Havre Public Schools Science Fifth Grade

Course Information:
Topic: Science
Grade Level: 5
Length: Full Year

Essential Understanding:
In 5th grade, students will be exposed to a variety of topics. Students will be exposed to 5 different science strands: (1) structure and property of matter, (2) matter and energy in organisms, (3) space systems, (4) earth's systems, and (5) engineering and design. Overall, they should be able to read and understand fifth grade level science text as well as conduct investigations into the different strands in order to increase their understanding of the topics.

Course Objectives and Expectations:
1. Literary skills will be applied to non-fiction science text.
2. Use and analyze texts, experiments, investigations, and visual sources in order to increase understanding.
3. Have a basic understanding of matter, physical vs. chemical change, and properties of matter.
4. Understand that our sun is a star and be able to relate how distance affects the brightness of stars.
5. Explain how gravitational force works.
6. Be able to use graphs or displays to relay information on how the earth and/or sun relationship affects daily changes to life.
7. Have a basic understanding of all the spheres of earth (geosphere, hydrosphere, biosphere, and atmosphere) and how all the spheres interact with one another.
8. Relay information on the amounts of water on earth and how this affects life in different locations.
9. Design, investigate, and use ideas on how to protect earth's environments.
10. Defend why it is true that all energy used in food was once energy from the sun.
11. Defend why it is true that plants get most of what they need to survive from air and water.
12. Explain the relationship between animals, plants, and decomposers in the environment.
13. Use engineering and design to make models and improve them, carry out demonstrations, and use investigations to prove/disprove hypotheses.

Student Objectives:
1. I can use reading skills to comprehend science text.
2. I can use and analyze texts, experiments, investigations, and visual sources in order to increase my understanding.
3. I can explain matter, physical vs. chemical change, and properties of matter.
4. I can relate how distance affects the brightness of stars.
5. I can explain how gravitational force works.
6. I can use graphs or displays to relay information on how the earth's rotation/revolution affects daily changes to life.
7. I can describe all the spheres of earth (geosphere, hydrosphere, biosphere, and atmosphere) and analyze how the spheres interact with one another.
8. I can relay information on the amounts of water on earth and how this affects life based on water availability.
9. I can design, investigate, and use ideas on how to protect earth's environments.
10. I can defend why it is true that all energy used in food was once energy from the sun.
11. I can defend why it is true that plants get most of what they need to survive from air and water.
12. I can explain the relationship between animals, plants, and decomposers in the environment.

13. I can design and carry out investigations and experiments in order to understand content and to prove/disprove a hypothesis.

Pacing and Pertinent Montana Content Standard:

Tri 1	Standard	Technology
STEAM	5.ETS1.3 Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved	TI.ID.5.1: Use Digital and Non-digital tools to plan and manage a design process TI.ID.5.2 use design process to develop and test prototypes
STEAM	5. ETS1.2 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.	TI.ID.5.1: Use Digital and Non-digital tools to plan and manage a design process TI.ID.5.2 use design process to develop and test prototypes
Space Systems	5-PS2-1:Support an argument that the gravitational force exerted by Earth on objects is directed down	TI.ID.5.1: Use Digital and Non-digital tools to plan and manage a design process TI.ID.5.2 use design process to develop and test prototypes
Space Systems	5-ESS1-1: Support an argument that differences in the apparent brightness of the sun compared to other stars is due to the relative distance from Earth	
Space Systems	5-ESS1-2 Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.	TI.KC.5.1 Employ appropriate research techniques to locate digital resources
Matter and Energy in Organisms	5-PS3-1: Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun	
Matter and Energy in Organisms	5-LS1-1: Support an argument that plants get the materials they need for growth chiefly from air and water.	

Tri 2	Standard	Technology
Matter and Energy in Organisms	5-PS3-1: Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun	
Matter and Energy in Organisms	5-LS2-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.	
Earth Systems	5-ESS2-1: Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and or atmosphere interact	TI.KC.5.1 Employ appropriate research techniques to locate digital resources TI.KC.5.3 Organize information and make meaningful connections between resources TI.CC.5.3 Create digital objects to communicate ideas visually and graphically.
Tri 3	Standard	Technology
Earth Systems	5-ESS-2: Describe and graph the amounts of saltwater and fresh water in various reservoirs to provide evidence about the distribution of water on Earth	
Earth Systems	5-ESS3-1: Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.	TI.CT.5.1 Explore or solve problems by selecting technology for data analysis, modeling, and algorithmic thinking. TI.CT.5.2 Break down problems into smaller parts, identify key information, and propose solutions TI.GC.5.2 Perform a variety of roles within a team using age-appropriate technology

		to complete a project or solve a problem
STEAM	5.ETS1.1 Design a product using constraints on material, time, and cost that reflects a need or a want	TI.CC.5.2 Use a variety of strategies for remixing or repurposing to create new works
Structure and Properties of Matter	5-PS1-3: Make observations and measurements to identify materials based on their properties.	
Structure and Properties of Matter	5-PS1-1: Develop a model to describe that matter is made of particles too small to be seen.	
Structure and Properties of Matter	5-PS1-3: Make observations and measurements to identify materials based on their properties.	
Structure and Properties of Matter	5-PS1-2: Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.	
Structure and Properties of Matter	5-PS1-4 Conduct an investigation to determine whether the mixing of two or more substances results in new substances.	

Course Outline and Assessments:

1. **Unit I: Space Systems**
   - Gravity
   - Textbook assessment and Egg Drop
   - Earth's Rotation
   - Shadow length
   - Seasonal changes
   - Textbook assessment, graphs, and experiments
   - Stars
   - Life Cycle
   - Distance
   - Groupings/Constellations
   - Textbook assessment, graphs, and experiments
2. **Unit 2: Matter and Energy in Organisms**
   - Cells

Textbook assessment and models
Plant parts: stem, leaf, root and photosynthesis
Textbook assessment and Writing Prompt
Body Systems
Textbook assessment and models
Food Chains
Textbook assessment and models
Food Webs
Textbook assessment and models
Cycles between matter and energy
Textbook assessment, experiments, and models

3. **Unit 3: Earth's Systems**
   All the spheres:
   Biosphere
   Textbook assessment and dioramas
   Hydrosphere
   Textbook assessment and models/diagrams
   Geosphere
   Textbook assessment and models/diagrams
   Atmosphere
   Textbook assessment and models/diagrams
   Distribution of Water
   Textbook assessment, graphs, and experiments
   Protecting Earth's Resources
   Textbook assessment, graphs, and research
4. **Unit 4: Structure and Properties of Matter**
   Properties of Matter
   Textbook assessment and experiments
   Particles & Matter
   Textbook assessment, models, and experiments
   Chemical Changes/Reactions
   Textbook assessment, graphs, and experiments
   Mixing Substances
   Textbook assessment, graphs, and experiments
5. **Unit 5: Scientific Engineering and design**
   Plan and carry out fair tests
   Experiments
   Generate and compare possible solutions to a problem
   Experiments
   Design a product
   Trade Fair

Timeline:

The timeline should include unit titles and the approximate time it will take to teach the unit.

Title	Approximate Timeline
Unit I: Space Systems	8 weeks
Unit 2: Matter and Energy in Organisms	10 weeks
Unit 3: Earth's Systems	10 weeks
Unit 4: Structure and Properties of Matter	8 weeks
Unit 5: Scientific Engineering and Design	Interspersed all year

Resources:

- Foss Kit: Mixtures and Solutions
- Science- A Closer Look by Macmillan/McGraw-Hill
- Mystery Science
- Youtube.com (videos for lessons)
- Blackfeet Skies
- 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

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