Lesson 1. 1 **Skeletal, Muscular, and Nervous Systems**

This lesson will help you practice working with concepts related to human body systems. Use it with core lesson 1. 1 Skeletal, Muscular, and Nervous Systems to reinforce and apply your knowledge.

Key Concept

The skeletal, muscular, and nervous systems work together to allow your body to react to the sights, sounds, tastes, odors, and physical contact that you encounter daily.

Core Skills & Practices

- Integrate Content Presented in Different Ways
- Determine Central Ideas

The Skeletal System

Bones provide structure to your body and protect your internal organs.

Directions: Answer the questions below.

1. Which statement gives the best example of evidence that bones are living tissue?

   A. Bones are made of calcium.

   B. A broken bone can grow back together again.

   C. Some joints are immovable while others allow a wide range of motion.

   D. Bones work together with muscles to allow body movements.

2. Bone-marrow transplants can help people who have leukemia or other blood cancers. Using what you know about bone marrow, explain why a bone-marrow transplant might help a patient with these conditions.

   _____

   _____

   _____

   _____

3. A woman has joint pain in one of her knees. Which of the following is the most likely cause of that pain?

   A. cartilage damage

   B. a semi mobile joint

   C. lack of bone marrow

   D. excess calcium in the diet

4. The shoulder is an example of a ball-and-socket joint while the knee is a hinge joint. How would bone movement be different if the knee were a ball-and-socket joint instead of a hinge?

   _____

   _____

   _____

   _____

Test-Taking Tip

When you have completed your response for a short-answer test item, re-read what you wrote to make sure that your idea is clearly represented. Then, reread the question. Finally, re-read your response again to make sure that you have addressed all aspects of the question in your answer. If you need to make changes, repeat this process.

The Muscular System

Muscles move your body. They also make your internal organs work.

Directions: Answer the questions below.

5. The muscular system and the skeletal system work together. Each of these systems also works with other body systems. Which word describes the main result of the skeletal system and muscular system working together?

   A. support

   B. digestion

   C. movement

   D. protection

6. What attaches skeletal muscles to bones?

   A. tendons

   B. skin cells

   C. ligaments

   D. smooth muscles

7. Which statement best explains how muscles work to move joints?

   A. Muscles work with bones to bend or straighten joints.

   B. Muscles work independently to bend or straighten joints.

   C. Muscles work in groups of three to bend or straighten joints.

   D. Muscles work in pairs to bend or straighten joints.

8. The smooth muscles of the intestines are involuntary. Could a person survive if these muscles were voluntary? Defend your answer.

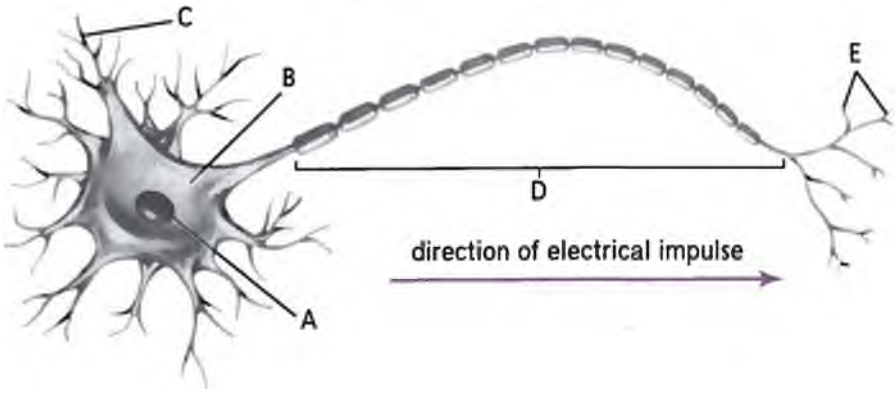
9. How does the muscular system and nervous system work together?

10. Explain the relationship between joints, bones, muscles, and tendons. Then explain what might happen if a person has tendon damage.

The Nervous System

Neurons in the brain, spinal cord, and body make up your nervous system. This network of neurons controls your body's actions and functions.

Directions: Use the diagram below to answer questions 11-12.



11. The diagram shows a neuron. What is the purpose of the neuron structure labeled D?

    A. to move a nerve impulse along the neuron

    B. to change electrical messages to chemical messages

    C. to transfer DNA from the nucleus along the neuron

    D. to carry chemical signals received from the cell body

12. Which of these correctly describes the pathway of a nerve impulse through the neuron?

    A. E—>D—>C—>B

    B. A—>B—>C—>D

    C. C—>B—>D—>E

    D. E—>D—>A—>C

Directions: Answer the questions below.

