



Cells and Tissues

3_A

Introducing the Read-Aloud

10 minutes

Essential Background Information or Terms

5 minutes

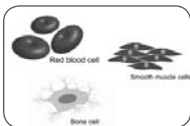
Show students Image Card 4 (Human Cell). Ask students if any of them can identify what they are seeing. Tell them it is a human cell. Explain that cells are the tiny building blocks that make up the human body; Nick Nutri mentioned cells at the end of the last read-aloud. Tell students that cells are the smallest units of all living things, not just of the human body. Cells are so small they cannot be seen without a microscope. Ask students if they remember what a microscope does. (makes tiny, almost invisible things appear much larger)

Refer students to the name of today's read-aloud, "Cells and Tissues." Tell them they are going to learn about cells and groups of cells. These groups of cells are called tissues.

Vocabulary Preview

5 minutes

Cells



← Show image 3A-5: Blood, muscle, and bone cells

1. In today's read-aloud, Nick Nutri is going to tell you about *cells*.
2. Say the word *cells* with me three times.
3. Cells are the smallest units, or parts, of living things.
4. Our bodies are made up of billions of tiny, microscopic cells.
5. [Point to each type of cell, and have students repeat the names of the cells after you. Ask for volunteers to describe each type of cell.] What do you notice is the same about all of the different cells? What is different?



Tissue

← Show image 3A-9: Muscle tissue

1. In today's read-aloud, you will hear about the four main types of *tissue* in our bodies.
2. Say the word *tissue* with me three times.
3. Tissue is a collection of the same kinds of cells working together to do the same job.
4. Muscle tissue makes up muscles that help our bodies move.
5. [Show Image Card 5 (Muscle Tissue).] What do you think muscle tissue makes? Can you see muscles in this picture? This is a closer image of muscle tissue. Can you see the cells that make up the tissue? Why not?

Purpose for Listening

Ask students to listen carefully to find out the relationship between cells and tissues in the human body, as well as about the four different types of tissues in the human body.

Cells and Tissues

Today we are going to talk about **cells**. When you hear the word *cell*, what is the first thing that comes to your mind?



← **Show image 3A-1: Nick Nutri holding a cell phone**

It may be that you think of a cell phone like this. Telephone companies divide cities, towns, and countrysides into lots of separate areas in order to provide the best service. Each area is called a cell. That's why mobile¹ phones are called cell phones. They use signals from lots of different cells.

1 or moveable

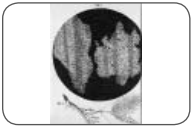
What do you remember about the hives of honeybees?² Their hives are made up of lots of different areas called cells, too. Different activities occur in each cell. Another example that might help us understand cells would be a large multi-floor school building that has many classrooms. A teacher is in each classroom, similar to cells lined up one after the other inside beehives. The word *cell* describes one of many small parts that form a much larger area. One classroom is like one cell of many cells or rooms in a school, like a honeybee's cell is one of many cells in a hive.³

2 [Show Image Card 2 (Bee Hive).]

Because you're learning about the human body, you may have guessed that we're not going to be talking about cell phones or honeybees today! Instead, we will focus on human body cells. These cells were a mystery to people for thousands of years. No one even knew they existed. The invention of the microscope changed all of that. Microscopes magnify cells, making them big enough for the human eye to see.

3 But unlike the cells of a beehive, the cells of living things are too small to be seen without the aid of a microscope.

Last time, I mentioned a man whose book of **microscopic** organisms, or living things, influenced the work of Anton van Leeuwenhoek.



← **Show image 3A-2: A view of Hooke’s cork cells**

4 [Show Image Card 3 (Cork Tree and Cork Board).] You are probably familiar with corkboards or bulletin boards made with cork. Cork comes from cork trees.

The man was an Englishman named Robert Hooke. In one of Hooke’s first experiments with a microscope, he sliced open the stem of a cork plant and placed it under his lens.⁴ What he saw amazed him. The cork was made up of tiny walled spaces. These little boxes reminded him of the cells in a honeycomb. Hooke was the first to use the term *cell* to describe what he saw through the microscope. We still use the word *cell* today when referring to these tiny little boxes of which all living things, both plants and animals, are made.



