

MAPPING GRADE 7 SCIENCE INSTRUCTION

Concept: Cell Structure and Function

<p>PWC Objective: LS-2</p> <p>The student will investigate and understand that <u>all living things are composed of cells</u>. Key concepts include:</p> <ul style="list-style-type: none"> cell structure and organelles (cell membrane, cell wall, cytoplasm, vacuole, mitochondrion, endoplasmic reticulum, nucleus and chloroplast) (SOL LS.2a) similarities and differences between plant and animal cells (SOL LS.2b) development of cell theory (SOL LS.2c) 	
What Students Should Know (Critical Attributes)	What Students Should Be Able To Do (Essential Skills)
<p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> What are the major parts (organelles) of a cell and what is the function of each? How does an organelle's structure relate to its function? Which organelles are found in plant cells but not in animal cells? What are the three main components of the cell theory? Who were important contributors to our knowledge of the cell? What technological advances led to the development of the cell theory? <p><u>Critical Attributes:</u></p> <p>LS.2a The structure of various cell organelles reflects the job or function carried out by the organelle. The major organelles of all cells are:</p> <ul style="list-style-type: none"> nucleus—contains the genetic material and controls the cell cell membrane—regulates the materials entering and leaving the cell cytoplasm—the gel-like material that organelles float inside the cell membrane vacuole—stores water, sugar, or wastes generated by the cell endoplasmic reticulum—the series of transport tunnels throughout the cell mitochondria—use oxygen to produce energy for the cell ribosomes—make protein 	<ul style="list-style-type: none"> Correlate the structures of cell organelles with their jobs and analyze how organelles perform particular jobs. Distinguish among the following: cell membrane, cytoplasm, nucleus, cell wall, vacuole, mitochondrion, endoplasmic reticulum, and chloroplast.

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What Students Should Know (Critical Attributes)	What Students Should Be Able To Do (Essential Skills)
<p>LS.2b Similarities and differences in plants and animals are evident at the cellular level. Plant and animal cells contain some of the same organelles but have others that differ. Plant cells contain a cell wall and chloroplasts. The cell wall supports and protects the plant cell. Chloroplasts trap light energy from the sun and change it into chemical energy in the form of a sugar called glucose.</p>	<ul style="list-style-type: none">• Compare and contrast examples of plant and animal cells using the light microscope and images obtained from microscopes.• Design an investigation from a testable question related to animal and plant cells. The investigation may be a complete experimental design or may focus on systematic observation, description, measurement, and/or data collection and analysis. An example question is, "Do onion cells vary in shape or structure, depending on where they are found in the plant?"• Analyze and critique the experimental design of basic investigations related to animal and plant cells. This analysis and critique should focus on the skills developed in LS-1(a) and LS-1(b).
<p>LS.2c The development of the cell theory can be attributed to the major discoveries of many notable scientists, including Hooke, van Leewenhoek, Schleiden, Schwann, and Virchow. The development of the cell theory has been dependent upon improvements in the microscope and microscopic techniques throughout the last four centuries, which led to the discovery of the cell.</p>	<ul style="list-style-type: none">• Describe and sequence the major events in the development of the cell theory.
<p>LS.2c The components of the cell theory include: all living things are composed of cells; cells are the smallest unit (structure) of living things that can perform the processes (functions) necessary for life; living cells come only from other living cells.</p>	<ul style="list-style-type: none">• Identify the three components of the cell theory.