

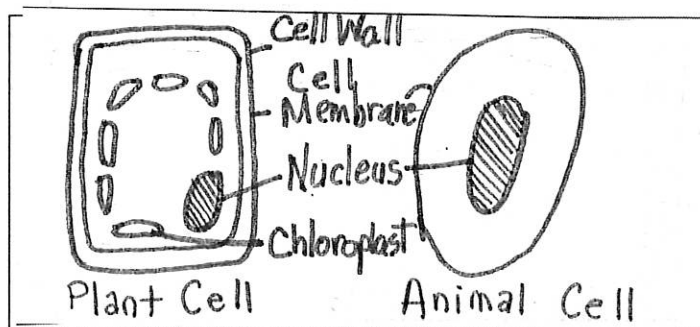
Key Concepts to Review

LS1-1 Cell Theory

- Unicellular vs. Multicellular Organisms-
 - unicellular organisms are made of just one cell, while multicellular organisms are made of a few to trillions of cells.
 - Examples of unicellular organisms- bacteria, some fungi like yeast and mold, amoeba, paramecium
 - Examples of multicellular organisms- all plants and animals, humans, fungi like mushrooms
- All living things are made of cells.
 - Cells only come from other cells.
 - All cells carry out basic life activities- take in molecules for energy and growth (food, oxygen and water molecules), remove waste molecules, etc.
- A microscope is a tool used to see objects that are too small to be seen by the naked eye.
 - A compound microscope uses two or more lenses to magnify an image.
 - When using a microscope, a lower power objective lets you see more cells in less detail, while a higher power objective will let you see fewer cells but in more detail.

LS 1-2 Cell Structures and Models

- Plant and animal cells are similar, except for the following:
 - Only plant cells have a cell wall, which is a stiff structure for support and protection.
 - Only plant cells have chloroplasts, which are organelles that perform photosynthesis, allowing plants to make their own food from carbon dioxide and water.
- Both plant and animal cells have the following organelles:
 - Cell membrane- controls what molecules go in and out of the cell
 - Nucleus- like the “brain” of the cell, it controls all activities
 - Mitochondria- provides energy for the cell, through cell respiration



LS 1-3 Body Systems

- In multicellular organisms, cells are organized, from simplest to most complex:
 - Cells → tissues → organs → organ systems → organism
- Cells in multicellular organisms are specialized to do different functions for the body. This is called differentiation. Examples: red blood cells for carrying oxygen, muscle cells for movement, root cells for absorption of water and minerals...
 - Tissues are groups of similar cells working together to perform a specific function.
 - Organs are groups of similar tissues working together to perform a specific function.
 - Organ systems are group so similar organs working together to perform a specific function.
 - An organism is a group of organ systems working together to be alive.
- Organ systems in the body include:
 - Digestive system- takes in food molecules and breaks them down into small enough molecules to travel through the bloodstream and into the cells. Includes the mouth, esophagus, stomach, small and large intestines.
 - Respiratory system- Lungs and airways take oxygen out of inhaled air and pass it into the bloodstream. They also remove carbon dioxide from the bloodstream to be exhaled.
 - Circulatory system- transports oxygen, nutrients and food molecules to the body cells, and transports waste molecules out. Includes the heart and blood vessels.
 - Nervous system- carries messages throughout the body using electrical impulses. Includes the sensory and motor nerve pathways.
 - Sensory nerves send information from stimuli to the brain for immediate response or storage as memories.
 - Excretory system- removes solid and liquid waste from the body. Includes the kidneys, ureters, bladder, urethra, colon, and rectum.
 - Musculoskeletal system- supports the body and allows it to move. Includes the bones and all of the muscles.

LS 1-7 Metabolism

- All living things contain carbon which is the key element found in molecules of earth organisms. Hydrogen, oxygen, nitrogen and phosphorus are also found in living organisms. These elements make up carbohydrates, proteins and lipids- necessary molecules used by the body for energy, growth and repair.

