



Grade 6 Science - Unit 3 - Cells & Systems

Unit Focus

In this unit, students explore how the human body repairs itself after an injury. The learning journey begins with a real-world scenario: a middle school student who needed stitches, pins, and a cast after an accident. By analyzing doctor reports and developing initial models, students investigate what happens inside the body during the healing process. Students then dive deeper, discovering that our bodies are made of cells that work together to help us move and function. Through hands-on investigations, they examine how cells create new cells, what they need to grow, and how different body systems work together to heal injuries. By revisiting their initial models and analyzing a timelapse of a healing wound, students apply their learning to explain the process of healing. Finally, they extend their understanding to explore how children grow into adults, connecting their knowledge of healing to growth at growth plates in bones. This unit is adapted from OpenSciEd, a research-based science curriculum designed to engage students in figuring out real-world phenomena through inquiry and collaboration.

Stage 1: Desired Results - Key Understandings

Standard(s)	Transfer	
<p>Next Generation Science Standards Performance Expectations: Middle School Life Sciences</p> <ul style="list-style-type: none"> Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. (MS-LS1-1) Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. (MS-LS1-2) Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. (MS-LS1-3) Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories. (MS-LS1-8) <p>Madison Public Schools Profile of a Graduate</p> <ul style="list-style-type: none"> Analyzing: Examining information/data/evidence from multiple sources to identify possible underlying assumptions, patterns, and relationships in order to make inferences. (POG.1.2) 	<p><i>Students will be able to independently use their learning to...</i></p> <p>T1 Analyze qualitative and quantitative data to interpret patterns, draw conclusions, and/or make predictions.</p>	
	<p style="text-align: center;">Meaning</p>	
	<p style="text-align: center;">Understanding(s)</p>	<p style="text-align: center;">Essential Question(s)</p>
	<p><i>Students will understand that...</i></p> <p>U1 The human body is composed of cells that work together to form tissues, organs, and systems that enable movement, function, and healing.</p> <p>U2 Cells are the fundamental building blocks of life, and different types of cells have specialized functions.</p> <p>U3 Healing occurs through cellular processes, requiring interaction between multiple body systems.</p> <p>U4 The nervous system plays a critical role in detecting injury, responding to stimuli, and coordinating healing.</p>	
	<p style="text-align: center;">Acquisition of Knowledge and Skill</p>	
	<p style="text-align: center;">Knowledge</p>	<p style="text-align: center;">Skill(s)</p>
<p><i>Students will know...</i></p> <p>K1 The body consists of interconnected systems (skin, muscle, bone) that work together to enable movement and other functions. Injury to any part of the body (skin, muscle, or bone) affects the entire system and disrupts its overall</p> <p><i>Students will be skilled at...</i></p> <p>S1 Analyzing and interpreting data from various sources (images, diagrams, scientific texts) to identify patterns in how</p>		

Stage 1: Desired Results - Key Understandings

function. Healing involves repairing damaged parts of the body through the formation of new cells.

K2 Injuries cause gaps between damaged structures. The body heals these gaps over time, with different parts healing at different rates. New cells are formed from existing cells, and the process of healing is similar to growth (e.g., growth plates in children).

K3 Blood circulates through blood vessels and delivers necessary components (e.g., red/white blood cells, platelets) to tissues. Nerves have unique structures that connect various body parts, transmitting signals between the body and brain.

K4 Blood flow increases during injury, helping tissue repair and recover. Platelets play a role in stopping leaks and promoting healing.

K5 Cells are the basic units of life. Cells in bones, skin, and muscles have distinct structures that support their specific functions (e.g., bone cells are ring-like for strength, muscle cells are long for movement, skin cells form protective layers).

K6 New cells are created through cell division (growth and splitting). This process is vital for healing as gaps in tissues (skin, muscle, bone) are filled by new cells.

K7 The body reacts to injury by swelling, which increases blood flow and brings extra fluid to help heal the damaged area. This process involves interactions between various subsystems, including the circulatory and nervous systems.

K8 Healing and growth processes share similarities, as both involve filling gaps in the body with new cells. In children, growth plates allow the bones to grow, similar to how healing occurs.

K9 Cells require food (nutrients) to grow and divide, making new cells. This applies to both unicellular and multicellular organisms.

K10 The body uses cell division to fill in gaps in tissues (e.g., skin, muscle, bone) during healing, just as cells are necessary for growth.

K11 Disabilities may be temporary or permanent, visible or invisible. Some people view their disability as a key part of their identity. It's important to design accessible environments for everyone, including those with disabilities.

K12 Vocabulary: healing, function, structure, cross-section, red blood cell, white blood cell, platelet, plasma, nerve cell, cells, tissue, cell membrane, cytoplasm, bone cell, muscle cell, skin cell, nucleus, chromosomes, single-celled organism, multiple-celled organism, cell wall.

body subsystems (e.g., skin, muscle, bone) interact during the healing process.

S2 Developing models to represent the healing process and interactions between body system and revising these models based on new data or observations, predicting changes in system function when parts are injured.

S3 Investigating biological phenomena (e.g., injuries, healing, cell growth) by asking scientific questions, gathering evidence, and refining experimental designs to test hypotheses.

S4 Synthesizing information from various scientific texts, images, and experiments to explain the structure-function relationships in cells (blood, nerve, muscle, skin) and their role in body systems.

S5 Using scientific ideas and evidence to explain real-world phenomena, such as how body systems interact during healing or how external factors (e.g., food, bacteria) influence growth and cell function.

S6 Constructing written or oral arguments using evidence from scientific investigations to explain the cause-and-effect relationships within biological systems (e.g., healing, growth, function of cells).

S7 Identifying design problems (e.g., inaccessibility for people with disabilities) and proposing solutions that address these issues through practical changes to existing systems or environments.