5th Grade Science

Instructional Focus:

- Apply process skills by asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring and communicating findings.
- Use quantitative and qualitative observations to create their own inferences and predictions. Quantitative (numerical, measurements) versus Qualitative (observable characteristics i.e. shiny, translucent, hard, fast, etc.)
- Work collaboratively to carry out investigations. (e.g., planning and conducting a simple investigation, work together writing procedures others can follow and following a set of written procedures for a scientific investigation)
- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. (Scientific Method)
- Use scientific tools to make quantitative observations. Students will be able to select tools appropriate to the task. (e.g., thermometers, meter sticks, balances, graduated cylinders, microscopes, telescopes)
- Define a simple design problem that can be solved through the development of an object, tool, process, or system.
- Support an argument with data and graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships.
- Explain and differentiate evidence from opinion, understanding that scientists do not rely on claims or conclusions unless they are backed by confirmed observations. (e.g., answering "how do you know?" questions with reasonable answers)

Physical Science: Matter and It's Interactions

Cross Cutting:

- Natural Objects exist from small to large.
- Standard units are used to measure and describe physical quantities. (i.e. weight, time, temp., and volume)
- Science assumes consistent patterns in natural systems.
- Cause and Effect relationships are identified and used to explain change.

Standard	Objective	Examples
5-PS1-1. Develop a model to describe that matter is made of particles too small to be seen.	Students will: • Understand that matter can be subdivided into particles too small to see. • Understand that tools can be used to detect very tiny particles. • Understand that observation can reveal that gases are made of free moving particles too small to be seen. • Understand through observation and modeling that gases are effected by air.	Examples of evidence supporting a model could include adding air to expand a basketball, compressing air in a syringe, dissolving sugar in water, and evaporating salt water.
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.	Students will: • Understand that the amount (weight) of matter is conserved when it changes forms. • Understand that the total weight of a substance does not change when reactions or changes in properties occur.	Examples of reactions or changes could include: phase changes, dissolving, and mixtures that form new substances.
5-PS1-3. Make observations and measurements to identify materials based on their properties.	Students will: • Understand materials can be identified by the measurements of their properties.	Examples of materials to be identified could include: baking soda and other powders, metals, minerals, and liquids. Examples of properties could include: color, hardness, reflectivity, electrical conductivity, thermal conductivity,

		response to magnetic forces, and solubility; density is not intended as an identifiable property.
5-PS1-4. Conduct an investigation to determine whether the mixing of two or more substances results in new substances.	Students will: • Understand when two or more different substances are mixed, a new substance with different properties may be formed.	Examples of reactions could include: baking soda and vinegar or baking soda, citric acid, and water.
Physical Science: Motion and Stability-Forces and Interaction		
Cross Cutting: • Cause and Effect relationships are identified and used to explain change.		
Standard	**Objective**	**Examples**
5-PS2-1. Support an argument that the gravitational force exerted by Earth on objects is directed down.	Students will: • Understand Earth's gravitational force acts on an object near its surface, while pulling that object toward the planet's center.	"Down" is a local description of the direction that points toward the center of the spherical Earth.
Physical Science: Energy		
Cross Cutting: • Energy can be transferred various ways and between objects. • Health Unit 3: The Great Body Shop: You Are What You Eat		
Standard	**Objective**	**Examples**
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.	Students will: • Understand that the energy released from food was once released from the sun. (Photosynthesis) • Understand food provides animals with nutrients necessary to maintain life.	Examples of models could include diagrams and flow charts.
Life Science: From Molecules to Organisms: Structures and Processes		
Cross Cutting: • Matter is transported into, out of, and within systems.		
Standard	**Objective**	**Examples**
5-LS1-1. Support an argument that plants get the materials they need for growth chiefly from air and water.	Students will: • Understand that plants acquire materials for growth chiefly from air and water.	Emphasis is on the idea that plant matter comes mostly from air and water, not from the soil.
Life Science: Ecosystems – Interactions, Energy and Dynamics		
Cross Cutting: • A system can be described in terms of its components and their interactions.		
Standard	**Objective**	**Examples**
5-LS1-2. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.	Students will: • Understand that organisms can survive only in environments in which their needs are met. • Understand that a healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. • Understand that newly introduced species can damage the balance of an ecosystem.	Emphasis is on the idea that matter that is not food (air, water, decomposed materials in soil) is changed by plants into matter that is food. Examples of systems could include organisms, ecosystems and the earth.