13. After a head injury, a person struggles with vision problems but does not have problems with any other senses or motor control. Which fact explains this person's experience?

    A. Different parts of the brain control different body functions.

    B. The brain contains 90 percent of the neurons in the body.

    C. The brain's hemispheres control the opposite sides of the body.

    D. The cerebellum coordinates movements of the muscles.

14. A student gathered data to compare the time it took blindfolded subjects to move their hands away from two surfaces. One surface was a cool temperature surface and the other surface was very hot. The student gathered data for 50 subjects and then calculated the average for each measurement. Which movement most likely took longer—the movement away from the cool surface or the very hot surface? Explain your answer.

Digestive, Excretory, Respiratory, and Circulatory Systems Lesson 1. 2

This lesson will help you practice working with concepts related to human body systems. Use it with core lesson 1. 2 Digestive, Excretory, Respiratory, and Circulatory Systems to reinforce and apply your knowledge.

Key Concept

The digestive, excretory, respiratory, and circulatory systems work together to move oxygen and nutrients through and out of your body.

Core Skills & Practices

- Evaluate Validity of Conclusions
* Interpret Text or Graphics

The Digestive System

Within the digestive system, ingested food is broken down through digestion, nutrients are absorbed, and wastes are eliminated.

Directions: Answer the questions below.

1. People who suffer from gallstones often have their gallbladders removed. Which of the following foods might these individuals have the most trouble digesting?

   A. a large salad

   B. scrambled eggs

   C. several dinner rolls

   D. slices of pepperoni pizza

2. A researcher wants to evaluate the effectiveness of a potential weight loss medication. Which site in the digestive system is most likely to be manipulated in the study?

   A. stomach

   B. esophagus

   C. small intestine

   D. large intestine

3. Human digestion takes place along a specific pathway and follows a sequence of events. Write the correct answers in each box to show the pathway in which digestion occurs in the body.

large intestine	mouth	rectum
small intestine	stomach	esophagus

BEGINNING							END

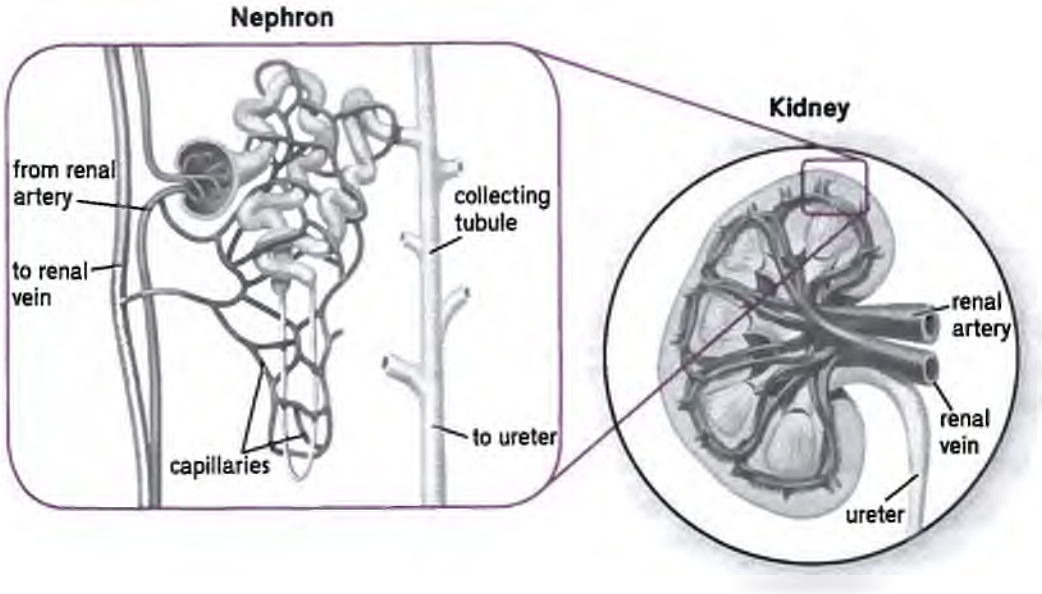
Test-Taking Tip

When completing drag-and-drop questions that require you to sequence events, or put them in order, first verify the order requested to avoid completing the sequence in reverse. If you are unsure of all placements, begin with those you know. When you have filled in the sequence, read back over it to be sure it is logical.

The Excretory System

The excretory system is the system that removes liquid, solid, and gas wastes from the body.

Directions: Use the diagram below to answer questions 4-5.



