

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

Revised June 18, 2021

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 Recognize that matter can appear as a solid, liquid, or gas, and/or understand 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 Recognize that all matter can be broken up into small pieces, the smallest of which are called atoms; classify molecules by their makeup and type; and/or use models to explain that atoms can combine to form molecules.	Classify molecules by make up: one type of atom or multiple types of atoms and simple or complex.
			5-PS1-2 Recognize that all matter has weight, and/or identify that total weight stays the same when materials change by melting, cooling, mixing, or reacting to form new materials.	Identify weight data that shows the total weight of matter before and after heating, cooling, or mixing materials stays the same.		MS-PS1-2 Recognize the physical and chemical properties of a substance, identify when substances have changed or formed new substances, and/or use data to explain that chemical changes involve changes in the 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, differentiate various materials based upon their properties, and/or use data to identify substances based on properties.	Differentiate substances that have different physical/chemical properties.		MS-PS1.3 Recognize common natural resources, identify materials made from those resources, and/or use information from a short passage to describe a synthetic material and its impact on society.	Identify the natural resources that are used to make a synthetic product.
			MS-PS1-4 Recognize that matter exists in various states. Understand that: 1) a material's state of matter can change when heat is added or removed, and/or 2) there are 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.			
<i>MS-PS1-5 The DCI in this PE is covered in MS-PS1-2 and MS-PS1-3</i>							
	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 Recognize one or more properties of a substance, identify properties of substances that are mixed, and/or use data to determine whether the mixing of two substances results in a chemical change.	Use data from observations to determine if 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 Recognize that chemical changes form new substances. Identify that: 1) there are sometimes changes in temperature, and/or 2) reactions that result in temperature changes can be used in the design of helpful devices.	Use presented evidence to determine if a reaction has released or absorbed thermal energy.
	PS1.C: Nuclear Process	N/A for Elementary and Middle School					

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 Recognize that a force may cause an object to move, identify a force as a push or pull that can cause an object's motion to change, and/or predict how an object's motion would change if a given force was applied.	Identify unbalanced forces as the cause of an object's movement.	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 Recognize that forces can cause motion and that the speed of an object affects impact during collisions, use models to predict how the motion of objects with different speeds is affected when they collide, and/or use data to determine how changing speed affects collisions.	Use models to predict how the motion of objects with different speeds will be affected when they collide.
			3-PS2-2 Recognize objects in motion, identify that some motion follows a pattern, and/or use data to predict future motion when a pattern exists.	Use data (presented pictorially) related to the motion of an object whose motion is following a pattern to predict future motion.		MS-PS2-2 Recognize that an object changed position due to an outside factor, identify that a force is needed to change motion, predict changes in motion of an object when it is acted on by forces of different sizes or when objects have different masses, and/or use data to draw conclusions when two objects of different masses are acted on by a series of forces. (Also see MS-PS3-1)	Predict how the motion of an object will change when acted on by forces of different sizes or when objects have different masses.
	PS2.B: Types of Interactions		3-PS2-3 Recognize objects that are affected by magnetic forces, identify that a magnet can exert a force on certain objects without touching them, identify interactions between magnets, and/or identify that the force they exert on other magnets or metallic objects varies based on the strength of the magnet and the distance between them.	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 Recognize a magnet as something that exerts an attractive force on some materials, 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/or 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.
			3-PS2-4 DCI Addressed in 3-PS2-3			MS-PS2-4 Recognize that objects fall to the ground when dropped, use models to illustrate the effect of Earth's gravity on the motion of objects, recognize that the force is greater between massive objects, and/or interpret data on the effects 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 Recognize that objects fall downward, identify that gravity causes all objects to fall toward Earth, and/or use observations to understand gravity's impact on objects and to support a claim.	Use observations to determine that objects regardless of their weight fall toward the Earth due to Earth's gravitational force.		MS-PS2-5 Recognize the poles of a magnet, identify that like poles repel each other and unlike poles attract, relate the orientation of magnets and distance between them to their behavior, and/or use data from an experiment to explain the effect of changing distance or orientation. (Gravitational forces largely addressed in MS-PS2-4)	Relates the orientation of magnets and the distance between them to the behavior of the magnets.
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 Recognize that the speed of a given object is variable, understand that similar objects moving at faster speeds have more energy, and/or use data to identify when 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	MS-PS3-1 Recognize the mass and speed of an object, use data to identify the object with the greatest/least mass and greatest/slowest speed, use mass or speed data to identify and determine the object with the greatest kinetic energy, and/or use graphical data to identify that kinetic energy changes as mass or speed changes.	Using mass or speed data to determine the object with the greatest kinetic energy.
			MS-PS3-2 The DCI is covered in MS-ESS1-2				

