FSI Cell Builder System

5th Grade Science Student Workbook

Plant and Animal Cells

Student Name: _____
Teacher: _____
Class: _____
Date: _____

Workbook Purpose

This workbook will help you explore the amazing world of cells! You will read about what cells are, learn their parts, and use your knowledge to build cell models. Use this workbook with your FSI Cell Builder Kit materials and your teacher's directions.

Standards Alignment (Georgia Standards of Excellence S5L3)

- **Compare and contrast plant and animal cells.**
- **Gather evidence that cells are too small to see without magnification.**
- **Identify and label parts of plant and animal cells.**
- **Explain how plant and animal cells are different.**

What Is a Cell?

Have you ever wondered what a plant, a puppy, and you all have in common? You are all made of cells! A cell is the smallest living part of an organism. Some living things, like bacteria, are made of just one single cell. Other living things, like humans and oak trees, are made of trillions of cells working together.

Cells are incredibly tiny. If you look at your hand, you cannot see the individual skin cells. Because cells are so small, scientists use tools called microscopes to see them. Microscopes provide magnification, which makes tiny things look much bigger.

Even though cells are tiny, they are very busy. Think of a cell like a small factory. Inside the cell are even smaller parts called organelles. Each organelle has a special job to do. Some organelles make food, some store water, and some act like the boss of the cell. All these parts must work perfectly together to keep the cell alive.

While all living things are made of cells, not all cells are exactly the same. Plant cells and animal cells share many of the same parts. For example, they both have a nucleus (the boss), cytoplasm (jelly-like fluid), and a cell membrane (the outer gate). But plant cells have some special parts that animal cells do not. Because plants cannot move around to find food, their cells have chloroplasts to make food from sunlight. Plant cells also have a tough outer layer called a cell wall to help them stand up tall!

Stop and Think

1. Why do scientists need microscopes to look at cells? _____

_____

2. What is an organelle? _____

_____

3. Name two parts that both plant and animal cells have. _____

_____

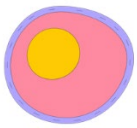
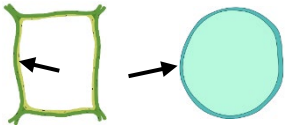
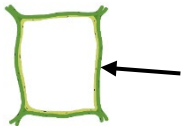
4. Why do plant cells need a cell wall and chloroplasts, but animal cells do not? _____

_____

_____

Picture Glossary

Learn the organelles! Use this glossary to help you remember the parts of the cell.

 **Nucleus** **Definition: The control center of the cell that directs all activities.** ***Memory Clue:*** **It is like the "brain" or the boss of the cell factory.**	 **Cell Membrane** **Definition: The thin, flexible outer layer that protects the cell and controls what goes in and out.** ***Memory Clue:*** **It acts like a security guard at a gate.**	 **Cytoplasm** **Definition: The jelly-like liquid inside the cell that holds all the organelles in place.** ***Memory Clue:*** **Think of fruit pieces floating in a bowl of Jello!**
 **Mitochondria** **Definition: The parts that release energy from food so the cell can do its jobs.** ***Memory Clue:*** **They are the "powerhouses" or batteries of the cell.**	 **Vacuole** **Definition: A storage space for water, food, and waste. Plant cells have one large vacuole; animal cells have small ones.** ***Memory Clue:*** **It is like a storage closet or a water tank.**	 **Chloroplast** **Definition: The green part in a plant cell that uses sunlight to make food.** ***Memory Clue:*** **It is the cell's solar-powered kitchen!**
	 **Cell wall** **Definition: A stiff out layer that gives the plant shape and support.** ***Memory Clue:*** **It is like the brick support wall of a house.**	

FSI 5th Grade Cell Builder System Kit Organelle Function & Malfunction Activity

Instructions: Match the organelle with its correct organelle function.

Nucleus	**Mitochondria**	**Cytoplasm**	**Vacuole**
Cell wall	**Chloroplast**	**Cell membrane**	

1. _____ Controls what comes in and out of the cell.

