Sixth Grade Nature of Science
Grade Standards, Supporting Skills, and Examples

Indicator 1: Understand the nature and origin of scientific knowledge.

Note: These skills should be taught and practiced in grade-level study of Physical, Life, and Earth/Space Science although mastery is not expected at these grade levels.

Standard	Bloom's Taxonomy	Supporting Skills and Examples	Assessment	Resources
		✓ Recognize scientific knowledge as not merely a set of static facts, but is dynamic and affords the best current explanations. ✓ Identify important contributions to the advancement of science from people of differing cultures, genders, and ethnicity. ✓ Examples: George W. Carver-peanuts, Gregor Mendel-genetics, Sylvia Earle-oceanography, Darwin-evolution	Famous Scientists PowerPoint Mole Day Lab	Google.com Enchantedlearning.com Wikipedia.org Brain Pop Destination machine Wireless notebook and display screen National Mole Day Website

Indicator 2: Apply the skills necessary to conduct scientific investigations.

Standard		Supporting Skills and Examples	Assessments	Resources
6.N.2.1. Students are able to pose questions that can be explored through scientific investigations.	**Application**	**Example**: How does light affect plant growth? ✓ Conduct systematic scientific investigations. • Use appropriate supportive technologies. • Describe the limits of accuracy inherent in a particular measuring device or measurement procedure. • Manipulate one variable over time with many repeated trials to test a hypothesis. • Construct and interpret graphs from data to make predictions. • Use research methods to investigate practical and/or personal scientific problems and questions. ✓ Describe and demonstrate various safety factors associated with different types of scientific activity. • Use appropriate scientific equipment safely in all investigations. • Wear appropriate attire.	Lab reports Lab practical quiz Polyacrylamide lab Film canister lab/alkaseltzer lab Oak Lake DO lab Diversity index lab Metric lab Quiz over microscope Measurement quiz Rube Goldberg apparatus Writing assignment on a proper conclusion Vocabulary quizes	Oak Lake Field Station Oak Lake Resource Packets Macro Invertebrate Key Grassland/Prairie Reference books "If You're Not From the Prairie" story

Sixth Grade Nature of Science
Performance Descriptors

Advanced	**Sixth grade students performing at the advanced level:** • pose a question and a hypothesis that can be explored through scientific exploration.
Proficient	**Sixth grade students performing at the proficient level:** • pose questions that can be explored through scientific investigations.
Basic	**Sixth Grade students performing at the basic level:** • given a prompt, pose one question that can be scientifically explored.

Sixth Grade Physical Science
Grade Standards, Supporting Skills, and Examples

Indicator 1: Describe structures and properties of, and changes in, matter.

Standard	Bloom's Taxonomy	Supporting Skills and Examples	Assessments	Resources
6.P.1.1. Students are able to identify the subatomic particles that make up atoms.	**Knowledge**	• Electrons, protons, and neutrons	Atom poem/Rapp/Story Build a model of an atom Bohr's model drawings Proton/neutron/electron worksheets	Websites Powers of Ten video website Brain Pop
6.P.1.2. Students are able to classify matter based on physical and chemical properties.	**Application**	**Examples**: mass, weight, volume, acidity, density, texture, color, melting point, boiling point ✓ Compare and contrast compounds and elements. Examples: sugar, salt, water (as compounds); Au, Fe, Na (as element symbols) ✓ Use the Periodic Table as a tool to describe elements. ✓ Examples: symbols, metals/non-metals, groups/rows, families	"Soup or Solid" lab "I've Been Slimed" lab Boiling point/melting point/freezing point lab Role modeling/charades of physical changes Alien Periodic Table activity	Periodic Table Activity book Brain Pop
6.P.1.3. Students are able to describe phase changes in matter differentiating between the particle motion in solids, liquids, and gases.	**Comprehension**	+ Contruct and interpret graphs depicting gas laws. + Construct and interpret graphs depicting phase changes in matter.	Melting Ice Lab Boyle's/Charles Law graphs	Prentice Hall "Chemical Building Blocks"

Indicator 2: Analyze forces, their forms, and their effects on motions.

