Grade 5

Fifth grade students are scientific thinkers who have developed many skills that enable them to conduct more refined measurements of data and communicate scientific information with greater detail through various forms of presentation. They can plan and carry out investigations, identify patterns in data, and revise design solutions. Explicit science instruction is critical for applying scientific literacy to make connections between academic content and the world around them. An encouraging and challenging learning environment can inspire fifth graders to develop a passion for science and engineering.

Students in Grade 5 learn disciplinary core ideas from the scientific domains of physical, life, and Earth and space sciences. The physical sciences domain includes "Matter and Its Interactions" and "Motion and Stability: Forces and Interactions." Students carry out investigations to provide evidence of the conservation of matter and find evidence of the gravitational force that pulls all objects toward the center of Earth. In life sciences, students explore "Ecosystems: Interactions, Energy, and Dynamics," in which they create models to explain the flow of matter in ecosystems. The Earth and space sciences domain encompasses "Earth's Place in the Universe," "Earth's Systems," and "Earth and Human Activity." Students use models to represent how systems interact and how water is distributed on Earth. Students obtain information about ways individuals and communities can protect Earth's resources and construct explanations for the patterns of seasons, day and night, and the seasonal changes of stars' visibility in the sky.

Embedded in the content standards are the disciplinary core ideas of the Engineering, Technology, and Applications of Science (ETS) domain, which require students to use design strategies in conjunction with knowledge and understanding of science and technology to solve practical problems. Engineering standards are denoted with a gear icon⚙. Through guided participation in the engineering design process, students find out what methods can be used to clean a polluted environment and determine ways to modify the speed of a falling object.

Each content standard completes the stem *"**Students will**..."*

Matter and Its Interactions		
Structure and Properties	1. Plan and carry out investigations to provide evidence that matter is made of particles too small to be seen. *Examples: adding air to expand a basketball, dissolving sugar into water*	**Scale, Proportion, and Quantity**
	2. Analyze data collected through observations and measurements to identify materials based on their properties, including color, hardness, and reflectivity.	**Structure and Function**
Physical and Chemical Changes	3. Conduct investigations to provide evidence that the total weight of matter is conserved during phase changes when substances are heated, cooled, or mixed. *Examples: melting a cube of ice in a cup of water; dissolving sugar in hot water; placing a warm water bottle in the refrigerator*	**Energy and Matter**
	4. Analyze data from tests to determine whether a new substance is formed after two or more substances are combined. *Examples: mixing vinegar and baking soda, sand and water*	**Cause and Effect**
Motion and Stability: Forces and Interactions		
Non-Contact Forces	5. Make a claim, supported by evidence, that the gravitational force exerted by Earth pulls objects towards the center of Earth.	**Systems and System Models**
	6. ⚙Design and conduct a test to modify the speed of an object falling due to gravity. *Example: constructing a parachute to slow the speed of a falling object*	**Cause and Effect**

Ecosystems: Interactions, Energy, and Dynamics		
Matter and Energy Flow	7. Support an argument from evidence that plants primarily use air and water to process matter needed for growth.	**Structure and Function**
	8. Use evidence to explain that energy from the sun is present in animals' food and is used for body repair, growth, motion, and maintenance of body warmth.	**Energy and Matter**
	9. Create and use a model to explain the transfer of matter and energy between the environment and organisms within it. *Examples: producers, consumers, scavengers, decomposers*	
Earth's Place in the Universe		
Sun, Moon, and Stars	10. Obtain and communicate information to explain why the sun appears to be larger and brighter than other stars.	**Scale, Proportion, and Quantity**
	11. Analyze data that reveal patterns of daily changes in length and direction of shadows, day and night, phases of the moon, and seasonal appearance of some stars in the night sky.	**Patterns**
Earth's Systems		
System Interactions	12. Use a model to represent how any two of Earth's systems (atmosphere, biosphere, geosphere, and hydrosphere) interact and support life. *Example: impact of the ocean (hydrosphere) on ecosystems and landforms (geosphere); impact of mountain ranges (geosphere) on weather (atmosphere)*	**Systems and System Models**

Water	13. Construct a model to represent the distribution of freshwater and saltwater on Earth. *Example: graphical display representing the percentages of fresh and saltwater amounts*	**Scale, Proportion, and Quantity**
Earth and Human Activity		
Human Impact	14. Obtain and evaluate information to communicate how science-based solutions are being used to protect Earth's natural resources and its environment. *Examples: terracing land to prevent soil erosion, recycling to reduce overuse of landfill areas*	**Stability and Change**
	15. ⚙ Design, test, and revise solutions to clean a polluted environment. *Examples: simulating a solution to an oil spill in the ocean, simulating using plants to clean contaminated environments (phytoremediation)*	