🔬 Lesson Plan: Cells, Tissues, and Organs

Grade Level: 5
Subject: Life Science
Duration: 45–60
NGSS 5-LS1-1: Support an argument that plants get the materials they need for growth chiefly from air and water.

🎯 Learning Objectives

By the end of this lesson, students will be able to:

- **Identify** the basic structure and function of cells as the building blocks of all living organisms.
- **Describe** how cells with similar structure and function group together to form tissues.

- **Chloroplast:** An organelle found in plant cells that contains chlorophyll, captures energy from the Sun, and uses it to produce food in the form of sugar during photosynthesis.
- **Mitochondria:** An organelle that breaks down sugar molecules into energy that the cell can use.
- **Tissue:** A group of similar cells that work together to perform a specific function.
- **Organ:** A structure made of two or more different types of tissues that work together to perform specific functions in the body.

💼 Materials Needed: (all links are included in this PDF)

- Printed copies of the Study Guide (https://newpathworksheets.com/api/guide/study-guide-science-grade-5-cells-tissues-and-organs.pdf)
- Worksheet 0 (multiple-choice assessment) (https://newpathworksheets.com/api/worksheet/worksheet-science-grade-5-cells-tissues-and-organs-0.pdf)
- Worksheet 1 (cell structure and function) (https://newpathworksheets.com/api/worksheet/worksheet-science-grade-5-cells-tissues-and-organs-1.pdf)
- Worksheet 2 (body systems) (https://newpathworksheets.com/api/worksheet/worksheet-science-grade-5-cells-tissues-and-organs-2.pdf)
- Vocabulary matching worksheet (https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-5-cells-tissues-and-organs-1.pdf)
- Chart paper or whiteboard

Step 2: Direct Instruction (15 minutes)

- Use the Study Guide to explain the structure of cells, highlighting key organelles such as the nucleus, cell membrane, cell wall, chloroplast, and mitochondria. (https://newpathworksheets.com/api/guide/study-guide-science-grade-5-cells-tissues-and-organs.pdf)
- Demonstrate the difference between plant and animal cells using a gelatin model: place gelatin in a clear container to represent cytoplasm, add small objects to represent organelles, and show how a rigid box (cell wall) surrounds plant cells while animal cells have only a flexible membrane.

- Explain how cells group together to form tissues, tissues form organs, and organs form systems, using examples from the Study Guide such as skin tissue, the heart organ, and the circulatory system. (https://newpathworksheets.com/api/guide/study-guide-science-grade-5-cells-tissues-and-organs.pdf)

Step 3: Guided Practice (15 minutes)

- Distribute the vocabulary matching worksheet and work through the first few terms as a class, reinforcing definitions. (https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-5-cells-tissues-and-organs-1.pdf)
- Show cell diagrams from Worksheet 1 and have students identify and label organelles as a group. (https://newpathworksheets.com/api/worksheet/worksheet-science-grade-5-cells-tissues-and-organs-1.pdf)
- Discuss the four main types of animal tissues (epithelial, connective, muscle, nervous) and have students brainstorm examples of where each type is found in the body.

Step 4: Independent Practice (15 minutes)

Differentiation Strategies

For advanced learners:

- Challenge advanced learners to research and present on a specific organ system, explaining how multiple organs work together to perform complex functions.
- Have students compare prokaryotic and eukaryotic cells, identifying key structural differences and examples of each.

For learners needing support:

- Provide a pre-labeled cell diagram with color-coded organelles for students to reference during independent work.
- Offer one-on-one or small-group support during the vocabulary matching activity, reading definitions aloud and discussing each term before students match them.

Extension Activities

- Have students build a 3D model of a plant or animal cell using household materials such as clay, foam balls, and a shoebox, labeling each organelle.
- Assign students to research a specific type of tissue (epithelial, connective, muscle, or nervous) and create a poster showing where it is found in the body and what it does.
- Conduct a microscope lab where students observe prepared slides of plant and animal cells, drawing what they see and labeling structures.

