Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
Middle School					472	150	107	210	
	Life Sciences				120	37	17	62	
		MS-LS1			29	3	4	21	
			MS-LS1.A		0	0	0	0	
				MS-LS1.A1	0	0	0	0	All living things are made up of cells, which is the smallest unit that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular).
				MS-LS1.A2	0	0	0	0	Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell.
				MS-LS1.A3	0	0	0	0	In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions.

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			MS-LS1.B		0	0	0	0	
				MS-LS1.B1	0	0	0	0	Animals engage in characteristic behaviors that increase the odds of reproduction.
				MS-LS1.B2	0	0	0	0	Plants reproduce in a variety of ways, sometimes depending on animal behavior and specialized features for reproduction.
				MS-LS1.B3	0	0	0	0	Genetic factors as well as local conditions affect the growth of the adult plant.
				MS-LS1.B4	0	0	0	0	Organisms reproduce, either sexually or asexually, and transfer their genetic information to their offspring
			MS-LS1.C		29	3	4	21	
				MS-LS1.C1	26	2	4	20	Plants, algae (including phytoplankton), and many microorganisms use the energy from light to make sugars (food) from carbon dioxide from the atmosphere and water through the process of photosynthesis, which also releases oxygen. These sugars can be used immediately or stored for growth or later use.
				MS-	2	1	0	1	Within individual

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
				LS1.C2					organisms, food moves through a series of chemical reactions in which it is broken down and rearranged to form new molecules, to support growth, or to release energy.
			MS-LS1.D		0	0	0	0	
				MS-LS1.D1	0	0	0	0	Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories.
		MS-LS2			79	29	5	43	
			MS-LS2.A		27	22	0	5	
				MS-LS2.A1	19	16	0	3	Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors.
Middle School	**Life Sciences**	**MS-LS2**	**MS-LS2.A**	**MS-LS2.A2**	5	2	0	3	In any ecosystem, organisms and populations with similar requirements for food, water, oxygen, or other

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									resources may compete with each other for limited resources, access to which consequently constrains their growth and reproduction.
				MS-LS2.A3	8	7	0	1	Growth of organisms and population increases are limited by access to resources.
				MS-LS2.A4	4	2	0	2	Similarly, predatory interactions may reduce the number of organisms or eliminate whole populations of organisms. Mutually beneficial interactions, in contrast, may become so interdependent that each organism requires the other for survival. Although the species involved in these competitive, predatory, and mutually beneficial interactions vary across ecosystems, the patterns of interactions of organisms with their environments, both living and nonliving, are shared.
			MS-LS2.B		6	1	0	3	
				MS-LS2.B1	6	1	0	3	Food webs are models that demonstrate how matter and energy is transferred between

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									producers, consumers, and decomposers as the three groups interact within an ecosystem. Transfers of matter into and out of the physical environment occur at every level. Decomposers recycle nutrients from dead plant or animal matter back to the soil in terrestrial environments or to the water in aquatic environments. The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem.
			MS-LS2.C		56	20	2	33	
				MS-LS2.C1	54	18	2	33	Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations.
				MS-LS2.C2	29	3	0	26	Biodiversity describes the variety of species found in Earthâ€™s terrestrial and oceanic ecosystems. The completeness or

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									integrity of an ecosystemâ€™s biodiversity is often used as a measure of its health
			MS-LS4.D		43	3	4	36	
				MS-LS4.D1	43	3	4	36	Changes in biodiversity can influence humansâ€™ resources, such as food, energy, and medicines, as well as ecosystem services that humans rely onâ€”for example, water purification and recycling.
		MS-LS3			0	0	0	0	
			MS-LS3.A		0	0	0	0	
				MS-LS3.A1	0	0	0	0	Genes are located in the chromosomes of cells, with each chromosome pair containing two variants of each of many distinct genes. Each distinct gene chiefly controls the production of specific proteins, which in turn affects the traits of the individual. Changes (mutations) to genes can result in changes to proteins, which can affect the structures and functions of the organism and thereby

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									change traits.
				MS-LS3.A2	0	0	0	0	Variations of inherited traits between parent and offspring arise from genetic differences that result from the subset of chromosomes (and therefore genes) inherited.
			MS-LS3.B		0	0	0	0	
				MS-LS3.B1	0	0	0	0	In sexually reproducing organisms, each parent contributes half of the genes acquired (at random) by the offspring. Individuals have two of each chromosome and hence two alleles of each gene, one acquired from each parent. These versions may be identical or may differ from each other.
				MS-LS3.B2	0	0	0	0	In addition to variations that arise from sexual reproduction, genetic information can be altered because of mutations. Though rare, mutations may result in changes to the structure and function of proteins. Some changes are beneficial, others harmful, and some neutral to the organism

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		MS-LS4			11	7	1	3	
			MS-LS4.A		7	6	0	1	
				MS-LS4.A1	7	6	0	1	The collection of fossils and their placement in chronological order (e.g., through the location of the sedimentary layers in which they are found or through radioactive dating) is known as the fossil record. It documents the existence, diversity, extinction, and change of many life forms throughout the history of life on Earth.
Middle School	**Life Sciences**	**MS-LS4**	**MS-LS4.A**	**MS-LS4.A2**	0	0	0	0	Anatomical similarities and differences between various organisms living today and between them and organisms in the fossil record, enable the reconstruction of evolutionary history and the inference of lines of evolutionary descent.
				MS-LS4.A3	0	0	0	0	Comparison of the embryological development of different species also reveals similarities that show relationships not evident in the fully-formed anatomy.