- All atoms and molecules needed by a person are obtained from outside the body through the digestive and respiratory systems. Atoms in these molecules may be rearranged by digestion or cell processes to make new molecules for growth, repair and energy that powers all of the body's life processes.
- Large food molecules, such as carbohydrates, proteins and fats, are broken down by the digestive system into smaller molecules for easier absorption into the circulatory system.
 - Chemicals called enzymes regulate chemical activities in the body and help break down these molecules. This process starts in the mouth and continues throughout the digestive system, which includes the esophagus, stomach, small and large intestines.
 - Large protein molecules are broken down into amino acids in the stomach and are used in the cells to make new proteins for repair and growth.
 - Large starch molecules are broken down into glucose which is used in cellular respiration to provide energy for the cells.
- Oxygen from the air is brought into the body via the respiratory system. Oxygen is small enough that it doesn't need to be broken down to enter the bloodstream. Carbon dioxide is a waste product that leaves the body when you exhale.
- The circulatory system carries oxygen, glucose, amino acids and other small molecules throughout the body and to all the cells. It also carries waste products back out.
- During cellular respiration, oxygen molecules from air and glucose molecules from food undergo a chemical reaction which produces energy for the body. This happens inside the mitochondria. Carbon dioxide and water molecules are produced as byproducts of this reaction.
- When a person feels sick, looking at the levels of glucose, oxygen and amino acid molecules in the respiratory system, digestive system and body cells can help you diagnose the problem.
 - Lower levels of oxygen or glucose in the cells would cause lower amounts of energy for the body
 - Lower levels of amino acids in the cells would hinder the body's abilities for growth, repair and other functions performed by proteins.
 - Low amounts of glucose or amino acids in the digestive system may indicate a problem with digestive enzymes that break down starches and proteins.
 - Low amounts of oxygen in the bloodstream or cells may indicate a problem with the respiratory system.

LS 1-8 Information Processing

- The brain controls all mental activity, such as processing and evaluating sensory information, thinking, decision making, learning, and storing memories.
- The brain sends and receives messages through the nerve cells (neurons).
 - The sensory nerves take in information from your senses (what you see, hear, taste, touch and smell) and send it to the brain for processing.
 - The motor nerves control your actions and reactions- they are responsible for movement of the body.
- Sensory systems include:
 - Eyes- have receptors that detect electromagnetic (light) waves
 - Ears- detect sound waves through vibrations that travel through the ear
 - Nose- has receptors that detect scent molecules
- When the brain receives input from one of the sensory systems, it may
 - Send a message through the motor nerves for immediate response or action
 - Ex. You see a baseball pop-fly coming your way- you respond by putting up your glove and positioning yourself in place to catch it
 - Ex. You hear a dog barking at night, so you get up and shut your window.
 - Store the input as a memory
 - Ex. You smell cookies baking and immediately remember Christmas time at Grandma's house
 - Ex. You see an iron, and remember when you touched the flat part when you were little and burned yourself. (You also respond by not touching it again!)
- Reflexes occur when some sensory information goes into the spinal cord and directly back out into the motor nerves for immediate reaction (skips the brain). This is a safety mechanism for the body. (ex. You startle when you hear a loud noise)

Body Systems Test Review Questions

Name _____

Date _____ Hour _____

LS 1-1 Cell Theory

1. What is the difference between a unicellular organism and a multicellular organism? Give two examples of each.

2. How are cells in multicellular organisms organized, from simple to complex?

3. A group of similar cells working together is called a _____.

4. A group of similar tissues working together is called a(n) _____.

5. A group of organs working together is called a(n) _____.

6. A group of organ systems working together is called a(n) _____.

7. What are specialized cells and do they occur in unicellular or multicellular organisms?

8. What is cell differentiation?

9. What kinds of activities do all living cells perform?

10. How is a microscope used to view cells and other tiny things?

LS 1-2 Cell Structures

1. What two structures do plant cells have that animal cells do not?

2. Which organelle controls what molecules go in and out of the cell?

3. Which organelle is like the “brain” and controls all activities of the cell?

4. Which organelle is like the “powerhouse” and produces energy for the cell?

LS 1-3 Body Systems

1. What is the level of organization of cells in multicellular organisms from simple to complex?

2. What are groups of cells that work together called?

3. What are groups of tissues that work together called?

4. What are groups of organs that work together called?

5. What are groups of organ systems that work together called?

6. Which system breaks down large food molecules into smaller molecules that can fit into the bloodstream and body cells?

