

Havre Public Schools Science Fourth Grade

Course Information

Topic: Science

Grade Level: 4

Length: Full Year

Essential Understanding:

In 4th grade, students will be exposed to many topics. Students will be exposed to 4 different science strands: earth science, physical science, life science and engineering and design. Overall, they should be able to read and understand fourth grade level science text as well as conduct investigations into the different strands in order to increase their understanding of the topics.

Course Objectives:

- Literary skills will be applied to non-fiction science text.
- Students will take notes, categorize information, design and conduct investigations and/or experiments to be utilized.
- Use and analyze texts, experiments, investigations, and visual sources in order to increase understanding.
- Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
- Demonstrate evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.
- Incorporating math standards with knowing relative sizes of measurement units, and reason abstractly and quantitatively.
- Conduct short research projects that build knowledge.
- Make observations and/or measurements to provide evidence of the effects of weathering or the rate or erosion by water, ice, wind, or vegetation.
- Analyze and interpret data from maps to describe patterns of Earth's features.
- Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.
- Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.
- Develop a model of waves to describe patterns in terms of amplitude and wavelength such as light reflecting from objects and compare multiple solutions that use patterns to transfer information.
- Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents and explain how it may relate to the speed of an object.
- Design, test, and refine a device that converts energy from one form to another such as circuit boards.
- Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

Student Objectives:

- I can use reading skills to comprehend science text.
- I can design and carry out investigations and experiments in order to understand content and to prove/disprove a hypothesis through research-based projects.
- I can compare multiple possible solutions to solve a problem.

- I can look at patterns in rock formations and fossils and explain the changes in landscapes over time.
- I can use measurement units to understand how small and large earth forms are.
- I can observe and provide evidence on the effects of weathering and erosion.
- I can design a map that describes patterns of earth's features.
- I can describe the difference between renewable and nonrenewable resources.
- I can create a conservation plan to reduce, reuse and recycle.
- I can develop a model to show patterns of waves and wavelengths and how they transfer information.
- I can observe that energy can transfer by sound, light, heat, and electric currents and how it relates to speed.
- I can design a circuit board to model energy conversion.
- I can provide evidence that plants and animals have internal and external structures that are used to support survival, growth, behavior, and reproduction.
- I can demonstrate and describe that animals receive information through their senses.
- I can design a science experiment to prove a hypothesis.

Pacing Guide and Timeline with Standard Included:

*=Required

Dates/Resource	Standard and Focus	Experiments	Projects
STEM activities.	How can Earth's crust change? What forces shape and change Earth's landforms? How does the weather shape and change the land?	Eroded rock grains (discover what size of material will be moved) Super-Cool Experiment (discover what happens to freezing and thawing rocks)	
(4 Weeks) Weather and Climate (Chapter 7) ngss.nsta.org When done teaching all information, STEM activities.	Earth's Systems (4-ESS2-1, 4ESS2-2, 4-ESS2.A, 4-ESS2.B, 4-ESS2.E) How can you tell that air is around you? How is water recycled? How do fronts and air masses change the weather?	Water cycle experiment (make a cloud in a jar) * Evaporation rate between different colored cups Make a model (How does the size of a puddle effect how fast it evaporates)	How does the wind move? (p. 313) Weather journal Cloud poster using cotton balls Climb It (learn about a famous mountain range along with its altitude and climate change Global Warming Expository Text

	Why do weather patterns change?		
(4 Weeks) Earth's Resources (Chapter 6)	Earth's Systems (4-ESS2-1, 4-ESS2-2, 4-ESS2.A, 4-ESS2.B, 4-ESS2.E, 4-ESS3-1)	Soil Permeability* STEM Irrigation system (use cups, straws, clay, and water)	Lego WeDo (Cleaning the ocean) Recycling Centers
(See Social Studies Chapter 1 for 4-ESS3-1 This standard is found in all social studies units about regions)	Why are there so many different kinds of rock? How does soil differ from place to place? What are fossils and fossil fuels?	Oil Spill Simulation (Fill a bottle with water, food coloring, and oil. Students must attempt to clean out the oil)	Edible Soil (make a model of the layers of soil with chocolate chips, pudding, Oreos, and coconut flakes)
ngss.nsta.org	How do people use and obtain water?		
When done teaching all information, STEM activities.	How can people reduce pollution and conserve resources?		