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			MS-LS4.B		0	0	0	0	
				MS-LS4.B1	0	0	0	0	Natural selection leads to the predominance of certain traits in a population, and the suppression of others.
				MS-LS4.B2	0	0	0	0	In artificial selection, humans have the capacity to influence certain characteristics of organisms by selective breeding. One can choose desired parental traits determined by genes, which are then passed on to offspring.
			MS-LS4.C		3	0	1	2	
				MS-LS4.C1	3	0	1	2	Adaptation by natural selection acting over generations is one important process by which species change over time in response to changes in environmental conditions. Traits that support successful survival and reproduction in the new environment become more common; those that do not become less common. Thus, the distribution of traits in a population changes.

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Middle School	**Physical Sciences**				88	22	24	39	
		MS-PS1			35	8	7	17	
			MS-PS1.A		9	5	2	0	
				MS-PS1.A1	4	3	1	0	Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms.
				MS-PS1.A2	0	0	0	0	Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it.
				MS-PS1.A3	4	2	0	0	Gases and liquids are made of molecules or inert atoms that are moving about relative to each other.
				MS-PS1.A4	0	0	0	0	In a liquid, the molecules are constantly in contact with others; in a gas, they are widely

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									spaced except when they happen to collide. In a solid, atoms are closely spaced and may vibrate in position but do not change relative locations.
				MS-PS1.A5	0	0	0	0	Solids may be formed from molecules, or they may be extended structures with repeating subunits (e.g., crystals).
				MS-PS1.A6	2	1	1	0	The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter.
			MS-PS1.B		19	4	5	8	
				MS-PS1.B1	9	2	2	4	Substances react chemically in characteristic ways. In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									from those of the reactants
				MS-PS1.B2	3	2	0	0	The total number of each type of atom is conserved, and thus the mass does not change.
				MS-PS1.B3	10	2	3	4	Some chemical reactions release energy, others store energy.
		MS-PS2			0	0	0	0	
			MS-PS2.A		0	0	0	0	
				MS-PS2.A1	0	0	0	0	For any pair of interacting objects, the force exerted by the first object on the second object is equal in strength to the force that the second object exerts on the first, but in the opposite direction (Newtonâ€™s third law).
				MS-PS2.A2	0	0	0	0	The motion of an object is determined by the sum of the forces acting on it; if the total force on the object is not zero, its motion will change. The greater the mass of the object, the

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									greater the force needed to achieve the same change in motion. For any given object, a larger force causes a larger change in motion.
				MS-PS2.A3	0	0	0	0	All positions of objects and the directions of forces and motions must be described in an arbitrarily chosen reference frame and arbitrarily chosen units of size. In order to share information with other people, these choices must also be shared.
			MS-PS2.B		0	0	0	0	
				MS-PS2.B1	0	0	0	0	Electric and magnetic (electromagnetic) forces can be attractive or repulsive, and their sizes depend on the magnitudes of the charges, currents, or magnetic strengths involved and on the distances between the interacting objects.
Middle	**Physical**	**MS-**	**MS-**	**MS-**	0	0	0	0	Gravitational forces

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School	**Sciences**	**PS2**	**PS2.B**	**PS2.B2**					are always attractive. There is a gravitational force between any two masses, but it is very small except when one or both of the objects have large massâ€”e.g., Earth and the sun.
				MS-PS2.B3	0	0	0	0	Forces that act at a distance (electric, magnetic, and gravitational) can be explained by fields that extend through space and can be mapped by their effect on a test object (a charged object, or a ball, respectively).
		MS-PS3			33	11	14	8	
			MS-PS3.A		11	4	4	3	
				MS-PS3.A1	5	1	1	3	Motion energy is properly called kinetic energy; it is proportional to the mass of the moving object and grows with the square of its speed
				MS-PS3.A2	5	0	3	2	A system of objects may also contain stored (potential) energy, depending on their relative

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									positions.
				MS-PS3.A3	3	2	1	0	Temperature is a measure of the average kinetic energy of particles of matter. The relationship between the temperature and the total energy of a system depends on the types, states, and amounts of matter present.
				MS-PS3.A4	0	0	0	0	The term â€œheatâ€ as used in everyday language refers both to thermal energy (the motion of atoms or molecules within a substance) and the transfer of that thermal energy from one object to another. In science, heat is used only for this second meaning; it refers to the energy transferred due to the temperature difference between two objects.
				MS-PS3.A5	0	0	0	0	The temperature of a system is proportional to the average internal kinetic energy and potential energy

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									per atom or molecule (whichever is the appropriate building block for the systemâ€™s material). The details of that relationship depend on the type of atom or molecule and the interactions among the atoms in the material. Temperature is not a direct measure of a system's total thermal energy. The total thermal energy (sometimes called the total internal energy) of a system depends jointly on the temperature, the total number of atoms in the system, and the state of the material
			MS-PS3.B		23	4	12	7	
				MS-PS3.B1	7	2	2	3	When the motion energy of an object changes, there is inevitably some other change in energy at the same time.
				MS-	16	2	9	5	The amount of

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
				PS3.B2					energy transfer needed to change the temperature of a matter sample by a given amount depends on the nature of the matter, the size of the sample, and the environment.
				MS-PS3.B3	5	1	3	1	Energy is spontaneously transferred out of hotter regions or objects and into colder ones.
			MS-PS3.C		1	1	0	0	
				MS-PS3.C1	1	1	0	0	When two objects interact, each one exerts a force on the other that can cause energy to be transferred to or from the object.
			MS-PS3.D		36	2	11	19	
				MS-PS3.D1	33	2	10	9	The chemical reaction by which plants produce complex food molecules (sugars) requires an energy input (i.e., from sunlight) to occur. In this reaction, carbon dioxide and water combine to form carbon-based

