

SUBJECT:

UNIT: While you were away



Lesson 1: Animal Cells

What is the function of the mitochondria in animal cells?

Which organelle controls the activities of an animal cell?

Lesson 2: Plant Cells

What three organelles are found in plant cells but not in animal cells?

What is the function of the chloroplast in a plant cell?

Lesson 3: Comparing Cells

How are animal and plant cells similar and different?

Which organelles are shared between plant and animal cells?

Lesson 4: Eukaryotic Cells and Prokaryotic Cells

What is the main structural difference between prokaryotic and eukaryotic cells?

Give one example each of a prokaryotic and a eukaryotic cell.

Lesson 5: RP Microscopes

What are the steps to correctly set up a light microscope?

Why might a scientist choose an electron microscope over a light microscope?

Lesson 6: Magnification and Resolution

What is the formula for calculating magnification?

Why do electron microscopes provide better resolution than light microscopes?

Lesson 7: Diffusion

What is diffusion and in which direction do substances move?

Where in the human body does diffusion of gases occur?

Lesson 8: Examples of Diffusion

How does diffusion occur in the alveoli of the lungs?

What role does diffusion play in the small intestine?

Lesson 10: Aerobic Respiration

What is the word equation for aerobic respiration?

Why is aerobic respiration considered an exothermic reaction?

Lesson 11: Anaerobic Respiration

What is produced during anaerobic respiration in humans?

Why does anaerobic respiration release less energy than aerobic respiration?

Lesson 12: Comparing Aerobic and Anaerobic Respiration

What are the key differences in the products of aerobic and anaerobic respiration?

In what situations might the body use anaerobic respiration instead of aerobic?

Lesson 13-15: Osmosis Practical

What is osmosis and how does it differ from diffusion?

In which part of a plant does osmosis commonly occur?

Lesson 16: Active Transport

What is required for active transport to occur?

Where in plants does active transport take place?

Lesson 17: Principles of Organisation

What is the correct order of biological organisation from cells to organisms?

What is a tissue and how is it different from an organ?

Lesson 18: Human Digestive System

What is the main function of the digestive system?

How do enzymes help in the digestive process?

Lesson 19: Communicable Diseases

What are three ways pathogens can be spread?

Name two methods to prevent the spread of communicable diseases.

Lesson 20: Viral Diseases

How is HIV transmitted and what does it do to the immune system?

What are the symptoms of measles and how is it spread?

Lesson 21: Bacterial Diseases

What are the symptoms of salmonella and how can it be prevented?

How is gonorrhoea transmitted and treated?

Lesson 22: Fungal Diseases

Name a common example of a fungal disease in humans?

How can fungal infections be treated?

Lesson 23: Protist Diseases

What is a common disease caused by protists?

How are protist diseases typically transmitted?

SUBJECT: Science

UNIT: Fundamentals: The Body



Cells

Cells are the building blocks of living organisms. There are lots of different types of cells and the two main types of cells are prokaryotic and eukaryotic cells.

Ambitious Vocabulary

Organelle
Mitochondria
Osmosis

Exchanging Substances Diffusion

Substances move from an area of high concentration to an area of low concentration (down a concentration gradient). Occurs in the alveoli in the lungs diffusing oxygen into the blood and carbon dioxide out of the blood. This exchange also occurs in plant leaves. Also occurs in the villi in the small intestine diffusing food molecules into the bloodstream.

Osmosis

The movement of water from a high concentration to a low concentration. Occurs in the root hair cells of plants.

Active Transport

The movement of mineral ions from an area of low concentration to an area of high concentration. Requires energy. Occurs in the root hair cells of plants.

Prokaryotic and Eukaryotic Cells

Prokaryotic – older, simpler cells. Do not have a nucleus or any membrane bound organelles. Often have flagella for movement. Examples: bacterial cells.

Eukaryotic – newer, more complex cells. Have a nucleus and membrane bound organelles. Examples: animal and plant cells.

Animal and Plant Cells

Animal and plant cells are both eukaryotic and have some organelles that are the same however plant cells have three organelles that are different.

Sub-Cellular Structures

Nucleus – controls the cell, contains DNA

Mitochondria – where respiration occurs

Chloroplasts – where photosynthesis occurs

Cell wall – supports the cell

Cell membrane – lets things in and out of the cell

Cytoplasm – where chemical reactions occur

Vacuole – contains cell sap

Microscopes

There are two main types of microscopes: light microscopes and electron microscopes. Light microscopes are cheaper but their magnification and resolution are not as high. Electron microscopes are more expensive and their magnification and resolution are much higher. To set up a microscope; place the slide onto the stage and secure with the clips. Put the lowest objective lens over the slide and look through the eyepiece. Adjust the coarse focus and then the fine focus to bring the image into focus.

$$\text{magnification} = \frac{\text{image size}}{\text{real size}}$$

Principles of Organisation

Cells are the basic building blocks of all living things. A group of cells with a similar structure and function is called a tissue. An organ is a combination of tissues carrying out a specific function. Organs work together in an organ system. Organ systems work together to form whole organisms.

Digestive system

The purpose of the digestive system is to break down large molecules into smaller soluble molecules so that they can be absorbed into the blood. The rate of these reactions is increased by enzymes which are biological catalysts.

Preventing the spread of disease

Ways to reduce the spread of diseases include; being hygienic, destroying vectors, isolation, and vaccination.

How pathogens are spread

Pathogens can be spread by:

Water – drinking dirty water

Air – breathed in

Direct contact – touching contaminated surfaces including the skin

Viral Diseases

Measles is spread by droplets of liquid from sneezes and coughs. Symptoms include a red rash on the skin and a fever. Measles can be fatal.

HIV is spread by sexual contact or exchanging body fluids. HIV can be controlled by antiviral drugs which stop the virus replicating. The virus attacks cells in the immune system. If the immune system is badly damaged the body cannot cope with other infections. This is the late stage and is called AIDS.

Tobacco mosaic virus affects plants. Parts of the leaves become discoloured which means that the plant cannot carry out photosynthesis and therefore cannot grow.

Respiration

Respiration is the chemical reaction which occurs inside the mitochondria in all living cells to release energy for living function and processes. The reaction is exothermic meaning that energy is released to the surroundings. Aerobic respiration:

Glucose + oxygen → carbon dioxide + water

In anaerobic respiration the glucose is not completely oxidised as there is not enough oxygen so less energy is released:

Glucose → lactic acid

In plants and yeast, anaerobic respiration is called fermentation and is used in bread making and beer brewing:

Glucose → ethanol + carbon dioxide

Bacterial Diseases

Salmonella bacteria causes food poisoning. Symptoms include fever, stomach cramps, vomiting, and diarrhoea. Wash hands and avoid contaminated food.

Gonorrhoea is a sexually transmitted disease passed on by sexual contact. Symptoms include pain when urinating and thick yellow/green discharge from the vagina or penis. To prevent the spread people should be treated with antibiotics and use a condom.