The Circulatory, Respiratory, Digestive, and Excretory Systems Worksheets

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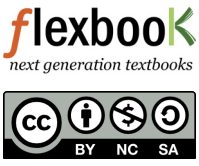

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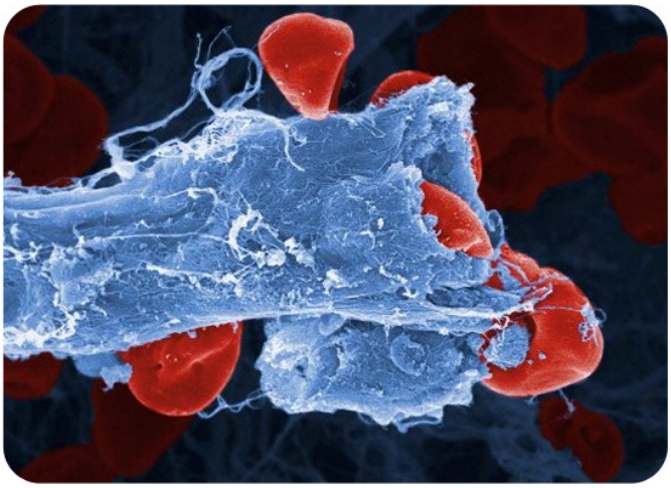
CHAPTER 1

The Circulatory, Respiratory, Digestive, and Excretory Systems Worksheets

CHAPTER OUTLINE



(Opening image copyright by Anne Weston, http://io9.com/#!373166/when-microscopic-blood-vessels-explode and under the Creative Commons license CC-BY-NC-ND.)

- **Lesson 23.1: The Circulatory System**
- **Lesson 23.2: The Respiratory System**
- **Lesson 23.3: The Digestive System**
- **Lesson 23.4: The Excretory System**

1.1 The Circulatory System

Lesson 23.1: True or False

Name_____ **Class**_____ **Date**_____

Write true if the statement is true or false if the statement is false.