Trimester 2

Dates/Resource	Standard and Focus	Experiments	Projects
2-3 Weeks) Forces (Chapter 11) ngss.nsta.org	Energy (4-PS4-1-4) How do objects move? How can pushes and pulls affect the way objects move? How are energy and work related? How do simple machines make work easier?	Inertia (explain Newton's first law when an egg drops into a glass) Make a ramp (How do forces change motion?) * Magnets and motion Cooking energy (use renewable energy from the sun to cook s'mores)	Inertia Towers Why do basketballs bounce and why do eggs not? Expository Text Potential and Kinetic Energy Newton's Law Poster/Notes (learn about Newton's 3 laws)

(2-3 Weeks) Energy (Chapter 12) ngss.nsta.org	Energy (4-Ps4-1,2,3,4)	What keeps heat out?	Infer which materials are the best insulators. The sound of science (build stringed instruments with three pitches) The effects of gravity short page story of how life on Earth would change if gravity were half of what it is now
	What is heat?	What makes white light?	
	How can you make sounds?	How does a magnifying glass bend light?	
	How does light behave?	Pinhole cameras and eyes (see inverted objects with magnifying lens) *	
	How does electricity affect your life?	The Sound of Science (make a model ear) Salt and Pepper electricity (separate salt and pepper with static electricity) Circuit Boards	

Trimester 2-3

Dates/Resource	Standard and Focus	Experiments	Projects
(2-3 Weeks) Exploring Ecosystems (Chapter 3) ngss.nsta.org	From Molecules to Organisms: Structure and Processes (4-LS1- 1)	How does a snail respond?	Photosynthesis posters*
	How do animals compare?	How do teeth help animals eat? (Animals' teeth shapes)	Classifying aliens (group aliens into different kingdoms, phylum's, etc. Based on their different characteristics)
	Which animals have backbones?	Feeding frenzy activity (insect adaptation on how they eat)	Vertebrate/invertebrate Venn diagrams*
	How do systems help animals survive?	What does a backbone do? (Which can support more weight using modeling clay and a pencil)	Nutrition label activities
	How do animals grow and reproduce?		Classifying animals by their symmetry All rise: What is yeast? Expository text
(2-3 Weeks) Exploring Ecosystems (Chapter 3) ngss.nsta.org	From Molecules to Organisms: Structures and Processes (4-LS1- 1,2)	Growing plants with changing variables (how does temperature affect seed growth?) *	What can you find in an environment? (What living and non-living things might you find in your environment?)
	How do the parts of an ecosystem interact?	How are soils different? Land snail habitat	

	How do ecosystems compare? How do organisms get energy?		
(2-3 Weeks) Surviving in Ecosystems (Chapter 4)	From Molecules to Organisms: Structures and Processes (4-LS1- 1,2)	Pop bottle ecosystem	Butterfly kits (see the cycle of a butterfly) Endangered Animal: Do Your Part!
ngss.nsta.org	How do animals survive in their environments?		Mimicry game
	How do plants survive in their environments? How can changes in an environment affect the animals that live there?		How do environmental changes affect a food chain in an ecosystem? (In what way does a change in the environment affect all organisms in a food chain?)*
			How much energy is needed to feed different organisms
(2-3 Weeks)	Engineering and Design	(See above experiments)	(See above projects)
	Explain the scientific method and how to apply	Skittles experiment (use the scientific method to decide if skittles will dissolve faster in hot or cold water) *	

Montana's Next Generation Science Standards (by Strand):

Energy

- develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move (1) see Science vs. Music
- develop a model communicating that light reflected from objects into the eye allows objects to be seen (2)
- generate and compare multiple solutions that use patterns to transfer information (3)

Life Science

- construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction (1)

- use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways (2)
- Earth Science
- identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time
- make observations or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation (1)
- analyze and interpret data from maps as evidence to make a claim about patterns of Earth's features (2)
- obtain and combine information from a variety of sources to communicate that energy and fuels are derived from natural resources and their uses affect the environment (1)
- generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans (2)

Resources

Science: A Closer Look by Macmillan/McGraw-Hill

Google Earth

Mystery Science

Science Standards- <https://opi.mt.gov/LinkClick.aspx?fileticket=qHA5q8j-oGw%3d&portalid=182>
[Comparison MT Sci Content Standards and NGSS.pdf](#)

Model Curriculum Guide <https://opi.mt.gov/Educators/Teaching-Learning/K-12-Content-Standards/Science-Standards#88989482-resources>

Approved: 03/11/2025