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									organic molecules and release oxygen.
				MS-PS3.D2	33	2	11	19	Cellular respiration in plants and animals involve chemical reactions with oxygen that release stored energy. In these processes, complex molecules containing carbon react with oxygen to produce carbon dioxide and other materials.
		MS-PS4			33	9	7	17	
			MS-PS4.A		0	0	0	0	
Middle School	**Physical Sciences**	**MS-PS4**	**MS-PS4.A**	**MS-PS4.A1**	0	0	0	0	A simple wave has a repeating pattern with a specific wavelength, frequency, and amplitude.
				MS-PS4.A2	0	0	0	0	A sound wave needs a medium through which it is transmitted.
			MS-PS4.B		33	9	7	17	
				MS-PS4.B1	32	8	7	17	When light shines on an object, it is reflected, absorbed, or transmitted through the object,

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									depending on the objectâ€™s material and the frequency (color) of the light.
				MS-PS4.B2	5	1	4	0	The path that light travels can be traced as straight lines, except at surfaces between different transparent materials (e.g., air and water, air and glass) where the light path bends.
				MS-PS4.B3	1	1	0	0	A wave model of light is useful for explaining brightness, color, and the frequency-dependent bending of light at a surface between media.
				MS-PS4.B4	0	0	0	0	However, because light can travel through space, it cannot be a matter wave, like sound or water waves.
			MS-PS4.C		0	0	0	0	
				MS-PS4.C1	0	0	0	0	Digitized signals (sent as wave pulses) are a more reliable way to encode and transmit information.

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Middle School	**Earth and Space Sciences**				410	113	96	199	
		MS-ESS1			14	9	4	1	
			MS-ESS1.A		5	5	0	0	
				MS-ESS1.A1	5	5	0	0	Patterns of the apparent motion of the sun, the moon, and stars in the sky can be observed, described, predicted, and explained with models.
				MS-ESS1.A2	0	0	0	0	Earth and its solar system are part of the Milky Way galaxy, which is one of many galaxies in the universe.
			MS-ESS1.B		13	8	4	1	
				MS-ESS1.B1	1	0	1	0	The solar system consists of the sun and a collection of objects, including planets, their moons, and asteroids that are held in orbit around the sun by its gravitational pull on them.
				MS-ESS1.B2	13	8	4	1	This model of the solar system can explain eclipses of the sun and the moon. Earthâ€™s spin axis is fixed in direction over the short-term but tilted relative to its orbit around the sun. The

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									seasons are a result of that tilt and are caused by the differential intensity of sunlight on different areas of Earth across the year.
				MS-ESS1.B3	0	0	0	0	The solar system appears to have formed from a disk of dust and gas, drawn together by gravity.
			MS-ESS1.C		2	1	1	0	
				MS-ESS1.C1	2	1	1	0	The geologic time scale interpreted from rock strata provides a way to organize Earthâ€™s history. Analyses of rock strata and the fossil record provide only relative dates, not an absolute scale.
				MS-ESS1.C2	0	0	0	0	Tectonic processes continually generate new ocean sea floor at ridges and destroy old sea floor at trenches
		MS-ESS2			261	67	50	144	
			MS-ESS2.A		36	14	5	15	
				MS-ESS2.A1	18	6	3	8	All Earth processes are the result of energy flowing and matter cycling within and among the planetâ€™s systems. This energy is derived from the sun and Earthâ€™s hot interior. The energy that flows and matter

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									that cycles produce chemical and physical changes in Earthâ€™s materials and living organisms
				MS-ESS2.A2	26	8	4	14	The planetâ€™s systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earthâ€™s history and will determine its future.
			MS-ESS2.B		1	0	0	1	
				MS-ESS2.B1	1	0	0	1	Maps of ancient land and water patterns, based on investigations of rocks and fossils, make clear how Earthâ€™s plates have moved great distances, collided, and spread apart.
			MS-ESS2.C		101	25	22	54	
				MS-ESS2.C1	69	6	13	50	Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land.
Middle School	**Earth and**	**MS-ESS2**	**MS-ESS2.C**	**MS-ESS2.C2**	52	13	15	24	The complex patterns of the changes and the

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
	Space Sciences								movement of water in the atmosphere, determined by winds, landforms, and ocean temperatures and currents, are major determinants of local weather patterns.
				MS-ESS2.C3	52	7	11	34	Global movements of water and its changes in form are propelled by sunlight and gravity.
				MS-ESS2.C4	28	6	5	17	Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents.
				MS-ESS2.C5	16	1	9	6	Waterâ€™s movementsâ€”both on the land and undergroundâ€”cause weathering and erosion, which change the landâ€™s surface features and create underground formations.
			MS-ESS2.D		225	46	44	137	
				MS-ESS2.D1	214	42	40	134	Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local and regional

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									geography, all of which can affect oceanic and atmospheric flow patterns.
				MS-ESS2.D2	12	6	3	3	Because these patterns are so complex, weather can only be predicted probabilistically.
				MS-ESS2.D3	48	11	13	25	The ocean exerts a major influence on weather and climate by absorbing energy from the sun, releasing it over time, and globally redistributing it through ocean currents.
		MS-ESS3			276	52	62	161	
			MS-ESS3.A		64	8	5	51	
				MS-ESS3.A1	64	8	5	51	Humans depend on Earthâ€™s land, ocean, atmosphere, and biosphere for many different resources. Minerals, fresh water, and biosphere resources are limited, and many are not renewable or replaceable over human lifetimes. These resources are distributed unevenly around the planet as a result of past geologic processes
			MS-ESS3.B		9	7	1	1	

