



NAME:

CLASS:

Year 11 Preliminary Biology

Module 1: Cells as the Basis of Life

Workbook 1

Contextual Outline

Cells are the basis of life. They coordinate activities to form colonial and multicellular organisms. Students examine the structure and function of organisms at both the cellular and tissue levels in order to describe how they facilitate the efficient provision and removal of materials to and from all cells in organisms. They are introduced to and investigate biochemical processes through the application of the Working Scientifically skills processes.

Students are introduced to the study of microbiology and the tools that scientists use in this field. These tools will be used throughout the course to assist in making predictions and solving problems of a multidisciplinary nature.

Course Outline

1. Cell Structure
2. Cell Function

Coaching in:	SCIENCE PHYSICS & CHEMISTRY BIOLOGY	Years 7 – 10 Years 11 – 12 Years 11 – 12
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MODULE 1: CELLS AS THE BASIS OF LIFE

Topic 1: Cell Structure

Inquiry question: What distinguishes one cell from another?

- Investigate different cellular structures, including but not limited to:
 - Examining a variety of prokaryotic and eukaryotic cells
 - Describe a range of technologies that are used to determine a cell's structure and function
- Investigate a variety of prokaryotic and eukaryotic cell structures, including but not limited to:
 - Drawing scaled diagrams of a variety of cells
 - Comparing and contrasting different cell organelles and arrangements
 - Modelling the structure and function of the fluid mosaic model of the cell membrane

Topic 2: Cell Function

Inquiry question: How do cells coordinate activities within their internal environment and the external environment?

- Investigate the way in which materials can move into and out of cells, including but not limited to:
 - Conducting a practical investigation modelling diffusion and osmosis
 - Examining the roles of active transport, endocytosis and exocytosis
 - Relating the exchange of materials across membranes to the surface-area-to-volume ratio, concentration gradients and characteristics of the materials being exchanged
- Investigate cell requirements, including but not limited to:
 - Suitable forms of energy, including light energy and chemical energy in complex molecules
 - Matter, including gases, simple nutrients and ions
 - Removal of wastes
- Investigate the biochemical processes of photosynthesis, cell respiration and the removal of cellular products and wastes in eukaryotic cells
- Conduct a practical investigation to model the action of enzymes in cells
- Investigate the effects of the environment on enzyme activity through the collection of primary or secondary data

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TOPIC 1: CELL STRUCTURE

What distinguishes one cell from another?

CELL STRUCTURE

- Investigate a variety of prokaryotic and eukaryotic cell structures, including but not limited to:
 - **Drawing scaled diagrams of a variety of cells**
 - Comparing and contrasting different cell organelles and arrangements
 - Modelling the structure and function of the fluid mosaic model of the cell membrane

Cells

- The cell theory has three tenets:

- Some organisms are **unicellular**, and some are **multicellular**.

Unicellular	
Multicellular	

- A eukaryote is defined as:

- Eukaryotes are divided into four kingdoms of life:

- A prokaryote is defined as:

- There are two kingdoms of prokaryotes:

Converting Measurements

- Cells are small so we need to use units of measurement that are small enough to measure microscopic organisms.

