

*Important Concepts . . .*

# Preview Review



***Science***

***Grade 8***

***W2 - Lesson 1: The Role of Cells within  
Living Things, Cells-Tissue-Organ System***

## Important Concepts of Grade 8 Science

## Materials Required

W1 - Lesson 1 .....	Mass, Volume, and Density
W1 - Lesson 2 .....	Solubility and Saturation Points
W1 - Lesson 3A.....	Viscosity, Flow Rate, and Buoyancy
W1 - Lesson 3B.....	Simple Machines
W1 - Lesson 4 .....	Gears, Mechanical Advantage, Speed Ratios, and Efficiency
W1 - Lesson 5 .....	Hydraulics and Pneumatics
W1- Quiz	
W2 - Lesson 1 ....	The Role of Cells within Living Things, Cells-Tissue-Organ System
W2 - Lesson 2 .....	The Microscope
W2 - Lesson 3 .....	Body Systems Part 1
W2 - Lesson 4 .....	Body Systems Part 2
W2 - Lesson 5 .....	Problems Associated with Body Systems
W2 - Quiz	
W3 - Lesson 1 .....	Transmission and Absorption of Light
W3 - Lesson 2 .....	Reflection and Refraction of Light
W3 - Lesson 3A.....	Vision and Lenses
W3 - Lesson 3B..	Water in its Various States Affects Earth's Landforms and Climate
W3 - Lesson 4 .....	Adaptations to Aquatic Ecosystems
W3 - Lesson 5 .....	Water Quality
W3 - Quiz .....	

Textbook:  
*Science in  
Action 8*

Science Grade 8

Version 5

Preview/Review W2 - Lesson 1

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# Preview/Review Concepts for Grade Eight Science



***W2 - Lesson 1:  
The Role of Cells within Living Things,  
Cells-Tissue-Organ System***

# OBJECTIVES

By the end of this lesson, you should

- explain features common to living organisms
- explain a cell and describe its basic parts
- explain the differences between unicellular and multicellular organisms
- explain how substances move into and out of cells
- explain the differences between cells, tissues, organs, and systems

## GLOSSARY

**cell** - the basic unit of living organisms

**diffusion** - the natural movement of particles from an area of higher concentration to an area of lower concentration

**organ** - a group of tissues working together to perform a specific function

**organelle** - structures in cells that carry out particular functions

**osmosis** - the diffusion of water through a semi-permeable membrane

**response** - the activity of an organism when stimulated

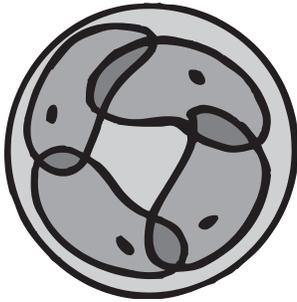
**stimulus** - something that causes an organism to respond

**system** - a group of organs working together to perform a function

**tissue** - a group of cells working together to perform a specific function

## W2 - Lesson 1: The Role of Cells within Living Things, Cells-Tissue-Organ System

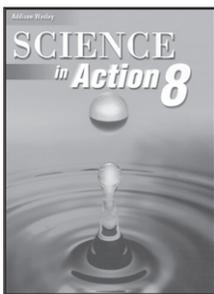
Welcome to W2 - Lesson 1. This lesson is designed to teach you about cells. Every living thing has cells. Knowing their role and how they work is important. This lesson should take about 1.5 hours to complete, and you will have a small homework assignment at the end.



What do all living things (organisms) have in common? All living things require nourishment - food and water. They all grow, move, and reproduce. A one-celled organism, such as an amoeba, needs food and water to grow and reproduce just as larger organisms do.

All organisms respond to their environments. A **stimulus** is anything that causes a response in an organism. A **response** is the reaction to a stimulus. For example, someone shining a bright light at your eyes is a stimulus. The usual reaction or response is to get out of the way of the bright light, to decrease your pupil size, or to close your eyes.

**All organisms are made of cells.** *Science in Action 8* defines **cell** as the **basic unit of life**. This is not to be confused with molecules and atoms that are the smallest parts of matter. The cell is the smallest **living** unit. Organisms can be one cell in size, such as amoebas and diatoms, or they can have trillions of cells such as an elephant or a palm tree.



### Activity 1

Read and understand pages 86 and 87 in *Science in Action 8*. Then, answer the following questions.

1. What is known as the basic unit of life?

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4. According to the textbook, what are nutrients?

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5. What is metabolism?

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6. In your own words, give an example of a stimulus-and-response scenario.

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7. The textbook on page 87 gives an example of all the stages that a tadpole goes through to turn into a frog. This is the process of growth and development. Can you think of another example of an organism going through stages to end up at maturity?

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## Structure of the Cell

Cells have smaller parts called **organelles**. Organelles are the parts of the cell that do specific things. The **nucleus** is to a cell as your brain is to you. It is the command centre, and controls movement, growth, and other life functions. It also contains all the genetic instructions. The **mitochondria** provide the power or energy. The **cell membrane** controls which materials enter and leave the cell. **Vacuoles** are the food storage “rooms”. **Cytoplasm** is the “liquid” that all the organelles are floating in. The **cell wall**, which is found only in plant cells, provides strength and support. The **chloroplasts**, which are also found only in plant cells, turn plants green and collect light for the process of photosynthesis so plants can make their own food. These are just some of the many cell organelles.