	• Understand that matter and energy transfer in ecosystems by maintaining the life cycle.	
Earth and Space Science: Earth's Place in the Universe		
Cross Cutting: • Natural objects exist from the very small to the immensely large. • Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena.		
Standard	**Objective**	**Examples**
5-ESS1–1. Support an argument that the apparent brightness of the sun and stars is due to their relative distances from the earth.	Students will: • Understand the sun is a star that appears larger and brighter than other stars because it is closer. • Understand that stars range greatly in their distance from the earth.	Examples of relative distances include comparing distances to the sun or scale models.
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.	Students will: • Understand that the Earth orbits around the sun. • Understand that the moon orbits around the Earth. • Understand that the Earth's axis and rotation cause observable patterns (i.e. the seasons, day and night, and shadows). • Understand that changes in length and direction of shadows, and positions of sun, moon, and stars, change based on different day, month, year, and location on the Earth.	Examples of patterns could include the position and motion of Earth with respect to the sun and selected stars that are visible only in particular months. Another example could include tracking the seasonal increase and decrease in daylight hours.
Earth and Space Science: Earth's Systems		
Cross Cutting: • A system can be described in terms of its components and their interactions. • Standard units are used to measure and describe physical quantities such as weight and volume.		
Standard	**Objective**	**Examples**
5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.	Students will: • Understand that Earth's major systems are geosphere, hydrosphere, atmosphere, and biosphere. • Understand that these systems interact in multiple ways to effect oceans, ecosystems, organisms, landforms, and climate. • Understand that winds and clouds interact with landforms to determine weather.	Examples could include the influence of the ocean on ecosystems, landform shape, and climate; the influence of the atmosphere on landforms and ecosystems through weather and climate; and the influence of mountain ranges on winds and clouds in the atmosphere. The geosphere, hydrosphere, atmosphere, and biosphere are each a system.
5-ESS2-2. Describe and graph the amounts and percentages of water and fresh water in various bodies of water to provide evidence about the distribution of water on earth.	Students will: • Understand that nearly all the Earth's available water is located in the ocean. • Understand that most fresh water is located in glaciers or underground. • Understand that only a tiny fraction of our water is in lakes, streams, wetlands, and atmosphere.	Examples are limited to oceans, lakes, rivers, glaciers, ground water, and polar ice caps, and does not include the atmosphere.

Earth and Space Science: Earth and Human Activity		
Cross Cutting: • A system can be described in terms of its components and their interactions. • Science findings are limited to questions that can be answered with evidence.		
Standard	**Objective**	**Examples**
5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.	Students will: • Understand that human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. • Understand that individuals and communities are taking action to help protect Earth's resources and environments.	Examples may include watching Wall-E ☺, field trips to recycling centers and water treatment centers, guest speakers from various environmental conservation groups.
Engineering and Technology Science: Engineering Design		
Cross Cutting: • People's needs and wants change over time, as do their demands for new and improved technologies. • Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands.		
5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.	Students will: • Understand that the possible solutions to a problem are limited by available materials and resources. (Constraints) • Understand that the success of a designed solution is determined by considering the desired features of a solution. (Criteria) • Understand that different proposals for solutions are based on criteria and constraints.	Example include engineering and elementary kits, science Olympiad activities, and other testable experiments.
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.	Students will: • Understand that research should be carried out before designing a solution. • Understand that testing needs to be done multiple times and under multiple conditions. • Understand that communicating with peers about proposed solutions is an important part of all stages of the design process; and that shared ideas can lead to improved designs.	Examples include science fair preparation and engineering kits, teamwork for multiple situations, and Kagan strategies. Another example would include understanding cultural, social, and personal beliefs.
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.	Students will: • Understand that tests are often designed to identify failure points or difficulties, in order to pinpoint elements that need to be improved. • Understand that different solutions need to be tested in order to understand which is best.	Examples include science fair preparation and engineering kits, teamwork for multiple situations, and Kagan strategies.