Standard	Bloom's Taxonomy Level	Supporting Skills and Examples	Assessments	Resources
6.P.2.1. Students are able to describe how push/pull forces acting on an object produce motion.	**Comprehension**	**Examples**: illustration of see-saw, sailboat on water, kite ✓ Demonstrate how all forces have magnitude and direction. ✓ Newton's Laws of Motion		Brain Pop

Indicator 3: Analyze interactions of energy and matter.

Standard	Bloom's TaxonomyLevel	Supporting Skills and Examples	Assessments	Resources
6.P.3.1. Students are able to identify types of energy transformations.	**Comprehension**	**Examples**: mechanical to electrical, chemical to light, kinetic to potential (and vice versa) ✓ Explain basic principles of electricity and magnetism including static, current, circuits, and magnetic fields. ✓ Investigate the properties of light (electromagnetic spectrum). ✓ Illustrate sunlight to chemical (photosynthesis). + Describe methods of heat transfer + Describe characteristics of light and sound. + Relate waves to the transfer of energy.	Circuit board activity Light and Sound Labs Hot House Lab	

Sixth Grade Physical Science
Performance Descriptors

Advanced	**Sixth grade students performing at the advanced level:** • draw models of simple atoms indicating appropriate positions of protons, electrons, and neutrons; • identify physical and chemical changes; • explain the role of temperature in phase changes of matter; • predict motion(s) of an object acted on by multiple push/pull forces; • given a scenario, identify energy transformation(s).
Proficient	**Sixth grade students performing at the proficient level:** • identify the subatomic particles that make up atoms; • classify matter based on physical and chemical properties; • describe phase changes in matter differentiating between the particle motion in solids, liquids, and gases; • describe how push/pull forces acting on an object produce motion; • identify types of energy transformations.
Basic	**Sixth grade students performing at the basic level:** • label the protons, neutrons, and electrons of an atom; • classify matter based on physical property; • given an illustration of particle motion, can identify solids, liquids, and gases; • given an illustration, identify push/pull forces; • give an example of one energy transformation.

Sixth Grade Life Science
Grade Standards, Supporting Skills, and Examples

Indicator 1: Understand the fundamental structures, functions, classifications, and mechanisms found in living things.

Standard	Bloom's Taxonomy Level	Supporting Skills and Examples	Assessment	Resources
6.L.1.1. Students are able to illustrate the difference between plant and animal cells.	**Comprehension**	• Plant cells have chloroplasts and cell walls. ✓ Identify basic cell organelles and their functions. ✓ Recognize cells as the building blocks of living things. • Observe cells with a compound microscope	Cell booklet Cell vocab foldable Illustrate cells as seen under the microscope Identify cell structures under the microscope	Cells Alive website Brain Pop
6.L.1.2. Students are able to explain the importance and scientific use of a classification system.	**Comprehension**	• Management of diversity for organization and categorization • Uniform scientific communication Example: identification and classification of newly- discovered organisms ✓ Kingdom, phylum, class, order, family, genus, species ✓ Kingdom classification system (monera, protista, plantae, fungi, animalia)	Classifying Button Lab Classifying Project in groups Dichotomous Key Bean Lab	Classification websites Dichotomous Key websites Enchanted Learning.com

Indicator 2: Analyze various patterns and products of natural and induced biological change.

Standard	Bloom's Taxonomy Level	Supporting Skills and Examples	Assessments	Resources
		✓ Investigate the lineage of organisms to predict traits and features. Examples: family genealogy, Mendel's pea plants, Punnett Squares ✓ Describe the difference between a hybrid and a purebred trait.	Punnet Square activity	

Indicator 3: Analyze how organisms are linked to one another and the environment.

Standard	Bloom's Taxonomy Level	Supporting Skills and Examples	Assessments	Resources
		✓ Model cycles in ecosystems. Ex: water, carbon dioxide/oxygen ✓ Describe the relationship between characteristics of biomes and the organisms that live there. ✓ Describe how organisms adapt to biotic and abiotic factors in a biome. + Describe the roles of producers, decomposers, consumers in a system. + Analyze energy transfer within a food web.	Tap Water Tour Lab	

Sixth Grade Life Science
Performance Descriptors

Advanced	**Sixth grade students performing at the advanced level:** • Explain the reasons for the differences between plant and animal cells; • Design a classification system.
Proficient	**Sixth grade students performing at the proficient level:** • Illustrated the difference between plant and animal cells; • Explain the importance and scientific use of a classification system.
Basic	**Sixth grade students performing at the proficient level:** • Name two similarities and differences between plant and animal cells; • List the five kingdoms.