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
				MS-ESS3.B1	9	7	1	1	Mapping the history of natural hazards in a region, combined with an understanding of related geologic forces can help forecast the locations and likelihoods of future events
			MS-ESS3.C		68	13	12	43	
				MS-ESS3.C1	51	5	6	40	Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earthâ€™s environments can have different impacts (negative and positive) for different living things.
				MS-ESS3.C2	19	8	3	8	Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise.
			MS-ESS3.D		213	38	53	121	
				MS-ESS3.D1	208	38	48	121	Human activities, such as the release of greenhouse gases from burning fossil fuels, are

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									major factors in the current rise in Earthâ€™s mean surface temperature (global warming). Reducing the level of climate change and reducing human vulnerability to whatever climate changes do occur depend on the understanding of climate science, engineering capabilities, and other kinds of knowledge, such as understanding of human behavior and on applying that knowledge wisely in decisions and activities.

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Middle School	**Engineering, Technology, and Applications of Science**				28	20	6	1	
		MS-ETS1			28	20	6	1	
			MS-ETS1.A		11	6	5	0	
				MS-ETS1.A1	11	6	5	0	The more precisely a design taskâ€™s criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions.
			MS-ETS1.B		20	14	4	1	
				MS-ETS1.B1	6	2	3	1	A solution needs to be tested, and then modified on the basis of the test

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									results, in order to improve it.
				MS-ETS1.B2	13	8	3	1	There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.
				MS-ETS1.B3	7	4	2	0	Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors.
				MS-ETS1.B4	5	1	3	1	Models of all kinds are important for testing solutions.
			MS-ETS1.C		8	4	2	1	
				MS-ETS1.C1	7	4	2	0	Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the

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									best in each test can provide useful information for the redesign processâ€”that is, some of those characteristics may be incorporated into the new design.
				MS-ETS1.C2	3	1	1	1	The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
High School					590	210	146	229	
	Life Sciences				160	51	38	66	
		HS-LS1			31	6	2	21	
			HS-LS1.A		1	0	0	1	
				HS-LS1.A1	1	0	0	1	Systems of specialized cells within organisms help them perform the essential functions of life.
				HS-LS1.A2	0	0	0	0	All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins, which carry out most of the work of cells.
				HS-LS1.A3	0	0	0	0	Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level.
				HS-LS1.A4	0	0	0	0	Feedback mechanisms maintain a living systemâ€™s internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system.
			HS-LS1.B		0	0	0	0	
				HS-LS1.B1	0	0	0	0	In multicellular organisms individual cells grow and then divide via a process called mitosis, thereby allowing the organism to grow. The organism begins as a single cell (fertilized egg) that divides successively to produce many cells, with each parent cell passing identical genetic material (two variants of each chromosome pair) to both daughter cells. Cellular division and differentiation produce and maintain a complex organism, composed of systems of tissues and organs that work together to meet the needs of the whole organism.
			HS-LS1.C		31	6	2	21	
				HS-LS1.C1	21	4	0	17	The process of photosynthesis converts light energy to stored

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									chemical energy by converting carbon dioxide plus water into sugars plus released oxygen.
				HS-LS1.C2	4	1	0	3	The sugar molecules thus formed contain carbon, hydrogen, and oxygen: their hydrocarbon backbones are used to make amino acids and other carbon-based molecules that can be assembled into larger molecules (such as proteins or DNA), used for example to form new cells.
				HS-LS1.C3	7	2	0	3	As matter and energy flow through different organizational levels of living systems, chemical elements are recombined in different ways to form different products.
				HS-LS1.C4	13	0	2	10	As a result of these chemical reactions, energy is transferred from one system of interacting molecules to another. Cellular respiration is a chemical process in which the bonds of food molecules and oxygen molecules are broken and new compounds are formed that can transport energy to muscles. Cellular respiration also

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									releases the energy needed to maintain body temperature despite ongoing energy transfer to the surrounding environment.
		HS-LS2			134	43	32	54	
			HS-LS2.A		9	7	1	1	
				HS-LS2.A1	8	6	1	1	Ecosystems have carrying capacities, which are limits to the numbers of organisms and populations they can support. These limits result from such factors as the availability of living and nonliving resources and from such challenges such as predation, competition, and disease. Organisms would have the capacity to produce populations of great size were it not for the fact that environments and resources are finite. This fundamental tension affects the abundance (number of individuals) of species in any given ecosystem.
			HS-LS2.B		50	11	23	10	
				HS-LS2.B1	3	1	0	1	Photosynthesis and cellular respiration (including anaerobic processes) provide most

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									of the energy for life processes.
High School	**Life Sciences**	**HS-LS2**	**HS-LS2.B**	**HS-LS2.B2**	6	1	1	3	Plants or algae form the lowest level of the food web. At each link upward in a food web, only a small fraction of the matter consumed at the lower level is transferred upward, to produce growth and release energy in cellular respiration at the higher level. Given this inefficiency, there are generally fewer organisms at higher levels of a food web. Some matter reacts to release energy for life functions, some matter is stored in newly made structures, and much is discarded. The chemical elements that make up the molecules of organisms pass through food webs and into and out of the atmosphere and soil, and they are combined and recombined in different ways. At each link in an ecosystem, matter and energy are conserved.
				HS-LS2.B3	48	9	23	10	Photosynthesis and cellular respiration are important components of the carbon cycle, in which carbon is exchanged among the

