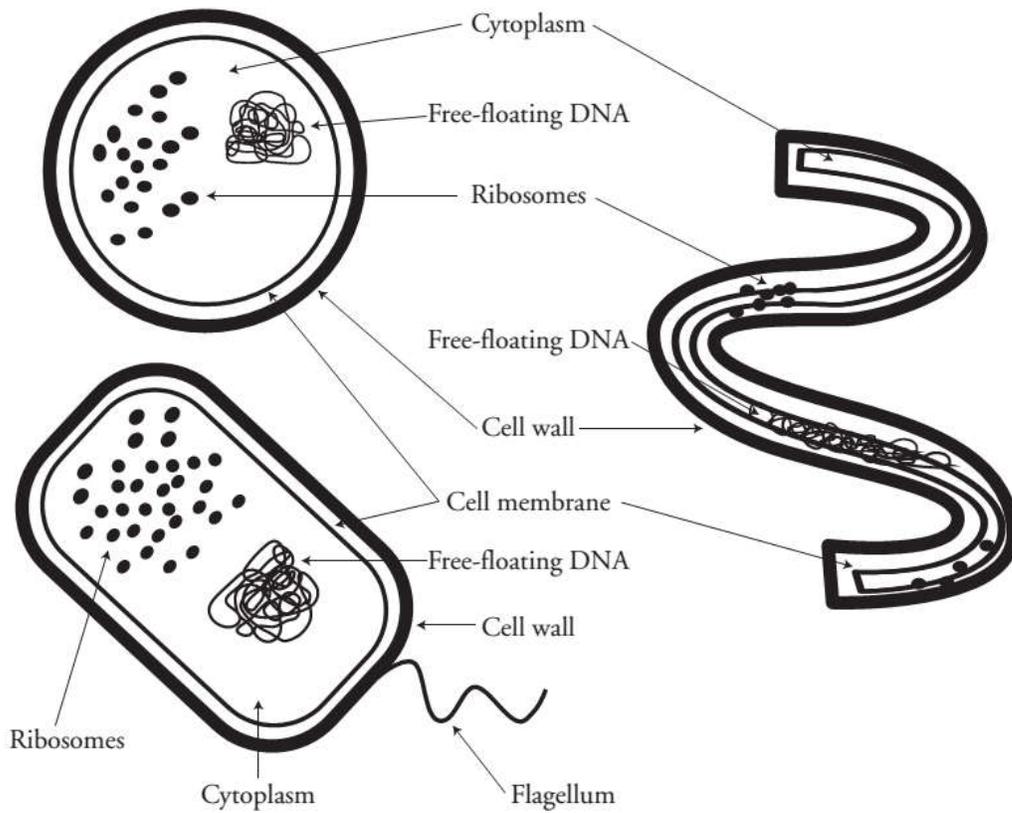
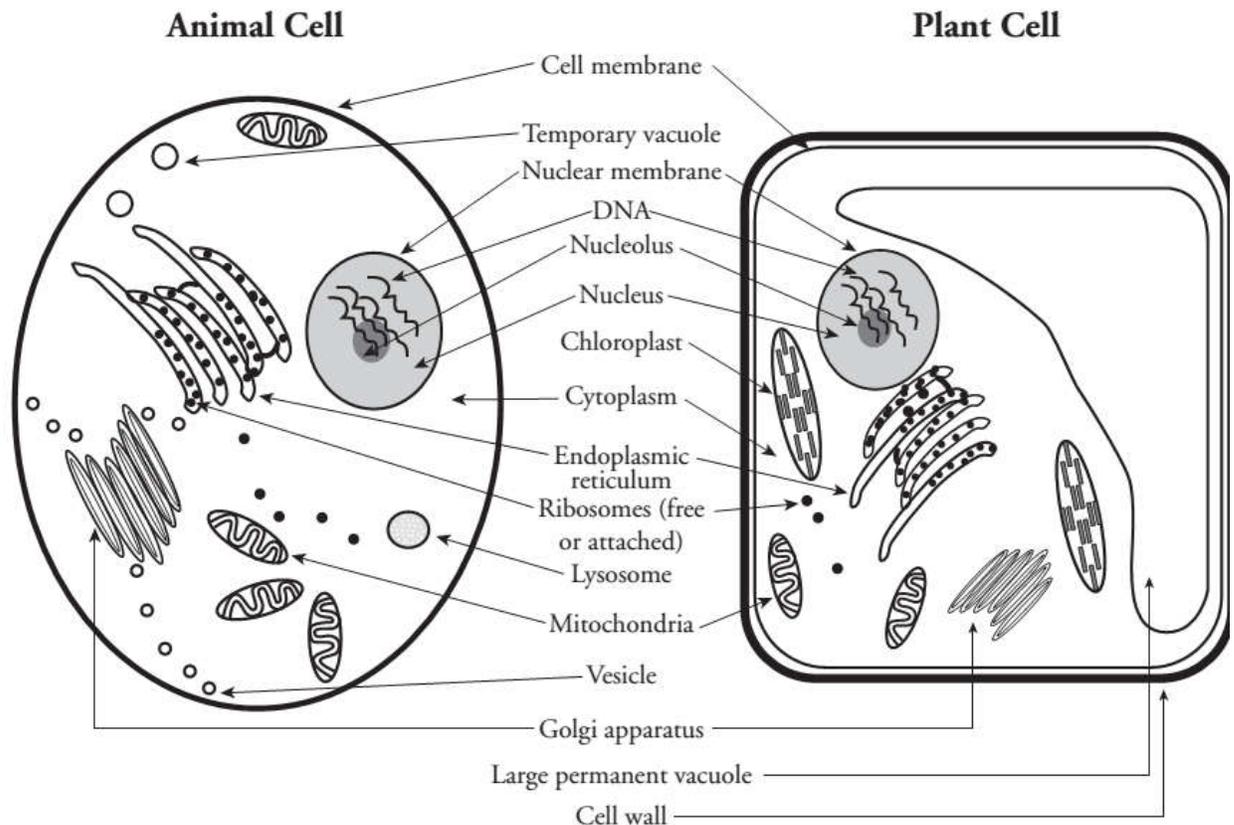


