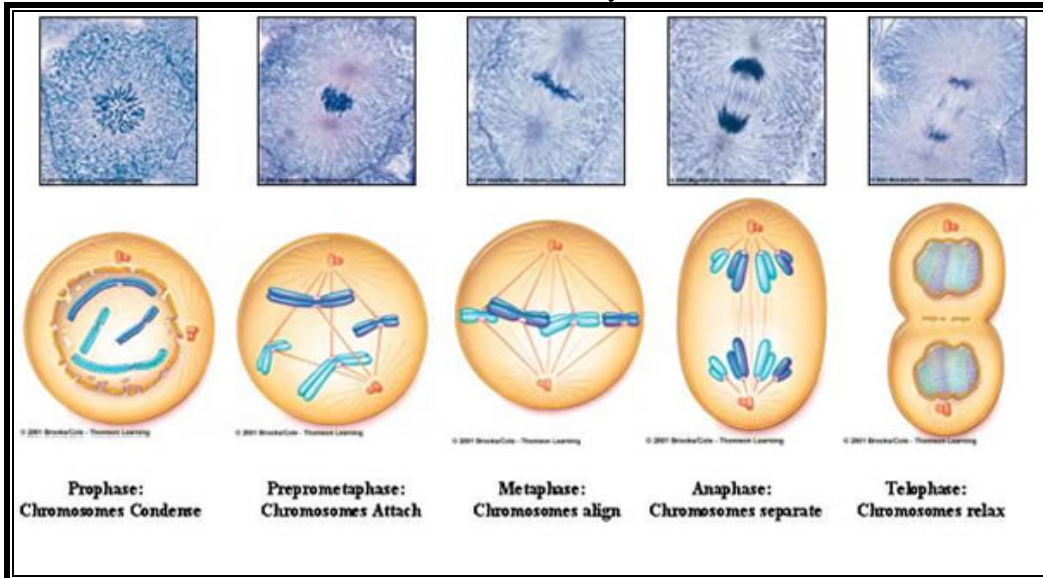


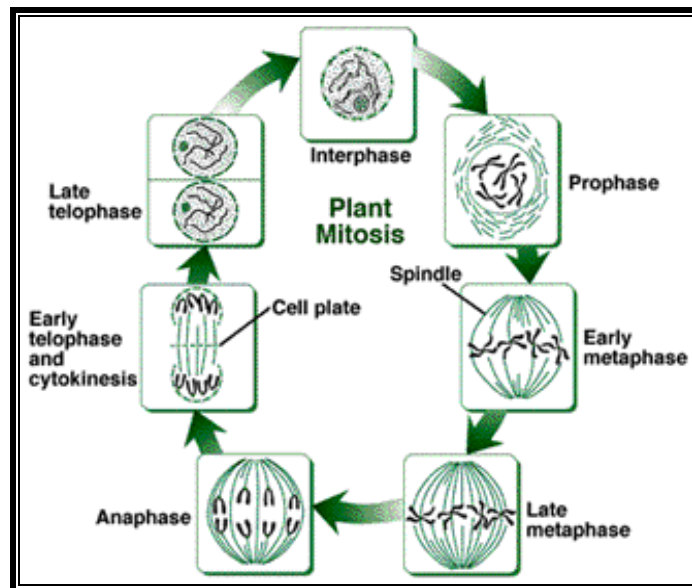
M Phase: Mitosis and Cytokinesis

The M phase of the cell cycle begins with Mitosis, which involves the division of the nuclear material. There are 4 phases to mitosis which include **Prophase, Metaphase, Anaphase, and Telophase**. A good way to remember the phases of mitosis including interphase is the acronym **IPMAT**.

Animal Mitosis and Cytokinesis



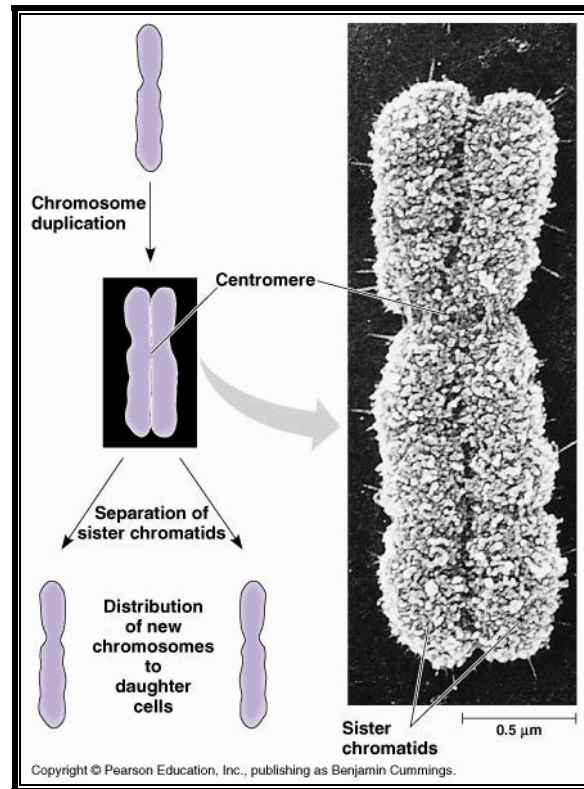
Plant Cell Mitosis and Cytokinesis



1. Prophase:

- ◆ Double stranded chromosomes become visible by condensing and thickening.
- ◆ Double stranded or sister chromosomes are now called **chromatids**. They are held together by a **centromere**.
- ◆ The nuclear membrane dissolves.

- ◆ In animal cells, spindle fibers form from the centrioles. In plant cells, spindle fibers are formed by enzymes in the cytoplasm.
- ◆ Double stranded chromosomes start to move toward the equator of the cell.



