

MSAD #53 Science Curriculum Grade 4

Unifying Themes/Core Concepts Systems, Models, Constancy and Change, Scale

Student Learning Goals: *Students will understand that . . .*

- Rocks are formed by cyclical processes and affect the earth’s surface.
- Energy is transferred.
- Cells are the basic unit of life.
- There are levels of organization within an organism.
- Body systems work together.
- Traits are inherited.
- Evolution means change over time.

Skills and Processes of Science (MLR Standard B):		
The following skills and processes should permeate all scientific learning in the classroom and the field.		
Scientific Inquiry	Process Skills	Technological Design
<p>Students plan, conduct, analyze data from, and communicate results of investigations, including fair tests.</p> <p><i>Students may . . .</i></p> <p>Pose investigable questions and seek answers from reliable sources of scientific information and from their own investigations.</p> <p>Plan and safely conduct investigations including simple experiments that involve a fair test.</p> <p>Use simple equipment, tools, and appropriate metric units of measurement to gather data and extend the senses.</p> <p>Use data to construct and support a reasonable explanation.</p>	<p><i>Students will . . .</i></p> <p>Observe</p> <p>Classify & sequence</p> <p>Communicate</p> <p>Predict, hypothesize, & infer</p> <p>Define, control, & manipulate variables in experimentation</p> <p>Design, construct, & interpret models</p> <p>Interpret & analyze data</p> <p>Reflect on data & process; revise conclusions based on new evidence</p>	<p>Students use a design process, simple tools, and a variety of materials to solve a problem or create a product, recognizing the constraints that need to be considered.</p> <p><i>Students may . . .</i></p> <p>Identify and explain a simple design problem and a solution related to the problem.</p> <p>Propose a solution to a design problem that recognizes constraints including cost, materials, time, space, or safety.</p> <p>Use appropriate tools, materials, safe techniques, and quantitative measurements to implement a proposed solution to design problem.</p>

<p>Communicate scientific procedures and explanations.</p>		<p>Balance simple constraints in carrying out a proposed solution to a design problem.</p> <p>Evaluate their own design results, as well as those of others, using established criteria.</p> <p>Modify designs based on results of evaluations.</p> <p>Present the design problem, process, and design or solution using oral, written, and/or pictorial means of communication.</p>
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Content & MLR Alignment	Skills: students will . . .	Resources
<p>Earth (D2)</p> <p>Rock Cycle Rock Formation</p>	<p>Describe the kinds of materials that form rocks and soil.</p> <p>Based on observable characteristics, begin to group rocks and minerals.</p> <p>Observe the rock cycle (erosion, transport, deposit).</p> <p>Recognize that rocks are formed by different processes (igneous, metamorphic, sedimentary).</p> <p>Use magnifying glass/hand lens.</p>	<p>Rocks and Minerals theme box (literature)</p> <p>Nancy Bubar’s rock collection</p> <p>AIMS (see T. George) covers erosion, layers, etc.</p>
<p>Matter & Energy (D3)</p> <p>Transfer of Energy</p>	<p>Describe what happens to the temperature of objects when a warmer object is near a cooler object.</p> <p>Recognize that the sun is a source of the earth’s surface heat and light energy.</p>	

<p>Cells (E3)</p> <p>Parts to Whole Levels of Organization – cells, tissues, organs, organ systems Human Body – skeletal, digestive, respiratory, skin, and circulatory systems</p>	<p>Describe how living things are made up of one or more cells and the way cells help organisms meet their basic needs.</p> <p>Give examples of organisms that consist of a single cell and organisms that are made of collection of cells.</p> <p>Compare how needs of living things are met in single-celled and multi-celled organisms.</p>	<p>Human Body theme box (literature)</p> <p>X-Rays</p>
<p>Heredity and Reproduction (E4)</p>	<p>Describe characteristics of organisms, and the reasons why organisms differ from or are similar to their parents.</p> <p>Name some likenesses between children and parents that are inherited, and some that are not.</p> <p>Explain that inherited traits come from parents.</p>	
<p>Evolution (E5)</p> <p>Adaptation Extinction Fossils</p>	<p>Describe fossil evidence and explanations that help us understand why there are differences among and between present and past organisms.</p> <p>Explain how adaptations have allowed species to survive over time.</p> <p>Compare fossils to one another and to living organisms according to their similarities and differences.</p>	

Interdisciplinary Connections:

English/Language Arts -- reading nonfiction; identifying & using features of nonfiction (e.g., diagrams, illustrations or photos, glossary, etc.); writing or drawing observations in science journals; orally presenting findings of investigations/experiments; participating in small and large group discussions about science.

Social Studies – Maine history; Maine fossil *Pertica Quadrifaria*

Math – patterns; measurement

Core Science Instructional Strategies:

- Build & activate prior knowledge through read-alouds, videos, writing & discussion prompts, K-W-L; establish context with engaging scenarios.
- Develop vocabulary knowledge w/word walls, four square, list/group/label, concept definition mapping, and other activities involving concentrated word work.
- Establish purpose for reading or listening.
- Support reading comprehension through identification of nonfiction text features & their purposes.
- Map stories using the language of the scientific method.
- Use models, manipulative materials, and demonstrations to introduce and extend concepts.
- Take students into the field whenever possible.
- Structure scientific talk and argument using the features of the scientific method (asking questions, using evidence from research/experiments/observations, considering others' ideas, making predictions, drawing conclusions).
- Use science notebooks throughout a unit; have students record predictions, questions, observations, ideas, and reflections in words and images.

Differentiation Strategies:

- Multiple texts with varying readability levels;
- Partner reading;
- Read alouds;
- Flexible grouping and/or centers for labs & projects w/multiple roles;
- Modified rubrics;
- Choice in content, process, or product;

Essential Vocabulary:

Erosion
Transport
Deposit
Rock Cycle
Metamorphic
Igneous
Sedimentary
Single- cell
Multi-cell
Heredity
Traits

Genes
Cell parts – nucleus, membrane, cytoplasm,
organelle
Tissue
Organs
Systems – digestive, respiratory, circulatory
and related terms
Evolution
Adaptation
Extinction
Fossil