Dynamic Learning Maps Science Dimensions for Grades 6–8

This document includes tables that show how the science dimensions are applied in the Dynamic Learning Maps® (DLM®) Essential Elements for science in Grades 6–8. Use this information as you plan science instruction for your students who may qualify in later grades for the alternate assessment, or for students who need additional support. The information is useful for defining science content and for illuminating foundational science learning expectations. This table of contents provides links to the sections corresponding to each dimension, and directly to each of the eight science and engineering practices (SEPs), the 14 "families" for disciplinary core ideas (DCI), and the seven crosscutting concepts (CCCs).

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Science and Engineering Practices

The table below provides examples of the ways that each of the eight science and engineering practices (SEPs), which were adapted for use in the DLM Essential Elements for science, can be applied in Grades 6–8. The third column in the table lists which Essential Elements include each SEP; those with links are tested Essential Elements. With this information, you can understand the grade-band expectations related to each SEP and use them for your instructional needs.

Science and Engineering Practice	Grade 6–8 Expectations	Essential Elements That Use This SEP
Asking Questions and Defining Problems A practice of science is to ask and refine questions that lead to descriptions and explanations of how the natural and designed world works. Students with significant cognitive disabilities can engage in this practice by exploring the natural and designed world, beginning with making observations and identifying questions, and later developing and using questions to define problems that lead to investigating and understanding scientific principles.	• Develop questions that can help determine cause-and-effect relationships. • Ask questions about how a simple design solution is used.	SCI.EE.8.LS.Trait-1 SCI.EE.8.LS.Human-1 SCI.EE.8.ESS.SolSys-1 SCI.EE.8.ESS.Weath-1 SCI.EE.8.PS.Energy-2

Science and Engineering Practice	Grade 6–8 Expectations	Essential Elements That Use This SEP
Developing and Using Models A practice of both science and engineering is to use and construct models as helpful tools for representing ideas and explanations. Examples of these tools could include drawings, graphs, physical replicas, and dramatizations. Students with significant cognitive disabilities can engage in this practice beginning with using models that represent concrete events and later developing and using models to represent more abstract relationships, events, and systems in the natural and designed world.	• Use and compare models to represent amounts, relationships, and patterns in the natural world.	SCI.EE.8.LS.Ecosys-1 SCI.EE.8.ESS.SolSys-1 SCI.EE.8.ESS.SolSys-2 SCI.EE.8.ESS.SolSys-3 SCI.EE.8.ESS.SolSys-4 SCI.EE.8.ESS.Earth-1 SCI.EE.8.PS.Matter-1 SCI.EE.8.PS.Energy-1 SCI.EE.8.PS.Energy-3
Planning and Carrying Out Investigations Scientists and engineers plan and carry out investigations in the field or laboratory, working collaboratively as well as individually. Students with significant cognitive disabilities can engage in this practice beginning with collecting and using simple observations and later using tools to gather data to serve as evidence in an investigation.	• Collect and record data using tools to determine and support an explanation of a phenomenon. • Use observations and measurements to determine and describe cause-and-effect relationships.	SCI.EE.8.PS.Matter-1 SCI.EE.8.PS.Matter-2 SCI.EE.8.PS.Matter-3 SCI.EE.8.PS.Forces-1 SCI.EE.8.PS.Forces-2 SCI.EE.8.PS.Energy-2

