LESSON 4

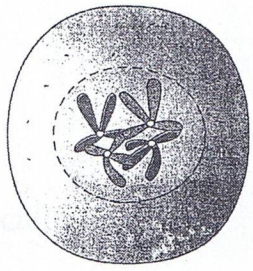
How Do Plants Make New Cells?

When you see a healthy plant, you are seeing cells at work. Each cell does its work, but for the plant to grow or repair itself, new cells must be added. Where does the plant get these new cells? The plant's cells reproduce, or divide to make new cells, in the process called **mitosis**.

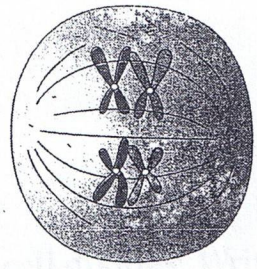
Even before mitosis begins, a cell prepares. For example, inside the cell's nucleus, or control center, is **genetic material**. This genetic material is a set of codes that tell the cell what to be and what to do. The genetic material forms long, tangled strings. Before mitosis begins, the strings shorten to form rod-like shapes called **chromosomes**. These chromosomes make exact copies of themselves before the cell begins to divide. This is an important step, since the new cells will need a complete set of chromosomes if they are going to do their jobs.

During the first step of mitosis, the membrane around the nucleus breaks apart. The chromosomes and their copies are connected, or joined. Together, they look like partners in a dance. In the second step of mitosis, the chromosomes and their partners move to the center of the cell. In the third step, the chromosomes are pulled apart from their partners to opposite ends of the cell. Then, a new nucleus forms around each set of chromosomes. Cytoplasm begins to divide. A special membrane called the **cell plate** forms in the middle of the cell. The cell plate grows to both edges of the cell where it joins the cell. It divides the parent cell into two new daughter cells that each have exactly the same genetic material. The daughter cells build new cell walls, new cytoplasm, and other organelles they need to live, grow, and become parent cells.

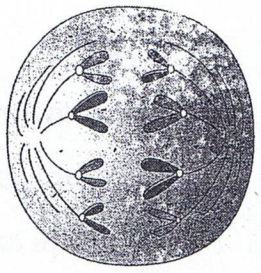
Mitosis, or Cell Division



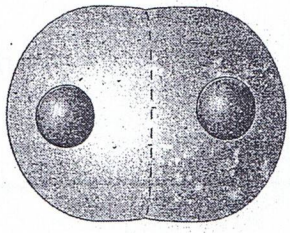
Chromosomes have copied themselves. The nuclear membrane breaks apart.



Chromosomes line up in the center of the cell.



Chromosomes move to opposite ends of the cell.



A cell plate forms, separating the parent cell into two new daughter cells.

A.

Write the missing word or words in each sentence.

1. A plant grows when it produces new _____.
   (work, cells, genetic material)
2. The process in which cells divide to make new cells is known as _____.
   (diffusion, osmosis, mitosis)
3. A cell that divides to make new cells is called a _____.
   (parent cell, daughter cell, organelle)
4. Rod-like shapes of genetic material in the nucleus are called _____.
   (mitosis, nucleus, chromosomes)
5. Daughter cells have the same genetic material as their _____.
   (worn out cells, parent cell, leaves)

B.

The sentences below describe the steps in which a plant cell divides. Write 1, 2, 3, 4, and 5 to show the correct order. The first one is done for you.

_____ Chromosomes line up in the center of the cell.

__1__ Chromosomes copy themselves.

_____ A cell plate forms, dividing the parent cell into two new cells.

_____ Partner chromosomes move to opposite ends of the cell.

_____ The membrane surrounding the nucleus breaks apart.

C.

Write one or more sentences to answer the question.

What would happen to daughter cells if the parent cell did not copy its chromosomes?

_____

_____