

Hawaii Alternate Assessment for NGSS Science Key Ideas / Essence Statements / Meets PLD / PHYSICAL SCIENCES / Grades 5 and 8

Revised October 4, 2022

**The NGSS Vision:** Proficient learners demonstrate scientific literacy through the application of the practices, crosscutting concepts, and core ideas of science and engineering to engage in discussions on science-related issues; to be critical consumers of scientific information related to their everyday lives; and to continue to learn about science throughout their lives. (Adapted from Framework for K-12 Science Education, p. 9)

Physical Science							
Domain	Sub-Domain	Grade 5 Key Idea	Essence	Meets	Grade 8 Key Idea	Essence	Meets
PS1: Matter and Interactions	PS1.A: Structure and Properties of Matter	Because matter exists as particles that are too small to see, matter is always conserved even if it seems to disappear. Measurements of a variety of observable properties can be used to identify particular materials.	5-PS1-1 Identify that matter can appear as a solid, liquid, or gas and that matter, can be broken down into particles that are too small to see but still exist.	Demonstrate an understanding that when a substance is dissolved, the pieces are still present but are too small to see.	The fact that matter is composed of atoms and molecules can be used to explain the properties of substances, diversity of materials, states of matter, phase changes, and conservation of matter.	MS-PS1-1 Identify that the smallest parts of all molecules are atoms and use models to explain that atoms can combine to form molecules and that those molecules can be classified by their makeup.	Classify molecules by makeup: one type of atom or multiple types of atoms and simple or complex
			5-PS1-2 Identify that all matter has weight and that total weight stays the same when materials change by melting, cooling, mixing, or reacting to form new materials.	Identify weight data that show that the total weight of matter before and after heating, cooling, or mixing materials stays the same.		MS-PS1-2 Identify when substances have changed and formed new substances and use data to explain that chemical changes involve changes in molecules and lead to new substances with new properties.	Use data to support a claim that properties have changed and a new substance has been formed
			5-PS1-3 Identify properties of substances and differentiate between various materials based on their properties using observations or data.	Differentiate substances that have different physical/chemical properties.		MS-PS1.3 Identify common natural resources, synthetic materials and products made from those resources and their impact on society.	Identify the natural resources used to make a synthetic product.
			MS-PS1-4 Identify that a material's state of matter can change when heat is added or removed and that there are predictable changes in the motion of the molecules when the state changes.	Use a model to identify that the particles that make up an object move fast or slow depending on the temperature of the object.			
	MS-PS1-5 DCI is covered in MS-PS1-2 and MS-PS1-3						
	PS1.A: Structure and Properties of Matter	Chemical reactions that occur when substances are mixed can be identified by the emergence of substances with different properties; the total mass remains the same.	5-PS1-4 Identify properties of substances that will be mixed and use data or observations to determine whether the mixing of two substances results in a chemical change.	Use data from observations to determine whether the mixing of two or more substances results in a chemical change.	Reacting substances rearrange to form different molecules, but the number of atoms is conserved. Some reactions release energy and others absorb energy.	MS-PS1-6 Identify that, during a chemical reaction, there are sometimes changes in temperature that can be used in the design of helpful devices.	Use presented evidence to determine whether a reaction has released or absorbed thermal energy.
	PS1.C: Nuclear Processes	N/A for Elementary and Middle School					

Physical Science

Domain	Sub-Domain	Grade 5 Key Idea	Essence	Meets	Grade 8 Key Idea	Essence	Meets
PS2: Motion and Stability: Forces and Interactions	PS2.A: Forces and Motion	The effect of unbalanced forces on an object results in a change of motion. Patterns of motion can be used to predict future motion. Some forces act through contact, some forces act even when the objects are not in contact. The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center.	3-PS2-1 Identify a force as a push or pull that can cause an object's motion to change and predict how an object's motion would change if a given force is applied.	Identify unbalanced forces as the cause of a change in an object's motion.	The role of the mass of an object must be qualitatively accounted for in any change of motion due to the application of a force.	MS-PS2-1 Relate how the speed of an object affects impact during collisions and use models or data to predict how the motion of objects with different speeds are affected when they collide.	Use models to predict how the motion of objects with different speeds will be affected when the objects collide.
			3-PS2-2 Identify patterns of motion and use data to predict future motion when a pattern exists.	Use data (presented pictorially) related to the pattern of an object's motion to predict future motion.		MS-PS2-2 Identify that a force is needed to change the motion of an object and predict changes in motion of objects when they are acted on by forces of different sizes or when the objects have different masses.	Predict how the motion of an object will change when acted on by forces of different sizes or when objects have different masses.
	3-PS2-3 Identify that a magnet can exert a force on other objects without touching them and that the interaction varies based on the strength and orientation of the magnet and its distance from other magnets or metallic objects.		Recognize that, as well as many metal objects, magnets can pull other magnets toward them and can also push other magnets away (when magnets have similar poles facing each other) without touching them.	Forces that act at a distance involve fields that can be mapped by their relative strength and effect on an object.	MS-PS2-3 Sort objects based on whether they are attracted by a magnet, use data to make statements about the effect of distance on the interactions between magnets, and identify a question that could be answered by an investigation involving one or more magnets.	Use data to make statements about the effect of distance on the interactions between magnets.	
	<b>3-PS2-4 DCI Addressed in 3-PS2-3</b>		MS-PS2-4 Use models to illustrate the effect of Earth's gravity on the motion of objects and recognize the effects and interpret data of gravitational forces of two objects with very large masses.		Recognize that the force of gravity is greater between massive objects (e.g., Earth and sun).		
	5-PS2-1 Identify that gravity pulls all objects on or near Earth toward the ground and use observations to determine gravity's impact on objects.		Use observations to determine that objects, regardless of their weight, are pulled towards the ground due to Earth's gravitational force.		MS-PS2-5 Identify that like magnetic poles repel each other and unlike poles attract and use data and observations to relate the orientation of magnets and the distance between them to their behavior.	Relate the orientation of magnets and the distance between them to the behavior of the magnets.	