Science and Engineering Practice	Grade 6–8 Expectations	Essential Elements That Use This SEP
Analyzing and Interpreting Data Scientific investigations produce data that must be analyzed to derive meaning. Students with significant cognitive disabilities can engage in this practice beginning with identifying and describing patterns and later interpreting, analyzing, and evaluating data in relation to explanations and solutions to problems in the natural and designed world.	• Represent and interpret data in tables or graphs to determine and identify patterns that indicate relationships. • Use data as evidence for constructing and supporting claims about cause-and-effect relationships.	SCI.EE.8.LS.Plant-1 SCI.EE.8.LS.EcoHlth-1 SCI.EE.8.LS.Group-1 SCI.EE.8.ESS.Weath-1 SCI.EE.8.ESS.Weath-2 SCI.EE.8.ESS.Impact-1 SCI.EE.8.PS.Matter-2 SCI.EE.8.PS.Matter-3 SCI.EE.8.PS.Forces-1
Using Mathematics and Computational Thinking In both science and engineering, mathematical and computational thinking are fundamental for representing physical variables and their relationships. They are used for a range of tasks, which can include recognizing, expressing, and applying quantitative relationships. Students with significant cognitive disabilities can engage in this practice beginning with simple mathematical representations and later applying and interpreting data as well as using mathematical reasoning to construct meaning about systems in the natural and designed world.	• Use simple data tables and graphs to determine and describe relationships in the natural world. • Use measurements and simple mathematical representations to describe characteristics of the natural world.	SCI.EE.8.ESS.SolSys-1 SCI.EE.8.PS.Forces-1 SCI.EE.8.PS.Forces-2

Science and Engineering Practice	Grade 6–8 Expectations	Essential Elements That Use This SEP
Constructing Explanations and Designing Solutions The products of science are explanations, and the products of engineering are solutions. Students with significant cognitive disabilities can engage in this practice beginning with describing and explaining relationships and later constructing and evaluating design solutions as well as explanations about processes and relationships in the natural and designed world.	• Identify observations, information, data, or models to describe and explain processes or relationships in the natural world. • Use information to determine and explain cause-and-effect relationships in the designed world.	SCI.EE.8.LS.Plant-1 SCI.EE.8.LS.EcoHlth-1 SCI.EE.8.LS.Group-1 SCI.EE.8.LS.Trait-1 SCI.EE.8.ESS.SolSys-2 SCI.EE.8.ESS.SolSys-3 SCI.EE.8.ESS.Earth-1 SCI.EE.8.ESS.Weath-2 SCI.EE.8.ESS.Impact-1 SCI.EE.8.PS.Matter-1 SCI.EE.8.PS.Energy-1
Engaging in Argument from Evidence Argumentation is the process by which explanations and solutions are reached. Students with significant cognitive disabilities can engage in this practice beginning with identifying information as evidence to support claims and later evaluating information to construct arguments about the natural and designed world.	• Identify relevant evidence to support a claim. • Use observations, information, data, or a model to support cause-and-effect claims.	SCI.EE.8.LS.Org-1 SCI.EE.8.ESS.Earth-2 SCI.EE.8.PS.Matter-3 SCI.EE.8.PS.Forces-2 SCI.EE.8.PS.Energy-2

Science and Engineering Practice	Grade 6–8 Expectations	Essential Elements That Use This SEP
Obtaining, Evaluating, and Communicating Information Scientists and engineers must be able to communicate clearly and persuasively the ideas and methods they generate. Critiquing and communicating ideas individually and in groups is a critical activity. Students with significant cognitive disabilities can engage in this practice beginning with using and describing observations to identify scientific ideas and later comparing and combining sources of information to communicate and evaluate scientific claims and ideas.	• Use observations, images, simple texts, and other media to understand problems and determine how the natural world works. • Use information (e.g., observations, images, graphs, maps) to answer questions and support scientific ideas.	SCI.EE.8.LS.Org-1 SCI.EE.8.LS.Trait-1 SCI.EE.8.LS.Human-1 SCI.EE.8.ESS.Earth-2 SCI.EE.8.ESS.Weath-1 SCI.EE.8.ESS.Weath-2

Disciplinary Core Ideas

The tables below summarize key topics for each of the 14 "families" formed to organize and adapt the disciplinary core ideas (DCIs) for use in the DLM Essential Elements for science in Grades 6–8. These tables show how scientific ideas relate to each other within a DCI family, and which Essential Elements are part of each DCI family (in the third column); those with links are tested Essential Elements. With this information, you can understand the grade-band expectations related to each DCI family and use them for your instructional needs.

Note that the DCI family names are shortened for use in the Essential Element content codes (e.g., the Essential Element for Grades 6–8 in the DCI family Organisms: Structure and Function, Growth and Development is SCI.EE.LS.2.Org-1); these shortened names are listed in parentheses after each DCI family name in the following tables for ease of correspondence to the list of Essential Elements.

