

Cells

Teacher Materials



Teacher Preparation

Before you begin this unit, photocopy and distribute the following to students:

- Word Web (page 15)
- Unit Vocabulary (page 16)
- Vocabulary Crossword Puzzle* (page 17)
- Student Briefs (pages 18–23)
- Unit Assessments (pages 24–34)

* *You may wish to decrease the difficulty of the crossword puzzle by providing students with a list of words as a reference.*



Key Unit Concepts

- *Cells* are the smallest units of life.
- Cells are *microscopic*.
- Cells perform life functions, like producing food and taking in oxygen.
- Cells are made up of many parts, including a *cell membrane* and a *nucleus*.
- The *nucleus* controls the cell.
- *Chromosomes* carry instructions for the cells.
- Chromosomes are located in the nucleus.
- Chromosomes are made up of the chemical molecule DNA.
- A person receives 23 chromosomes from each of his or her parents.
- *Genes* are located in the DNA.
- Genes determine our personal traits.
- *Heredity* means the passing of genes to subsequent generations.
- Cells have different shapes according to the type of function they perform.
- *Tissue* is made of a single type of cell.
- *Organs* are made from multiple types of tissue.
- *Organ systems* are two or more organs working in tandem to perform a function.



Discussion Topics

- Name some organs systems in the human body. What jobs do these systems perform?
- Discuss what makes people different from each other. Where do these differences come from?

See “Generic Strategies and Activities” on pages 8 and 9 for additional strategies useful to presenting this unit.

Cells

Activities



Brief #1: The Parts of Cells

- **Conduct an Interview:** Interview family members to determine what familial traits all of you have in common. Make a list of what these traits are.
- **Find Inherited Traits:** There are many traits that people have that are inherited from their parents. Some of these traits are dimples, the ability to roll the tongue, attached or unattached earlobes, being right- or left-thumbed, or having the second toe on the foot being longer than the big toe. Have students examine themselves and classmates for some of these inherited traits.
- **Be a Tour Guide:** Pretend you are a cell tour guide. Take visitors on a walk through a human cell. Explain the different parts. Tell what jobs these various parts do.
- **Make a Chart:** Human beings have 46 chromosomes. But not all living things have the same number of chromosomes. Find out the number of chromosomes in the following animals and make a chart that shows this data: fruit fly, dog, cat, goldfish, horse, cow.

Key Words: *inherited traits, chromosomes in animals*



Brief #2: How Cells Work

- **Make an Informational Poster:** The cells that form tissue in the human body come in many shapes. Research the shape of some human cells—blood cells, muscle cells, nerve cells, bone cells, etc. Then create an informational poster that includes illustrations of the cells and text that describes how their shape helps them to get a job done.
- **Write an Organ Monologue:** Select one organ in the human body and write a monologue from the point of view of that organ. Make sure to include information about location, shape and size, and specific job.

Key Words: *types of human cells, shapes of human cells, organs of human body*



Brief #3: Organ Systems

- **Research and Report:** Select one of the following organ systems to research: respiratory system, digestive system, nervous system, skeletal system, or muscular system. Create a report that tells what the organs are in the system and how they work together. Includes illustrations, graphs, charts, or any other materials that you think will help provide information about the system.

