

Fifth Grade Science Curriculum

| 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. | | |
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| Benchmark End of Grade 8 | Essential Learning Expectation | Essential Vocabulary |
| 1. Identify a question, determine relevant variable and a control, formulate a testable hypothesis, plan and predict the outcome of an investigation, safely conduct scientific investigation, and compare and analyze data | A. Recognize and select a testable question when presented with multiple choices B. Write a testable question for an investigation C. Identify a hypothesis D. Explain the relationship between a testable question and a hypothesis E. Plan an investigation to test a hypothesis F. Identify the independent and dependent variable G. Identify a control group and explain its purpose H. List and follow appropriate safety procedures. I. Conduct the investigation | control, prediction, hypothesis, variable, testable question, independent variable, dependent variable |
| 2. Select and use appropriate tools including technology to make measurements (in metric units), gather, process and analyze data from scientific investigations | A. Collect data using observation and tools such as scale, balances, thermometer, beaker, digital probes, stop watch, graduated cylinder in metric units B. Record data using data tables C. Represent data using graphs | graduated cylinder, scales, Celsius thermometers, beaker, digital probes, stop watch, balances, metric units, data tables, graphs |
| 3. Review, communicate and defend results of investigations, including considering alternative explanations. | A. Compare data to hypothesis with guidance B. Determine if hypothesis is supported or not supported with guidance C. Communicate findings in written or oral format. | hypothesis, supported, not supported, prediction |
| 4. Create models to illustrate scientific concepts and use the model to predict change. (e.g., computer simulation, stream table, graphic representation) | A. Explain the purpose of a model B. List various types of models including 2-D, 3-D and computer simulations C. Follow step-by-step directions to build a model | 2-D, 3-D, computer simulations, legend/key |
| 5. Identify strengths and weakness in an investigation design. | Benchmark is addressed in grades 6-8 | |
| 6. Compare how observations of nature form an essential base of knowledge among the Montana American Indians. | A. Identify examples of Montana American Indians using observation to create knowledge of nature B. Explain how Montana American Indians have used observation to explain processes of nature | |

