

## TEKS

- 5A** Describe the stages of the cell cycle, including deoxyribonucleic acid (DNA) replication and mitosis, and the importance of the cell cycle to the growth of organisms
- 5B** Examine specialized cells, including roots, stems, and leaves of plants; and animal cells such as blood, muscle, and epithelium
- 5C** Describe the roles of DNA, ribonucleic acid (RNA), and environmental factors in cell differentiation
- 5D** Recognize that disruption of the cell cycle leads to diseases such as cancer
- 6A** Identify components of DNA and describe how information for specifying the traits of an organism is carried in the DNA
- 10C** Analyze levels of organization in biological systems and relate the levels to each other and to the whole system

## instructional content:

- ✦ Chromosome structure
- ✦ Limits to cell growth
  - DNA overload and exchange of materials
  - Surface area to volume ratio
- ✦ Cell cycle
- ✦ Mitosis and cytokinesis
- ✦ Regulation of the cell cycle
  - Cell cycle regulators
  - Uncontrolled cell growth
- ✦ Cell differentiation
  - Levels of organization (cell, tissue, organ, system)
  - Stem cells

## learning outcomes students will:

- Use all content and scientific process skills learned earlier in the course
- Describe the function of nucleosomes
- Explain the importance of histone proteins in packaging DNA in the nucleus
- Provide several reasons why cells divide
- Calculate surface area to volume ratio of a cell model
- Describe the main events of the cell cycle
- Describe the events in the four phases of mitosis
- Identify stages of mitosis in dividing plant and animal cells
- Draw how a chromosome appears during metaphase and label chromatids and centromere
- Explain how cytokinesis differs between plant and animal cells
- Differentiate between internal and external regulators of the cell cycle
- Explain why cancer is a disease of the cell cycle
- Explain why cell differentiation is an important part of the development of multicellular organisms
- Explain the defining characteristics of a stem cell
- Differentiate between totipotent, pluripotent, and multipotent stem cells



Incorporate scientific process skills during the instruction of all Biology concepts.  
**Look for this icon at wardsci.com/TEKS** for more information on scientific process skills.

## Recommended Ward's Science products with item numbers for easy online searching:

### science tools:

- [Onion, Mitosis \(ls\) ih](#) **917041**
- [Onion Mitosis \(ls\) ih & og](#) **932145**
- [Fish Mitosis \(sect\) ih](#) **932242**
- [Fish, Blastodisc \(sect\) ih](#) **932240**
- [Fish and Onion Mitosis \(sect\) ih](#) **932243**
- [Animal Cell Mitosis and Meiosis Models](#) **821230**
- [3B® Magnetic Animal Mitosis Model](#) **813051**

### instructional resources:

- [Ward's Diffusion and Cell Size Lab Activity](#) **361241**
- [Mitosis Manipulatives](#) **148350**
- [Ward's Plant and Animal Mitosis Flashcards](#) **323375**
- [Cell Division Posters](#) **332225**
- [Boreal Plant and Animal Mitosis Study Kit](#) **861212**
- [Ward's Mitotic Stage Counts Flashcards](#) **323378**
- [Interactive Whiteboard Science Lesson CD: Mitosis](#) **745162**