_____ 1. The heart has four chambers: two upper ventricles and two lower atria.

_____ 2. Capillaries are the largest of the blood vessels.

_____ 3. High blood pressure is also known as hypertension.

_____ 4. Blood is a connective tissue.

_____ 5. The systemic circulation carries blood between the heart and body.

_____ 6. The pulmonary circulation carries blood between the heart and body.

_____ 7. White blood cells carry oxygen in the blood.

_____ 8. A heart attack occurs when the blood supply to part of the heart is blocked and cardiac muscle tissue dies.

_____ 9. Cells in blood include red blood cells, white blood cells, green blood cells, and platelets.

_____ 10. ABO blood type is determined by three common antigens, often referred to as antigens A, B, and O.

_____ 11. Smoking contributes to the development of atherosclerosis.

_____ 12. Blood pressure is highest in the veins and lowest in the arteries.

_____ 13. The leading cause of cardiovascular disease is atherosclerosis.

_____ 14. Platelets release chemicals that are needed for blood clotting.

_____ 15. Diseases of the heart and blood vessels are very common.

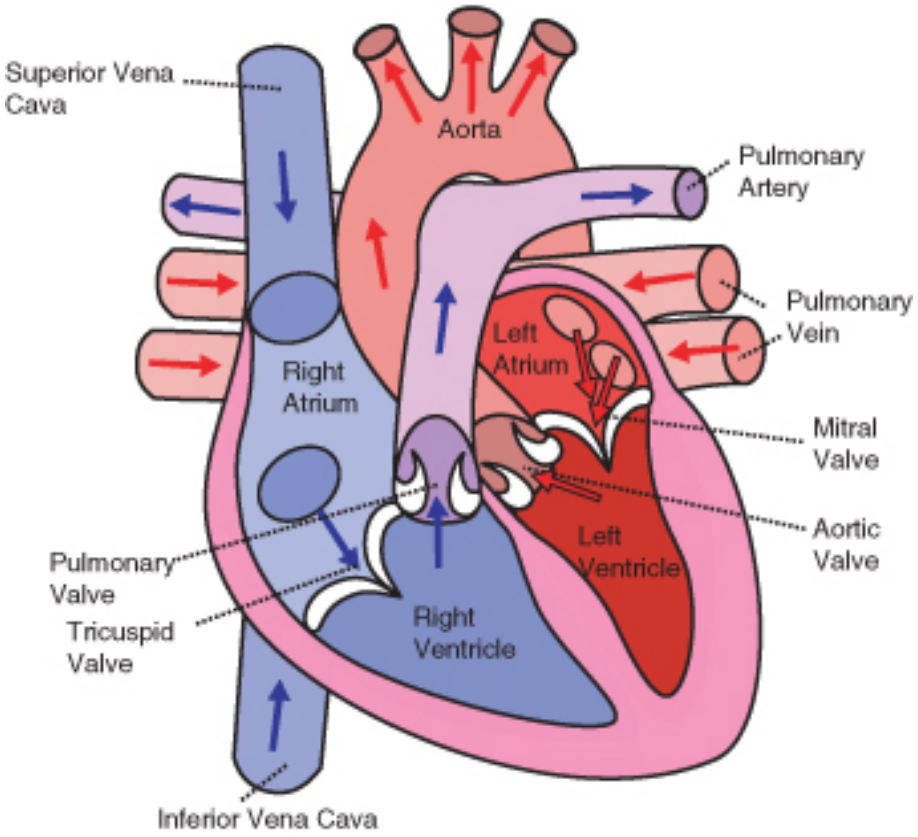
Lesson 23.1: Critical Reading

Name_____ **Class**_____ **Date**_____

Read these passages from the text and answer the questions that follow.

The Heart

The heart is a muscular organ in the chest. It consists mainly of cardiac muscle tissue and pumps blood through blood vessels by repeated, rhythmic contractions. The heart has four chambers, as illustrated below: two upper atria (singular, atrium) and two lower ventricles. Valves between chambers keep blood flowing through the heart in just one direction.



The chambers of the heart and the valves between them are shown here. *(Image courtesy of Wapcaplet and Yaddah and under GNU-FDL 1.2.)*

Blood Flow Through the Heart

Blood flows through the heart in two separate loops, which are indicated by the arrows in the figure above.

a. Blood from the body enters the right atrium of the heart. The right atrium pumps the blood to the right ventricle, which pumps it to the lungs. This loop is represented by the blue arrows in the figure above.
b. Blood from the lungs enters the left atrium of the heart. The left atrium pumps the blood to the left ventricle, which pumps it to the body. This loop is represented by the red arrows in the figure above.

Heartbeat

Unlike skeletal muscle, cardiac muscle contracts without stimulation by the nervous system. Instead, specialized cardiac muscle cells send out electrical impulses that stimulate the contractions. As a result, the atria and ventricles normally contract with just the right timing to keep blood pumping efficiently through the heart.

Questions

1. What is the role of the heart?

2. The _____ chambers of the heart are: _____ , _____ , _____ , _____ .

3. What is the main difference between the right side and left side of the heart?

4. What causes the heart to beat? Describe how this occurs.

Lesson 23.1: Multiple Choice

Name_____ Class_____ Date_____

Circle the letter of the correct choice.

a. The materials carried by the circulatory system include which of the following? (1) blood, (2) hormones, (3) oxygen, (4) cellular wastes.
   a. 1 only
   b. 1 and 2
   c. 1, 2, and 3
   d. 1, 2, 3, and 4

b. The correct order of blood flow is
   a. aorta → right atrium → right ventricle → lungs → left atrium → left ventricle → vena cava.
   b. vena cava → right atrium → right ventricle → lungs → left atrium → left ventricle → aorta.
   c. vena cava → left atrium → left ventricle → lungs → right atrium → right ventricle → aorta.
   d. aorta → left atrium → left ventricle → lungs → right atrium → right ventricle → vena cava.

c. The major blood vessels include

a. arteries.
b. veins.
c. capillaries.
d. all of the above.

d. Which statement is correct?

a. The pulmonary circulation carries blood between the heart and lungs, while the systemic circulation carries blood between the heart and body.
b. The systemic circulation carries blood between the heart and lungs, while the pulmonary circulation carries blood between the heart and body.
c. The systemic circulation carries blood between the heart and lungs, while the pulmonary circulation carries oxygen between the heart and body.
d. The pulmonary circulation carries oxygen between the heart and lungs, while the systemic circulation carries blood between the heart and body.