- Vocabulary Set 2 PDF (https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-5-cells-tissues-and-organs-2.pdf)
- Vocabulary Set 3 PDF (https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-5-cells-tissues-and-organs-3.pdf)
- Vocabulary Set 4 PDF (https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-5-cells-tissues-and-organs-4.pdf)
- Vocabulary Set 5 PDF (https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-5-cells-tissues-and-organs-5.pdf)

- Vocabulary Set 6 PDF (https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-5-cells-tissues-and-organs-6.pdf)

PREVIEW

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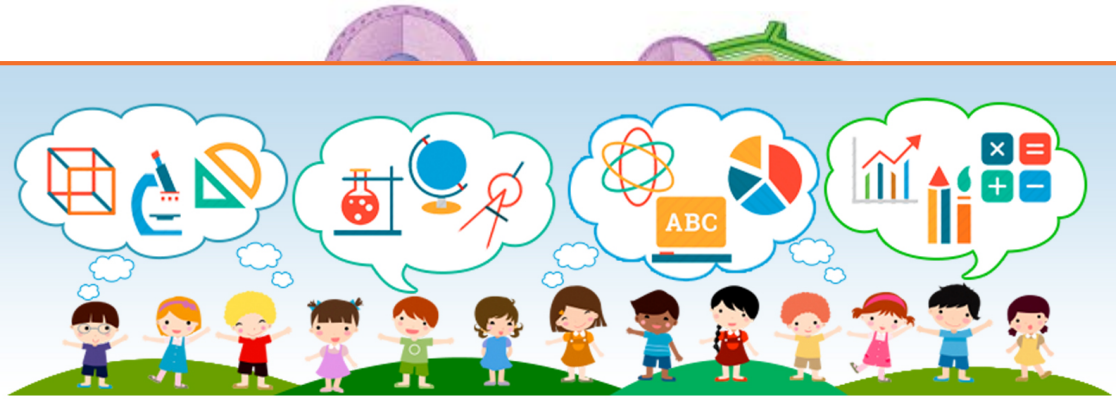
CELLS, TISSUES, AND ORGANS

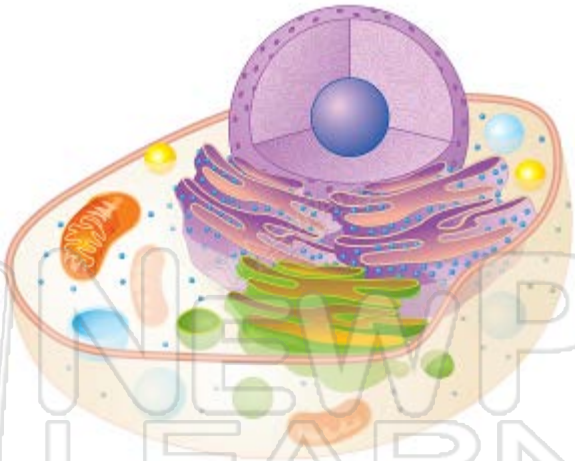
Organelles

A plant cell contains important organelles that each have different jobs to do in order to keep the plant alive and healthy. For example, photosynthesis takes place within the **chloroplast** of a plant cell.

A plant cell (as well as animal cells) contains cytoplasm which supports and protects the organelles of the cell. The mitochondria of a plant cell breaks down sugar molecules into energy. The nucleus in the plant cell (and animal cell once again) is the control center of the cell, the nucleus controls all the cell's activities – so obviously that is one important organelle.



Other important cell organelles include chromosomes, which contains **hereditary information** and are found in the nucleus of a cell. The **vacuole** of a cell acts stores and breaks down materials within a cell.



Cells come in different shapes and sizes, but they can't be too big or too small. If a cell was too large, then oxygen and important nutrients wouldn't be able to make it to the middle of cell, causing the cell to die. If a cell was too small, it would not have room for all its

to/from the brain to our bodies.

Other cells, like skin cells, are flat which allow them to pile up and overlap each other covering large areas. Skin cells are flat. Still other cells, are round. Being round allows red blood cells to carry oxygen all throughout our bodies.

Cells also have different structures, such as hair, which allow them to do their job properly. Some cells are covered with **hair** called **cilia**.

