

*Fourth Grade Science*

<b>Science Content Standard 1. Students, through the inquiry process, demonstrate the ability to design, conduct, evaluate, and communicate results and reasonable conclusions of scientific investigations.</b>		
<b>Benchmark End of Grade 4</b>	<b>Essential Learning Expectation</b>	<b>Essential Vocabulary</b>
<b>1. Use models that illustrate simple concepts and compare those models to the actual phenomenon</b>	<b>A. Identify the relative scale of a given model B. Compare and contrast how a model relates to the actual phenomenon</b>	scale, compare, contrast, phenomenon, legend/key
<b>2. Identify a valid test in an investigation</b>	<b>A. Identify the parts of a valid test B. Identify a valid test in an investigation</b>	
<b>3. Identify how observations of nature form an essential base of knowledge among the Montana American Indians</b>	<b>A. Identify examples of Montana American Indians using observations in nature B. Describe the ways that some American Indians used observation to create knowledge</b>	

**Science Content Standard 2. Students, through the inquiry process, demonstrate the knowledge of properties, forms, changes and interactions of physical and chemical systems.**

Benchmark End of Grade 4	Essential Learning Expectation	Essential Vocabulary
<p><b>1. Create mixtures and separate them based on different physical properties (e.g., salt and sand, iron filings and soil, oil and water)</b></p>	<p><b>A. Identify substances in a mixture            B. Identify examples of mixtures in everyday life.            C. Create a mixture with objects that have various physical properties.            D. Identify physical properties of substances in a mixture.            E. Separate mixtures based on different physical properties.            F. Separate mixtures</b></p>	<p><b>substance, mixture, physical properties, separate</b></p>
<p><b>2. Examine, measure, describe, compare and classify objects in terms of common physical properties</b></p>	<p><b>A. Define physical property            B. Identify characteristics of a physical property (size, color, shape, texture)            C. Measure objects to determine differences and similarities            D. Classifying objects multiple times by a variety of physical properties</b></p>	<p><b>physical property, characteristic, classify</b></p>
<p><b>3. Identify the basic characteristics of light, heat, motion, magnetism, electricity, and sound</b></p>	<p><b>A. Investigate attraction and repulsion with magnets.            B. Describe the effect of distance on the magnetic field.</b></p>	<p><b>attract, repel, magnet, magnetic field</b></p>
	<p><b>C. Investigate the visible spectrum            D. Define reflect, refract, and absorb            E. Classify materials as those that can reflect, refract or absorb light.</b></p>	<p><b>reflect, refract, absorb, visible spectrum, prism</b></p>
	<p><b>F. Describe and list examples of a wave.            G. Describe the relationship between a vibration and a sound wave.            H. Model wave motion (up and down, back and forth, speed)</b></p>	<p><b>wave, vibration, sound, motion, speed, frequency, volume, pitch, wavelength, amplitude</b></p>

	<p><b>I. Identify electricity as a flow of energy</b>  <b>J. Compare and contrast current electricity and static electricity.</b>  <b>K. List the safe uses of electricity.</b>  <b>L. Construct an example of an electrical circuit.</b></p>	<p>electricity, energy, current, static, closed and open circuits, switch, parallel, series, battery (dry-cell vs. wet-cell), positive charge, negative charge.</p>
<p><b>4. Model and explain that matter exists as solids, liquids, and gases and can change form one form to another</b></p>	<p><b>A. Differentiate between solids, liquids, and gases</b>  <b>B. Identify examples of solids, liquids, and gases</b></p>	<p><b>solid, liquid, gas</b></p>
	<p><b>C. Define physical properties and physical change</b>  <b>D. List examples of physical changes</b>  <b>E. Demonstrate physical changes through investigation.</b></p>	<p><b>physical property, physical change</b></p>
<p><b>5. Identify that the position of an object can be described by its location relative to another object and its motions described and measured by external forces acting upon it</b></p>	<p><b>A. Investigate and describe how speed, direction, and forces affect the motion of an object.</b></p>	<p><b>speed, direction, force, motion</b></p>
<p><b>6. Identify, build, and describe mechanical systems and the forces acting within those systems</b></p>	<p><b>A. Explore and identify simple machines, including real life examples.</b>  <b>B. Build simple machines and explain how they make work easier.</b></p>	<p><b>simple machine, work, levers, inclined plane, wheel and axle, pulley, wedge, screw</b></p>
<p><b>7. Observe, measure and manipulate forms of energy: sound, light, heat, electrical, magnetic</b></p>	<p><b>See Benchmark 3 for Essential Learning Expectations</b></p>	

