Red cells and clotting

Student activity • observation and reasoning

YEAR 10 / LESSON 60 / BIOLOGY + SCIENCE (DOUBLE AWARD)

The question

How do red-cell structure and clotting support circulation?

Use the supplied examples, record your reasoning and correct it using evidence.

Equipment

- Student booklet, blood-cell reference diagrams, drawing paper, pencil and ruler

Paper, modelling and written reasoning only. No chemicals or biological samples are handled.

Course coverage: Shared Biology / Double Award: 2.59 and 2.61. Biology-only extension: 2.64B clotting.

Plan, model or apparatus sketch

Draw and label the apparatus or biological model; identify one limitation.

Method and reasoning

Read the whole sequence before starting

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1. Draw a mature human red blood cell in face and side views, showing the biconcave shape.

2. Link shape to surface area and short diffusion distance, and lack of nucleus to space for haemoglobin.

3. Explain reversible oxygen binding to haemoglobin, with loading in lungs and unloading in respiring tissues.

4. Distinguish red cells from platelets and white cells using diagrams.

5. Biology extension: describe how platelet involvement at vessel damage leads to a fibrin mesh that traps cells and reduces blood loss.

6. Biology extension: explain how a clot can limit entry of microorganisms at a wound, while an inappropriate internal clot can obstruct flow.

Cleanup

• Return models and keep the corrected work.

Record your evidence

Blank spaces are for your own work

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Reference and task data

Mature human red cells lack a nucleus and contain haemoglobin. Their flexible biconcave form supports transport through capillaries. Platelets are fragments involved in clotting; the detailed clotting explanation is a Biology-only extension here. No blood handling or intentional injury is used.

Example / trial	Observation / evidence	Explanation / limit
Evidence / comparison		
Explanation		
Limit / correction		

Show your calculations, labelled model or correction here.

Explain and evaluate

Use evidence and show calculation steps where relevant

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1. Why is a biconcave shape useful?

2. Why is haemoglobin important?

3. Do mature human red cells have a nucleus?

4. Is oxygen binding reversible?

5. Biology: what mesh traps blood cells?

6. Biology: give two protective outcomes of clotting.