PREVIEW

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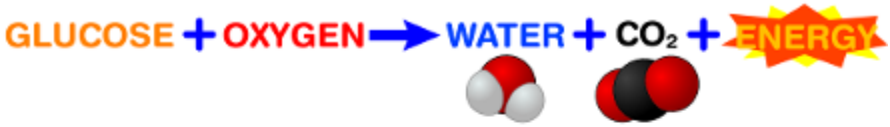
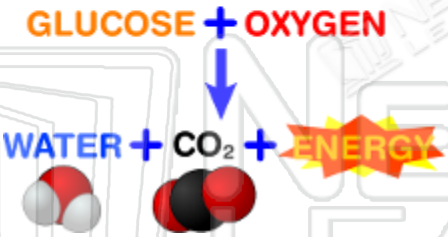


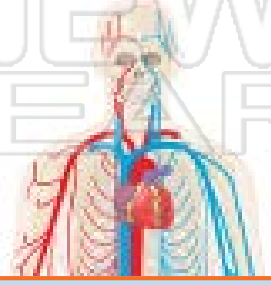


What else do cells do? When similar cells group together and work together for the same purpose, they form **tissues**. For example, skin tissues protect our bodies from **dirt and germs** getting inside our bodies. Nerve tissue helps us feel things, such as if something is hot or cold.

Body Systems

Now, when organs and tissues work together to carry out essential processes needed for our survival, they form a **system**. Our bodies have many systems including our skeletal, muscular, respiratory, circulatory, and excretory systems – just to name a few.

Your **circulatory system** is powered by your heart. The job of the circulatory system's job is to move food and oxygen throughout your body and to rid your body of wastes, such as carbon dioxide, through your blood. Your blood is made up of different types of cells. **Red blood cells** carry oxygen throughout your body (as was mentioned earlier) and **white blood cells** help protect your body from germs and sicknesses. Even pieces of cells help us out…can you believe that? It's true. **Platelets** are pieces of cells that stop the bleeding in a vessel that gets cut, it clots the blood so that not too much blood is lost.



blood vessels. Capillaries have very thin walls. Oxygen moves from blood in your capillaries to your cells – which is important because cells need oxygen to live! Capillaries form together to form veins. **Veins** are made of blood vessels, carry blood TO the heart, have thinner walls than arteries, and have valves (arteries do not have valves). **Valves** are flaps that only allow blood to flow in one direction.

Lesson Checkpoint:
What is the job of your circulatory system?

When you breath in – that stuff called mucus that you may think is gross – helps you out! **Mucus** traps dirt and germs in your nasal passages so the dirt and germs do not go any further into your body! So maybe mucus isn't so gross anymore, is it?

Your **respiratory system** helps you do something important – BREATHE! The oxygen you breathe in through your nose or mouth follows the same pathway right into your lungs. Oxygen travels from your mouth → to the back of your throat → to the larynx → down your trachea → through tubes called bronchi (which lead into your lungs) → into smaller tubes called bronchioles → to air sacs. It is in the air sacs where oxygen enters your blood and where carbon dioxide leaves your blood.

Lesson Checkpoint:
What is the job of your respiratory system?

Digestive System

If you like eating, then we should discuss your **digestive system**. Your **mouth, esophagus, stomach,** and **intestines** help make up

majority of the digestion happens! Digestion occurs mostly in your small intestines.

Lesson Checkpoint:
Where does the majority of your food digestion occur?

Urinary System

Lastly, when you have to go, you have to go…
Your **urinary system** rids your body of waste that can poison your body. Your kidneys remove waste from your blood.

PREVIEW

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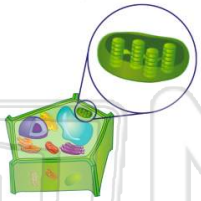
Cells, tissues and organs

Sci E

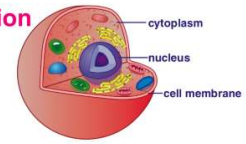
Name_____ Class_____ Date_____

1 In which organelle does the process of **photosynthesis** take place within a plant cell?



A nucleus
B mitochondria
C chloroplast
D vacuole

2 What is the **function of cytoplasm** in a plant and animal cell?



A supports and protects the organelles
B carries oxygen through the cell
C rids the cell of waste
D controls activities of the cell

