Vocabulary

Crosscutting Concepts

5-PS3-1

Energy and Matter

Energy can be transferred in various ways and between objects.

5-LS1-1

Energy and Matter

Matter is transported into, out of, and within systems.

5-LS2-1

Systems and System Models

A system can be described in terms of its components and their interactions.

Resources *

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Superintendent

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Deputy Superintendent

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Fifth Grade • First Quarter Pacing Guide

Science

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Grade 5 Science First Quarter

Energy 5-PS3-1	From Molecules to Organisms: Structures and Processes 5-LS1-1	Ecosytems: Interactions, Energy, and Dynamics 5-LS2-1
I CAN STATEMENT		
☐ **I CAN** trace the energy that animals use back to the sun.	☐ **I CAN** argue that plants don't need soil to grow. ☐ **I CAN** argue that plants need air and water to grow.	☐ **I CAN** explain how plants are the origin for food that sustains life. ☐ **I CAN** argue that, without plants, most life on Earth would vanish.
Core Idea		
Energy in Chemical Processes and Everyday Life The energy released [from] food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water).	**Organization for Matter and Energy Flow in Organisms** Plants acquire their material for growth chiefly from air and water.	**Interdependent Relationships in Ecosystems** The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. 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. Newly introduced species can damage the balance of an ecosystem. **Cycles of Matter & Energy Transfer in Ecosystems** Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, and water, from the environment, and release waste matter (gas, liquid, or solid) back into the environment.
Standard		
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. *Clarification Statement: Examples of models could include diagrams, and flow charts.*	**Support an argument that plants get the materials they need for growth chiefly from air and water.** *Clarification Statement: Emphasis is on the idea that plant matter comes mostly from air and water, not from the soil.*	**Develop a model to describe the movement of matter among plants, animals, decomposers and the environment.** *Clarification Statement: 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.*
Science and Engineering Practices		
Developing and Using Models Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. ► Use models to describe phenomena.	**Engaging in Argument from Evidence** Engaging in argument from evidence in 3–5 builds on K– 2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). ► Support an argument with evidence, data, or a model.	**Developing and Using Models** Modeling in 3–5 builds on K–2 models and progresses to building and revising simple models and using models to represent events and design solutions. ► Develop a model to describe phenomena.

Vocabulary

Crosscutting Concepts

5-PS1-1
Scale, Proportion, and Quantity
Natural objects exist from the very small to the immmensely large.

5-PS1-3
Scale, Proportion, and Quantity
Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume.

5-PS1-4
Cause and Effect
Cause and effect relationships are routinely identified, tested, and used to explain change.

Resources *

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Fifth Grade • Second Quarter Pacing Guide

Science

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Grade 5 Science Second Quarter

	Models to Describe Minute Particles 5-PS1-1	Matter Conservation 5-PS1-2	Material Identification Using Measurements 5-PS1-3	Mixing of Two or More Substances 5-PS1-4	Experiment Design 3-5-ETS1-3
I CAN STATEMENT	☐ **I CAN** make a model describing the relative sizes of particles.	☐ **I CAN** use a scale to determine that heating, cooling, or mixing substances will not change the weight of the substance.	☐ **I CAN** use different techniques to identify and measure substances based on their unique properties.	☐ **I CAN** conduct an investigation to determine whether the mixing of two or more substances results in new substances.	☐ **I CAN** plan and test using controlled variables so a model design can be improved.
Core Idea	**Structure and Properties of Matter** Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects.	**Structure and Properties of Matter** The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish.	**Structure and Properties of Matter** Measurements of a variety of properties can be used to identify materials. (Boundary: At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic-scale mechanism of evaporation and condensation.)	**Chemical Reactions** When two or more different substances are mixed, a new substance with different properties may be formed. No matter what reaction or change in properties occurs, the total weight of the substances does not change. (Boundary: Mass and weight are not distinguished at this grade level.)	**Optimizing the Design Solution** Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints.
Standard	**Develop a model to describe that matter is made of particles too small to be seen.**	**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.**	**Make observations and measurements to identify materials based on their properties.**	**Conduct an investigation to determine whether the mixing of two or more substances results in new substances.**	**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.**
Science and Engineering Practices	**Developing and Using Models** Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. ► Use models to describe phenomena.	**Planning and Carrying Out Investigations** Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. ► 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. ► Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon.	**Using Mathematics and Computational Thinking** Mathematical and computational thinking in 3–5 builds on K–2 experiences and progresses to extending quantitative measurements to a variety of physical properties and using computation and mathematics to analyze data and compare alternative design solutions. ► Measure and graph quantities such as weight to address scientific and engineering questions and problems. ► Recognize volume as an attribute of solid figures and understand concepts of volume measurement. ► Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.	**Planning and Carrying Out Investigations** Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. ► 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.	**Consturcting Explanations and Designing Solutions** ► Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. ► At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. ► Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved.