← **Show image 3A-3: Giraffe with an oxpecker**

5 or jobs

6 Who remembers what *microscopic* means? (can only be seen using a microscope)

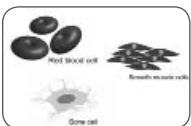
All living things, no matter how big or how small, are made up of microscopic units called cells. Cells are the body’s building blocks, the smallest units of life that can carry out the **functions**⁵ of a living thing. They are so small that they cannot be seen without the aid of a microscope. That is why we call them microscopic.⁶

The bacteria that Anton van Leeuwenhoek discovered are one-celled organisms, but most living things on Earth have more than one cell. In fact, some have billions of cells. You are one of those creatures. *You* have millions and billions, maybe even trillions, of cells.



← **Show image 3A-4 Cell division**

You began life as a single cell formed by the joining of two cells, one cell from your mother and one cell from your father. Your parents’ two cells merged, and become one joint cell, called a fertilized egg. Then, that one cell divided into two cells that divided into two more. The cells divided again and again until pretty soon there were billions of cells. Your whole body is made up of these tiny building blocks.



← **Show image 3A-5: Blood, muscle, and bone cells**

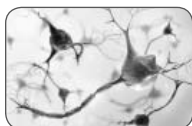
7 or functions

The human body is a collection of more than two hundred different types of cells. Cells come in all shapes and sizes, depending upon the jobs⁷ they must perform. Blood cells build

blood. Bone cells build bone. And guess what muscle cells build? Muscles!

The shape of a cell usually reflects the role it plays in the day-to-day working of the human body. For example, red blood cells are shaped somewhat like shallow bowls. Just like bowls that can be used to hold things like cereal, milk, or ice cream, the bowl-shaped red blood cells hold and carry nutrients through your blood.⁸

8 What are nutrients?



← **Show image 3A-6: Nerve cell**

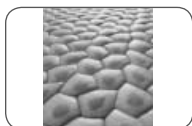
Nerve cells have really long tails to send and receive messages quickly. See all the little branches on this nerve cell?⁹

9 [Point to image 3A-6 and the branches of the nerves.]

10 Factories are buildings or places where things are made. Some examples are toy factories, book factories, car factories, and so on.

Cells are like tiny chemical factories.¹⁰ Because they are living organisms, they need nutrients and air to stay alive. Your heart pumps blood to cells throughout your body, carrying food and oxygen to each cell. Your cells use these nutrients to form muscles, nerves, skin, and bone, and to help protect your body from disease.

Living things do not last forever. Body cells have limited lives. Some cells get damaged when you get hurt. Others wear out over time. As cells die, the dead cells are replaced with new cells on a daily basis. Isn't that amazing?



← **Show image 3A-7: Microscopic section of skin**

11 or dividing line

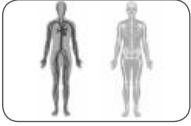
Let's look closely at a microscopic section of skin. Skin cells are packed tightly together to form a protective boundary¹¹ between you and your environment. Do you see the layers of cells, stacked one on top of the other? The old, dead cells flake off and form a protective layer for the new cells that are constantly growing beneath. They grow, split, make new cells, and die. Some cells live for only a few days. Others live for years.

12 What does *function* mean? (job or purpose)

13 *Tissue* can also be a piece of soft and very thin paper that is used especially for blowing your nose.

Cells work together. They are organized into groups of cells that all perform the same function.¹² These groups of cells are called **tissue**. Tissue is a collection of the same kinds of cells working together to do the same job.¹³

There are four main types of tissue, and each type serves a different function. The four types of tissue are connective, muscle, nervous, and epithelial [ep-uh-*THEE*-lee-uhl].



← **Show image 3A-8: Skeleton and circulatory system**

What do you think connective tissue does? It connects. Connective tissue supports the body and binds other tissue together like glue. Your skeleton is made up of bone, a connective tissue that provides the structure or framework for your body. It contains cells that make the tissue strong and flexible.¹⁴ Fat is a connective tissue, padding your body and supplying it with energy. You may be surprised to learn that blood is also a connective tissue, but think about it. This liquid tissue flows throughout your entire body and connects all of its many parts.

14 or able to bend easily without breaking

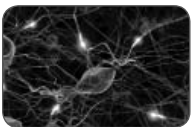


← **Show image 3A-9: Muscle tissue**

Muscle tissue helps your body move. It is the softest and most abundant tissue in your body.¹⁵ There are different kinds of muscle tissue. Your stomach walls are lined with smooth muscle tissue that helps digest your food. You would not be alive without cardiac muscle tissue. What does the cardiac muscle do? It is found only in your heart, and its job is to pump your blood. Skeletal muscle tissue moves your bones. The long, thin strands of muscle tissue stretch and shrink in response to messages from your brain. As they shorten, they move the parts of your body.