Key Words: *systems of the human body*



Internet Resources

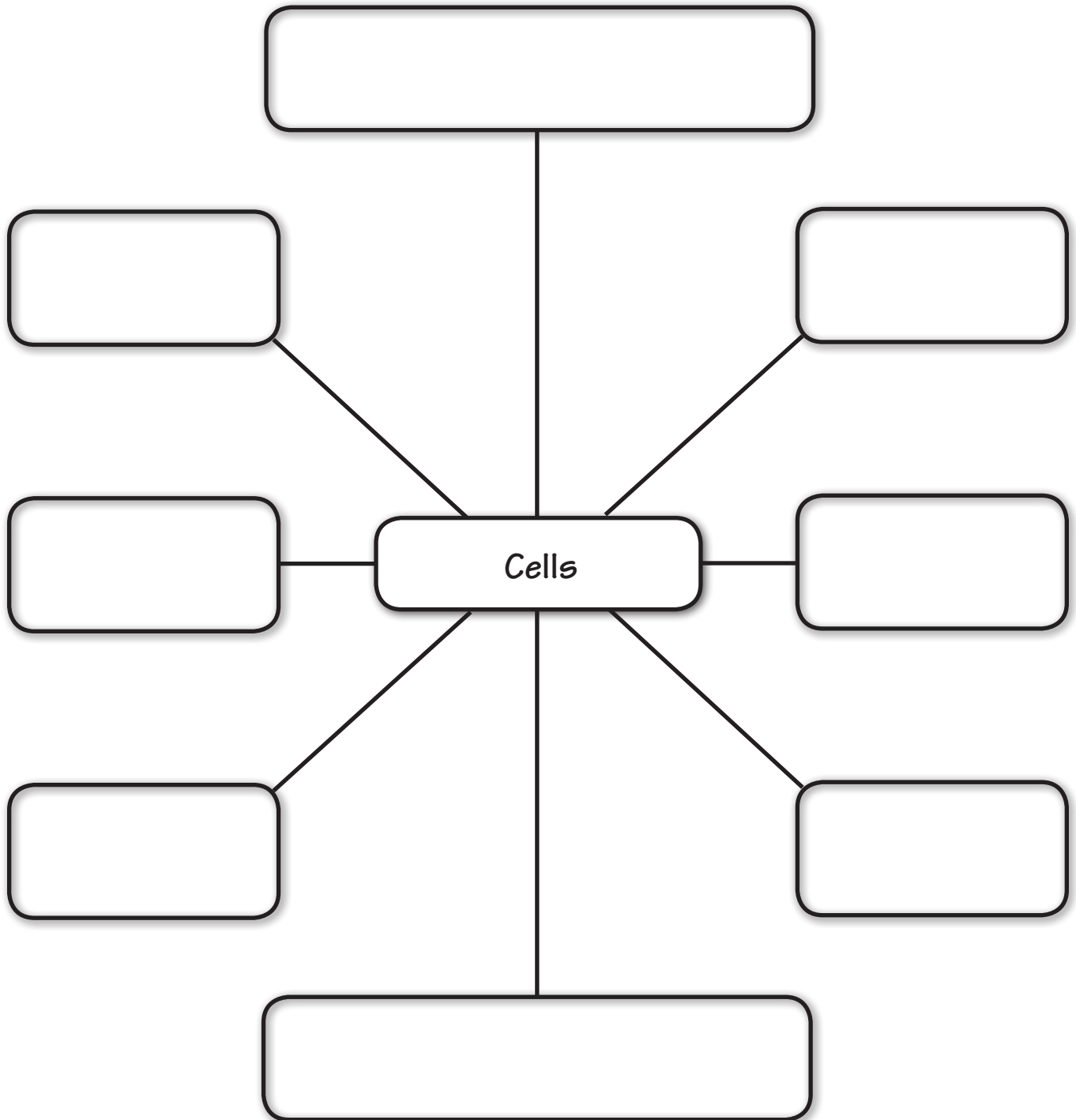
- <http://kidshealth.org/kid/> — a great site from the Nemours Foundation, designed especially for children of all ages; includes relevant information in the form of games, recipes, and articles