7. What are the parts of the digestive system?

8. Which system takes in oxygen from the air and into the bloodstream. It also expels carbon dioxide?

9. Which system transports oxygen, food molecules, water and other nutrients throughout the body?

10. Which system filters and removes waste from the body?

11. Which system is responsible for support and movement of the body?

12. Which system sends and receives messages between the brain and the rest of the body?

LS1-7 Metabolism

1. Molecules used by the cell to produce energy are:

2. Molecules used by the cell to build proteins are:

3. In digestion, large starch molecules are broken down into

4. In digestion, large protein molecules are broken down into

5. Special proteins that regulate chemical activities in the body and break down food molecules in the digestive system are called

6. The chemical reaction that produces energy for the cell is called

7. The process above occurs in the _____ of the cell.

8. Cellular respiration produces _____ for the cell, as well as the molecules _____ and _____.

9. How do cells make new proteins?

10. If a patient has low glucose levels in her cells, what might be the problem?

11. If a patient has low oxygen levels in her cells, what might be the problem?

12. If a patient has normal amounts of amino acids and glucose in his cells, but lower amounts of oxygen, will he be able to exercise normally?

13. If a patient has normal amount of starch in his digestive system, but lower amounts of glucose, what might be the problem, and how would it affect him?

1-8 Information Processing

1. What are some functions of the brain?

2. How does the brain send and receive messages?

3. What is the difference between sensory nerves and motor nerves?

4. What kinds of information do receptors in your eyes detect?

5. What kinds of information do receptors in your ears detect?

6. What kinds of information do receptors in your nose detect?

7. List two responses your brain may make to incoming information from the sensory nerves:

a. _____

b. _____

8. What is a reflex and how does it work?

Body Systems Test Study Guide
LS1-1, LS1-2, LS 1-3, LS1-7, LS1-8

Name _____

Key

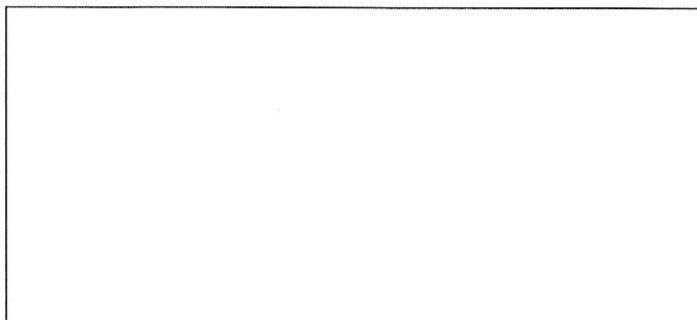
Key Concepts to Review

LS1-1 Cell Theory

- Unicellular vs. Multicellular Organisms-
 - unicellular organisms are made of just one cell, while multicellular organisms are made of a few to trillions of cells.
 - Examples of unicellular organisms- bacteria, some fungi like yeast and mold, amoeba, paramecium
 - Examples of multicellular organisms- all plants and animals, humans, fungi like mushrooms
- All living things are made of cells.
 - Cells only come from other cells.
 - All cells carry out basic life activities- take in molecules for energy and growth (food, oxygen and water molecules), remove waste molecules, etc.
- A microscope is a tool used to see objects that are too small to be seen by the naked eye.
 - A compound microscope uses two or more lenses to magnify an image.
 - When using a microscope, a lower power objective lets you see more cells in less detail, while a higher power objective will let you see fewer cells but in more detail.

LS 1-2 Cell Structures and Models

- Plant and animal cells are similar, except for the following:
 - Only plant cells have a cell wall, which is a stiff structure for support and protection.
 - Only plant cells have chloroplasts, which are organelles that perform photosynthesis, allowing plants to make their own food from carbon dioxide and water.
- Both plant and animal cells have the following organelles:
 - Cell membrane- controls what molecules go in and out of the cell
 - Nucleus- like the “brain” of the cell, it controls all activities
 - Mitochondria- provides energy for the cell, through cell respiration