15 [Point to the image.] You can see how much muscle tissue there is throughout the whole human body.

So, connective tissue connects and muscle tissue moves your body parts.

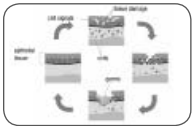


← **Show image 3A-10: Nervous tissue**

The third type of body tissue is nervous tissue. Maybe you can figure out what it does based on its name. What does it do? Nervous tissue runs through your body and connects to your brain. Nervous tissue serves as the messengers between your brain and body. Nerve cells within the nervous tissue sense a **stimulus** and carry electrical signals to and from the brain.¹⁶ Nervous tissue acts as the body's most important communication

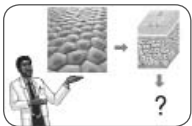
16 A stimulus is a thing that starts other actions. Examples of a stimulus include a light, a sound, a touch, etc.

system. One example of how nervous tissue works would be when you touch something that is so hot you would burn yourself. Your nervous tissue receives the stimulus of extreme heat, the message is sent to your brain, and your brain sends a message back to the nervous tissue to tell your muscle tissue to jerk your hand away from the hot stimulus. This happens almost automatically without you having to think about it.



← **Show image 3A-11: Bacteria repelled by epithelial tissue**

What about epithelial tissue? Let's try to pronounce it first. Ep-uh-*THEE*-lee-uhl. What a big word for tissue that covers and protects us! Sheets of cells, packed closely together, make up epithelial tissue. Does this picture look familiar? Remember, those are the skin cells that form the outer layer of your skin. You're looking at the epithelial tissue that prevents bacteria from entering your body. This thin, tough covering protects your body and its organs. Epithelial tissue is also found inside your body. It forms barriers to protect the inside of your mouth, nose, throat, and stomach.



← **Show image 3A-12: Cells, tissue, and ?**

Everything you do, from breathing to eating to running, requires lots of working cells. They are truly the building blocks of your body. Cells are organized into tissues, grouped by the similar jobs that they do. Tissues are organized into groups that work together to do similar jobs as well. You will learn all about these groups of tissues the next time we're together.

Comprehension Questions

10 minutes

If students have difficulty responding to questions, reread pertinent passages of the read-aloud and/or refer to specific images. If students give one-word answers and/or fail to use read-aloud or domain vocabulary in their responses, acknowledge correct responses by expanding students' responses using richer and more complex language. Ask students to answer in complete sentences by having them restate the question in their responses.

1. *Literal* What is the smallest microscopic building block of all living things? (a cell) What is a group of the same cells that perform the same job called? (tissue)
2. *Literal* Name all four types of body tissue. (connective, muscle, nervous, and epithelial)
3. *Literal* Your blood is a tissue, made up of many cells. What type of tissue is blood? (connective) Why? (It connects all parts of your body.)
4. *Inferential* Whenever you hear the word *cardiac* you may safely guess that it has something to do with the heart. Therefore, where is cardiac muscle tissue located? (in the heart)
5. *Literal* Why are cells called microscopic? (They are too small to be seen without the aid of a microscope.)
6. *Inferential* How do we know that cells are alive? (Just like other living organisms, cells need nutrients and air. They grow, split, make new cells, and die.)
7. *Inferential* What is the name of the body tissue that protects? (epithelial) Name some parts of the body where epithelial, or protective, tissue is found. (on your skin and inside your mouth, nose, throat, and stomach)

[Please continue to model the *Think Pair Share* process for students, as necessary, and scaffold students in their use of the process.]

I am going to ask a question. I will give you a minute to think about the question, and then I will ask you to turn to your neighbor and discuss the question. Finally, I will call on several of you to share what you discussed with your partner.

8. *Evaluative Think Pair Share:* Nerve cells form nervous tissue. You have already learned about the nervous system. Where do you think nerve cells and nervous tissues are found? (Answers may vary, but help students understand that nerves are located all over the body. The nervous system is the body’s highway of communication.)
9. After hearing today’s read-aloud and questions and answers, do you have any remaining questions? [If time permits, you may wish to allow for individual, group, or class research of the text and/or other resources to answer these questions.]