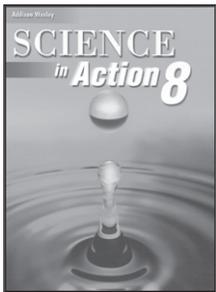


## Single-Celled Vs. Multi-Celled Organisms

**Unicellular** organisms are made up of one cell. **Multicellular** organisms are made up of many cells. Multicellular organisms can be plants, animals or fungi. The one cell in a unicellular organism is responsible for everything including movement, eating, and reproducing. In a multicellular organism, cells do not perform every life function. These organisms have developed **specialized cells** where groups of cells have specific functions and leave other functions to other cells.

Multicellular organisms can become larger than unicellular organisms. They can carry out more functions, and they have better thinking abilities. They have more cells devoted to those areas. You will see in the next activities of this lesson the functions of specialized cells.

### Activity 3



Read and understand pages 110 - 111 and page 114 in *Science in Action 8*. Then, answer the following questions.

1. What is your favorite multicellular animal? What are some of the physical activities it performs to carry out its life processes such as eating?

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2. How does an amoeba (a unicellular organism) gather and process food?

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3. What is one advantage that a multicellular organism has over a unicellular organism?

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### How Substances Move Into and Out of Cells

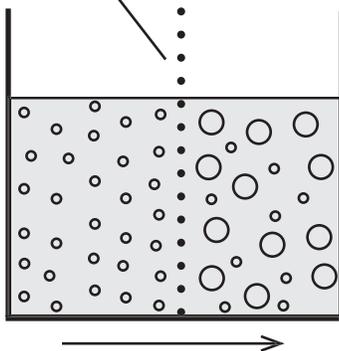
All cells must be able to move water, gases, and food into themselves. At the same time, waste and certain cell products must be moved out. Each cell must do this to remain alive.

One process the cell uses to move particles in or out is called **diffusion**. This is the movement of particles from an area of high concentration to an area of low concentration until there is an even amount of particles in the entire area. An example is spraying some perfume in one corner of a closed room without a breeze. Over time, without help, the perfume becomes evenly distributed throughout the room.

The **cell membrane** allows the diffusion of many particles such as oxygen and carbon dioxide. When carbon dioxide builds up inside the cell, it can diffuse out. At the same time, the concentration of oxygen is low, so it can diffuse into the cell.

A special kind of diffusion is **osmosis**. That is the diffusion of water through a semipermeable membrane; it is very important to cells.

selectively permeable membrane

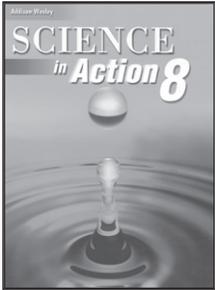


water moves from where it is in the higher concentration to where it is lower

**Key**

- water particles
- solute particles

Particles that must get through the cell membrane but cannot move through diffusion or osmosis are moved in another way. They are transported by special molecules that need additional energy to work. This process is called **active transport**, but we will not discuss it in detail.



### Activity 4

Read and understand pages 115 to 119 in *Science in Action 8*. Then, answer the following questions.

1. What is the key principle to diffusion? Give an example of something diffusing.

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2. What part of the cell acts like a filter with extremely tiny openings that allow some particles to pass through?

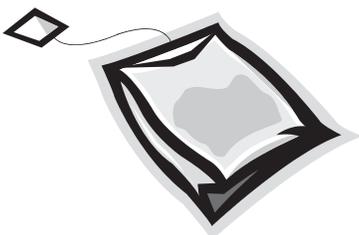
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3. Define the term “*selectively permeable membrane*”.

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4. Define osmosis.

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5. Under what condition can cells become depleted of water?

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6. When you are in water, such as a swimming pool, for a long time your skin wrinkles. Why do you think this happens?

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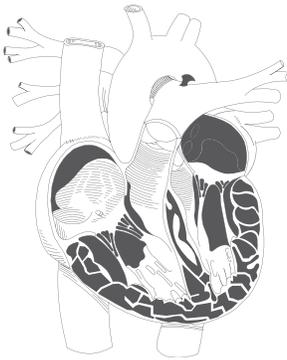
7. Why does a blood cell placed in salt water develop a shrunken appearance?

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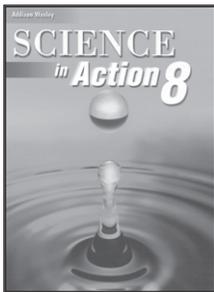
## Cells-Tissues-Organ System



Multicellular organisms have developed specialized cells that serve different functions needed to support life. Red blood cells, for example, carry oxygen to all cells in your body and some carbon dioxide from the cells. They must be able to capture oxygen, and then travel to the cells that need it, and then carry back carbon dioxide. Without these cells, it would be difficult for animals to remain alive.

Within an organism, specialized cells can develop into **tissues**. Tissues can group together and form **organs**. Organs work together in **systems**. An example of this in humans is cardiac cells that form cardiac muscle (tissue) in the heart (organ), which is part of the circulatory system.

Every part of you—your skin, organs, even your finger nails—is made of cells that have specific functions that serve some purposes. It is the same with all multi-cellular organisms, including plants which have leaves to trap sunlight and perform photosynthesis. Some plants have developed thorns so that animals will not eat them. All these special features are made of cells.



### Activity 5

Read pages 121 to 124 in *Science in Action 8*. Then, answer the following questions.

1. What are specialized cells?

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2. What are the four tissue types for animals?

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**You should now be able to meet all the objectives listed at the beginning of the lesson. Go through the list to see if there is anything you need to spend more time on.**

**Extended Activity (Homework)**

Make a list of at least 10 body parts, both external and internal. Describe the function of each part. An example has been done for you.

Body Part	Body Part Function
Hair on the back of my hand	Some protection from the sun, wind, or rain; may keep the hand a little warmer.

**If you have some time, check the following website:**

**<http://sun.menloschool.org/~birchler/cells/animals/nucleus/>**





