

10.2 The Process of Cell Division

Lesson Objectives

-  Describe the role of chromosomes in cell division.
-  Name the main events of the cell cycle.
-  Describe what happens during the four phases of mitosis.
-  Describe the process of cytokinesis.

BUILD Vocabulary

A. The chart below shows key terms from the lesson with their definitions. Complete the chart by writing a strategy to help you remember the meaning of each term. One has been done for you.

Term	Definition	How I'm Going to Remember the Meaning
Cell cycle	Series of events a cell goes through as it grows and divides	
Centromere	Area where two sister chromatids are attached.	
Chromatid	One of two identical "sister" parts of a replicated chromosome	
Chromatin	A combination of DNA and protein found in eukaryotic cells	
Chromosome	Made up of DNA; contains the genetic information needed to make new cells and carry out cell functions	
Cytokinesis	Part of the eukaryotic cell cycle during which the cytoplasm divides	
Interphase	Long period of the cell cycle between one cell division and the next	<i>Inter- means between. Interphase means between phases.</i>
Mitosis	Part of the eukaryotic cell cycle during which the nucleus divides	

B. As you work through this lesson, you may find these terms in the activities. When you write a key term or a definition, **highlight** the term or the definition.

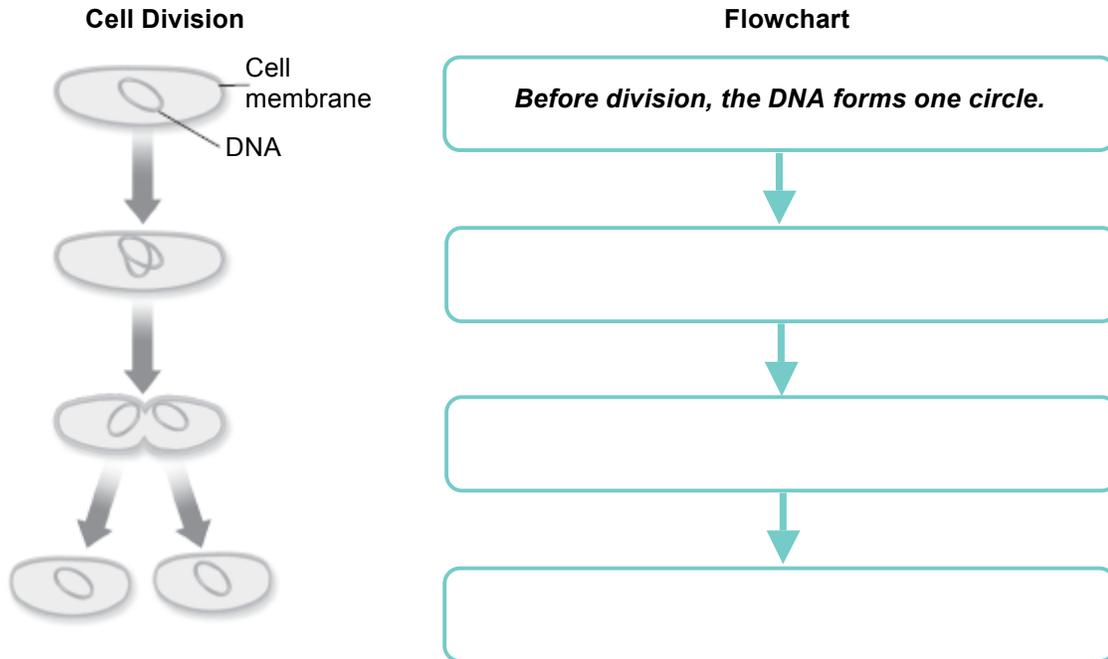
The Cell Cycle

The Prokaryotic Cell Cycle The diagram on the left shows how a prokaryotic cell divides. The stages of cell division are shown in order they happen.

Use the flowchart on the right to describe the steps in prokaryotic cell division. In a flowchart, arrows connect one step to the next.

Follow the directions.

- Write the stages in prokaryotic cell division in order in the flowchart.



Answer the questions.

- The process of cell division in prokaryotic cells is called _____.
- Will the new cells have the same genetic material as the parent cell, or will each cell have different genetic material? _____
- Is this asexual or sexual reproduction? _____
- An example of an organism that reproduces with this kind of reproduction is a
 - salamander.
 - histone.
 - red blood cell.
 - bacterium.

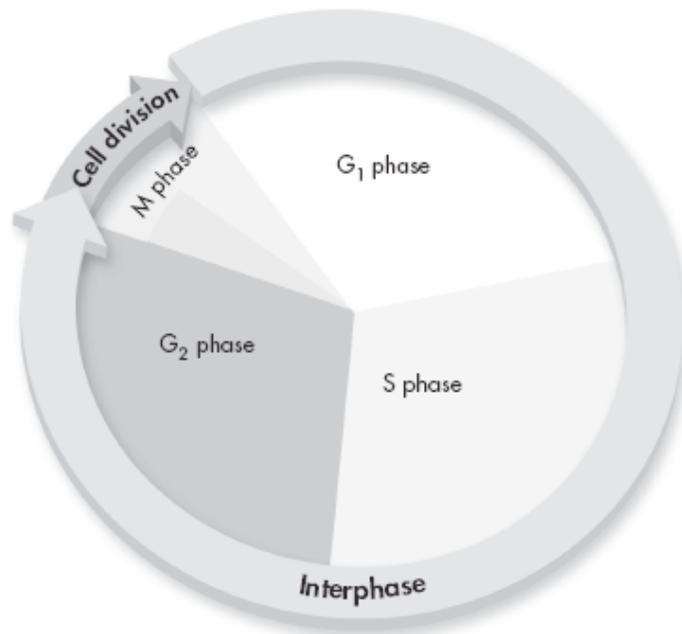
The Cell Cycle

The Eukaryotic Cell Cycle Cell growth and division occur in a regular cycle. This cycle is divided into four phases: G₁, S, G₂, and M.