Sixth Grade Earth/Space Science
Grade Standards, Supporting Skills, and Examples

Indicator 1: Analyze the various structures and processes of the Earth system.

Standard	Bloom's Taxonomy Level	Supporting Skills and Examples	Assessment	Resources
6.E.1.1. Students are able to describe how the spheres (lithosphere, hydrosphere, atmosphere, and biosphere) of the Earth interact.	**Comprehension**	• Impact of humans and natural events ✓ Composition of spheres		
6.E.1.2. Students are able to examine the role of water on the Earth.	**Comprehension**	• Surface Examples: waves, glaciers, rivers	Water Cycle Poster	

		• Underground Example: aquifers • Atmosphere Examples: precipitation, humidity		
6.E.1.3. Students are able to explain processes involved in the formation of the Earth's structure.	**Comprehension**	**Examples**: plate tectonics, volcanoes, earthquakes ✓ Interpret topographic and digital imagery or remotely sensed data to identify surface features. Examples: local, global, regional ✓ Explain the formation of different rock types and their characteristics. ✓ Use geospatial technologies to investigate natural phenomena. ✓ Examples: GPS, GIS, remote sensing		

Indicator 2: Analyze essential principles and ideas about the composition and structure of the universe.

Standard	Bloom's Taxonomy Level	Supporting Skills and Examples	Assessments	Resources
6.E.2.1. Students are able to identify the organization and relative scale of the solar system.	**Knowledge**	• Sun, Moon, Earth, other planets and their moons, meteors, asteroids, and comets ✓ Origins and age of the universe ✓ Explain the association of time measurement with celestial motions. Examples: time zones, leap years, international dateline	Planet Project: - Brochure - Scale model of solar system - Presentation	Websites on planets and solar system

Sixth Grade Earth/Space Science
Performance Descriptors

Advanced	**Sixth grade students performing at the advanced level:** • analyze the role of water as it interacts with the Earth's spheres; • explain the role of plate tectonics in shaping the earth; • compare and contrast terrestrial and gaseous planets.
Proficient	**Sixth grade students performing at the proficient level:** • describe how the spheres (lithosphere, hydrosphere, atmosphere, and biosphere) of the Earth interact; • examine the role of water on the Earth; • explain processes involved in the formation of the Earth's structure; • identify the organization and relative scale of the solar system.
Basic	**Sixth grade students performing at the basic level:** • identify the spheres of Earth; • list two effects of water on Earth; • identify processes of weathering and erosion in the formation of earth's structures; • list the planets in order from the Sun outward.

Sixth Grade Science, Technology, Environment, and Society
Grade Standards, Supporting Skills, and Examples

Indicator 1: Analyze various implications/effects of scientific advancement within the environment and society.

Standard	Bloom's Taxonomy Level	Supporting Skills and Examples	Assessments	Resources
6.S.1.1. Students are able to describe how science and technology have helped society to solve problems.	**Comprehension**	Examples**:** GPS, GIS, remote sensing, prevention and treatment of diseases, vaccinations, water treatment, prosthetics		

Indicator 2: Analyze the relationships/interactions among science, technology, environment, and society.

Standard	Bloom's Taxonomy Level	Supporting Skills and Examples	Assessments	Resources
6.S.2.1. Students are able, given a scenario, to identify the problem(s) of human activity on the local, regional, or global environment.	**Knowledge**	Examples: urban expansion, water treatment + Investigate an environmental issue by identifying a problem, look for the cause, study the effects, and look for a solution.		Fruitvale Activity Tap Water Tour Oak Lake or Wetland Unit Wetland Trunk from ADWD.

Sixth Grade Science Technology, Environment, and Society
Performance Descriptors

Advanced	**Sixth grade students performing at the advanced level:** • list pros and cons of technological solutions to problems.
Proficient	**Sixth grade students performing at the proficient level:** • describe how science and technology have helped society to solve problems; • given a scenario, identify the problem(s) of human activity on the local, regional, or global environment.
Basic	**Sixth grade students performing at the basic level:** • recognize a problem.