

GCSE Biology: required practicals checklist

AQA 8461 specifies 10 required practicals for separate Biology. Written exam questions draw on them: you need to know the method, key variables, controls, safety, and what the results show. Use this sheet to track your readiness and spot gaps.

England

AQA 8461

Separate Biology

A4 · 2 pages

HOW REQUIRED PRACTICALS ARE EXAMINED

Questions do not describe the practical and ask you to replicate it. They ask you to **apply** your knowledge: identify variables, explain a result, spot an error, suggest an improvement, or calculate a value from data. Knowing the method and expected results well lets you handle any question type.

REQUIRED PRACTICALS 1-5: CELLS, TRANSPORT & ENZYMES

PRACTICAL	WHAT YOU MUST KNOW	READY?
1. Microscopy	Preparing a slide; magnification = image size ÷ real size; identify sub-cellular structures. Know: eyepiece × objective = total magnification.	
2. Osmosis	Potato/plant tissue in sucrose solutions of different concentrations; measure % change in mass; plot graph; find isotonic point (where tissue neither gains nor loses mass).	
3. Enzymes	Effect of pH or temperature on enzyme activity (e.g. amylase + starch / lipase + milk); measure rate; explain denaturation at high temperature; lock-and-key model.	
4. Food tests	Iodine → starch (blue-black); Benedict's → reducing sugars (brick-red); Biuret → protein (purple); emulsion test → lipids (milky layer). Know: colour changes and what controls to use.	
5. Photosynthesis	Rate of photosynthesis vs light intensity (count bubbles from pondweed per minute; inverse-square law at Higher). Variables: light intensity, CO ₂ concentration, temperature, leaf area.	

REQUIRED PRACTICALS 6–10: ECOLOGY, HOMEOSTASIS & ASEPTIC TECHNIQUE

PRACTICAL	WHAT YOU MUST KNOW	READY?
6. Reaction time	Ruler-drop test; measure distance → calculate time; identify independent (practice, caffeine), dependent (reaction time) and control variables; validity and reliability.	
7. Field investigations	Quadrat sampling: estimate population = (mean count ÷ quadrat area) × field area. Transect: systematic belt or line. Randomise quadrat positions to avoid bias. Know how to calculate percentage cover.	
8. Transpiration (plant transport)	Potometer: rate of water uptake vs light intensity, temperature, air movement; increases in light/temperature/air movement increase rate. Measure distance bubble moves per unit time.	
9. Decomposition	Effect of temperature on decay (e.g. fresh milk + lipase; vitamin C in fruit juice); measure pH or colour change; faster at warmer temperatures up to enzyme optimum; need micro-organisms / enzymes.	
10. Aseptic technique	Agar plates + antibiotics / antiseptics; streak culture; measure zones of inhibition; sterilise wire loop; work near Bunsen flame; seal plates to prevent contamination. Larger zone = more effective.	

QUICK-FIRE EXAM PRACTICE

Q1 · Sampling / quadrat calculation (3 marks)

A student used 0.25 m² quadrats to estimate daisies in a field (40 m × 25 m). Mean per quadrat = 6. Estimate the total number of daisies in the field.

Q2 · Photosynthesis (2 marks)

Write the word equation for photosynthesis.

Answers: Q1 = 40×25=1000 m²; density = 6÷0.25=24 per m²; total = 24×1000 = 24 000 daisies. Q2 = carbon dioxide + water → (light/chlorophyll) → glucose + oxygen.