| Science Content Standard 2. Students, through the inquiry process, demonstrate the knowledge of properties, forms, changes and interactions of physical and chemical systems. | | |
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| Benchmark End of Grade 8 | Essential Learning Expectation | Essential Vocabulary |
| 1. Classify, describe, and manipulate the physical models of matter in terms of: elements, and compounds, pure substances and mixtures, atoms, and molecules | <p>A. Identify common elements</p> <p>B. Define elements as pure substances</p> <p>C. Identify common compounds (water, carbon dioxide, salt)</p> <p>D. Distinguish between pure substances and mixtures</p> <p>E. Explain the relationship between elements, compounds, pure substances, and mixtures.</p> | element, compound, mixture, pure substance |
| 2. Examine, describe, compare and classify objects and substances based on common physical properties and simple chemical properties | <p>A. Define physical properties as properties that do not change the chemical nature of matter (i.e., color, smell, freezing point, boiling point, melting point, magnetism)</p> <p>B. Define chemical properties as properties that do change the chemical nature of matter (i.e., combustion, rust, decompose)</p> <p>C. Identify examples of chemical change (generating a gas, color change, rust)</p> | mass, volume, chemical change, physical change, physical property, chemical property |
| 3. Describe energy and compare and contrast the energy transformations and the characteristics of light, heat, motion, magnetism, electricity, sound and mechanical waves | <p>A. Identify that most matter can exist as a solid, liquid or gas depending on temperature.</p> <p>B. Describe the processes of sublimation, condensation, and evaporation</p> | sublimation, evaporation, condensation, freezing point, melting point, energy, boiling point, solid, liquid, gas, matter |
| | <p>C. Explain how sound is produced, transmitted, and received.</p> <p>D. Describe how sound can be changed.</p> <p>E. Design and construct instruments that produce sound (The effects of mechanical waves are applied in Standard 4 Benchmark 1)</p> | frequency, amplitude, pitch, wavelength, vibration, tension, medium, transmit, instrument |
| | Light is addressed in grades 6-8 | |
| | <p>F. Define electricity as the flow of energy</p> <p>G. Distinguish the differences between simple, series, and parallel circuits</p> <p>H. Model series and parallel circuits</p> <p>I. Explain the flow of energy in a circuit.</p> | energy, electricity, circuits (simple, parallel, series), battery, positive and negative charge |
| | <p>J. Explain the three types of heat transfer</p> | conduction, convection, radiant energy (light), heat transfer, temperature |
| 5. Describe and explain the motion of an object in terms of its position, direction, & speed as well as the forces acting upon it | <p>A. Experiment with potential and kinetic energy, (i.e., cars/balls on ramp)</p> <p>B. Explain the differences between kinetic and potential energy</p> <p>C. Identify that work is movement following application of a force.</p> <p>D. Demonstrate an example of work.</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. | | |
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| Benchmark End of Grade 8 | Essential Learning Expectation (ELE) | Essential Vocabulary |
| 1. Compare the structure and function of prokaryotic cells (bacteria) and eukaryotic cells (plant, animal, etc.) including the levels of organization of the structure and function, particularly with humans | A. Describe the basic structure and function of a cell. B. Observe cells using a microscope. C. Compare plant and animals cells D. Create model/diagram of an animal and/or plant cells. | cell membrane, cell wall, nucleus, vacuoles, cytoplasm, mitochondria, chloroplast |
| 2. Explain how organisms and systems of organisms obtain and use energy resources to maintain stable conditions (e.g., food webs, photosynthesis, respiration) | A. Identify plant structures involved in photosynthesis and transpiration B. Identify the compounds involved in photosynthesis and transpiration C. Explain the process of photosynthesis and transpiration in terms of the key structures and compounds that are utilized. D. Explain the relationship between photosynthesis and transpiration | chlorophyll, photosynthesis, oxygen, carbon dioxide, sugar, water, light energy, transpiration, water vapor, roots, leaves |
| 3. Communicate the differences in the reproductive processes of a variety of plants and animals using the principles of genetic modeling (e.g., Punnet squares) | Benchmark addressed in grades 6-8 | |
| 4. Investigate and explain the interdependent nature of populations and communities in the environment and describe how species in these populations adapt by evolving | A. Explore and compare symbiotic relationships B. Define symbiosis C. Identify the key characteristics of an ecosystem D. Describe the interdependence between the parts of an ecosystem | symbiosis, ecosystems, population, community, environment, interdependence, diversity |
| 5. Create and use a basic classification scheme to identify plants and animals | A. Employ dichotomous key to separate a collection of basic objects B. Identify the kingdoms C. Know the difference between kingdom, phylum and class D. Define vertebrate/invertebrate, warm blooded/cold blooded E. Compare and contrast two characteristics of the animal kingdoms. F. Classify plants by flowering, non-flowering, mosses, ferns | dichotomous key, kingdom, phylum, class, vertebrate, invertebrate, cold-blooded, warm-blooded, mosses, ferns, flowering, non-flowering |

