

*Important Concepts . . .*

# Preview Review



***Science***

***Grade 8 TEACHER KEY***

***W2 - Lesson 3: Body Systems - Part 1***

## Important Concepts of Grade 8 Science

## Materials Required

Textbook:  
*Science in Action 8*

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 .....	

Science Grade 8

Version 5

Preview/Review W2 - Lesson 3 TEACHER KEY

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# Preview/Review Concepts for Grade Eight Science

## ***TEACHER KEY***



***W2 - Lesson 3:  
Body Systems - Part 1***

# OBJECTIVES

By the end of this lesson, you should

- name basic parts of and explain in general terms the working of the digestive system
- name basic parts of and explain in general terms the working of the respiratory system
- name basic parts of and explain in general terms the working of the circulatory system.

## GLOSSARY

**circulatory system** - transports materials around the body

**digestive system** - prepares nutrients so they can be passed to the circulatory system

**peristalsis** - waves of muscle contraction that move material through the digestive system

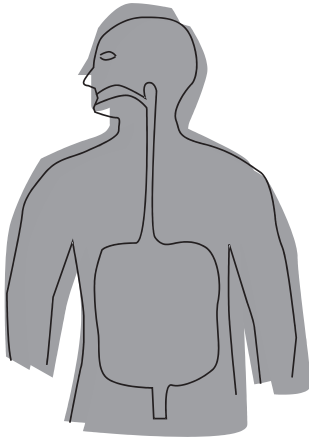
**respiratory system** - exchanges gases for the body

## W2 - Lesson 3: Body Systems Part 1

Welcome to W2 - Lesson 3. This lesson is designed to teach you about the **digestive**, **respiratory**, and **circulatory** systems. It should take about 1.5 hours to complete, and there will be a small homework assignment at the end.

### Body Systems

In the first lesson you learned about the cell, the smallest living unit in all living things. How do you suppose our cells stay alive? Our bodies have developed systems that work together to provide everything our body needs to survive. All the systems are necessary for our body's health.



### The Digestive System

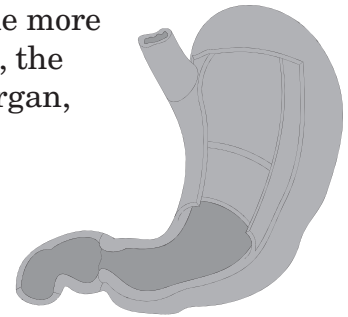
The main function of the **digestive system** is to get food and water into the body and to break down the food eaten into parts small enough to be transported and used throughout the body. This is the way we get our energy to run other body systems such as the muscle system. Without energy, these systems cannot function at all. This is also where we get our building blocks for growth.



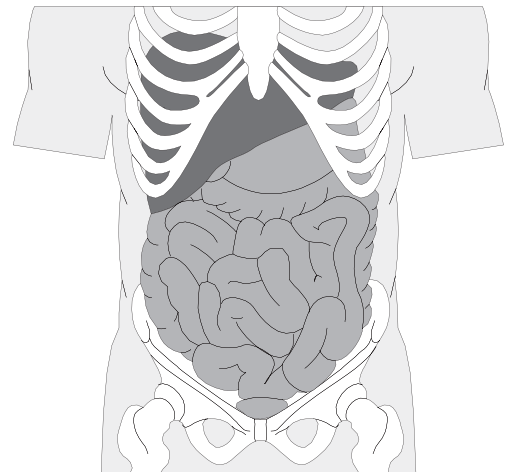
The journey that food takes when we put it into our mouths makes quite a story. When food is swallowed, it enters the **esophagus**, the tube through which food travels to your stomach.

The esophagus moves material to your stomach in a process known as **peristalsis**.

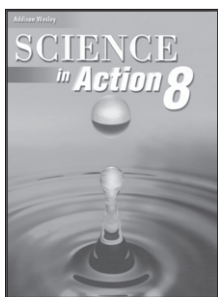
When the food enters the **stomach**, it is made more liquid, mixed, and partly broken down. Then, the partially digested food is sent into the next organ, the **small intestine**.



