

# Cells and Systems

Grade 8 Science: from the basic unit of life to whole-body systems



# Learning Intentions and Success Criteria

- I can describe the cell as the basic unit of life.
- I can distinguish between plant and animal cells.
- I can explain diffusion and osmosis in general terms as movement of gases and liquids into and out of cells.
- I can apply the concept of system to describe how organisms are structured and function.
- I can describe how body systems keep humans healthy and respond to stimuli.

# Plant Cells vs. Animal Cells

## Plant Cells

Plant cells have a cell wall in addition to a cell membrane, giving them rigid structure. They also contain chloroplasts, involved in energy capture, and typically a large vacuole for storage.

## Animal Cells

Animal cells have a cell membrane but no cell wall, allowing more flexible shapes. Structures such as the nucleus, mitochondrion, and endoplasmic reticulum carry out life processes in both plant and animal cells.

# How Oxygen and Nutrients Reach Your Cells

1

## Digestive system

Breaks down food and absorbs nutrients through the mouth, stomach, intestines, liver, and pancreas.

2

## Respiratory system

Exchanges oxygen and carbon dioxide using the trachea, lungs, and diaphragm.

3

## Circulatory system

Moves blood, carrying oxygen and nutrients, through the heart and blood vessels.

4

## Body cells and tissues

Individual cells in nerves, muscle, blood, skin, and bone use the delivered oxygen and nutrients to function.

# Cells, Tissues, Organs, Systems: Levels of Organization

## Cell

The basic unit of life; single-celled organisms like an amoeba carry out all life functions alone, while multicelled organisms like a grizzly bear divide the work among many cells.

## Tissue

Groups of similar cells working together, such as those forming plant and animal structures.

## Organ

Structures such as lungs or the heart, where individual organs support the healthy functioning of the human body.

## System

Organs working together, such as respiration, circulation, digestion, excretion, and sensory awareness, to keep the body healthy.

# Wrapping Up Cells and Systems

Today we connected the smallest unit of life, the cell, to the body systems that keep humans and other organisms healthy. Cells are the basic unit of life and differ between plants and animals. Cells contribute to healthy body function in nerves, muscle, blood, skin, and bone, and body systems change in response to conditions like exercise or temperature. Applying the concept of system helps us interpret structure and function across all living things.

**If a single cell can carry out all of life's basic functions on its own, why do larger organisms like humans need trillions of specialized cells organized into tissues, organs, and systems instead?**