Dynamic Learning Maps® (DLM®) Essential Elements for Science—Spring 2027

The final set of 84 Essential Elements are presented here organized by grade band (K–2, 3–5, 6–8, 9–12), disciplinary core idea (DCI) domain (life science, Earth and space science, physical science), and then DCI family within the grade band. Essential Elements are numbered in a manner similar to the Next Generation Science Standards performance expectations (NGSS PEs):

- A numeral indicating the end grade within the grade band (i.e., two for Grades K–2, five for Grades 3–5, eight for Grades 6–8, and 12 for Grades 9–12)
- The DCI domain abbreviation (e.g., ESS for Earth and space science, LS for life science, PS for physical science)
- The shortened DCI family name (e.g., SolSys for Earth in the Solar System; see Appendix for full list of DCI families)
- The number within the grade band and family

For instance, the first Essential Element in the list is SCI.EE.2.LS.Org-1, which corresponds to K–2, in life science, the DCI family "Organisms: Structure and Function, Growth and Development", and the first Essential Element in that DCI family and grade band. The specification and descriptions of each of the three dimensions (DCI, science and engineering practices [SEP], and crosscutting concept [CCC]) and linked NGSS PEs for each Essential Element can be found in the Individual Essential Element Description tables in a separate file.

The following tables present the Essential Elements for science in the three DCI domains: life science in Table 1, Earth and space science in Table 2, and physical science in Table 3. Each table is organized by DCI family (rows) across grade bands (columns). Asterisks indicate Essential Elements that are included on the assessment blueprints.

Table 1

DCI Domain: Life Science

Disciplinary Core Idea Family	Grades K–2	Grades 3–5	Grades 6–8	Grades 9–12
Organisms: Structure and Function, Growth and Development	SCI.EE.2.LS.Org-1: Use information to identify that different organisms have different external parts for specific functions.	SCI.EE.5.LS.Org-1: Use information to describe how the parts of organisms help them survive, grow, and reproduce.	SCI.EE.8.LS.Org-1: Provide evidence that living things are made of cells, some of which are unicellular while others are multicellular.	* SCI.EE.12.LS.Org-1: Use a model to construct an explanation of how systems of specialized cells within organisms work together to perform essential functions of life.
Plants: Cycling of Matter and Flow of Energy	SCI.EE.2.LS.Plant-1: Investigate what plants need to grow.	* SCI.EE.5.LS.Plant-1: Use data to show that plants use energy (i.e., sunlight) and matter (i.e., air and water) for growth.	* SCI.EE.8.LS.Plant-1: Use data to explain that plants use energy (i.e., sunlight) and matter (i.e., air and water) to produce food (i.e., plant matter) for growth.	SCI.EE.12.LS.Plant-1: Use a model to explain the role of plants in the flow of energy and matter among organisms in the ecosystem.
Ecosystem: Cycling of Matter and Flow of Energy	SCI.EE.2.LS.Ecosys-1: Use information to support that animals need food to live and grow.	* SCI.EE.5.LS.Ecosys-1: Use data to support that food provides animals with the materials and energy they need for body repair, growth, warmth, and motion.	* SCI.EE.8.LS.Ecosys-1: Use a model to describe the transfer of food (i.e., matter and energy) between plants, animals, and decomposers.	* SCI.EE.12.LS.Ecosys-1: Develop a model that describes how matter (plant or animal matter) and energy (i.e., sunlight and food energy) are cycled within an ecosystem.

Disciplinary Core Idea Family	Grades K–2	Grades 3–5	Grades 6–8	Grades 9–12
Ecosystem Health	SCI.EE.2.LS.EcoHlth-1: Use information to describe that many kinds of living things live in different habitats.	SCI.EE.5.LS.EcoHlth-1: Use information to support that healthy ecosystems meet the needs of many varieties and types of organisms. * SCI.EE.5.LS.EcoHlth-2: Ask questions to determine how living things (both plants and animals) impact the habitat in which they live.	* SCI.EE.8.LS.EcoHlth-1: Use data to explain the relationship between organisms' survival and growth and their interactions with both living and nonliving factors in their ecosystem.	* SCI.EE.12.LS.EcoHlth-1: Use data to make an argument about the effects of unstable environments on the health of ecosystems.
Group Survival Behavior	SCI.EE.2.LS.Group-1: Use information to identify that offspring learn survival behaviors.	SCI.EE.5.LS.Group-1: Provide evidence that animals gain information for survival through their senses.	SCI.EE.8.LS.Group-1: Use information to explain the relationship between animals' abilities to sense and communicate information and the response behaviors that help them grow and survive.	SCI.EE.12.LS.Group-1: Use data to support a claim about how group behavior affects individuals' and species' chances to survive.