When the liquid food is in the **small intestine**, it is acted on by chemicals from organs such as the **pancreas** and the **liver**. These chemicals break the food down to their building blocks. The small intestine is the main site of digestion. It is also the main site of nutrient absorption into the circulatory system. **Villi** and **microvilli** line the inner surface of the intestine. They are where nutrients are passed to the circulatory system. They have many small, finger-like projections that increase the surface area of the small intestine to increase the absorption of nutrients.



The **large intestine** has a very simple function. It absorbs water along with some vitamins and minerals. It also stores the unused remains of food until they are expelled from the body.



### Activity 1

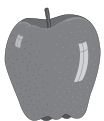
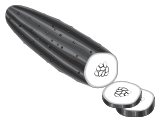
Read and understand pages 127 to 130 in *Science in Action 8*. Then, answer the following questions.

1. Technology has advanced amazingly. Currently, a capsule sized sensor can be swallowed to transmit images so a computer-generated record can be made of its journey through the digestive system. Pretend this sensor was sent through your digestive system. In your own words, write an essay of what you might see on that computer screen from start to finish. Use the following page, if you need more space, use your own loose-leaf paper.

*Answers will vary.*

2. Identify the two types of digestion and briefly define each.

**Mechanical digestion involves the physical breakdown of food into very small pieces. Chemical Digestion involves the breakdown of large particles into smaller particles by substances called enzymes.**



3. Where is bile made and stored? What is its function?

**Bile is made in the liver and stored in the gall bladder. It is released into the small intestine where it breaks up large globules of lipids into much smaller droplets.**

4. What is the purpose of villi?

**These small finger-like projections increase the surface area of the intestine to aid absorption of nutrients.**

5. What is the effect on a person if a large portion of small intestine were removed?

**They would not be able to digest and absorb food and would have serious health problems as a result.**

6. In a paragraph, explain the main purpose of the digestive system?

**The purpose of the digestive system is to break down nutrients and pass them to the circulatory system so that the body and other body systems and cells have the energy and building materials to do their jobs.**



7. Sketch and label the human digestive system. Be sure you know the function of each main part.

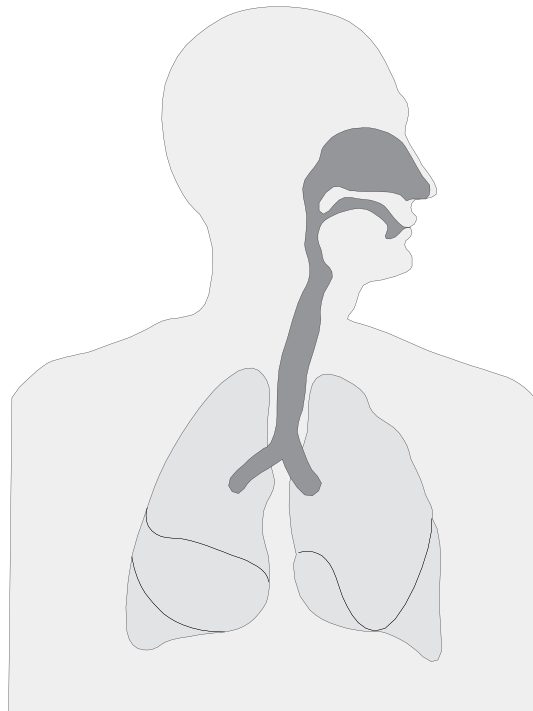
***Diagrams for key on pages 127 and 132.***

- 1. Tube from mouth —→ stomach is the esophagus.***
- 2. glands around mouth are the salivary glands***

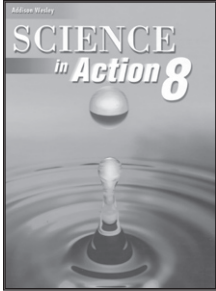
## The Respiratory System

The **respiratory system** puts oxygen into your blood and removes carbon dioxide from it. It is the part of you that breathes. Your body takes in oxygen when you inhale and gets rid of carbon dioxide when you exhale. Most living things have some sort of gas exchange system because they need oxygen to release energy from food. At the same time, they produce carbon dioxide, a waste product.

The passageways these gases move through are called **bronchi** and **bronchioles**. They lead to air filled sacs called **alveoli** in the lungs where oxygen is traded for carbon dioxide in the blood.



