

Strand 1: Properties and Principles of Matter and Energy

1. Changes in properties and states of matter provide evidence of the atomic theory of matter.					
		GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
A Objects, and the materials they are made of, have properties that can be used to describe and classify them.	A	<p>Physical Properties of Matter</p> <p>PP1.1. Explore physical properties of objects. a. Recognize that objects have specific properties (i.e., size, shape, color, and/or weight). b. Using one or more of the five senses, explore the physical properties of different objects (e.g., Identify one physical property of an object – “The ball is round”; “It is red.”; “The box is big.”; “The feather is light.”).</p> <p>Identify physical properties of objects.</p> <p>PP1.2. Investigate common materials. a. Identify different materials (e.g., cloth, paper, wood, and rock). b. Using one or more of the five senses, explore properties of different materials (e.g., color, shiny/dull, smell, sound, and/or taste).</p>	<p>Physical Properties of Matter</p> <p>PP1.1. Explore physical properties of objects. a. Recognize that objects have specific properties (i.e., size, shape, color, weight, smell, texture, and/or temperature). b. Using one or more of the five senses, explore the physical properties of different objects (e.g., identify one physical property of an object—the ball is round; It is red; The box is big; the ice cube is cold; the surface is rough; the feather is light).</p> <p>Identify physical properties of objects.</p> <p>PP1.2. Investigate common materials. a. Identify different materials (e.g., cloth, paper, wood, rock). b. Using one or more of the five senses, explore properties of different materials (e.g., color, texture, shiny/dull, smell, sound, taste, hard/soft, and/or temperature).</p> <p>PP1.4. Match objects. a. Using one physical property (e.g., leaf shapes, size of rocks). b. Using one or more physical properties.</p> <p>PP1.5. Sort objects into groups based on one physical property (i.e., size, shape, color weight, smell, texture).</p> <p>Properties of Matter: Mass and Volume</p> <p>PP1.6. Compare objects using one physical property. a. Using simple tools (i.e., equal arm balance, magnifier, ruler, and/or magnet), compare the physical properties of different objects (e.g., using an equal arm balance, compare the weight of different objects). b. Compare the size (the amount of space an object occupies) of objects (e.g., will the container hold all the water?).</p>	<p>Physical Properties of Matter</p> <p>PP1.1. Explore physical properties of objects. a. Recognize that objects have specific properties (i.e., size, shape, color, weight, smell, texture, and/or temperature). b. Using one or more of the five senses, explore the physical properties of different objects (e.g., identify one physical property of an object—the ball is round; It is red; The box is big; the ice cube is cold; the surface is rough; the feather is light).</p> <p>Identify physical properties of objects.</p> <p>PP1.2. Investigate common materials. a. Identify different materials (e.g., cloth, paper, wood, rock). b. Using one or more of the five senses, explore properties of different materials (e.g., color, texture, shiny/dull, smell, sound, taste, hard/soft, and/or temperature).</p> <p>PP1.4. Match objects. a. Using one physical property (e.g., leaf shapes, size of rocks). b. Using one or more physical properties.</p> <p>PP1.5. Sort objects into groups based on one physical property (i.e., size, shape, color weight, smell, texture). a. Sort objects into groups based on one or more physical properties.</p> <p>Properties of Matter: Mass and Volume</p> <p>PP1.6. Compare objects using one physical property. a. Using simple tools (i.e., equal arm balance, magnifier, ruler, and/or magnet), compare the physical properties of different objects (e.g., using an equal arm balance, compare the weight of different objects). b. Compare the size (the amount of space an object occupies) of objects (e.g., will the container hold all the water?). c. Compare objects using one or more physical properties.</p>	<p>Physical Properties of Matter</p> <p>PP1.1. Explore physical properties of objects. a. Recognize that objects have specific properties (i.e., size, shape, color, weight, smell, texture, and/or temperature). b. Using one or more of the five senses, explore the physical properties of different objects (e.g., identify one physical property of an object—the ball is round; It is red; The box is big; the ice cube is cold; the surface is rough; the feather is light). c. Identify physical properties of objects.</p> <p>Identify physical properties of objects.</p> <p>PP1.2. Investigate common materials. a. Identify different materials (e.g., cloth, paper, wood, rock). b. Using one or more of the five senses, explore properties of different materials (e.g., color, texture, shiny/dull, smell, sound, taste, hard/soft, and/or temperature).</p> <p>PP1.3. Describe physical properties of objects.</p> <p>PP1.4. Match objects. a. Using one physical property (e.g., leaf shapes, size of rocks). b. Using one or more physical properties. c. Using two or more physical properties.</p> <p>PP1.5. Sort objects into groups based on one physical property (i.e., size, shape, color, weight, smell, texture). a. Sort objects into groups based on one or more physical properties. b. Sort objects into groups based on two or more physical properties.</p> <p>Properties of Matter: Mass and Volume</p> <p>PP1.6. Compare objects using one physical property. a. Using simple tools (i.e., equal arm balance, magnifier, ruler, and/or magnet), compare the physical properties of different objects (e.g., using an equal arm balance, compare the weight of different objects). b. Compare the size (the amount of space an object occupies) of objects (e.g., will the container hold all the water?). c. Compare objects using one or more physical properties. d. Compare objects using two or more physical properties.</p>

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1. Changes in properties and states of matter provide evidence of the atomic theory of matter. (continued)				
GRADES K–2		GRADES 3–5	GRADES 6–8	GRADES 9–12
A	Objects, and the materials they are made of, have properties that can be used to describe and classify them.	<p>PP1.7. Order objects.</p> <p style="margin-left: 20px;">a. according to weight.</p> <p style="margin-left: 20px;">b. according size/volume.</p>	<p>PP1.7. Order objects.</p> <p style="margin-left: 20px;">a. according to weight.</p> <p style="margin-left: 20px;">b. according to size/volume.</p> <p style="margin-left: 20px;">c. according to temperature.</p>	<p>PP1.7. Order objects.</p> <p style="margin-left: 20px;">a. according to weight/mass.</p> <p style="margin-left: 20px;">b. according to size/volume.</p> <p style="margin-left: 20px;">c. according to temperature.</p>
		<p>PP1.8. Measure objects using one physical property.</p> <p style="margin-left: 20px;">a. Measure the weight of objects.</p> <p style="margin-left: 20px;">b. Measure the amount of liquids using a measuring device.</p>	<p>PP1.8. Measure objects using one physical property.</p> <p style="margin-left: 20px;">a. Measure the weight of objects.</p> <p style="margin-left: 20px;">b. Measure the amount of liquids using a measuring device.</p> <p style="margin-left: 20px;">c. Measure the volume of liquids and/or solids (e.g., using different measuring devices; using displacement—submerge solids into a liquid).</p> <p style="margin-left: 20px;">d. Measure the temperature.</p>	<p>PP1.8. Measure objects using one physical property.</p> <p style="margin-left: 20px;">a. Measure the weight of objects.</p> <p style="margin-left: 20px;">b. Measure the amount of liquids using a measuring device.</p> <p style="margin-left: 20px;">c. Measure the volume of liquids and/or solids (e.g., using different measuring devices; using displacement—submerge solids into a liquid).</p> <p style="margin-left: 20px;">d. Measure the temperature.</p>
			<p>Mixtures and Solutions</p>	<p>Mixtures and Solutions</p>
			<p>PP1.9. Identify that objects as “one kind of material” or a mixture (made up of two or more different kinds of material).</p>	<p>PP1.9. Identify that objects as “one kind of material” or a mixture (made up of two or more different kinds of material).</p>
			<p>PP1.10. Identify no two objects can occupy the same space at the same time (e.g., water level rises when an object or substance, such as a rock, is placed in a glass of water).</p>	<p>PP1.10. Identify that no two objects can occupy the same space at the same time (e.g., water level rises when an object or substance, such as a rock, is placed in a glass of water).</p>
			<p>PP1.11. Investigate that objects float or sink in water (e.g., placing a piece of wood and a piece of metal in a glass of water).</p>	<p>PP1.11. Investigate that objects float or sink in water (e.g., placing a piece of wood and a piece of metal in a glass of water).</p> <p style="margin-left: 20px;">a. Compare objects that float or sink in water (e.g., placing a piece of wood and a piece of metal in a glass of water).</p> <p style="margin-left: 20px;">b. Identify that matter takes up space and may have weight.</p>
				<p>PP1.12. Describe objects as “one kind of material” or a mixture.</p>

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1. Changes in properties and states of matter provide evidence of the atomic theory of matter.					
		GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
Properties of mixtures depend upon the concentrations, properties, and interactions of particles.	B	Properties of Mixtures	Properties of Mixtures	Properties of Mixtures	Properties of Mixtures
		<p>PP2.1. Investigate mixtures.</p> <p>a. Identify a mixture (e.g., cheerios and a bag of multi-colored M&Ms).</p> <p>b. Observe how mixtures are made by combining solids (e.g., trail mixes).</p> <p>PP2.3 Investigate ways to separate the components of a mixture by one physical property (e.g., sorting different rocks by size, sand sifting).</p>	<p>PP2.1. Investigate mixtures.</p> <p>a. Identify a mixture (e.g., Cheerios and a bag of multi-colored M&Ms).</p> <p>b. Observe how mixtures are made by combining solids (e.g., trail mixes).</p> <p>PP2.2. Identify mixtures.</p> <p>a. Identify how mixtures are made by combining solids, liquids, and/or combinations of both (e.g., cooking, making kool-aid, making soil, different colored liquids, sand/water).</p> <p>b. Identify the components in a mixture (e.g., trail mix, conglomerate rock, salad).</p> <p>PP2.3. Investigate ways to separate the components of a mixture by one physical property (e.g., sorting different rocks by size, sand sifting).</p> <p>PP2.4. Identify ways to separate the components of a mixture by one physical property (e.g., magnets and, screening; using a colander to separate water and spaghetti).</p> <p>PP2.5. Experiment with how various solids mix with water.</p> <p>a. Experiment with solids that float in water (e.g. wood, ice, plastic toys).</p> <p>b. Experiment with solids that sink in water (e.g., rocks, metals, glass marbles).</p>	<p>PP2.1. Investigate mixtures.</p> <p>a. Identify a mixture (e.g., cheerios and a bag of multi-colored M&Ms).</p> <p>b. Observe how mixtures are made by combining solids (e.g., trail mixes).</p> <p>PP2.2. Identify mixtures.</p> <p>a. Identify how mixtures are made by combining solids, liquids, and/or combinations of both (e.g., cooking, making kool-aid, making soil, mixing different colored liquids, mixing sand with water).</p> <p>b. Identify the components in mixture (e.g., trail mix, conglomerate rock, salad).</p> <p>c. Describe mixtures.</p> <p>d. Describe how mixtures are made.</p> <p>e. Compare between the components in a mixture (e.g., chocolate chip cookies, ingredients in a salad).</p> <p>PP2.3. Investigate ways to separate the components of a mixture by one physical property (e.g., sorting different rocks by size, sand sifting).</p> <p>PP2.4. Identify ways to separate the components of a mixture by one physical property (e.g., magnets and, screening; using a colander to separate water and spaghetti).</p> <p>a. Compare ways to separate the components of a mixture by one physical property (e.g., picking up spaghetti by hand versus using different tools such as forks, spoons, and tongs).</p> <p>PP2.5. Experiment with how various solids mix with water.</p> <p>a. Experiment with solids that float in water (e.g. wood, ice, plastic toys).</p> <p>b. Experiment with solids that sink in water (e.g., rocks, metals, glass marbles).</p> <p>c. Identify how various solids mix with water.</p>	<p>PP2.1. Investigate mixtures.</p> <p>a. Identify a mixture (e.g., Cheerios and a bag of multi-colored M&Ms).</p> <p>b. Observe how mixtures are made by combining solids (e.g., trail mixes).</p> <p>PP2.2. Identify mixtures.</p> <p>a. Identify how mixtures are made by combining solids, liquids, and/or combinations of both (e.g., cooking, making kool-aid, making soil, mixing different colored liquids, mixing sand with water).</p> <p>b. Identify the components in a mixture (e.g., trail mix, conglomerate rock, salad).</p> <p>c. Describe mixtures.</p> <p>d. Describe how mixtures are made.</p> <p>e. Compare between the components in a mixture (e.g., chocolate chip cookies, ingredients in salad).</p> <p>PP2.3. Investigate ways to separate the components of a mixture by one physical property (e.g., sorting different rocks by size, sand sifting).</p> <p>PP2.4. Identify ways to separate the components of a mixture by one physical property (e.g., magnets and, screening; using a colander to separate water and spaghetti).</p> <p>a. Compare ways to separate the components of a mixture by one physical property (e.g., picking up spaghetti by hand versus using different tools such as forks, spoons, and tongs).</p> <p>b. Describe ways to separate the components of a mixture by one physical property (e.g., filtration, and/or evaporation).</p> <p>PP2.5. Experiment with how various solids mix with water.</p> <p>a. Experiment with solids that float in water (e.g. wood, ice, plastic toys).</p> <p>b. Experiment with solids that sink in water (e.g., rocks, metals, glass marbles).</p> <p>c. Identify how various solids mix with water.</p> <p>d. Describe how various solids mix with water.</p> <p>e. Predict which solids will sink or float in water.</p>

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		GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
Properties of mixtures depend upon the concentrations, properties, and interactions of particles.	B		<p>Properties of Solutions</p> <p>PP2.6. Explore different solutions (e.g., Kool-Aid, lemonade, iced tea).</p> <p>PP2.7. Investigate the properties of each component in a mixture/solution (e.g. oil and vinegar do not form solutions; salt and water form solutions).</p>	<p>Properties of Solutions</p> <p>PP2.6. Explore different solutions (e.g., Kool-Aid, lemonade, iced tea).</p> <p style="padding-left: 20px;">a. Compare different solutions using their physical properties (e.g., color, smell, and/or taste).</p> <p>PP2.7. Investigate the properties of each component in a mixture/solution (e.g., oil and vinegar do not form solutions; salt and water form solutions).</p> <p>PP2.8. Compare the properties of each component in a mixture/solution (e.g. oil and vinegar are both liquids; sand is a solid; and water is a liquid).</p> <p>PP2.9 Recognize water as a liquid that dissolves some materials (e.g., sugar disappears in a glass of water; sand does not dissolve in water).</p> <p>PP2.10. Investigate diluted or concentrated solutions.</p> <p style="padding-left: 20px;">a. Using one or more of the five senses, compare solutions with different concentration (e.g., salt, saltier; sugar, sweeter; vinegar, smellier; fruit punch mix, redder).</p>	<p>Properties of Solutions</p> <p>PP2.6. Explore different solutions (e.g., Kool-Aid, lemonade, iced tea).</p> <p style="padding-left: 20px;">a. Compare different solutions using their physical properties (e.g., color, smell, and/or taste).</p> <p style="padding-left: 20px;">b. Describe different solutions using their physical properties.</p> <p>PP2.7. Investigate the properties of each component in mixture/solution (e.g., oil and vinegar do not form solutions; salt and water form solutions).</p> <p>PP2.8. Compare the properties of each component in a mixture/solution (e.g., oil and vinegar are both liquids; sand is a solid; water is a liquid).</p> <p style="padding-left: 20px;">a. Describe the properties of each component in a mixture/solution.</p> <p>PP2.9. Recognize water as a liquid that dissolves some materials (e.g., sugar disappears in a glass of water; sand does not dissolve in water).</p> <p style="padding-left: 20px;">a. Describe water as a liquid that dissolves some materials.</p> <p>PP2.10. Investigate diluted or concentrated solutions.</p> <p style="padding-left: 20px;">a. Using one or more of the five senses, compare solutions with different concentration (e.g., salt, saltier; sugar, sweeter; vinegar, smellier; fruit punch mix, redder).</p> <p>PP2.11. Describe diluted or concentrated solutions.</p> <p style="padding-left: 20px;">a. Order solutions with different concentrations (e.g., add different numbers of food coloring drops in three identical glasses of water).</p> <p>PP2.12. Investigate ways that affect how fast substances dissolve in water (solubility).</p> <p style="padding-left: 20px;">a. Investigate how temperature affects solubility (e.g., stir in the same amount of sugar in three glasses of water with different temperatures).</p> <p style="padding-left: 20px;">b. Investigate how the rate of stirring affects solubility (i.e., the faster you stir, the faster it dissolves).</p>

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1. Changes in properties and states of matter provide evidence of the atomic theory of matter.				
GRADES K–2		GRADES 3–5		GRADES 6–8
Physical changes in the state of matter that result from thermal changes can be explained by the kinetic theory of matter.	D	States of Matter		
	<p>States of Matter</p> <p>PP3.1. Explore states of matter.</p> <p>a. Explore solids (e.g., rocks, ice, metal).</p> <p>b. Explore liquids (e.g., water, oil).</p> <p>c. Explore gases (e.g., air, bubbles, helium).</p>	<p>States of Matter</p> <p>PP3.1. Explore states of matter.</p> <p>a. Explore solids (e.g., rocks, ice, metal).</p> <p>b. Explore liquids (e.g., water, oil).</p> <p>c. Explore gases (e.g., air, bubbles, helium).</p> <p>PP3.2. Identify states of matter.</p> <p>a. Identify solids.</p> <p>b. Identify liquids.</p> <p>c. Identify gases (e.g., steam, air, bubbles, helium).</p> <p>PP3.3. Observe different states of matter (e.g., solids have definite shape and volume; liquids have definite volume but shape changes to fit the container; balloon; soda).</p> <p>PP3.4. Identify matter as solid or liquid from everyday examples (e.g., Ice is a solid; water is a liquid).</p>	<p>States of Matter</p> <p>PP3.1. Explore states of matter.</p> <p>a. Explore solids (e.g., rocks, ice, metal).</p> <p>b. Explore liquids (e.g., water, oil).</p> <p>c. Explore gases (e.g., air, bubbles, helium).</p> <p>PP3.2. Identify states of matter.</p> <p>a. Identify solids.</p> <p>b. Identify liquids.</p> <p>c. Identify gases (e.g., steam, air, bubbles, helium).</p> <p>PP3.3. Observe different states of matter (e.g., solids have definite shape and volume; liquids have definite volume but shape changes to fit the container; balloon; soda).</p> <p>a. Compare different states of matter (e.g., gases have no definite volume and shape; liquids and solids are visible; gases are invisible).</p> <p>PP3.4. Identify matter as solid or liquid from everyday examples (e.g., Ice is a solid; water is a liquid).</p> <p>PP3.5. Identify matter as gas from everyday examples (e.g., blowing up a balloon).</p>	<p>States of Matter</p> <p>PP3.1. Explore states of matter.</p> <p>a. Explore solids (e.g., rocks, ice, metal).</p> <p>b. Explore liquids (e.g., water, oil).</p> <p>c. Explore gases (e.g., air, bubbles, helium).</p> <p>PP3.2. Identify states of matter.</p> <p>a. Identify solids.</p> <p>b. Identify liquids.</p> <p>c. Identify gases (e.g., steam, air, bubbles, helium).</p> <p>PP3.3. Observe different states of matter (e.g., solids have definite shape and volume; liquids have definite volume but shape changes to fit the container; balloon; soda).</p> <p>a. Compare different states of matter (e.g., gases have no definite volume and shape; liquids and solids are visible; gases are invisible).</p> <p>b. Describe different states of matter.</p> <p>PP3.4. Identify matter as solid or liquid from everyday examples (e.g., Ice is a solid; water is a liquid).</p> <p>PP3.5. Identify matter as gas from everyday examples (e.g., blowing up a balloon).</p> <p>a. Classify matter as solid, liquid, or gas from everyday examples using physical properties (e.g., volume, shape, ability to flow).</p>
		Phase Changes of Matter		
	<p>PP3.6. Identify matter changes from one state to another.</p> <p>a. Identify solids can change to liquids (melting).</p> <p>b. Identify liquids can change to solids (freezing).</p> <p>PP3.7. Identify everyday examples of the water cycle of matter changing in state.</p> <p>c. Melting (e.g., ice cube melts; butter melts; snow melts into water).</p> <p>d. Freezing (e.g., Kool -Aid freezes into a popsicle; water droplets freezes into ice or sleet).</p>	<p>Phase Changes of Matter</p> <p>PP3.6. Identify matter changes from one state to another.</p> <p>a. Identify that solids can change to liquids (melting).</p> <p>b. Identify that liquids can change to solids (freezing).</p> <p>c. Identify that liquids can change to gas (evaporation).</p> <p>d. Identify that gas can change to liquid (condensation).</p> <p>PP3.7. Identify everyday examples of the water cycle of matter changing in state.</p> <p>a. Melting (e.g., ice cube melts; butter melts; snow melts into water).</p> <p>b. Freezing (e.g., Kool-Aid freezes into a popsicle; water droplets freezes into ice or sleet).</p> <p>c. Evaporation (e.g., leave a glass of water by the window and observe and measure the amount of water every day; water bubbles as water boils; a puddle of water evaporates into the air).</p>	<p>Phase Changes of Matter</p> <p>PP3.6. Identify that matter changes from one state to another.</p> <p>a. Identify that solids can change to liquids (melting).</p> <p>b. Identify that liquids can change to solids (freezing).</p> <p>c. Identify that liquids can change to gas (evaporation).</p> <p>d. Identify that gas can change to liquid (condensation).</p> <p>PP3.7. Identify everyday examples of the water cycle of matter changing in state.</p> <p>a. Melting (e.g., ice cube melts; butter melts; snow melts into water).</p> <p>b. Freezing (e.g., Kool-Aid freeze into a popsicle; water and droplets freeze into ice or sleet).</p> <p>c. Evaporation (e.g., leave a glass of water by the window and observe and measure the amount of water every day; water bubbles as water boils; a puddle of water evaporates into the air).</p>	

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1. Changes in properties and states of matter provide evidence of the atomic theory of matter. (continued)				
	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
D			<p>d. Condensation (e.g., water condenses into droplets on a glass of ice-cold lemonade; breathing on a window on a cold winter day fogs the window; water vapor condenses and form clouds).</p> <p>PP3.8. Compare the changes in physical properties of water (i.e., shape, volume) when frozen or melted.</p> <p>Heat and Temperature</p> <p>PP3.9. Identify how solids melt matter changes in state.</p> <p>a. Identify how solids melt by heating (e.g., butter melts in a warm pot).</p> <p>b. Identify how liquids freeze by cooling (e.g., water freezes inside a freezer).</p>	<p>d. Condensation (e.g., water condenses into droplets on a glass of ice-cold lemonade; breathing on a window on a cold winter day fogs the window; water vapor condenses and form clouds).</p> <p>PP3.8. Compare the changes in physical properties of water (i.e., shape, volume) when frozen or melted.</p> <p>a. Describe the changes in physical properties of water.</p> <p>Heat and Temperature</p> <p>PP3.9. Identify how solids melt matter changes in state.</p> <p>a. Identify how solids melt by heating (e.g., butter melts in a warm pot).</p> <p>b. Identify how liquids freeze by cooling (e.g., water freezes inside a freezer).</p> <p>c. Identify how liquids evaporate by heating (e.g., observe bubbles rising as water is boiling in a pot).</p> <p>d. Identify how gases condense by cooling (e.g., place a glass full of ice cubes over a boiling pot and observe water droplets forming).</p> <p>PP3.10. Predict the effect of heat and temperature on objects and materials (e.g., when wax is heated, it turns from a solid to a liquid).</p>

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		GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
Properties of objects and states of matter can change chemically and/or physically.	G	Not assessed at this level	<p>Physical Change</p> <p>PP4.1. Experiment with physical changes in common objects.</p> <p style="padding-left: 20px;">a. Experiment with changes in shape as physical changes (e.g., bending a piece of wire; cutting a piece of paper).</p>	<p>Physical Change</p> <p>PP4.1. Experiment with physical changes in common objects.</p> <p style="padding-left: 20px;">a. Experiment with changes in shape as physical changes (e.g., bending a piece of wire, cutting a piece of paper).</p> <p>PP4.2. Identify physical changes in common objects.</p> <p style="padding-left: 20px;">a. Identify mixtures as physical changes (e.g. mixing salt and sand, mixing salt and water).</p> <p style="padding-left: 20px;">b. Identify phase changes as physical changes (e.g., melting ice into water).</p> <p style="text-align: center;">Chemical Change</p> <p>PP4.3. Experiment with chemical changes (i.e., cooking; baking; burning; and/or rusting).</p>	<p>Physical Change</p> <p>PP4.1. Experiment with physical changes in common objects.</p> <p style="padding-left: 20px;">a. Experiment with changes in shape as physical changes (e.g., bending a piece of wire, cutting a piece of paper).</p> <p>PP4.2. Identify physical changes in common objects.</p> <p style="padding-left: 20px;">a. Identify mixtures as physical changes (e.g., mixing salt and sand, mixing salt and water).</p> <p style="padding-left: 20px;">b. Identify phase changes as physical changes (e.g., melting ice into water).</p> <p style="padding-left: 20px;">c. Describe physical changes in common objects.</p> <p style="padding-left: 20px;">d. Describe changes in shape as physical changes.</p> <p style="padding-left: 20px;">e. Describe mixtures as physical changes (e.g., recovering salt from salt water—evaporation).</p> <p style="padding-left: 20px;">f. Describe phase changes as physical changes (e.g. melting ice into water and freezing it back to ice).</p> <p style="text-align: center;">Chemical Change</p> <p>PP4.3. Experiment with chemical changes (i.e., Cooking, baking, burning and/or rusting).</p> <p style="padding-left: 20px;">a. Identify chemical changes.</p> <p style="padding-left: 20px;">b. Recognize that a new substance is formed during chemical change (e.g., baking a cake, mixing baking soda with vinegar, putting an Alka-Seltzer tablet in a bottle of water and closing the cap).</p> <p style="padding-left: 20px;">c. Identify everyday examples as chemical and/or physical changes (e.g., compare cake mix and baking; compare mixing/cutting vegetables and cooking vegetables).</p>

Strand 1: Properties and Principles of Matter and Energy

1. Changes in properties and states of matter provide evidence of the atomic theory of matter.				
	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
I	Not assessed at this level.	Not assessed at this level.	<p>Conservation of Matter</p> <p>PP5.1. Investigate that the total weight of a material remains constant whether it is together, in parts, or in a different state of matter (e.g., weigh 2 sets of 10 M & Ms individually and compare with the total weight of 20 M & Ms; place a candy bar inside a storage bag, and weigh the bag before and after the candy bar is crushed into many pieces).</p>	<p>Conservation of Matter</p> <p>PP5.1. Investigate that the total weight of a material remains constant whether it is together, in parts, or in a different state of matter (e.g., weigh two sets of 10 M&Ms individually and compare with the total weight of 20 M&Ms; place a candy bar inside a storage bag, and weigh the bag before and after the candy bar is crushed into many pieces).</p> <p>PP5.2. Identify that weight of water remains constant as it changes state as evidenced in a closed container (e.g., weigh a bottle of water before and after it freezes).</p> <p>PP5.3. Identify that weight is conserved before and after a physical change (e.g., measure the mass of a piece of paper before and after the paper has been cut into pieces; weigh a bottle of water before and after it freezes).</p>
Mass is conserved during any physical or chemical change.				