Cells

Student Introduction: Cells Word Web

Name: _____ Date: _____

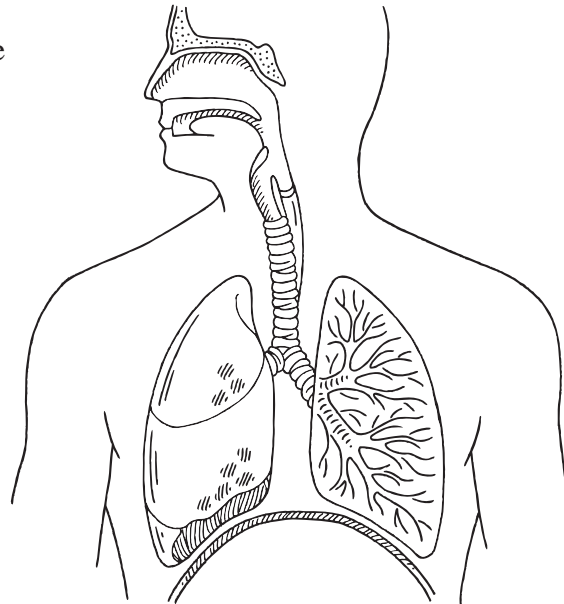
Directions: Use this word web to help you brainstorm the characteristics of cells. What do cells do? What are the different parts of cell?



Cells

Vocabulary

1. **cell membrane**—the protective covering of a cell
2. **cells**—the smallest units of life
3. **chromosomes**—where the cell instructions are located
4. **DNA**—a double-helix-shaped chemical molecule that contains genes and is located in the chromosomes
5. **double helix**—the shape of DNA molecules; a shape like that of a twister ladder
6. **genes**—the part of DNA that determines what our personal traits will be
7. **microscopic**—something that can't be seen without using a microscope
8. **neurons**—nerve cells
9. **nucleus**—the control center of a cell
10. **organ**—groups of different types of tissue working together to do a job
11. **organ system**—two or more organs working together to perform a specific job or function
12. **round cells**—cells that have a round shape, like red blood cells
13. **tissue**—group of the same kinds of cells working together to do a job

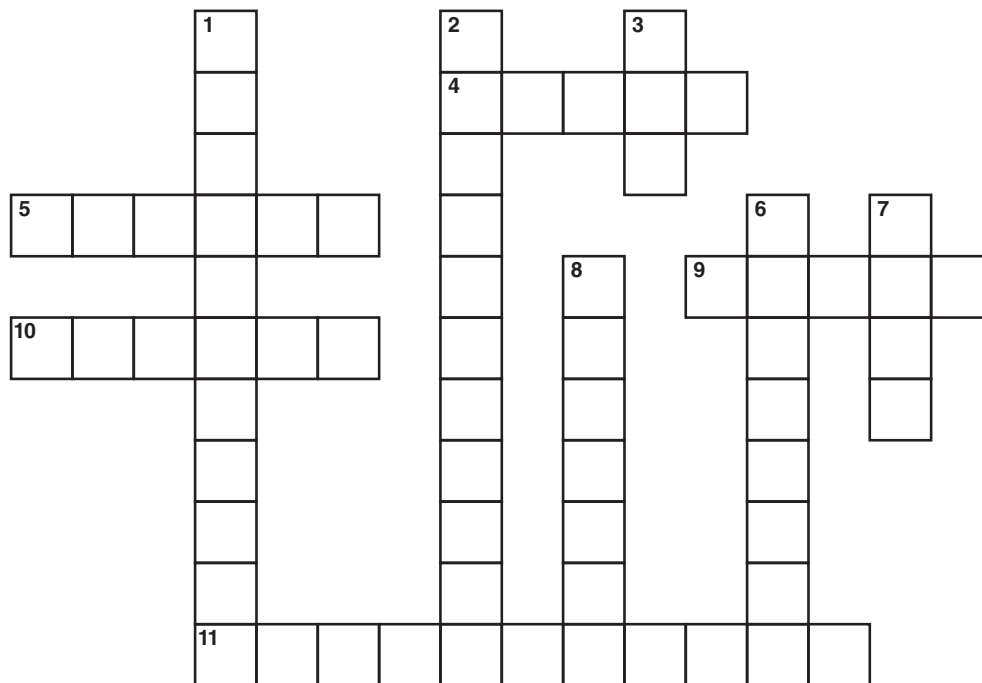


Cells

Vocabulary Crossword Puzzle

Name: _____ Date: _____

Directions: Complete the crossword puzzle. All of the words are vocabulary from Unit #1.



