

Exercise walk-through

13.1

Digestion, transport and health evidence

International Baccalaureate · IB Diploma · Biology · SL

13.1 Digestion, transport and health evidence

Name: _____ Class: _____ Date: _____ **Total: 10 marks**

KEY WORDS digestion • absorption

Objective

Digestion, transport and health evidence. Supported SL concept preparation; original classroom practice, not an official IB paper or assessed learner work.

1 Key knowledge and worked examples

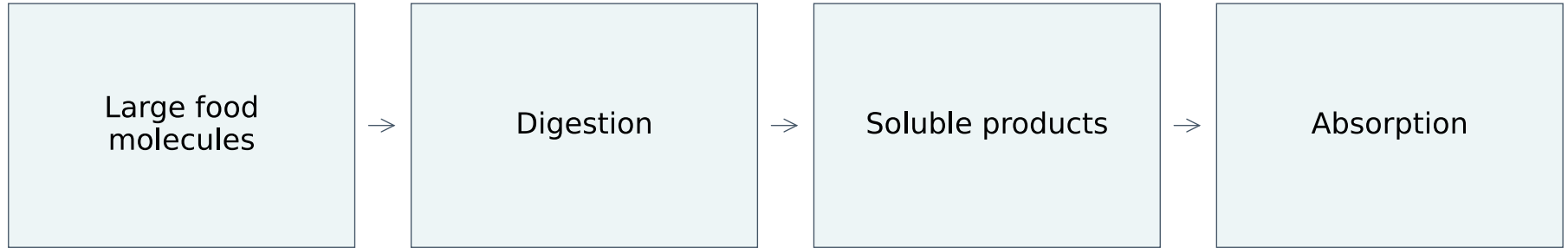
■ What would explain this observation?

- Two foods can have the same mass but provide different nutrients. A health claim must distinguish the nutrient measured from the health outcome inferred.
- Start with a prediction. State the quantities or features you would compare, then decide what evidence could distinguish two explanations.

■ Build the model

- Large insoluble food molecules are digested into smaller soluble molecules. Carbohydrases form sugars, proteases form amino acids, and lipases form fatty acids and glycerol. Bile emulsifies lipids and helps neutralize acidic stomach contents.

- **digestion** : Breakdown of large food molecules; **absorption** : Movement of soluble products into the body.



■ Choose evidence that can test it

- Absorption moves soluble products into blood or lymph. Thin exchange surfaces and a large surface area shorten diffusion paths and increase transfer. Enzyme activity and transport are different processes.
- Use Benedict reagent with controlled heating for reducing sugars, iodine for starch, Biuret reagent for protein, and the ethanol emulsion test for lipids. Keep ethanol away from flames. Use positive and negative controls.

■ Work from known quantities

- State the known values and their units. Choose the relation because its assumptions

fit this case, then rearrange before substitution.

- Known: 6 of 24 study participants report a condition. Proportion = cases / total. Percentage = $6/24 \times 100 = 25\%$. The percentage describes this sample. It does not establish that one food caused the condition; confounders and how the sample was chosen matter.

Example:

9 of 36 participants report an outcome. Calculate the percentage. Use the same sequence: known quantities $\rightarrow$ model $\rightarrow$ relation $\rightarrow$ substitution $\rightarrow$ unit and interpretation.

■ Check the conclusion and its limits

- Bile is not an enzyme. A positive food test identifies a component under the test

conditions; it does not show that a food is healthy or unhealthy in every diet.

- Return to the original observation. Explain what the result supports, which conditions it assumes, and one way to test a competing explanation.

Warn:

A correlation between diet and illness proves causation. This claim is false: Bile is not an enzyme. A positive food test identifies a component under the test conditions; it does not show that a food is healthy or unhealthy in every diet.

Key:

Digestion, transport and health evidence: Absorption moves soluble products into blood or lymph. Thin exchange surfaces and a large surface area shorten diffusion paths and

increase transfer. Enzyme activity and transport are different processes.

Exercises 2.1-2.3

2.1 Which statement about bile is correct? Choose one answer.

- **A** It is a protease
- **B** It emulsifies lipids
- **C** It breaks every nutrient into monomers

[1]

2.2 9 of 36 participants report an outcome. Calculate the percentage. Show the relation, substitution and units.

[2]

2.3 Decide whether this claim is true and justify: A correlation between diet and illness proves causation.

[2]

Exercises 2.1·2.3

2.1 Which statement about bile is correct? Choose one answer.

- **A** It is a protease
- **B** It emulsifies lipids
- **C** It breaks every nutrient into monomers

[1]

2.1 B Absorption moves soluble products into blood or lymph. Thin exchange surfaces and a large surface area shorten diffusion paths and increase transfer. Enzyme activity and transport are different processes.

2.2 9 of 36 participants report an outcome. Calculate the percentage. Show the relation, substitution and units.

[2]

2.2 $\text{percentage} = 9/36 \times 100 = 25\%$.

2.3 Decide whether this claim is true and justify: A correlation between diet and illness proves causation.

[2]

2.3 False. Bile is not an enzyme. A positive food test identifies a component under the test conditions; it does not show that a food is healthy or unhealthy in every diet.

Exercises 2.4·3.1

2.4 Breakdown of large food molecules: write the technical term. [1]

3 Exam-style questions

3.1 Fictional surveys record an outcome in $\frac{9}{36}$ and $\frac{12}{60}$ participants. Compare percentages. Give two reasons why this cannot establish that a food caused the outcome. [4]

Exercises 2.4·3.1

2.4 Breakdown of large food molecules: write the technical term.

[1]

3 Exam-style questions

2.4 digestion. digestion means Breakdown of large food molecules.

3.1 Fictional surveys record an outcome in 9/36 and 12/60 participants. Compare percentages. Give two reasons why this cannot establish that a food caused the outcome.[4]

3.1 25% and 20%. Confounding and selection/reporting bias can explain differences; temporal ordering and comparable measurement also matter. This is evidence evaluation, not dietary advice.