3 On this plant cell diagram, the arrow is pointing to the _____. They break down sugar molecules into **energy**.

A nucleus
B mitochondria

4 Which organelle can be referred to as the **control center** of the cell?

A vacuole
B mitochondrion
C Golgi apparatus

5

PREVIEW

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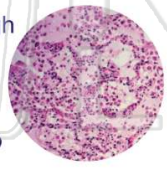
B inside the mitochondria
C in the cytoplasm
D in the chloroplast

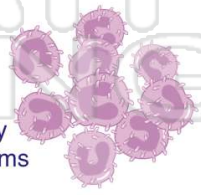
B brain
C heart
D stomach

9 Why do most cells remain **small** in size?



A They do not get enough nutrients.
B They can move faster.
C They can hide better.
D They are better able to absorb nutrients.

10 Different cells have different jobs. What job do **white blood cells** have?



A getting rid of carbon dioxide
B carrying oxygen throughout the body
C fighting against germs
D thinning blood

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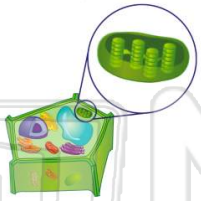

C

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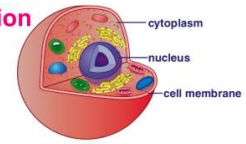

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C in the cytoplasm
D in the chloroplast

D

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C heart
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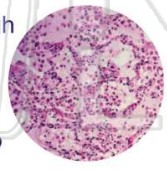

D

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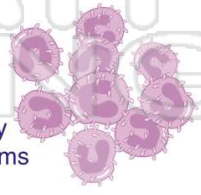


C

Cells, tissues and organs

Sci E

Name_____ Class_____ Date_____

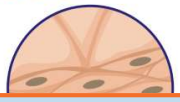
1 **Platelets** are _____ that stop the bleeding of injured vessels. They **create clots** in the blood so that not too much blood is lost.

A pieces of cells
B white blood cells
C red blood cells
D large cells

2 Which of the following cells are cells that **branch out**, as seen in the picture below?

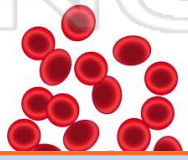
A nerve cells
B red blood cells
C skin cells
D white blood cells

3 Which type of cell is an example of **flat cells** that overlap each other in order to cover a wide area?



A brain cells
B nerve cells

4 **Red blood cells** _____.



A attack foreign cells
B fight off diseases
C carry oxygen all over the body

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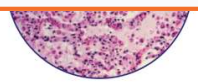
C tissues
D processes



D nerve tissues

9 Brad touched a **hot** pan and pulled back quickly. Which cells **sent a message** which caused him to quickly remove his fingers from the **hot** pan?

A muscle cells
B bone cells
C nerve cells
D heart cells

10 Which of the following is a **group of tissues** that work together?

A an organ
B a tissue
C a system
D red blood cells

Cells, tissues and organs

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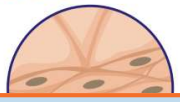

A brain cells
B nerve cells

D

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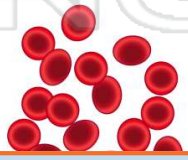

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D processes

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PREVIEW

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Cells, tissues and organs

Sci E

Name_____ Class_____ Date_____

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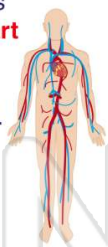


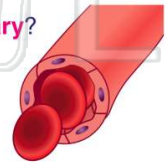
True or false?

A true
B false

2 **Arteries** and **veins** are similar since they both carry blood inside your body. How are arteries and veins **different**?

A veins are not made of blood vessels, arteries are
B arteries carry blood to heart, veins do not
C arteries have thinner walls than veins
D veins have valves, arteries do not

3 Which is true of a **capillary**?



A it is the smallest type of blood vessel
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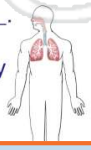
4 Your nose, trachea, lungs, and diaphragm make up your **respiratory system**, which is the system in charge of _____.



