

Summary Revision of Cells

- Cells are the basic structural and functional units of all living organisms.
- Cells are microscopic and can only be seen under a microscope.
- Plant and animal cells have cell membranes, cytoplasm, a nucleus and organelles such as mitochondria and sometimes vacuoles.
- The cell membrane encloses the contents of the cell and separates it from its environment.
- Cell membranes are selectively permeable, which means they only allow certain substances to pass into and out of the cell.
- The cytoplasm includes the organelles and the cytosol. The cytosol is the jelly-like medium in which many chemical reactions take place in the cell. Everything inside the cell membrane, except the nucleus, is considered the cytoplasm.
- The nucleus in eukaryotic cells is enclosed by a nuclear membrane and contains the DNA.
- DNA contains inherited characteristics of an organism and controls the cell's activities. It is unique to each organism, resulting in variation within a species.
- Mitochondria are responsible for cellular respiration, which is the release of energy from food.
- Plant cells have a cell wall around the cell membrane that is rigid and provides support and protection of the cell's content.
- Plants have chloroplasts with the pigment chlorophyll to photosynthesise and produce glucose.
- Plant cells also have large vacuoles to store water and glucose, and to provide support for the plant.
- Vacuoles in animal cells are temporary (or absent) and much smaller.
- Cells come in many different shapes and sizes.
- Stem cells are cells that have the ability to divide and develop into many different cell types.
- Microscopic organisms can only be seen under a microscope. All single-celled organisms, such as bacteria, are microscopic. However, some multicellular organisms such as dust mites are also too small to see with the naked eye.
- Macroscopic organisms consist of many cells and can be seen with the naked eye.
- Specialised cells perform special functions. Specialised cells that work together to perform a specific function form a tissue.
- A group of different tissues makes up an organ.
- Organs working together in groups form systems or organ systems.
- Organ systems make up an organism, such as a human.

Concept map

This year in Natural Sciences, we are going to learn more about how to make our own concept maps.

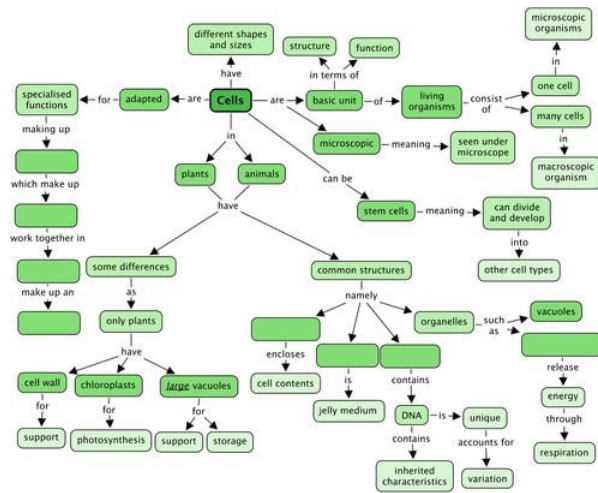
In the summary, we first have the "Key concepts" for this chapter. This is a written summary and the information from this chapter is summarised using words. We can also create a concept map of this chapter which is a map of how all the concepts (ideas and topics) in this chapter fit together and are linked to each other. A concept map gives us a more visual way of summarising information.

Different people like to learn and study in different ways; some people like to make written summaries, whilst others like to draw their own concept maps when studying and learning. These are useful skills to have, especially for later in high school and after school!

Have a look at the concept map which shows what we have learned about the cell in this chapter and how these concepts link together. Can you see how the arrows show the direction in which you must "read" the concept map?

There are some empty spaces in the concept map that you need to fill in. For example, some of the common structures in cells have been left out. You need to look at the concepts linking from these bubbles to work out which structure goes where. For example, what structure in a cell encloses the cell contents? Write the answer in the correct space. On the left hand side of the concept map there

are also empty spaces - can you see that this describes the hierarchy of how cells are organised into tissues, which are organised into organs, and so on? Fill in each level of organisation into the spaces.



Revision Questions

Why would you say cells are considered to be the smallest unit of life? [2 marks]

Explain what **selectively permeable** means when referring to the cell membrane. [1 mark]

Eukaryotic and prokaryotic cells differ. What is the main difference between these two types of cells? [2 marks]

What is the main function of the nucleus and what is the function of the DNA? [2 marks]

When a Gr. 9 learner labelled one of the cell organelles 'Powerhouse', their teacher marked it wrong. What should the learner rather have written? [1 mark]

A plant and an animal cell are similar in some ways yet very different in others. Compare the two types of cells in a paragraph. [10 marks]

Make two drawings to show the differences between plant and animal cells using the examples of plant and animal cells you studied under the microscope. Follow the drawing guidelines for making scientific drawings. [10 marks]

There are different types of specialised cells and tissues in plants and animals that perform different functions. Match each function to the corresponding tissue. [3 marks]

Smooth muscle tissue	receives and sends messages and helps the body respond to stimuli
Nerve cell	carry oxygen around the body in mammals
Red blood cells	contracts and enables movement

Use words from this box to complete the sentences below. Write the sentences out in full. [4 marks]

- organs
- tissues
- organ systems
- specialised cells

Macroscopic organisms consist of many different _____ that are made of individual _____ that work together in a very particular way. These are formed from _____ that are in turned created when groups of _____ function together in a specific way.