e. Atherosclerosis

a. occurs when the blood supply to part of the heart muscle is blocked.
b. is the buildup of plaque inside arteries.
c. consists of cell debris, cholesterol, and other substances.
d. all of the above

f. Blood

a. in veins carries carbon dioxide and nutrients, while blood in arteries carries oxygen and other wastes.
b. in veins carries oxygen and nutrients, while blood in arteries carries carbon dioxide and other wastes.
c. in arteries carries oxygen and nutrients, while blood in veins carries carbon dioxide and other wastes.
d. in arteries carries carbon dioxide and nutrients, while blood in veins carries oxygen and other wastes.

g. Plasma includes

a. white blood cells.
b. red blood cells.
c. platelets.
d. all of the above.

h. Roles of blood include which of the following? (1) defending the body against infection, (2) repairing body tissues, (3) transporting water from the lungs to body cells (4) controlling the body's pH.

a. 1 and 2
b. 1, 2, and 3
c. 1, 2, and 4
d. 1, 2, 3, and 4

Lesson 23.1: Vocabulary I

Name_____ **Class**_____ **Date**_____

Match the vocabulary word with the proper definition.

Definitions

_____ 1. the smallest type of blood vessel

_____ 2. the part of the circulatory system that carries blood between the heart and body

_____ 3. diseases of the heart and blood vessels

_____ 4. transports materials from one place to another

_____ 5. blood vessel that carries blood toward the heart

_____ 6. carries oxygen

_____ 7. a fluid connective tissue

_____ 8. muscular blood vessel that carries blood away from the heart

_____ 9. the buildup of plaque inside arteries

_____ 10. the fluid part of blood

_____ 11. the part of the circulatory system that carries blood between the heart and lungs

_____ 12. occurs when the blood supply to part of the heart muscle is blocked and cardiac muscle fibers die

Terms

a. artery

b. atherosclerosis

c. blood

d. capillary

e. cardiovascular disease

f. circulatory system

g. heart attack

h. plasma

i. pulmonary circulation

j. red blood cell

k. systemic circulation

l. vein

Lesson 23.1: Vocabulary II

Name_____ **Class**_____ **Date**_____

Fill in the blank with the appropriate term.

1. Red blood cells contain _____, a protein with iron that binds with oxygen.
2. The most commonly known blood types are the _____ and Rhesus blood types.
3. The exchange of gases between cells and blood takes place across the thin walls of _____.
4. Cardiac muscle contracts without stimulation by the _____ system.
5. Platelets are cell fragments involved in blood _____.
6. The main components of the circulatory system are the heart, blood vessels, and _____.
7. The _____ has four chambers: two upper atria, and two lower ventricles.
8. Arteries are muscular vessels that carry blood _____ from the heart.
9. _____ circulation is the part of the circulatory system that carries blood between the heart and body.
10. Pulmonary circulation is the part of the circulatory system that carries blood between the heart and _____.

11. _____ generally carry deoxygenated blood.

12. _____ is the buildup of plaque inside arteries.

Lesson 23.1: Critical Writing

Name_____ Class_____ Date_____

Thoroughly answer the question below. Use appropriate academic vocabulary and clear and complete sentences.

Define and outline pathways of the pulmonary and systemic circulations.

1.2 The Respiratory System

Lesson 23.2: True or False

Name_____ Class_____ Date_____

Write true if the statement is true or false if the statement is false.

_____ 1. The exchange of gases between the body and the outside air is called breathing.

_____ 2. Respiration begins with gas exchange.

_____ 3. Respiration and cellular respiration are different.

_____ 4. Pulmonary gas exchange occurs in the alveoli of the lungs.

_____ 5. Asthma is a disease in which the air passages of the lungs periodically become too large.

_____ 6. Oxygenated blood is transported by the respiratory system from lungs to tissues throughout the body.

_____ 7. The mouth is an organ of the respiratory system.

_____ 8. Ventilation is the process of moving air into and out of the lungs.

_____ 9. Pulmonary gas exchange is the exchange of gases between inhaled air and the blood.

_____ 10. The heart pumps the oxygen-rich blood into your veins, which carry it throughout the body.

_____ 11. Body cells have a much higher concentration of oxygen than blood in the peripheral capillaries.

_____ 12. The regular, rhythmic contractions of the diaphragm are controlled by the brain stem.

_____ 13. Carbon dioxide from body cells travels in the blood back to the heart, then to the lungs where it is inhaled again.

