IGCSE BIOLOGY • EXERCISE SHEET

7.3 Physical digestion

Name: _____ Class: _____ Date: _____ **Total: 19 marks**

KEY WORDS teeth 牙齿 • physical digestion 物理消化 • bile 胆汁 • surface area 表面积 • molars 臼齿

Objective

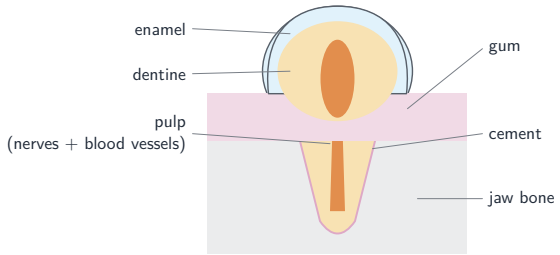
Build the skills to answer exam questions on **physical digestion** 物理消化 — the **teeth** 牙齿, the stomach, and **bile** 胆汁.

You must be able to:

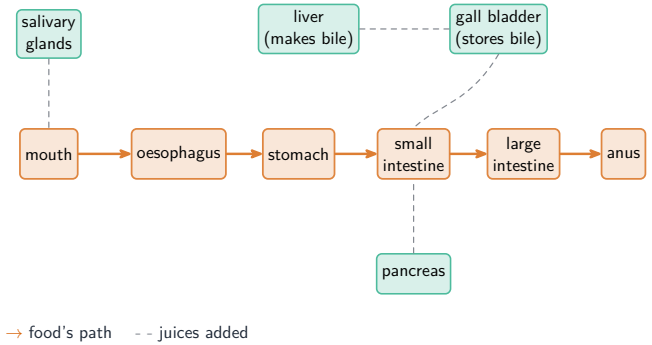
- name the four types of tooth and their jobs
- describe physical digestion (smaller pieces, larger surface area)
- explain how bile emulsifies fats

1 Worked examples

Teeth and bile



Physical digestion breaks food into smaller pieces — a larger surface area for enzymes



Teeth begin mechanical digestion in the gut

- **teeth:** incisors (bite), canines (tear), premolars/molars (chew/grind).
- **bile** (from liver, stored in gall bladder) emulsifies fats → larger surface area for lipase. Bile has no enzymes.

2 Practice

2.1 Name the type of tooth used for biting and cutting. [1]

2.2 State why physical digestion is useful for later (enzyme) digestion. [1]

3 Exam-style questions

3.1 Bile emulsifies fats, which means it: [1]

- **A** digests fat into fatty acids
- **B** breaks large fat drops into small droplets
- **C** neutralises acid
- **D** absorbs fat

3.2 Bile is made in the liver.

(a) State where bile is stored. [1]

(b) Explain why emulsifying fat speeds up its digestion. [2]

3.3 State the job of the molars and premolars. [1]

3.4 Physical digestion happens in the mouth, the stomach and the small intestine.

(a) Name the four types of tooth and state the job of each. [4]

(b) Explain what physical digestion is, and why it is needed before chemical digestion can work well. [3]

(c) Bile is made in the liver and stored in the gall bladder. Describe its **two** jobs in the small intestine. [3]

(d) The stomach churns food, and stomach acid helps break down protein. Explain which of these is physical digestion and which is not. [2]

Solutions

2.1 incisors.

2.2 it makes the pieces smaller, giving a larger surface area for enzymes to act on.

3.1 B. Emulsifying breaks large fat drops into many small droplets.

3.2 (a) the gall bladder.
(b) small droplets give a much larger surface area; so lipase can digest the fat faster.

3.3 chewing and grinding food.

3.4 (a) **Incisors** — chisel-shaped, for biting and cutting. **Canines** — pointed, for tearing. **Premolars** — for grinding and chewing. **Molars** — broad and ridged, for grinding food to a paste.
(b) Physical digestion breaks food into smaller **pieces** without changing the molecules themselves; it greatly increases the surface area of the food; enzymes can then act on far more of it at once, so chemical digestion is much faster.
(c) Bile is alkaline, so it **neutralises** the acid arriving from the stomach and gives the intestinal enzymes the pH they work best at. It also **emulsifies** fat — breaking large drops into many tiny ones, which raises the surface area for lipase to act on.
(d) The churning is physical digestion — it breaks the food into smaller pieces but the molecules are unchanged. The acid helping break down protein is **chemical** digestion, because the protein molecules themselves are broken into smaller ones.