### Model 1 – Three Types of Bacterial Cells



### Model 2 – Animal and Plant Cells



Refer to Models 1 and 2 to complete the chart below. Write yes or no in the box for each cell.

	<b>Bacterial Cell</b>	<b>Animal Cell</b>	<b>Plant Cell</b>	<b>All Cells</b>
Cell Membrane				
Ribosome				
Cytoplasm				
Mitochondria				
Nucleolus				
Nucleus				
DNA				
Cell Wall				
Prokaryotic				
Eukaryotic				

What is the main difference between a prokaryotic and eukaryotic cell?

Of the 6 kingdoms (Animalia, fungi, Protista, plantae, archaebacterial, eubacteria), which ones are prokaryotic? Which ones are eukaryotic?

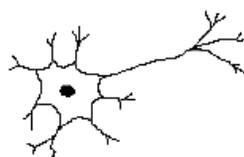
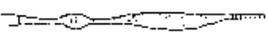
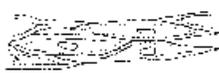
## Cell Differentiation and Specialization

- **Unicellular Organisms**
  - Tend to have fairly \_\_\_\_\_. This is because they can only \_\_\_\_\_
- **Multicellular Organisms**
  - Have lots of cells that are specialized, or \_\_\_\_\_.
  - This allows you to have variation in cell shape/structure to better serve a specific function
  - Multicellular organisms start out as single cells that divide and multiply. We all start out as a bunch of \_\_\_\_\_, which are **pluripotent**, meaning these cells \_\_\_\_\_

**How does cell differentiation occur?** Fill out the following chart after the class has completed the “cell differentiation simulation”

<b>Cell Differentiation Process</b>	<b>Representation in Simulation</b>
Early in development, genes are “poised” like runners in the starting blocks, ready to jump into action	
In each cell, some genes are shut down and others are activated, causing cells to be “nudged” toward a final (and specialized) fate	
Different cell experiences causes the profiles of each cell type to grow increasingly different over time	
In the end, hundreds of cell types form, each with a distinct identity and a specialized function	