4. Which principle of human body systems does this illustration best represent?

A. the interaction of the circulatory and excretory systems in waste removal

B. the role of the kidney in urine storage

C. the necessary release of wastes in many different forms

D. the importance of digestion for effective kidney function

5. Which characteristic of nephrons is most important to kidney function?

A. their ability to process solid waste

B. their total number within a kidney

C. their detachment from capillaries

D. their large size relative to the entire kidney

The Respiratory System

Through the respiratory system, the oxygen required for cellular respiration enters the body and carbon dioxide is released.

Directions: Answer the questions below.

6. What important lung process or structure is likely to be affected at high altitudes, where air pressures are lower?

A. transport of blood to lungs

B. number of working alveoli

C. diffusion of blood to nephrons

D. diffusion of oxygen into lungs

7. Alveoli are most similar in function and structure to which body system component?

A. heart

B. nephron

C. pancreas

D. esophagus

The Circulatory System

The circulatory system transports blood through the human body. Blood delivers water, nutrients, and oxygen to all cells in the body and carries wastes from those cells to the organs of the excretory system.

Directions: Answer the questions below.

8. Which of the following phrases best sums up the function of the circulatory system?

A. energy generator

B. support structure

C. transport and delivery

D. communication network

9. What is the most likely reason that being overweight puts an extra burden on the heart?

A. The heart must pump more blood to nourish extra fat cells.

B. An overweight person has an increased risk of developing diabetes

C. The lungs may lack the capacity to deliver oxygen throughout the body.

D. The heart of an overweight person tends to be smaller than average.

Directions: Use the diagram below to answer questions 10-12.

10. At which of the following locations is the level of carbon dioxide in blood the highest?

A. aorta

B. inferior vena cava

C. superior vena cava

D. left pulmonary artery

12. Why are some vessels a darker shade than others?

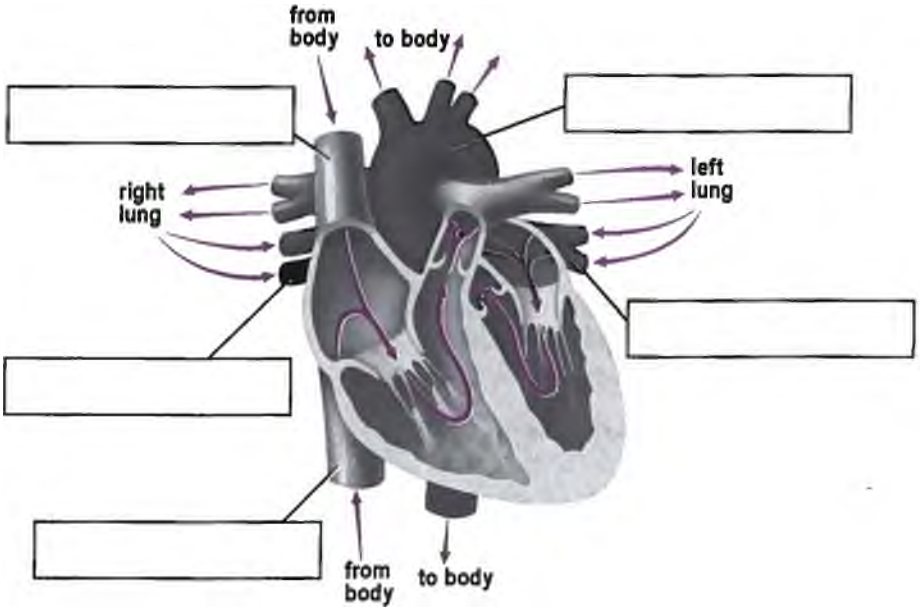
_____

_____

_____

_____

11. Label the image of the heart by writing the correct name in each box.



superior vena cava
inferior vena cava
aorta
right pulmonary arteries
left pulmonary veins

Lesson 1.3 **Endocrine and Reproductive Systems**

This lesson will help you practice working with concepts related to human body systems. Use it with core lesson 1.3 Endocrine and Reproductive Systems to reinforce and apply your knowledge.

Key Concept

The endocrine and reproductive systems are examples of body systems. Hormones in the endocrine system influence functions throughout the body, including the functions of the reproductive systems.

