was moved, and that is a case-changing fact. LIMIT: dark skin tones and pressure points complicate the read.

The method: estimate a window from each clock separately, then intersect the windows. Independent agreement is the day's big idea, the same one that will close the whole case: one clock persuades, three clocks corroborate.

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

PBS-U1-
D12-A1

The reading gives a cooling rate for the body after death. What is it, and what starting temperature does it assume? Copy the first three words of the sentence you used.

PBS-U1-
D12-A2

The reading says lividity tells time AND position. What would a mismatch between the settled pattern and the found position mean?

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

SEC 01A

Three clocks, three windows, one intersection (practice values, not the case)

A practice worksheet: a body measured at 10:00 PM reads 33.0 degrees C in a 20 degree C room, stiffness is present only in the jaw and fingers, and the settled blood fades when pressed.



What to notice: Notice the two thermometers: every cooling estimate needs both numbers, the body's and the room's, and the room's is the one people forget to write down.

1. Step 1. Algor, the drop: normal 37 minus measured 33.0 = 4.0 degrees C dropped. Write the unit every time.
2. Step 2. Algor, the two rates: at 1 degree C per hour, 4.0 divided by 1 = 4.0 hours. At 1.5 degrees C per hour, 4.0 divided by 1.5 = about 2.7 hours. Window: 2.7 to 4.0 hours before 10:00 PM, which is about 6:00 PM to 7:20 PM. Assumption: the person started at 37 and the room stayed at 20.
3. Step 3. Rigor: stiffness in small muscles only means the clock is in its first few hours. Window: under about 4 hours, so after about 6:00 PM. Assumption: normal temperature and no hard exertion before death.
4. Step 4. Livor: blood settled but fades when pressed means not fixed, so under several hours, call it under 8. Window: after about 2:00 PM. Assumption: a light skin tone and no pressure points hiding the pattern. Also check position: the settled blood is on the surfaces that were lowest in the found position, so nothing says moved.
5. Step 5. Intersect: time inside every window. Algor says 6:00 to 7:20 PM, rigor says after 6:00 PM, livor says after 2:00 PM. Overlap: about 6:00 to 7:20 PM. Algor set both ends; the other two agreed and did not narrow it.
6. Step 6. Name the least-trusted clock and why: livor, because 'fades when pressed' is a soft yes-or-no read with a wide schedule. Then the conversion: 33.0 times 1.8 = 59.4, plus 32 = 91.4 degrees F.

Finished product: Practice window: death about 6:00 to 7:20 PM (2.7 to 4.0 hours before the 10:00 PM reading), with the 37 degree start as the load-bearing assumption; rigor and livor agree without narrowing it, and 33.0 degrees C is 91.4 degrees F.

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

IF YOU WERE NOT IN CLASS: THE DATA YOU NEED

SEC 01B

ABSENT OR NEW TO THE CLASS? START HERE

In class, Team E led the external exam demonstration at the scene model and every team worked the time-of-death worksheet values below, one clock per pair, then intersected the windows. The door access log (DOC-6) also landed. All values are simulated and printed on the worksheet.

When and where measured	Body temperature taken at discovery, Monday 7:55 AM, in the studio. Ambient (room) temperature 21 degrees C, steady all weekend, HVAC (the building's heating and cooling system) on.
Algor mortis measurement	Body temperature 21.8 degrees C. That is 0.8 degrees C above the room, so the body has reached room temperature: the cooling clock has run out.
Algor arithmetic with units	37 minus 21.8 = 15.2 degrees C dropped. At 1.5 degrees C per hour: 15.2 divided by 1.5 = about 10.1 hours. At 1 degree C per hour: 15.2 hours. But once a body matches the room it stops cooling, so the honest window is AT LEAST 10 to 15 hours, with no upper limit from this clock. Assumption: a 37 degree start and a steady 21 degree room; the acoustic blanket over the lower body slows cooling and makes the true time longer, not shorter.
Rigor mortis observation	Fully passed: no stiffness anywhere. The worksheet schedule: stiffening begins in small muscles within a few hours, peaks around 12 hours, releases over the next day. Fully passed means roughly 24 to 36 hours or more before the 7:55 AM check. Assumption: normal temperature and no heavy exertion before death, both of which shift the schedule.
Livor mortis observation	Fixed (does not fade when pressed), on the anterior (front) surfaces, which matches the prone (face-down) found position. Fixed livor means several hours or more since death, at least about 8 to 12 on most schedules; this clock gives a floor, not a ceiling. Position reading: the pattern matches the found position, so nothing here says the body was moved.
Intersection a team reached	All three clocks agree only on a floor: death at least about a day before Monday morning discovery, so no later than Sunday morning. None of the three can pin an hour this late, and saying so is the correct finding.
Least-trusted clock a team named (Part B2)	Algor, because the body is within 1 degree of the room (the clock has run out) and the blanket covering part of the body bends the cooling curve. Rigor is a close second: fully passed is a one-word observation with a wide schedule behind it.
Door access log DOC-6 (exhibit a12), for the timeline check	Friday 9:02 PM: Cole fob OUT. Saturday 2:15 PM: Bell fob IN. Sunday 3:00 AM: DOOR HELD alarm, no fob. Monday 7:38 AM: Cole fob IN. Monday 7:40 AM: 911 call placed. No other entries all weekend. The 3:00 AM row is logged as an OPEN QUESTION, not a conclusion.
Extra conversion practice on the case value (item B3 uses 30.5 C, which is 86.9 F)	21.8 degrees C to Fahrenheit: 21.8 times 1.8 = 39.24, plus 32 = 71.2 degrees F (the room, 21 C, is 69.8 F).