					depends on the types, states, and amounts of matter.	MS-PS3-3 Recognize objects as hot or cold, identify “things” used to keep something hot or cold, realize that heat can be transferred, and or 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 Recognize different forms of energy, identify the type of energy present, and/or identify that energy can move from place to place and change forms.	Identify examples of energy moving from place to place.		MS-PS3-4 Recognize sources of heat, use data to determine when an object changed temperature due to the application of heat, use data to determine the change in temperature of two objects of the same material but different masses when heat is applied, and/or draw conclusions when cool objects of the same material but different masses are placed in hot water. (Also see MS-PS3-3.)	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* Recognize that a stationary object may move when hit by a moving object, identify that objects move due to motion energy, ¹ identify that the faster similar objects move, the more energy they have, and/or predict the changes in motion that occur when energy is transferred as objects collide.	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 Recognize that the kinetic energy of an object can change, identify the kinetic energy transfer in presented examples, predict what will happen to kinetic energy when objects collide, and/or use data to describe energy transfer in a given situation.	Predict what will happen to the kinetic energy between two similar objects when one collides with the other.
	PS3.B: Conservation of Energy and Energy Transfer	Covered within PS3.D			Covered within PS3.D		
	PS3.C: Relationship and Forces	When objects collide, contact forces transfer energy so as to change the objects’ motions.	4-PS3-3* Recognize that a stationary object may move when hit by a moving object, identify that objects move due to motion energy, ¹ identify that the faster similar objects move, the more energy they have, and/or predict the changes in motion that occur when energy is transferred as objects collide.	Predict the motion of a stationary object when a moving object collides with it. (Exceeds level) *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.	Covered through MS-PS3-2	
	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 ¹ can be used to convert energy from one form to another for a variety of uses.	Identify a missing component in a device that changes energy from one form to another.	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.	See MS-LS1-6 and MS-LS1-7	
			5-PS3-1 Recognize that all animals need food for energy, and/or understand that materials an animal needs for body maintenance, growth, and motion can be traced back to plants, which get energy from the sun.	Trace the source of the materials an animal needs for body maintenance, growth, and motion to the sun.			

	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 Recognize that objects falling in water can cause waves, identify that the size of an object changes the size of a wave, compare waves in terms of amplitude and wavelength, and/or make predictions based on a wave's regular pattern of motion.	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 Recognize examples of waves, identify a wave property, compare wave diagrams to identify differences in wavelength and amplitude, and/or use data to show that a greater wave height results in greater force and wave 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 Recognize sources of light, identify that light allows us to see, and/or use a model to demonstrate the reflection of light to enable sight.	Identify a model 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 Recognize that light travels through some materials and not others; use observations to identify transparent materials; and/or use models to identify that light can be reflected, absorbed, or transmitted and describe the behavior of light 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 Instrumentation	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 Recognize different means of communication; identify examples of digital technologies and identify a benefit of digital technology; and/or evaluate the advantages and disadvantages of various means of communication, given a short passage.	Identify a benefit of a digital technology used to communicate information.