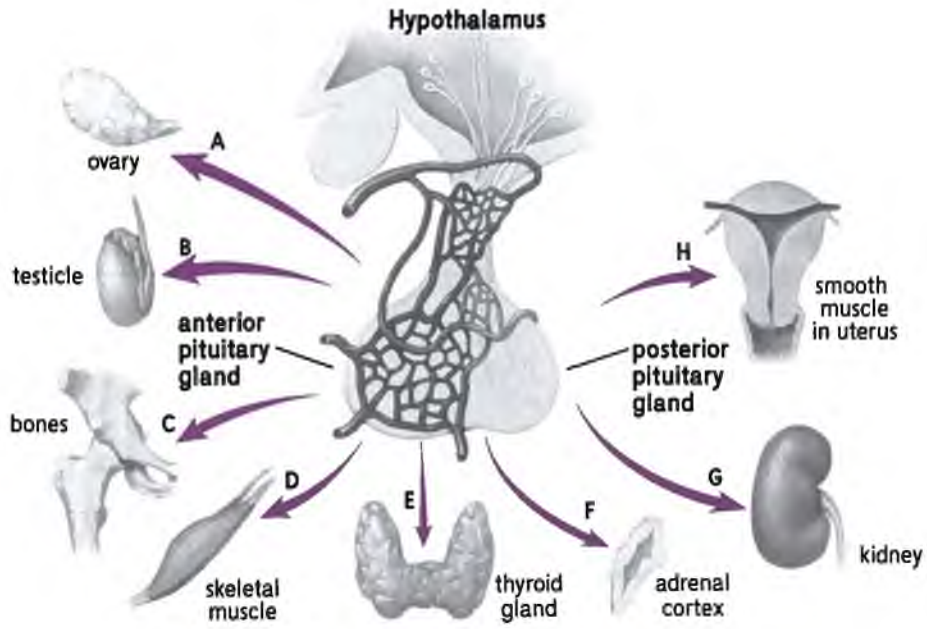
Core Skills & Practices

* Reconcile Multiple Findings
* Compare and Contrast Information

The Endocrine System

The endocrine system regulates many body processes through the release of hormones into the bloodstream.

Directions: Use the diagram below to answer questions 1-4.



1. The diagram shows various tissues and organs that are affected by hormones produced by the pituitary gland. A rapid reaction to stress triggers a hormone in_____

   A. pathway C

   B. pathway E

   C. pathway F

   D. pathway H

2. What does the diagram illustrate about the relationship between the hypothalamus, the pituitary gland, and target sites?

3. Which hormone pathway in the diagram is most likely to control cell growth?

A pathway A

B. pathway C

C. pathway E

D. pathway G

4. Which statement best describes how the endocrine system triggers a response in the body?

A Receptors on a target cell release chemicals that trigger changes in the bloodstream.

B. A nerve impulse generated in the brain travels through the bloodstream to target cells.

C. A chemical released by a gland travels through the bloodstream to target cells.

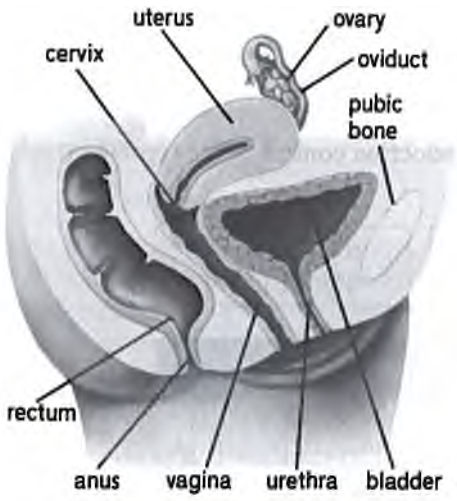
D. A chemical released by neurons travels through the bloodstream to a body organ.

The Reproductive System

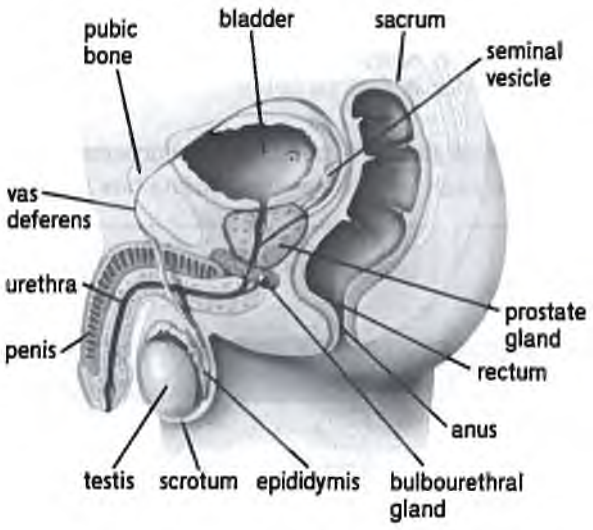
The reproductive system is involved with sexual development and the production of offspring. Its functions are directed by sex hormones.

Directions: Use the diagram below to answer questions 5-7.