_____ 14. Emphysema is a lung disease usually caused by smoking and is irreversible.

_____ 15. Gas exchange is extremely important in maintaining homeostasis.

Lesson 23.2: Critical Reading

Name_____ Class_____ Date_____

Read these passages from the text and answer the questions that follow.

Journey of a Breath of Air

Take in a big breath of air through your nose. As you inhale, you may feel the air pass down your throat and notice your chest expand. Now exhale and observe the opposite events occurring. Inhaling and exhaling may seem like simple actions, but they are just part of the complex process of respiration, which includes these four steps:

a. Ventilation.
b. Pulmonary gas exchange.
c. Gas transport.

d. Peripheral gas exchange.

Ventilation

Respiration begins with **ventilation**. This is the process of moving air in and out of the lungs. The **lungs** are the organs in which gas exchange takes place between blood and air.

- Air enters the respiratory system through the nose. As the air passes through the nasal cavity, mucus and hairs trap any particles in the air. The air is also warmed and moistened so it won't harm delicate tissues of the lungs.
- Next, the air passes through the **pharynx**, a long tube that is shared with the digestive system. A flap of connective tissue called the epiglottis closes when food is swallowed to prevent choking.
- From the pharynx, air next passes through the **larynx**, or voice box. The larynx contains vocal cords, which allow us to produce vocal sounds.
- After the larynx, air moves into the **trachea**, or wind pipe. This is a long tube that leads down to the chest.
- In the chest, the trachea divides as it enters the lungs to form the right and left bronchi. The bronchi contain cartilage, which prevents them from collapsing. Mucus in the bronchi traps any remaining particles in air. Tiny hairs called cilia line the bronchi and sweep the particles and mucus toward the throat so they can be expelled from the body.
- Finally, air passes from the bronchi into smaller passages called bronchioles. The bronchioles end in tiny air sacs called alveoli.

Questions

1. Describe the journey of air during ventilation.

2. What happens to air in the nasal cavity?

3. What is the role of the larynx?

4. What happens in the bronchi?

5. Where are the alveoli located?

Lesson 23.2: Multiple Choice

Name_____ Class_____ Date_____

Circle the letter of the correct choice.

a. The functions of the respiratory system include which of the following? (1) bringing air containing oxygen into the body, (2) releasing carbon dioxide into the atmosphere, (3) exchanging oxygen with carbon dioxide in blood cells, (4) transporting oxygen to cells throughout the body.

   a. 1 only
   b. 1 and 2
   c. 1, 2, and 3
   d. 1, 2, 3, and 4

b. The four steps of respiration are

   a. ventilation, central gas exchange, gas transport, peripheral gas exchange.
   b. ventilation, pulmonary gas transport, gas exchange, peripheral gas transport.

c. ventilation, pulmonary gas exchange, gas transport, peripheral gas exchange.
d. breathing, pulmonary gas exchange, central gas exchange, peripheral gas exchange.

c. Inhaling

a. occurs when the diaphragm contracts.
b. occurs when the diaphragm relaxes.
c. is the exchange of gas between blood cells and the lungs.
d. is when oxygen in the air is drawn into the body and carbon dioxide is released from the body.

d. Respiration begins with

a. gas transport between the mouth and the atmosphere.
b. ventilation, the process of moving air in and out of the lungs.
c. ventilation between the lungs and the blood.
d. gas exchange between the lungs and the blood.

e. Ventilation involves which organs?

a. the larynx, pharynx, and trachea
b. the lungs, larynx, pharynx, and trachea
c. the heart and lungs, larynx, pharynx, and trachea
d. the heart, blood and lungs, larynx, pharynx, and trachea

f. Gas exchange occurs

a. in the lungs, between the blood and the air.
b. in the alveoli of the lungs, between the peripheral capillaries and lung cells.
c. in the alveoli of the lungs, between the peripheral capillaries and body cells.
d. all of the above

g. Emphysema

a. results in less gas can be exchanged in the lungs.
b. is caused by smoking and is irreversible.
c. causes shortness of breath.
d. all of the above

h. Asthma occurs when the

a. some of the alveoli of the lungs fill with fluid so gas exchange cannot occur.
b. air passages of the lungs periodically become too narrow, often with excessive mucus production.
c. walls of the alveoli break down so less gas can be exchanged in the lungs.
d. all of the above

Lesson 23.2: Vocabulary I

Name_____ **Class**_____ **Date**_____

Match the vocabulary word with the proper definition.

