From filtrate to urine

Student activity • observation and reasoning

YEAR 11 / LESSON 71 / BIOLOGY ONLY

The question

Why does final urine differ from the fluid first filtered?

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

Equipment

• Student booklet, paper models, pencil and ruler

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

Course coverage: Biology only: 2.78B–2.79B. Urine composition and water regulation.

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. Compare the expected contents of blood plasma, glomerular filtrate and urine in a healthy simplified model.

2. Trace water, glucose, urea and ions through filtration and reabsorption using separate arrows.

3. Explain why useful glucose normally returns to blood rather than appearing in final urine.

4. Predict how greater collecting-duct water reabsorption changes urine volume and concentration.

5. Separate the amount of a solute from its concentration: removing water can raise concentration without increasing solute mass.

6. Explain why an educational composition table cannot diagnose an individual; no personal samples are collected.

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

Urine normally contains water, urea and ions. Its composition varies with regulation and conditions. Glucose is normally reabsorbed, and substantial protein or blood cells are not expected in the simple healthy model. Concentration is amount per volume, not total amount.

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. Name three normal urine components.

2. Where is glucose normally reabsorbed?

3. Does less urine necessarily mean less concentrated urine?

4. How can urea concentration rise without more urea?

5. What is ADH's relevant action?

6. Are filtrate and final urine identical?