Strand 1: Properties and Principles of Matter and Energy

2. Energy has a source, can be transferred, and can be transformed into various forms but is conserved between and within systems.				
GRADES K–2		GRADES 3–5		GRADES 6–8
A Forms of energy have a source, a means of transfer (work and heat), and a receiver.	Sound Energy	Sound Energy	Sound Energy	Sound Energy
	<p>PP6.1. Investigate sound.</p> <p>a. Investigate sound energy using one or more of the five senses (e.g., observing rubber band moving back and forth after being plucked, feeling drums vibrate, feeling cell phones vibrate, see salt moves on vibrating drums).</p> <p>b. Investigate the sounds in everyday life (e.g., alarms, car horns, animals, machines, musical instruments).</p> <p>PP6.2. Investigate the properties of sound.</p> <p>a. Investigate different loudness (i.e., soft, loud).</p> <p>b. Investigate different pitches (i.e., high, low) (e.g., rubber bands getting tighter; blowing across a bottle opening with different amounts of water; xylophone; wind chime).</p> <p>c. Investigate rhythm (i.e., slow, fast).</p>	<p>PP6.1. Investigate sound.</p> <p>a. Investigate sound energy using one or more of the five senses (e.g., observing rubber band moving back and forth after being plucked, feeling drums vibrate, feeling cell phones vibrate, see salt moves on vibrating drums).</p> <p>b. Investigate the sounds in everyday life (e.g., alarms, car horns, animals, machines, musical instruments).</p> <p>c. Identify sound as vibrations (e.g., feeling a vibration by touching a tuning fork after being struck).</p> <p>d. Identify the sounds and their source of vibrations in everyday life.</p> <p>e. Identify sound as a form of energy (e.g., hitting a drum; striking a guitar string).</p> <p>PP6.2. Investigate the properties of sound.</p> <p>a. Investigate different loudness (i.e., soft, loud).</p> <p>b. Investigate different pitches (i.e., high, low) (e.g., rubber bands getting tighter; blowing across a bottle opening with different amounts of water; xylophone; wind chime).</p> <p>c. Investigate rhythm (i.e., slow, fast).</p> <p>PP6.3. Identify the properties of sound.</p> <p>a. Identify different loudness.</p> <p>b. Identify different pitches.</p> <p>c. Identify rhythm.</p> <p>PP6.5. Identify that the ear serves as a receiver of sound.</p>	<p>PP6.1. Investigate sound.</p> <p>a. Investigate sound energy using one or more of the five senses (e.g., observing a rubber band moving back and forth after it is plucked, feeling drums vibrate, feeling cell phones vibrate, seeing salt move on a vibrating drums).</p> <p>b. Investigate the sounds in everyday life (e.g., alarms, car horns, animals, machines, musical instruments).</p> <p>c. Identify sound as vibrations (e.g., feeling the vibration of a tuning fork after it is struck).</p> <p>d. Identify the sounds and their source of vibrations in everyday life.</p> <p>e. Identify sound as a form of energy (e.g., hitting a drum, striking a guitar string).</p> <p>PP6.2. Investigate the properties of sound.</p> <p>a. Investigate different loudness (i.e., soft, loud).</p> <p>b. Investigate different pitches (i.e., high, low) (e.g., rubber bands getting tighter; blowing across a bottle opening with different amounts of water, using a xylophone, using a wind chime).</p> <p>c. Investigate rhythm (i.e., slow, fast).</p> <p>PP6.3. Identify the properties of sound.</p> <p>a. Identify different loudness.</p> <p>b. Identify different pitches.</p> <p>c. Identify rhythm.</p> <p>PP6.4. Compare the properties of sound</p> <p>a. Compare different loudness (i.e., softer, louder).</p> <p>b. Compare different pitches (i.e., higher, lower).</p> <p>c. Compare rhythm (i.e., slower, faster).</p> <p>d. Identify rhythm has a pattern that repeats.</p> <p>PP6.5. Identify that the ear serves as a receiver of sound.</p>	<p>PP6.1. Investigate sound.</p> <p>a. Investigate sound energy using one or more of the five senses (e.g., observing a rubber band moving back and forth after it is plucked, feeling drums vibrate, feeling cell phones vibrate, seeing salt move on a vibrating drums).</p> <p>b. Investigate the sounds in everyday life (e.g., alarms, car horns, animals, machines, musical instruments).</p> <p>c. Identify sound as vibrations (e.g., feeling the vibration of a tuning fork after it is struck).</p> <p>d. Identify the sounds and their source of vibrations in everyday life.</p> <p>e. Identify sound as a form of energy (e.g., hitting a drum, striking a guitar string).</p> <p>f. Describe sound.</p> <p>g. Describe the sounds and their source of vibrations in everyday life.</p> <p>h. Describe sound as a form of energy.</p> <p>PP6.2. Investigate the properties of sound.</p> <p>a. Investigate different loudness (i.e., soft, loud).</p> <p>b. Investigate different pitches (i.e., high, low) (e.g., rubber bands getting tighter; blowing across a bottle opening with different amounts of water, using a xylophone, using a wind chime).</p> <p>c. Investigate rhythm (i.e., slow, fast).</p> <p>PP6.3. Identify the properties of sound.</p> <p>a. Identify different loudness.</p> <p>b. Identify different pitches.</p> <p>c. Identify rhythm.</p> <p>PP6.4. Compare the properties of sound.</p> <p>a. Compare different loudness (i.e., softer, louder).</p> <p>b. Compare different pitches (i.e., higher, lower).</p> <p>c. Compare rhythm (i.e., slower, faster).</p> <p>d. Identify rhythm has a pattern that repeats.</p> <p>e. Describe the properties of sound.</p> <p>f. Describe ways to change the loudness of a sound (e.g., hitting a drum harder to produce a louder sound).</p> <p>g. Describe ways to change the pitches of a sound (e.g., making the rubber band tighter to make a higher-pitched sound).</p> <p>h. Describe ways to change the rhythm by changing the beat and the pattern.</p> <p>PP6.5. Identify that the ear serves as a receiver of sound.</p>

Strand 1: Properties and Principles of Matter and Energy

2. Energy has a source, can be transferred, and can be transformed into various forms but is conserved between and within systems.					
		GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
A	Forms of energy have a source, a means of transfer (work and heat), and a receiver.		<p>Heat Energy</p> <p>PP6.6. Identify sound travels through air.</p> <p>PP6.7. Identify sound travels through different mediums (i.e., air, water, solids).</p> <p>PP6.8. Investigate heat and temperature.</p> <ol style="list-style-type: none"> a. Investigate the source of energy that causes an increase in temperature of an object (e.g., Sun, stove, flame, light bulb). b. Compare the temperature of objects (i.e., warmer or cooler) by touch. c. Identify sources of heat energy (e.g., Sun, stove, flame). d. Compare the temperature of objects (i.e., warmer or cooler) by touch. 	<p>Heat Energy</p> <p>PP6.6. Identify that sound travels through air.</p> <p>PP6.7. Identify that sound travels through different mediums (i.e., air, water, solids).</p> <p>PP6.8. Investigate heat and temperature.</p> <ol style="list-style-type: none"> a. Investigate the source of energy that causes an increase in the temperature of an object (e.g., sun, stove, flame, light bulb). b. Identify the source of energy that causes an increase in the temperature of an object. c. Compare the sources of energy that cause an increase in the temperature of objects (e.g., sun, stove, flame, light bulb). d. Compare the temperature of objects (i.e., warmer or cooler) by touch. e. Compare the temperature of objects by using a simple thermometer. f. Identify sources of heat energy (e.g., sun, stove, flame). g. Identify sources of heat energy that can cause solids to change to liquids, and liquids to change to gas. h. Identify heat as a form of energy. i. Identify materials as heat conductors (e.g., metals). j. Identify materials as heat insulators (e.g., oven mitten, wood, plastic, ceramic). 	<p>Heat Energy</p> <p>PP6.6. Identify that sound travels through air.</p> <p>PP6.7. Identify that sound travels through different mediums (i.e., air, water, solids).</p> <p>PP6.8. Investigate heat and temperature.</p> <ol style="list-style-type: none"> a. Investigate the source of energy that causes an increase in the temperature of an object (e.g., sun, stove, flame, light bulb). b. Identify the source of energy that causes an increase in the temperature of an object. c. Compare the sources of energy that cause an increase in the temperature of objects (e.g., sun, stove, flame, light bulb). d. Compare the temperature of objects (i.e., warmer or cooler) by touch. e. Compare the temperature of objects by using a simple thermometer. f. Identify sources of heat energy (e.g., sun, stove, flame). g. Identify sources of heat energy that can cause solids to change to liquids, and liquids to change to gas. h. Identify heat as a form of energy. i. Identify materials as heat conductors (e.g., metals). j. Identify materials as heat insulators (e.g., oven mitten, wood, plastic, ceramic). k. Classify materials as conductors or insulators of heat.
			<p>Mechanical Energy</p> <p>PP6.9. Investigate mechanical energy as the energy of motion (e.g., a moving wheelchair has mechanical energy).</p>	<p>Mechanical Energy</p> <p>PP6.9. Investigate mechanical energy as the energy of motion (e.g., a moving wheelchair has mechanical energy).</p> <ol style="list-style-type: none"> a. Identify mechanical energy as the energy of motion (e.g., hand mixers, sound/vibration causes motion and are an example of mechanical energy). 	<p>Mechanical Energy</p> <p>PP6.9. Investigate mechanical energy as the energy of motion (e.g., a moving wheelchair has mechanical energy).</p> <ol style="list-style-type: none"> a. Identify mechanical energy as the energy of motion (e.g., hand mixers, sound/vibration causes motion and are an example of mechanical energy).

Strand 1: Properties and Principles of Matter and Energy

2. Energy has a source, can be transferred, and can be transformed into various forms but is conserved between and within systems.					
		GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
A	Forms of energy have a source, a means of transfer (work and heat), and a receiver.			<p>Electrical Energy</p> <p>PP6.10. Investigate electrical energy.</p> <p style="margin-left: 20px;">a. Observe evidence of energy transfer in a closed series circuit (e.g., lit bulb, moving motor, fan).</p> <p style="margin-left: 20px;">b. Investigate static electricity (e.g., observe hair attracted to a rubbed balloon; recognize static electrical shock from a carpet).</p> <p>Light Energy</p> <p>PP6.11. Investigate light energy.</p> <p style="margin-left: 20px;">a. Investigate sources of light energy (e.g., Sun, bulbs, flames, and/or lightning).</p> <p style="margin-left: 20px;">b. Investigate light intensity (i.e., bright, dim).</p> <p>PP6.13. Investigate light reflection.</p> <p style="margin-left: 20px;">a. Investigate the reflection of visible light by various surfaces (e.g., mirror, smooth and rough surfaces, shiny and dull surfaces, Moon).</p>	<p>Electrical Energy</p> <p>PP6.10. Investigate electrical energy.</p> <p style="margin-left: 20px;">a. Observe evidence of energy transfer in a closed series circuit (e.g., lit bulb, moving motor, fan).</p> <p style="margin-left: 20px;">b. Investigate static electricity (e.g., observe hair attracted to a rubbed balloon; recognize static electrical shock from a carpet).</p> <p style="margin-left: 20px;">c. Investigate materials as electrical conductors (e.g., metal wires, aluminum foil, lemon juice, water, safety issues with electrical wiring).</p> <p style="margin-left: 20px;">d. Investigate materials as electrical insulators (e.g., wood, plastics, glass, air, water).</p> <p>Light Energy</p> <p>PP6.11. Investigate light energy.</p> <p style="margin-left: 20px;">a. Investigate sources of light energy (e.g., Sun, bulbs, flames, and/or lightning).</p> <p style="margin-left: 20px;">b. Investigate light intensity (i.e., bright, dim).</p> <p>PP6.12. Identify light energy.</p> <p style="margin-left: 20px;">a. Identify sources of light energy.</p> <p style="margin-left: 20px;">b. Compare light intensity (i.e., brighter, dimmer).</p> <p style="margin-left: 20px;">c. Identify the three things (light source, object, and surface) necessary to produce a shadow.</p> <p>PP6.13. Investigate light reflection.</p> <p style="margin-left: 20px;">a. Investigate the reflection of visible light by various surfaces (e.g., mirror, smooth and rough surfaces, shiny and dull surfaces, Moon).</p> <p>PP6.14. Investigate how different surfaces affect light.</p> <p style="margin-left: 20px;">a. Investigate transparent materials and how light goes through them (e.g., glass, clear plastic, water).</p> <p style="margin-left: 20px;">b. Investigate translucent materials and how only some of the light goes through them (e.g., paper, translucent plastic).</p> <p style="margin-left: 20px;">c. Investigate opaque materials and how no light goes through them (e.g., metal, wood, rock).</p>

Strand 1: Properties and Principles of Matter and Energy

2. Energy has a source, can be transferred, and can be transformed into various forms but is conserved between and within systems.					
		GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
C	Electromagnetic energy from the Sun (solar radiation) is a major source of energy on Earth.	Not assessed at this level.	PP7.1. Explore energy from the Sun and living things. a. Identify light from the Sun as a basic need of most plants.	PP7.1. Explore energy from the Sun and living things. a. Identify light from the Sun as a basic need of most plants. b. Identify the Sun as the primary source of light and food energy on Earth.	PP7.1. Explore energy from the Sun and living things. a. Identify light from the Sun as a basic need of most plants. b. Identify the Sun as the primary source of light and food energy on Earth. c. Identify the Sun as the source of almost all energy used to produce the food for living organisms. PP7.2. Identify the Sun as the primary source of energy for temperature change on Earth (e.g., it is warmer in Sunlight than in the shade).

Strand 1: Properties and Principles of Matter and Energy

2. Energy has a source, can be transferred, and can be transformed into various forms but is conserved between and within systems.					
		GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
F	Energy can change from one form to another within systems, but the total amount remains the same.	Not assessed at this level.	Not assessed at this level.	<p>Energy Transformation</p> <p>PP8.1. Investigate the types of energy transformation in everyday examples.</p> <ul style="list-style-type: none"> a. Investigate mechanical energy to heat energy transformation (e.g., rubbing your hands together generates heat). b. Investigate electrical energy to heat energy transformation (e.g., an electric heater becomes warmer when it is plugged into an electrical outlet). c. Investigate the transformation of electrical energy to mechanical energy transformation (e.g., an electric fan moves when it is plugged into an electrical outlet). d. Investigate the transformation light energy to heat energy transformation (e.g., a box exposed to Sunlight feels warmer than a box in the shade). 	<p>Energy Transformation</p> <p>PP8.1. Investigate the types of energy transformation in everyday examples.</p> <ul style="list-style-type: none"> a. Investigate mechanical energy to heat energy transformation (e.g., rubbing your hands together generates heat). b. Investigate electrical energy to heat energy transformation (e.g., an electric heater becomes warmer when it is plugged into an electrical outlet). c. Investigate the transformation of electrical energy to mechanical energy transformation (e.g., an electric fan moves when it is plugged into an electrical outlet). d. Investigate the transformation light energy to heat energy transformation (e.g., a box exposed to Sunlight feels warmer than a box in the shade). e. Investigate the transformation of heat energy to light energy transformation (e.g., an electric stove turns red when it becomes very hot). f. Investigate the transformation of electrical energy to light energy transformation (e.g., a light bulb is lit when it is plugged into an electrical outlet). g. Investigate the transformation of light energy to electrical energy transformation (e.g., a motor runs when a solar photovoltaic cell is exposed to light). h. Investigate the transformation of mechanical energy to electrical energy transformation (e.g., using a hand-cranked generator to light a light bulb). <p>PP8.2. Classify types of energy transformation from everyday examples.</p>

Strand 1: Properties and Principles of Matter and Energy

PHYSICAL SCIENCE GLOSSARY

- **Balance:** an instrument used to measure the mass of an object.
- **Chemical change:** when one or more substances are changed into new substance(s) with new and different properties.
- **Condensation:** the physical change of matter going from a gaseous state to a liquid state.
- **Evaporation:** vaporization that occurs only at the surface of a liquid.
- **Gas:** matter that has no definite shape or volume.
- **Liquid:** matter that has a definite volume but takes the shape of the container holding it.
- **Mass:** the amount of matter in something.
- **Matter:** anything that has mass and takes up space.
- **Mixture:** a combination of two or more substances that are not combined chemically but can be separated by physical means (e.g.: beach sand, peas and carrots).
- **Photovoltaic cell:** a semiconductor that transforms light energy directly to electrical energy.
- **Physical change:** a change of matter from one form to another without a change in chemical properties.
- **Physical property:** a characteristic of matter that does not involve a chemical change, such as density, color, or hardness.
- **Solution:** a homogenous mixture in which one substance dissolves into another.
- **Weight:** the measure of the force of gravity on an object.

Glossary and Hierarchy of Terms Developed by the Science AGLE Review Committee

Terms	Definitions
Explore	Use of one or more of the five senses*, to participate within a science content activity.
Identify	Measurable recognition of a science concept (this may be shown in many modes, such as matching, labeling, naming, signing, pointing, and/or touching.)
Investigate	Conduct an science inquiry for purpose of gaining information.
Describe	Communicate/convey information about a science concept.
Compare/Contrast	Identify similarities and differences about a science concept.
Predict	Use of prior knowledge to determine what will or could happen within the content of a science activity.
*Five Senses	Use of smell, hearing, sight, taste and/or touch (includes sensory feeling, such as how your body feels when a car slows down).