## Cell Diversity (Specialization) and Functions

 <p><b>Nerve Cell</b> Transmits information as chemical or electrical impulses through the body.</p>	 <p><b>Sperm Cell</b> Reproductive cell that swims to and fertilizes an egg.</p>
 <p><b>Rod</b></p>	 <p><b>Muscle Cells</b> Stretch and contract to permit movement of parts of the body.</p>
 <p><b>Cone</b></p> <p>Rods and cones are cells of the eye. Rods detect black and white. Cones detect color.</p>	 <p><b>Red blood cell</b> Carries oxygen to the cells of the body. Carries carbon dioxide from body cells to the lungs for removal.</p>

1. What **structure** of the sperm enables it to move?

2. A nerve cell is often compared to a telephone line because of its function. In what ways is the function of a nerve cell similar to a telephone line? How does its **structure** relate to its function?

3. What is the function of a muscle cell? How is the **structure** of a muscle cell suited to its function?

4. What are the specialized functions of the specialized cells of the eye?

5. Red blood cells do not have a nucleus; what does this suggest about the ability of red blood cells to reproduce?

## Cell Division and Mitosis

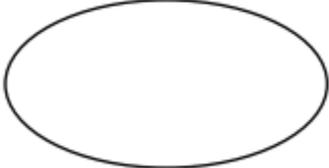
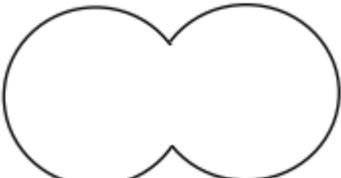
**Cell Division:** a process by which a cell divides into \_\_\_\_\_

Why do cells need to divide?

1. Living things \_\_\_\_\_ by producing \_\_\_\_\_ cells, NOT because each cell increases in size
2. \_\_\_\_\_ of damaged tissue
3. If a cell gets too big, it \_\_\_\_\_ get enough \_\_\_\_\_ into the cell and transport \_\_\_\_\_ out of the cell

**Cell Cycle**-a series of events cells go through as they grow and develop.

The cell grows, prepares for division, and then divides to form \_\_\_\_\_  
(each with the same amount and type of DNA as the parent cell)

- **Interphase**-period of cell \_\_\_\_\_ and \_\_\_\_\_
  - Cell grows and carries out normal cell activities
  - Cell spends \_\_\_\_\_ of its life cycle in interphase
  - DNA \_\_\_\_\_ (copying) occurs to prepare for cell division
- **Prophase:** first stage of cell division (mitosis)
  - Chromosomes \_\_\_\_\_ (look like X's)
  - Nuclear envelope \_\_\_\_\_
  - \_\_\_\_\_ form
- **Metaphase ("Middle")**
  - \_\_\_\_\_ attach to the chromatids at the centromere (center of the "X")
  - Chromosomes line up in the \_\_\_\_\_ of the cell
- **Anaphase ("Apart")**
  - \_\_\_\_\_ pull \_\_\_\_\_ apart and to the \_\_\_\_\_ ends of the cell.
- **Telophase ("Two")**
  - Chromosomes uncoil
  - \_\_\_\_\_ form
  - \_\_\_\_\_ are formed
  - Spindle fibers \_\_\_\_\_
- **Cytokinesis**
  - Cell membrane \_\_\_\_\_ to create two new \_\_\_\_\_ daughter cells, each with its own nucleus and identical chromosomes.

### Mitosis Questions:

1. Chromosomes line up in the center of the cell during which phase of mitosis?
- a. Anaphase
  - b. Metaphase
  - c. Prophase
  - d. Telophase

2.



What is indicated by the arrow?

- a. Centromere
  - b. Chromatid
  - c. Chromosome
  - d. Nucleus
3. If a cell has 30 chromosomes at the start of mitosis, how many chromosomes will be in each new daughter cell?
- a. 10
  - b. 15
  - c. 30
  - d. 60



Figure A



Figure B

4. The figures illustrate two phases of mitosis. Which occurs first: A or B? Explain your reasoning.

5. Which stage of mitosis follows those illustrated above?