Disciplinary Core Idea Family	Grades K–2	Grades 3–5	Grades 6–8	Grades 9–12
Traits of Organisms	SCI.EE.2.LS.Trait-1: Use information to show that organisms (both plants and animals) may resemble their biological parents but are not identical to their parents.	SCI.EE.5.LS.Trait-1: Use information to describe that different organisms vary in how they look due to the traits passed down from their biological parents.	SCI.EE.8.LS.Trait-1: Use information to determine how the environment affects organisms' traits and their survival.	SCI.EE.12.LS.Trait-1: Use information to support a claim that heredity and the environment influence the traits of an individual. * SCI.EE.12.LS.Trait-2: Use mathematical reasoning to support relationships between changing environmental conditions, adaptation by natural selection, and changes in the distribution of traits within a population.
Human Impacts on Ecosystems	There are no Essential Elements in this family in this grade band.	SCI.EE.5.LS.Human-1: Use information to describe how humans impact a variety of ecosystems.	SCI.EE.8.LS.Human-1: Define problems caused by human activities on ecosystems.	SCI.EE.12.LS.Human-1: Evaluate design solutions that minimize the effects of human activities on the health of ecosystems.

*Note: Asterisks indicate Essential Elements that are included on the assessment blueprints.

Table 2

DCI Domain: Earth and Space Science

Disciplinary Core Idea Family	Grades K–2	Grades 3–5	Grades 6–8	Grades 9–12
Earth in the Solar System	SCI.EE.2.ESS.SolSys-1: Use observations to identify the daily patterns of celestial objects that can appear in the sky during daytime and nighttime.	SCI.EE.5.ESS.SolSys-1: Use data to support that the Sun appears to be the largest and brightest star in the sky because it is the closest star to Earth. SCI.EE.5.ESS.SolSys-2: Use a model to explain the relationship between Earth's rotation on its axis and the 24-hour cycle of nighttime and daytime. * SCI.EE.5.ESS.SolSys-3: Use data from different times of the year to determine seasonal patterns in the number of daylight hours. * SCI.EE.5.ESS.SolSys-4: Make observations to support that Earth's	SCI.EE.8.ESS.SolSys-1: Use models to compare the components of our solar system and describe the motions of those components. SCI.EE.8.ESS.SolSys-2: Use a model of the Sun-Earth-Moon system to explain the motion of the Moon and the cyclical patterns of its phases. * SCI.EE.8.ESS.SolSys-3: Use a model to explain the relationships between the orientation of Earth's axis in relation to the Sun, Earth's motion, and seasonal patterns in the number of daylight hours.	SCI.EE.12.ESS.SolSys-1: Use mathematical reasoning to describe the relationships between the amount of energy released by a star that reaches Earth and the star's mass and distance from Earth. * SCI.EE.12.ESS.SolSys-2: Gather data to determine the relationship between the intensity and directness of sunlight reaching Earth's surface and seasonal temperature patterns. SCI.EE.12.ESS.SolSys-3: Analyze and interpret data to describe the relationships between the gravitational force between objects in the

Disciplinary Core Idea Family	Grades K–2	Grades 3–5	Grades 6–8	Grades 9–12
		gravity exerts a downward force on all objects on its surface.	SCI.EE.8.ESS.Solsys-4: Use a model to describe the role of gravity in the motions of planets and their moons within the solar system.	solar system, their masses, and the distance between them.
Earth Systems	SCI.EE.2.ESS.Earth-1: Use information to describe that different types of bodies of water are found in different locations on Earth's surface. SCI.EE.2.ESS.Earth-2: Use observations to describe that wind and water can change the shape of the land.	SCI.EE.5.ESS.Earth-1: Use a model to describe the distribution of fresh and salt water on Earth's surface. * SCI.EE.5.ESS.Earth-2: Use information to describe that water is found in different forms almost everywhere on Earth. SCI.EE.5.ESS.Earth-3: Use observations to explain how water, ice, wind, organisms, and gravity break rocks, soil, and sediments into smaller particles and move them around.	SCI.EE.8.ESS.Earth-1: Use a model to explain how water continuously cycles between the surface of Earth and the atmosphere. * SCI.EE.8.ESS.Earth-2: Use information to evaluate a claim about how the hydrosphere affects the shape of land (i.e., the geosphere) over time.	SCI.EE.12.ESS.Earth-1: Use data to make a claim that a change to one of Earth's spheres can cause changes to other Earth's spheres (i.e., geosphere, hydrosphere, atmosphere, biosphere). * SCI.EE.12.ESS.Earth-2: Ask questions to determine how a change in one of Earth's systems (i.e., spheres) affects humans.