Strand 2: Properties and Principles of Force and Motion

1. The motion of an object is described by its change in position relative to another object or point.					
		GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
A	Position of Objects	<p>FM1.1. Identify the position of an object relative to another object.</p> <p>a. Identify an object is next to another object (e.g., the orange and next to the apple) .</p> <p>b. Identify an object is in front of or behind another object (e.g., the bus is in front of the house).</p> <p>c. Identify an object is above or below another object (e.g., the airplane is above the building).</p>	<p>Position of Objects</p> <p>FM1.1. Identify the position of an object relative to another object.</p> <p>a. Identify that an object is next to another object (e.g., the ball is next to the car).</p> <p>b. Identify that an object is in front of or behind another object (e.g., the bus is in front of or behind the house).</p> <p>c. Identify that an object is above or below another object (e.g., the airplane is above the building).</p> <p>d. Identify that an object is to the left or to the right of another object (e.g., the pencil is to the right of the book).</p>	<p>Position of Objects</p> <p>FM1.1. Identify the position of an object relative to another object.</p> <p>a. Identify that an object is next to another object (e.g., the ball is next to the car).</p> <p>b. Identify that an object is in front of or behind another object (e.g., the bus is in front of or behind the house).</p> <p>c. Identify that an object is above or below another object (e.g., the airplane is above the building).</p> <p>d. Identify that an object is to the left or to the right of another object (e.g., the pencil is to the right of the book).</p> <p>e. Compare the distance between two objects (e.g., Suzie is closer to the door).</p>	<p>Position of Objects</p> <p>FM1.1. Identify the position of an object relative to another object.</p> <p>a. Identify that an object is next to another object (e.g., the ball is next to the car).</p> <p>b. Identify that an object is in front of or behind another object (e.g., the bus is in front of or behind the house).</p> <p>c. Identify that an object is above or below another object (e.g., the airplane is above the building).</p> <p>d. Identify that an object is to the left or to the right of another object (e.g., the pencil is to the right of the book).</p> <p>e. Compare the distance between two objects (e.g., Suzie is closer to the door).</p>
	Motion of Objects	<p>FM1.2. Investigate an object’s motion.</p> <p>a. Identify when an object is moving (in motion) and not moving (at rest).</p>	<p>Motion of Objects</p> <p>FM1.2. Investigate an object’s motion.</p> <p>a. Identify when an object is moving (in motion) and not moving (at rest).</p> <p>b. Investigate moving an object (e.g., the marble is moving across the floor).</p> <p>c. Investigate an object moving in different directions (i.e., forward, backward, sideways, up and/or down).</p> <p>d. Investigate an object falling (e.g., a ball falls off the desk).</p> <p>e. Investigate starting and/or stopping an object in motion (e.g., rolling a ball).</p> <p>f. Investigate an object moving in a circular motion (e.g., using a game spinner).</p>	<p>Motion of Objects</p> <p>FM1.2. Investigate an object’s motion.</p> <p>a. Identify when an object is moving (in motion) and not moving (at rest).</p> <p>b. Investigate moving an object (e.g., the marble is moving across the floor).</p> <p>c. Investigate with an object moving in different directions (i.e., forward, backward, sideways, up and/or down).</p> <p>d. Investigate an object falling (e.g., a ball falls off the desk).</p> <p>e. Investigate starting and/or stopping an object in motion (e.g., rolling a ball).</p> <p>f. Investigate an object moving in a circular motion (e.g., using a game spinner).</p> <p>g. Investigate an object moving in a back and forth/vibrating motion (e.g., beating a drum).</p> <p>h. Investigate an object moving in a zigzag motion (e.g., a moving body in zigzag motion in an obstacle course; computer games; and/or bumper cars).</p> <p>i. Investigate an object moving in a curve motion (e.g., turning a wheelchair, bicycle, walker, cutting shapes).</p>	<p>Motion of Objects</p> <p>FM1.2. Investigate an object’s motion.</p> <p>a. Identify when an object is moving (in motion) and not moving (at rest).</p> <p>b. Investigate moving an object (e.g., the marble is moving across the floor).</p> <p>c. Investigate an object moving in different directions (i.e., forward, backward, sideways, up and/or down).</p> <p>d. Investigate an object falling (e.g., a ball falls off the desk).</p> <p>e. Investigate starting and/or stopping an object in motion (e.g., rolling a ball).</p> <p>f. Investigate an object moving in a circular motion (e.g., using a game spinner).</p> <p>g. Investigate an object moving in a back and forth/vibrating motion (e.g., beating a drum).</p> <p>h. Investigate an object moving in a zigzag motion (e.g., a moving body in zigzag motion in an obstacle course; computer games; and/or bumper cars).</p> <p>i. Investigate an object moving in a curve motion (e.g., turning a wheelchair, bicycle, and/or walker, cutting shapes).</p>

Strand 2: Properties and Principles of Force and Motion

1. The motion of an object is described by its change in position relative to another object or point. (continued)			
	GRADES K–2	GRADES 3–5	GRADES 6–8
A		<p>Speed of Objects</p> <p>FM1.3. Investigate objects moving at different speeds (i.e., using cars with ramps of different inclines).</p>	<p>Speed of Objects</p> <p>FM1.3. Investigate objects moving at different speeds (i.e., using cars with ramps of different inclines).</p> <ul style="list-style-type: none"> a. Identify the initial and final positions of an object's motion (e.g., start and finish lines of race car track). b. Identify the initial and final time of an object's motion (e.g., use a stop watch or egg timer). c. Identify an object's motion in terms of distance and time (e.g., arrival and/or take off of a car on a ramp or track).
The motion of an object is described as a change in position, direction, and speed relative to another object (frame of reference).			<p>j. Investigate an object moving in a projectile motion (e.g., a thrown baseball is moving in a projectile path).</p> <p>Speed of Objects</p> <p>FM1.3. Investigate objects moving at different speeds (i.e., using cars with ramps of different inclines).</p> <ul style="list-style-type: none"> a. Identify the initial and final positions of an object's motion (e.g., start and finish lines of racecar track). b. Identify the initial and final time of an object's motion (e.g., use a stopwatch or egg timer). c. Identify an object's motion in terms of distance and time (e.g., arrival and/or takeoff of a car on a ramp or track). <p>FM1.4. Compare objects moving at different speeds (i.e., fast, slow, faster, and/or slower).</p>

Strand 2: Properties and Principles of Force and Motion

1. The motion of an object is described by its change in position relative to another object or point.				
	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
B	Not assessed at this level.	Not assessed at this level.	Not assessed at this level.	<p>FM2.1. Experiment with an object going faster and faster (e.g., pumping your legs or being pushed on a swing; or increasing the incline of a ramp as marbles roll down).</p> <p>FM2.2. Experiment with an object going slower and slower (e.g., you feel your body moving forward as the car comes to a stop; or reducing the incline of a ramp as marbles roll down).</p> <p>FM2.3. Experiment with an object changing direction (e.g., bouncing a ball against a wall; flying a kite).</p>
An object that is accelerating is speeding up, slowing down, or changing direction.				

Strand 2: Properties and Principles of Force and Motion

2. Forces affect motion				
	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
A Forces are classified as either contact (pushes, pulls, friction, buoyancy) or non-contact forces (gravity, magnetism) that can be described in terms of direction and magnitude.	Relationship between Force and Motion	Relationship between Force and Motion	Relationship between Force and Motion	Relationship between Force and Motion
	<p>FM3.1. Explore the relationship between force and motion.</p> <p>a. Explore ways to cause some objects to move (i.e., push and/or pull).</p>	<p>FM3.1. Explore the relationship between force and motion.</p> <p>a. Explore ways to cause some objects to move (i.e., push and/or pull).</p> <p>FM3.2. Identify the relationship between force and motion.</p> <p>a. Identify ways to cause some objects to move by applying force (i.e., push and/or pull).</p> <p style="text-align: center;">Magnetism</p> <p>FM3.3. Explore magnetic forces.</p> <p>a. Explore magnets that cause some objects to move without touching them (e.g., using paperclips and magnets to move paper clips).</p> <p style="text-align: center;">Friction</p> <p>FM3.4. Explore friction.</p> <p>a. Explore friction (e.g., rubbing hands together, or roll a ball over different surfaces –carpet, wax paper, and/or grass).</p>	<p>FM3.1. Explore the relationship between force and motion.</p> <p>a. Explore ways to cause some objects to move (i.e., push and/or pull).</p> <p>FM3.2. Identify the relationship between force and motion.</p> <p>a. Identify ways to cause some objects to move by applying force (i.e., push and/or pulls).</p> <p>b. Identify objects can change directions (e.g., bouncing a ball, or flying a kite).</p> <p>c. Identify the initial and final positions of an object that moves.</p> <p>d. Explore how different amounts of force will act on the same object (e.g., the harder the push, the faster the object will move; the harder the push, the farther the object will travel).</p> <p style="text-align: center;">Magnetism</p> <p>FM3.3. Explore magnetic forces.</p> <p>a. Explore magnets that cause some objects to move without touching them (e.g., using magnets to move paper clips).</p> <p>b. Investigate how two magnets pull and push (attract and repel) each other without touching.</p> <p>c. Describe magnetism as a force that can push or pull other objects without touching them.</p> <p style="text-align: center;">Friction</p> <p>FM3.4. Explore friction.</p> <p>a. Explore friction (e.g., rubbing hands your together; or rolling a ball over different surfaces – carpet, wax paper, and/or grass).</p> <p>b. Investigate friction as; a force that slows down an object (e.g., rolling a ball across different surfaces, such as carpet, tile, grass and/or wax paper).</p> <p>c. Compare motion of an object over different surfaces (i.e., rough and/or smooth).</p>	<p>FM3.1. Explore the relationship between force and motion.</p> <p>a. Explore ways to cause some objects to move (i.e., push and/or pull).</p> <p>FM3.2. Identify the relationship between force and motion.</p> <p>a. Identify ways to cause some objects to move by applying force (i.e., push and/or pull).</p> <p>b. Identify objects can change directions (e.g., bouncing a ball, or flying a kite).</p> <p>c. Identify the initial and final positions of an object that moves.</p> <p>d. Explore how different amounts of force will act on the same object (e.g., the harder the push, the faster the object will move; the harder the push, the farther the object will travel).</p> <p>e. Compare the initial and final positions of an object that moves, and determine the distance an object traveled.</p> <p>f. Identify the direction of the force and the resulting path (e.g., if you hit a ball in x direction, it will move in that direction).</p> <p style="text-align: center;">Magnetism</p> <p>FM3.3. Explore magnetic forces.</p> <p>a. Explore magnets that cause some objects to move without touching them (e.g., using magnets to move paper clips).</p> <p>b. Investigate how two magnets pull and push (attract and repel) each other without touching.</p> <p>c. Describe magnetism as a force that can push or pull other objects without touching them.</p> <p style="text-align: center;">Friction</p> <p>FM3.4. Explore friction.</p> <p>a. Explore friction (e.g., rubbing hands your together; or rolling a ball over different surfaces –carpet, wax paper, and/or grass).</p> <p>b. Investigate friction as; a force that slows down an object (e.g., rolling a ball across different surfaces, such as carpet, tile, grass and/or wax paper).</p> <p>c. Compare motion of an object over different surfaces (i.e., rough and/or smooth).</p>

Strand 2: Properties and Principles of Force and Motion

2. Forces affect motion. (continued)				
	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
B				
Every object exerts a gravitational force on every other object.		<p>Gravity</p> <p>FM3.5. Explore gravity. Experiment with objects and gravity (e.g., show that gravity is a force that pulls objects to the ground by demonstrating how a ball falls when not held).</p>	<p>Gravity</p> <p>FM3.5. Explore gravity.</p> <ol style="list-style-type: none"> a. Experiment with objects and gravity (e.g., show that gravity is a force that pulls objects to the ground by demonstrating how a ball falls when not held). b. Compare the weight of two different objects (e.g., which is heavier, which is lighter). c. Measure the weight of different objects (e.g., measuring/weighing produce). 	<ol style="list-style-type: none"> d. Identify that force is required to overcome friction in order to move an object (e.g., a coin at rest on a ramp will start to move when the board is steep enough for the force of gravity to overcome the friction of the board). <p>Gravity</p> <p>FM3.4. Explore friction.</p> <ol style="list-style-type: none"> a. Experiment with objects and gravity (e.g., show that gravity is a force that pulls objects to the ground by demonstrating how a ball falls when not held). b. Compare the weight of different objects (e.g., which is heavier, which is lighter). c. Measure the weight of different objects using a spring scale (e.g., measuring/weighing produce). d. Identify Earth's gravity as a force that pulls objects toward Earth without touching them (e.g., by cutting down a tree or dropping a book, you cause both objects to fall toward the instead of floating).

Strand 2: Properties and Principles of Force and Motion

2. Forces affect motion.				
	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
Newton's Laws of Motion explain the interaction of mass and forces, and are used to predict changes in motion.	D			
	Not assessed at this level.	<p>Investigating Motion</p> <p>FM4.1. Investigate ways to change the motion of an object.</p> <ul style="list-style-type: none"> a. Investigate ways to cause an object to go slower (e.g., change the slope/incline of a ramp). b. Investigate ways to cause an object to go faster (e.g., change the incline of a ramp). c. Investigate ways to cause an object to go farther (e.g., pushing a toy car (increasing force) harder; changing the surface of the floor from carpet to tile). d. Investigate ways to cause an object to come to a stop (friction). 	<p>Investigating Motion</p> <p>FM4.1. Investigate ways to change the motion of an object.</p> <ul style="list-style-type: none"> a. Investigate ways to cause an object to go slower (e.g., change the slope/incline of a ramp). b. Investigate ways to cause an object to go faster (e.g., change the slope/incline of a ramp). c. Investigate ways to cause an object to go farther (e.g., pushing a toy car harder—increasing force; changing the surface of the floor from carpet to tile). d. Investigate ways to cause an object to come to a stop (e.g., friction). e. Identify ways to change motion of an object (e.g., bouncing a ball against a wall). <p>Laws of Motion</p> <p>FM4.2. Investigate the distances traveled by objects of different weight after applying the same amount of force is applied in the same direction.</p> <p>FM4.3. Identify the distances traveled by objects with the same weight after different amount of force is applied in the same direction.</p>	<p>Investigating Motion</p> <p>FM4.1. Investigate ways to change the motion of an object.</p> <ul style="list-style-type: none"> a. Investigate ways to cause an object to go slower (e.g., change the slope/incline of a ramp). b. Investigate ways to cause an object to go faster (e.g., change the slope/incline of a ramp). c. Investigate ways to cause an object to go farther (e.g., pushing a toy car harder—increasing force; changing the surface of the floor from carpet to tile). d. Investigate ways to cause an object to come to a stop (e.g., friction). e. Identify ways to change the motion of an object (e.g., bouncing a ball against a wall). f. Describe ways to change the motion of an object. <p>Laws of Motion</p> <p>FM4.2. Investigate the distances traveled by objects of different weight after applying the same amount of force is applied in the same direction.</p> <ul style="list-style-type: none"> a. Investigate how the weight of an object (e.g., cars, marbles, rocks, boulders) affects the motion of that object. <p>FM4.3. Identify the distances traveled by objects with the same weight after different amount of force is applied in the same direction.</p> <ul style="list-style-type: none"> a. Identify how increasing and decreasing the amount of force on an object affects the motion of that object. <p>FM4.4. Investigate balanced and un-balanced Forces.</p> <ul style="list-style-type: none"> a. Identify that balanced forces do not affect the motion of an object (e.g., a shopping cart being pushed on both ends at an equal force will not move). b. Identify how unbalanced forces affect the motion of an object (e.g., one student on the opposite side of a shopping cart pushing with more force will cause the shopping cart to move in that direction).

Strand 2: Properties and Principles of Force and Motion

2. Forces affect motion.				
	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
D				
Newton's laws of motion explain the interaction of mass and force, and are used to predict changes in motion.				FM4.5. Investigate how friction affects the amount of force needed to do work over different surfaces (e.g., pushing a box on a smooth tile floor requires less work than pushing the same box on a carpeted floor).

Strand 2: Properties and Principles of Force and Motion

2. Forces affect motion.				
	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
F Simple machines (levers, inclined planes, wheel and axle, pulleys) affect the force applied to and object and/or direction of movement as work is done.	Not assessed at this level.	FM5.1. Explore inclined planes. a. Investigate the amount of effort (force) needed to raise an object to given height with and without using inclined planes (ramps) of different slope. FM5.2. Explore levers. a. Investigate that levers can raise an object (e.g., seesaw/teeter totter, bottle openers). FM5.4. Explore pulleys. a. Investigate pulleys as simple machines that reduce the amount of effort raising an object (e.g., raising a flag on a flagpole). b. Investigate pulleys as simple machines that change the direction of applied force. FM5.6. Explore wheels and axles. a. Investigate wheel and axle as simple machines that reduce friction (e.g., using legos with wheel and axles, toy cars and trucks, bicycle).	FM5.1. Explore inclined planes. a. Investigate the amount of effort (force) needed to raise an object to given height with and without using inclined planes (ramps) of different slope. b. Identify inclined planes. FM5.2. Explore levers. a. Investigate that levers can raise an object (e.g., seesaw, bottle opener, the nail (pulling side of a hammer)). FM5.3. Identify levers. FM5.4. Explore pulleys. a. Investigate pulleys as simple machines that reduce the amount of effort raising an object (e.g., raising a flag on a flagpole). b. Investigate pulleys as simple machines that change the direction of applied force. FM5.5. Identify pulleys. FM5.6. Explore wheels and axles. a. Investigate wheels and axles as simple machines that reduce friction (e.g., Legos with wheels and axles, toy truck, bicycle, teacher’s chair with wheels). b. Identify wheels and axles. FM5.7. Recognize that simple machines decrease the amount of effort force and/or change the direction of force. FM5.8. Identify the simple machines in common tools and household items (e.g., wheelchair ramp—inclined plane; shopping cart wheel—wheel and axle; wrench—lever; flagpole—pulley).	FM5.1. Explore inclined planes. a. Investigate the amount of effort (force) needed to raise an object to given height with and without using inclined planes (ramps) of different slope. b. Identify inclined planes. FM5.2. Explore levers. a. Investigate that levers can raise an object (e.g., seesaw, bottle opener, the nail (pulling side of a hammer)). b. Describe inclined planes. FM5.3. Identify levers. a. Describe levers. FM5.4. Explore pulleys. a. Investigate pulleys as simple machines that reduce the amount of effort needed to raise an object (e.g., raising a flag on a flagpole). b. Investigate pulleys as simple machines that change the direction of applied force. FM5.5. Identify pulleys. a. Describe pulleys. FM5.6. Explore wheels and axles. a. Investigate wheels and axles as simple machines that reduce friction (e.g., Legos with wheels and axles, toy truck, bicycle, teacher’s chair with wheels, media cart, dolly). b. Identify wheels and axles. c. Describe wheels and axles. FM5.7. Recognize that simple machines decrease the amount of effort and/or change the direction of force. FM5.8. Identify the simple machines in common tools and household items (e.g., wheelchair ramp—inclined plane; shopping cart wheel—wheel and axle; wrench—lever; flagpole—pulley).

Strand 2: Properties and Principles of Force and Motion

2. Forces affect motion.				
	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
F Simple machines (levers, inclined planes, wheels and axles, pulleys) affect the force applied to an object and/or direction of movement as work is done.				<p>FM5.9. Determine the use of simple machines that are used in real life situations (e.g., using a wheelchair ramp; moving a heavy object with a dolly/cart, a wrench for fixing things).</p> <p>FM5.10. Identify work as what happens when force is used to move an object over a distance (e.g., moving large boxes versus small boxes—it takes more work to move the large boxes).</p>

Strand 2: Properties and Principles of Force and Motion

PHYSICAL SCIENCE GLOSSARY

- **Force:** a quantity that produces an acceleration in the direction of its application; it is directly proportional to mass and acceleration ($F = M \times A$).
- **Friction:** a force that resists the relative motion or tendency to such motion of two bodies in contact.
- **Gravity:** a force that acts to pull objects together.
- **Mass:** amount of matter (for AGLEs, mass will be represented by the weight of matter on Earth).
- **Simple machine:** a simple device, such as a lever, pulley, inclined plane, or a wheel and axle.
- **Scale:** an instrument used to measure the weight or force of an object (e.g., a spring scale).
- **Speed:** distance traveled per unit time.
- **Work:** the transfer of energy to a body by the application of a force that moves the body in the direction of the force ($W = F \times d$).
- **Weight:** measure of the force of gravity on an object or the amount of matter (mass) as weighed on Earth.

Glossary and Hierarchy of Terms Developed by the Science AGLE Review Committee

Terms	Definitions
Explore	Use of one or more of the five senses*, to participate within a science content activity.
Identify	Measurable recognition of a science concept (this may be shown in many modes, such as matching, labeling, naming, signing, pointing, and/or touching.)
Investigate	Conduct an science inquiry for purpose of gaining information.
Describe	Communicate/convey information about a science concept.
Compare/Contrast	Identify similarities and differences about a science concept.
Predict	Use of prior knowledge to determine what will or could happen within the content of a science activity.
*Five Senses	Use of smell, hearing, sight, taste and/or touch (includes sensory feeling, such as how your body feels when a car slows down).

Strand 3: Characteristics and Interactions of Living Organisms

1. There is a fundamental unity underlying the diversity of all living organisms.					
GRADES K–2		GRADES 3–5		GRADES 6–8	GRADES 9–12
A	Basic Needs for Animals and Plants				
	Organisms have basic needs for survival.	<p>LO1.1. Explore living things (e.g., animals, plants, people).</p> <p>LO1.2. Explore non-living things (e.g., rocks, soil, water).</p>	<p>LO1.1. Explore living things (e.g., animals, plants, people).</p> <p>LO1.2. Explore non living things (e.g., rocks, soil, water).</p> <p>LO1.3. Identify living and non living things (e.g., identify living things among a group of living and non living things; sort into groups of living and non living things).</p> <p>LO1.4. Identify one or more basic needs for animals (i.e., air, water, food, and/or shelter).</p> <p>LO1.5. Identify one or more basic needs for plants (i.e., air, water, and/or light).</p>	<p>LO1.1. Explore living things (e.g., animals, plants, people).</p> <p>LO1.2. Explore non living things (e.g., rocks, soil, water).</p> <p>LO1.3. Identify living and non living things (e.g., identify living things among a group of living and non living things; sort into groups of living and non living things).</p> <p>LO1.4. Identify one or more basic needs for animals (i.e., air, water, food, and/or shelter).</p> <p>LO1.5. Identify one or more basic needs for plants (i.e., air, water, and/or light).</p> <p>LO1.6. Investigate what happens when growing conditions are changed (e.g., dark versus light; water versus no water).</p> <p>Life Processes</p> <p>LO1.7. Identify common life processes (i.e., growth, reproduction, and/or life span).</p> <p>LO1.8. Identify that most plants and animals require food and oxygen to carry out life processes.</p>	<p>LO1.1. Explore living things (e.g., animals, plants, people).</p> <p>LO1.2. Explore non living things (e.g., rocks, soil, water).</p> <p>LO1.3. Identify living and non living things (e.g., identify living things among a group of living and non living things).</p> <p>LO1.4. Identify one or more basic needs for animals (i.e., air, water, food, and/or shelter).</p> <p>LO1.5. Identify one or more basic needs for plants (i.e., air, water, and/or light).</p> <p>LO1.6. Investigate what happens when growing conditions are changed (e.g., dark versus light; water versus no water).</p> <p>Life Processes</p> <p>LO1.7. Identify common life processes (i.e., growth, reproduction, and/or life span).</p> <p>LO1.8. Identify that most plants and animals require food and oxygen to carry out life processes.</p> <p>LO1.9. Investigate the common life processes required for the survival of organisms (i.e., growth, reproduction, life span, response to stimuli, energy use, exchanges of gases, use of water, and/or elimination of waste).</p>

Strand 3: Characteristics and Interactions of Living Organisms

1. There is a fundamental unity underlying the diversity of all living organisms.					
		GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
Organisms progress through life cycles unique to different types of organisms.	B	Not assessed in this level	<p>Life Cycles</p> <p>LO2.1. Identify the life cycle that animals go through (i.e., birth, growth, reproduction, and/or death).</p> <p>LO2.3. Identify life stages of common organisms.</p> <p style="padding-left: 20px;">a. Identify the early stage of common organisms (e.g., seedling, duckling, human baby).</p> <p style="padding-left: 20px;">b. Identify the mature stage of common organisms (e.g., tree, duck, human adult).</p> <p>Explore Life Cycle of Animals</p> <p>LO2.5. Explore the life cycle of animals that do not go through metamorphosis (e.g., dog, rabbit, human).</p> <p>LO2.6. Explore the life cycle of animals that goes through metamorphosis (e.g., butterfly, beetle, frog).</p> <p>LO2.7. Identify the different stages of a life cycle from observations (e.g., record or draw the stages of a butterfly).</p> <p>Explore Life Cycle of Plants</p> <p>LO2.11. Explore the life cycle of a flowering plant (e.g., seed, sprouting seed, plants with buds, plants with flowers).</p>	<p>Life Cycles</p> <p>LO2.1. Identify the life cycle which animals go through (i.e., birth, growth, reproduction, and/or death).</p> <p>LO2.2. Identify the life that cycle plants go through (i.e., seed germination, growth, reproduction, and/or death).</p> <p>LO2.3. Identify life stages of common organisms.</p> <p style="padding-left: 20px;">a. Identify the early stage of common organisms (e.g., seedling, duckling, human baby).</p> <p style="padding-left: 20px;">b. Identify the mature stage of common organisms (e.g., tree, duck, human adult).</p> <p>LO2.4. Identify the similarities between parent and offspring.</p> <p style="padding-left: 20px;">a. Match offspring with parent (e.g., puppy, dog; kitten, cat; chick, hen; cub-bear).</p> <p style="padding-left: 20px;">b. Compare physical characteristics between parent and offspring (e.g., feet, noses, wings).</p> <p>Explore Life Cycle of Animals</p> <p>LO2.5. Explore the life cycle of animals that do not go through metamorphosis (e.g., dog, rabbit, human).</p> <p>LO2.6. Explore the life cycle of animals that goes through metamorphosis (e.g., butterfly, beetle, frog).</p> <p>LO2.7. Identify the different stages of a life cycle from observations (e.g., record or draw the stages of a butterfly).</p> <p>LO2.8. Identify stages of life cycle (e.g., eggs, larvae, pupa, chrysalis, young adult, adult).</p> <p>LO2.9. Identify life cycle of familiar animals (e.g., butterfly, chicken, frog).</p> <p>LO2.10. Identify the correct sequence of stages in the life cycle of familiar animals.</p> <p>Explore Life Cycle of Plants</p> <p>LO2.11. Explore the life cycle of a flowering plant (e.g., seed, sprouting seed, plants with buds, plants with flowers).</p> <p>LO2.12. Identify stages of the life cycle of a flowering plant.</p> <p>LO2.13. Identify the correct sequence of stages in the life cycle of a flowering plant.</p>	<p>Life Cycles</p> <p>LO2.1. Identify the life cycle which animals go through (i.e., birth, growth, reproduction, and/or death).</p> <p>LO2.2. Identify the life cycle that plants go through (i.e., seed germination, growth, reproduction, and/or death).</p> <p>LO2.3. Identify life stages of common organisms.</p> <p style="padding-left: 20px;">a. Identify the early stage of common organisms (e.g., seedling, duckling, human baby).</p> <p style="padding-left: 20px;">b. Identify the mature stage of common organisms (e.g., tree, duck, human adult).</p> <p>LO2.4. Identify the similarities between parent and offspring.</p> <p style="padding-left: 20px;">a. Match offspring with parent (e.g., puppy, dog; kitten, cat; chick, hen; cub, bear).</p> <p style="padding-left: 20px;">b. Compare physical characteristics between parent and offspring (e.g., feet, noses, wings).</p> <p>Explore Life Cycle of Animals</p> <p>LO2.5. Explore the life cycle of animals that do not go through metamorphosis (e.g., dog, rabbit, human).</p> <p>LO2.6. Explore the life cycle of animals that goes through metamorphosis (e.g., butterfly, beetle, frog).</p> <p>LO2.7. Identify the different stages of a life cycle from observations (e.g., record or draw the stages of a butterfly).</p> <p>LO2.8. Identify stages of life cycle (e.g., eggs, larvae, pupa, chrysalis, young adult, adult).</p> <p>LO2.9. Identify life cycle of familiar animals (e.g., butterfly, chicken, frog).</p> <p>LO2.10. Identify the correct sequence of stages in the life cycle of familiar animals.</p> <p>Explore Life Cycle of Plants</p> <p>LO2.11. Explore the life cycle of a flowering plant (e.g., seed, sprouting seed, plants with buds, plants with flowers).</p> <p>LO2.12. Identify stages of life the cycle of a flowering plant.</p> <p>LO2.13. Identify the correct sequence of stages in the life cycle of a flowering plant.</p>

