

Disciplinary Core Ideas

Learning Progressions K-5 | Physical Science



DCI	DCI Description	Kindergarten	1 st Grade	2 nd Grade	3 rd Grade	4 th Grade	5 th Grade
PS1 – Matter and Its Interactions							
PS1.A	Structure and Properties of Matter			<p>Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties. (2-PS1-1)</p> <p>Different properties are suited to different purposes. (2-PS1-2),(2-PS1-3)</p> <p>A great variety of objects can be built up from a small set of pieces. (2-PS1-3)</p>			<p>Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model shows that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including the inflation and shape of a balloon; the effects of air on larger particles or objects. (5-PS1-1)</p> <p>The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish. (5-PS1-2)</p> <p>Measurements of a variety of properties can be used to identify materials. (Boundary: At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic-scale mechanism of evaporation and condensation.) (5-PS1-3)</p>

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PS1.B	Chemical Reactions			Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not. (2-PS1-4)			When two or more different substances are mixed, a new substance with different properties may be formed. (5-PS1-4) No matter what reaction or change in properties occurs, the total weight of the substances does not change. (Boundary: Mass and weight are not distinguished at this grade level.) (5-PS1-2)
PS1.C	Nuclear Processes						
PS2 – Motion and Stability: Forces and Interactions							
PS2.A	Forces and Motion	Pushes and pulls can have different strengths and directions. (KPS2-1),(K-PS2-2) Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it. (K-PS2-1),(K-PS2-2)			Each force acts on one particular object and has both strength and a direction. An object at rest typically has multiple forces acting on it, but they add to give zero net force on the object. Forces that do not sum to zero can cause changes in the object's speed or direction of motion. (Boundary: Qualitative and conceptual, but not quantitative addition of forces)		

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					<p>are used at this level.) (3-PS2-1)</p> <p>The patterns of an object's motion in various situations can be observed and measured; when that past motion exhibits a regular pattern, future motion can be predicted from it. (Boundary: Technical terms, such as magnitude, velocity, momentum, and vector quantity, are not introduced at this level, but the concept that some quantities need both size and direction to be described is developed.) (3-PS2-2)</p>		
PS2.B	Types of Interactions	When objects touch or collide, they push on one another and can change motion. (K-PS2-1)			<p>Objects in contact exert forces on each other. (3-PS2-1)</p> <p>Electric, and magnetic forces between a pair of objects do not require that the</p>		The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center. (5-PS2-1)

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					objects be in contact. The sizes of the forces in each situation depend on the properties of the objects and their distances apart and, for forces between two magnets, on their orientation relative to each other. (3-PS2-3), (3-PS2-4)		
PS2.C	Stability and Instability in Physical Systems						
PS3 – Energy							
PS3.A	Definitions of Energy					<p>The faster a given object is moving, the more energy it possesses. (4-PS3-1)</p> <p>Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (4-PS3-2),(4-PS3-3)</p>	
PS3.B	Conservation of Energy and Energy Transfer	Sunlight warms Earth's surface. (K-PS3-1),(K-PS3-2)				Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby	

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						<p>changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. (4-PS3-2),(4-PS3-3)</p> <p>Light also transfers energy from place to place. (4-PS3-2)</p> <p>Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy. (4-PS3-2),(4-PS3-4)</p>	
PS3.C	Relationship Between Energy and Forces	A bigger push or pull makes things go faster. (secondary to K-PS2-1)				When objects collide, the contact forces transfer energy so as to change the objects' motions. (4-PS3-3)	
PS3.D	Energy in Chemical Processes and Everyday Life					The expression "produce energy" typically refers to the conversion of stored	The energy released [from] food was once energy from the sun that was captured by plants in the chemical

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						energy into a desired form for practical use. (4-PS3-4)	process that forms plant matter (from air and water). (5-PS3-1)
PS4 – Waves and Their Applications in Technologies for Information Transfer							
PS4.A	Wave Properties		Sound can make matter vibrate, and vibrating matter can make sound. (1-PS4-1)			<p>Waves, which are regular patterns of motion, can be made in water by disturbing the surface. When waves move across the surface of deep water, the water goes up and down in place; it does not move in the direction of the wave except when the water meets the beach. (Note: This grade band endpoint was moved from K–2.) (4-PS4-1)</p> <p>Waves of the same type can differ in amplitude (height of the wave) and wavelength spacing between wave peaks). (4-PS4-1)</p>	
PS4.B	Electromagnetic Radiation		<p>Objects can be seen only when light is available to illuminate them. Some objects give off their own light. (1-PS4-2)</p> <p>Some materials allow light to pass through them, others allow</p>			An object can be seen when light reflected from its surface enters the eyes. (4-PS4-2)	

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			<p>only some light through and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach. Mirrors can be used to redirect a light beam. (Boundary: The idea that light travels from place to place is developed through experiences with light sources, mirrors, and shadows, but no attempt is made to discuss the speed of light.) (1-PS4-3)</p>				
PS4.C	Information Technologies and Instrumentation		<p>People also use a variety of devices to communicate (send and receive information) over long distances. (1-PS4-4)</p>			<p>Digitized information transmitted over long distances without significant degradation. High-tech devices, such as computers or cell phones, can receive and decode information—convert it from digitized form to voice—and vice versa. (4-PS4-3)</p>	