Kentucky Science

Grade 5

Adopted 2022

Grade 5

Physical Science

5-PS1-1. Develop a model to describe that matter is made of particles too small to be seen. 5-PS1-1

5-SEPS1-1. Developing and Using Models - Develop a model to describe phenomena. 5-SEPS1-1

1A. 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. 5-DCI.PS1.1A

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

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. 5-PS1-2

5-SEPS1-2. Using Mathematics and Computational Thinking - Measure and graph quantities such as weight to address scientific and engineering questions and problems. 5-SEPS1-2

2A. 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.) 5-DCI.PS1.2A

2B. Chemical Reactions - 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.) 5-DCI.PS1.2B

PS1-2. Scale, Proportion, and Quantity - Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume. 5-CC.PS1-2

5-PS1-3. Make observations and measurements to identify materials based on their properties. 5-PS1-3

5-SEPS1-3. Planning and Carrying Out Investigations - Make observations and measurements in order to produce data to serve as the basis for evidence for an explanation of a phenomenon. 5-SEPS1-3

3A. 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.) 5-DCI.PS1.3A

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

5-PS1-4. Conduct an investigation to determine whether the mixing of two or more substances results in new substances. 5-PS1-4

5-SEPS1-4. Planning and Carrying Out Investigations - 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 is considered. 5-SEPS1-4

4B. Chemical Reactions - When two or more different substances are mixed, a new substance with different properties may be formed. 5-DCI.PS1.4B

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

5-PS2-1. Support an argument that the gravitational force exerted by Earth on objects is directed down. 5-PS2-1

5-SEPS2-1. Engaging in Argument from Evidence - Support an argument with evidence, data, or a model. 5-SEPS2-1

1B. Types of Interactions - The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center. 5-DCI.PS2.1B

PS2-1. Cause and Effect - Cause-and-effect relationships are routinely identified and used to explain change. 5-CC.PS2-1

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. 5-PS3-1

5-SEPS3-1. Developing and Using Models - Use models to describe phenomena. 5-SEPS3-1

3D. 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). 5-DCI.PS3.3D

3C. Organization for Matter and Energy Flow in Organisms - Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion. 5-DCI.LS1.3C

PS3-1. Energy and Matter - Energy can be transferred in various ways and between objects. 5-CC.PS3-1

Life Science

5-LS1-1. Support an argument that plants get the materials they need for growth chiefly from air and water. 5-LS1-1

5-SEPLS1-1. Engaging in Argument from Evidence - Support an argument with evidence, data, or a model. 5-SEPLS1-1

1C. Organization for Matter and Energy Flow in Organisms - Plants acquire their material for growth chiefly from air and water. 5-DCI.LS1.1C

LS1-1. Energy and Matter - Matter is transported into, out of, and within systems. 5-CC.LS1-1

5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. 5-LS2-1

5-SELS2-1. Developing and Using Models - Develop a model to describe phenomena. 5-SELS2-1

1A. 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. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plant parts and animals) and therefore operate as "decomposers." Decomposition eventually restores (recycles) some materials to the soil. Organisms can survive only in environments in which their particular needs are met. 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. 5-DCI.LS2.1A

1B. Cycles of Matter and 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 then release waste matter (gas, liquid, or solid) back into the environment. 5-DCI.LS2.1B

LS2-1. Systems and System Models - A system can be described in terms of its components and their interactions. 5-CC.LS2-1

Earth and Space Science

5-ESS1-1. Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth. 5-ESS1-1

5-SEPESS1-1. Engaging in Argument from Evidence - Support an argument with evidence, data, or a model. 5-SEPESS1-1

1A. 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. 5-DCI.ESS1.1A

ESS1-1. Scale, Proportion, and Quantity - Natural objects exist from the very small to the immensely large. 5-CC.ESS1-1

5-ESS1-2. Represent data in graphical displays to reveal patterns of daily changes in the length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. 5-ESS1-2

5-SELESS1-2. Analyzing and Interpreting Data - Represent data in graphical displays (bar graphs, pictographs, and/or pie charts) to reveal patterns that indicate relationships. 5-SELESS1-2

2B. 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. 5-DCI.ESS1.2B

ESS1-2. Patterns - Similarities and differences in patterns can be used to sort, classify, communicate, and analyze simple rates of change for natural phenomena. 5-CC.ESS1-2

5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. 5-ESS2-1

5-SELESS2-1. Developing and Using Models - Develop a model using an example to describe a scientific principle. 5-SELESS2-1

1A. 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. 5-DCI.ESS2.1A

ESS2-1. Systems and System Models - A system can be described in terms of its components and their interactions. 5-CC.ESS2-1

5-ESS2-2. Describe and graph the amounts and percentages of salt water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth. 5-ESS2-2

5-SELESS2-2. Using Mathematics and Computational Thinking - Describe and graph quantities such as area and volume to address scientific questions. 5-

SELESS2-2

C. 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. 5-DCI.ESS2.C

ESS2-2. Scale, Proportion, and Quantity - Standard units are used to measure and describe physical quantities such as weight and volume. 5-CC.ESS2-2

5-ESS3-1. Obtain and combine information about solutions individual communities use to protect the Earth's resources and environment. 5-ESS3-1

5-SELESS3-1. Obtaining, Evaluating, and Communicating Information - Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. 5-SELESS3-1

3C. Human Impacts on Earth Systems - Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, oceans, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments. 5-DCI.ESS3.3C

A. Defining and Delimiting Engineering Problems - Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. 5-DCI.ETS1.A

ESS3-1. Systems and System Models - A system can be described in terms of its components and their interactions. 5-CC.ESS3-1

3-5 Engineering Design

3-5-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. 3-5-ETS1-1

3-5-SEPEST1-1. Asking Questions and Defining Problems - Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost. 3-5-SEPEST1-1

1A. Defining and Delimiting Engineering Problems - Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. 3-5-DCI.ETS1.1A

3-5-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. 3-5-ETS1-2

3-5-SEPEST1-2. **Constructing Explanations and Designing Solutions - Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem.** 3-5-SEPEST1-2

2B. **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.** 3-5-DCI.ETS1.2B

3-5-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.** 3-5-ETS1-3

3-5-SEPEST1-3. **Planning and Carrying Out Investigations - Plan and conduct an investigation collaboratively in order to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials is considered.** 3-5-SEPEST1-3

3B. **Developing Possible Solutions - Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved.** 5-DCI.ETS1.3B

3C. **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.** 5-DCI.ETS1.3C