A pumping blood through your body
B taking oxygen in and releasing carbon dioxide out of the body

5

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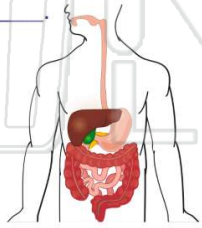
C respiratory
D digestive

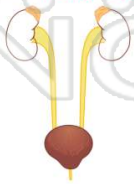
B esophagus
C sinus passages
D trachea

9 The **digestion of your food** occurs mostly in your _____.

A large intestines
B small intestines
C stomach
D esophagus



10 Your **urinary system** rids your body of waste that can poison your body. Which **organ** of the urinary system removes waste from your blood?



A kidneys
B heart
C pancreas
D liver

Cells, tissues and organs

Sci E

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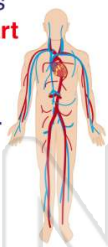

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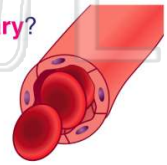

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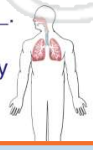

A pumping blood through your body
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C respiratory
D digestive

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B esophagus
C sinus passages
D trachea

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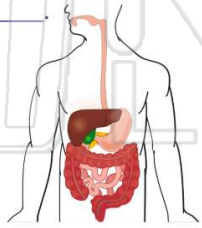
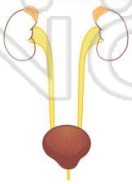


B

10 Your **urinary system** rids your body of waste that can poison your body. Which **organ** of the urinary system removes waste from your blood?



A kidneys
B heart
C pancreas
D liver

A

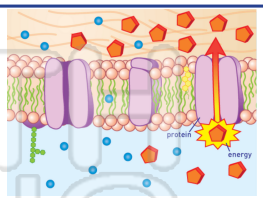
Cells, tissues and organs

Name_____ Class_____ Date_____

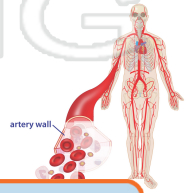
Match each of the following terms to its definition:

Cell wall	Cellular respiration	Cell membrane	Cell
Chloroplast	Active transport	Capillaries	Arteries

1. - the transport of materials through cell membrane proteins that uses energy



2. - blood vessels that carry blood away from the heart and out to the body; arteries have thick walls



3. netwo
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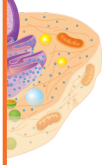
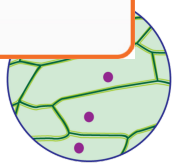
4.

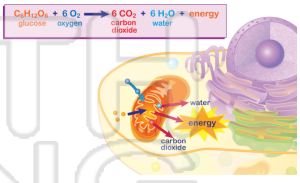


5. regula
layer

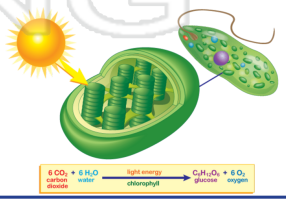
6. other



7. - a process that cells use to get energy by breaking down food molecules and releasing stored energy; the process where cells turn food into usable energy



8. - an organelle found in plant cells which contains chlorophyll that captures energy from the Sun and uses it to produce food in the form of sugar for the plant during a process known as photosynthesis



Cells, tissues and organs

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Chloroplast	Active transport	Capillaries	Arteries

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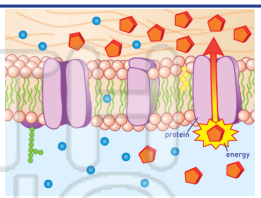
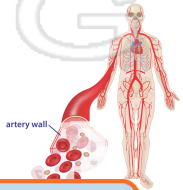


2. arteries - blood vessels that carry blood away from the heart and out to the body; arteries have thick walls



3. cap
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4. cell

5. cell
which
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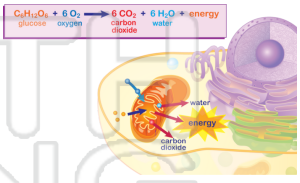
6. cell
organi

7. cellular respiration - a process that cells use to get energy by breaking down food molecules and releasing stored energy; the process where cells turn food into usable energy



8. chloroplast - an organelle found in plant cells which contains chlorophyll that captures energy from the Sun and uses it to produce food in the form of sugar for the plant during a process known as photosynthesis