Vocabulary

Crosscutting Concepts

5-ESS2-1

Systems and System Models

A system can be described in terms of its components and their interactions.

5-ESS2-2

Scale, Proportion, and Quantity

Standard units are used to measure and describe physical quantities such as weight and volume.

5-ESS3-1

Energy and Matter

- Matter is transported into, out of, and within systems.
- Energy can be transferred in various ways and between objects.

Resources *

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Fifth Grade • Third Quarter Pacing Guide

Science

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Grade 5 Science Third Quarter

	Earth's Systems 5-ESS2-1	Earth's Systems 5-ESS2-2	Earth and Human Activity 5-ESS3-1
I CAN STATEMENT			
	☐ **I CAN** demonstrate the connection between land features/ plants and animals/water and air.	☐ **I CAN** determine and compare the amounts of salt water, frozen water (ice/snow), and fresh water (drinkable or not) available on earth.	☐ **I CAN** identify ways that Lansing/Ingham County/Michigan uses science knowledge to reduce our need for natural resources as well as to protect our environment.
Core Idea			
	Earth Materials and Systems Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather.	**The Roles of Water in Earth's Surface Processes** Nearly all of Earth's available water is in the ocean. Most fresh water is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere.	**Human Impacts on Earth Systems** Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments.
Standard			
	Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. *Clarification Statement: 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.*	**Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.**	**Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.**
Science and Engineering Practices			
	Developing and Using Models Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. ► Develop a model using an analogy, example, or abstract representation to describe a scientific principle.	**Using Mathematics and Computational Thinking** Mathematical and computational thinking in 3–5 builds on K–2 experiences and progresses to extending quantitative measurements to a variety of physical properties and using computation and mathematics to analyze data and compare alternative design solutions. ► Describe and graph quantities such as area and volume to address scientific questions.	**Obtaining, Evaluating, and Communicating Information** Obtaining, evaluating, and communicating information in 3– 5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods. ► Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem.

Vocabulary

Crosscutting Concepts

5-PS2-1	5-ESS1-1	5-ESS1-2
Cause and Effect	**Scale, Proportion, and Quantity**	**Patterns**
Cause and effect relationships are routinely identified and used to explain change.	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.

Resources *

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Fifth Grade • Fourth Quarter Pacing Guide

Science

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Grade 5 Science Fourth Quarter

Motion and Stability: Forces and Interactions 5-PS2-1	Earth's Place in the Universe E-SS1-1	Earth's Place in the Universe E-SS1-2	Multiple Solutions to a Problem 3-5-TS1-2
I CAN STATEMENT			
☐ **I CAN** show multiple ways that gravitational force is directed "down" - wherever you are on Earth. ☐ **I CAN** describe why gravitational "down" can be different from geo-coordinate "down" depending on your location on Earth.	☐ **I CAN** show multiple ways that the brightness of an object (Sun, Stars) is influenced by distance from the earth.	☐ **I CAN** use data to show and explain daily patterns of shadows from the Sun and Moon. ☐ **I CAN** use data to show the seasonal appearance of some stars in the night sky.	☐ **I CAN** generate and compare multiple, possible solutions to a problem. ☐ **I CAN** determine which solution best serves the constraints of the problem.
Core Idea			
Types of Interactions The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center.	**The Universe and its Stars** The sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth.	**Earth and the Solar System** The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns. These include day and night; daily changes in the length and direction of shadows; and different positions of the sun, moon, and stars at different times of the day, month, and year.	**Developing Possible Solutions** Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved.
Standard			
Support an argument that the gravitational force exerted by Earth on objects is directed down. *Clarification Statement: "Down" is a local description of the direction that points toward the center of the spherical Earth.*	**Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth.**	**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.** *Clarification Statement: 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.*	**Generate and compare mutiple possible solutionsto a problem and how well each is likely to meet the criterira and constraints of the problem.**
Science and Engineering Practices			
Engaging in Argument from Evidence Engaging in argument from evidence in 3-5 builds on K-2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world (s). ► Support an argument with evidence, data, and and/or a model.	**Engaging in Argument from Evidence** Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). ► Support an argument with evidence, data, or a model.	**Analyzing and Interpreting Data** Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used. ► Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships.	**Planning and Carrying Out Investigations** Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. ► 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.