How do we breathe? We change the volume and pressure of our chest cavity. As volume increases and pressure decreases around the lungs, air moves in. As volume decreases and pressure increases around the lungs, air moves out. The change in volume is produced by muscles between the ribs, and by the **diaphragm**—a muscle separating the chest and abdomen.



## Activity 2

Read and understand pages 132 to 134 in *Science in Action 8*. Then, answer the following questions.

1. What are the responsibilities of the respiratory system?

*The respiratory system is responsible for supplying the blood with oxygen and removing the carbon dioxide from the blood and returning it to the air outside the body.*

2. Name one illness that can interfere with the respiratory system's ability to carry out its role in the body.

*asthma, pneumonia, lung cancer, emphysema, etc.*

3. What main muscle allows us to breathe?

*the diaphragm*

4. What is the function of alveoli in the lung?

*Gas exchange occurs in the alveoli (oxygen into the blood, carbon dioxide out of the blood)*



5. In your own words, how do we inhale and exhale?

*Answers will vary. Breathing occurs because of your rib and diaphragm muscles. When you inhale, these muscles contract, pulling your ribs up, and your diaphragm down. This increases the size of your chest and lungs, pulling air into your lungs. When you exhale, these muscles relax; your ribs go down and your diaphragm goes up. This decreases the size of your chest and lungs, forcing air out.*

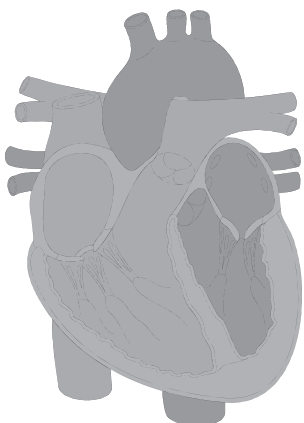
6. For what process do cells need oxygen? Explain.

*Cells need oxygen to release energy from nutrients such as glucose in the process of cellular respiration.*

7. How can you keep your respiratory system in good condition?

*exercise and do not smoke, etc.*

## The Circulatory System

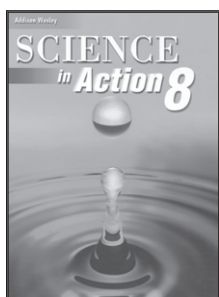


The **circulatory system** moves materials to and from every cell in the body. It delivers nutrients from the digestive system and oxygen from the respiratory system to cells. It transports waste products from the cells to the excretory system (which we will discuss in the next lesson) and the respiratory system for removal. It is made of all blood vessels and the heart plus the blood in them.

**Blood** contains **red blood cells** that carry oxygen to cells and carbon dioxide away from cells. Blood also contains **white blood cells** that work to fight off diseases and infections, **platelets** that help stop bleeding at cuts, and **plasma** that is the liquid portion of blood.

The heart and blood vessels transport blood to where it is needed. The **heart** is the muscle that pumps oxygen-rich blood from the lungs to the body, and then pumps carbon dioxide-rich blood back to the lungs.

Blood moves through the body in **arteries**, **capillaries**, and **veins**. **Arteries** are the blood vessels that contain blood moving away from the heart. **Capillaries** are where materials are exchanged between the circulatory system and body cells. For example, oxygen is exchanged for carbon dioxide. Sugar also can be passed to cells, and waste products moved into the blood. **Veins** carry blood back to the heart. The blood circulates over and over, hence the term *circulatory system*.



### Activity 3

Read and understand pages 135 to 140 in *Science in Action 8*. Then, answer the following questions.