2. _____ Provides structure, shape, and support for plant cells.

3. _____ Controls all cell activities, stores DNA (genetic information).

4. _____ Stores water and nutrients, larger in plant cells.

5. _____ Jelly-like substance where chemical reactions occur, holds organelles in place.

6. _____ Breaks down food, produces ATP (energy) through cellular respiration.

7. _____ Absorbs sunlight energy to make food for plant cell.

Instructions: Match the organelles from above with its correct job analogy.

8. _____ Energy power plant.

9. _____ Control center.

10. _____ Sunlight energy food maker.

11. _____ Refrigerator for cell that stores water and nutrients. Large and centralized in plant cells.

12. _____ Factory floor that holds all of the organelles, where all the work happens.

13. _____ Cell security.

14. _____ Support walls for the plant cell.

Instructions: Match the organelles with the malfunction if they were not functioning properly.

Nucleus	**Mitochondria**	**Cytoplasm**	**Vacuole**
Cell wall	**Chloroplast**	**Cell membrane**	

15. _____ Storage of water and materials fail.

16. _____ Glucose sugars (food) are not being made for the plant cell.

17. _____ ATP energy is not produced efficiently.

18. _____ DNA instructions are missing or incorrect.

19. _____ Entry and exit in and out of the cell is no longer regulated.

20. _____ Support walls malfunctioning.

21. _____ Organelles not being held in place.

Build-the-Cell Guide

It is time to build! Use your FSI Cell Builder Kit materials and your teacher's directions to create your own plant and animal cells. Follow the steps below and check off each step as you finish.

☐ Step 1: Sort! 🔍 Look at your kit materials. Sort the pieces by organelle name, picture, or job.

☐ Step 2: Choose! ⚖️ Decide if you are going to build a plant cell or an animal cell first.

☐ Step 3: Label Outer Edge! ⭕ If making an animal cell, label the cell membrane with a dry erase marker. If making a plant cell, label the cell wall and label the cell membrane inside it with a dry erase marker.

☐ Step 4: Label Cytoplasm! 💧 Make sure you label the jelly-like substance that hold the parts (marker)

☐ Step 5: Add Nucleus! 🎯 Place your control center inside the cell.

☐ Step 6: Add Inner Parts! 🧩 Add the mitochondria. Add a large vacuole and chloroplasts if it is a plant cell. Add smaller vacuoles if it is an animal cell.

☐ Step 7: Explain Model! 🗣️ Show your finished model to a partner and explain what each organelle does.

Reflection

What was the easiest part of the cell to build? _____ **Why?** _____

_____

_____

What was the hardest part to understand or build? _____ **Why?** _____

_____

_____

Part A: Match the term to the correct definition.

Nucleus	Cell membrane	Cytoplasm	Mitochondria
Chloroplast	Vacuole	Cell wall	Cell

1. _____ Jelly-like liquid that holds organelles.
2. _____ Stiff outer layer that supports a plant.
3. _____ Controls what enters and leaves the cell.
4. _____ Makes food using sunlight.
5. _____ The basic building block of all living things.
6. _____ Releases energy for the cell.
7. _____ Stores water, food, and waste.
8. _____ Directs all the cell's activities.

Part B: Plant, Animal, or Both?

Put a checkmark in the correct boxes to show where each part is found.

Cell Part	Plant Cell Only	Animal Cell Only	Both Plant & Animal Cell
Nucleus			
Cell wall			
Chloroplast			
Cell membrane			
Cytoplasm			
Mitochondria			

Part C: Compare and Contrast

Write one way that plant cells and animal cells are different, using evidence from the table above.