Female Reproductive System



Male Reproductive System



5. The structures that link the endocrine and reproductive systems are called_____

6. Which two structures pictured carry out similar functions in females and males?

A. uterus, testes

B. uterus, male bladder

C. fallopian tube, urethra

D. female bladder, scrotum

7. Compare the male and female reproductive systems. Which description of reproduction is true for males but not females?

A. Gamete production is controlled by hormones.

B. Gametes mature outside the abdomen.

C. The development of gametes is cyclical.

D. The reproductive tract is separate from the bladder.

8. Which of the following is the first step in pregnancy?

   A. shedding of the uterine lining

   B. fertilization of the female egg

   C. movement of sperm out of the scrotum

   D. movement of egg through fallopian tube

9. Drinking alcohol and smoking dining pregnancy can harm a developing fetus. What is the most likely reason that this is true?

   A. Substances in a mother's blood cross the placenta to the fetus.

   B. The mother's health is at risk throughout the pregnancy.

   C. These substances could cause thinning of the uterine wall.

   D. Alcohol and tobacco cause the placenta to break down.

10. During respiration, human body cells produce carbon dioxide gas as a waste product This gas is carried to the lungs by blood and expelled during breathing. What most likely happens to the carbon dioxide gas produced by die body cells of a fetus?

   A. It is reused by the fetus.

   B. It stays in the mother's blood.

   C. It remains in the fetus until birth

   D. It is expelled by the mother's lungs.

Directions: Answer the questions below.

11. The terms below describe structures and processes involved in the endocrine control of the reproductive system. Write each term in the appropriate box in the table.

sperm production	progesterone	estrogen	testes	thickening of uterine lining

Hormone	Site where released	What it affects
testosterone		
		breast development
	ovary	

Test-Taking Tip

During a test, as you are reading a question, circle or write key words that help you understand what the question is asking. For example, you might circle the words *most likely* or *best.*

This lesson will help you practice working with concepts related to regulating the body. Use it with core lesson 1.4 Homeostasis to reinforce and apply your knowledge.

Key Concept

Human body systems work to maintain a balanced state of internal physiological conditions even when there are changes in the external or internal environment.

Core Skills & Practices

- Evaluate Evidence
- Express Scientific Information or Findings Visually

Homeostasis

Through homeostasis, body systems are regulated to maintain and balance the conditions needed to sustain life.

Directions: Answer the questions below.

1. Which of the following does the human body regulate to maintain homeostasis?

   A. height

   B. blood pH

   C. bone density

   D. joint mobility

2. Which of the following is least likely to be classified as an example of homeostasis?

   A. mobility in the joints

   B. cell growth in plants

   C. hormone regulation in animals

   D. warming effect of Earth's atmosphere

3. It's a cold January day, and Veronica has forgotten her coat. Put the following stages of homeostatic response in the correct order. Write A, B, C, or D in the appropriate boxes.

   A. A signal is sent to the brain.

   B. Shivering begins, causing movement and warmth

   C. The hypothalamus signals her muscles to contract.

   D. The sensory receptors in her skin detect a change in temperature.

1
2
3
4

Test-Taking Tip

Before answering a drag-and-drop question that requires you to put the answers in order, read through all of the responses and identify the first or last variable in the sequence. Place that variable in the correct position. Then determine the correct order of the other answers.

4. Which of the following is true about the relationship between a stimulus and a response?

A. The response and the stimulus occur exactly at the same time.

B. The stimulus always occurs before the response.

C. The response always occurs before the stimulus.

D. The stimulus and response are independent of each other.

5. A group of boaters has been stranded at sea for several hours. List several stimuli that would initiate a homeostatic response and identify whether each stimulus is internal or external.

Directions: Use the passage below to answer questions 6-7.

The Gaia hypothesis, proposed in the 1970s by British scientist James Lovelock, states that Earth behaves as a single living organism. According to this theory, Earth regulates its own temperature, provides itself with resources needed for life, disposes of its own wastes, and fights off disease. These activities are similar to the homeostatic reactions that occur in the human body.

6. According to the passage, which of the following is evidence that Earth exhibits its own homeostatic response?

A. Earth rotates around the sun.

B. Other planets lack intelligent life.

C. Earth maintains relatively constant oxygen levels.

D. Earth supports both plant and animal life.

7. Earth exhibits a homeostatic response to a rise in temperature. For example, increased temperatures cause increased evaporation, which causes an increase in rainfall and cloud cover, cooling Earth. Explain how a parallel homeostatic response occurs in the human body in response to an increase in temperature.

Feedback Mechanisms

Feedback mechanisms are systems set up to respond to changes in the body

Directions: Answer the questions below.

8. A puddle of water freezes when the water temperature drops below 32°F. Which statement illustrates the main difference between a puddle freezing and an animal's response to freezing temperature?