**Science Content Standard 3. Students, through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process and diversity of life, and how living organisms interact with each other and their environment.**

Benchmark End of Grade 4	Essential Learning Expectation	Essential Vocabulary
1. Identify that plants and animals have structures and systems that serve different functions for growth, survival, and reproduction	A. Identify the parts of plants. (stem, root, leaf, flower) B. Identify the parts of a flower (stamen, sepal, petal, pistil, pollen, ovule) C. Illustrate and label a plant and its parts.	stem, root, leaf, flower, stamen, sepal, pistil, pollen, ovule, petal,
	D. Identify that animals have systems for certain functions E. Explain the relationship between basic animal systems and their functions.	system
2. Identify, measure, and describe basic requirements of energy and nutritional needs for an organism	A. Define producer, consumer, decomposer, food chain, food web. B. Explain the difference between a food chain and a food web. C. Illustrate and describe the relationships in food chains and food webs	producer, consumer, decomposer, food chain, food web, herbivore, carnivore, omnivore
3. Describe and use models that trace the life cycles of different plants and animals and discuss how they differ from species to species	Benchmark is addressed in grade 2 and 3	
4. Explain cause and effect relationships between nonliving and living components with ecosystems; and explain individual response to the changes in the environment including identifying differences between inherited, instinctual, and learned behaviors	A. Define adaptation. B. Identify adaptations in a variety of organisms that are specific to survival in their environment.	adaptation, survival, environment, organism
	C. Define instinctual behaviors, inherited behaviors, and learned behaviors. D. Classify living things by instinctual, inherited, and learned behaviors. E. Compare and contrast the instinctual, inherited, and learned behaviors	instinctual, behavior, inherited, learned

	<p>F. Define predator, prey, competition</p> <p>G. Identify examples of predator/prey relationships and competition</p>	predator, prey, competition
5. Create and use a classification system to group a variety of plants and animals according to their similarities and differences	<p>A. Define vertebrate and invertebrates.</p> <p>B. Identify examples of invertebrates and vertebrates</p> <p>C. Identify characteristics of flowering and non-flowering plants.</p>	vertebrate, invertebrate, flowering, non-flowering
	<p>D. Identify rules for classification</p> <p>E. Place organisms into groups according to the classification rules</p>	classify, similarities, differences, classification system

<b>Science Content Standard 4. Students through the inquiry process, demonstrate knowledge of the composition, structures, processes and interaction of Earth's systems and other objects in space.</b>		
<b>Benchmark End of Grade 4</b>	<b>Essential Learning Expectation</b>	<b>Essential Vocabulary</b>
1. Describe and give examples of earth's changing features	<p>A. Define and illustrate the following terms: erosion, weathering, volcanoes, earthquakes, glaciations</p> <p>B. Describe the changes that occur to earth features in each event</p> <p>C. Illustrate the effects of the changes in Earth's surface</p>	erosion, weathering, earthquakes, volcano, glaciations
2. Describe and measure the physical properties of earth's basic materials (including soil, rocks, water and gases) and the resources they provide	<p>A. Describe the formation of the three rock types.</p> <p>B. Compare and contrast the characteristics of the three basic types of rocks: sedimentary, metamorphic and igneous</p> <p>C. Identify specific samples of sedimentary, metamorphic and igneous rocks</p> <p>D. Identify everyday uses of rocks</p> <p>E. Classify rock samples by rock type</p>	classification, igneous, metamorphic, sedimentary, pressure, deposition
3. Investigate fossils and make inferences about life, the plants, animals, and the environment at that time	<p>A. Define a fossil as physical evidence of past life</p> <p>B. Identify body fossils as those that contain plant and animal remains</p> <p>C. Identify trace fossils as those that record an impression of past life</p> <p>D. Explain how body and trace fossils are formed</p> <p>E. Compare a fossil to a plant/animal living</p>	fossil, body fossil, trace fossil, environment, impression

