

From a Cell to an Organism



Grade 7 Science Content Standards—5.a: Students know plants and animals have levels of organization for structure and function, including cells, tissues, organs, organ systems, and the whole organism. Also covers: 1.c, 1.e, 1.f

Before You Read

Before you read the chapter, think about what you know about the topic. List three things that you already know about cells and organisms in the first column. Then list three things that you would like to learn about cells and organisms in the second column.

K What I know	W What I want to find out

Accept all reasonable responses.



Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Predict what other functions the root might have for the new plant.

Answers may vary: take in water from the soil.

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Lesson 1 The Cell Cycle and Cell Division



Grade 7 Science Content Standards—1.e. Students know cells divide to increase their numbers through a process of mitosis, which results in two daughter cells with identical sets of chromosomes. Also covers: 1.c

Accept all reasonable responses.

Scan the What You'll Learn statements for Lesson 1 of your book. Predict three topics that will be discussed.

1. the cell cycle
2. stages of mitosis
3. the importance of cell division

Review Vocabulary

eukaryotic cell

Define eukaryotic cell using your book or a dictionary.

cell with a nucleus and other organelles

New Vocabulary

Read the definitions below. Write the correct vocabulary term on the blank to the left of each definition.

mitosis	process by which a cell nucleus divides
homologous chromosomes	pair of similar chromosomes
sister chromatid	copy of a chromosome made during the cell cycle
daughter cells	identical cells formed during cell division
interphase	phase of the cell cycle during which the cell prepares to reproduce
prophase	first phase of mitosis
metaphase	phase of mitosis during which chromosomes move to the middle of the cell
telophase	final phase of mitosis
anaphase	phase of mitosis during which sister chromatids begin to separate

Academic Vocabulary

establish

Use a dictionary to define establish.

to begin or create; to prove to be true

Lesson 1 The Cell Cycle and Cell Division (continued)

Main Idea

The Cell Cycle

I found this information on page _____
CA SE, p. 88

I found this information on page _____
CA SE, pp. 89–91

Mitosis and Cell Division

I found this information on page _____
CA SE, pp. 91–92

Details

Model the phases of the cell cycle as a circle graph. Label each section of your graph.

Graphs should show interphase, the mitotic phase, and cytokinesis.

Sequence and describe the stages of interphase.

Stage	Description
G1	The cell grows and carries out its usual functions.
S	The cell continues to grow; chromosomes inside nucleus duplicate, forming sister chromatids.
G2	The cell continues to grow and function; organelles duplicate.

Analyze the importance of mitosis and cell division. List four functions that mitosis and cell division perform.

1. growth of many-celled organisms
2. replacing old cells
3. reproduction in some organisms
4. replacing damaged or lost cells

SUMMARIZE IT

Summarize the main ideas of the above sections.

Accept all reasonable responses. Cell cycle, that includes growth, development, and reproduction. During interphase, cells grow and function, and duplicate their chromosomes and organelles. Mitosis and cell division allow organisms to grow, reproduce, and replace old or damaged cells.

Lesson 1 The Cell Cycle and Cell Division (continued)

Main Idea

I found this information on page _____ CA SE, p. 92

I found this information on page _____ CA SE, p. 93

Have students use pieces of yarn to represent chromosomes and model the changes in the chromosomes during each phase of mitosis.

I found this information on page _____ CA SE, p. 94

Accept all reasonable responses.

Details

Complete the table about the phases of mitosis.

Phase	What Happens
Prophase	DNA of replicated chromosomes twists into coils; membrane around nucleus breaks apart.
Metaphase	Replicated chromosomes move to and line up along center of cell.
Anaphase	Sister chromatids begin to separate and move to opposite ends of the cell.
Telophase	New membranes form around each set of chromosomes, forming two identical nuclei.

Draw a cell during each phase of mitosis.

Prophase	Metaphase	Anaphase	Telophase
Drawings should show cells in each phase as described in the table above.			

Contrast cytokinesis in cells with and without cell walls.

In cells without cell walls, the cell membrane pinches inward to divide the cytoplasm. In cells with a cell wall, a cell plate forms between the two new nuclei.

SUMMARIZE IT

Summarize two main ideas of the above section.

Accept all reasonable responses. During the phases of mitosis, a cell duplicates itself.

When cytokinesis follows mitosis, the cytoplasm of a cell divides to produce two new daughter cells.