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

Fill one row per clock from today's time-of-death worksheet. Each window needs its assumption written down; the final window is only as tight as the assumptions are honest.

WINDOW: the earliest and latest time a clock allows. A single number pretends to a precision no clock has.

INTERSECTION: the overlap of all the windows. Time inside every window is possible; time outside any one window is ruled out by that clock.

CLOCK	MEASUREMENT YOU USED	WINDOW (EARLIEST TO LATEST HOURS SINCE DEATH)	THE ASSUMPTION THAT COULD THROW IT OFF
Algor mortis (cooling)			
Rigor mortis (stiffening)			
Livor mortis (settling)			
Intersection of all three			

PBS-U1-
D12-B1

☐

Windows table complete: three clocks, three windows with units, three assumptions, and the intersection. (Scored on the table.)

PBS-U1-
D12-B2

☐

Which clock do you trust least in this case, and why? Name the specific condition at the scene that weakens it.

PBS-U1-
D12-B3

☐

Practice numbers (not from the case). A body measures 30.5 degrees C in a normal room. Normal living temperature is 37 degrees C. How many degrees has it dropped? At 1 degree per hour, how many hours? At 1.5 degrees per hour? Write the window those two rates give. Then convert 30.5 degrees C to Fahrenheit (multiply by 1.8, add 32).

Write the time-of-death paragraph for the timeline. Include: the three windows in one sentence each with their assumption, the intersection, the least-trusted clock and why, and what the window does to any person of interest whose whereabouts are known for part of it. Stay inside the ceiling: the window constrains, it does not convict.

Claim ceiling. The window is an estimate with stated assumptions, not a fact. It constrains the timeline; it does not convict anyone inside it.

PBS-U1-
D12-C1

☐

Your writing:

PBS-U1-
D12-D1

☐

Use **algor mortis** and **rigor mortis** and **livor mortis** correctly in one or two sentences about today's work. A definition alone does not count; use the words about something real.

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

PBS-U1-
D12-E1

☐

Body temperature 8 degrees C below normal in a normal room. Rough time estimate and its biggest assumption?

PBS-U1-
D12-E2

☐

Livor pattern fixed on the back, body found face down. Meaning?

PBS-U1-
D12-E3



Why intersect three windows instead of trusting the tightest one?

TURN IN

SLIP

Time-of-death worksheet: Three windows with assumptions; Intersection window; Least-trusted clock sentence.

Hand this sheet to Mr. Mendoza before you leave. The notebook pages named on today's pack stay in your Investigative Notebook. Pre-lab gate: Vital Signs simulation at mendozabiomed.org/learn/lab-sim/pbs-vital-signs.

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

REF

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

Ohio Health Science	2.1.14	Describe the difference between pathology and physiology and the conditions typically observed during a disease state.
Ohio Health Science	2.1.15	Explain the pathophysiology changes associated with or resulting from disease or injury for each body system.
Ohio Health Science	5.8.8	Compute measures of central tendency and dispersion to interpret results and draw conclusions.
Ohio Health Science	5.8.9	Describe the relationships between variables using correlations and draw conclusions.
Ohio Health Science	5.2.18	Convert units of measure from English to metric and vice versa.
PLTW PBS framework	ANP-A.2	Understand that interactions between internal and external sources can affect body systems and cell functions.
PLTW PBS framework	EXD-B.3	Perform necessary calculations to analyze experimental data.
PLTW PBS framework	CCP-B.1	Use mathematical computations to interpret data.
Common Core	RST.9-10.7	Translate quantitative or technical information expressed in words into visual form (a table or chart) and translate information expressed visually or mathematically into words.
Common Core	WHST.9-10.1	Write arguments focused on discipline-specific content: precise claims, relevant evidence, and reasoning that connects them.
Common Core	HSS-ID.C.7	Interpret the slope (rate of change) and the intercept of a linear model in the context of the data.
Common Core	HSN-Q.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
NGSS	SEP-5	Using mathematics and computational thinking: use mathematical representations to describe and support explanations and predictions.

How this sheet is used in DDI. Each item carries a code (for example PBS-U1-D12-B2). Mr. Mendoza scores every item 0, 1, or 2 (2 = complete and correct, 1 = partly, 0 = missing or wrong) and records the scores by period and investigator code, never by name. The scores roll up into these skills:

PBS.S.12a	Explain each body clock and the assumption that can throw it off	items A1, A2, E1
PBS.S.12b	Estimate a time window from a rate and state the assumption	items B1, B3
PBS.S.12c	Intersect independent windows and say why agreement earns confidence	items B2, E3, C1
PBS.S.12d	Read a lividity pattern against the found position	items E2, D1

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

