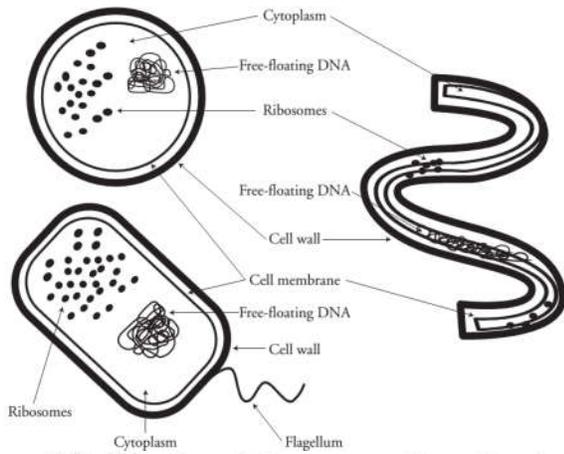
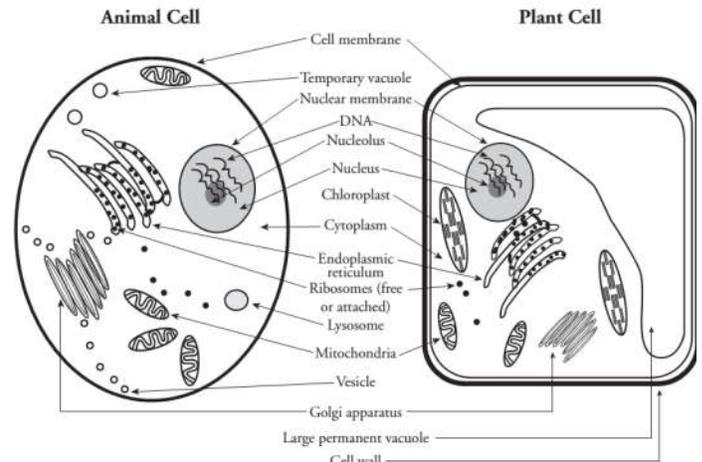


Model 1 – Three Types of Bacterial Cells



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.

	Bacterial Cell	Animal Cell	Plant Cell	All Cells
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 _____
 - Even though the developing cells all have the same DNA, some genes get turned on and some get turned off, causing cells to develop into different specialized cells.