Life Science

Disciplinary Core Idea (DCI) Family	Grade 6–8 Expectations	Essential Elements in This DCI Family
Organisms: Structure and Function, Growth and Development (Org)	Cell structures: Living things are made of cells, which are defined as the smallest units of life. All cells have an external membrane that controls the exchange of materials between the cell and the external medium, and many have a nucleus that contains hereditary material. Cellular organization: Unicellular organisms consist of a single cell that performs all functions, while multicellular organisms have multiple cells that are often specialized and work together to support the organism's functions.	SCI.EE.8.LS.Org-1

Disciplinary Core Idea (DCI) Family	Grade 6–8 Expectations	Essential Elements in This DCI Family
Plants: Cycling of Matter and Flow of Energy (Plant)	Plant use of matter and energy: Plants use light energy from the Sun and materials from the air and water to make their food. This food becomes part of the plant's mass and is also used for their functions. For example, food is essential for growth and development (e.g., making flowers and seeds), provides energy, and can be stored for later use. Measures of plant growth: Plant growth can be described by the increase in plant matter, such as mass, height of the stalk, and the number of leaves. These changes are evidence that plants are taking in and incorporating materials from the environment.	SCI.EE.8.LS.Plant-1
Ecosystem: Cycling of Matter and Flow of Energy (Ecosys)	Energy for ecosystems: The Sun provides energy which is used by plants to produce food. The matter for making plant food comes from the air. Food is used by plants for growth, energy, or storage (e.g., in fruits and bulbs). Since plants make food, they ultimately provide matter and energy to the organisms in the ecosystem. Matter and energy transfer in an ecosystem: Some animals eat plants, others eat both plants and animals, and some eat only animals. Decomposers play a crucial role in the ecosystem by breaking down dead plants and animals, recycling nutrients back into the soil, and supporting the cycle of matter in the ecosystem. Food webs are representations of the transfer of matter and energy across organisms of an ecosystem.	SCI.EE.8.LS.Ecosys-1

Disciplinary Core Idea (DCI) Family	Grade 6–8 Expectations	Essential Elements in This DCI Family
Ecosystem Health (EcoHlth)	Organism interactions: Populations of different species interact with each other. These interactions include predation, competition, disease, migration, cooperation, and symbiosis. Organisms also interact with the environment, for example, when weather changes or water becomes less available. Human activity can also affect populations in the ecosystem, enabling or disrupting them. When resources, which are unevenly distributed, are changing or becoming limited, they can slow or stop population growth. Potentially, changes in ecosystems can lead to more permanent changes. Ecosystem relationships: Organisms (including humans) rely on their habitat for essential resources. Human activities can disrupt or improve ecosystems, impacting the connections between Earth's *spheres* (and have interactions with the biosphere, hydrosphere, atmosphere, and geosphere). The relationships among living and nonliving components support populations and can result in ecosystem changes.	SCI.EE.8.LS.EcoHlth-1

Disciplinary Core Idea (DCI) Family	Grade 6–8 Expectations	Essential Elements in This DCI Family
Group Survival Behavior (Group)	Receptors and information processing: Sensory inputs enable animals to convey important messages, navigate their environments, and respond to various stimuli, all of which are essential for their survival. Sound transmits through media like air or solids via vibrations, which are detected by the ears. Light travels through space and, when it shines on a nonluminous object, it is reflected, allowing the object to be seen when the reflected light enters the eyes. Luminous objects are visible when their light enters the eyes directly. Animals' response to environmental information: Animals sense and communicate information and respond to it with behaviors that help them interact with the environment and survive. Sense receptors capture various types of information, which the brain processes to generate a response. Through these interactions, animals can alert others to danger, indicate the presence of food, or coordinate group activities, and enhance their chances of survival.	SCI.EE.8.LS.Group-1