Word Work: Functions

5 minutes

1. In the read-aloud you heard, “Cells are the body’s building blocks, the smallest units of life that can carry out the *functions* of a living thing.”
2. Say the word *functions* with me.
3. Functions are the roles, jobs, or purposes that support particular activities.
4. Some of the functions that trees provide are releasing oxygen to the air we breathe, giving shade and cooling, serving as a habitat for animals, and supplying the resource of wood.
5. Think of some functions that schools serve. Tell your partner about two of them. Use the word *functions* when you tell about it.
[Ask two or three students. If necessary, guide and/or rephrase students’ responses: “Two functions that schools serve include _____ and _____.”]
6. What’s the word we’ve been talking about?

Use a *Terms* activity for follow-up. Directions: [Show Poster 2 (Human Body Systems). Have students say the name of each body system with you.]

I am going to describe the function, or job, of one of the body systems. Use a complete sentence to tell me which system performs this function; say, “That’s the function of the _____ system.”

- This system supports your body and gives it shape. (That’s the function of the skeletal system.)
- This system circulates blood through the heart to every part of the body. (That’s the function of the circulatory system.)
- This system breaks down food into nutrients that your body can use. (That’s the function of the digestive system.)
- This system helps your body move. (That’s the function of the muscular system.)
- This system sends messages back and forth between the body and the brain. (That’s the function of the nervous system.)
- This system is in charge of how your body takes in air into your lungs to supply your body with oxygen. (That’s the function of the respiratory system.)



Complete Remainder of the Lesson Later in the Day



Cells and Tissues

3_B

Note: Extensions may have activity options that exceed the time allocated for this part of the lesson. To remain within the time periods allocated for this portion of the lesson, you will need to make conscious choices about which activities to include based on the needs of your students.

Extensions

20 minutes

↔ Multiple Meaning Word Activity

5 minutes

Context Clues: Tissue

Note: You may choose to have students hold up one or two fingers to indicate which image shows the meaning being described, or have a student walk up to the poster and point to the image being described.

1. [Show Poster 2M (Tissue).] In the read-aloud you heard, “Tissue is a collection of the same kinds of cells working together to do the same job.” Which picture of *tissue* matches the way *tissue* is used in the lesson?
2. *Tissue* can also mean other things, such as a piece of soft and very thin paper. Which picture matches this description of *tissue*?
3. I’m going to say some sentences with the word *tissue*. Hold up one finger if the word *tissue* in my sentence is the same as in picture one; hold up two fingers if the word *tissue* in my sentence is the same as in picture two.
 - When my nose is running I use a tissue to wipe it.
 - Nervous tissue acts as a messenger between the brain and the body.
 - Muscle tissue in our stomach helps our food digest.
 - The sales clerk wrapped the glass bowl in tissue paper so it wouldn’t break.

Making Connections: Cells—The Body’s Building Blocks 20 *minutes*

- Divide the class into groups of four. Give each group a tub of different colored cubes. Explain that each cube represents a cell, one of the body’s building blocks, and that each color represents a different type of cell.
- Remind students that when individual cells of the same kind group together, they form tissue. Tell students that they are going to put the cubes in groups of the same kind (or color), just as cells of the same kind group together to form tissue.
- Have students sort the cubes by color. Then have students put each group of same-colored cubes into a plastic, resealable bag. [Or if the cubes can be connected, have students connect the same-colored cubes together.]
- Ask students: “What does each individual cube represent?” (a cell) “What does each bag of single-colored cubes represent?” (tissue)
- Review the four types of body tissue: connective, muscle, nervous, and epithelial.
- Have each student take one bag of same-colored cubes. Ask students to regroup, according to the color of their cubes. All of the students with yellow cubes will form one group; all of the students with blue cubes will form another group; etc. There should now be a total of four groups.
- Assign each color a type of tissue: connective, muscle, nervous, or epithelial. Have the students in each group practice the motion for their type of tissue and describe to the rest of the class what their tissue does.

My Human Body Journal (Instructional Master 3B-1) 15 *minutes*

- Distribute a copy of Instructional Master 3B-1 (Journal Page 3) to each student. Have students write two sentences, one about cells and another about tissue. Then have students draw a picture about something they learned about cells and tissue from the read-aloud.