Definitions

_____ 1. the voice box

_____ 2. the exchange of gases between the body and the outside air

_____ 3. a long tube that is shared with the digestive system

_____ 4. a disease in which the air passages of the lungs periodically become too narrow

_____ 5. the wind pipe

_____ 6. tiny air sacs in the lungs

_____ 7. the organs in which gas exchange takes place between blood and air

_____ 8. the body system that brings air containing oxygen into the body and releases carbon dioxide into the atmosphere

_____ 9. a disease in which some of the alveoli of the lungs fill with fluid

_____ 10. the metabolic process by which cells obtain energy

_____ 11. the process of moving air in and out of the lungs

_____ 12. a lung disease in which walls of the alveoli break down

Terms

a. alveoli

b. asthma

c. cellular respiration

d. emphysema

e. larynx

f. lungs

g. pharynx

h. pneumonia

i. respiration

j. respiratory system

k. trachea

l. ventilation

Lesson 23.2: Vocabulary II

Name_____ **Class**_____ **Date**_____

Fill in the blank with the appropriate term.

1. Respiration begins with _____.

2. Gas exchange is needed to provide cells with the _____ they need for cellular respiration.

3. Tiny air sacs in the lungs are known as _____.

4. Inhaling is an active movement that results from the contraction of a muscle called the _____.

5. Asthma is a disease in which the air passages of the _____ become narrow, often with excessive mucus production.

6. The _____ is also known as the wind pipe.

7. Emphysema is usually caused by _____ and is irreversible.

8. The _____ is also known as the voice box.

9. The _____ pumps oxygen-rich blood into arteries.

10. _____ gas exchange is the exchange of gases between inhaled air and the blood.

11. _____ is a disease in which some of the alveoli of the lungs fill with fluid so gas exchange cannot occur.

12. Oxygen _____ from the peripheral capillaries into body cells.

Lesson 23.2: Critical Writing

Name_____ Class_____ Date_____

Thoroughly answer the question below. Use appropriate academic vocabulary and clear and complete sentences.

Define respiration, and explain how it differs from cellular respiration.

1.3 The Digestive System

Lesson 23.3: True or False

Name_____ Class_____ Date_____

Write true if the statement is true or false if the statement is false.

_____ 1. To get glucose from food, digestion must occur.

_____ 2. Chemical digestion is the physical breakdown of chunks of food into smaller pieces.

_____ 3. The GI tract is one long tube that connects your mouth to your anus.

_____ 4. The small intestine is part of the GI tract and is about 23 feet long in adults.

_____ 5. Mechanical digestion occurs mainly in the small intestine.

_____ 6. Shellfish and chicken cause common food allergies.

_____ 7. Your mouth is an organ of the digestive system.

_____ 8. Absorption is the process in which nutrients pass into the bloodstream, where they can circulate throughout the body.

_____ 9. Nutrients the body needs in relatively small amounts are called macronutrients.

_____ 10. The major salivary enzyme is maltase, which aids in the digestion of carbohydrates.

_____ 11. Minerals are chemical elements that are essential for life.

_____ 12. Most nutrients are absorbed into the blood in the jejunum.

_____ 13. Most chemical digestion takes place in the stomach.

_____ 14. According to MyPyramid, ice cream and chips can be eaten every day.

_____ 15. Most people can survive only a few days without carbohydrates.

Lesson 23.3: Critical Reading

Name_____ Class_____ Date_____

Read these passages from the text and answer the questions that follow.

Digestion and Absorption: The Small Intestine

The **small intestine** is a narrow tube about 7 meters (23 feet) long in adults. It is the site of most chemical digestion and virtually all absorption. The small intestine consists of three parts: the duodenum, jejunum, and ileum.

Digestion in the Small Intestine

The duodenum is the first and shortest part of the small intestine. Most chemical digestion takes place here, and many digestive enzymes are active in the duodenum (see **Table** 1.1). Some are produced by the duodenum itself. Others are produced by the pancreas and secreted into the duodenum.