Strand 3: Characteristics and Interactions of Living Organisms

1. There is a fundamental unity underlying the diversity of all living organisms.				
	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
C Cells are the fundamental units of structure and function of all living things.	Not assessed at this level.	Not assessed at this level.	<p>LO3.1. Identify that all living organisms are made up of cells that are too small to be seen by the naked eye.</p> <p>LO3.2. Identify that some organisms are made up of one cell (e.g., bacteria).</p>	<p>LO3.1. Identify that all living organisms are made up of cells which are too small to be seen by the naked eye.</p> <p>LO3.2. Identify that some organisms are made up of one cell (e.g., bacteria).</p> <p>LO3.3. Identify that individual cells have the same needs for survival as organisms (e.g., cells need oxygen, cells need food, cells reproduce).</p>

Strand 3: Characteristics and Interactions of Living Organisms

1. There is a fundamental unity underlying the diversity of all living organisms.				
	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
D Plants and animals have different structures that serve similar functions necessary for the survival of the organism.	Explore Animals LO4.1. Explore common animals (e.g., humans, dogs, birds, fish).	Explore Animals LO4.1. Explore common animals (e.g., humans, dogs, birds, fish). LO4.2. Identify the physical structures of common animals. LO4.3. Identify sensory organs of common animals (e.g., eyes, ears, nose, mouth, tongue, hands, paws). LO4.4. Identify appendages of common animals (e.g., arms, legs, wings, fins). LO4.5. Identify the body covering of common animals (e.g., skin, feathers, fur, scales).	Explore Animals LO4.1. Explore common animals (e.g., humans, dogs, birds, fish). LO4.2. Identify the physical structures of common animals. LO4.3. Identify sensory organs of common animals (e.g., eyes, ears, nose, mouth, tongue, hands, paws). LO4.4. Identify appendages of common animals (e.g., arms, legs, wings, fins). LO4.5. Identify the body covering of common animals (e.g., skin, feathers, fur, scales). LO4.6. Investigate the function of the physical structures of common animals. LO4.7. Identify the function of sensory organs (e.g., using the eyes to see; using the nose to smell; using the mouth to taste). LO4.8. Identify the function of appendages (e.g., using the legs to move; using the fins to swim; using the wings to fly). LO4.9. Identify the function of body covering (e.g., using the fur to keep warm; using the skin to protect). LO4.10. Identify the function of other organs (e.g., using the beak to catch food; using the mouth to eat; using the fingers to grasp).	Explore Animals LO4.1. Explore common animals (e.g., humans, dogs, birds, fish). LO4.2. Identify the physical structures of common animals. LO4.3. Identify sensory organs of common animals (e.g., eyes, ears, nose, mouth, tongue, hands, paws). LO4.4. Identify appendages of common animals (e.g., arms, legs, wings, fins). LO4.5. Identify the body covering of common animals (e.g., skin, feathers, fur, scales). LO4.6. Investigate the function of the physical structures of common animals. LO4.7. Identify the function of sensory organs (e.g., using the eyes to see; using the nose to smell; using the mouth to taste). LO4.8. Identify the function of appendages (e.g., using the legs to move; using the fins to swim; using the wings to fly). LO4.9. Identify the function of body covering (e.g., using the fur to keep warm; using the skin to protect). LO4.10. Identify the function of other organs (e.g., using the beak to catch food; using the mouth to eat; using the fingers to grasp). LO4.11. Compare the physical structures that serve similar functions in different animals. LO4.12. Compare the ability to move (e.g., wings versus legs versus fins). LO4.13. Compare the ability to protect and keep warm (e.g., turtle shells versus human skins versus duck feathers versus dog hair). LO4.14. Compare the ability to catch food (e.g., claws versus hands versus talons versus beaks). LO4.15. Compare the ability to breathe oxygen (e.g., lungs versus gills).
	Explore Plants LO4.16. Explore common plants (e.g., grass, flowers, trees).	Explore Plants LO4.16. Explore common plants (e.g., grass, flowers, trees). LO4.17. Identify the physical structures of common plants (e.g., stems, leaves, flowers, seeds, roots, fruits).	Explore Plants LO4.16. Explore common plants (e.g., grass, flowers, trees). LO4.17. Identify the physical structures of common plants (e.g., stems, leaves, flowers, seeds, roots, fruits).	Explore Plants LO4.16. Explore common plants (e.g., grass, flowers, trees). LO4.17. Identify the physical structures of common plants (e.g., stems leaves, flowers, seeds, roots, fruits).

Strand 3: Characteristics and Interactions of Living Organisms

1. There is a fundamental unity underlying the diversity of all living organisms. (continued)				
	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
D				
Plants and animals have different structures that serve similar functions necessary for the survival of the organism.	<p style="text-align: center;">Comparing Plants and Animals</p> <p>LO4.20. Identify an animal from a group of plants. LO4.21. Identify a plant from a group of animals.</p>	<p style="text-align: center;">Comparing Plants and Animals</p> <p>LO4.20. Identify an animal from a group of plants. LO4.21. Identify a plant from a group of animals. LO4.22. Sort a group of organisms into plants and animals.</p>	<p style="text-align: center;">Comparing Plants and Animals</p> <p>LO4.20. Identify an animal from a group of plants. LO4.21. Identify a plant from a group of animals. LO4.22. Sort a group of organisms into plants and animals.</p>	<p style="text-align: center;">Comparing Plants and Animals</p> <p>LO4.18. Investigate the function of major organs of common plants. a. Identify that roots hold the plants in place and brings in nutrients and water from the soil to the plant. b. Identify that stems provide support for plants and let water and nutrients move to other parts of the plant. c. Identify that plants use leaves to make food. d. identify that flowers, seeds, and fruits are related to the reproduction of flowering plants. LO4.19. Identify how some plants protect themselves (e.g., roses with thorns, cactuses with needles, poison ivy).</p> <p>LO4.20. Identify an animal from a group of plants. LO4.21. Identify a plant from a group of animals. LO4.22. Sort a group of organisms into plants and animals.</p> <p>LO4.23. Compare the physical structures of plants and animals that serve similar functions. a. Compare how plants and animals take in water. b. Compare how plants and animals use oxygen. c. Compare how plants and animals support themselves (e.g., some plants use stems, trunks, and/or roots for support; some animals use a skeleton, exo- or endo-, for support). d. Compare how plants and animals obtain energy (e.g., plants make their food, animals acquire food). e. Compare how plants and animals respond to changes in conditions. f. Compare how plants and animals protect themselves.</p>

Strand 3: Characteristics and Interactions of Living Organisms

1. There is a fundamental unity underlying the diversity of all living organisms.				
	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
D	Not assessed at this level.	Not assessed at this level.	LO5.1. Identify that scientists use structural similarities to classify organisms.	LO5.1. Identify that scientists use structural similarities to classify organisms.
Biological classifications are based on how organisms are related.				

Strand 3: Characteristics and Interactions of Living Organisms

2. Living organisms carry out life processes in order to survive.				
GRADES K–2		GRADES 3–5		GRADES 6–8
B Photosynthesis and cellular respiration are complementary processes necessary to the survival of most organisms on Earth.	Not assessed at this level.	Photosynthesis LO6.1. Identify that plants need sunlight to survive .	Photosynthesis LO6.1. Identify that plants need sunlight to survive. LO6.2. Explore how plants make their own food using sunlight (e.g., growing bean plants with different amounts of light). LO6.4. Investigate photosynthesis as plants using energy from the Sun to produce food (sugar) and oxygen.	Photosynthesis LO6.1. Identify that plants need sunlight to survive. LO6.2. Explore how plants make their own food using sunlight (e.g., growing bean plants with different amounts of light). LO6.3. Identify how plants make their own food using sunlight. LO6.4. Investigate photosynthesis as plants using energy from the Sun to produce food (sugar) and oxygen. LO6.5. Identify photosynthesis as plants using energy from the Sun to produce food (sugar) and oxygen.

Strand 3: Characteristics and Interactions of Living Organisms

2. Living organisms carry out life processes in order to survive.					
		GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
Complex multicellular organisms have systems that interact to carry out life processes through physical and chemical means.	C	Not assessed at this level.	<p>LO7.1. Explore the path of water and nutrients as they move through the transport system of a plant (e.g., dip a white carnation or a celery stalk in different food coloring and observe the change in color).</p>	<p>LO7.1. Explore the path of water and nutrients as they move through the transport system of a plant (e.g., dip a white carnation or a celery stalk in different food coloring and observe the change in color).</p> <p>LO7.2. Identify the path of water and nutrients as they move through the transport system of a plant.</p> <p>LO7.4. Explore the major life processes of animal systems (e.g., support, reproductive, response).</p> <p>LO7.6. Explore the major life processes of plant systems (e.g., support, reproductive, photosynthesis, transport).</p>	<p>LO7.1. Explore the path of water and nutrients as they move through the transport system of a plant (e.g., dip a white carnation or a celery stalk in different food coloring and observe the change in color).</p> <p>LO7.2. Identify the path of water and nutrients as they move through the transport system of a plant.</p> <p>LO7.3. Describe the path of water and nutrients as they move through the transport system of a plant.</p> <p>LO7.4. Explore the major life processes of animal systems (e.g., support, reproductive, response).</p> <p>LO7.5. Identify the major life processes of animal systems.</p> <p>LO7.6. Explore the major life processes of plant systems (e.g., support, reproductive, photosynthesis, transport).</p> <p>LO7.7. Identify the major life processes of plant systems.</p> <p>LO7.8. Investigate different levels of organization in multicellular organisms.</p> <p style="padding-left: 20px;">a. Investigate organs (e.g., heart pumps blood, lungs take in oxygen, brain processes information).</p> <p style="padding-left: 20px;">b. Investigate organ systems (e.g., the circulatory system provides food and oxygen to different parts of the body; the skeletal system supports the body).</p>

Strand 3: Characteristics and Interactions of Living Organisms

3. There is a genetic basis for the transfer of biological characteristics from one generation to the next through reproductive processes.

	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
A	Not assessed at this level.	Not assessed at this level.	<p>LO8.1. Identify that reproduction is a process whereby new individuals (offspring) are produced by parent(s).</p> <p>LO8.2. Identify that genetic information is passed from the parent(s) to the new offspring (e.g., hair color, skin color, eye color, height).</p>	<p>LO8.1. Identify that reproduction is a process whereby new individuals (offspring) are produced by parent(s).</p> <p>LO8.2. Identify that genetic information is passed from the parent(s) to the new offspring (e.g., hair color, skin color, eye color, height).</p> <p style="text-align: center;">Asexual Reproduction</p> <p>LO8.3. Investigate one or more examples of asexual reproduction (e.g., binary fission, plant cutting, cloning).</p> <p>LO8.4. Identify that the offspring is exactly the same as the parent.</p> <p style="text-align: center;">Sexual Reproduction</p> <p>LO8.5. Identify that two parents are needed in sexual reproduction.</p> <p>LO8.6. Identify that the offspring is not exactly the same as the parents.</p>
Reproduction can occur asexually or sexually.				

Strand 3: Characteristics and Interactions of Living Organisms

3. There is a genetic basis for the transfer of biological characteristics from one generation to the next through reproductive processes.

	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
D	LO 9.1. Identify that living things have offspring.	LO9.1. Identify that living things have offspring. LO9.2. Explore a parent-offspring relationship based on the organisms' physical similarities and/or differences (e.g., both the child and the mother have brown eyes; both the puppy and its parent have spots). LO9.3. Explore the similarities and/or differences between animal parents and their offspring (e.g., long neck, skin pattern). LO9.7. Explore similarities and/or differences among multiple offspring of an animal parent (e.g., all puppies are not exactly the same in a litter; not all siblings are exactly the same). LO9.10. Explore the similarities and/or differences between plants and their offspring (i.e., seedlings).	LO9.1. Identify that living things have offspring. LO9.2. Explore a parent-offspring relationship based on the organisms' physical similarities and/or differences (e.g., both the child and the mother have brown eyes; both the puppy and its parent have spots). LO9.3. Explore the similarities and/or differences between animal parents and their offspring (e.g., long neck, skin pattern). LO9.4. Identify the similarities and/or differences between animal parents and their offspring (e.g., compare pictures of children and their biological parents). LO9.6. Compare young animals to their parents (e.g., giraffe, rabbit, human, chicken). LO9.7. Explore similarities and/or differences among multiple offspring of an animal parent (e.g., all puppies are not exactly the same in a litter; not all siblings are exactly the same). LO9.8. Identify similarities and/or differences among multiple offspring of an animal parent. LO9.10. Explore the similarities and/or differences between plants and their offspring (i.e., seedlings). LO9.11. Identify the similarities and/or differences between plants and their offspring.	LO9.1. Identify that living things have offspring. LO9.2. Explore a parent-offspring relationship based on the organisms' physical similarities and/or differences (e.g., both the child and the mother have brown eyes; both the puppy and its parent have spots). LO9.3. Explore the similarities and/or differences between animal parents and their offspring (e.g., long neck, skin pattern). LO9.4. Identify the similarities and/or differences between animal parents and their offspring (e.g., compare pictures of children and their biological parents). LO9.5. Describe the similarities and/or differences between animal parents and their offspring. LO9.6. Compare young animals to their parents (e.g., giraffe, rabbit, human, chicken). LO9.7. Explore similarities and/or differences among multiple offspring of an animal parent (e.g., all puppies are not exactly the same in a litter; not all siblings are exactly the same). LO9.8. Identify similarities and/or differences among multiple offspring of an animal parent. LO9.9. Describe similarities and/or differences among multiple offspring of an animal parent. LO9.10. Explore the similarities and/or differences between plants and their offspring (i.e., seedlings). LO9.11. Identify the similarities and differences between plants and their offspring. LO9.12. Describe the similarities and/or differences between plants and their offspring. LO9.13. Investigate why the offspring is not identical to either parent in sexual reproduction (e.g., each parent passes on only half of the genetic information to the offspring, the new combination is not identical to either one of the parents).
There is heritable variation within every species of an organism.				

Strand 3: Characteristics and Interactions of Living Organisms

LIFE SCIENCE GLOSSARY

- **Asexual reproduction:** reproduction that does not include the union of sex cells and in which one parent produces offspring that are genetically identical to the parent.
- **Cell:** the basic building block for all organisms.
- **Circulatory system:** a collection of organs (e.g., heart, arteries, veins) that move blood throughout an organism.
- **Fission:** a asexual reproductive process in which a unicellular organism divides into two or more independently maturing daughter cells.
- **Genetic Information:** hereditary information that is unique to an organism and is stored in sequences within DNA molecules.
- **Life cycle:** the complete process of change and development during organism's lifetime.
- **Living:** anything that utilizes energy to grow, respond to stimuli, move, respire, and eliminate waste.
- **Metamorphosis:** to undergo a complete or marked change of bodily form while developing into an adult animal.
- **Non Living:** anything that does not (or never did) exhibit the characteristics of living things.
- **Offspring:** the descendants of organisms.
- **Organ:** a differentiated part of an organism, such as an eye, heart, or leaf, that performs a specific function.
- **Organ system:** a system, such as circulatory, digestive, or respiratory, that consists of a collection of organs to perform a specific function.
- **Organism:** a living thing.
- **Photosynthesis:** a process by which green plants and other organisms produce simple sugars and oxygen from carbon dioxide and water, using energy that chlorophyll or other pigments absorb from the Sun.
- **Reproduce:** to produce offspring or new individuals through a sexual or asexual process.
- **Skeletal system:** a collection of organs (e.g., bones, hard outer shells for insects) that provide structural support for an organism.
- **Sexual reproduction:** reproduction that involves the union of male and female reproductive cells, each contributing half of the genetic makeup of the resulting offspring.
- **Survive:** to manage to stay alive or continue to exist, especially in difficult situations.

Glossary and Hierarchy of Terms Developed by the Science AGLE Review Committee

Terms	Definitions
Explore	Use of one or more of the five senses*, to participate within a science content activity.
Identify	Measurable recognition of a science concept (this may be shown in many modes, such as matching, labeling, naming, signing, pointing, and/or touching.)
Investigate	Conduct an science inquiry for purpose of gaining information.
Describe	Communicate/convey information about a science concept.
Compare/Contrast	Identify similarities and differences about a science concept.
Predict	Use of prior knowledge to determine what will or could happen within the content of a science activity.

Strand 3: Characteristics and Interactions of Living Organisms

*Five Senses	Use of smell, hearing, sight, taste and/or touch (includes sensory feeling, such as how your body feels when a car slows down).
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Strand 4: Changes in Ecosystems and Interactions of Organisms with Their Environments

1. Organisms are interdependent with one another and with their environment.				
	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
A				
All populations living together within a community interact with one another and with their environment in order to survive and maintain a balanced ecosystem.	<p>EC1.1. Explore one or more ways in which the seasons affect the behavior of plants and animals.</p> <p>a. Explore one or more ways in which plants need warmer temperature to grow in the spring and the summer (e.g., place a bean plant in a warm and sunny spot and a bean plant in a cold and dark spot).</p> <p>b. Explore why animals tend to be more active during the spring and the summer (e.g., bear hibernation, other animal activities).</p> <p>EC1.4. Explore one or more ways in which the seasons and weather affect the everyday life of humans.</p> <p>a. Explore one or more ways in which humans need more clothing for warmth during cold weather.</p> <p>b. Explore one or more ways in which humans tend to do more outdoor activities during the warm weather.</p> <p>EC1.7. Explore one or more ways in which humans depend on plants and animals.</p> <p>a. Explore one or more ways in which humans need plants and animals for food.</p> <p>b. Explore one or more ways in which humans need plants and animals for clothing.</p> <p>c. Explore one or more ways in which humans need plants for shelter (e.g., using wood to build houses).</p>	<p>EC1.1. Explore one or more ways in which the seasons affect the behavior of plants and animals.</p> <p>a. Explore one or more ways in which plants need warmer temperature to grow in the spring and the summer (e.g., place a bean plant in a warm and sunny spot and a bean plant in a cold and dark spot).</p> <p>b. Explore why animals tend to be more active during the spring and the summer (e.g., bear hibernation, other animal activities).</p> <p>EC1.2. Identify one or more ways in which the seasons affect the behavior of plants and animals (e.g., leaves changing color and falling, animal hibernation).</p> <p>EC1.4. Explore one or more ways in which the seasons and weather affect the everyday life of humans.</p> <p>a. Explore one or more ways in which humans need more clothing for warmth during cold weather.</p> <p>b. Explore one or more ways in which humans tend to do more outdoor activities during the warm weather.</p> <p>EC1.5. Identify one or more ways in which the seasons and weather affect the everyday life of humans (e.g., food, clothing, shelter).</p> <p>EC1.7. Explore one or more ways in which humans depend on plants and animals.</p> <p>a. Explore one or more ways in which humans need plants and animals for food.</p> <p>b. Explore one or more ways in which humans need plants and animals for clothing.</p> <p>c. Explore one or more ways in which humans need plants for shelter (e.g., using wood to build houses).</p> <p>EC1.8. Identify one or more ways in which humans depend on plants and animals.</p>	<p>EC1.1. Explore one or more ways in which the seasons affect the behavior of plants and animals.</p> <p>a. Explore one or more ways in which plants need warmer temperature to grow in the spring and the summer (e.g., place a bean plant in a warm and sunny spot and a bean plant in a cold and dark spot).</p> <p>b. Explore why animals tend to be more active during the spring and the summer (e.g., bear hibernation, other animal activities).</p> <p>EC1.2. Identify one or more ways in which the seasons affect the behavior of plants and animals (e.g., leaves changing color and falling, animal hibernation).</p> <p>EC1.3. Describe one or more ways in which the seasons affect the behavior of plants and animals.</p> <p>EC1.4. Explore one or more ways in which the seasons and weather affect the everyday life of humans.</p> <p>a. Explore one or more ways in which humans need more clothing for warmth during cold weather.</p> <p>b. Explore one or more ways in which humans tend to do more outdoor activities during the warm weather.</p> <p>EC1.5. Identify one or more ways in which the seasons and weather affect the everyday life of humans (e.g., food, clothing, shelter).</p> <p>EC1.6. Describe one or more ways in which the seasons and weather affect the everyday life of humans.</p> <p>EC1.7. Explore one or more ways in which humans depend on plants and animals.</p> <p>a. Explore one or more ways in which humans need plants and animals for food.</p> <p>b. Explore one or more ways in which humans need plants and animals for clothing.</p> <p>c. Explore one or more ways in which humans need plants for shelter (e.g., using wood to build houses).</p> <p>EC1.8. Identify one or more ways in which humans depend on plants and animals.</p> <p>EC1.9. Describe one or more ways in which humans depend on plants and animals.</p> <p>EC1.10. Explore one or more ways in which a specific organism may interact with other organisms (e.g., defense mechanisms; a bee’s interaction with a flower and the resulting pollination; predators; ticks; lice).</p>	<p>EC1.1. Explore one or more ways in which the seasons affect the behavior of plants and animals.</p> <p>a. Explore one or more ways in which plants need warmer temperature to grow in the spring and the summer (e.g., place a bean plant in a warm and sunny spot and a bean plant in a cold and dark spot).</p> <p>b. Explore why animals tend to be more active during the spring and the summer (e.g., bear hibernation, other animal activities).</p> <p>EC1.2. Identify one or more ways in which the seasons affect the behavior of plants and animals (e.g., leaves changing color and falling, animal hibernation).</p> <p>EC1.3. Describe one or more ways in which the seasons affect the behavior of plants and animals.</p> <p>EC1.4. Explore one or more ways in which the seasons and weather affect the everyday life of humans.</p> <p>a. Explore one or more ways in which humans need more clothing for warmth during cold weather.</p> <p>b. Explore one or more ways in which humans tend to do more outdoor activities during the warm weather.</p> <p>EC1.5. Identify one or more ways in which the seasons and weather affect the everyday life of humans (e.g., food, clothing, shelter).</p> <p>EC1.6. Describe one or more ways in which the seasons and weather affect the everyday life of humans.</p> <p>EC1.7. Explore one or more ways in which humans depend on plants and animals.</p> <p>a. Explore one or more ways in which humans need plants and animals for food.</p> <p>b. Explore one or more ways in which humans need plants and animals for clothing.</p> <p>c. Explore one or more ways in which humans need plants for shelter (e.g., using wood to build houses).</p> <p>EC1.8. Identify one or more ways in which humans depend on plants and animals.</p> <p>EC1.9. Describe one or more ways in which humans depend on plants and animals.</p> <p>EC1.10. Explore one or more ways in which a specific organism may interact with other organisms (e.g., defense mechanisms; a bee’s interaction with a flower and the resulting pollination; predators; ticks; lice).</p>