_____

_____

_____

_____

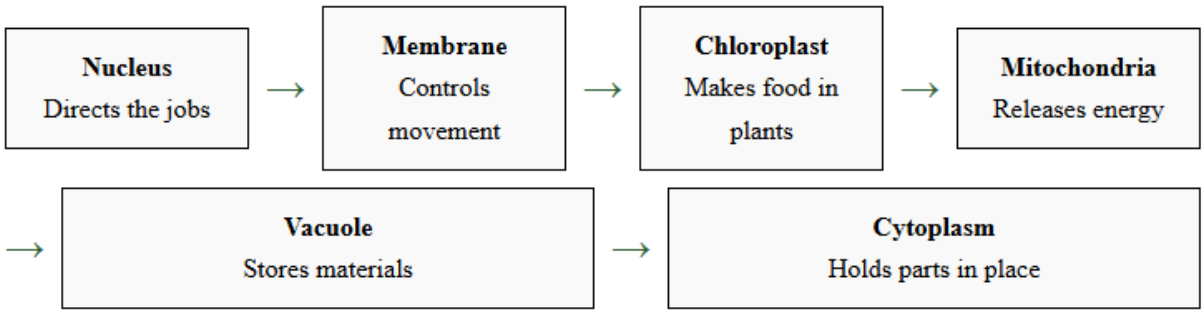
_____

How Do Organelles Work Together?

Organelles do not work alone! They work as a team to keep the cell alive. Read the scenario and look at the chart.

Plant Cell Scenario: It is a sunny day! A plant cell in a leaf is busy making food. The *nucleus* gives directions. The *chloroplasts* catch sunlight and help make sugar (food). The *mitochondria* use some of that food to release energy. The *vacuole* stores water and other materials. The *cell membrane* controls what moves in and out, and the *cytoplasm* holds the parts in place.

Animal Cell Scenario: An animal cell in a muscle cannot make its own food, so it gets food from outside the cell. The *cell membrane* lets needed materials in. The *nucleus* directs the jobs, the *mitochondria* release energy, the *vacuole* stores some materials, and the *cytoplasm* keeps everything together.



Questions:

1. Which organelle acts like the boss to start the process? _____

2. Where does the plant cell get its food? _____

3. Why do mitochondria need the chloroplasts to do their job first? _____

_____

4. What would happen if the cell membrane stopped working during this process? _____

_____

5. How would this story be different if it was an *animal* cell? _____

_____

6. Why is it important that all the organelles are held in place by the cytoplasm? _____

_____

_____

When a Cell Part Stops Working

Imagine you are a cell doctor! Read about each cell emergency. What problem would happen? How would the rest of the cell be affected?

The Emergency	What problem would happen? How would other parts be affected?
1. Damaged Membrane: **The cell membrane has holes in it.**	
2. Missing Chloroplast: **A plant cell's chloroplasts disappear.**	
3. Weak Mitochondria: **The mitochondria stop releasing energy.**	
4. Full Vacuole Problem: **The plant's vacuole shrinks and loses water.**	
5. Broken Nucleus: **The nucleus stops sending directions.**	
6. Dried Cytoplasm: **The cytoplasm dries up entirely.**	

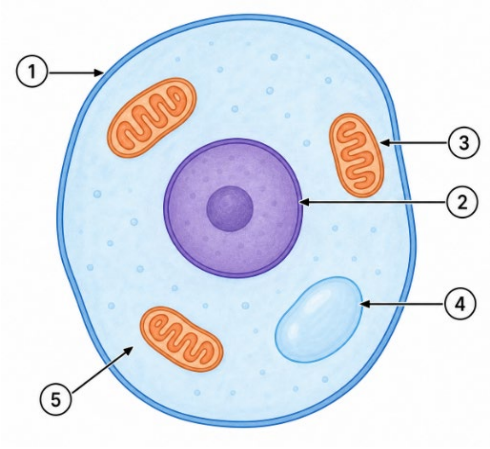
Extension Question:

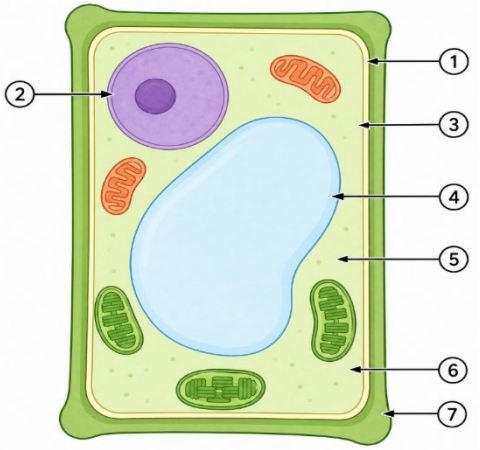
Which of the problems above do you think would be the most serious for the cell? Explain why.

