Gizmos

Name: _____ Date: _____

# Student Exploration: Cell Structure

**Vocabulary:** cell membrane, cell wall, capsule, centriole, chloroplast, cytoplasm, cytoskeleton, endoplasmic reticulum, flagellum, Golgi apparatus, lysosome, mitochondria, nucleoid, nuclear membrane, nucleolus, nucleus, organelle, pilus, plasmid, plastid, ribosome, vacuole, vesicle

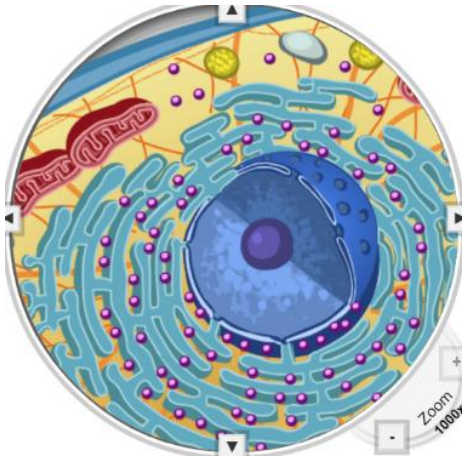
**Prior Knowledge Questions** (Do these BEFORE using the Gizmo.)

1. What do you think are some of the structures inside a cell that help it to live and perform its role in an organism? _____

2. How do you think plant cells differ from animal cells? (Hint: What can plants do that animals cannot?) _____

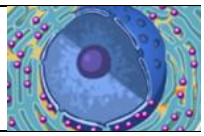
**Gizmo Warm-up**

The *Cell Structure* Gizmo allows you to look at typical animal, plant, and bacterial cells under a microscope. On the ANIMAL CELL tab, click **Sample** to take a sample of an animal cell. On the dropdown menu, select **Centriole**.



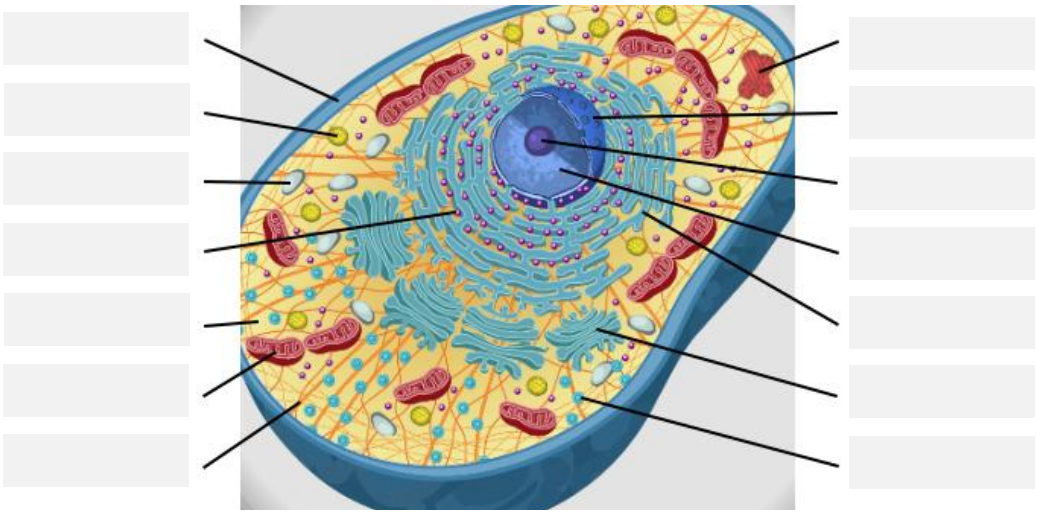

1. Find the **centrioles** (Highlighted in green). Make a sketch of the centrioles in the space below.

2. Read the description of the centrioles. What is their function? _____

| **Activity A:**<br>**Animal cells** | Get the Gizmo ready:<br>• Check that an **Animal cell** is mounted on the microscope. |  |
|---|---|---|

**Question: Organelles are specialized structures that perform various functions in the cell. What are the functions of the organelles in an animal cell?**

1. Label: Locate each organelle in the animal cell. You can choose organelles from the dropdown menu or click on them directly. Label the organelles in the diagram below.