Disciplinary Core Idea (DCI) Family	Grade 6–8 Expectations	Essential Elements in This DCI Family
Traits of Organisms (Trait)	Environmental influence on traits: Organisms display different traits that enable them to survive in specific environments. The environment interacts with organisms and affects their behaviors and responses, such as changes in diet based on food availability, temperature, and water availability. For instance, plants' roots grow deeper during droughts or individuals' outer layers (e.g., skin, fur, bark) will thicken in response to temperature changes. This environmental-enhanced diversity is crucial for the adaptability and resilience of species in changing conditions. The traits of entire populations of organisms can change over time in response to persistent changes in their environment. This occurs through the process of natural selection, in which variations of a trait in a population are more advantageous than others, and those individuals who possess them are more likely to survive and pass it down to offspring. This process of adaptation ensures that species evolve and adapt to better suit their habitats, increasing their overall chances of survival and reproduction. Trait diversity and environmental advantages: The diversity of traits that organisms display can provide some advantages to some individuals over others. These beneficial traits might include physical adaptations, behavioral strategies, or physiological changes that improve an organism's ability to thrive in a particular environment. Traits that provide benefits are more likely to be inherited from parents to offspring, becoming more common over time through natural selection. Conversely, traits that do not contribute to survival are less likely to be inherited and gradually become less common. This process of adaptation ensures that species evolve and adapt to better suit their habitats, increasing their overall chances of survival and reproduction.	SCI.EE.8.LS.Trait-1

Disciplinary Core Idea (DCI) Family	Grade 6–8 Expectations	Essential Elements in This DCI Family
Human Impacts on Ecosystems (Human)	Ecosystem interactions: Organisms, including humans, rely on their habitats for obtaining essential living and non-living resources. These resources are unevenly distributed, and their availability depends on different interactions between ecosystems components, such as predation, competition, disease, immigration of species, cooperation or symbiosis, weather, food availability, nesting, and sheltering. These interactions are crucial for the survival and growth of populations, as they provide access to resources and influence behaviors and functions within ecosystems. On a global scale, these interactions encompass the biosphere, hydrosphere, atmosphere, and geosphere. Disruption in ecosystems: Human activities can disrupt ecosystems and cause instability and changes that impact populations. Unstable environments are affected by factors like floods, droughts, disease, excessive predation, or immigration of other species, and can decrease biodiversity. This reduction in biodiversity affects populations' access to both living and non-living resources. Changes in biodiversity and environmental conditions, whether natural or human-induced, influence the distribution and survival of species.	SCI.EE.8.LS.Human-1

Disciplinary Core Idea (DCI) Family	Grade 6–8 Expectations	Essential Elements in This DCI Family
Earth in the Solar System (SolSys)	Solar system: Our solar system is part of the Milky Way galaxy, which contains many stars, including the Sun. The Moon orbits the Earth, taking approximately a month to complete its revolution. Earth and other planets rotate on their axes and orbit the Sun. Sun-Earth-Moon system: The Sun shines light on the Earth and the Moon. The Moon does not produce light of its own; it reflects the Sun's light, and some of it reflects to Earth. The cycle of the phases of the moon is due to the pattern by which the Earth orbits the Sun, the Moon orbits the Earth, and the way we observe the sunlight reflected from the Moon. Rotation and revolution: The Earth takes 24 hours to complete a full rotation and about 365 days to orbit the Sun. The apparent motion of the Sun in the sky, including the east-west pattern of sunrise and sunset, is due to Earth's rotation on its tilted axis. This rotation results in daytime and nighttime, with Earth completing one full spin every 24 hours. Seasonal patterns in daylight hours are influenced by Earth's tilt and its orbit around the Sun, leading to variations in the number of daylight hours throughout the year. Gravity forces in the universe: Gravity is the force that holds the solar system together, controlling the orbital motions of planets and moons. It exists between all objects in the universe, attracting every celestial body to one another. The gravitational pull of the Sun keeps the planets in orbit, while the gravitational pull of planets holds their moons in orbit, ensuring the stability and movement of celestial objects within the solar system.	SCI.EE.8.ESS.SolSys-1 SCI.EE.8.ESS.SolSys-2 SCI.EE.8.ESS.SolSys-3 SCI.EE.8.ESS.SolSys-4