Strand 4: Changes in Ecosystems and Interactions of Organisms with Their Environments

1. Organisms are interdependent with one another and with their environment.					
		GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
A All populations living together within a community interact with one another and with their environment in order to survive and maintain a balanced ecosystem.	A		<p>EC1.11 Explore one or more ways in which a specific organism may interact with the environment (e.g., shelter, seed dispersal, camouflage, migration, hibernation, dandelion seeds spread by wind).</p>	<p>EC1.11. Explore one or more ways in which a specific organism may interact with the environment (e.g., shelter, seed dispersal, camouflage, migration, hibernation, dandelion seeds spread by wind).</p> <p>EC1.12. Identify one or more ways in which a specific organism may interact with the environment (e.g., shelter, seed dispersal, camouflage, migration, hibernation, dandelion seeds spread by wind).</p> <p>EC1.15. Investigate how different environments (i.e., pond, forest, and/or prairie) support the life of different types of plants.</p> <p>EC1.17. Investigate how different environments (i.e., pond, forest, and/or prairie) support the life of different types of animals.</p> <p>EC1.19. Investigate one or more biotic factors that make up an ecosystem (e.g., different living organisms).</p> <p>EC1.21. Explore one or more abiotic factors that make up an ecosystem (e.g., soil, light, water, temperature).</p>	<p>EC1.11. Explore one or more ways in which a specific organism may interact with the environment (e.g., shelter, seed dispersal, camouflage, migration, hibernation, dandelion seeds spread by wind).</p> <p>EC1.12. Identify one or more ways in which a specific organism may interact with the environment (e.g., shelter, seed dispersal, camouflage, migration, hibernation, dandelion seeds spread by wind).</p> <p>EC1.13. Identify one or more ways in which a specific organism may interact with other organisms.</p> <p>EC1.14. Describe one or more ways in which a specific organism may interact with the environment.</p> <p>EC1.15. Investigate how different environments (i.e., pond, forest, and/or prairie) support the life of different types of plants.</p> <p>EC1.16. Identify how different environments support the life of different types of plants.</p> <p>EC1.17. Investigate how different environments (i.e., pond, forest, and/or prairie) support the life of different types of animals.</p> <p>EC1.18. Identify how different environments support the life of different types of animals.</p> <p>EC1.19. Investigate one or more biotic factors that make up an ecosystem (e.g., different living organisms).</p> <p>EC1.20. Identify one or more biotic factors that make up an ecosystem.</p> <p>EC1.21. Explore one or more abiotic factors that make up an ecosystem (e.g., soil, light, water, temperature).</p> <p>EC1.22. Identify one or more abiotic factors that make up an ecosystem.</p> <p>EC1.23. Investigate why predator/prey relationships are needed to control overpopulation of any one species (e.g., not enough prey, the predator population goes up; too much prey, the predator population goes down).</p>

Strand 4: Changes in Ecosystems and Interactions of Organisms with Their Environments

1. Organisms are interdependent with one another and with their environment.				
	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
B	Not assessed in this level.	Not assessed in this level.	<p>EC2.1. Identify the occurrence of a population within a habitat (e.g., worms, butterflies, camels, polar bears, birds).</p> <p>EC2.2. Identify the community of organisms in a habitat (e.g., there are frogs, fish, plants, mosquitoes in a pond habitat).</p> <p>EC2.4. Explore populations within a community that are in competition with one another for resources (e.g., both horses and cows eat grass in the same field; weeds compete with regular plants for space, water, and nutrients in a garden).</p> <p>EC2.5. Identify one or more factors (e.g., amount of food source, amount of light, amount of water, temperature and temperature range, soil composition, diseases, competition from other organisms, predators) that affect different types of organisms found in an ecosystem (e.g., why polar bears do not live in Missouri).</p>	<p>EC2.1. Identify the occurrence of a population within a habitat (e.g., worms, butterflies, camels, polar bears, birds).</p> <p>EC2.2. Identify the community of organisms in a habitat (e.g., there are frogs, fish, plants, mosquitoes in a pond habitat).</p> <p>EC2.3. Compare and contrast population and community.</p> <p>EC2.4. Explore populations within a community that are in competition with one another for resources (e.g., both horses and cows eat grass in the same field; weeds compete with regular plants for space, water, and nutrients in a garden).</p> <p>EC2.5. Identify one or more factors (e.g., amount of food source, amount of light, amount of water, temperature and temperature range, soil composition, diseases, competition from other organisms, predators) that affect different types of organisms found in an ecosystem (e.g., why polar bears do not live in Missouri).</p> <p>EC2.6. Identify one or more factors (e.g., space, food supply, competition, predator, light, moisture, temperature) that can limit a population within an ecosystem (e.g., loss of habitat limits space and food supply for a population of deer in Missouri; too many fish in a small pond/aquarium can cause the fish to die because of limited food and oxygen).</p> <p>EC2.7. Identify one or more ways in which populations might be affected by changes in biotic factors (e.g., gypsy moth, African killer bees, zebra mussels, deer, cougars).</p> <p>EC2.8. Identify one or more ways in which populations might be affected by changes in abiotic factors (e.g., a decrease in rainfall might reduce certain populations of plants, thus reducing certain populations of animals that depend on plants for food).</p>
Living organisms have the capacity to produce populations of infinite size, but environments and resources are finite.				

Strand 4: Changes in Ecosystems and Interactions of Organisms with Their Environments

1. Organisms are interdependent with one another and with their environment.				
	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
C All organisms, including humans, and their activities cause changes in their environment that affect the ecosystem.	Not assessed at this level.	Not assessed at this level.	Not assessed at this level.	EC3.1. Investigate one or more possible negative effects of human interactions with ecosystems (e.g., farming, waste disposal, pollution, logging, mining). EC3.2. Investigate one or more ways in which the stability and/or biodiversity of ecosystems can be restored (e.g., replanting prairie grass or planting trees along a riverbank).

Strand 4: Changes in Ecosystems and Interactions of Organisms with Their Environments

1. Organisms are interdependent with one another and with their environment.							
GRADES K–2		GRADES 3–5		GRADES 6–8		GRADES 9–12	
D	Not assessed in this level.	<p>EC4.1. Explore one or more examples in Missouri where human activity has a positive effect on other organisms (e.g., restoring green space, planting trees, picking up trash).</p>	<p>EC4.1. Explore one or more examples in Missouri where human activity has a positive effect on other organisms (e.g., restoring green space, planting trees, picking up trash).</p>	<p>EC4.1. Explore one or more examples in Missouri where human activity has a positive effect on other organisms (e.g., restoring green space, planting trees, picking up trash).</p>	<p>EC4.1. Explore one or more examples in Missouri where human activity has a positive effect on other organisms (e.g., restoring green space, planting trees, picking up trash).</p>		
		<p>EC4.2. Explore one or more examples in Missouri where human activity has a negative effect on other organisms (e.g., littering, construction, destruction of habitats).</p>	<p>EC4.2. Explore one or more examples in Missouri where human activity has a negative effect on other organisms (e.g., littering, construction, destruction of habitats).</p>	<p>EC4.2. Explore one or more examples in Missouri where human activity has a negative effect on other organisms (e.g., littering, construction, destruction of habitats).</p>	<p>EC4.2. Explore one or more examples in Missouri where human activity has a negative effect on other organisms (e.g., littering, construction, destruction of habitats).</p>		
			<p>EC4.3. Investigate one or more beneficial human activities to ecosystems (e.g., restoring natural habitats, reintroduction of species, recycling, alternate energy, and/or carpooling).</p>	<p>EC4.3. Investigate one or more beneficial human activities to ecosystems (e.g., restoring natural habitats, reintroduction of species, recycling, alternate energy, and/or carpooling).</p>	<p>EC4.3. Investigate one or more beneficial human activities to ecosystems (e.g., restoring natural habitats, reintroduction of species, recycling, alternate energy, and/or carpooling).</p>		
			<p>EC4.4. Investigate one or more harmful human activities to ecosystems (e.g., building roads, building dams, burning of fossil fuels, waste disposal, and/or destruction of habitats).</p>	<p>EC4.4. Investigate one or more harmful human activities to ecosystems (e.g., building roads, building dams, burning of fossil fuels, waste disposal, and/or destruction of habitats).</p>	<p>EC4.4. Investigate one or more harmful human activities to ecosystems (e.g., building roads, building dams, burning of fossil fuels, waste disposal, and/or destruction of habitats).</p>		
				<p>EC4.5. Describe how human activities affect different organisms within an ecosystem (e.g., reintroduction of an endangered bird increases the bird’s population; the construction of a dam floods many riverbank habitats upriver).</p>	<p>EC4.5. Describe how human activities affect different organisms within an ecosystem (e.g., reintroduction of an endangered bird increases the bird’s population; the construction of a dam floods many riverbank habitats upriver).</p>		
				<p>EC4.6. Describe one or more effects (beneficial or harmful) of a natural environmental change on the populations in a community of an ecosystem (e.g., forest fires, floods, volcanic eruptions, tornadoes and hurricanes, mudslides, and/or avalanches).</p>	<p>EC4.6. Describe one or more effects (beneficial or harmful) of a natural environmental change on the populations in a community of an ecosystem (e.g., forest fires, floods, volcanic eruptions, tornadoes and hurricanes, mudslides, and/or avalanches).</p>		
				<p>EC4.7. Identify one or more possible solutions to prevent potentially harmful environmental changes within an ecosystem.</p>	<p>EC4.7. Identify one or more possible solutions to prevent potentially harmful environmental changes within an ecosystem.</p>		
				<p>EC4.8. Identify one or more possible solutions to restore an ecosystem as a result of harmful environmental changes.</p>	<p>EC4.8. Identify one or more possible solutions to restore an ecosystem as a result of harmful environmental changes.</p>		
				<p>EC4.9. Identify one or more possible causes of extinction of a population (e.g., over hunting buffalo; loss of habitat such as prairies, marshes, and/or woods in Missouri).</p>	<p>EC4.9. Identify one or more possible causes of extinction of a population (e.g., over hunting buffalo; loss of habitat such as prairies, marshes, and/or woods in Missouri).</p>		

Strand 4: Changes in Ecosystems and Interactions of Organisms with Their Environments

2. Matter and energy flow through an ecosystem.				
	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">A</p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">As energy flows through the ecosystem, all organisms capture a portion of that energy and transform it to a form they can use.</p>	<p>Not assessed at this level.</p>	<p>EC5.1. Identify sunlight as the primary source of energy plants use to produce their own food.</p> <p>EC5.2. Explore producers (e.g., plants).</p> <p>EC5.4. Explore consumers (e.g., most animals).</p> <p>EC5.6. Explore decomposers (e.g., bacteria, some animals).</p> <p>EC5.13. Explore different types of consumers.</p> <p style="padding-left: 20px;">a. Explore common herbivores (e.g., rabbits, deer, giraffe).</p> <p style="padding-left: 40px;">c. Explore common carnivores (e.g., dogs, lions, wolves).</p> <p style="padding-left: 40px;">e. Explore common omnivores (e.g., bears, humans, chickens).</p> <p>EC5.15. Explore predators and prey (e.g., fox/rabbit, chicken/hawk, deer/wolf).</p>	<p>EC5.1. Identify sunlight as the primary source of energy plants use to produce their own food.</p> <p>EC5.2. Explore producers (e.g., plants).</p> <p>EC5.3. Identify one or more examples of producers (e.g., plants, algae).</p> <p>EC5.4. Explore consumers (e.g., most animals).</p> <p>EC5.5. Identify one or more examples of consumers.</p> <p>EC5.6. Explore decomposers (e.g., bacteria, some animals).</p> <p>EC5.7. Identify one or more examples of decomposers (e.g., earthworms, maggots).</p> <p>EC5.8. Sort organisms into producers and consumers.</p> <p>EC5.10. Explore the flow of energy through a food chain (e.g., sun > plants > rabbits > hawks).</p> <p>EC5.11. Identify the flow of energy through a food chain.</p> <p>EC5.13. Explore different types of consumers.</p> <p style="padding-left: 20px;">a. Explore common herbivores (e.g., rabbits, deer, giraffe).</p> <p style="padding-left: 40px;">b. Identify one or more examples of herbivores.</p> <p style="padding-left: 40px;">c. Explore common carnivores (e.g., dogs, lions, wolves).</p> <p style="padding-left: 40px;">d. Identify one or more examples of carnivores.</p> <p style="padding-left: 40px;">e. Explore common omnivores (e.g., bears, humans, chickens).</p> <p style="padding-left: 40px;">f. Identify one or more examples of omnivores.</p> <p>EC5.14. Sort organisms into herbivores, carnivores, and omnivores.</p> <p>EC5.15. Explore predators and prey (e.g., fox/rabbit, chicken/hawk, deer/wolf).</p> <p>EC5.16. Identify organisms as predator or prey in a given ecosystem.</p>	<p>EC5.1. Identify sunlight as the primary source of energy plants use to produce their own food.</p> <p>EC5.2. Explore producers (e.g., plants).</p> <p>EC5.3. Identify one or more examples of producers (e.g., plants, algae).</p> <p>EC5.4. Explore consumers (e.g., most animals).</p> <p>EC5.5. Identify one or more examples of consumers.</p> <p>EC5.6. Explore decomposers (e.g., bacteria, some animals).</p> <p>EC5.7. Identify one or more examples of decomposers (e.g., earthworms, maggots).</p> <p>EC5.8. Sort organisms into producers and consumers.</p> <p>EC5.9. Classify organisms into producers, consumers, and decomposers.</p> <p>EC5.10. Explore the flow of energy through a food chain (e.g., sun > plants > rabbits > hawks).</p> <p>EC5.11. Identify the flow of energy through a food chain.</p> <p>EC5.12. Identify one or more possible effects of removing an organism from a food chain.</p> <p>EC5.13. Explore different types of consumers.</p> <p style="padding-left: 20px;">a. Explore common herbivores (e.g., rabbits, deer, giraffe).</p> <p style="padding-left: 40px;">b. Identify one or more examples of herbivores.</p> <p style="padding-left: 40px;">c. Explore common carnivores (e.g., dogs, lions, wolves).</p> <p style="padding-left: 40px;">d. Identify one or more examples of carnivores.</p> <p style="padding-left: 40px;">e. Explore common omnivores (e.g., bears, humans, chickens).</p> <p style="padding-left: 40px;">f. Identify one or more examples of omnivores.</p> <p>EC5.14. Sort organisms into herbivores, carnivores, and omnivores.</p> <p>EC5.15. Explore predators and prey (e.g., fox/rabbit, chicken/hawk, deer/wolf).</p> <p>EC5.16. Identify organisms as predator or prey in a given ecosystem.</p> <p>Food Webs</p> <p>EC5.17. Identify a food chain within an aquatic or land food web.</p> <p>EC5.18. Identify one or more producers, consumers, and decomposers within an aquatic or land food web.</p> <p>EC5.19. Identify one or more predator/prey relationships within an aquatic and land food web.</p>

Strand 4: Changes in Ecosystems and Interactions of Organisms with Their Environments

3. Genetic variation sorted by the natural selection process explains evidence of biological evolution.					
GRADES K–2		GRADES 3–5		GRADES 6–8	
A	Not assessed at this level.	<p>EC6.1. Explore one or more common fossils found in Missouri (i.e., trilobites, ferns, crinoids, gastropods, bivalves, fish, and/or mastodons).</p>	<p>EC6.1. Explore one or more common fossils found in Missouri (i.e., trilobites, ferns, crinoids, gastropods, bivalves, fish, and/or mastodons).</p> <p>EC6.2. Identify one or more common fossils found in Missouri.</p>	<p>EC6.1. Explore one or more common fossils found in Missouri (i.e., trilobites, ferns, crinoids, gastropods, bivalves, fish, and/or mastodons).</p> <p>EC6.2. Identify one or more common fossils found in Missouri.</p>	<p>EC6.1. Explore one or more common fossils found in Missouri (i.e., trilobites, ferns, crinoids, gastropods, bivalves, fish, and/or mastodons).</p> <p>EC6.2. Identify one or more common fossils found in Missouri.</p>
		<p>EC6.4. Explore fossils as evidence of some types of organisms that once lived in the past.</p>	<p>EC6.4. Explore fossils as evidence of some types of organisms that once lived in the past.</p> <p>EC6.5. Identify fossils as evidence of some types of organisms that once lived in the past.</p>	<p>EC6.4. Explore fossils as evidence of some types of organisms that once lived in the past.</p> <p>EC6.5. Identify fossils as evidence of some types of organisms that once lived in the past.</p>	<p>EC6.3. Describe one or more common fossils found in Missouri.</p> <p>EC6.4. Explore fossils as evidence of some types of organisms that once lived in the past.</p> <p>EC6.5. Identify fossils as evidence of some types of organisms that once lived in the past.</p>
		<p>EC6.7. Explore fossils as evidence that some organisms are extinct and no longer live today.</p>	<p>EC6.7. Explore fossils as evidence that some organisms are extinct and no longer live today.</p> <p>EC6.8. Identify fossils as evidence that some organisms are extinct and no longer live today.</p>	<p>EC6.7. Explore fossils as evidence that some organisms are extinct and no longer live today.</p> <p>EC6.8. Identify fossils as evidence that some organisms are extinct and no longer live today.</p>	<p>EC6.6. Describe fossils as evidence of some types of organisms that once lived in the past.</p> <p>EC6.7. Explore fossils as evidence that some organisms are extinct and no longer live today.</p> <p>EC6.8. Identify fossils as evidence that some organisms are extinct and no longer live today.</p>
			<p>EC6.10. Explore one or more physical characteristics of past and present organisms (e.g., mammoth versus elephant, saber-toothed tiger versus present day tiger, prehistoric fish versus present day fish).</p>		<p>EC6.9. Describe fossils as evidence that some organisms are extinct and no longer live today.</p> <p>EC6.10. Explore one or more physical characteristics of past and present organisms (e.g., mammoth versus elephant, saber-toothed tiger versus present day tiger, prehistoric fish versus present day fish).</p> <p>EC6.11. Identify one or more physical characteristics of past and present organisms (e.g., mammoth versus elephant, saber-toothed tiger versus present day tiger, prehistoric fish versus present day fish).</p>

Strand 4: Changes in Ecosystems and Interactions of Organisms with Their Environments

3. Genetic variation sorted by the natural selection process explains evidence of biological evolution.					
		GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
C	Natural selection is the process of sorting individuals based on their ability to survive and reproduce within their ecosystem.	Not assessed at this level.	<p>EC7.1. Explore one or more structural adaptations that help common plants survive in their environment (e.g., root, cactus needles, rose thorns, winged seed, waxy leaves, poisonous plants).</p> <p>EC7.3 Explore one or more behavioral adaptations that help common plants survive in their environment (e.g., flowers and plants point and grow toward the direction of sunlight).</p> <p>EC7.6. Explore one or more structural adaptations that help common animals survive in their environment (e.g., thick fur for polar bears, camouflage, hard outer layers for insects, excreting odor, squids excreting ink, poisonous snakes).</p> <p>EC7.8. Explore one or more behavioral adaptations that help common animals survive in their environment (e.g., hibernation, seasonal migration, pretending to be dead, remaining motionless).</p>	<p>EC7.1. Explore one or more structural adaptations that help common plants survive in their environment (e.g., root, cactus needles, rose thorns, winged seed, waxy leaves, poisonous plants).</p> <p>EC7.2. Identify one or more structural adaptations in common plants.</p> <p>EC7.3. Explore one or more behavioral adaptations that help common plants survive in their environment (e.g., flowers and plants point and grow toward the direction of sunlight).</p> <p>EC7.4. Identify one or more behavioral adaptations in common plants.</p> <p>EC7.6. Explore one or more structural adaptations that help common animals survive in their environment (e.g., thick fur for polar bears, camouflage, hard outer layers for insects, excreting odor, squids excreting ink, poisonous snakes).</p> <p>EC7.7. Identify one or more structural adaptations in common animals.</p> <p>EC7.8. Explore one or more behavioral adaptations that help common animals survive in their environment (e.g., hibernation, seasonal migration, pretending to be dead, remaining motionless).</p> <p>EC7.9. Identify one or more behavioral adaptations in common animals.</p>	<p>EC7.1. Explore one or more structural adaptations that help common plants survive in their environment (e.g., root, cactus needles, rose thorns, winged seed, waxy leaves, poisonous plants).</p> <p>EC7.2. Identify one or more structural adaptations in common plants.</p> <p>EC7.3. Explore one or more behavioral adaptations that help common plants survive in their environment (e.g., flowers and plants point and grow toward the direction of sunlight).</p> <p>EC7.4. Identify one or more behavioral adaptations in common plants.</p> <p>EC7.5. Predict if a common plant will be able to survive in a specific environment based on its structural or behavioral characteristics (e.g., would waxy leaf plants survive in a desert?; would palm trees survive in the arctic?).</p> <p>EC7.6. Explore one or more structural adaptations that help common animals survive in their environment (e.g., thick fur for polar bears, camouflage, hard outer layers for insects, excreting odor, squids excreting ink, poisonous snakes).</p> <p>EC7.7. Identify one or more structural adaptations in common animals.</p> <p>EC7.8. Explore one or more behavioral adaptations that help common animals survive in their environment (e.g., hibernation, seasonal migration, pretending to be dead, remaining motionless).</p> <p>EC7.9. Identify one or more behavioral adaptations in common animals.</p> <p>EC7.10 Predict if a common animal will be able to survive in a specific environment based on its structural or behavioral characteristics (e.g., would frogs and snakes survive in the arctic?).</p> <p>EC7.11. Identify examples of adaptations that may have resulted from natural selection (e.g., giraffes with longer necks have an advantage over giraffes with shorter necks; different colored moths might have an advantage over other colored moths based on its surroundings).</p>

Strand 4: Changes in Ecosystems and Interactions of Organisms with Their Environments

LIFE SCIENCE GLOSSARY

- **Abiotic:** pertaining to the non-living part of the environment.
- **Adaptation:** the development of physical and behavioral characteristics that allow organisms to survive and reproduce in their habitats.
- **Biotic:** pertaining to the living part of the environment.
- **Biodiversity:** the number and variety of organisms found in a particular habitat or ecosystem.
- **Carnivores:** meat eaters.
- **Community:** a group of plants and animals living and interacting with one another in the same ecosystem.
- **Consumer:** an organism that feeds on other organisms or on material derived from them.
- **Decomposer:** an organism, especially a bacterium or fungus, that causes organic matter to rot or decay.
- **Ecosystem:** a localized group of interdependent organisms together with the environment that they inhabit and depend on.
- **Food chain:** a hierarchy of different living things, each of which feeds on the one below.
- **Food web:** the interlinking food chains within an ecological community.
- **Fossil:** the remains of an animal or plant preserved from an earlier era inside a rock or other geological deposit, often as an impression or in a petrified state.
- **Habitat:** part of an ecosystem where organisms get food and shelter.
- **Herbivore:** plant eaters.
- **Hibernation:** a sleeplike dormant state over the winter during which an organism lives off reserves of body fat, with a decrease in body temperature and pulse rate and slower metabolism.
- **Living:** anything that utilizes energy to grow, respond to stimuli, move, respire, and eliminate waste.
- **Migration:** the seasonal movement of organisms from one location to another.
- **Natural selection:** changes in a population as a response to changes in their environment over time.
- **Omnivores:** organisms that consume both plants and meat.
- **Organism:** a living thing.
- **Population:** organisms of the same species in a specified habitat.
- **Producer:** an organism that provides (makes) its own food (e.g., plants).
- **Survive:** to manage to stay alive or continue to exist, especially in difficult situations.

* Glossary and Hierarchy of Terms Developed by the Science AGLE Review Committee on next page.