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									biosphere, atmosphere, oceans, and geosphere through chemical, physical, geological, and biological processes.
			HS-LS2.C		72	31	7	5	
				HS-LS2.C1	33	13	0	20	A complex set of interactions within an ecosystem can keep its numbers and types of organisms relatively constant over long periods of time under stable conditions. If a modest biological or physical disturbance to an ecosystem occurs, it may return to its more or less original status (i.e., the ecosystem is resilient), as opposed to becoming a very different ecosystem. Extreme fluctuations in conditions or the size of any population, however, can challenge the functioning of ecosystems in terms of resources and habitat availability.
				HS-LS2.C2	57	19	5	34	Moreover, anthropogenic changes (induced by human activity) in the environmentâ€”including habitat destruction, pollution, introduction of invasive species, overexploitation, and

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									climate changeâ€”can disrupt an ecosystem and threaten the survival of some species.
			HS-LS2.D		0	0	0	0	
				HS-LS2.D1	0	0	0	0	Group behavior has evolved because membership can increase the chances of survival for individuals and their genetic relatives
		HS-LS3			3	2	1	1	
			HS-LS3.A		0	0	0	0	
				HS-LS3.A1	0	0	0	0	Each chromosome consists of a single very long DNA molecule, and each gene on the chromosome is a particular segment of that DNA. The instructions for forming speciesâ€™ characteristics are carried in DNA. All cells in an organism have the same genetic content, but the genes used (expressed) by the cell may be regulated in different ways. Not all DNA codes for a protein; some segments of DNA are involved in regulatory or structural functions, and some have no as-yet known

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									function.
			HS-LS3.B		3	2	1	1	
				HS-LS3.B1	0	0	0	0	In sexual reproduction, chromosomes can sometimes swap sections during the process of meiosis (cell division), thereby creating new genetic combinations and thus more genetic variation. Although DNA replication is tightly regulated and remarkably accurate, errors do occur and result in mutations, which are also a source of genetic variation. Environmental factors can also cause mutations in genes, and viable mutations are inherited.
				HS-LS3.B2	3	2	1	1	Environmental factors also affect expression of traits, and hence affect the probability of occurrences of traits in a population. Thus the variation and distribution of traits observed depends on both genetic and environmental factors
		HS-LS4			37	12	8	18	
			HS-LS4.A		0	0	0	0	
				HS-LS4.A1	0	0	0	0	Genetic information, like the fossil record,

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									provides evidence of evolution. DNA sequences vary among species, but there are many overlaps; in fact, the ongoing branching that produces multiple lines of descent can be inferred by comparing the DNA sequences of different organisms. Such information is also derivable from the similarities and differences in amino acid sequences and from anatomical and embryological evidence.
			HS-LS4.B		0	0	0	0	
				HS-LS4.B1	0	0	0	0	Natural selection occurs only if there is both (1) variation in the genetic information between organisms in a population and (2) variation in the expression of that genetic informationâ€”that is, trait variationâ€”that leads to differences in performance among individuals.
				HS-LS4.B2	0	0	0	0	The traits that positively affect survival are more likely to be reproduced, and thus are more common in the population.

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			HS-LS4.C		19	9	3	8	
High School	Life Sciences	HS-LS4	HS-LS4.C	HS-LS4.C1	0	0	0	0	Evolution is a consequence of the interaction of four factors: (1) the potential for a species to increase in number, (2) the genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for an environmentâ€™s limited supply of the resources that individuals need in order to survive and reproduce, and (4) the ensuing proliferation of those organisms that are better able to survive and reproduce in that environment.
				HS-LS4.C2	0	0	0	0	Natural selection leads to adaptation, that is, to a population dominated by organisms that are anatomically, behaviorally, and physiologically well suited to survive and reproduce in a specific environment. That is, the differential survival and reproduction of organisms in a population that have an advantageous heritable trait leads to an increase in the proportion of

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									individuals in future generations that have the trait and to a decrease in the proportion of individuals that do not.
				HS-LS4.C3	1	0	0	1	Adaptation also means that the distribution of traits in a population can change when conditions change.
				HS-LS4.C4	19	9	3	8	Changes in the physical environment, whether naturally occurring or human induced, have thus contributed to the expansion of some species, the emergence of new distinct species as populations diverge under different conditions, and the declineâ€“and sometimes the extinctionâ€“of some species
				HS-LS4.C5	4	1	0	3	Species become extinct because they can no longer survive and reproduce in their altered environment. If members cannot adjust to change that is too fast or drastic, the opportunity for the speciesâ€™ evolution is lost.
			HS-LS4.D		24	2	1	21	
				HS-	24	3	5	16	Humans depend on the

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
				LS4.D1					living world for the resources and other benefits provided by biodiversity. But human activity is also having adverse impacts on biodiversity through overpopulation, overexploitation, habitat destruction, pollution, introduction of invasive species, and climate change. Thus sustaining biodiversity so that ecosystem functioning and productivity are maintained is essential to supporting and enhancing life on Earth. Sustaining biodiversity also aids humanity by preserving landscapes of recreational or inspirational value.
				HS-LS4.D2	23	2	0	21	Biodiversity is increased by the formation of new species (speciation) and decreased by the loss of species (extinction).