LS 1-3 Body Systems

- In multicellular organisms, cells are organized, from simplest to most complex:
 - Cells → tissues → organs → organ systems → organism
- Cells in multicellular organisms are specialized to do different functions for the body. This is called differentiation. Examples: red blood cells for carrying oxygen, muscle cells for movement, root cells for absorption of water and minerals...
 - Tissues are groups of similar cells working together to perform a specific function.
 - Organs are groups of similar tissues working together to perform a specific function.
 - Organ systems are group so similar organs working together to perform a specific function.
 - An organism is a group of organ systems working together to be alive.
- Organ systems in the body include:
 - Digestive system- takes in food molecules and breaks them down into small enough molecules to travel through the bloodstream and into the cells. Includes the mouth, esophagus, stomach, small and large intestines.
 - Respiratory system- Lungs and airways take oxygen out of inhaled air and pass it into the bloodstream. They also remove carbon dioxide from the bloodstream to be exhaled.
 - Circulatory system- transports oxygen, nutrients and food molecules to the body cells, and transports waste molecules out. Includes the heart and blood vessels.
 - Nervous system- carries messages throughout the body using electrical impulses. Includes the sensory and motor nerve pathways.
 - Sensory nerves send information from stimuli to the brain for immediate response or storage as memories.
 - Excretory system- removes solid and liquid waste from the body. Includes the kidneys, ureters, bladder, urethra, colon, and rectum.
 - Musculoskeletal system- supports the body and allows it to move. Includes the bones and all of the muscles.

LS 1-7 Metabolism

- All living things contain carbon which is the key element found in molecules of earth organisms. Hydrogen, oxygen, nitrogen and phosphorus are also found in living organisms. These elements make up carbohydrates, proteins and lipids- necessary molecules used by the body for energy, growth and repair.

- All atoms and molecules needed by a person are obtained from outside the body through the digestive and respiratory systems. Atoms in these molecules may be rearranged by digestion or cell processes to make new molecules for growth, repair and energy that powers all of the body's life processes.
- Large food molecules, such as carbohydrates, proteins and fats, are broken down by the digestive system into smaller molecules for easier absorption into the circulatory system.
 - Chemicals called enzymes regulate chemical activities in the body and help break down these molecules. This process starts in the mouth and continues throughout the digestive system, which includes the esophagus, stomach, small and large intestines.
 - Large protein molecules are broken down into amino acids in the stomach and are used in the cells to make new proteins for repair and growth.
 - Large starch molecules are broken down into glucose which is used in cellular respiration to provide energy for the cells.
- Oxygen from the air is brought into the body via the respiratory system. Oxygen is small enough that it doesn't need to be broken down to enter the bloodstream. Carbon dioxide is a waste product that leaves the body when you exhale.
- The circulatory system carries oxygen, glucose, amino acids and other small molecules throughout the body and to all the cells. It also carries waste products back out.
- During cellular respiration, oxygen molecules from air and glucose molecules from food undergo a chemical reaction which produces energy for the body. This happens inside the mitochondria. Carbon dioxide and water molecules are produced as byproducts of this reaction.
- When a person feels sick, looking at the levels of glucose, oxygen and amino acid molecules in the respiratory system, digestive system and body cells can help you diagnose the problem.
 - Lower levels of oxygen or glucose in the cells would cause lower amounts of energy for the body
 - Lower levels of amino acids in the cells would hinder the body's abilities for growth, repair and other functions performed by proteins.
 - Low amounts of glucose or amino acids in the digestive system may indicate a problem with digestive enzymes that break down starches and proteins.
 - Low amounts of oxygen in the bloodstream or cells may indicate a problem with the respiratory system.

LS 1-8 Information Processing

- The brain controls all mental activity, such as processing and evaluating sensory information, thinking, decision making, learning, and storing memories.
- The brain sends and receives messages through the nerve cells (neurons).
 - The sensory nerves take in information from your senses (what you see, hear, taste, touch and smell) and send it to the brain for processing.
 - The motor nerves control your actions and reactions- they are responsible for movement of the body.
- Sensory systems include:
 - Eyes- have receptors that detect electromagnetic (light) waves
 - Ears- detect sound waves through vibrations that travel through the ear
 - Nose- has receptors that detect scent molecules
- When the brain receives input from one of the sensory systems, it may
 - Send a message through the motor nerves for immediate response or action
 - Ex. You see a baseball pop-fly coming your way- you respond by putting up your glove and positioning yourself in place to catch it
 - Ex. You hear a dog barking at night, so you get up and shut your window.
 - Store the input as a memory
 - Ex. You smell cookies baking and immediately remember Christmas time at Grandma's house
 - Ex. You see an iron, and remember when you touched the flat part when you were little and burned yourself. (You also respond by not touching it again!)
- Reflexes occur when some sensory information goes into the spinal cord and directly back out into the motor nerves for immediate reaction (skips the brain). This is a safety mechanism for the body. (ex. You startle when you hear a loud noise)

