

ALL THREE CLASSES

Study Guide

Everything on next week's exam, in the order we learned it, with what to be able to DO for each idea.

DATE Friday, September 18, 2026	EXAM Next week	COVERS Thursday's circuit and Friday's lecture
SECTIONS 5	FORMAT Know it, do it, likely question	CLASSES All three

YOUR CHARGE TODAY

Every idea below appeared in a mini lab or in Friday's lecture. If you can do the DO line for all of them without your notes, you are ready.

YOU TURN IN

- Nothing to hand in. This one is for you.

Time: Study at home.

SEC 01 Experimental design

WHY THIS MATTERS

Every result you will ever be asked to trust, in any science class or any hospital, rests on whether somebody ran the right control. This is the most transferable idea in the whole unit.

READ THIS

For each line: the left column is what to **know**. The right column is what you must be able to **do** with it. Exam questions are written from the right column.

Know this	Be able to do this
A control group is a run where you already know what should happen.	Given any mini lab from Thursday, name its control and say what a failed control would mean.
The independent variable is what you change on purpose.	Name the independent and dependent variable in the bloodstain control set and the dilution series.
Controlled variables are what you hold the same.	List two things held the same in the dilution series and say why each one matters.

YOU COMPLETE THIS

Which line on this page are you least sure about? Write it, then go back to that mini lab.

WHY THIS MATTERS

Every test that reports a number instead of a yes or no is standing on a dilution series somebody made carefully.

READ THIS

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Know this	Be able to do this
A serial dilution repeats the same dilution, so each step is ten times weaker.	Given a stock and five 1:10 steps, state the concentration at each step.
A standard curve is built from knowns and used to read unknowns.	Explain why you cannot read an unknown without plotting the knowns first.
A detection limit is the weakest thing a test can still find.	Explain what a negative result means BELOW the detection limit. The answer is not 'it is not there'.

YOU COMPLETE THIS

Which line on this page are you least sure about? Write it, then go back to that mini lab.

WHY THIS MATTERS

A laboratory result that cannot be checked by somebody else is an opinion with equipment.

READ THIS

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Know this	Be able to do this
On a gel, short fragments travel further than long ones.	Read a band size off a standard curve, and say why the ladder is printed but the samples are not.
A pattern class narrows a crowd; only minutiae point at one finger.	Given a scene print and five references, say which step eliminates and which step identifies.
A shared band is not a profile.	Given a scene lane sharing one band with two references, write what that can and cannot establish.
The shape of an epidemic curve suggests how exposure happened.	Tell a single shared exposure from person to person spread, and say which feature told you.

YOU COMPLETE THIS

Which line on this page are you least sure about? Write it, then go back to that mini lab.

WHY THIS MATTERS

Your immune system solves, every day, a problem no engineer has solved: recognising something it has never seen before, without damaging you.

READ THIS

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Know this	Be able to do this
A protein's shape comes from its amino acid order, and the shape is the job.	Explain in one sentence why changing the order changes what a protein can bind.
An antibody has two heavy chains, two light chains, a variable region and a constant region.	Draw one from memory and label five parts.
An epitope is the small patch an antibody recognises.	Explain why one germ leads to many different antibodies.
Clonal selection: the invader selects which B cell is copied.	Explain why this means your body does not design an antibody to order.
Plasma cells make antibody now; memory cells make the second response fast.	Explain why a vaccine works using those two cell types.

YOU COMPLETE THIS

Which line on this page are you least sure about? Write it, then go back to that mini lab.

WHY THIS MATTERS

Most people, including many adults, believe a positive test means you have the thing. For a rare condition that is usually false, and understanding why will serve you for the rest of your life.

READ THIS

For each line: the left column is what to **know**. The right column is what you must be able to **do** with it. Exam questions are written from the right column.

Know this	Be able to do this
ELISA: coat, add sample, add detection antibody with an enzyme, add substrate. Wash between each.	Name all four steps in order and say what the wash is for.
More target means more colour, and a standard curve turns colour into concentration.	Explain why a darker well is not automatically a sicker patient.
Sensitivity catches the sick; specificity clears the well.	Say which one a screening test is tuned for, and what it accepts in exchange.
When a condition is rare, most positives are false positives.	Work the arithmetic for a condition affecting 1 in 1,000 and say what follows a positive screen.

YOU COMPLETE THIS

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