A. An animal freezes solid at a lower temperature.

B. An animal responds more slowly than water freezes.

C. An animal responds in a way that best ensures its own survival.

D. An animal does not freeze because it is not made of pure water.

9. Which of the following conditions is an example of positive feedback?

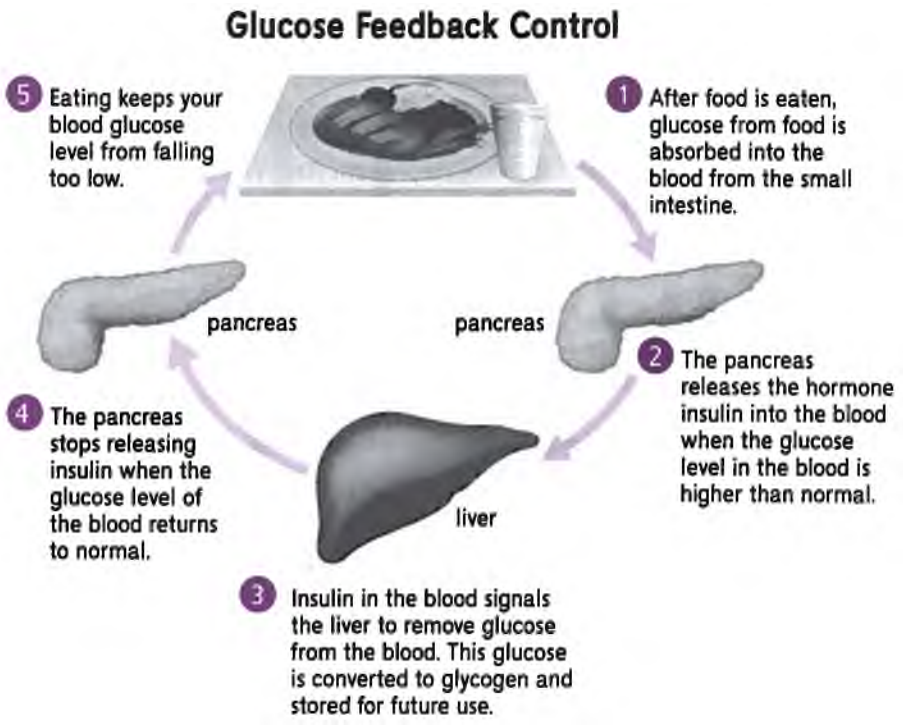
A. increasing heart rate to raise blood pressure

B. releasing insulin to lower blood glucose levels

C. dilation of blood vessels to cool the body

D. running a fever to kill pathogens in the body

Directions: Use the diagram below to answer questions 10-14.



10. Which of the following can be inferred about the human body from the illustration?

A. It functions most efficiently with high levels of blood sugar.

B. It functions most efficiently with widely varying amounts of blood sugar.

C. It functions most efficiently with a limited amount of blood sugar.

D. It functions most efficiently with balanced levels of blood sugar and insulin.

11. Releasing insulin is the body's_____ to the stimulus of absorption of glucose.

12. If the body does not produce insulin, the glucose level in the blood can get dangerously _____.

13. Why is blood glucose regulation an example of a negative feedback mechanism?

A. The feedback cycle damages the body.

B. The purpose is to reverse changes in the body.

C. The purpose is to accelerate changes in the body.

D. The feedback cycle sometimes operates in reverse.

14. How might a doctor use blood glucose tests to determine if the glucose feedback control is working properly in a patient? Explain your response.

_____

_____

_____

_____

_____

Lesson 1. 5 **Nutrition**

This lesson will help you practice working with concepts related to eating a healthy diet rich in nutrients. Use it with core lesson 1. 5 Nutrition to reinforce and apply your knowledge.

Key Concept

Your body depends on six key nutrients. Because nutrients come from food, eating a balanced diet contributes to your overall health.

Core Skills & Practices

- Represent Real World Arithmetic Problems
- Reconcile Multiple Findings, Conclusions, or Theories

Nutrients

Nutrients nourish and provide energy to all living things. Eating a well-balanced diet containing the proper nutrients is necessary to sustain life.

Directions: Answer the questions below.

1. Which statement best illustrates why a diet extremely low in carbohydrates could be considered unhealthy?

   A. Sugars are natural sources of energy.

   B. Fiber is essential for smooth digestion.

   C. Carbohydrates digest fats and proteins.

   D. Carbohydrates are the body's main source of energy.

2. Manuel does not like to eat meat but wants to begin bodybuilding. A friend advises him to consume both milk and peanut butter as sources of protein. Why would both be helpful?