2. Metaphase:

- ◆ Centromeres of sister chromatids attach to the spindle fibers
- ◆ Sister chromosomes line up along the equatorial plate of the cell
- ◆ Centromeres replicate

3. Anaphase:

- ◆ Spindle fibers shorten, pulling the sister chromatids to opposite poles of the cell

4. Telophase:

- ◆ Nuclear membranes form around each set of chromatids (now called chromosomes)
- ◆ Spindle fibers disappear
- ◆ Chromosomes lengthen and thin to form chromatin again

Cytokinesis:

In Animal Cells:

- ◆ During anaphase, the cell begins to pinch inward forming a cleavage furrow.
- ◆ The cell continues to pinch inward until the cytoplasm completely divides.

In Plant Cells:

- ◆ A cell plate begins to form from the middle outward eventually forming a cell wall.

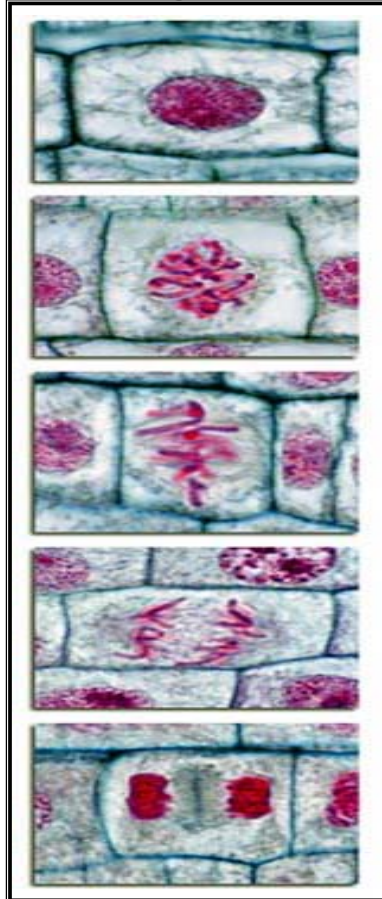
Results of Mitosis and Cytokinesis:

Two daughter cells that are genetically identical to the parent cell, only smaller in size.

Questions:

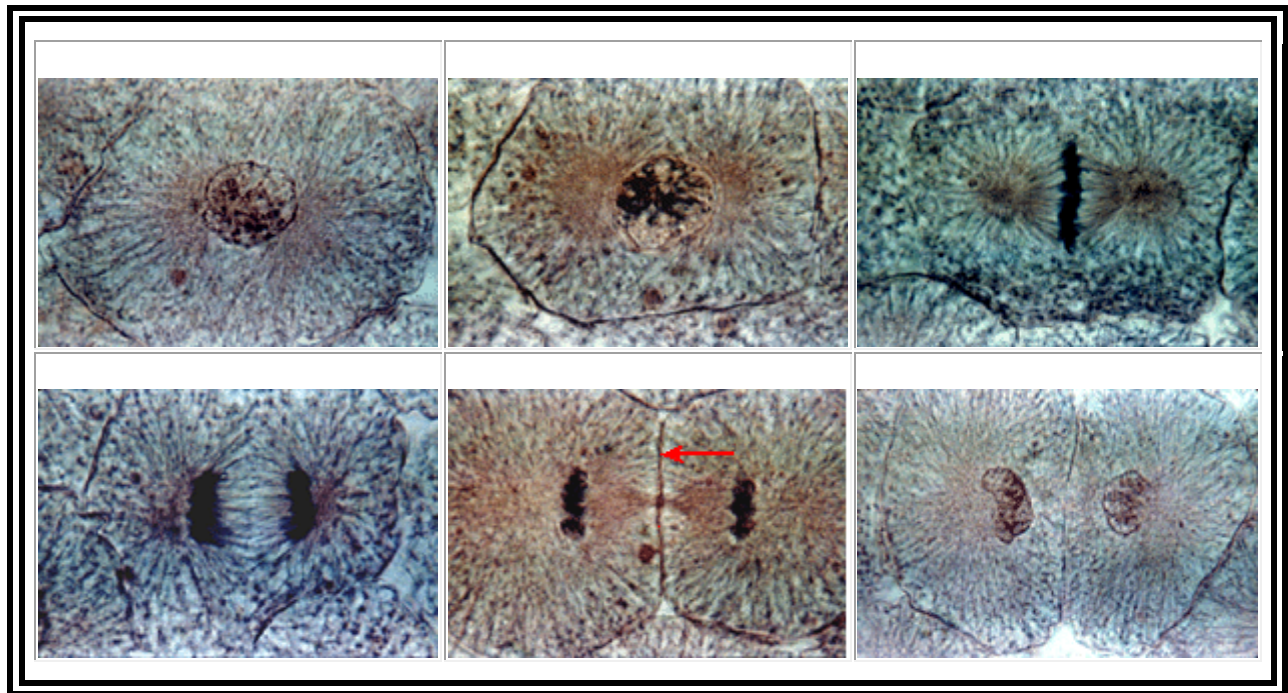
1. Label each mitotic cell phases in Diagram A below and briefly summarize the events that are occurring in each of these phases.
2. What type of cells are in Diagram A

Diagram A



3. Label the mitotic cell phases in Diagram B below.
4. What type of cells are depicted in Diagram B. How do you know? (next page)

Diagram B



5. Why must cells reproduce (list 3 reasons)?
6. Differentiate between mitosis and cytokinesis.
7. Compare plant cell mitosis to animal cell mitosis.
8. How do the products of mitosis compare to the parent cell?