Cell Division

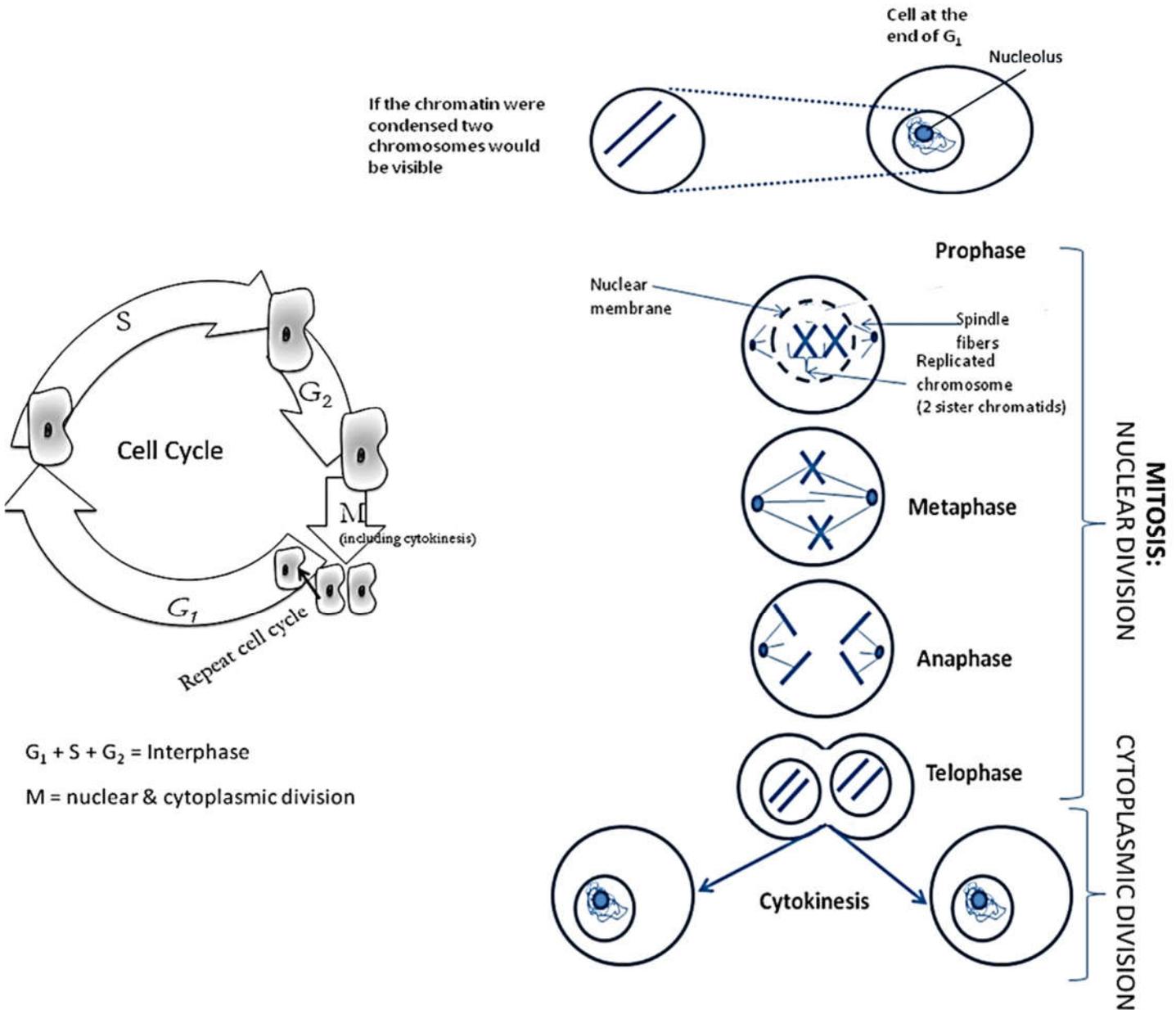
- Living organisms need to be able to replicate their DNA and create new, identical cells in order to grow and to replace older cells that die off
- How does cell division occur?

Mitosis

How do living things grow and repair themselves?

Why?

Living things must grow and develop. At times they suffer injuries or damage, or cells simply wear out. New cells must be formed for the living thing to survive.



1. Look at the phases in the cell division process depicted. List the 4 phases of mitosis.
2. When does mitosis occur in the cell cycle? Before _____ and after _____

3. What 3 phases of the cell cycle are considered a part of “interphase”?
4. How many cells are present at the end of G2?
5. How many cells are present at the end of mitosis?
6. What shape do the replicated chromosomes look like in prophase of the original cell?
7. How many chromatids are in each replicated chromosome?
8. How many **replicated chromosomes** (X's) are there in the original cell during prophase
9. How many **single chromosomes** are there in each of the new cells in telophase?
10. The S phase stands for synthesis, which means to make something. Scientists know that during the S phase, DNA is being replicated (copied) in the nucleus of the cell. This needs to occur before cell division. Notice that your answers to questions 8 and 9 should be the same. Why is it important to have the same number of chromosomes after the cell has divided into 2 different cells?
11. During what phase do you see the spindle fibers forming?
12. During what phase do you see that the spindle fibers have disappeared?
13. Look at metaphase and anaphase. What do you think the function of the spindle fibers is during mitosis?
14. Describe what happens to the nuclear membrane after prophase.

15. Why do you think it is necessary to disintegrate the nuclear membrane during mitosis?

16. By the end of what phase of mitosis has the nuclear membrane reformed?

17. What happens during cytokinesis?

18. Make a table below where you list each of the phases of the cell cycle in the left hand column and a word description of what is happening during that phase in the right hand column.

Phase of Cell Cycle	What is occurring in the cell during this phase
Interphase	
Prophase	
Metaphase	
Anaphase	
Telophase and Cytokinesis	

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?