Body Systems Test Review Questions

Name _____

Date _____ Hour _____

LS 1-1 Cell Theory

1. What is the difference between a unicellular organism and a multicellular organism? Give two examples of each.

Unicellular - 1 cell (bacteria)
Multicellular - 2 or more cells (human)

2. How are cells in multicellular organisms organized, from simple to complex?

Cell, tissue, organ, organ system, organism

3. A group of similar cells working together is called a _____.

tissue

4. A group of similar tissues working together is called a(n) _____.

organ

5. A group of organs working together is called a(n) _____.

organ system

6. A group of organ systems working together is called a(n) _____.

organism

7. What are specialized cells and do they occur in unicellular or multicellular organisms?

Sp. cells have a specific job to do.
Multicellular.

8. What is cell differentiation?

Specialized to do a different function.

9. What kinds of activities do all living cells perform?

Respiration, food, waste, oxygen, move, etc.

10. How is a microscope used to view cells and other tiny things?

Lets you see with lenses, small objects.

LS 1-2 Cell Structures

1. What two structures do plant cells have that animal cells do not?

Cell wall + Chloroplast.

2. Which organelle controls what molecules go in and out of the cell?

cell membrane

3. Which organelle is like the "brain" and controls all activities of the cell?

Nucleus

4. Which organelle is like the "powerhouse" and produces energy for the cell?

Mitochondria

LS 1-3 Body Systems

1. What is the level of organization of cells in multicellular organisms from simple to complex?

cell, tissue, organ, organ system, organism

2. What are groups of cells that work together called?

tissue

3. What are groups of tissues that work together called?

organs

4. What are groups of organs that work together called?

organ systems

5. What are groups of organ systems that work together called?

organism

6. Which system breaks down large food molecules into smaller molecules that can fit into the bloodstream and body cells?

digestive system

7. What are the parts of the digestive system?

mouth, esophagus, stomach, small and large intestine

8. Which system takes in oxygen from the air and into the bloodstream. It also expels carbon dioxide?

Respiratory

9. Which system transports oxygen, food molecules, water and other nutrients throughout the body?

Circulatory

10. Which system filters and removes waste from the body?

excretory

11. Which system is responsible for support and movement of the body?

muscular/skeletal

12. Which system sends and receives messages between the brain and the rest of the body?

Nervous

LS1-7 Metabolism

1. Molecules used by the cell to produce energy are:

Glucose & Oxygen

2. Molecules used by the cell to build proteins are:

amino acids

3. In digestion, large starch molecules are broken down into

glucose

4. In digestion, large protein molecules are broken down into

amino acids

5. Special proteins that regulate chemical activities in the body and break down food molecules in the digestive system are called

enzymes

6. The chemical reaction that produces energy for the cell is called

cellular respiration

7. The process above occurs in the mitochondria of the cell.

8. Cellular respiration produces energy for the cell, as well as the molecules carbon dioxide and water.

9. How do cells make new proteins?

Proteins are broken down into amino acids and then reassembled in the cell into proteins.

10. If a patient has low glucose levels in her cells, what might be the problem?

Break down of starches in the digestive system

11. If a patient has low oxygen levels in her cells, what might be the problem?

Problem in respiratory system

12. If a patient has normal amounts of amino acids and glucose in his cells, but lower amounts of oxygen, will he be able to exercise normally?

No

13. If a patient has normal amount of starch in his digestive system, but lower amounts of glucose, what might be the problem, and how would it affect him?

Enzymes not breaking down starches. Low energy.

1-8 Information Processing

1. What are some functions of the brain?

Mental activity like thinking, decision making, learning & storing memories

2. How does the brain send and receive messages?

Through nerve cells

3. What is the difference between sensory nerves and motor nerves?

Sensory nerves - take in information
Motor nerves - control actions and reactions

4. What kinds of information do receptors in your eyes detect?

electromagnetic (light) waves

5. What kinds of information do receptors in your ears detect?

Sound (vibrations)

6. What kinds of information do receptors in your nose detect?

Scent - chemical compounds

7. List two responses your brain may make to incoming information from the sensory nerves:

- a. Send a message for immediate response
- b. Store the input as a memory

8. What is a reflex and how does it work?

You sense information which goes to the spinal cord and a response is sent back to the body.

