# *The digestive system* **Teacher background notes**

**In this investigation, the role of the digestive system is investigated in the context of modelling the human digestive system.**

## [Australian Curriculum: Science links](https://assist.asta.edu.au/resource/3940/digestive-system-cle-year-8)

## Learning intentions

Students will be able to:

* describe the role of the digestive system;
* identify the organs in the human digestive system and describe their function;
* explain the difference between mechanical and chemical digestion and identify where each occurs in the digestive system;
* describe the role of enzymes in the breakdown of food in the digestive system;
* identify the question for investigation;
* make predictions based on scientific knowledge;
* identify variables to be changed, measured and controlled in an investigation;
* record and represent observations and data;
* identify patterns and trends from observations and data;
* use patterns and trends observed to draw a conclusion;
* explain how modifications to their investigation could improve the quality of their data.

## Suggested time for this CLE

The time need to complete *The* *Digestive system CLE* will depend on the depth of the prior knowledge of students, the time to perform the four investigations and follow up with any further extension activities. Allow 8–12 hours.

## Prior conceptual knowledge

Science / Year 8 / Science Understanding / Chemical sciences

Content description

*Chemical change involves substances reacting to form new substances* [*(ACSSU225)*](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSSU225)

Science / Year 8 / Science Understanding / Biological sciences

Content description

*Cells are the basic units of living things; they have specialised structures and functions* [*(ACSSU149)*](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSSU149)

## New concepts to be introduced

In this CLE, students will be introduced to the structures of the human digestive system and their functions.

The processes that occur in the digestive system are:

1. ingestion (eating);
2. digestion (mechanical and chemical);
3. absorption;
4. egestion (elimination).

The role of the digestive system is to ingest food and break it down into small enough particles to enable it to pass into the blood stream. The blood then transports these particles (nutrients) to the body's cells. The absorption of nutrients out of the small intestine into the blood occurs on the basis of particle size. Only particles small enough to fit through the walls of the small intestine (a semipermeable membrane) will move into the blood.

There are two types of digestion that occur in the digestive system—mechanical and chemical. Chemical digestion occurs with the assistance of enzymes. Digestive enzymes speed up the breakdown of food into smaller molecules and are specific to that particular food type (substrate). Enzymes are catalysts and so are not use up in the reaction.

Links to information about the digestive system and enzymes can be found at the end of this document.

#### A summary of the structure and function of the digestive system.

|  |  |  |
| --- | --- | --- |
| Structure | Function | Enzyme |
| Mouth | Mechanical (chewing) and chemical digestion | Amylase  carbohydrate 🡪 simple sugar  (starch) (glucose) |
| Oesophagus | Transport food from mouth to stomach |  |
| Stomach | Mechanical (churning) and chemical digestion | Protease (pepsin)  protein 🡪 amino acids |
| Small intestine | Chemical digestion and absorption of nutrients (simple sugars, amino acids, fatty acid and glycerol) | Amylase  carbohydrate 🡪 simple sugar  (starch) (glucose)  Protease (pepsin)  protein 🡪 amino acids  Lipase  fat 🡪 fatty acid + glycerol |
| Large intestine | Absorption of water |  |
| Rectum | Egestion—stores undigested food |  |
| Anus | Place where undigested food passes out of the body |  |

Absorption of most nutrients out of the small intestine into the blood occurs by diffusion (passive). Some substances that are very important for the body are also transported out of the gut through active processes. Year 8 students don’t need to learn about these processes.

Water absorption occurs in the large intestine by osmosis.

Links to information about diffusion and osmosis can be found at the end of this document.

## Possible misconceptions

|  |  |
| --- | --- |
| **STUDENTS MAY THINK…** | **INSTEAD OF THINKING…** |
| Acid in the stomach breaks down food. | The acid in the stomach activates the enzyme pepsin and sterilises food. Chewing food stimulates acid release in the stomach, which in turn activates pepsin. This process helps prevent auto digestion of the stomach, which is also made of protein. |
| Enzymes breakdown food. | Enzymes are organic catalysts that speed up reactions in the body. They are not used up in the reaction. The reactions would take place eventually anyway. |

## Links to further information

‘What is the digestive system?’, BBC KS2 *Bitesize* website, <https://www.bbc.co.uk/bitesize/topics/zcyycdm/articles/z8bntrd> Information about digestion and the digestive system aimed at lower secondary students.

‘The effects of diet, exercise and drugs on the body’, BBC KS3 *Bitesize* website <https://www.bbc.co.uk/bitesize/topics/zcyycdm/articles/zk784xs> Information about digestion and the digestive system aimed at lower secondary students.

‘Structure of the digestive system’, BBC KS3 *Bitesize* website, <https://www.bbc.co.uk/bitesize/topics/zf339j6/articles/zv8m7yc> This information is aimed at senior secondary students.

‘Digestive enzymes and absorption’, BBC KS3 *Bitesize* website, <https://www.bbc.co.uk/bitesize/topics/zf339j6/articles/zs9dkty> This information is aimed at senior secondary students.

‘The role of diffusion in and within cells’, BBC KS3 *Bitesize* website, <https://www.bbc.co.uk/bitesize/topics/znyycdm/articles/z8cqqfr>