TABLE 1.1: Digestive Enzymes Active in the Duodenum"'

Enzyme	What It Digests	Where It Is Made
Amylase	carbohydrates	pancreas
Trypsin	proteins	pancreas
Lipase	lipids	pancreas
Maltase	carbohydrates	duodenum
Peptidase	proteins	duodenum
Lipase	lipids	duodenum

The **liver** is an organ of both digestion and excretion. It produces a fluid called **bile**, which is secreted into the duodenum. Some bile also goes to the **gall bladder**, a sac-like organ that stores and concentrates bile and then secretes it into the small intestine. In the duodenum, bile breaks up large globules of lipids into smaller globules that are easier for enzymes to break down. Bile also reduces the acidity of food entering from the highly acidic stomach. This is important because digestive enzymes that work in the duodenum need a neutral environment. The pancreas contributes to the neutral environment by secreting bicarbonate, a basic substance that neutralizes acid.

Absorption in the Small Intestine

The jejunum is the second part of the small intestine, where most nutrients are absorbed into the blood. The mucous membrane lining the jejunum is covered with millions of microscopic, fingerlike projections called **villi** (singular, villus). Villi contain many capillaries, and nutrients pass from the villi into the bloodstream through the capillaries. Because there are so many villi, they greatly increase the surface area for absorption. In fact, they make the inner surface of the small intestine as large as a tennis court!

The ileum is the third part of the small intestine. A few remaining nutrients are absorbed here. Like the jejunum, the inner surface of the ileum is covered with villi that increase the surface area for absorption.

Questions

1. What happens in the small intestine?

2. List and describe three enzymes of the small intestine.

3. What is bile? What is the function of bile?

4. What are the three parts of the small intestine?

5. What is the role of the villi in the jejunum?

Lesson 23.3: Multiple Choice

Name_____ Class_____ Date_____

Circle the letter of the correct choice.

a. The gastrointestinal tract is a long tube that includes
   a. the mouth, stomach, intestines and anus.
   b. the mouth, stomach, intestines, liver and anus.
   c. the mouth, stomach, intestines, liver, gallbladder and anus.
   d. the mouth, stomach, intestines, liver, gallbladder, pancreas and anus.

b. The organs of the GI tract are lined with
   a. enzymes that break down food.
   b. cilia to sweep food through the GI tract.
   c. mucous membranes that secrete digestive enzymes and absorb nutrients.
   d. all of the above.

c. Which of the following statements is the best description of digestion?

   a. Mechanical digestion is the physical breakdown of food, and chemical digestion is the chemical breakdown of food molecules.
   b. Chemical digestion is the physical breakdown of food, and mechanical digestion is the chemical breakdown of food molecules.
   c. Chemical digestion is the physical breakdown of food, and mechanical digestion is the mechanical breakdown of food molecules.
   d. Mechanical digestion occurs in your mouth, and chemical digestion occurs in your stomach.

d. In your mouth,

   a. pepsin begins the acidic digestion of proteins.
   b. amylase begins the chemical digestion of carbohydrates.
   c. amylase begins the mechanical digestion of carbohydrates.
   d. amylase, pepsin, trypsin, and other enzymes start to break down food.

e. The stomach

   a. digests food both mechanically and chemically.
   b. contains pepsin, which chemically digests protein.
   c. has an acidic environment, which kills bacteria in food and is needed for the stomach enzymes to function.
   d. all of the above

f. In the small intestine,

   a. most nutrients from food are absorbed into the blood.
   b. excess water is absorbed from food.
   c. the mechanical breakdown of food is completed.
   d. partly digested food is stored until ready for the final aspects of digestion.

g. The large intestine includes

   a. the duodenum, jejunum, and ileum.
   b. the GI tract, from the mouth to the anus.
   c. the cecum, colon, and rectum.
   d. the duodenum, jejunum, ileum, cecum, colon, and rectum.

h. Nutrients

   a. include carbohydrates, proteins, lipids, and water.
   b. are needed for energy, building materials, and control of body processes.
   c. include chemical elements like calcium and potassium.
   d. all of the above

Lesson 23.3: Vocabulary I

Name_____ **Class**_____ **Date**_____

Match the vocabulary word with the proper definition.

