Digestion and a model gut membrane

Teacher / technician

YEAR 10 / LESSON 53 / BIOLOGY + SCIENCE (DOUBLE AWARD)

Staff preparation and answer guidance. Keep separate from student sheets. Original learning tasks; no supplied numerical example represents class measurements.

Coverage and delivery

Shared Biology / Double Award: 2.17 and 2.29. Non-living membrane model and digestive enzymes.

Allow about 60 minutes. Follow the student sequence and use the answers to check reasoning.

Requisition • class of 30, working in 15 pairs

Item	Per pair / setup	Class total
Booklets	1 per learner	30
Dialysis bags / vessels	1 each per pair	15 each plus spare tubing
1% starch / 1% glucose	5 cm^3 each per bag	100 cm^3 each including controls
Clean water	30 cm^3 outside each bag	450 cm^3 plus rinsing and control water
Benedict's reagent / test tubes	3 sample tests per pair + shared controls	60 cm^3 reagent; 50 tubes
Iodine / tiles / pipettes	drops per test; separate pipettes	30 cm^3 iodine; 15 tiles; labelled pipette supply
Electric bath / holders / goggles	supervised shared station	bath capacity for batches; holders; 30 goggles

Immediate safety

Wear eye protection and do not taste any solutions. Staff prepare tubing and manage the electric hot-water bath; tubes remain open and point away from people. Use holders for hot tubes. Keep copper-containing Benedict's waste in a labelled collection container and wash hands after the activity.

Preparation and delivery

Read alongside the student method

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1. For 15 pairs prepare 15 leak-tested bags with 5 cm^3 1% starch suspension and 5 cm^3 1% glucose each. Supply 100 cm^3 of each stock including control/spare. Rinse bag exteriors thoroughly and use clean vessels with 30 cm^3 water each.

2. Pilot the membrane batch and 20-minute interval. Keep the water volume, bag surface area and temperature comparable; do not infer molecular size from a failed setup.

3. Benedict's tests use 1 cm^3 sample plus 1 cm^3 reagent in open labelled tubes for three minutes in an approximately 80 °C electric water bath, using the validated school reagent instructions. Pilot detection and adjust the shared protocol if required. Never heat a sealed tube.

4. Per pair test outside water at start and finish and the original mixture; provide shared glucose-positive and water-negative controls. Allow 50 test tubes and 60 cm^3 Benedict's reagent including spare. Keep reagent/sample pipettes separate and collect copper waste.

Close of lesson

- Collect Benedict's-containing liquids in the labelled copper-waste container.
- Dispose of tubing and other reagents as directed; rinse equipment and wash hands.

Check before teaching

Check the cards, reference data and quantities against this requisition. Keep the staff answer guide separate until the checking stage. Supplied numerical practice datasets are labelled examples; they are not class measurements.

Answers and teaching notes

Expected explanations • do not give as experimental observations

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- To remove glucose or starch contamination that could create a misleading outside result.
- Starch.
- Reducing sugars.
- No; glucose was supplied initially and no enzyme was added.
- Starch → maltose by amylase; maltose → glucose by maltase.
- No living epithelium, active transport, villi or circulation; artificial membrane selectivity differs.

References and provenance

Pearson Biology specification

Practical Biology: model gut membrane

Prepared 22 November 2026. Original wording, tables and questions. Sources inform the concepts and technique; the lesson scope and classroom quantities are explicitly described here. No laboratory trial or final school risk approval is claimed.