Strand 4: Changes in Ecosystems and Interactions of Organisms with Their Environments

Glossary and Hierarchy of Terms Developed by the Science AGLE Review Committee

Terms	Definitions
Explore	Use of one or more of the five senses*, to participate within a science content activity.
Identify	Measurable recognition of a science concept (this may be shown in many modes, such as matching, labeling, naming, signing, pointing, and/or touching.)
Investigate	Conduct an science inquiry for purpose of gaining information.
Describe	Communicate/convey information about a science concept.
Compare/Contrast	Identify similarities and differences about a science concept.
Predict	Use of prior knowledge to determine what will or could happen within the content of a science activity.
*Five Senses	Use of smell, hearing, sight, taste and/or touch (includes sensory feeling, such as how your body feels when a car slows down).

Strand 5: Processes and Interactions of the Earth's Systems (Geosphere, Atmosphere, and Hydrosphere)

1. Earth's systems (geosphere, atmosphere, and hydrosphere) have common components and unique structures.					
		GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
A	Soils		<p>Soils</p> <p>ES1.1. Explore soil using one or more of the five senses.</p> <p>ES1.2. Identify soil from other common objects (e.g., glass, metal, paper, plastic).</p> <p>ES1.3. Explore the different components of soil using one or more of the five senses (e.g. use a microscope or hand lens to examine soil; describe or draw pictures of what is seen).</p> <p>ES1.5. Explore the physical properties (e.g., odor, color, appearance) of soil.</p>	<p>Soils</p> <p>ES1.1. Explore soil using one or more of the five senses.</p> <p>ES1.2. Identify soil from other common objects (e.g., glass, metal, paper, plastic).</p> <p>ES1.3. Explore the different components of soil using one or more of the five senses (e.g., use a microscope or hand lens to examine soil; describe and/or draw pictures of what is seen).</p> <p>ES1.4. Identify the components of soil (e.g., plant roots, leaves, grass, bacteria, fungi, worms, types of rock).</p> <p>ES1.5. Explore the physical properties (e.g., odor, color, appearance) of soil.</p> <p>ES1.6. Identify the physical properties of soil (e.g., odor, color, texture).</p>	<p>Soils</p> <p>ES1.1. Explore soil using one or more of the five senses.</p> <p>ES1.2. Identify soil from other common objects (e.g., glass, metal, paper, plastic).</p> <p>ES1.3. Explore the different components of soil using one or more of the five senses (e.g., use a microscope or hand lens to examine soil; describe and/or draw pictures of what is seen).</p> <p>ES1.4. Identify the components of soil (e.g., plant roots, leaves, grass, bacteria, fungi, worms, types of rock).</p> <p>ES1.5. Explore the physical properties (e.g., odor, color, appearance) of soil.</p> <p>ES1.6. Identify the physical properties of soil (e.g., odor, color, texture).</p> <p>ES1.7. Compare the different components of soil.</p>
	Rocks	<p>ES1.8. Explore rocks using one or more of the five senses.</p>	<p>Rocks</p> <p>ES1.8. Explore rocks using one or more of the five senses.</p> <p>ES1.9. Identify rocks from other common objects and materials (e.g., grass, wood, leaves, paper, plastic).</p> <p>ES1.10. Explore one or more of the physical properties (e.g., size, shape, color, presence of fossils) of rocks using one or more of the five senses.</p>	<p>Rocks</p> <p>ES1.8. Explore rocks using one or more of the five senses.</p> <p>ES1.9. Identify rocks from other common objects and/or materials (e.g., grass, wood, leaves, paper, plastic).</p> <p>ES1.10. Explore one or more of the physical properties (e.g., size, shape, color, presence of fossils) of rocks using one or more of the five senses.</p> <p>ES1.11. Identify one or more of the physical properties (i.e., size, shape, color, texture, layering, and/or presence of fossils) of rocks (e.g., feel rocks; use a microscope to examine and describe or draw pictures; weigh rocks, compare; do a hardness test; scratch for color; hammer on rocks to determine hardness).</p>	<p>Rocks</p> <p>ES1.8. Explore rocks using one or more of the five senses.</p> <p>ES1.9. Identify rocks from other common objects and/or materials (e.g., grass, wood, leaves, paper, plastic).</p> <p>ES1.10. Explore one or more of the physical properties (e.g., size, shape, color, presence of fossils) of rocks using one or more of the five senses.</p> <p>ES1.11. Identify one or more of the physical properties (i.e., size, shape, color, texture, layering, and/or presence of fossils) of rocks (e.g., feel rocks; use a microscope to examine and describe or draw pictures; weigh rocks, compare; do a hardness test; scratch for color; hammer on rocks to determine hardness).</p>

Strand 5: Processes and Interactions of the Earth's Systems (Geosphere, Atmosphere, and Hydrosphere)

1. Earth's systems (geosphere, atmosphere, and hydrosphere) have common components and unique structures. (continued)				
	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
A				<p>Minerals</p> <p>ES1.12. Investigate one or more types of rocks; (eg., visit a quarry, visit a landscape store; gather soil from various areas around the school; create a mosaic/step stones; gather rocks in the area; use a rock tumbler; estimate how many rocks will fill a particular container; create a chart that shows the class's collected rocks).</p> <ul style="list-style-type: none"> a. Explore sedimentary rocks (e.g., conglomerates, sandstone, shale, limestone). b. Explore igneous rocks (e.g., granite, basalt). c. Explore metamorphic rocks (e.g., marble, slate). <p>ES1.13. Explore one or more of the physical properties of minerals (e.g., texture, smell, luster, hardness, crystal shape, streak, reaction to magnets, feeling of minerals, use a microscope to examine and describe minerals or draw pictures of them, weigh minerals, do a hardness test, scratch for color).</p>

Earth's crust is composed of various materials, including soil, minerals, and rocks, with characteristic properties.

Strand 5: Processes and Interactions of the Earth's Systems (Geosphere, Atmosphere, and Hydrosphere)

1. Earth's systems (geosphere, atmosphere, and hydrosphere) have common components and unique structures.					
GRADES K–2		GRADES 3–5		GRADES 6–8	GRADES 9–12
B	The hydrosphere is composed of water (a material with unique properties) and other materials.	Not assessed at this level.		Not assessed at this level.	
		Not assessed at this level.		<p>ES2.1. Explore one or more major bodies of surface water (e.g., rivers, lakes, oceans, glaciers).</p> <p>ES2.2. Explore bodies of water as fresh or salt water.</p> <p>ES2.3. Explore bodies of water as flowing or stationary.</p> <p>ES2.4. Explore bodies of water as solid or liquid.</p> <p>ES2.5. Explore bodies of water as surface or groundwater.</p>	<p>ES2.1. Explore one or more major bodies of surface water (e.g., rivers, lakes, oceans, glaciers).</p> <p>ES2.2. Explore bodies of water as fresh or salt water.</p> <p>ES2.3. Explore bodies of water as flowing or stationary.</p> <p>ES2.4. Explore bodies of water as solid or liquid.</p> <p>ES2.5. Explore bodies of water as surface or groundwater.</p> <p>ES2.6. Identify one or more bodies of water.</p> <p>ES2.7. Describe one or more bodies of water.</p> <p>ES2.8. Identify that water is an essential component of Earth's systems.</p>

Strand 5: Processes and Interactions of the Earth's Systems (Geosphere, Atmosphere, and Hydrosphere)

1. Earth's systems (geosphere, atmosphere, and hydrosphere) have common components and unique structures.					
		GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
C	The atmosphere (air) is composed of a mixture of gases, including water vapor, and minute particles	ES3.1. Explore wind as moving air (e.g., using a folding paper fan, pinwheel).	ES3.1. Explore wind as moving air (e.g., using a folding paper fan, pinwheel). ES3.2. Identify wind as moving air.	ES3.1. Explore wind as moving air (e.g., using a folding paper fan, and/or a pinwheel). ES3.2. Identify wind as moving air. ES3.3. Describe wind as moving air.	ES3.1. Explore wind as moving air (e.g., using a folding paper fan, and/or a pinwheel). ES3.2. Identify wind as moving air.
			ES3.4. Explore liquid water changing into a gas (e.g., observe the size of a water puddle at different time during the day; boiling a pot of water).	ES3.4. Explore liquid water changing into a gas (e.g., observe the size of a water puddle at different times during the day; boiling a pot of water). ES3.5. Identify liquid water changing into a gas.	ES3.3. Describe wind as moving air. ES3.4. Explore liquid water changing into a gas (e.g., observe the size of a water puddle at different times during the day; boiling a pot of water). ES3.5. Identify liquid water changing into a gas.
		ES3.7. Explore how clouds and/or fogs are made of tiny droplets of water (e.g., open the freezer door on a hot and humid day and observe a fog forming; place a glass of ice over a boiling pot of water and observe water droplets forming).	ES3.7. Explore how clouds and/or fogs are made of tiny droplets of water (e.g., open the freezer door on a hot and humid day and observe a fog forming; place a glass of ice over a boiling pot of water and observe water droplets forming). ES3.8. Identify clouds and/or fogs as being made of tiny droplets of water.	ES3.7. Explore how clouds and/or fogs are made of tiny droplets of water (e.g., open the freezer door on a hot and humid day and observe a fog forming; place a glass of ice over a boiling pot of water and observe water droplets forming). ES3.8. Identify clouds and/or fogs as being made of tiny droplets of water.	ES3.6. Describe liquid water changing into a gas. ES3.7. Explore how clouds and/or fogs are made of tiny droplets of water (e.g., open the freezer door on a hot and humid day and observe a fog forming; place a glass of ice over a boiling pot of water and observe water droplets forming). ES3.8. Identify clouds and/or fogs as being made of tiny droplets of water.
		ES3.10. Explore air is an invisible substance that takes up space (e.g., observe the size of the balloon getting larger when more air is added).	ES3.10. Explore air as invisible substance that takes up space (e.g., observe the size of the balloon getting larger when more air is added). ES3.11. Identify air is invisible substance that takes up space.	ES3.10. Explore air as invisible substance that takes up space (e.g., observe the size of the balloon getting larger when more air is added). ES3.11. Identify air as invisible substance that takes up space.	ES3.9. Describe clouds and/or fogs are made of tiny droplets. ES3.10. Explore air as invisible substance that takes up space (e.g., observe the size of the balloon getting larger when more air is added). ES3.11. Identify air as invisible substance that takes up space.
					ES3.12. Describe air as an invisible substance that takes up space. ES3.13. Investigate the components in the atmosphere (e.g., oxygen, nitrogen, carbon dioxide, water vapor, dust pollen, spores, virus, bacteria).

Strand 5: Processes and Interactions of the Earth's Systems (Geosphere, Atmosphere, and Hydrosphere)

1. Earth's systems (geosphere, atmosphere, and hydrosphere) have common components and unique structures.				
	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
D Climate is a description of average weather conditions in a given area over time.	Not assessed at this level.	Not assessed at this level.	<p>ES4.1. Investigate factors affecting weather.</p> <ul style="list-style-type: none"> a. Investigate amounts of precipitation (i.e., rain, snow, sleet, and/or hail). b. Investigate air temperature (i.e., cold, warm, and/or hot). c. Investigate wind (e.g., flying a kite, a flag on a pole). d. Investigate one or more types of storms (e.g., thunderstorm, tornadoes, hurricanes). <p>ES4.3. Investigate how climate and/or weather impacts people (e.g., hot and dry climates make growing plants difficult; people need to wear warmer clothing and heat their homes in cold climates).</p>	<p>ES4.1. Investigate factors affecting weather.</p> <ul style="list-style-type: none"> a. Investigate amounts of precipitation (i.e., rain, snow, sleet, and/or hail). b. Investigate air temperature (i.e., cold, warm, and/or hot). c. Investigate wind (e.g., flying a kite, a flag on a pole). d. Investigate one or more types of storms (e.g., thunderstorms, tornadoes, hurricanes). e. Investigate humidity (i.e., dry and/or humid). <p>ES4.2. Investigate factors affecting climate.</p> <ul style="list-style-type: none"> a. Investigate how climate varies by location and/or region. <p>ES4.3. Investigate how climate and/or weather impacts people (e.g., hot and dry climates make growing plants difficult; people need to wear warmer clothing and heat their homes in cold climates).</p> <p>ES4.4. Identify how climate and/or weather impacts people.</p>

Strand 5: Processes and Interactions of the Earth's Systems (Geosphere, Atmosphere, and Hydrosphere)

2. Earth's systems (geosphere, atmosphere, and hydrosphere) interact with one another as they undergo change by common processes.					
		GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
Earth's systems (geosphere, atmosphere, and hydrosphere) interact with one another as they undergo change by common processes.	A	Not assessed at this level.	<p>ES5.1. Explore examples of slow changes in the Earth's surface and surface materials (e.g., river rock is smooth compared to a regular rock; rivers can create canyons; soil layers).</p> <p>ES5.2. Explore the breakdown of plant and animal material into soil through decomposition processes (e.g., decay, rotting, composting, digestion).</p> <p>ES5.3. Explore the major landforms on Earth (i.e., mountains, plains, oceans, river valleys, coastlines, canyons).</p>	<p>ES5.1. Explore examples of slow changes in Earth's surface and surface materials (e.g., river rock is smooth compared to a regular rock; rivers can create canyons; soil layers).</p> <p>ES5.2. Explore the breakdown of plant and/or animal material into soil through decomposition processes (e.g., decay, rotting, composting, digestion).</p> <p>ES5.3. Explore one or more of the major landforms on Earth (i.e., mountains, plains, oceans, river valleys, coastlines, and/or canyons).</p> <p>ES5.4. Identify the major landforms on Earth.</p> <p>ES5.6. Explore weathering processes by water (e.g., freezing and thawing of water to create potholes).</p> <p>ES5.7. Explore weathering processes by chemicals (e.g., acid rain on limestone statues).</p> <p>ES5.8. Explore weathering processes by temperature (e.g., buckling of concrete roadways on hot days).</p> <p>ES5.9. Explore weathering processes by plants (e.g., roots growing in cracks expand and break rocks).</p> <p>ES5.11. Explore erosion processes by the action of gravity (e.g., landslides, mudslides, avalanches).</p> <p>ES5.12. Explore erosion processes by waves (e.g., ocean waves hitting the coastline and breaking rocks into sand).</p> <p>ES5.13. Explore erosion processes by wind (e.g., wind carries small particles to create arches).</p> <p>ES5.14. Explore erosion processes by rivers (e.g., rivers carving out canyons).</p> <p>ES5.17. Explore how Earth's surface can change abruptly (e.g., flooding, rock/mudslides, volcano eruptions, earthquakes, storms)</p>	<p>ES5.1. Explore examples of slow changes in Earth's surface and surface materials (e.g., river rock is smooth compared to a regular rock; rivers can create canyons; soil layers).</p> <p>ES5.2. Explore the breakdown of plant and/or animal material into soil through decomposition processes (e.g., decay, rotting, composting, digestion).</p> <p>ES5.3. Explore one or more of the major landforms on Earth (i.e., mountains, plains, oceans, river valleys, coastlines, and/or canyons).</p> <p>ES5.4. Identify the major landforms on Earth.</p> <p>ES5.5. Describe the major landforms on Earth.</p> <p>ES5.6. Explore weathering processes by water (e.g., freezing and thawing of water to create potholes).</p> <p>ES5.7. Explore weathering processes by chemicals (e.g., acid rain on limestone statues).</p> <p>ES5.8. Explore weathering processes by temperature (e.g., buckling of concrete roadways on hot days).</p> <p>ES5.9. Explore weathering processes by plants (e.g., roots growing in cracks expand and break rocks).</p> <p>ES5.10. Investigate how weathering processes cause changes on Earth's surface.</p> <p>ES5.11. Explore erosion processes by the action of gravity (e.g., landslides, mudslides, avalanches).</p> <p>ES5.12. Explore erosion processes by waves (e.g., ocean waves hitting the coastline and breaking rocks into sand).</p> <p>ES5.13. Explore erosion processes by wind (e.g., wind carries small particles to create arches).</p> <p>ES5.14. Explore erosion processes by rivers (e.g., rivers carving out canyons).</p> <p>ES5.15. Investigate how erosion processes cause changes on the Earth's surface (e.g., formations of canyons and river deltas; using a stream table to demonstrate water erosion).</p> <p>ES5.16. Investigate the formation of sedimentary rocks using their physical properties (e.g., layering and the presence of fossils indicate sedimentation).</p> <p>ES5.17. Explore how Earth's surface can change abruptly (e.g., flooding, rock/mudslides, volcano eruptions, earthquakes, storms).</p> <p>ES5.18. Identify how Earth's surface can change abruptly.</p>

Strand 5: Processes and Interactions of the Earth's Systems (Geosphere, Atmosphere, and Hydrosphere)

2. Earth's systems (geosphere, atmosphere, and hydrosphere) interact with one another as they undergo change by common processes.				
	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
D	Not assessed at this level.	Not assessed at this level.	<p>ES6.1. Explore replacement fossils (e.g., petrified wood, trilobites).</p> <p>ES6.2. Explore mold and/or cast fossils (e.g., dinosaur footprints).</p> <p>ES6.3. Explore preservation fossils (e.g., insect in amber).</p> <p>ES6.4. Investigate the processes by which different fossils are formed (e.g., hand and foot impressions in plaster casts, use small plastic animals to make impressions in plaster).</p>	<p>ES6.1. Explore replacement fossils (e.g., petrified wood, trilobites).</p> <p>ES6.2. Explore mold and/or cast fossils (e.g., dinosaur footprints).</p> <p>ES6.3. Explore preservation fossils (e.g., insect in amber).</p> <p>ES6.4. Investigate the processes by which different fossils are formed (e.g., hand and foot impressions in plaster casts; use small plastic animals to make impressions in plaster).</p> <p>ES6.5. Investigate fossil evidence and/or how it indicates changes on Earth (i.e., superposition of rock layers; similarities between fossils in different geographical locations; and/or fossils of seashells indicate that the area was once under water).</p> <p>ES6.6. Investigate how rocks and fossils can tell us about Earth a long time ago.</p> <ul style="list-style-type: none"> a. Investigate changes in successive layers of sedimentary rock and the fossils contained within them. b. Investigate similarities between fossils in different geographic locations. c. Investigate similarities between fossils and present-day organisms. d. Investigate changes in climate using fossils of organisms. e. Investigate fossils of extinct organisms.
Changes in the earth over time can be inferred through rock and fossil evidence.				

Strand 5: Processes and Interactions of the Earth's Systems (Geosphere, Atmosphere, and Hydrosphere)

2. Earth's systems (geosphere, atmosphere, and hydrosphere) interact with one another as they undergo change by common processes.					
		GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
F	Changes in the form of water as it moves through Earth's systems are described as the water cycle	Not assessed at this level	ES7.1. Explore clouds and/or precipitation (i.e., rain, snow, sleet, hail) as forms of water.	ES7.1. Explore clouds and/or precipitation (i.e., rain, snow, sleet, and/or hail) as forms of water.	ES7.1. Explore clouds and/or precipitation (i.e., rain, snow, sleet, and/or hail) as forms of water.
				ES7.2. Explore the different forms of water on Earth (e.g., snow, rain, sleet, fog, clouds, dew, water vapor).	ES7.2. Explore the different forms of water on Earth (e.g., snow, rain, sleet, fog, clouds, dew, water vapor).
			ES7.3. Explore the components of the water cycle. <ol style="list-style-type: none"> a. Explore evaporation (e.g., water goes from liquid to gas). b. Explore condensation (e.g., water goes from gas to liquid—formation of clouds). c. Explore precipitation (e.g., water falling as rain, snow, sleet, hail). d. Explore surface runoff/groundwater flow. 	ES7.3. Explore the components of the water cycle. <ol style="list-style-type: none"> a. Explore evaporation (e.g., water goes from liquid to gas). b. Explore condensation (e.g., water goes from gas to liquid—formation of clouds). c. Explore precipitation (e.g., water falling as rain, snow, sleet, hail). d. Explore surface runoff/groundwater flow). 	ES7.3. Explore the components of the water cycle. <ol style="list-style-type: none"> a. Explore evaporation (e.g., water goes from liquid to gas). b. Explore condensation (e.g., water goes from gas to liquid—formation of clouds). c. Explore precipitation (e.g., water falling as rain, snow, sleet, hail). d. Explore surface runoff/groundwater flow).
					ES7.4. Identify the components of the water cycle (i.e., evaporation, condensation, precipitation, surface runoff).
					ES7.5. Identify the correct sequence in the water cycle (i.e., evaporation, condensation, precipitation, runoff).
					ES7.6. Investigate how the different forms of water in the water cycle affect atmospheric conditions at a given location. <ol style="list-style-type: none"> a. Investigate air temperature (e.g., it is cooler after a thunderstorm). b. Investigate air pressure (e.g., high pressure, clear sky; low pressure, cloudy). c. Investigate wind direction (e.g., using a weather map). d. Investigate wind speed. e. Investigate humidity.