Definitions

_____ 1. an involuntary muscle contraction that moves rapidly along an organ

_____ 2. a relatively wide tube that connects the small intestine with the anus

_____ 3. a long tube that connects the mouth with the anus

_____ 4. the process in which substances pass into the bloodstream

_____ 5. shows the relative amounts of foods in different food groups you should eat each day

_____ 6. substances the body needs for energy, building materials, and the control of body processes

_____ 7. a long, narrow tube that passes food from the pharynx to the stomach

_____ 8. the breakdown of food

_____ 9. consists of organs that break down food and absorb nutrients

_____ 10. the chemical breakdown of large, complex food molecules

_____ 11. microscopic, finger-like projections of the jejunum

_____ 12. a sac-like organ in which food is further digested

_____ 13. organic compounds that are needed by the body to function properly

_____ 14. the site of most chemical digestion and virtually all absorption

_____ 15. the physical breakdown of chunks of food

Terms

a. absorption

b. chemical digestion

c. digestion

d. digestive system

e. esophagus

f. gastrointestinal tract

g. large intestine

h. mechanical digestion

i. MyPyramid

j. nutrients

k. peristalsis

l. small intestine

m. stomach

n. villi

o. vitamins

Lesson 23.3: Vocabulary II

Name_____ **Class**_____ **Date**_____

Fill in the blank with the appropriate term.

1. Peristalsis is an _____ muscle contraction that moves rapidly along an organ.

2. The _____ is a sac-like organ in which food is further digested both mechanically and chemically.

3. The small intestine consists of three parts: the duodenum, _____, and ileum.

4. Macronutrients include carbohydrates, _____, lipids, and water.

5. _____ shows the relative amounts of foods you should eat each day.

6. _____ is the process in which substances pass into the bloodstream.

7. The large intestine consists of three parts: the cecum, _____, and rectum.

8. _____ is the process in which wastes leave the body.

9. _____ digestion is the chemical breakdown of large, complex food molecules into smaller, simpler nutrient molecules.

10. Mechanical _____ is the physical breakdown of chunks of food into smaller pieces.

11. The _____ is where most nutrients are absorbed into the blood.

12. Body mass _____ is an estimate of the fat content of the body.

Lesson 23.3: Critical Writing

Name_____ Class_____ Date_____

Thoroughly answer the question below. Use appropriate academic vocabulary and clear and complete sentences.

Identify three classes of nutrients and their functions in the human body.

1.4 The Excretory System

Lesson 23.4: True or False

Name_____ **Class**_____ **Date**_____

Write true if the statement is true or false if the statement is false.

_____ 1. If you exercise on a hot day, you are likely to lose a lot of sweat in water.

_____ 2. The kidneys filter all the blood in the body many times each day and produce a total of about 1.5 pints of urine.

_____ 3. The amount of water lost in urine is controlled by the kidneys.

_____ 4. The kidney is the structural and functional unit of the nephron.

_____ 5. Excretion is one of the major ways the body maintains homeostasis.

_____ 6. The bladder stores urine.

_____ 7. The kidneys are a pair of bean-shaped organs just below the waist.

_____ 8. The skin is considered an excretory organ.

_____ 9. A single kidney may have more than a million nephrons.

_____ 10. Kidney stones are common. Many people have kidney stones and do not even know it!

_____ 11. The main function of the urinary system is to filter waste products and excess water from the blood and excrete them from the body.

_____ 12. Urine leaves the body through the urethra.

_____ 13. Urine leaves the body through the process of excretion.

_____ 14. The kidneys play very important roles in homeostasis.

_____ 15. Kidney failure is treatable.

Lesson 23.4: Critical Reading

Name_____ **Class**_____ **Date**_____

Read these passages from the text and answer the questions that follow.

Excretion

Excretion is the process of removing wastes and excess water from the body. It is one of the major ways the body maintains homeostasis. Although the kidneys are the main organs of excretion, several other organs also excrete wastes. They include the large intestine, liver, skin, and lungs. All of these organs of excretion, along with the kidneys, make up the **excretory system**. This lesson focuses on the role of the kidneys in excretion. The roles of the other excretory organs are summarized below:

- The large intestine eliminates solid wastes that remain after the digestion of food.
- The liver breaks down excess amino acids and toxins in the blood.
- The skin eliminates excess water and salts in sweat.
- The lungs exhale water vapor and carbon dioxide.

Lesson Summary

- The kidneys filter blood and form urine. They are part of the urinary system, which also includes the ureters, bladder, and urethra.
- Each kidney has more than a million nephrons, which are the structural and functional units of the kidney. Each nephron is like a tiny filtering plant.
- The kidneys maintain homeostasis by controlling the amount of water, ions, and other substances in the blood. They also secrete hormones that have other homeostatic functions.
- Kidney diseases include kidney stones, infections, and kidney failure due to diabetes. Kidney failure may be treated with dialysis.