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
High School	Physical Sciences				111	40	31	40	
		HS-PS1			26	12	8	5	
			HS-PS1.A		7	2	5	0	
				HS-PS1.A1	2	1	1	0	Each atom has a charged substructure consisting of a nucleus, which is made of protons and neutrons, surrounded by electrons.
				HS-PS1.A2	0	0	0	0	The periodic table orders elements horizontally by the number of protons in the atomâ€™s nucleus and places those with similar chemical properties in columns. The repeating patterns of this table reflect patterns of outer electron states
				HS-PS1.A3	3	0	3	0	The structure and interactions of matter at the bulk scale are determined by electrical forces within and

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									between atoms.
				HS-PS1.A4	5	1	4	0	A stable molecule has less energy than the same set of atoms separated; one must provide at least this energy in order to take the molecule apart.
			HS-PS1.B		20	11	4	4	
				HS-PS1.B1	8	3	2	2	Chemical processes, their rates, and whether or not energy is stored or released can be understood in terms of the collisions of molecules and the rearrangements of atoms into new molecules, with consequent changes in the sum of all bond energies in the set of molecules that are matched by changes in kinetic energy.
				HS-PS1.B2	6	4	1	1	In many situations, a dynamic and

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									condition-dependent balance between a reaction and the reverse reaction determines the numbers of all types of molecules present.
				HS-PS1.B3	7	5	1	1	The fact that atoms are conserved, together with knowledge of the chemical properties of the elements involved, can be used to describe and predict chemical reactions.
			HS-PS1.C		4	0	2	2	
				HS-PS1.C1	3	0	2	1	Nuclear processes, including fusion, fission, and radioactive decays of unstable nuclei, involve release or absorption of energy. The total number of neutrons plus protons does not change in any nuclear process.

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
				HS-PS1.C2	1	0	0	1	Spontaneous radioactive decays follow a characteristic exponential decay law. Nuclear lifetimes allow radiometric dating to be used to determine the ages of rocks and other materials
		HS-PS2			11	4	4	4	
			HS-PS2.A		1	0	1	1	
				HS-PS2.A1	0	0	0	0	Newtonâ€™s second law accurately predicts changes in the motion of macroscopic objects
				HS-PS2.A2	1	0	1	1	Momentum is defined for a particular frame of reference; it is the mass times the velocity of the object.
				HS-PS2.A3	1	0	1	1	If a system interacts with objects outside itself, the total momentum of the system can change;

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									however, any such change is balanced by changes in the momentum of objects outside the system.
			HS-PS2.B		1	1	0	0	
High School	Physical Sciences	**HS-PS2**	**HS-PS2.B**	**HS-PS2.B1**	0	0	0	0	New tonâ€™s law of universal gravitation and Coulombâ€™s law provide the mathematical models to describe and predict the effects of gravitational and electrostatic forces between distant objects.
				HS-PS2.B2	0	0	0	0	Forces at a distance are explained by fields (gravitational, electric, and magnetic) permeating space that can transfer energy through space. Magnets or electric currents cause magnetic fields; electric charges or changing

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									magnetic fields cause electric fields.
				HS-PS2.B3	1	1	0	0	Attraction and repulsion between electric charges at the atomic scale explain the structure, properties, and transformations of matter, as well as the contact forces between material objects.
		HS-PS3			72	23	23	26	
			HS-PS3.A		51	11	9	21	
				HS-PS3.A1	20	7	4	9	Energy is a quantitative property of a system that depends on the motion and interactions of matter and radiation within that system. That there is a single quantity called energy is due to the fact that a systemâ€™s total energy is conserved, even as, within the

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									system, energy is continually transferred from one object to another and between its various possible forms.
				HS-PS3.A2	33	6	6	21	At the macroscopic scale, energy manifests itself in multiple ways, such as in motion, sound, light, and thermal energy.
				HS-PS3.A3	7	1	1	5	These relationships are better understood at the microscopic scale, at which all of the different manifestations of energy can be modeled as a combination of energy associated with the motion of particles and energy associated with the configuration (relative position of the particles). In some cases the relative

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									position energy can be thought of as stored in fields (which mediate interactions between particles). This last concept includes radiation, a phenomenon in which energy stored in fields moves across space.
				HS-PS3.A5	10	4	3	3	â€œElectrical energyâ€ may mean energy stored in a battery or energy transmitted by electric currents.
			HS-PS3.B		50	13	20	17	
				HS-PS3.B1	13	5	2	6	Conservation of energy means that the total change of energy in any system is always equal to the total energy transferred into or out of the system.

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
				HS-PS3.B2	38	8	13	17	Energy cannot be created or destroyed, but it can be transported from one place to another and transferred between systems
				HS-PS3.B3	2	0	1	1	Mathematical expressions, which quantify how the stored energy in a system depends on its configuration (e.g. relative positions of charged particles, compression of a spring) and how kinetic energy depends on mass and speed, allow the concept of conservation of energy to be used to predict and describe system behavior.
				HS-PS3.B4	19	2	11	6	The availability of energy limits what can occur in any system.
				HS-PS3.B5	4	0	0	4	Uncontrolled systems always evolve toward

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									more stable statesâ€”that is, toward more uniform energy distribution (e.g., water flows downhill, objects hotter than their surrounding environment cool down)
			HS-PS3.C		0	0	0	0	
				HS-PS3.C1	0	0	0	0	When two objects interacting through a field change relative position, the energy stored in the field is changed.
			HS-PS3.D		38	3	14	18	
				HS-PS3.D1	43	13	14	16	Although energy cannot be destroyed, it can be converted to less useful formsâ€”for example, to thermal energy in the surrounding environment.
				HS-PS3.D2	38	3	14	18	The main way that solar energy is captured and stored on Earth is through the