Across

- 4. shape of red blood cells
- 5. nerve cell
- 9. trait providers
- 10. group of same cells
- 11. location of cell instructions

Down

- 1. can't be seen with the naked eye
- 2. two or more organs
- 3. double-helix molecule
- 6. cell covering
- 7. smallest unit of life
- 8. cell's control center

Cells

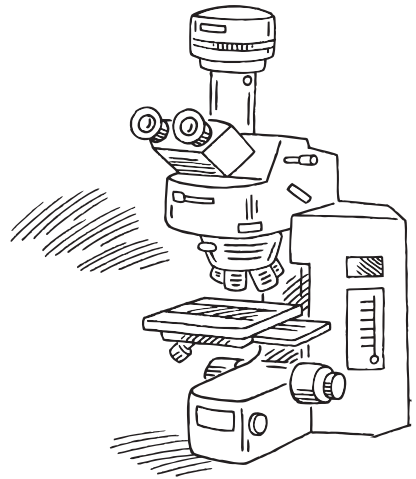
Brief #1: The Parts of Cells

Focus

Cells have different parts that perform specific functions.

All living things on our planet are made up of cells. It doesn't matter whether the living thing is big or small, swims or flies, or is a plant or an animal. **Cells are the smallest units of life.** They are the building blocks of life on Earth.

Cells are microscopic. **If something is microscopic, that means that you can't see it without using a microscope.** There are some animals on the Earth that are made up of only a single cell. But there are others, like elephants and people, that contain trillions and trillions of cells.



The Life of a Cell

Even though cells are tiny, they have the same basic needs as larger organisms. For example, cells need to take in oxygen and produce food.

They also need to remove waste products from their systems. Cells respond to changes in their environment, just as people do. Cells do all of these things so they can grow and divide, which is how new cells are made.



Cells Parts

Your body is made up of many different parts, and these parts all have different jobs to do. For example, your heart and lungs keep oxygen-rich blood circulating through your body. Your muscles enable you to move around. Cells are also made up of smaller parts. These smaller parts help cells to do many of the same things that your body does.

All cells have a cell membrane. **The cell membrane is kind of like the skin of the cell.** It protects the inner parts of the cell. The cell membrane allows things like oxygen and water to enter the cells. But it also allows waste materials, like carbon dioxide, to leave the cell.

Cells also have mitochondria and vacuoles. Mitochondria combine oxygen and food to produce energy, while vacuoles store and break down materials.

Inside every cell there is a nucleus. The cell nucleus is very important. **The nucleus is the control center of the cell.** Inside each nucleus there are chromosomes. **Chromosomes hold the instructions for each cell.** In other words, it is the chromosomes that tell each cell what their job is and how to do it.

Vocabulary

1. cells
2. microscopic
3. cell membrane
4. nucleus
5. chromosomes

Cells

Brief #1: The Parts of Cells (cont.)



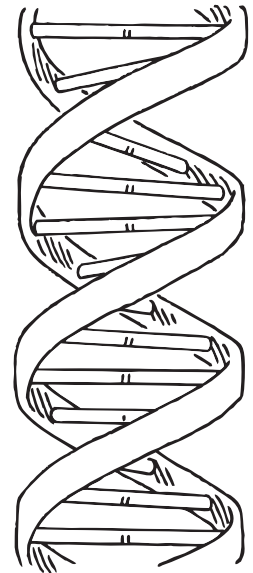
Cells Parts (cont.)

Chromosomes are made up of a chemical molecule called deoxyribonucleic acid. The abbreviation for this chemical molecule is *DNA*. DNA has a specific shape. This shape is called a **double helix, which look a bit like a twisted ladder.** Every cell nucleus has 46 chromosomes. Every person inherits half, or 23, of his/her chromosomes from his/her mother and the other half from his/her father.