   A. The body cannot digest plant-based proteins without animal-based proteins.

   B. Plant-based proteins often lack many amino acids present in animal products.

   C. Proteins work best when eaten in both a liquid and solid form.

   D. Peanut butter is not a naturally occurring source of protein but milk is.

3. Which of the following statements supports the claim that eating too many saturated fats is unhealthy?

   A. Foods high in saturated fats can raise blood cholesterol.

   B. Foods high in saturated fats usually come from animals.

   C. Foods high in unsaturated fats reduce the risk of heart disease.

   D. Foods high in saturated fats contain very few vitamins.

4. Which of the following are inorganic elements that the body needs for most of its metabolic functions?

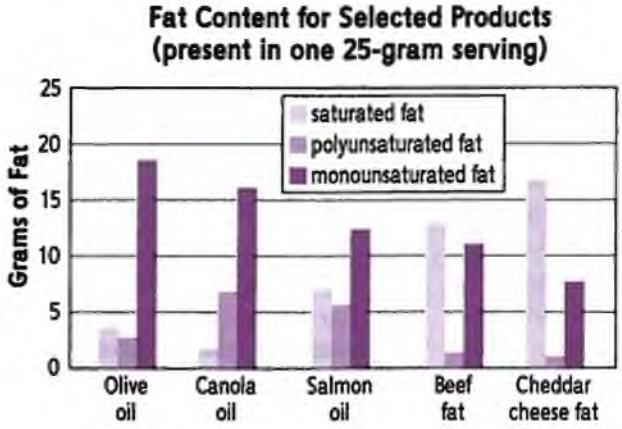
   A. proteins

   B. minerals

   C. nutrients

   D. vitamins

Directions: Use the diagram below to answer questions 5-7.



5. What information do you need to determine which of the food products in the chart is most healthful?

   A. the number of grams contained in each ounce of the food

   B. the risks and benefits of each type of fat contained in the food

   C. the presence of each type of fat in other commonly eaten foods

   D. the total number of calories allowed each day on a person's diet

6. Which products might be substituted in the diet of someone who is trying to lower cholesterol level by reducing consumption of saturated fat?

   A. salmon instead of beef

   B. canola oil instead of olive oil

   C. olive oil instead of canola oil

   D. cheddar cheese instead of beef

7. Studies have shown that polyunsaturated fats may help reduce the risk of type 2 diabetes. Which product would a doctor most likely recommend to a patient at risk for developing this disease?

   A. beef fat

   B. olive oil

   C. canola oil

   D. cheddar cheese fat

Directions: Answer the question below.

8. Fatima likes to eat only bagels, eggs, nectarines, salad, spaghetti, and yogurt. She wants to consume at least one fruit or vegetable, one carbohydrate, and one protein with each meal but does not want to repeat the same meal in one day. Design a lunch and dinner menu that meets her needs.

bagel	eggs	nectarine	salad	spaghetti	yogurt

Lunch			
Dinner			

Eating a Healthy, Balanced Diet

If your diet is balanced, that means you are eating meals that provide a variety of the nutrients the body needs. Food labels provide valuable information to help you make wise food choices. Use them to make decisions toward the most healthful choices for your nutritional needs.

Directions: Use the nutrition label below of a serving of cereal to answer questions 9-10.

9. Nutrition facts are based on percent daily values for a 2, 000 calorie diet Based on a 2, 000 calorie diet, if you ate two servings with one cup milk, what percent daily value of potassium will you consume?

A. 4%

B. 10%

C. 16%

D. 20%

10. If you snacked on 2 servings of dry cereal, how many calories would you consume?

A. 180 calories

B. 225 calories

C. 270 calories

D. 360 calories

Nutrition Facts
Serving Size 3/4 Cup (27g)

Amount Per Serving	Cereal	With 1/2 Cup Skim Milk
Calories	90	130
Calories from Fat	10	10
	% Daily Value	
Total Fat 1g*	2%	2%
Saturated Fat Og	0%	0%
Trans Fat Og	0%	0%
Cholesterol Omg*	0%	0%
Sodium 190mg*	8%	11%
Potassium 85mg*	2%	8%
Total Carbohydrates 23g*	8%	10%
Dietary Fiber 5g	20%	20%
Sugars 5g		
Protein 2g*		
Vitamin A	0%	4%
Vitamin C	10%	15%
Calcium	0%	15%
Iron	2%	2%

Directions: Answer the following question.

11. Humans must bum 3, 500 calories to lose one pound of fat. If Jiang bums 1, 800 calories per day but consumes only 1, 550 calories per day, it will take him_____ days to lose one pound of fat.