| Science Content Standard 4. Students, through the inquiry process, demonstrate knowledge of the composition, structures, processes and interactions of Earth's systems and other objects in space. | | |
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| Benchmark End of Grade 8 | Essential Learning Expectation | Essential Vocabulary |
| 1. Model and explain the internal structure of the earth and describe the formation and composition of earth's external features in terms of the rock cycle and plate tectonics and constructive and destructive forces | A. Describe Earth's physical features B. Explain glaciations and weathering effects on the Earth's surface C. Define the role that plate tectonics play in changing Earth's features | glaciations, erosion, deposition, plate tectonics, continental drift, mountain, earthquake, volcano |
| 2. Differentiate between rocks types and minerals types and classify both by how they are formed and the utilization by humans | A. Differentiate between igneous, sedimentary, and metamorphic rocks. B. Identify that rock is composed of different kinds of minerals C. Define minerals as the building blocks of rocks. D. Compare and contrast the differences between rocks and minerals. | igneous, sedimentary, metamorphic, mineral, rock |
| 3. Use fossils to describe the geological timeline | A. Explain how sedimentary rock layers represent a progression of time B. Describe how the relative age of fossils can be determined from their position in sedimentary rock layers | sedimentary, fossil, relative age |
| 4. Describe the water cycle, the composition and structure of the atmosphere and the impact of oceans on large-scale weather patterns | A. Explain the water cycle and its application to weather. B. Identify different types of clouds and how they can be used to predict weather. | water cycle, condensation, evaporation, precipitation, forecast, meteorologist |
| | C. Describe properties of air masses moving across the earth's surface D. Discuss how interactions of air masses are used to forecast the weather E. Interpret a weather map using correct symbols. | air mass, front, air pressure, warm front, cold front, precipitation, air currents |
| 5. Describe and model the motion and tilt of earth in relation to the sun, and explain the concepts of day, night, seasons, year, and climatic changes | A. Compare and contrast revolution and rotation B. Illustrate/model Earth's rotation in relation to the sun C. Explain how the Earth's rotation causes day and night D. Illustrate and model Earth's revolution in relation to the sun E. Describe and model the causes of seasons and year due to the revolution and tilt of the Earth in relation to the sun | revolution, rotation, tilt, axis, seasons, orbit, year |
| 6. Describe the earth, moon, planets and other objects in space in terms of size, force of gravity, structure, and movement in relation to the sun | A. Identify the relationship between the Earth, the sun, and the moon B. Explain how the moon is lighted by the sun C. Model the relative movements of the moon, Earth and sun D. Identify phases of the moon by how much of the lighted part of moon can be seen from Earth | Earth, planet, sun, moon, relative, phases of the moon, light, orbit |

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

| Benchmark End of Grade 8 | Essential Learning Expectation | Essential Vocabulary |
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| 1. Describe the specific fields of science and technology as they relate to occupations within those fields | A. Identify specific fields of science B. Identify occupations within specific fields of science C. Identify uses of technology unique to specific occupations within each field of science | life science, earth science, physical science, engineering, technology, occupations, science |
| 2. Apply scientific knowledge and process skills to understand issues and everyday events | A. Identify a local current event or problem involving science B. Research and summarize the scientific issues relevant to that local current event or problem | current event, issue, problem |
| 4. Use scientific knowledge to investigate problems and their proposed solutions and evaluate those solutions while considering environmental impacts | A. Identify a local issue with an environmental impact B. List possible environmental impacts C. Research and discuss proposed solutions | environmental impact |
| 5. Describe how the knowledge of science and technology influences the development of the Montana American Indian cultures | A. Investigate how science and technology have an impact on Montana American Indians B. Explain the impact of science and technology on Montana American Indians. | |

Science Content Standard 6. Understand historical developments in science and technology.

| Benchmark End of Grade 8 | Essential Learning Expectation | Essential Vocabulary |
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| 1. Give examples of scientific discoveries and describe the interrelationship between technological advances and scientific understanding, including Montana American Indian examples | A. Identify examples of technological advances throughout history, including Montana American Indian examples B. Identify and discuss scientific discoveries influenced by these technologies C. Discuss how technology advances science understanding | technology, scientific discoveries, advances |
| 2. Identify major milestones in science that have impacted science, technology, and society | A. Chart the history of scientific milestones (see Grades 6-8.) B. Discuss how milestones have impacted society over time. | milestones |
| 3. Describe and explain science as a human endeavor and an ongoing process | A. Investigate occupations that use science | occupation |
| | B. Identify the features of science that make it a human endeavor and an ongoing process. | |