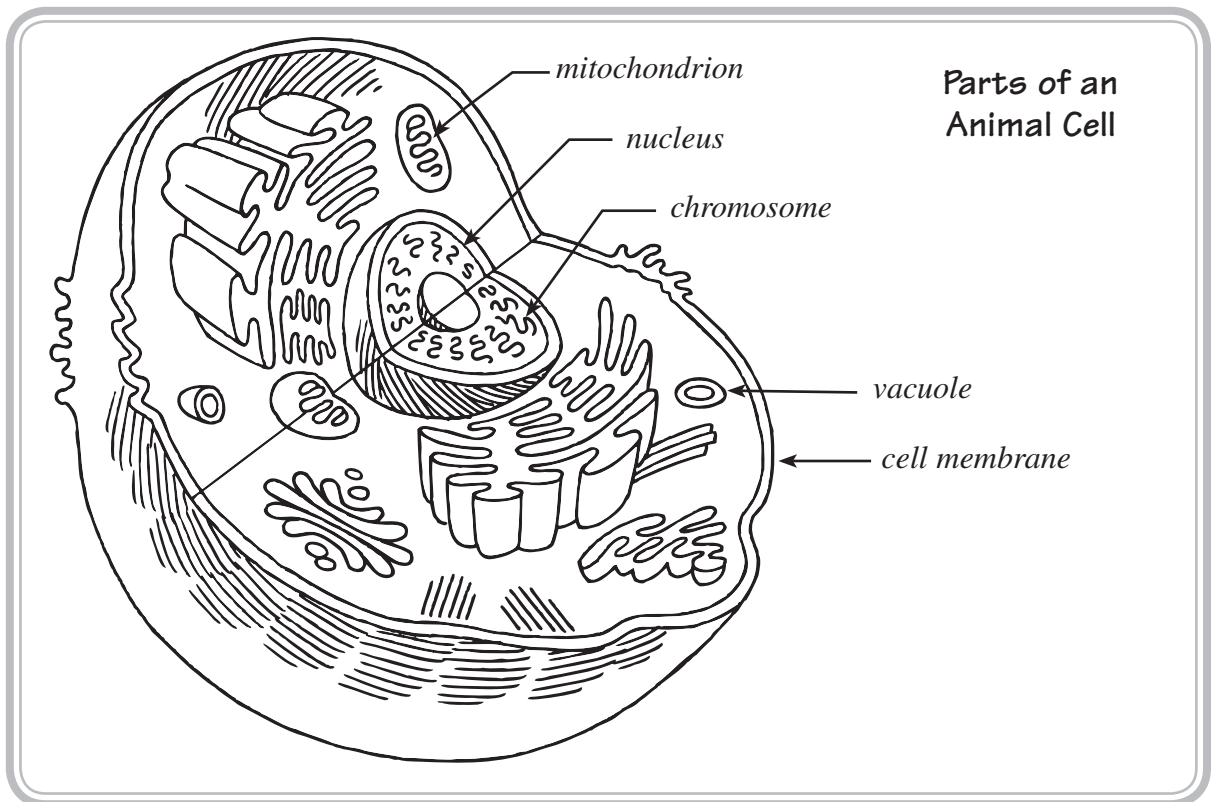
Part of the DNA in the chromosomes is made up of genes. Each gene carries one piece of information. It is our genes that determine how tall we become, the color of our eyes and hair, and other traits that make us who we are. All of the cells in a particular human body have copies of the same genes. Each person is made up of about 50,000 different genes.

Vocabulary

6. DNA
7. double helix
8. gene



*double-helix-shaped
DNA molecule*



**Parts of an
Animal Cell**

Cells

Brief #1: The Parts of Cells *(cont.)*

Learning Toolbox

sung to the tune of "Old MacDonald"

Old MacDonald's made of cells, DN-DN-A,
And in his cells are chromosomes, DN-DN-A.
23 from Mom, 23 from Dad,
23 and 23, that makes 46,
Old MacDonald's made of cells, DN-DN-A.

Old MacDonald's chromosomes are made of DNA,
And in that DNA you'll find fifty thousand genes.
With a gene gene here, and a gene gene there,
Here a gene, there a gene, fifty thousand gene genes,
Old MacDonald's chromosomes are made of DNA.

Your parents pass their genes to you, and then you pass them on,
Heredity's the name of when the genes get passed along.
With a trait trait here, and a trait trait there,
Here a trait, there a trait, everywhere a trait trait,
Everybody's made of cells, DN-DN-A.



