Exercise walk-through

# 16.1 Digestion, transport and health evidence

International Baccalaureate · IB Diploma · Biology · HL

INTERNATIONAL BACCALAUREATE · IB DIPLOMA · BIOLOGY · HL • EXERCISE SHEET

# 16.1 Digestion, transport and health evidence

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

**KEY WORDS** digestion • absorption

## Objective

Digestion, transport and health evidence. Original classroom practice for IB HL; not an official IB paper.

## 1 Key knowledge and worked examples

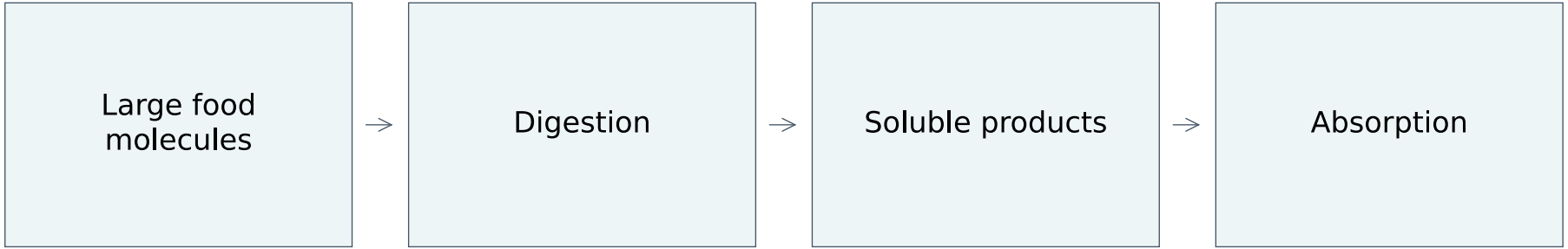
### ■ What would explain this observation?

- Two foods can have the same mass but provide different nutrients. A health claim must distinguish the nutrient measured from the health outcome inferred.

## 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.

**In the lab:** 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.

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## Work from known quantities

- 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.

**Your turn:** 9 of 36 participants report an outcome. Calculate the percentage.

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## ■ 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.

**Not true:** A correlation between diet and illness proves causation. A correlation shows that two measurements vary together; it does not prove one causes the other. A confounding variable, reverse causation or chance could explain the link, so a controlled comparison is needed before claiming causation.

**Key:**

- Large insoluble food molecules are digested into smaller soluble molecules.
- Absorption moves soluble products into blood or lymph.
- Watch for: bile is not an enzyme.

## ■ Write from 15 percent of a sample

- 6 of 40 participants report an outcome.

- Find the percentage. The sample percentage is not proof that one food caused it.

# 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 shows that two measurements vary together; it does not prove one causes the other. [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** Bile is made in the liver and emulsifies lipids: it breaks large fat droplets into smaller ones, increasing the surface area for lipase. Bile is not an enzyme, so it is not a protease, and it digests nothing itself, so it cannot break nutrients into monomers.

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**2.2** 9 of 36 participants report an outcome. Calculate the percentage. Show the relation, substitution and units. [2]

**2.2** percentage=9/36×100=25%.

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**2.3** Decide whether this claim is true and justify: A correlation shows that two measurements vary together; it does not prove one causes the other. [2]

**2.3** True. True. A correlation shows that two measurements vary together; it does not prove one causes the other. A confounding variable, reverse causation or chance could explain the link, so a controlled comparison is needed before claiming causation.

# Exercises 2.4·3.1

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

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**3.1** Fictional surveys record an outcome in9/36 and12/60 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]

**2.4** digestion. digestion means Breakdown of large food molecules.

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**3.1** Fictional surveys record an outcome in9/36 and12/60 participants. Compare percentages. Give two reasons why this cannot establish that a food caused the outcome.[4]

**3.1** 25% and20%. Confounding and selection/reporting bias can explain differences; temporal ordering and comparable measurement also matter. This is evidence evaluation, not dietary advice.