	<p>today</p> <p>F. Infer what fossils tell us about past life and the environment.</p>	
<p>4. Observe and describe the water cycle and the local weather and demonstrate how weather conditions are measured</p>	<p>A. Record temperature</p> <p>B. Display data on a graph</p> <p>C. Interpret trends and patterns of data</p>	<p>barometer, anemometer, weather vane, temperature, humidity, wind, precipitation, air pressure, patterns, trends</p>
	<p>D. Identify and explain the use of a barometer, weather vane, and anemometer</p> <p>E. Collect, record and chart data from each weather instrument</p> <p>F. Identify the patterns</p> <p>G. Discuss trends within the patterns</p>	
<p>5. Identify seasons and explain the difference between weather and climate</p>	<p>Benchmark is addressed in grade 3</p>	
<p>6. Identify objects (e.g., moon, stars, meteors) in the sky and their patterns of movement and explain that light and heat comes from a star called the sun</p>	<p>A. Define and model revolution and rotation</p> <p>B. Model the orbit of the planets around the sun</p>	<p>orbit, rotation, revolution, planets, sun, axis</p>
	<p>C. Identify the patterns of movement between a planet, its moon, and the sun.</p> <p>D. Identify changes in the appearance of the Earth's moon over the course of a month</p>	<p>moon, planet, sun, orbit, Earth</p>
	<p>E. Identify other objects in the solar system (meteors, comets, and asteroids)</p> <p>F. Discuss the characteristics and movements of meteors, comets, and asteroids.</p>	<p>meteor, comet, asteroid, solar system</p>

**Science Content Standard 5. Students, through the inquiry process, understand how scientific knowledge and technological developments impact communities, cultures and societies**

<b>Benchmark End of Grade 4</b>	<b>Essential Learning Expectation</b>	<b>Essential Vocabulary</b>
<p><b>1. Describe and discuss examples of how people use science and technology</b></p>	<p><b>A. Identify technology as the knowledge, processes and products used to solve problems and make lives easier</b>  <b>B. Identify examples of technology used in modern society.</b>  <b>C. Identify uses of technology in science, (i.e., probes, microscopes, lasers)</b>  <b>D. Discuss how science and technology have impacted our environment.</b></p>	<p><b>technology, society, environment</b></p>
<p><b>2. Describe a scientific or technological innovation that impacts communities, cultures, and societies</b></p>	<p><b>A. Define and discuss what constitutes a community, a culture, and a society</b>  <b>B. Compare and contrast community, culture and society</b>  <b>C. Identify and discuss examples of scientific or technological discoveries that impact a community, a culture and a society</b></p>	<p><b>technology, society, environment, community, culture</b></p>
<p><b>3. Simulate scientific collaboration by sharing and communicating ideas to identify and describe problems</b></p>	<p><b>A. Identify a local current event or problem involving science</b>  <b>B. Research and summarize the scientific issues relevant to that local current event or problem</b>  <b>C. Present and discuss the research on the scientific issues relevant to that local current event or problem</b></p>	
<p><b>4. Use scientific knowledge to make inferences and propose solutions for simple environmental problems</b></p>	<p><b>A. List and discuss environmental problems and concerns.</b>  <b>B. Research and summarize the scientific issues relevant to environmental problems</b>  <b>C. Propose and discuss solutions for environmental problems using scientific knowledge</b></p>	<p><b>environment</b></p>
<p><b>5. Identify how the knowledge of science and technology influences the development of the Montana American Indian cultures</b></p>	<p><b>A. Identify and discuss examples of scientific knowledge influencing the development of Montana American Indian cultures</b></p>	

**Science Content Standard 6. Students, understand historical developments in science and technology.**

<b>Benchmark End of Grade 4</b>	<b>Essential Learning Expectation</b>	<b>Essential Vocabulary</b>
<b>1. Give historical examples of scientific and technological contributions to communities, cultures and societies, including Montana American Indian examples</b>	<b>A. Define and discuss what constitutes a community, a culture, and a society B. Identify and discuss historical examples of scientific or technological contributions that impacted a community, a culture and a society; including Montana American Indians</b>	<b>society, culture, community</b>
<b>2. Describe how scientific inquiry has produced much knowledge about the world and a variety of contributions toward understanding events and phenomenon within the universe</b>	<b>A. Research and describe examples where scientific inquiry was used to gain understanding of the natural world B. Identify and describe examples of scientific understanding that was contributed to by multiple scientists</b>	<b>scientific inquiry, natural world, collaborate</b>
<b>3. Describe science as a human endeavor and an ongoing process</b>	<b>A. Identify occupations that use science including Montana American Indians. B. Identify and describe examples of science as an ongoing process.</b>	