Cells

Brief #2: How Cells Work

Focus

Different types of cells perform specialized jobs in the human body.

The human body is made up of trillions and trillions of cells. But all of these cells are not the same. Your body is full of all different types of cells. There are muscle cells, bone cells, and cells that make up your hair and nails. These cells have different shapes that help them to do their job. All of these different types of cells work together to make the human body function.



Some Cell Types

Neurons are the cells that make up the nervous system.

Neurons relay information from the brain to the body, and vice versa. For example, let's say that you wanted to reach your hand up to catch a ball. The neurons in your brain would very rapidly carry this

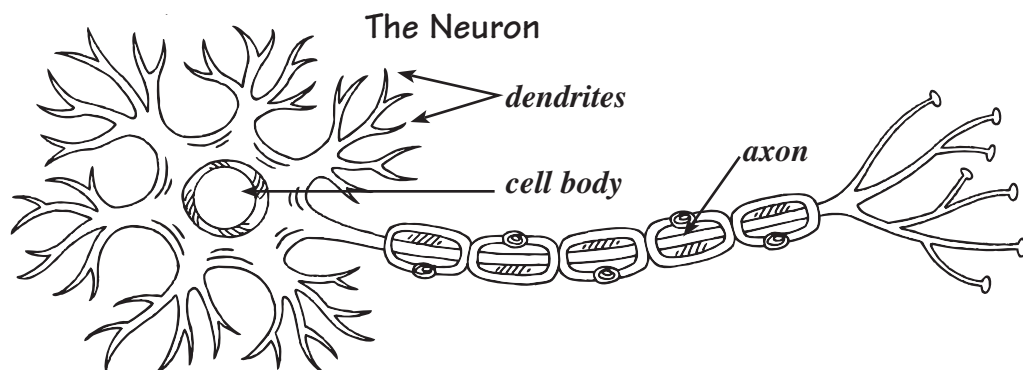
message from your brain down through the muscles in your arm so you could raise it up in the air and catch the ball.

Now let's say that you accidentally touched the handle of a very hot pot. Ouch! In this case, the neurons in your hand send an almost-instant message to your brain that tells you to let go of the handle!

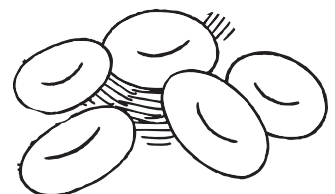
The special shape of the neuron helps it to do its job of sending and receiving information.

Vocabulary

1. neurons
2. round cells



Round cells are shaped just like their name. Red blood cells are round cells. The job of a red blood cell is to carry oxygen through the body. The specific shape of a red blood cell helps it to do its job. If you look carefully at the illustration to the right, you will see that red blood cells are smooth and have indentations in their middles. Those little indentations create more surface area. That means the cell can carry more oxygen. Their smoothness allows these cells to glide easily through the blood vessels.



Cells

Brief #2: How Cells Work (cont.)



Tissue

Most cells are so small that they can't be seen without the help of a microscope. But if enough cells join together, they can become visible. This is how tissue is formed in the body.

Tissue is a large group of the same kinds of cells that have joined together to do a job.

Cells can create all sorts of different types of tissue.

Nerve cells, or neurons, join together to make nerve tissue. Muscle cells join together to make muscle tissue, and skin cells join together to make skin tissue. In fact, when you look at your skin, what you are really seeing are trillions and trillions of flat skin cells that are connected together like the fibers in a blanket.