Disciplinary Core Idea Family	Grades K–2	Grades 3–5	Grades 6–8	Grades 9–12
Weather and Climate	SCI.EE.2.ESS.Weath-1: Use local weather condition data to describe patterns over time.	SCI.EE.5.ESS.Weath-1: Determine patterns in weather data to help predict future weather.	SCI.EE.8.ESS.Weath-1: Determine the weather data needed to describe patterns in the movement of air masses that likely cause changes in weather. * SCI.EE.8.ESS.Weath-2: Use information to describe the relationships between regional climates, locations on Earth, geographic features, and weather.	SCI.EE.12.ESS.Weath-1: Use data to determine the relationship between the absorption of the Sun's energy by Earth's spheres (i.e., geosphere, hydrosphere, atmosphere, biosphere) and trends in average global temperature. SCI.EE.12.ESS.Weath-2: Ask questions to describe the relationship between human activity and global average temperature.
Reducing Impacts of Severe Weather	SCI.EE.2.ESS.Impact-1: Use information to identify the impacts of severe weather on humans.	SCI.EE.5.ESS.Impact-1: Explain how a design solution reduces the impacts of severe weather on humans.	SCI.EE.8.ESS.Impact-1: Evaluate solutions that reduce the impacts of severe weather on humans.	SCI.EE.12.ESS.Impact-1: Improve a solution that reduces the impacts of severe weather on humans.

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Table 3

DCI Domain: Physical Science

Disciplinary Core Idea Family	Grades K–2	Grades 3–5	Grades 6–8	Grades 9–12
Matter and Chemical Reactions	SCI.EE.2.PS.Matter-1: Make observations to classify different kinds (e.g., wood, metal, water) and forms (i.e., solid, liquid) of matter.	* SCI.EE.5.PS.Matter-1: Make observations and measurements to describe changes in the physical properties of substances when heated, cooled, or mixed. SCI.EE.5.PS.Matter-2: Use evidence to support a claim that matter exists even when it cannot be seen.	* SCI.EE.8.PS.Matter-1: Use a particle model of matter to describe the relationships between the states of matter, their characteristics and properties, and temperature. SCI.EE.8.PS.Matter-2: Gather and use data to determine whether an interaction between substances results in the formation of a new substance. SCI.EE.8.PS.Matter-3: Gather and use data to support the law of conservation of mass when substances change.	SCI.EE.12.PS.Matter-1: Use a model to describe that substances are made of different types and numbers of atoms. SCI.EE.12.PS.Matter-2: Use a model to describe that in chemical reactions, the atoms in the starting substances (i.e., the reactants) rearrange to form new substances (i.e., the products). SCI.EE.12.PS.Matter-3: Based on data, describe how the temperature and amount (i.e., concentration) of reacting substances affect the rates of chemical reactions.

Disciplinary Core Idea Family	Grades K–2	Grades 3–5	Grades 6–8	Grades 9–12
				* SCI.EE.12.PS.Matter-4: Use a model to support the law of the conservation of matter during chemical reactions.
Interacting Forces	SCI.EE.2.PS.Forces-1: Make observations to compare the effects of different strengths and directions of pushes and pulls on the motion of an object.	* SCI.EE.5.PS.Forces-1: Make observations to determine the effects of balanced and unbalanced forces on the motion (i.e., speed and direction) of an object. SCI.EE.5.PS.Forces-2: Provide evidence that some objects (e.g., magnets, metals, pith balls, objects falling toward Earth) exert forces on each other even when the objects are not in contact.	* SCI.EE.8.PS.Forces-1: Use observations and measurements to determine how an object's mass affects the force needed to change its motion. SCI.EE.8.PS.Forces-2: Make observations of the motion of two colliding objects to provide evidence of Newton's third law.	* SCI.EE.12.PS.Forces-1: Conduct an investigation to describe the relationships between force, mass, and acceleration. SCI.EE.12.PS.Forces-2: Conduct an investigation to describe the factors that affect the strength of electrical and magnetic forces between interacting objects.

Disciplinary Core Idea Family	Grades K–2	Grades 3–5	Grades 6–8	Grades 9–12
Energy	SCI.EE.2.PS.Energy-1: Make observations that energy exists.	SCI.EE.5.PS.Energy-1: Use observations to support a claim about the amount of energy moved from one place to another by sound, light, heat, and moving objects.	SCI.EE.8.PS.Energy-1: Develop a model to infer the relationship between the kinetic energy and temperature of an object or particles of a substance. * SCI.EE.8.PS.Energy-2: Provide evidence that kinetic energy is transferred between two objects when they collide with each other. SCI.EE.8.PS.Energy-3: Develop a model to describe the behavior of light (i.e., transmission, reflection, scattering) that comes into contact with objects made of different materials.	* SCI.EE.12.PS.Energy-1: Gather data to describe the thermal energy transfer between two objects or substances in contact with each other. SCI.EE.12.PS.Energy-2: Ask questions to describe the relationship between sound energy and the vibrations of particles of matter.

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