2. Match: Read about each organelle. Then match each organelle to its function/description.

| | |
|---|---|
| _____ **Cytoplasm** | A. Structure that organizes motion of chromosomes. |
| _____ **Lysosome** | B. Stack of membranes that packages chemicals. |
| _____ **Mitochondria** | C. Membrane that surrounds and protects the nucleus. |
| _____ **Centriole** | D. Membrane that surrounds and protects the cell. |
| _____ **Endoplasmic reticulum** | E. Sac filled with digestive chemicals. |
| _____ **Vacuole** | F. Structures that convert nutrients to energy. |
| _____ **Cell membrane** | G. Passageways where chemicals are made. |
| _____ **Nucleus** | H. Jelly-like substance within the cell membrane. |
| _____ **Cytoskeleton** | I. Structure that manufactures ribosomes. |
| _____ **Ribosome** | J. Structure that contains DNA and regulates genes. |
| _____ **Nuclear membrane** | K. Package created by the Golgi apparatus. |
| _____ **Golgi apparatus** | L. Small structure that synthesizes proteins. |
| _____ **Vesicle** | M. Sac that stores water, nutrients, or waste products. |
| _____ **Nucleolus** | N. Tubules and filaments that give the cell its shape. |

**(Activity A continued on next page)**

**Activity A (continued from previous page)**

3. Investigate: Select the **Cell membrane**. Turn on **Show closeup**. Read the description, watch the animation, and answer the following questions below.

   A. What kind of molecules can diffuse (go through) the cell membrane directly? _____

   _____

   B. How can some large molecules and charged ions get through the cell membrane?

   _____

   _____

4. Investigate: Select the **Nuclear membrane** closeup. How is the nuclear membrane similar to the cell membrane? _____

   _____

5. Investigate: Select the **Mitochondrion** closeup. What happens inside the mitochondrion?

   _____

   _____

6. Investigate: Select the **Ribosome** closeup. How does the cell make proteins inside the ribosome? _____

   _____

7. Investigate: Select the **Vesicle** closeup. How do vesicles move through the cell? _____

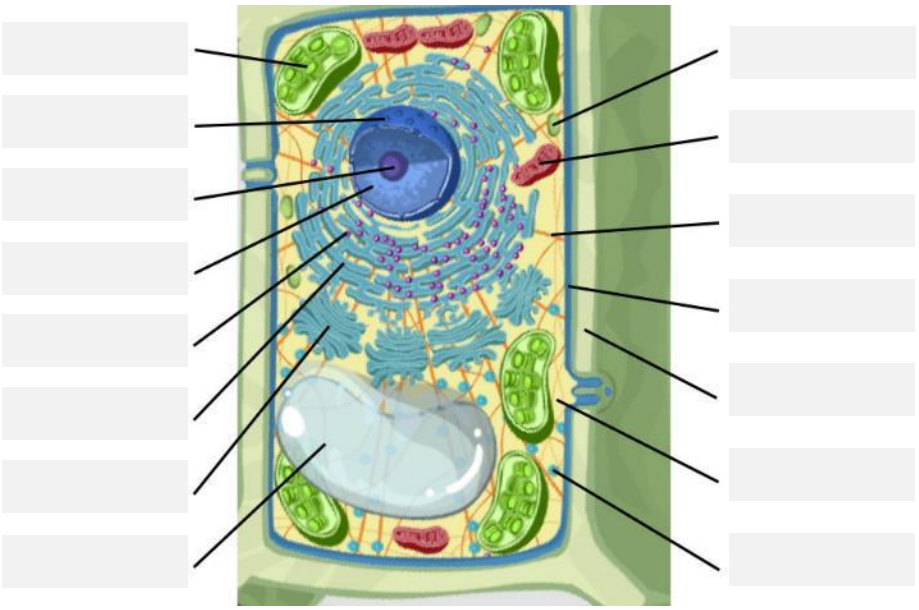
   _____

   _____

| | | |
|---|---|---|
| **Activity B:**<br>**Plant cells** | Get the Gizmo ready:<br>• Select the PLANT CELL tab, and click **Sample**. |  |

**Question: What functions do the organelles in a plant cell perform?**

1. Label: Locate each organelle in the plant cell. Label the organelles in the diagram below.



2. Compare: What structures are present in an animal cell, but not in a plant cell? _____

_____

What structures are present in a plant cell, but not in an animal cell? _____

_____

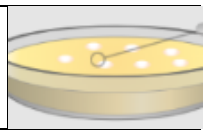
3. Fill in: Name the organelle or organelles that perform each of the following functions.