Test-Taking Tip

After completing a fill — in — the — blank question, reread the entire sentence and make sure that the answer you wrote makes sense in the context of the sentence.

This lesson will help you practice working with concepts related to disease, the immune system, and disease prevention. Use it with core lesson 1. 6 Disease Prevention to reinforce and apply your knowledge.

Key Concept

Disease can be caused by something introduced into the body, like a virus, or by improper care of the body. Many diseases can be prevented by taking advantage of advances in medical science and by practicing healthy behaviors.

Core Skills

- Understand and Explain a Non-textual Scientific Presentation
- Distinguish Between Cause and Effect

Disease

A disease is any condition that disrupts the normal functioning of the body. Diseases can be classified as infectious and non-infectious.

Directions: Answer the questions below.

1. Which disease is caused by a pathogen?

   A. arthritis

   B. cirrhosis

   C. diabetes

   D. hepatitis

2. Explain how a sneeze transmits a cold from one person to another.

3. How do infectious diseases differ from non-infectious diseases?

   A Infectious diseases may be passed genetically from parent to child, but non-infectious diseases cannot be.

   B. Infectious diseases disrupt the normal functioning of the body, while non-infectious diseases do not.

   C. Infectious diseases cannot be passed by contact with another person, but non-infectious diseases can.

   D. Infectious diseases are caused by bacteria, viruses, or parasites, while non-infectious diseases are not

Test-Taking Tip

When completing a short-answer question, read the question carefully. Make sure that your answer clearly addresses the information that is asked for.

Directions: Use the passage below to answer questions 4-5.

Many pathogens are transmitted by vectors. Vectors are animals that spread pathogens through their saliva, parasites, body waste, and meat. Some of the infectious diseases that require a vector include malaria, rabies, and bubonic plague. Bubonic plague is transmitted from infected rats to humans by fleas. This disease, also known as the Black Death, killed more than half the population of Europe during an epidemic in the fourteenth Centura.

4. Which disease would be transmitted by a vector?

   A. cancer

   B. *E. coli*

   C. diabetes

   D. arthritis

5. Based on the information in the passage, explain why diseases like malaria and bubonic plague are classified as infectious diseases and why they require a vector.

The Immune System

The immune system is the body's defense against pathogens.

Directions: Answer the questions below.

6. Which is a defense that makes it difficult for a pathogen to invade the body?

   A. B cells

   B. T cells

   C. bone marrow

   D. mucous membranes

7. How do T cells distinguish between healthy body cells and infected cells?

   A. Infected cells cause inflammation that attracts the T cells.

   B. T cells produce proteins that attach to antigens on the infected cells.

   C. Infected cells are marked by antibodies that the T cells recognize.

   D. T cells recognize proteins located on the walls of healthy cells.

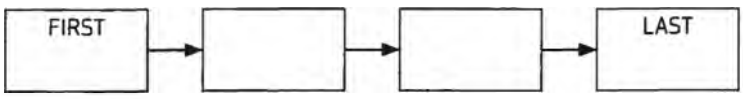
8. Order the events that occur as a pathogen invades the body through the skin. Write the appropriate letter in each box below.

   A. B cells and T cells are produced

   B. antigens trigger immune response

   C. B cells attach antibodies to the pathogens

   D. T cells destroy infected cells and pathogens marked by antibodies



Preventing Disease

In the mid-nineteenth century, scientists made the connection between germs and disease. Based on this discovery, ways of preventing the spread of disease have been developed and have saved millions of lives.

Directions: Answer the questions below.

9. Which will not help to prevent the transmission of syphilis?

A. getting a vaccine

B. proper condom use

C. refraining from sex

D. limiting sexual partners

10. Which action would be the most effective in preventing the spread of Salmonella from one food source to another?

A. washing your hands thoroughly before handling cooked poultry

B. covering your mouth whenever you cough

C. cooking all food thoroughly at a very high temperature

D. cleaning a knife used to cut poultry before using it for other food

Directions: Use the information from the table below to answer questions 11-12.

Causes of Disease before and after Vaccine Availability in the U.S.

Disease	Average Number of Cases per Year before Vaccine Available	Cases in 1998 after Vaccine Available
measles	503, 282	89
diphtheria	175, 885	1
tetanus	1, 314	34
mumps	1, 152, 209	606
rubella	47, 745	345
pertussis (whooping cough)	147, 271	6, 279

11. According to the table, which vaccine was most effective in eradicating a disease?

A. tetanus vaccine

B. rubella vaccine

C. measles vaccine

D. diphtheria vaccine

12. Based on the information in the table, summarize the overall effectiveness of these vaccines?