Vocabulary

3. tissue

4. organ

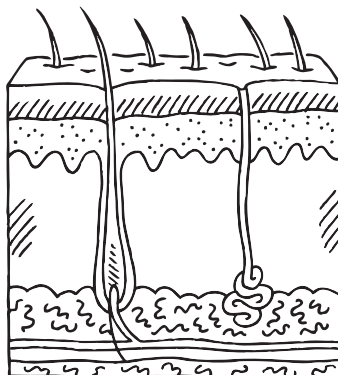


Organs

You know that your body isn't made up of just tissue. You are full of different types of organs that do special jobs. Your heart and lungs are organs that pump blood and oxygen throughout your body. Your brain is an organ that is located inside of your skull. **Organs are made up of different types of tissue that work together to do a job that helps your body function.**

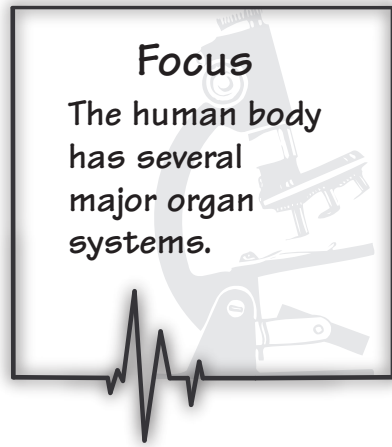
Fast Facts

1. Skin is the largest organ in your body.
2. Skin is made up of layers and layers of cells.
3. Skin protects other organs and helps keep germs and bacteria out.
4. You shed about 40,000 dead skin cells every minute.
5. The eyelid has the thinnest skin on the body.



Cells

Brief #3: Organ Systems



Inside of your body there are organs made of tissues, and these tissues are made of cells. But the organs in your body do not usually work separately from each other. Most of the organs in your body work together to get a job done.

Think of the different parts of a bicycle. The wheels, gears, pedals, and chain all work together to make the bicycle move. **An organ system is two or more organs that work together to help your body perform an important function or job.**



Some Organ Systems

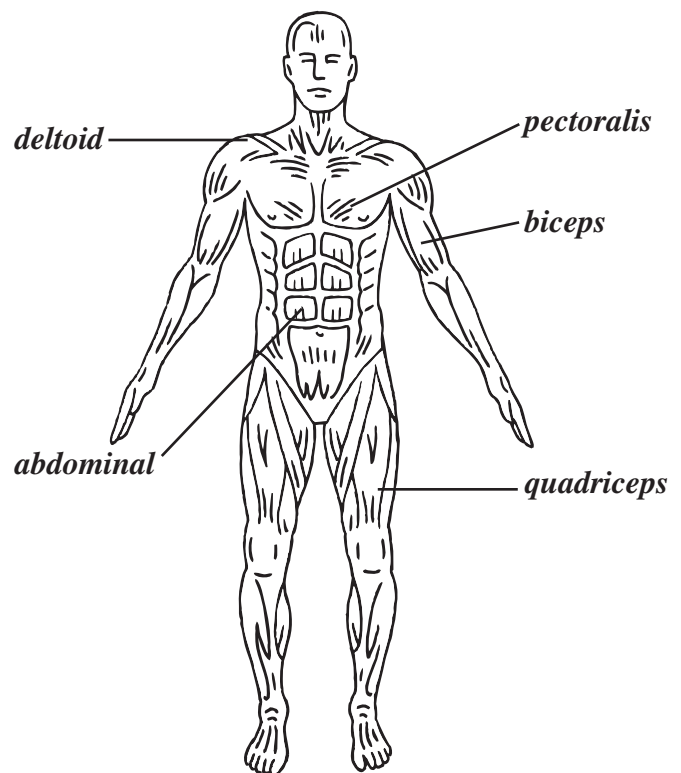
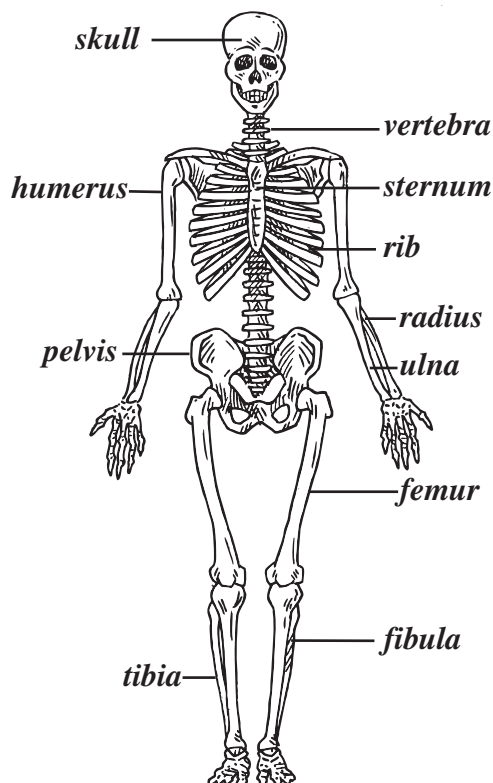
The skeletal system is one major organ system in the human body. This system is made up of 206 bones.