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									complex chemical process known as photosynthesis.
High School	Physical Sciences	**HS-PS3**	**HS-PS3.D**	**HS-PS3.D3**	17	4	3	10	Solar cells are human-made devices that likewise capture the sunâ€™s energy and produce electrical energy.
				HS-PS3.D4	0	0	0	0	Nuclear Fusion processes in the center of the sun release the energy that ultimately reaches Earth as radiation.
		HS-PS4			34	13	6	15	
			HS-PS4.A		2	1	0	1	
				HS-PS4.A1	2	1	0	1	The wavelength and frequency of a wave are related to one another by the speed of travel of the wave, which depends on the type of wave and the medium through which it is passing.
				HS-PS4.A2	0	0	0	0	Information can be digitized (e.g., a picture stored

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									as the values of an array of pixels); in this form, it can be stored reliably in computer memory and sent over long distances as a series of wave pulses.
				HS-PS4.A3	0	0	0	0	[From the 3â€“5 grade band endpoints] Waves can add or cancel one another as they cross, depending on their relative phase (i.e., relative position of peaks and troughs of the waves), but they emerge unaffected by each other. (Boundary: The discussion at this grade level is qualitative only; it can be based on the fact that two different sounds can pass a location in different directions without getting mixed up.)
				HS-	0	0	0	0	Geologists use

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
				PS4.A4					seismic waves and their reflection at interfaces between layers to probe structures deep in the planet.
			HS-PS4.B		27	9	5	13	
				HS-PS4.B1	10	0	1	9	Electromagnetic radiation (e.g., radio, microwaves, light) can be modeled as a wave of changing electric and magnetic fields or as particles called photons. The wave model is useful for explaining many features of electromagnetic radiation, and the particle model explains other features
				HS-PS4.B2	14	7	3	4	When light or longer wavelength electromagnetic radiation is absorbed in matter, it is generally converted into thermal energy

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									(heat). Shorter wavelength electromagnetic radiation (ultraviolet, X-rays, gamma rays) can ionize atoms and cause damage to living cells
				HS-PS4.B3	12	1	2	9	Photoelectric materials emit electrons when they absorb light of a high-enough frequency
				HS-PS4.B4	1	1	0	0	Atoms of each element emit and absorb characteristic frequencies of light. These characteristics allow identification of the presence of an element, even in microscopic quantities.
			HS-PS4.C		0	0	0	0	
				HS-PS4.C1	0	0	0	0	based on the understanding of waves and their interactions with matter are part of everyday experiences in the modern

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									world (e.g., medical imaging, communications, scanners) and in scientific research. They are essential tools for producing, transmitting, and capturing signals and for storing and interpreting the information contained in them.

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High School	Earth and Space Sciences				549	182	143	224	
		HS-ESS1			10	5	4	1	
			HS-ESS1.A		1	1	0	0	
				HS-ESS1.A1	0	0	0	0	The star called the sun is changing and will burn out over a lifespan of approximately 10 billion years.
				HS-ESS1.A2	1	1	0	0	The study of starsâ€™ light spectra and brightness is used to identify compositional elements of stars, their movements, and their distances from Earth.
				HS-ESS1.A3	0	0	0	0	The Big Bang theory is supported by observations of distant galaxies receding from our own, of the measured composition of stars and non-stellar gases, and of the maps of spectra of

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									the primordial radiation (cosmic microwave background) that still fills the universe.
				HS-ESS1.A4	0	0	0	0	Other than the hydrogen and helium formed at the time of the Big Bang, nuclear fusion within stars produces all atomic nuclei lighter than and including iron, and the process releases electromagnetic energy. Heavier elements are produced when certain massive stars achieve a supernova stage and explode.
			HS-ESS1.B		7	3	4	0	
				HS-ESS1.B1	7	3	4	0	Keplerâ€™s laws describe common features of the motions of orbiting objects, including their elliptical paths around the sun. Orbits may change due to

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									the gravitational effects from, or collisions with, other objects in the solar system.
				HS-ESS1.B2	19	4	7	8	Cyclical changes in the shape of Earthâ€™s orbit around the sun, together with changes in the tilt of the planetâ€™s axis of rotation, both occurring over hundreds of thousands of years, have altered the intensity and distribution of sunlight falling on the earth. These phenomena cause a cycle of ice ages and other gradual climate changes.
			HS-ESS1.C		0	0	0	0	
				HS-ESS1.C1	0	0	0	0	Continental rocks, which can be older than 4 billion years, are generally much older than the rocks of the

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									ocean floor, which are less than 200 million years old
				HS-ESS1.C2	0	0	0	0	Although active geologic processes, such as plate tectonics and erosion, have destroyed or altered most of the very early rock record on Earth, other objects in the solar system, such as lunar rocks, asteroids, and meteorites, have changed little over billions of years. Studying these objects can provide information about Earthâ€™s formation and early history.
		HS-ESS2			375	103	100	174	
			HS-ESS2.A		87	30	11	45	
				HS-ESS2.A1	69	17	9	42	Earthâ€™s systems, being dynamic and interacting, cause feedback effects that can

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									increase or decrease the original changes.
				HS-ESS2.A2	2	0	0	2	Evidence from deep probes and seismic waves, reconstructions of historical changes in Earthâ€™s surface and its magnetic field, and an understanding of physical and chemical processes lead to a model of Earth with a hot but solid inner core, a liquid outer core, a solid mantle and crust. Motions of the mantle and its plates occur primarily through thermal convection, which involves the cycling of matter due to the outward flow of energy from Earthâ€™s interior and gravitational movement of