1. What are the jobs of the circulatory system?

*The circulatory system delivers the nutrients absorbed by the digestive system to each cell in the body. It also transports oxygen to the cells and removes waste products such as carbon dioxide.*

2. What vessels carry blood away from the heart to all parts of the body?

*arteries*

3. What vessels return blood from your body to the heart?

**veins**

4. What role does diffusion play with your blood?

**Diffusion is the process responsible for transporting**  
**oxygen from your blood into your cells and carbon dioxide**  
**from your cells into your blood. Diffusion is also used to**  
**transport some nutrients from your small intestine to your**  
**blood.**

5. Where is carbon dioxide exchanged for oxygen in the blood?

**in the capillaries**

6. What are the four parts of blood? What are the functions of these parts?

**Red blood cells, white blood cells, platelets, and plasma.**

**Red blood cells carry oxygen. White blood cells are**  
**specialized to fight infection; some are capable of eating**  
**bacteria at infection; sites such as cuts. Platelets help to**  
**stop the bleeding at cuts (blood clotting). Plasma is the**  
**liquid portion of blood and transports nutrients to the**  
**cells and carries away wastes such as carbon dioxide.**

7. How are the digestive, respiratory, and circulatory systems connected to each other?

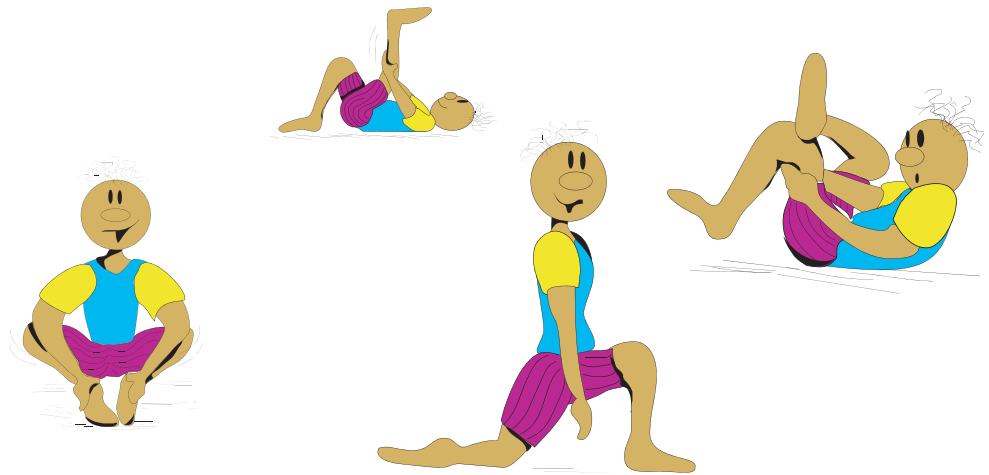
*The digestive system provides the energy and building*

*blocks for the other two . The respiratory system*

*provides the gas exchange for the circulatory system.*

*The circulatory system provides the oxygen and glucose*

*for the digestive system to function.*



**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)

Your pulse can be felt on the side of your neck or on your wrist. Count the number of pulses that you feel (don't use your thumb because it has its own pulse) for 15 seconds. Then multiply that number by 4 to get your pulse per minute.

Take your pulse at rest and record it on the chart below. Then run for about 5 minutes, take your pulse again, and record it on the chart. An example has been done for you below. Then, answer the following questions.

Pulse At Rest	Pulse After Exercise
75 beats per minute	120 beats per minute.

1. Compare your two answers. How many more beats per minute did your heart do after you exercised?

***answers will vary,  $120-75= 45$  beats more after exercising.***

2. In your own words, why does your pulse increase when you exercise?

***Your cells require more oxygen to make energy; hence, there is a greater demand on the system that handles the oxygen, the circulatory system.***

3. Now, you do the math. Assume your body has about 6 litres of blood. Each time your heart pumps (that is, a beat in your pulse) it moves 100 millilitres of blood. How many heart beats do you need to move all your blood?

***$6000\text{mL}/100\text{mL} = 60$  beats to move 6L of blood.***



4. A person lived to be 87 years old. Assume the person never exercised much and had a constant pulse of 75 beats per minute. How many beats did that person's heart achieve over his or her lifetime?

***87 years converted into minutes***

***$87 \times 365 \text{ days} \times 24 \text{ hrs} \times 60 \text{ min} = 45727200 \text{ minutes}$***

***$45727200 \times 75 = 3429540000 \text{ beats}$***

5. Which body system provides the energy that your body needs for its normal functions?

***The digestive system.***

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

**[http://www.gastro.net.au/frame\\_digestedive.html](http://www.gastro.net.au/frame_digestedive.html)**

**<http://encarta.msn.com/encnet/refpages/refarticle.aspx?refid=761566878>**