Disciplinary Core Idea (DCI) Family	Grade 6–8 Expectations	Essential Elements in This DCI Family
Earth Systems (Earth)	Water cycle: Water moves continuously among land, bodies of water (like rivers, lakes and the ocean), and the atmosphere. Since matter is neither created nor destroyed, the same water particles keep cycling. This cycle involves processes such as evaporation (where liquid water absorbs the Sun's energy and changes to gas), condensation (where gaseous water cools down and forms clouds), and precipitation (where water in clouds falls back to Earth.) Many of these processes are related to changes in energy. For example, the absorption of sunlight increases the kinetic energy of water particles, causing the water to evaporate. Water impacts: The water cycle significantly impacts Earth's various levels, including the geosphere (e.g., rocks) and hydrosphere (e.g., rivers). Gravity pulls water downhill, moving soil and rocks and reshaping landforms over time. Precipitation, such as rain, sleet, and hail, also contributes to these changes, gradually altering the landscape through weathering and erosion.	SCI.EE.8.ESS.Earth-1 SCI.EE.8.ESS.Earth-2

Disciplinary Core Idea (DCI) Family	Grade 6–8 Expectations	Essential Elements in This DCI Family
Weather and Climate (Weath)	Weather components: Weather is defined by temperature, humidity, precipitation, and wind; and is affected by the Sun's heat, the movement of water in the atmosphere, and interactions between air masses. Weather refers to specific, temporary events. Air masses move around the Earth, influence local weather, and can lead to significant changes when they move (e.g., storms or heat waves), especially because air masses tend to be uniform in temperature and humidity, and often related to the areas where they are formed. Climate features: Climate refers to the long-term patterns of weather in a particular area, influenced by interactions involving sunlight, ice, bodies of water, and geography. Different regions have distinct climates, such as tropical wet climates near the equator and polar climates near the poles. These varied climates contribute to Earth's biodiversity, and the climate of an area affects the weather in other regions. It has been observed that the Earth's global climate is warming. Weather system interactions: The movement of air masses has significant effects on weather and climate. When winds move these air masses, they carry their weather conditions, such as hot or cold, dry or moist, from their source region to new areas. These movements can lead to significant changes in local weather, such as colder weather occurring when a cold air mass pushes a warmer mass out of the way. These interactions, when occurring annually, contribute to shaping local climates.	SCI.EE.8.ESS.Weath-1 SCI.EE.8.ESS.Weath-2

Disciplinary Core Idea (DCI) Family	Grade 6–8 Expectations	Essential Elements in This DCI Family
Reducing Impacts of Severe Weather (Impact)	Solutions for severe weather hazards: Science helps us understand why severe weather occurs and how these events can be predicted (even though predictions can sometimes be inaccurate). Engineering approaches can be designed to address these problems by first clearly understanding them through questions, observations, and information gathering. A key step is to evaluate different solutions based on criteria and constraints to ensure the best possible outcome and mitigate harmful impacts.	SCI.EE.8.ESS.Impact-1

Disciplinary Core Idea (DCI) Family	Grade 6–8 Expectations	Essential Elements in This DCI Family
Matter and Chemical Reactions (Matter)	Particle model of matter for different states: Matter is made of different types of particles and can exist as a solid, liquid, or gas, depending on temperature. In solids, particles are closely spaced and vibrate in position; while in liquids, the particles move but are constantly in contact. In gases, they move freely and are widely spaced. Phase changes occur with variations in temperature. Adding heat changes solids to liquids and liquids to gases; removing heat reverses these changes. The observation of some properties of materials, such as the ability to flow or take the shape of a container, can be explained by the particle model. Chemical reactions and properties: When two or more substances mix, they can chemically react to form new substances with different properties from the original ones. These chemical reactions result in substances with unique physical and chemical properties, such as mass, hardness, solubility, flammability, and conductivity, among others. The formation of rust, for example, is the result of a chemical reaction between iron, water, and oxygen. The properties of rust (e.g., its reddish-brown color or flakiness) are different than the initial iron, water, or oxygen, which is indicative of a chemical reaction. These properties can be used to identify substances and differentiate them from each other. Conservation of mass in closed systems: Matter is always conserved, meaning it is neither created nor destroyed during chemical or physical changes. This means that in a closed system (i.e., where no matter can leave or enter), the mass of the starting substances equals the mass of ending substances. That explains why observations and measures of the mass of smoke or bubbles can be used to infer conservation of matter at the particle level.	SCI.EE.8.PS.Matter-1 SCI.EE.8.PS.Matter-2 SCI.EE.8.PS.Matter-3