Strand 5: Processes and Interactions of the Earth's Systems (Geosphere, Atmosphere, and Hydrosphere)

2. Earth's systems (geosphere, atmosphere, and hydrosphere) interact with one another as they undergo change by common processes. (continued)					
		GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
F	Changes in the form of water as it moves through Earth's systems are described as the water cycle.	<p>ES8.1. Explore daily weather.</p> <ul style="list-style-type: none"> a. Explore precipitation (e.g., snow, rain, sleet, fog). b. Explore wind (i.e., light breezes to strong wind). c. Explore cloud cover (i.e., clear, partly cloudy, and/or cloudy). 	<p>ES8.1. Explore daily weather.</p> <ul style="list-style-type: none"> a. Explore precipitation (e.g., snow, rain, sleet, fog). b. Explore wind (i.e., light breezes to strong wind). c. Explore cloud cover (i.e., clear, partly cloudy, and/or cloudy). 	<p>ES8.1. Explore daily weather.</p> <ul style="list-style-type: none"> a. Explore precipitation (e.g., snow, rain, sleet, fog). b. Explore wind (i.e., light breezes to strong wind). c. Explore cloud cover (i.e., clear, partly cloudy, and/or cloudy). d. Explore temperature. 	<p>ES8.1. Explore daily weather.</p> <ul style="list-style-type: none"> a. Explore precipitation (e.g., snow, rain, sleet, fog). b. Explore wind (i.e., light breezes to strong wind). c. Explore cloud cover (i.e., clear, partly cloudy, and/or cloudy). d. Explore temperature.
		<p>ES8.3. Explore appropriate tools to collect weather data.</p> <ul style="list-style-type: none"> a. Explore precipitation using rain gauges. b. Explore wind speed using anemometers. c. Explore wind direction using wind vane. 	<p>ES8.3. Explore appropriate tools to collect weather data.</p> <ul style="list-style-type: none"> a. Explore precipitation using rain gauges. b. Explore wind speed using anemometers. c. Explore wind direction using wind vane. 	<p>ES8.2. Measure and record weather data.</p> <ul style="list-style-type: none"> a. Measure and record precipitation by rain gauges. b. Measure and record wind speed by wind socks. c. Measure and record cloud cover by observations. d. Measure and record temperature by thermometers. 	<p>ES8.2. Measure and record weather data.</p> <ul style="list-style-type: none"> a. Measure and record precipitation by rain gauges. b. Measure and record wind speed by wind socks. c. Measure and record cloud cover by observations. d. Measure and record temperature by thermometers.
<p>ES8.7. Explore the general weather conditions that occur in your region during each season.</p>	<p>ES8.7. Explore the general weather conditions that occur in your region during each season.</p>	<p>ES8.3. Explore appropriate tools to collect weather data.</p> <ul style="list-style-type: none"> a. Explore precipitation using rain gauges. b. Explore wind speed using anemometers. c. Explore wind direction using wind vane. 	<p>ES8.3. Explore appropriate tools to collect weather data.</p> <ul style="list-style-type: none"> a. Explore precipitation using rain gauges. b. Explore wind speed using anemometers. c. Explore wind direction using wind vane. 	<p>ES8.4. Investigate appropriate tools to collect weather data.</p> <ul style="list-style-type: none"> a. Investigate by collecting precipitation data using rain gauges. b. Investigate by collecting wind speed data using anemometers. c. Investigate by collecting wind direction data using wind vanes. 	<p>ES8.3. Explore appropriate tools to collect weather data.</p> <ul style="list-style-type: none"> a. Explore precipitation using rain gauges. b. Explore wind speed using anemometers. c. Explore wind direction using wind vane. <p>ES8.4. Investigate appropriate tools to collect weather data.</p> <ul style="list-style-type: none"> a. Investigate by collecting precipitation data using rain gauges. b. Investigate by collecting wind speed data using anemometers. c. Investigate by collecting wind direction data using wind vanes. d. Investigate by collecting temperature data using thermometers. e. Investigate by collecting relative humidity data using hygrometers. f. Investigate by collecting air pressure data using barometers.
				<p>ES8.5. Compare temperatures in different locations (e.g., inside, outside, in the sun, in the shade).</p>	<p>ES8.5. Compare temperatures in different locations (e.g., inside, outside, in the sun, in the shade).</p>
				<p>ES8.6. Compare different geographical regions (e.g., desert, arctic, rain forest).</p>	<p>ES8.6. Compare different geographical regions (e.g., desert, arctic, rain forest).</p>
				<p>ES8.7. Explore the general weather conditions that occur in your region during each season.</p>	<p>ES8.7. Explore the general weather conditions that occur in your region during each season.</p>

Strand 5: Processes and Interactions of the Earth's Systems (Geosphere, Atmosphere, and Hydrosphere)

2. Earth's systems (geosphere, atmosphere, and hydrosphere) interact with one another as they undergo change by common processes. (continued)					
		GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
F	Changes in the form of water as it moves through Earth's systems are described as the water cycle.		<p>ES8.8. Compare weather data observed in your region at different times throughout the year (hot versus cold, cloudy versus clear, types of precipitation, windy versus calm).</p> <p>ES8.9. Explore trends between weather data and weather phenomena (e.g., snow falls when it is cold outside; dark clouds lead to rain).</p>	<p>ES8.8. Compare weather data observed in your region at different times throughout the year (e.g., hot versus cold, cloudy versus clear, types of precipitation, windy versus calm).</p> <p>ES8.9. Explore trends between weather data and weather phenomena (e.g., snow falls when it is cold outside; dark clouds lead to rain).</p>	<p>ES8.8. Compare weather data observed in your region at different times throughout the year (e.g., hot versus cold, cloudy versus clear, types of precipitation, windy versus calm).</p> <p>ES8.9. Explore trends between weather data and weather phenomena (e.g., snow falls when it is cold outside; dark clouds lead to rain).</p> <p>ES8.10. Identify trends between weather data collected over a period of time (e.g., determine the warmest temperature during a day; rain tends to occur on cloudy days; record the direction of wind over a period of time).</p> <p>ES8.11. Investigate elements in weather maps (i.e., temperatures, air pressures, cloud covers, and/or weather fronts).</p> <p>ES8.12. Investigate weather conditions associated with fronts (e.g., boundaries between air masses).</p> <p style="padding-left: 20px;">a. Cold fronts (e.g., strong and shifty winds, sudden drops in temperature, heavy rain with possibility of hail, thunder and lightning).</p> <p style="padding-left: 20px;">b. Warm fronts (e.g., air temperature becomes warmer and more humid).</p> <p>ES8.13. Investigate factors that can affect the weather patterns in a particular region (e.g., location near large bodies of water, prevailing wind currents, amount of sunlight, location near mountain ranges).</p> <p>ES8.14. Investigate the current day weather by using weather data from weather instruments and maps.</p> <p>ES8.15. Predict the next day's weather based on current weather data.</p> <p>ES8.16. Identify that a large change in temperature may lead to severe weather (i.e., strong thunderstorms, tornadoes, hurricanes).</p>

Strand 5: Processes and Interactions of the Earth's Systems (Geosphere, Atmosphere, and Hydrosphere)

3. Human activity is dependent upon and affects Earth's resources and systems.						
GRADES K–2		GRADES 3–5		GRADES 6–8	GRADES 9–12	
A	Exploring Earth's Resources		Exploring Earth's Resources		Exploring Earth's Resources	
	Earth Activity is dependent upon and affects Earth's resources and systems.	<p>ES9.1. Explore one or more ways humans use Earth's materials (e.g., soil, rock) in daily life.</p>	<p>ES9.1. Explore one or more ways humans use Earth's materials (e.g., soil, rock) in daily life.</p> <p>ES9.2. Explore one or more ways to solve simple environmental problems (e.g., recycling to reduce trash, composting to create natural fertilizers, planting vegetation to reduce soil erosion).</p> <p>ES9.3. Explore one or more ways how humans affect Earth's materials (e.g., clearing of land, planting vegetation, paving land, construction of new buildings).</p>	<p>ES9.1. Explore one or more ways humans use Earth's materials (e.g., soil, rock) in daily life.</p> <p>ES9.2. Explore one or more ways to solve simple environmental problems (e.g., recycling to reduce trash, composting to create natural fertilizers, planting vegetation to reduce soil erosion). Explore one or more ways how humans affect Earth's materials (e.g., clearing of land, planting vegetation, paving land, construction of new buildings).</p> <p>ES9.3. Explore one or more ways how humans affect Earth's materials (e.g., clearing of land, planting vegetation, paving land, construction of new buildings).</p> <p>ES9.4. Identify one or more ways humans affect the erosion and deposition of soil and rock materials (e.g., clearing of land can lead to increase soil erosion; planting vegetation can prevent soil erosion; paving land and building construction can lead to more water runoff and increase soil erosion; building a dam can reduce the change of flow downstream and reduce possible soil deposition).</p>	<p>ES9.1. Explore one or more ways humans use Earth's materials (e.g., soil, rock) in daily life.</p> <p>ES9.2. Explore one or more ways to solve simple environmental problems (e.g., recycling to reduce trash, composting to create natural fertilizers, planting vegetation to reduce soil erosion). Explore one or more ways humans affect Earth's materials (e.g., clearing of land, planting vegetation, paving land, construction of new buildings).</p> <p>ES9.3. Explore one or more ways humans affect the erosion and deposition of soil and rock materials (e.g., clearing of land can lead to increase soil erosion; planting vegetation can prevent soil erosion; paving land and building construction can lead to more water runoff and increase soil erosion; building a dam can reduce the change of flow downstream and reduce possible soil deposition).</p> <p>ES9.4. Identify one or more ways humans affect the erosion and deposition of soil and rock materials (e.g., clearing of land can lead to increase soil erosion; planting vegetation can prevent soil erosion; paving land and building construction can lead to more water runoff and increase soil erosion; building a dam can reduce the change of flow downstream and reduce possible soil deposition).</p> <p>ES9.5. Identify one or more human activities that negatively impact the air (atmosphere) (e.g., automobile exhaust, factory emission).</p> <p>ES9.6. Identify one or more human activities that negatively impact the water (hydrosphere) (e.g., dumping of chemicals; fertilizers; pesticides; oil spills; trash).</p> <p>ES9.7. Identify one or more human activities that negatively impact the land (geosphere) (e.g., dumping of chemicals; waste disposal).</p> <p>ES9.8. Identify that major mineral resources are limited on Earth (e.g., petroleum, coal, iron, aluminum, copper, gravel).</p>	

Strand 5: Processes and Interactions of the Earth's Systems (Geosphere, Atmosphere, and Hydrosphere)

3. Human activity is dependent upon and affects Earth's resources and systems. (continued)				
GRADES K–2		GRADES 3–5	GRADES 6–8	GRADES 9–12
A	Exploring Water as a Natural Resource			
	<p>ES9.9. Explore ways water, as a solid and/or liquid, is used in everyday activities (e.g., bathe, drink, make ice cubes, build snowmen, cook, swim).</p>	<p>Exploring Water as a Natural Resource</p> <p>ES9.9. Explore ways water, as a solid and/or liquid, is used in everyday activities (e.g., bathe, drink, make ice cubes, build snowmen, cook, swim).</p> <p>ES9.10. Identify that major bodies of water are important natural resources for human activity (e.g., food, recreation, habitat, irrigation, cleaning, transportation).</p>	<p>Exploring Water as a Natural Resource</p> <p>ES9.9. Explore ways water, as a solid and/or liquid, is used in everyday activities (e.g., bathe, drink, make ice cubes, build snowmen, cook, swim).</p> <p>ES9.10. Identify that major bodies of water are important natural resources for human activity (e.g., food, recreation, habitat, irrigation, cleaning, transportation).</p> <p>ES9.11. Investigate how human needs and activities (e.g., irrigation, damming of rivers, waste treatment, sources of drinking water) have affected the quantity and quality of major bodies of fresh water.</p> <p>ES9.14. Investigate the effect of human activities (e.g., landfills, use of fertilizers and pesticides, farms, sewages) on the quality of drinking water.</p>	<p>Exploring Water as a Natural Resource</p> <p>ES9.9. Explore ways water, as a solid and/or liquid, is used in everyday activities (e.g., bathe, drink, make ice cubes, build snowmen, cook, swim).</p> <p>ES9.10. Identify that major bodies of water are important natural resources for human activity (e.g., food, recreation, habitat, irrigation, cleaning, transportation).</p> <p>ES9.11. Investigate how human needs and activities (e.g., irrigation, damming of rivers, waste treatment, sources of drinking water) have affected the quantity and quality of major bodies of fresh water.</p> <p>ES9.12. Investigate solutions to problems related to water quality and availability that result from human activity.</p> <p>ES9.13. Investigate the relative amounts of fresh and salt water on Earth.</p> <p>ES9.14. Investigate the effect of human activities (e.g., landfills, use of fertilizers and pesticides, farms, sewages) on the quality of drinking water.</p> <p>ES9.15. Identify the effect of human activities.</p> <p>ES9.16. Identify that fresh water is a limited resource.</p> <p>Exploring Renewable and Nonrenewable Energy Sources</p> <p>ES9.17. Investigate types of renewable energy sources (e.g., solar, wind, geothermal, hydroelectric).</p> <p>ES9.18. Investigate types of nonrenewable energy sources (e.g., petroleum, coal).</p>
Human activity is dependent upon and affects Earth's resources and systems				

Strand 5: Processes and Interactions of the Earth’s Systems (Geosphere, Atmosphere, and Hydrosphere)

EARTH SCIENCE GLOSSARY

- **Atmosphere (air):** consists of all the gaseous matter enveloping and surrounding Earth.
- **Condensation:** the process by which water vapor becomes liquid water.
- **Deposition:** when transported earth materials are dropped in another location.
- **Erosion:** movement of weathered rock and soil.
- **Evaporation:** the process by which liquid water becomes a gas (vapor).
- **Fossil:** traces or remains of organisms that lived in the past.
- **Hydrosphere (water):** consists of all the water (solid, liquid, and gas) on Earth.
- **Geosphere (land):** also known as lithosphere, the outer part of the earth that is solid, consisting of the crust and upper mantle.
- **Gravity:** a force that acts to pull objects together.
- **Humidity:** amount of water vapor in the atmosphere.
- **Igneous rock:** a rock that forms when melted rock (lava or magma) cools and crystallizes.
- **Metamorphic rock:** a rock that forms when other rocks are changed by intense heat and pressure.
- **Precipitation:** any form of water that falls to earth from a cloud.
- **Runoff:** water that flows over the land surface outside of a channel.
- **Sediment:** pieces of rocks.
- **Sedimentary rock:** a rock that forms through cementation of sediments or through processes such as evaporation and compaction.
- **Water cycle:** a model describing the movement of water in, on, and above the earth.
- **Weathering:** a slow and continuous process of breaking down rocks chemically or mechanically.

Glossary and Hierarchy of Terms Developed by the Science AGLE Review Committee

Terms	Definitions
Explore	Use of one or more of the five senses*, to participate within a science content activity.
Identify	Measurable recognition of a science concept (this may be shown in many modes, such as matching, labeling, naming, signing, pointing, and/or touching.)
Investigate	Conduct an science inquiry for purpose of gaining information.
Describe	Communicate/convey information about a science concept.
Compare/Contrast	Identify similarities and differences about a science concept.
Predict	Use of prior knowledge to determine what will or could happen within the content of a science activity.
*Five Senses	Use of smell, hearing, sight, taste and/or touch (includes sensory feeling, such as how your body feels when a car slows down).

Strand 6: Composition and Structure of the Universe and the Motion of the Objects within It

1. The universe has observable properties and structure.					
		GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
A	The Earth, Sun, and Moon are part of a larger system that includes other planets and smaller celestial bodies.	Celestial Bodies in the Sky	Celestial Bodies in the Sky	Celestial Bodies in the Sky	Celestial Bodies in the Sky
		UM1.1. Explore one or more objects in the sky (i.e., the Sun, Moon, and/or stars).	UM1.1. Explore one or more objects in the sky (i.e., the Sun, Moon, and/or stars).	UM1.1. Explore one or more objects in the sky (i.e., the Sun, Moon, and/or stars). UM1.2. Investigate one or more objects within the solar system (i.e., the Sun, planets, moons, asteroids, comets, and/or meteors).	UM1.1. Explore one or more objects in the sky (i.e., the Sun, Moon, and/or stars). UM1.3. Identify objects within the solar system as a star, a planet, or a moon.
				UM1.4. Investigate the position of common celestial bodies (i.e., Sun, moon, planets, smaller celestial bodies such as comets and meteors, and/or other stars) in the sky to the Earth.	UM1.4. Investigate the position of common celestial bodies (i.e., Sun, moon, planets, smaller celestial bodies such as comets and meteors, and/or other stars) in the sky to the Earth. UM1.5. Identify the position of common celestial bodies in the sky relative to the Earth.
		Sun and the Stars	Sun and the Stars	Sun and the Stars	Sun and the Stars
		UM1.6. Identify that there are more stars in the sky than can be easily counted.	UM1.6. Identify that there are more stars in the sky than can be easily counted.	UM1.6. Identify that there are more stars in the sky than can be easily counted.	UM1.6. Identify that there are more stars in the sky than can be easily counted.
		UM1.7. Identify that the stars are not spaced evenly in the sky.	UM1.7. Identify that the stars are not spaced evenly in the sky.	UM1.7. Identify that the stars are not spaced evenly in the sky.	UM1.7. Identify that the stars are not spaced evenly in the sky.
		UM1.8. Identify that the stars vary in brightness.	UM1.8. Identify that the stars vary in brightness.	UM1.8. Identify that the stars vary in brightness. UM1.9. Identify our Sun as a star. UM1.10. Identify our Sun as the source of energy for our solar system.	UM1.8. Identify that the stars vary in brightness. UM1.9. Identify our Sun as a star. UM1.10. Identify our Sun as the source of energy for our solar system.
			The Moon	The Moon	The Moon
			UM1.11. Identify that the Moon reflects light from the Sun.	UM1.11. Identify that the Moon reflects light from the Sun. UM1.12. Identify that the Moon (a natural satellite) orbits the Earth. UM1.13. Investigate one or more moons on other planets within the solar system.	UM1.11. Identify that the Moon reflects light from the Sun. UM1.12. Identify that the Moon (a natural satellite) orbits the Earth. UM1.13. Investigate one or more moons on other planets within the solar system.
			Earth and Other Planets	Earth and Other Planets	Earth and Other Planets
	UM1.14. Explore one or more planets other than the Earth in the solar system.	UM1.14. Explore one or more planets other than the Earth in the solar system.	UM1.14. Explore one or more planets other than the Earth in the solar system.		
	UM1.15. Identify that planets look like stars in the night sky.	UM1.15. Identify that planets look like stars in the night sky. UM1.16. Investigate that different planets have different characteristics (e.g., size, relative distance from the Sun).	UM1.15. Identify that planets look like stars in the night sky. UM1.16. Investigate that different planets have different characteristics (e.g., size, relative distance from the Sun, composition and atmosphere, inner/rocky, outer/gaseous, Pluto as a distinct icy planet with an irregular orbit). UM1.17. Compare the planets in the solar system. UM1.18. Describe one or more planets in the solar system.		

Strand 6: Composition and Structure of the Universe and the Motion of the Objects within It

1. The universe has observable properties and structure.				
	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
B	Not assessed at this level.	<p>UM2.1. Explore one or more physical features of Earth that allows life to exist (i.e., air, water, and/or temperature).</p>	<p>UM2.1. Explore one or more physical features of Earth that allows life to exist (i.e., air, water, and/or temperature).</p> <p>UM2.2. Investigate how air on Earth allows life to exist (e.g., oxygen in air is required for human, and other animals to survive).</p> <p>UM2.3. Investigate how water on Earth allows life to exist (e.g., water is required to help make food for plants; water is essential for all cellular processes in living organisms).</p> <p>UM2.4. Investigate how the temperatures on Earth allow life to exist (e.g., life will not exist if the temperature is too hot or too cold).</p>	<p>UM2.1. Explore one or more physical features of Earth that allows life to exist (i.e., air, water, and/or temperature).</p> <p>UM2.2. Investigate how air on Earth allows life to exist (e.g., oxygen in air is required for human, and other animals to survive).</p> <p>UM2.3. Investigate how water on Earth allows life to exist (e.g., water is required to help make food for plants; water is essential for all cellular processes in living organisms).</p> <p>UM2.4. Investigate how the temperatures on Earth allows life to exist (e.g., life will not exist if the temperature is too hot or too cold).</p> <p>UM2.5. Compare physical features of Earth to those of the Sun (e.g., the temperature of the Sun is too high to sustain life).</p> <p>UM2.6. Compare physical features of Earth to those of the Moon (e.g., the Moon as no air to support life).</p> <p>UM2.7. Compare physical features of Earth to those of other planets within the solar system (e.g., the atmosphere of Jupiter does not have oxygen to support life; the temperature on Pluto is too cold to support life).</p> <p>UM2.8. Describe one or more characteristics of Earth that make it favorable to provide a life-supporting environment (i.e., distance from the Sun, temperature, and/or atmosphere).</p>
Earth has a composition and location suitable to sustain life.				

Strand 6: Composition and Structure of the Universe and the Motion of the Objects within It

1. The universe has observable properties and structure.				
	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
C	Not assessed at this level.	Not assessed at this level.	Not assessed at this level.	<p>UM3.1. Investigate the distance between stars.</p> <p>UM3.2. Investigate why stars appear smaller than the Sun (e.g., stars like our Sun are much farther away from us than the Sun is).</p> <p>UM3.3. Identify that distance makes stars appear smaller than they are because they are so far away (e.g., Sun, a star which appears much larger because it is close to Earth).</p>
Most of the information we know about the universe comes from the electromagnetic spectrum.				

Strand 6: Composition and Structure of the Universe and the Motion of the Objects within It

2. Regular and predictable motions of objects in the universe can be described and explained as the result of gravitational forces.					
		GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
A	The apparent position of the Sun and other stars, as seen from Earth, changes in observable patterns.	<p>UM4.1. Identify the Sun from other objects in the sky.</p> <p>UM4.2. Identify the Sun can only be seen during the daytime.</p> <p>UM4.3. Identify the Sun moves across the sky from morning to night.</p>	<p>UM4.1. Identify the Sun from other objects in the sky.</p> <p>UM4.2. Identify that Sun can only be seen during the daytime.</p> <p>UM4.3. Identify that Sun moves across the sky from morning to night.</p> <p>UM4.4. Investigate how the Sun appears to move slowly across the sky (from east to west) during the day.</p>	<p>UM4.1. Identify the Sun from other objects in the sky.</p> <p>UM4.2. Identify that Sun can only be seen during the daytime.</p> <p>UM4.3. Identify that Sun moves across the sky from morning to night.</p> <p>UM4.4. Investigate how the Sun appears to move slowly across the sky (from east to west) during the day.</p> <p>UM4.5. Investigate the apparent east-to-west movement of the Sun, stars, and planets in the sky (as a result of Earth's rotation/spinning about its axis).</p>	<p>UM4.1. Identify the Sun from other objects in the sky.</p> <p>UM4.2. Identify that the Sun can be seen only during the daytime.</p> <p>UM4.3. Identify that the Sun moves across the sky from morning to night.</p> <p>UM4.4. Investigate how the Sun appears to move slowly across the sky (from east to west) during the day.</p> <p>UM4.5. Investigate the apparent east-to-west movement of the Sun, stars, and planets in the sky (as a result of Earth's rotation/spinning about its axis).</p> <p>UM4.6. Investigate the pattern of daylight hours throughout the year (e.g., days are shorter during the winter months; days are longer during the summer months).</p> <p>UM4.7. Identify that during the winter, the Sun appears lower in the sky than it does during the summer.</p>

Strand 6: Composition and Structure of the Universe and the Motion of the Objects within It

2. Regular and predictable motions of objects in the universe can be described and explained as the result of gravitational forces.					
		GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
B	The apparent position of the Moon, as seen from Earth, and its actual position relative to Earth change in observable patterns.	<p>UM5.1. Identify that/how the Moon is different.</p> <p>UM5.2. Identify that the Moon can be seen sometimes at night and sometimes during the day.</p>	<p>UM5.1. Identify that/how the Moon is different.</p> <p>UM5.2. Identify that the Moon can be seen sometimes at night and sometimes during the day.</p> <p>UM5.3. Identify that the shape of the Moon appears to change.</p> <p>UM5.4. Investigate how the Moon appears to move across the sky (from east to west).</p>	<p>UM5.1. Identify that/how the Moon is different.</p> <p>UM5.2. Identify that the Moon can be seen sometimes at night and sometimes during the day.</p> <p>UM5.3. Identify that the shape of the Moon appears to change.</p> <p>UM5.4. Investigate how the Moon appears to move across the sky (from east to west).</p> <p>UM5.5. Explore the shape of the Moon (e.g., sketch the shape of the Moon once a week and observe the pattern).</p> <p>UM5.6. Investigate the motion of the Moon over time (e.g., record the time and location of moonrise; record the time and location of moonset; record/draw the appearance of the Moon, and/or identify the pattern of change).</p>	<p>UM5.1. Identify that/how the Moon is different.</p> <p>UM5.2. Identify that the Moon can be seen sometimes at night and sometimes during the day.</p> <p>UM5.3. Identify that the shape of the Moon appears to change.</p> <p>UM5.4. Investigate how the Moon appears to move across the sky (from east to west).</p> <p>UM5.5. Explore the shape of the Moon (e.g., sketch the shape of the Moon once a week and observe the pattern).</p> <p>UM5.6. Investigate the motion of the Moon over time (e.g., record the time and location of moonrise; record the time and location of moonset; record/draw the appearance of the Moon, and/or identify the pattern of change).</p> <p>UM5.7. Identify that the Moon rises later each day because the Moon goes around the Earth in a counterclockwise motion.</p> <p>UM5.8. Identify that the Moon is in the sky for about 12 hours each day (e.g., if the Moon rises at about 6:00 p.m., it will set at about 6:00 a.m.).</p> <p>UM5.9. Identify that one half of the Moon is always facing the Sun and is always reflecting light.</p> <p>UM5.10. Identify that the shape of the Moon, as seen from Earth, repeats itself about every 28 days.</p>

Strand 6: Composition and Structure of the Universe and the Motion of the Objects within It

2. Regular and predictable motions of objects in the universe can be described and explained as the result of gravitational forces.					
		GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
C The regular and predictable motions of Earth and the moon relative to the Sun explain natural phenomena on Earth, such as days, months, years, shadows, Moon phases, eclipses, tides, and seasons.	Seasons	Seasons UM6.1. Explore the characteristics of summer in your region (e.g., warm, long days). UM6.2. Explore the characteristics of fall in your region (e.g., leaves falling). UM6.3. Explore the characteristics of winter in your region (e.g., cold, short days). UM6.4. Explore the characteristics of spring in your region (e.g., flowers blooming).	Seasons UM6.1. Explore the characteristics of summer in your region (e.g., warm, long days). UM6.2. Explore the characteristics of fall in your region (e.g., leaves falling). UM6.3. Explore the characteristics of winter in your region e.g., cold, short days). UM6.4. Explore the characteristics of spring in your region (e.g., flowers blooming).	Seasons UM6.1. Explore the characteristics of summer in your region (e.g., warm, long days). UM6.2. Explore the characteristics of fall in your region (e.g., leaves falling). UM6.3. Explore the characteristics of winter in your region e.g., cold, short days). UM6.4. Explore the characteristics of spring in your region (e.g., flowers blooming).	Seasons UM6.1. Explore the characteristics of summer in your region (e.g., warm, long days). UM6.2. Explore the characteristics of fall in your region (e.g., leaves falling). UM6.3. Explore the characteristics of winter in your region e.g., cold, short days). UM6.4. Explore the characteristics of spring in your region (e.g., flowers blooming). UM6.5. Investigate the tilting of Earth's axis and orbital position of Earth around the Sun to the seasons (e.g., use a flashlight and a globe in a dark room to describe the lit part of Earth in different orbital positions).
		Earth's Motions	Earth's Motions UM6.6. Identify there is a day/night cycle every 24 hours. UM6.7. Explore the changes in length and/or position (direction) of the shadows during the day.	Earth's Motions UM6.6. Identify that there is a day/night cycle every 24 hours. UM6.7. Explore the changes in length and/or position (direction) of shadows during the day. UM6.8. Identify the relationship between the Sun's position in the sky and the changes in length and/or position of the shadows. UM6.9. Identify a day as the time it takes Earth to make a full rotation about its axis. UM6.10. Identify the path the Earth travels as it goes around (revolves) the Sun (e.g., draw a diagram of Earth orbiting the Sun). UM6.11. Identify a year as the time it takes Earth to go around the Sun once.	Earth's Motions UM6.6. Identify that there is a day/night cycle every 24 hours. UM6.7. Explore the changes in length and/or position (direction) of shadows during the day. UM6.8. Identify the relationship between the Sun's position in the sky and the changes in length and/or position of the shadows. UM6.9. Identify a day as the time it takes Earth to make a full rotation about its axis. UM6.10. Identify the path the Earth travels as it goes around (revolves) the Sun (e.g., draw a diagram of Earth orbiting the Sun). UM6.11. Identify a year as the time it takes Earth to go around the Sun once.
	Moon Phases		Moon Phases UM6.12. Explore one or more phases (i.e., new, crescent, quarter, and/or full) of the Moon (e.g., record on an individual calendar the daily/nightly appearances of the Moon; match the shapes of the Moon with the correct phases).	Moon Phases UM6.12. Explore one or more phases (i.e., new, crescent, quarter, and/or full) of the Moon (e.g., record on an individual calendar the daily/nightly appearances of the Moon; match the shapes of the Moon with the correct phases). UM6.13. Identify one or more phases (i.e., new, waxing crescent, first quarter, waxing gibbous, full, waning gibbous, last quarter, and/or waning crescent) of the Moon.	