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									denser materials toward the interior.
				HS-ESS2.A3	45	17	7	21	The geological record shows that changes to global and regional climate can be caused by interactions among changes in the sunâ€™s energy output or Earthâ€™s orbit, tectonic events, ocean circulation, volcanic activity, glaciers, vegetation, and human activities. These changes can occur on a variety of time scales from sudden (e.g., volcanic ash clouds) to intermediate (ice ages) to very long-term tectonic cycles.
			HS-ESS2.B		4	0	2	2	
				HS-ESS2.B1	2	0	1	1	The radioactive decay of unstable isotopes continually

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									generates new energy within Earthâ€™s crust and mantle, providing the primary source of the heat that drives mantle convection. Plate tectonics can be viewed as the surface expression of mantle convection.
High School	Earth and Space Sciences	**HS-ESS2**	**HS-ESS2.B**	**HS-ESS2.B2**	2	0	1	1	Plate tectonics is the unifying theory that explains the past and current movements of the rocks at Earthâ€™s surface and provides a framework for understanding its geologic history. Plate movements are responsible for most continental and ocean-floor features and for the distribution of most rocks and minerals within Earthâ€™s crust.

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
			HS-ESS2.C		76	9	20	48	
				HS-ESS2.C1	76	9	20	48	The abundance of liquid water on Earthâ€™s surface and its unique combination of physical and chemical properties are central to the planetâ€™s dynamics. These properties include waterâ€™s exceptional capacity to absorb, store, and release large amounts of energy, transmit sunlight, expand upon freezing, dissolve and transport materials, and lower the viscosities and melting points of rocks.
			HS-ESS2.D		318	72	79	167	
				HS-ESS2.D1	264	55	48	162	The foundation for Earthâ€™s global climate systems is the electromagnetic

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									radiation from the sun, as well as its reflection, absorption, storage, and redistribution among the atmosphere, ocean, and land systems, and this energyâ€™s re-radiation into space.
				HS-ESS2.D2	65	4	31	30	Gradual atmospheric changes were due to plants and other organisms that captured carbon dioxide and released oxygen.
				HS-ESS2.D3	168	23	53	91	Changes in the atmosphere due to human activity have increased carbon dioxide concentrations and thus affect climate.
				HS-ESS2.D4	131	54	38	38	Current models predict that, although future regional climate changes will be complex and varied, average global temperatures will continue to

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									rise. The outcomes predicted by global climate models strongly depend on the amounts of human-generated greenhouse gases added to the atmosphere each year and by the ways in which these gases are absorbed by the ocean and biosphere.
			HS-ESS2.E		98	7	33	60	
				HS-ESS2.E1	98	7	33	60	The many dynamic and delicate feedbacks between the biosphere and other Earth systems cause a continual co-evolution of Earthâ€™s surface and the life that exists on it.
		HS-ESS3			372	123	86	162	
			HS-ESS3.A		132	45	21	65	
				HS-ESS3.A1	68	9	15	44	Resource availability has

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
									guided the development of human society.
				HS-ESS3.A2	111	37	18	55	All forms of energy production and other resource extraction have associated economic, social, environmental, and geopolitical costs and risks as well as benefits. New technologies and social regulations can change the balance of these factors.
			HS-ESS3.B		11	3	1	7	
				HS-ESS3.B1	11	3	1	7	Natural hazards and other geologic events have shaped the course of human history; [they] have significantly altered the sizes of human populations and have driven human migrations
			HS-ESS3.C		88	35	13	39	
				HS-	61	16	8	37	The

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
				ESS3.C1					sustainability of human societies and the biodiversity that supports them requires responsible management of natural resources.
				HS-ESS3.C2	30	21	4	4	Scientists and engineers can make major contributions by developing technologies that produce less pollution and waste and that preclude ecosystem degradation.
			HS-ESS3.D		151	41	46	66	
High School	Earth and Space Sciences	**HS-ESS3**	**HS-ESS3.D**	**HS-ESS3.D1**	124	24	37	65	Though the magnitudes of human impacts are greater than they have ever been, so too are human abilities to model, predict, and manage current and future impacts.

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
				HS-ESS3.D2	37	14	13	10	Through computer simulations and other studies, important discoveries are still being made about how the ocean, the atmosphere, and the biosphere interact and are modified in response to human activities.

Grade Level	Topic	DCI	sub-DCI	sub-sub-DCI	TOTAL	ACTIVITY	VISUALIZATION	VIDEO	
High School	Engineering, Technology, and Applications of Science				86	39	9	34	
		HS-ETS1			86	39	9	34	
			HS-ETS1.A		67	20	9	34	
				HS-ETS1.A1	20	4	5	10	Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them.
				HS-ETS1.A2	62	16	9	34	Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution,

									which can be addressed through engineering. These global challenges also may have manifestations in local communities
			HS-ETS1.B		58	27	6	23	
				HS-ETS1.B1	49	18	6	23	When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts.
				HS-ETS1.B2	8	4	3	1	Both physical models and computers can be used in various ways to aid in the engineering design process. Computers are useful for a variety of purposes, such as

									running simulations to test different ways of solving a problem or to see which one is most efficient or economical; and in making a persuasive presentation to a client about how a given design will meet his or her needs.
			HS-ETS1.C		14	6	4	4	
				HS-ETS1.C1	13	5	4	4	Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (trade-offs) may be needed