Disciplinary Core Idea (DCI) Family	Grade 6–8 Expectations	Essential Elements in This DCI Family
Interacting Forces (Forces)	Newton's third law of motion: Newton's third law of motion states that for every action (i.e., force), there is an equal force exhibited in the opposite direction. For instance, when a person walks, their feet push against the ground and, in turn, the ground pushes back against their feet, moving them forward. By rapidly burning fuel, a rocket expels a great deal of gas downward, which produces an equal force up on the rocket, propelling it upward. Forces affecting motion: The motion of an object depends on the total forces acting on it. The greater the object's mass, the greater the force needed to achieve a given change in motion. Similarly, a stronger force will move an object faster and farther.	SCI.EE.8.PS.Forces-1 SCI.EE.8.PS.Forces-2
Energy (Energy)	Kinetic energy and heat: The kinetic energy of particles (or objects) is directly related to their motion and temperature. Faster-moving particles have greater kinetic energy, which is often associated with higher temperatures. Heat refers to the motion of particles, with hot substances having particles that move more quickly compared to those in cold substances. Temperature refers to a measure of the average kinetic energy of an object. Energy transfer: Energy can transfer from one object to another. Energy cannot be created or destroyed, only transferred. Energy transfer occurs when objects (and their particles) collide, causing kinetic energy to flow from one object to another. Energy transfer can change the motion of the objects involved, such as when a moving marble collides with a stationary marble. Light energy: This form of energy behaves differently when it travels through various media. It can be reflected, absorbed, or transmitted depending on the material it encounters. Transparent materials allow light to pass through, opaque materials block light, and translucent materials scatter light. Light travels in a straight path but bends at surfaces between different transparent materials.	SCI.EE.8.PS.Energy-1 SCI.EE.8.PS.Energy-2 SCI.EE.8.PS.Energy-3

Crosscutting Concepts

The table below presents descriptions of the seven crosscutting concepts (CCCs) from *A Framework for K-12 Science Education* (National Research Council, 2012) and used in the Next Generation Science Standards (NGSS; NGSS Lead States, 2013) in Grades 6–8. The third column in the table lists which DLM Essential Elements for science include each CCC; those with links are tested Essential Elements. Note that these concepts have not been reduced in depth, breadth, and complexity from the general education standards for use in the DLM Essential Elements for science, because that reduction was accomplished through the other dimensions (SEPs and DCIs). The text within this table is quoted from the National Science Teachers Association (NSTA) Matrix of CCCs (NSTA, 2013), which was developed from *A Framework for K–12 Science Education* (National Research Council, 2012) and NGSS Appendix G (NGSS Lead States, 2013). Use the information as a guide for your instructional needs.

Crosscutting Concept (CCC)	Grade 6–8 Expectations	Essential Elements That Use This CCC
Patterns Observed patterns in nature guide organization and classification, and prompt questions about relationships and causes underlying them.	• Similarities and differences in patterns can be used to sort, classify, communicate, and analyze simple rates of change for natural phenomena and designed products. • Patterns of change can be used to make predictions. • Patterns can be used as evidence to support explanation.	SCI.EE.8.LS.Group-1 SCI.EE.8.LS.Trait-1 SCI.EE.8.ESS.SolSys-2 SCI.EE.8.ESS.SolSys-3 SCI.EE.8.ESS.Weath-1 SCI.EE.8.ESS.Weath-2 SCI.EE.8.PS.Matter-2 SCI.EE.8.PS.Forces-1 SCI.EE.8.PS.Forces-2

