

7.4 Digestion

Digestion is the breakdown of large, insoluble food molecules into small, water-soluble food molecules so that they can be absorbed into the bloodstream. The large food molecules are starch, proteins and fats. Digestion occurs mechanically and chemically. This happens in the alimentary canal (esophagus, stomach, small and large intestines), or gut, which together with the liver and pancreas form your digestive system.

Mechanical digestion is the breakdown of large pieces of food into smaller pieces of food without changing the food molecules. This starts in the mouth where chewing breaks down food into smaller pieces that can be swallowed. Muscular contractions of the stomach continue this process. In the small intestine large globules of fat are broken into smaller globules by emulsification by bile.

→ Highlight the definition of mechanical digestion.

→ From the paragraph above about mechanical digestion, draw 3 pictures representing the 3 locations of mechanical digestion. *Use the diagram of the digestive system provided to help you draw diagrams.*

1. Location of digestion: _____

2. Location of digestion: _____

3. Location of digestion: _____

Chemical digestion is the breakdown of the large food molecules into smaller molecules by the action of **enzymes**. This occurs in the mouth, stomach and small intestine. Mechanical digestion gives a larger surface area for the enzymes to work on.

Chemical digestion

Before the body can use food that has been eaten, the food must be broken down into smaller molecules.

When the food has been digested, it is **absorbed** through the wall of the small intestine into the blood. Before the food molecules can go through the gut wall they must be dissolved. Large food molecules are insoluble; they will not dissolve therefore cannot get through the wall of the small intestine. On the other hand, small food molecules are soluble. They will dissolve so they can get through the wall of the small intestine and enter the blood and the lymph, which is another body fluid that absorbs and transports fat.

There are three main types of enzyme in your alimentary canal:

- a **protein** molecule is made up of many different amino acids → **protease** enzymes break down protein molecules into → amino acids
- a **starch** molecule is made up of many glucose molecules → **amylase** enzymes break down carbohydrate molecules into → glucose (simple sugars)
- a **fat** molecule is made up from fatty acid and glycerol molecules → **lipase** enzymes break down fat molecules into → fatty acids and glycerol

→ Highlight the definition of chemical digestion.

→ Highlight **and underline** the *purpose* of chemical digestion.

→ List the 3 locations where chemical digestion occurs.

- 1.
- 2.
- 3.

→ State what is necessary for chemical digestion to occur: _____.

Chewing and swallowing

Ingestion is the taking of food and drink into the body through the mouth. When food enters the mouth, the incisor teeth and canine teeth bite it into chunks. The premolar and molar teeth grind these chunks of food into much smaller pieces. It is important to chew your food well as this makes digestion easier. The tongue mixes the food with **saliva** and the moistened food is chewed by the teeth. The food is then rolled into a ball or **bolus**.

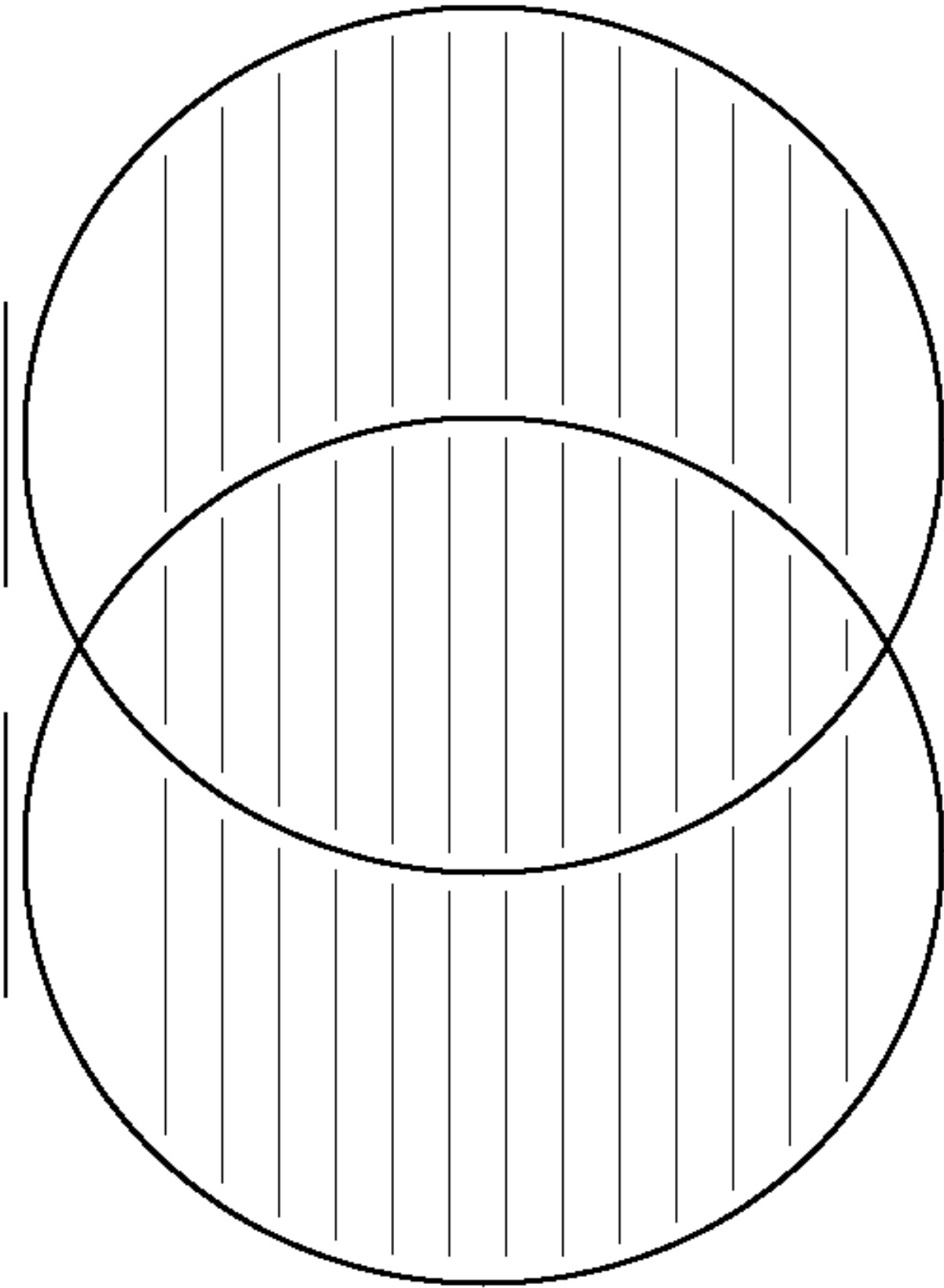
The **salivary glands** make saliva, which contains:

- **mucus**, which is a slimy substance that lubricates the passage of the food bolus down the throat
- **amylase**, which is the enzyme that catalyses the breakdown of starch to simple sugars

→ Draw pictures in the boxes below to represent the steps in chewing and swallowing food (mechanical digestion)

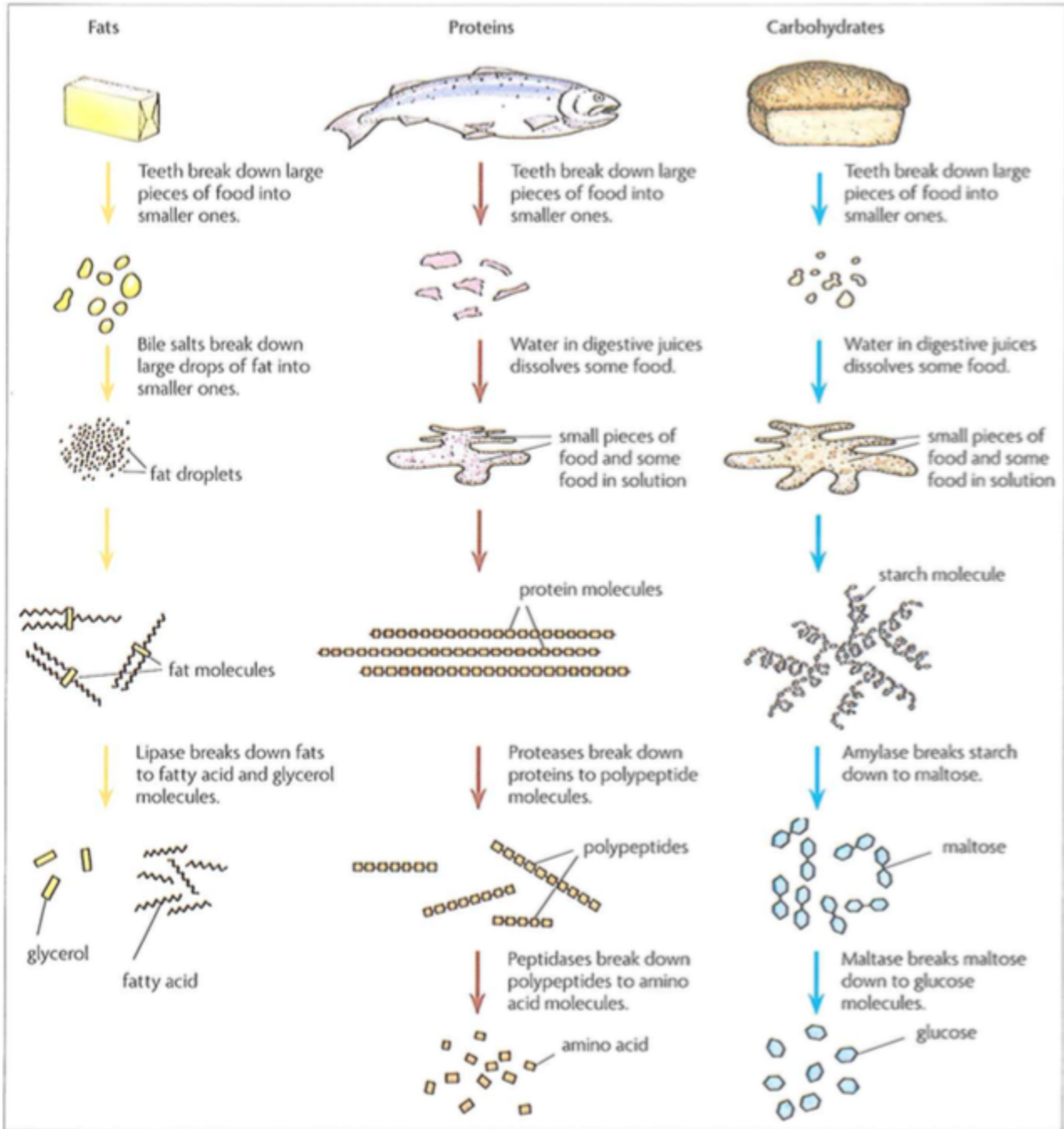
Incisor & canine teeth bite food into chunks	Pre/molar teeth grind chunks of food into smaller pieces	Tongue mixes food with saliva and food is chewed more	Food is rolled into a bolus by the tongue and swallowed

Directions: compare and contrast mechanical and chemical digestion; use the reading above to help you complete the venn diagram.



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Figure 7.11 Digestion
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The Human Digestive System

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