The bones of the human body provide a frame for the muscles. They protect internal organs and make it possible for us to move around.

Of course, your bones couldn't move around at all unless they were covered and connected by muscles. The muscles of the body form another major organ system. The human body has 640 muscles. And yet another organ system runs through your muscles, helping them to work. That is your nervous system.

Vocabulary

1. organ system



Cells

Sentence-Completion Assessment

Name: _____ Date: _____

Directions: Read each statement. Fill in the word or words that best complete the sentence.

1. A _____ is the smallest unit of life.
2. In order to live, cells must take in _____ and make _____.
3. The cell _____ protects the inner parts of the cell.
4. The cell membrane is kind of like the _____ of the cell.
5. The _____ acts like the brain of the cell.
6. The chromosomes are located in the _____.
7. The _____ tell each cell what to do and how to do it.
8. The number of chromosomes each person has is _____.
9. DNA is a _____ molecule.
10. You inherit your chromosomes from your _____.



Cells

Sentence-Completion Assessment *(cont.)*

11. DNA is located in the _____ .
12. The _____ carry information about our traits.
13. The number of genes that people have is about _____ .
14. Cells have different shapes to help them do specific _____ .
15. A nerve cell is also called a _____ .
16. The shape of a red blood cell is _____ .
17. A group of the same cells working together is called _____ .
18. The shape of a skin cell is _____ .
19. When different groups of tissue work together, _____ are formed.
20. An _____ is two or more organs working together to do a specific job.



Answer Key

Unit #1

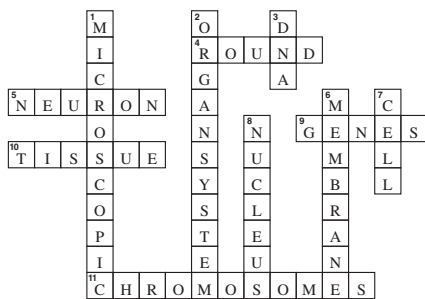
Crossword Puzzle (page 17)

Across

4. round
5. neuron
9. genes
10. tissue
11. chromosomes

Down

1. microscopic
2. organ system
3. DNA
6. membrane
7. cell
8. nucleus



Multiple-Choice (pages 24–27)

1. A
2. B
3. D
4. C
5. C
6. C
7. A
8. B
9. C
10. A
11. B
12. D
13. D
14. B
15. C
16. B

17. C

18. B

19. A

20. D

Sentence-Completion (pages 28–29)

1. cell
2. oxygen, food
3. membrane
4. skin
5. nucleus
6. nucleus
7. chromosomes
8. 46
9. chemical
10. parents
11. chromosomes

12. genes

13. 50,000

14. jobs

15. neuron

16. round

17. tissue

18. flat

19. organs

20. organ system

True-False (pages 30–31)

1. T
2. T
3. F
4. T
5. T
6. F
7. T
8. F
9. T
10. F
11. T
12. T

13. F

14. T

15. F

16. F

17. F

18. F

19. T

20. F

Matching (pages 32–33)

1. K
2. V
3. A
4. H
5. W
6. F
7. C
8. U
9. T
10. S
11. R
12. Q
13. J
14. G
15. P
16. B
17. D
18. O
19. N
20. I

Graphic (page 34)

Check graphics for accuracy and understanding. Use the diagram on page 19 as a guide.

Unit #2

Crossword Puzzle (page 41)

Across

4. trachea
6. larynx
9. arteries