Crosscutting Concept (CCC)	Grade 6–8 Expectations	Essential Elements That Use This CCC
Cause and Effect: Mechanism and Explanation Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering.	• Cause and effect relationships are routinely identified, tested, and used to explain change. • Events that occur together with regularity might or might not be a cause and effect relationship.	SCI.EE.8.LS.EcoHlth-1 SCI.EE.8.LS.Group-1 SCI.EE.8.LS.Trait-1 SCI.EE.8.LS.Human-1 SCI.EE.8.ESS.SolSys-2 SCI.EE.8.ESS.Earth-1 SCI.EE.8.ESS.Earth-2 SCI.EE.8.ESS.Weath-1 SCI.EE.8.ESS.Weath-2 SCI.EE.8.ESS.Impact-1 SCI.EE.8.PS.Matter-1 SCI.EE.8.PS.Matter-2 SCI.EE.8.PS.Forces-1 SCI.EE.8.PS.Forces-2 SCI.EE.8.PS.Energy-2 SCI.EE.8.PS.Energy-3
Scale, Proportion, and Quantity In considering phenomena, it is critical to recognize what is relevant at different size, time, and energy scales, and to recognize proportional relationships between different quantities as scales change.	• Natural objects and/or observable phenomena exist from the very small to the immensely large or from very short to very long time periods. • Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume.	SCI.EE.8.ESS.SolSys-1 SCI.EE.8.ESS.Weath-2

Crosscutting Concept (CCC)	Grade 6–8 Expectations	Essential Elements That Use This CCC
Systems and System Models A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems.	• A system is a group of related parts that make up a whole and can carry out functions its individual parts cannot. • A system can be described in terms of its components and their interactions.	SCI.EE.8.LS.Org-1 SCI.EE.8.LS.Plant-1 SCI.EE.8.LS.Ecosys-1 SCI.EE.8.LS.EcoHlth-1 SCI.EE.8.LS.Trait-1 SCI.EE.8.LS.Human-1 SCI.EE.8.ESS.SolSys-1 SCI.EE.8.ESS.SolSys-2 SCI.EE.8.ESS.SolSys-3 SCI.EE.8.ESS.SolSys-4 SCI.EE.8.ESS.Earth-1 SCI.EE.8.PS.Matter-1 SCI.EE.8.PS.Energy-1
Energy and Matter: Flows, Cycles, and Conservation Tracking energy and matter flows into, out of, and within systems helps one understand their system's behavior.	• Matter is made of particles. • Matter flows and cycles can be tracked in terms of the weight of the substances before and after a process occurs. The total weight of the substances does not change. This is what is meant by conservation of matter. Matter is transported into, out of, and within systems. • Energy can be transferred in various ways and between objects.	SCI.EE.8.LS.Plant-1 SCI.EE.8.LS.Ecosys-1 SCI.EE.8.ESS.Earth-1 SCI.EE.8.PS.Matter-1 SCI.EE.8.PS.Matter-2 SCI.EE.8.PS.Matter-3 SCI.EE.8.PS.Energy-1 SCI.EE.8.PS.Energy-2 SCI.EE.8.PS.Energy-3

Crosscutting Concept (CCC)	Grade 6–8 Expectations	Essential Elements That Use This CCC
Structure and Function The way an object is shaped or structured determines many of its properties and functions.	• Different materials have different substructures, which can sometimes be observed. • Substructures have shapes and parts that serve functions.	SCI.EE.8.LS.Org-1 SCI.EE.8.LS.Group-1
Stability and Change For both designed and natural systems, conditions that affect stability and factors that control rates of change are critical elements to consider and understand.	• Change is measured in terms of differences over time and may occur at different rates. • Some systems appear stable, but over long periods of time will eventually change.	SCI.EE.8.LS.EcoHlth-1 SCI.EE.8.LS.Trait-1 SCI.EE.8.LS.Human-1 SCI.EE.8.ESS.Earth-2

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