Follow the directions.

1. Color the phase in which most cell growth occurs blue.
2. Color the phase in which DNA replication occurs red.
3. Color the phase in which preparation for mitosis occurs yellow.
4. Color the phase in which mitosis and cytokinesis occur orange.

Answer the questions.



5. Which three phases make up interphase? _____

6. The division of the cell nucleus during the M phase of the cell cycle is called _____.

7. Match the process with the correct phase.

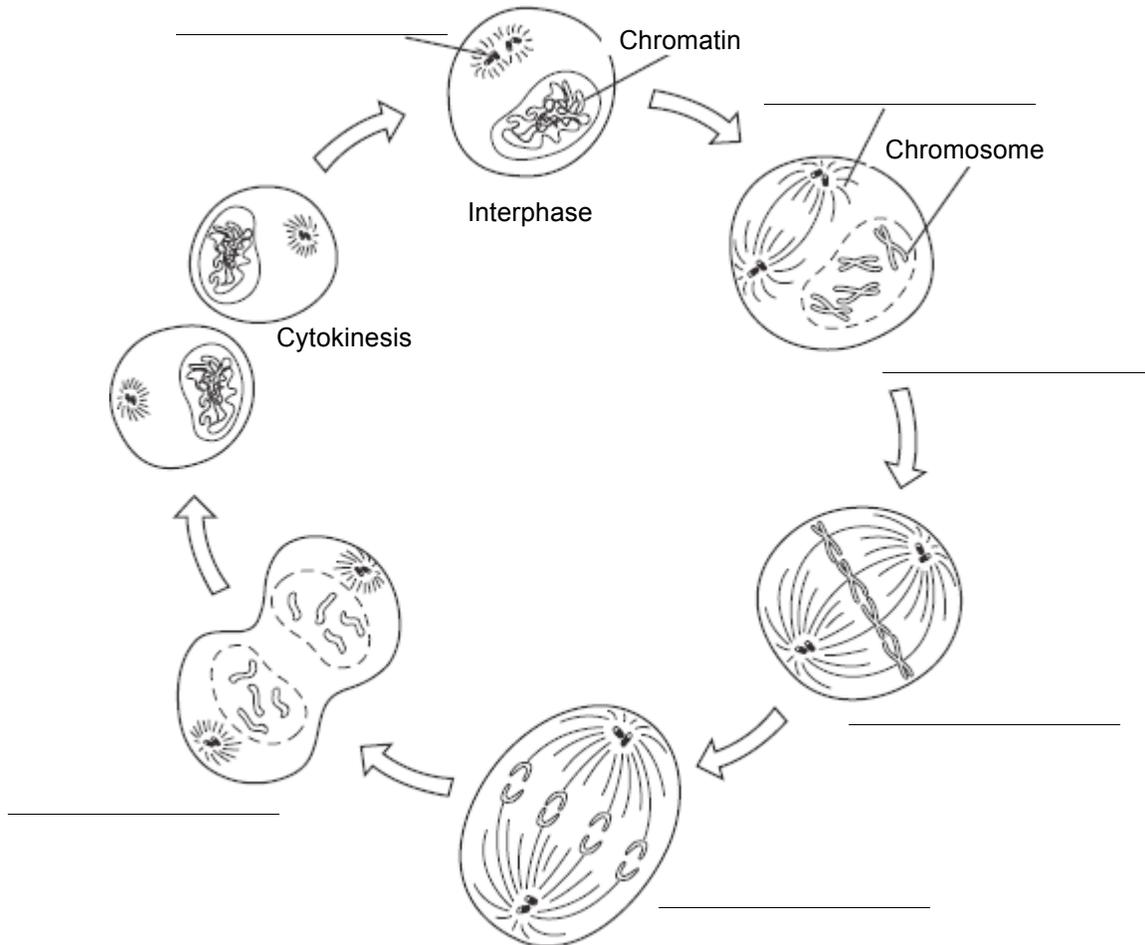
- | | |
|----------------------|---|
| _____ S | A. Cells do most of their growing. |
| _____ G ₂ | B. Chromosomes are replicated, and the synthesis of DNA molecules takes place. |
| _____ G ₁ | C. Many of the organelles and molecules required for cell division are produced. |

Mitosis

Mitosis is the process by which the nucleus of most eukaryotic cells divides. Mitosis has four phases: prophase, metaphase, anaphase, and telophase.

Follow the directions.

1. Label the four phases of mitosis in the diagram.
2. Label the spindles and centrioles in one of the phases.
3. Color each chromosome in prophase a different color. Follow each of these chromosomes through mitosis. Show this by coloring the correct structures in each phase of mitosis.



Answer the questions.

4. In which phase do the chromosomes line up in the middle of the cell? _____
5. In which phase do the chromosomes become visible? _____
6. In which phase do the chromosomes move until they form two groups near the poles of the spindles? _____