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PS3: Energy	PS3.A: Definitions of Energy	Moving objects contain energy. The faster the object moves, the more energy it has. Energy can be moved from place to place by moving objects, or through sound, light, or electrical currents. Energy can be converted from one form to another form.	4-PS3-1 Identify that identical objects moving at different speeds have different amounts of energy and use data to identify when the energy is the greatest or least.	Recognize that if two identical objects are moving at different speeds, then the one moving faster has more energy.	Kinetic energy can be distinguished from the various forms of potential energy. Energy changes to and from each type can be tracked through physical or chemical interactions. The relationship between the temperature and the total energy of a system depends on the types, states, and amounts of matter.	MS-PS3-1 Use data to compare the kinetic energy of objects with different masses and speeds and use graphical data to identify that kinetic energy changes as mass or speed changes.	Use mass or speed data to determine the object with the greatest kinetic energy.
			<b>MS-PS3-2 DCI is covered in MS-ESS1-2</b>			MS-PS3-3 Identify items used to keep something hot or cold by changing the rate of the transfer of heat energy and use data to identify the “tool” that is most efficient at keeping something hot or cold.	Realize that heat can be transferred.
			4-PS3-2 Identify the type of energy present in a scenario and identify that energy can move from place to place and change forms.	Identify examples of energy moving from place to place.		MS-PS3-4 Determine when an object has changed temperature due to the application or removal of heat or a change in temperature of two objects of the same material but different masses.	Use temperature data to determine the temperature changes of objects of the same material but different masses when heat is applied for a certain period of time.
			4-PS3-3* Identify that objects move due to motion energy and that the faster similar objects move, the more energy they have and that the changes in motion that occur when energy is transferred as objects collide can be predicted.	Identify that the harder/stronger the push, the farther and faster an object will move.  *4-PS3-3 crosses PS3.B and PS3.C		MS-PS3-5 Identify the kinetic energy transfer in given examples and use data or observations to predict what will happen to kinetic energy when objects collide.	Predict what will happen to the kinetic energy between two similar objects when one collides with the other.
PS3: Energy (cont.)	PS3.B: Conservation of Energy and Energy Transfer	<b>Covered within PS3.D</b>			<b>Covered within PS3.D</b>		
	PS3.C: Relationship and Forces	When objects collide, contact forces transfer energy so as to change the objects’ motions.	4-PS3-3* Identify that objects move due to motion energy and that the faster similar objects move, the more energy they have and that the changes in motion that occur when energy is transferred as objects collide can be predicted.	Identify that the harder/stronger the push, the farther and faster an object will move.  *4-PS3-3 crosses PS3.B and PS3.C	When two objects interact, each one exerts a force on the other, and these forces can transfer energy between them.	<b>Covered through MS-PS3-2</b>	
	PS3.D: Energy in Chemical Processes and Everyday Life	Energy can be “produced,” “used,” or “released” by converting stored energy. Plants capture energy from sunlight, which can later be used as fuel or food.	4-PS3-4 Identify sources and forms of energy, and/or demonstrate that devices <sup>1</sup> can be used to convert energy from one form to another for a variety of uses.  5-PS3-1 Identify that materials an animal needs for body maintenance, growth, and motion can be traced back to plants, which get energy from the sun.	Identify a missing component in a device that changes energy from one form to another.  Trace the source of the materials an animal needs for body maintenance, growth, and motion to the sun.	Sunlight is captured by plants and used in a reaction to produce sugar molecules, which can be reversed by burning those molecules to release energy.	<b>See MS-LS1-6 and MS-LS1-7</b>	

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PS4: Waves and Their Applications in Technology	PS4.A: Wave Properties	Waves are regular patterns of motion, which can be made in water by disturbing the surface. Waves of the same type can differ in amplitude and wavelength. Waves can make objects move.	4-PS4-1 Identify that the size of similar objects that fall into water changes the size of a wave and that those waves can be compared and the patterns predicted in terms of amplitude and wavelength	Compare the pattern of two waves with different amplitudes or wavelengths.	A simple wave model has a repeating pattern with a specific wavelength, frequency, and amplitude, and mechanical waves need a medium through which they are transmitted. This model can explain many phenomena including sound and light. Waves can transmit energy.	MS-PS4-1 Identify wave properties and differences in those properties by comparing wave diagrams, and use data or observations to show that a greater wave height results in greater force and impact.	Compare wave diagrams to identify differences in wavelength and amplitude.
	PS4.B: Electromagnetic Radiation	Object can be seen when light reflected from their surface enters our eyes.	4-PS4-2 Identify that light allows us to see and use models to demonstrate the reflection of light to enable sight.	Identify a model (diagram) that shows the reflection of light following a path between a light source, the object, and the eye.	The construct of a wave is used to model how light interacts with objects.	MS-PS4-2 Use observations to identify transparent, translucent, and opaque materials, recognize that light can be reflected, absorbed, or transmitted, and that the behavior of light can be described using models in these instances.	Use models to recognize that light can be reflected, absorbed, or transmitted (light passes through the object).
	PS4.C: Information Technologies and	Patterns can encode, send, receive and decode information.			Waves can be used to transmit digital information. Digitized information is comprised of a pattern of 1s and 0s.	MS-PS4-3 Identify examples of and benefits of using digital technologies for communicating and evaluate the advantages and disadvantages of various means of communication.	Identify a benefit of a digital technology used to communicate information.