Practice Questions

1. Convert the following measurements to micrometers:

a. 10cm

b. 3mm

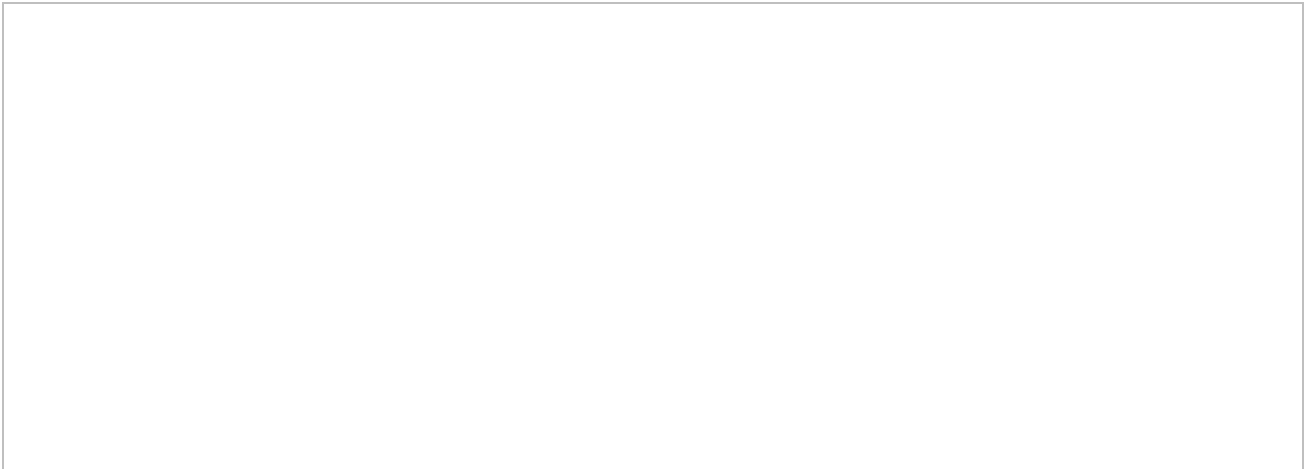
c. 5m

Drawing Scaled Diagrams

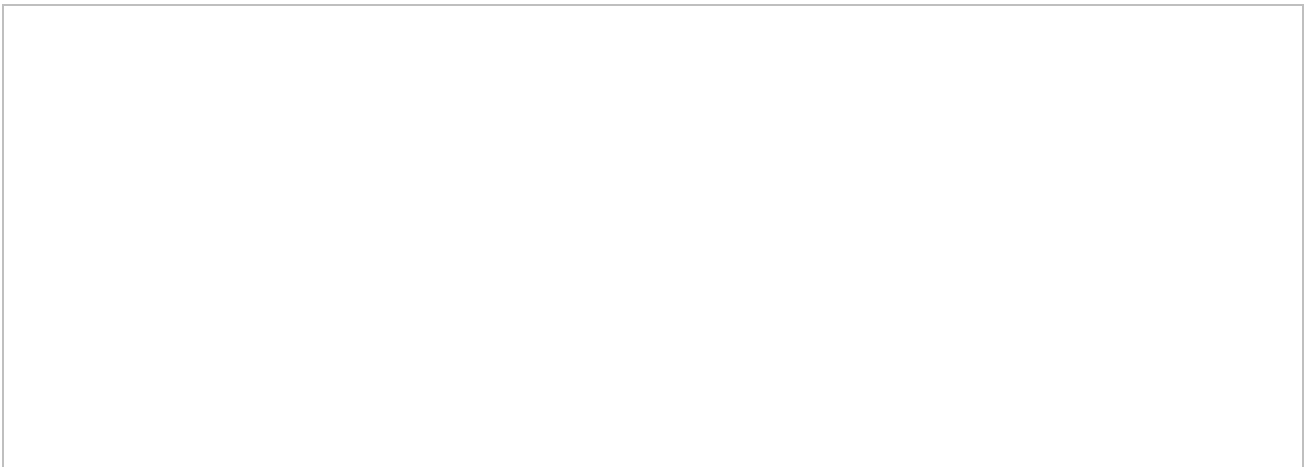
Steps to drawing a scaled diagram:

Practice Questions

1. A lung cell has a diameter of $45\mu\text{m}$. Its nucleus has a diameter of $18\mu\text{m}$. Draw a scaled diagram of the lung cell in the space below. (3 marks)



2. A red blood cell has a diameter of $48\mu\text{m}$. Draw an 8cm scaled diagram of the red blood cell in the space below. (3 marks)



3. What is one difference between prokaryotic and eukaryotic cells?
 - (A) Nucleic acids are only found in prokaryotes.
 - (B) Mitochondria are found in larger quantities in prokaryotes.
 - (C) The golgi apparatus is only found in prokaryotes.
 - (D) Prokaryotes do not contain a nuclear membrane.