Questions

1. What is excretion?

2. What are the body's organs of excretion?

3. Describe the role in excretion of two organs other than the kidney.

4. What is a nephron? What role do nephrons play in the kidney?

5. Excretion is one of the major ways the body maintains homeostasis. What role does the kidney play in maintaining homeostasis?

Lesson 23.4: Multiple Choice

Name_____ Class_____ Date_____

Circle the letter of the correct choice.

a. Excretion involves which of the following?

   a. The large intestine eliminates solid wastes that remain after the digestion of food.
   b. The lungs break down excess amino acids and toxins in the blood.
   c. The liver eliminates excess water and salts in sweat.
   d. The skin exhales water vapor and carbon dioxide.

b. The main function of the urinary system is to

   a. form urine.
   b. remove excess water from the body.
   c. filter waste products and excess water from the blood and excrete them from the body.
   d. eliminate solid wastes that remain after the digestion of food.

c. The function of the kidney is to

   a. eliminate excess water and salts.
   b. filter blood and form urine.
   c. excrete water vapor and carbon dioxide.
   d. destroy excess amino acids and toxins in the blood.

d. In the nephron, when blood moves diffuses out of the capillaries, it enters the

   a. renal artery of the nephron.
   b. glomerulus of a nephron.

c. Bowman's capsule.
d. renal tubule of the nephron.

e. Urine follows which of the following pathways?

a. collecting ducts of the kidneys, ureters, bladder, urethra.
b. collecting ducts of the kidneys, bladder, ureters, urethra.
c. bladder, collecting ducts of the kidneys, ureters, urethra.
d. collecting ducts of the kidneys, urethra, bladder, ureters.

f. The role of the kidneys in homeostasis includes which of the following?

a. The kidneys control the amount of water, ions, and other substances in the blood.
b. The kidneys secrete hormones that regulate other body processes.
c. The kidneys filter all the blood in the body many times each day.
d. all of the above

g. Kidney "stones"

a. are infections of the urinary tract, especially the bladder.
b. are mineral crystals that form in urine inside the kidney.
c. can result in damage to the capillaries of nephrons.
d. are used when blood is filtered through a machine.

Lesson 23.4: Vocabulary I

Name_____ Class_____ Date_____

Match the vocabulary word with the proper definition.

Definitions

_____ 1. includes the kidneys, large intestine, liver, skin, and lungs

_____ 2. how urine leaves the body

_____ 3. a muscular tube that carries urine out of the body

_____ 4. filters waste products and excess water from the blood and excretes them from the body

_____ 5. the liquid waste product of the body

_____ 6. when the kidneys lose much of their ability to filter blood

_____ 7. the process of removing wastes and excess water from the body

_____ 8. two muscular tubes that move urine by peristalsis to the bladder

_____ 9. the structural and functional units of the kidneys

_____ 10. a hollow, sac-like organ that stores urine

_____ 11. a medical procedure in which blood is filtered through a machine

Terms

a. bladder

b. dialysis

c. excretion

d. excretory system

e. kidney failure

f. nephron

g. ureters

h. urethra

i. urinary system

j. urination

k. urine

Lesson 23.4: Vocabulary II

Name_____ **Class**_____ **Date**_____

Fill in the blank with the appropriate term.

1. The large intestine eliminates solid wastes that remain after the digestion of _____.
2. The _____ eliminates excess water and salts in sweat.
3. The lungs exhale water vapor and _____.
4. The function of the _____ is to filter blood and form urine.
5. The _____ is a hollow, sac-like organ that stores urine.
6. _____ are the structural and functional units of the kidneys.
7. The kidneys filter all the _____ in the body many times each day.
8. A single _____ may have more than a million nephrons.
9. If you exercise on a hot day, you are likely to lose a lot of _____ in sweat.
10. Blood enters the kidney through the _____ artery.
11. The urethra is a muscular tube that carries _____ out of the body.
12. Kidney _____ are mineral crystals that form in urine inside the kidney.

Lesson 23.4: Critical Writing

Name_____ **Class**_____ **Date**_____

Thoroughly answer the question below. Use appropriate academic vocabulary and clear and complete sentences.

Explain how the urinary system filters blood and excretes wastes.