   A. _____ convert sunlight to chemical energy.

   B. The _____, the _____, and the _____ support the plant cell and help it to maintain its shape.

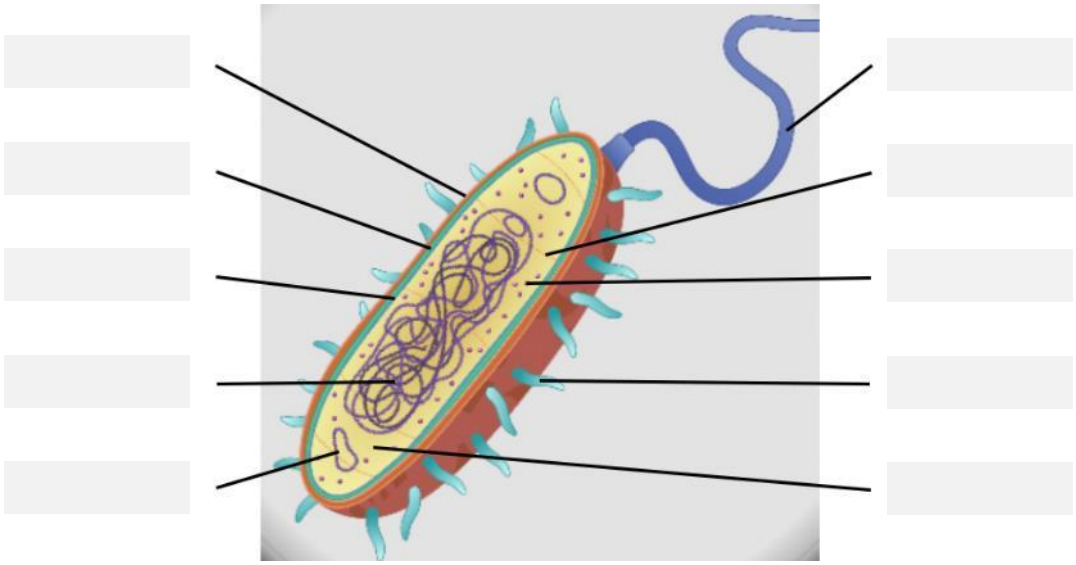
   C. _____ store food or pigments.

   D. _____ convert food into energy. They are found in plant and animal cells.

| | | |
|---|---|---|
| **Activity C:**<br>**Bacterial cells** | Get the Gizmo ready:<br>• Select the BACTERIAL CELL tab and click **Sample**. |  |

**Question: How are bacterial cells different from plant and animal cells?**

1. Label: Locate each organelle in the bacterial cell. Label the organelles in the diagram below.



2. Match: Read about each organelle. Then match each organelle to its function/description.

_____ **Capsule**
_____ **Nucleoid**
_____ **Plasmid**
_____ **Flagellum**
_____ **Pilus**

A. Hair-like structure that the cell uses for movement.
B. Hair-like structure that attaches the cell to a surface and can transfer genetic material from one cell to another.
C. Region inside cell that contains genetic material but is not surrounded by a nuclear membrane.
D. Outermost layer of the cell that provides protection.
E. Circular piece of genetic material.

3. Compare: What structures are present in a bacterial cell, but not in a plant or animal cell?

_____

What structures are present in plant and animal cells, but not in a bacterial cell? _____

_____

What structures inside plant and animal cells look like bacteria? _____

Chloroplasts and mitochondria have their own DNA. Long ago, these structures may have originated as bacteria that were engulfed (eaten) by larger cells.