Color and Label

Use the word bank to label the parts of the plant and animal cells below. Write the correct word on the blank lines. Then, follow your teacher's directions to color the cell parts.

Cell membrane	**Cell wall**	**Cytoplasm**	**Nucleus**
Chloroplast	**Vacuole**	**Mitochondria**	





Animal Cell Labels

1. _____

2. _____

3. _____

4. _____

5. _____

Plant Cell Labels

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

Early Finisher Challenge

Write one sentence telling how the two cells above are alike: _____

_____

Write one sentence telling how they are different: _____

_____

Quick Checks: Choose the best answer for each question.

1. Why do scientists use microscopes to study cells?

A. Cells move too quickly to see.
B. Cells are too small to see with just our eyes.
C. Cells are hidden inside bones.
D. Microscopes add color to the cells.

2. Which organelle is considered the "control center" of the cell?

A. Vacuole
B. Cytoplasm
C. Nucleus
D. Cell Membrane

3. Which part gives a plant cell its stiff, rectangular shape?

A. Cell Wall
B. Cell Membrane
C. Chloroplast
D. Mitochondria

4. What is the job of the cell membrane?

A. It makes food for the cell.
B. It controls what enters and leaves the cell.
C. It holds the jelly-like fluid.
D. It controls the nucleus.

5. Which of the following is found in BOTH plant and animal cells?

A. Cell Wall
B. Chloroplast
C. Mitochondria
D. Green coloring

6. A student looks at a cell and sees a large vacuole, a cell wall, and chloroplasts. What kind of cell is it?

A. An animal cell
B. A plant cell
C. A bacteria cell
D. It could be any cell

7. What is the jelly-like substance that fills the cell and holds organelles in place?

A. Water
B. Cytoplasm
C. Blood
D. Nucleus fluid

8. Why do plant cells have chloroplasts, but animal cells do not?

A. Plants need to make their own food using sunlight.
B. Plants need to breathe faster.
C. Animals are already green.
D. Animals use cell walls instead.

9. Which organelle releases energy for the cell to use?

A. Nucleus B. Vacuole C. Mitochondria D. Chloroplast

10. The basic building blocks of all living things are:

A. Blood B. Bones C. Cells D. Skin

11. Which organelles are found in a plant cell? *(Choose all that apply)*

A. Nucleus B. Chloroplast C. Cell Wall D. Cell Membrane

12. Which organelles are found in an animal cell? *(Choose all that apply)*

A. Mitochondria B. Cytoplasm C. Cell Wall D. Nucleus

13. Which of these are jobs of the cell membrane? *(Choose all that apply)*

A. Protecting the cell B. Letting water in

C. Making food D. Keeping bad things out

14. What do vacuoles store? *(Choose all that apply)*

A. Water B. Sunlight C. Food D. Waste

15. Which living things are made of cells? *(Choose all that apply)*

A. A dog B. A rock C. An oak tree D. A human

16. Why are microscopes important for cell science? *(Choose all that apply)*

A. They magnify tiny things. B. They let us see organelles.

C. They make the cells glow. D. They help us gather evidence that cells exist.

17. What do mitochondria do? *(Choose all that apply)*

A. Act as a powerhouse B. Release energy C. Control the nucleus D. Help the cell work

Short Response

18. Explain how the nucleus and the cell membrane work together to keep a cell healthy. _____

_____

_____

_____

19. If you were looking through a microscope, what evidence would tell you if you were looking at a plant cell or an animal cell? _____

_____

_____

20. Why do you think animal cells have many small vacuoles instead of one giant vacuole like a plant cell? _____

_____

_____