DCI: Ecosystems: Interactions, Energy, and Dynamics

5.LS2.A: 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 plants parts and animals) and therefore operate as "decomposers." Decomposition eventually restores (recycles) some materials back 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-LS2-1)

DCI: Ecosystems: Interactions, Energy, and Dynamics

5.LS2.B: 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 release waste matter (gas, liquid, or solid) back into the environment. (5-LS2-1)

DCI: Matter and Its Interactions

5.PS1.A: 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-PS1-1)

DCI: Matter and Its Interactions

5.PS1.A: 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. (5-PS1-2)

DCI: Matter and Its Interactions

5.PS1.B: 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-PS1-2)

DCI: Matter and Its Interactions

5.PS1.A: 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-PS1-3)

DCI: Earth's Systems

5.ESS2.A: 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-ESS2-1)

Performance Expectation

5-LS2-1: 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. Examples of systems could include organisms, ecosystems, and the Earth.
Assessment Boundary: Assessment does not include molecular explanations.

Performance Expectation

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

Clarification Statement: Examples of evidence could include adding air to expand a basketball, compressing air in a syringe, dissolving sugar in water, and evaporating salt water.
Assessment Boundary: Assessment does not include the atomic-scale mechanism of evaporation and condensation or defining the unseen particles.

Performance Expectation

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.

Clarification Statement: Examples of reactions or changes could include phase changes, dissolving, and mixing that form new substances.
Assessment Boundary: Assessment does not include distinguishing mass and weight.

Performance Expectation

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

Clarification Statement: 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.
Assessment Boundary: Assessment does not include density or distinguishing mass and weight.

Performance Expectation

5-ESS2-1: 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.
Assessment Boundary: Assessment is limited to the interactions of two systems at a time.

Science and Engineering Practice

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 to describe phenomena. (5-LS2-1)

Science and Engineering Practice

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 to describe phenomena. (5-PS1-1)

Science and Engineering Practice

Using Mathematics and Computational Thinking

Mathematical and computational thinking at the 3–5 level 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. (5-PS1-2)

Science and Engineering Practice

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.

Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. (5-PS1-3)

Science and Engineering Practice

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 example to describe a scientific principle. (5-ESS2-1)

Crosscutting Concept

Systems and System Models

A system can be described in terms of its components and their interactions. (5-LS2-1)

Crosscutting Concept

Scale, Proportion, and Quantity

Natural objects exist from the very small to the immensely large. (5-PS1-1)

Crosscutting Concept

Scale, Proportion, and Quantity

Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume. (5-PS1-2)

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Connection to Nature of Science

Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena

Science explanations describe the mechanisms for natural events. (5-LS2-1)

Connection to Engineering, Technology, and Applications of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

Science assumes consistent patterns in natural systems. (5-PS1-2)

Common Core State Standards for ELA/Literacy

Reading Informational Text

RI.5.7 - Integration of Knowledge and Ideas

Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. (5-LS2-1)

Common Core State Standards for ELA/Literacy

Speaking & Listening

SL.5.5 - Presentation of Knowledge and Ideas

Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. (5-LS2-1)

Common Core State Standards for Mathematics

Mathematical Practices

MP.2 - Reason abstractly and quantitatively

CCSS text (5-LS2-1)

Common Core State Standards for Mathematics

Mathematical Practices

MP.4 - Model with mathematics

CCSS text (5-LS2-1)