Strand 6: Composition and Structure of the Universe and the Motion of the Objects within It

2. Regular and predictable motions of objects in the universe can be described and explained as the result of gravitational forces. (continued)				
	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
C The regular and predictable motions of Earth and the moon relative to the Sun explain natural phenomena on Earth, such as days, months, years, shadows, Moon phases, eclipses, tides, and seasons.			<p>UM6.14. Identify on a class calendar one or more phases of the Moon.</p> <p>UM6.16. Investigate one or more phases of the Moon as the Moon orbits/goes around Earth (e.g., use a flashlight and a tennis ball in a dark room to demonstrate).</p> <p>Eclipses</p> <p>UM6.18. Explore solar eclipses (e.g., using pictures and drawings).</p> <p>UM6.19. Explore lunar eclipses (e.g., using pictures and drawings).</p>	<p>UM6.14. Identify on a class calendar one or more phases of the Moon.</p> <p>UM6.15. Predict on a calendar one or more upcoming phases of the Moon.</p> <p>UM6.16. Investigate one or more phases of the Moon as the Moon orbits/goes around Earth (e.g., use a flashlight and a tennis ball in a dark room to demonstrate).</p> <p>UM6.17. Identify that one or more phases of the Moon are due to the relative positions of the Moon with respect to Earth and the Sun (e.g., use models of Earth, the Moon, and the Sun to describe different phases of the Moon).</p> <p>Eclipses</p> <p>UM6.18. Explore solar eclipses (e.g., using pictures and drawings).</p> <p>UM6.19. Explore lunar eclipses (e.g., using pictures and drawings).</p> <p>UM6.20. Investigate solar eclipses (e.g., using the relative positions of Earth, the Moon, and the Sun; using models).</p> <p>UM6.21. Investigate lunar eclipses (e.g., using the relative positions of Earth, the Moon, and the Sun; using models).</p>

Strand 6: Composition and Structure of the Universe and the Motion of the Objects within It

2. Regular and predictable motions of objects in the universe can be described and explained as the result of gravitational forces.				
	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
D	Not assessed at this level.	Not assessed at this level.	Not assessed at this level.	<p>UM7.1. Identify that the Earth's gravitational pull draws any object on or near the Earth toward it (e.g., including natural and artificial satellites, the Moon).</p> <p>UM7.2. Identify that the Sun's gravitation pull keeps the Earth and other planets in their orbits around the Sun.</p>
Gravity is a force of attraction between objects in the solar system and governs their motion.				

Strand 6: Composition and Structure of the Universe and the Motion of the Objects within It

EARTH SCIENCE GLOSSARY

- **Crescent moon:** as being observed on Earth less than half of the Moon is reflecting light.
- **Electromagnetic spectrum:** a form of energy in wave form that can be transmitted through a vacuum or different medium.
- **Full moon:** the entire face of the moon is reflecting light as being observed on Earth.
- **Gibbous moon:** more than half of the Moon as being observed on Earth is reflecting light.
- **Gravitational Pull:** a force that acts to pull objects together.
- **Lunar eclipse:** the Moon appears dark when sunlight is blocked by Earth.
- **Moon phases:** shapes of the light-reflecting part of the Moon as being observed on Earth.
- **Orbiting:** an object travels around another object in a circular or an elliptical path.
- **Quarter moon:** half of the Moon's face as observed from Earth is reflecting light.
- **Revolve:** going around an object in a circular or an elliptical path.
- **Rotation:** spinning around an axis.
- **Satellite (natural and artificial):** a smaller object that orbits a larger, more massive object.
- **Seasons:** a periods of time characterized by weather and other natural events caused by the tilt of Earth's axis as it is orbiting the Sun.
- **Solar eclipse:** the Sun appears dark when sunlight is blocked by the Moon.
- **Waning:** the light-reflecting part of the Moon is shrinking.
- **Waxing:** the light-reflecting part of the Moon is getting larger.

Glossary and Hierarchy of Terms Developed by the Science AGLE Review Committee

Terms	Definitions
Explore	Use of one or more of the five senses*, to participate within a science content activity.
Identify	Measurable recognition of a science concept (this may be shown in many modes, such as matching, labeling, naming, signing, pointing, and/or touching.)
Investigate	Conduct an science inquiry for purpose of gaining information.
Describe	Communicate/convey information about a science concept.
Compare/Contrast	Identify similarities and differences about a science concept.
Predict	Use of prior knowledge to determine what will or could happen within the content of a science activity.
*Five Senses	Use of smell, hearing, sight, taste and/or touch (includes sensory feeling, such as how your body feels when a car slows down).

Strand 7: Scientific Inquiry

1. Scientific understanding is developed through the use of scientific process skills, scientific knowledge, scientific investigation, reasoning, and critical thinking.					
		GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
A Scientific inquiry includes the ability of students to formulate a testable question and explanation and to select appropriate investigative methods in order to obtain evidence relevant to the explanation.	A	<p>SI1.1. Ask questions.</p> <p>a. Ask questions about objects (e.g., what color is the ball?).</p> <p>SI1.2. Investigate to answer a question.</p> <p>a. Follow one or more related directions.</p>	<p>SI1.1. Ask questions.</p> <p>a. Ask questions about objects (e.g., what color is the ball?).</p> <p>b. Ask questions about materials (e.g., what is the table made of?).</p> <p>c. Ask questions about events in the environment (e.g., what is the weather today?).</p> <p>SI1.2. Investigate to answer a question.</p> <p>a. Follow one or more related directions.</p> <p>b. Conduct a simple investigation to answer a question (e.g., which ramp will the marble go faster on?; which material is magnetic?).</p>	<p>SI1.1. Ask questions.</p> <p>a. Ask questions about objects (e.g., what color is the ball?).</p> <p>b. Ask questions about materials (e.g., what is the table made of?).</p> <p>c. Ask questions about events in the environment (e.g., what is the weather today?).</p> <p>d. Identify testable (e.g., which ball is heavier?) and non testable questions (e.g., which color ball is the best?).</p> <p>SI1.2. Investigate to answer a question.</p> <p>a. Follow one or more related directions.</p> <p>b. Conduct a simple investigation to answer a question (e.g., which ramp will the marble go faster on?; which material is magnetic?).</p>	<p>SI1.1. Ask questions.</p> <p>a. Ask questions about objects (e.g., what color is the ball?).</p> <p>b. Ask questions about materials (e.g., what is the table made of?).</p> <p>c. Ask questions about events in the environment (e.g., what is the weather today?).</p> <p>d. Identify testable (e.g., which ball is heavier?) and non testable questions (e.g., which color ball is the best?).</p> <p>e. Formulate testable questions (e.g., are all boys taller than girls?).</p> <p>SI1.2. Investigate to answer a question.</p> <p>a. Follow one or more related directions.</p> <p>b. Conduct a simple investigation to answer a question (e.g., which ramp will the marble go faster on?; which material is magnetic?).</p> <p>c. Plan a simple investigation to answer a question.</p> <p>d. Make one or more suggestions to improve an investigation.</p>

Strand 7: Scientific Inquiry

1. Scientific understanding is developed through the use of scientific process skills, scientific knowledge, scientific investigation, reasoning, and critical thinking.					
		GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
B Scientific inquiry relies upon gathering evidence from qualitative and quantitative observations.	Qualitative Observations		Qualitative Observations SI2.1. Make qualitative observations using one or more of the five senses (e.g., the ball is big; the box is big). SI2.2. Use tools, equipment, and/or techniques. a. Make observations using simple tools and/or equipment (e.g., magnifiers/hand lenses, magnets, equal arm balances). Quantitative Observations SI2.3. Use measurements. a. Measure length with non standard units (e.g., lining paperclips end to end; using hands or feet as units of measure). b. Measure weight with non standard units (e.g., use marbles as weight units with an equal arm balance).	Qualitative Observations SI2.1. Make qualitative observations using one or more of the five senses (e.g., the ball is big; the box is big). SI2.2. Use tools, equipment, and/or techniques. a. Make observations using simple tools and/or equipment (e.g., magnifiers/hand lenses, magnets, equal arm balances, thermometers). b. Identify the appropriate tools to collect data (i.e., ruler, scale, thermometer, and/or measuring cup). Quantitative Observations SI2.3. Use measurements. a. Measure length with non standard units (e.g., lining paperclips end to end; using hands or feet as units of measure). b. Measure weight with non standard units (e.g., use marbles as weight units with an equal arm balance). c. Compare amounts/measurements.	Qualitative Observations SI2.1. Make qualitative observations using one or more of the five senses (e.g., the ball is big; the box is big). SI2.2. Use tools, equipment, and/or techniques. a. Make observations using simple tools and/or equipment (e.g., magnifiers/hand lenses, magnets, equal arm balances, thermometers). b. Identify the appropriate tools to collect data (i.e., ruler, scale, thermometer, and/or measuring cup). c. Use tools appropriately to collect data. Quantitative Observations SI2.3. Use measurements. a. Measure length with non standard units (e.g., lining paperclips end to end; using hands or feet as units of measure). b. Measure weight with non standard units (e.g., use marbles as weight units with an equal arm balance). c. Compare amounts/measurements. d. Measure length with the appropriate unit. e. Measure weight with the appropriate unit. f. Measure temperature with the appropriate unit. g. Measure volume with the appropriate unit. h. Identify whether measurements and quantities are reasonable.
	SI2.1. Make qualitative observations using one or more of the five senses (e.g., the ball is big; the box is big).				

Strand 7: Scientific Inquiry

1. Scientific understanding is developed through the use of scientific process skills, scientific knowledge, scientific investigation, reasoning, and critical thinking.

	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
C	Not assessed at this level.	<p>Observations and Data</p> <p>SI3.1. Use observations and data.</p> <p>a. Identify observations as support for reasonable explanation (e.g., is it warmer today because the sun is shining?).</p>	<p>Observations and Data</p> <p>SI3.1. Use observations and data.</p> <p>a. Identify observations as support for reasonable explanation (e.g., is it warmer today because the sun is shining?).</p> <p>b. Use data as support for reasonable explanation (e.g., the need to wear a coat because it is zero degrees outside).</p> <p>c. Use observations and data to describe relationships and/or patterns (e.g., the higher the ramp goes up, the faster the car goes).</p>	<p>Observations and Data</p> <p>SI3.1. Use observations and data.</p> <p>a. Identify observations as support for reasonable explanation (e.g., is it warmer today because the sun is shining?).</p> <p>b. Use data as support for reasonable explanation (e.g., the need to wear a coat because it is zero degrees outside).</p> <p>c. Use observations and data to describe relationships and/or patterns (e.g., the higher the ramp goes up, the faster the car goes).</p> <p>d. Use observations and data to make predictions.</p> <p>Errors</p> <p>SI3.2. Investigate possible errors.</p> <p>a. In observations.</p> <p>b. In measurements.</p>

Evidence is used to formulate explanations.

Strand 7: Scientific Inquiry

1. Scientific understanding is developed through the use of scientific process skills, scientific knowledge, scientific investigation, reasoning, and critical thinking.

	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
D	Not assessed at this level.	SI4.1. Make explanations using prior knowledge.	SI4.1. Make explanations using prior knowledge. SI4.2. Investigate the reasonableness of an explanation (e.g., is it reasonable that it is snowing if it is 100 degrees outside?).	SI4.1. Make explanations using prior knowledge. SI4.2. Investigate the reasonableness of an explanation (e.g., is it reasonable that it is snowing if it is 100 degrees outside?).
Scientific inquiry includes evaluation of explanations (hypotheses, laws, theories) in light of scientific principles (understandings).				

Strand 7: Scientific Inquiry

1. Scientific understanding is developed through the use of scientific process skills, scientific knowledge, scientific investigation, reasoning, and critical thinking.

	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
E The nature of science relies upon communication of results and justification of explanations.	<p>SI5.1. Communicate observations and/or events using words, symbols, pictures, objects, and/or action (e.g., to describe the weather as sunny, cloudy, rainy, windy; to draw a landscape – mountain, river, trees, rocks, soil, water).</p>	<p>SI5.1. Communicate observations and/or events using words, symbols, pictures, objects, and/or actions (e.g., to describe the weather as sunny, cloudy, rainy, windy; to draw a landscape – mountain, river, trees, rocks, soil, water).</p> <p>SI5.2. Communicate simple procedures using words, symbols, pictures, objects, and/or actions (e.g., outline the steps in separating a mixture).</p>	<p>SI5.1. Communicate observations and/or events using words, symbols, pictures, objects, and/or actions (e.g., to describe the weather as sunny, cloudy, rainy, windy; to draw a landscape – mountain, river, trees, rocks, soil, water).</p> <p>SI5.2. Communicate simple procedures using words, symbols, pictures, objects, and/or actions (e.g., outline the steps in separating a mixture).</p> <p>SI5.3. Communicate results of an investigation using words, symbols, pictures, objects, and/or actions (e.g. using data tables or graphs).</p>	<p>SI5.1. Communicate observations and/or events using words, symbols, pictures, objects, and/or actions (e.g., to describe the weather as sunny, cloudy, rainy, windy; to draw a landscape – mountain, river, trees, rocks, soil, water).</p> <p>SI5.2. Communicate simple procedures using words, symbols, pictures, objects, and/or actions (e.g., outline the steps in separating a mixture).</p> <p>SI5.3. Communicate results of an investigation using words, symbols, pictures, objects, and/or actions (e.g., using data tables or graphs).</p> <p>SI5.4. Communicate explanations using words, symbols, pictures, objects, and/or actions.</p>

Strand 7: Scientific Inquiry

Glossary and Hierarchy of Terms Developed by the Science AGLE Review Committee

Terms	Definitions
Explore	Use of one or more of the five senses*, to participate within a science content activity.
Identify	Measurable recognition of a science concept (this may be shown in many modes, such as matching, labeling, naming, signing, pointing, and/or touching.)
Investigate	Conduct an science inquiry for purpose of gaining information.
Describe	Communicate/convey information about a science concept.
Compare/Contrast	Identify similarities and differences about a science concept.
Predict	Use of prior knowledge to determine what will or could happen within the content of a science activity.
*Five Senses	Use of smell, hearing, sight, taste and/or touch (includes sensory feeling, such as how your body feels when a car slows down).

Strand 8: Impact of Science, Technology, and Human Activity

1. The nature of technology can advance, and is advanced by, science as it seeks to apply scientific knowledge in ways that meet human needs.					
		GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
A Designed objects are used to do things better or more easily and to do some things that could not otherwise be done at all.	Not assessed at this level.	IS1.1. Explore objects that occur in nature (e.g., soil, rock, trees, water). IS1.2. Explore objects that have been designed and made by people (e.g., houses, cars, airplanes, pencils, telephones).	IS1.1. Explore objects that occur in nature (e.g., soil, rock, trees, water). IS1.2. Explore objects that have been designed and made by people (e.g., houses, cars, airplanes, pencils, telephones). IS1.3. Identify objects that occur in nature (e.g., mountain, ocean, the Sun, Earth, the Moon). IS1.4 Identify objects that have been designed and made by people to solve human problems (e.g., wheels, books) and/or enhance quality of life (e.g., wheelchair, elevator).	IS1.1. Explore objects that occur in nature (e.g., soil, rock, trees, water). IS1.2. Explore objects that have been designed and made by people (e.g., houses, cars, airplanes, pencils, telephones). IS1.3. Identify objects that occur in nature (e.g., mountain, ocean, the Sun, Earth, the Moon). IS1.4. Identify objects that have been designed and/or made by people to solve human problems (e.g., wheels, books) and enhance quality of life (e.g., wheelchair, elevator). IS1.5. Describe how technological improvements lead to changes in everyday life. (e.g., the microwave is faster than conventional ovens; transportation; assistive technology; computers; Velcro on sneakers).	

Strand 8: Impact of Science, Technology, and Human Activity

1. The nature of technology can advance, and is advanced by, science as it seeks to apply scientific knowledge in ways that meet human needs.				
	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
C	Not assessed at this level.	Not assessed at this level.	<p>IS2.1. Identify positive and/or negative effects of communication technologies (e.g., mobile phones can be used during an emergency in remote areas – positive; the dangers of using mobile phones while driving a car - negative).</p> <p>IS2.3. Identify positive and/or negative effects of transportation technologies (e.g., cars, trains, and airplanes can reduce travel and shipping time – positive; increase noise and air pollution – negative).</p> <p>IS2.5. Identify positive and/or negative effects in the advances of weather observation and prediction (e.g., Doppler radar offers early warning of potential storms – positive; satellite images enable meteorologist to generate a forecast to help farmers plant and harvest their crops – positive).</p>	<p>IS2.1. Identify positive and/or negative effects of communication technologies (e.g., mobile phones can be used during an emergency in remote areas – positive; the dangers of using mobile phones while driving a car - negative).</p> <p>IS2.2. Describe positive and/or negative effects of communication technologies.</p> <p>IS2.3. Identify positive and/or negative effects of transportation technologies (e.g., cars, trains, and airplanes can reduce travel and shipping time – positive; increase noise and air pollution – negative).</p> <p>IS2.4. Describe positive and/or negative effects of transportation technologies.</p> <p>IS2.5. Identify positive and/or negative effects in the advances of weather observation and prediction (e.g., Doppler radar offers early warning of potential storms – positive; satellite images enable meteorologist to generate a forecast to help farmers plant and harvest their crops – positive).</p> <p>IS2.6. Describe positive and/or negative effects in the advances of weather observation and prediction.</p>
Technological solutions to problems often have drawbacks as well as benefits.				

Strand 8: Impact of Science, Technology, and Human Activity

3. Science and technology affect, and are affected by, society.				
	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
A	Not assessed at this level.	<p>IS3.1. Identify a problem that was solved based on scientific discoveries and technological advances (e.g., diseases were spread by tiny bacteria that could not be seen without a microscope – discovery; humans were able to control flooding by building dams – technology).</p>	<p>IS3.1. Identify a problem that was solved based on scientific discoveries and technological advances (e.g., diseases were spread by tiny bacteria that could not be seen without a microscope – discovery; humans were able to control flooding by building dams – technology).</p> <p>IS3.2. Describe a problem that was solved based on scientific discoveries and technological advances.</p> <p>IS3.3. Identify a current problem that can be solved by scientific discoveries and/or technological advances (e.g., cancer, air pollution, global warming).</p>	<p>IS3.1. Identify a problem that was solved based on scientific discoveries and technological advances (e.g., diseases were spread by tiny bacteria that could not be seen without a microscope – discovery; humans were able to control flooding by building dams – technology).</p> <p>IS3.2. Describe a problem that was solved based on scientific discoveries and technological advances.</p> <p>IS3.3. Identify a current problem that can be solved by scientific discoveries and/or technological advances (e.g., cancer, air pollution, global warming).</p> <p>IS3.4. Identify a potential problem that can be solved by scientific discoveries and/or technological advances (e.g., limited fuel sources, food shortages, overpopulation, and/or lack of freshwater supplies).</p>

Strand 8: Impact of Science, Technology, and Human Activity

3. Science and technology affect, and are affected by, society.				
	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
B Social, political, economic, ethical and environmental factors strongly influence, and are influenced by, the direction of progress of science and technology.	Not assessed at this level.	<p>IS4.1. Explore physical problems that may be overcome using science and technology (e.g., wheelchairs, artificial limbs, robotics).</p> <p>IS4.4. Explore environmental problems that may be overcome using science and technology (e.g., the need for clean alternative fuels; waste disposal; diseases).</p>	<p>IS4.1. Explore physical problems that may be overcome using science and technology (e.g., wheelchairs, artificial limbs, robotics).</p> <p>IS4.2. Identify physical problems that may be overcome using science and technology.</p> <p>IS4.4. Explore environmental problems that may be overcome using science and technology (e.g., the need for clean alternative fuels; waste disposal; diseases).</p> <p>IS4.5. Identify environmental problems that may be overcome using science and technology.</p> <p>IS4.7. Identify economic problems that may be overcome using science and technology (e.g., automation, mechanized farming equipment, alternate fuels).</p> <p>IS4.9. Identify social problems that may be overcome using science and technology (e.g., space travel, mass transit, cars, drug research).</p>	<p>IS4.1. Explore physical problems that may be overcome using science and technology (e.g., wheelchairs, artificial limbs, robotics).</p> <p>IS4.2. Identify physical problems that may be overcome using science and technology.</p> <p>IS4.3. Describe physical problems that may be overcome using science and technology.</p> <p>IS4.4. Explore environmental problems that may be overcome using science and technology (e.g., the need for clean alternative fuels; waste disposal; diseases).</p> <p>IS4.5. Identify environmental problems that may be overcome using science and technology.</p> <p>IS4.6. Describe environmental problems that may be overcome using science and technology.</p> <p>IS4.7. Identify economic problems that may be overcome using science and technology (e.g., automation, mechanized farming equipment, alternative fuels).</p> <p>IS4.8. Describe economic problems that may be overcome using science and technology.</p> <p>IS4.9. Identify social problems that may be overcome using science and technology (e.g., space travel, mass transit, cars, drug research).</p> <p>IS4.10. Describe social problems that may be overcome using science and technology.</p> <p>IS4.11. Identify ways in which science and technology influence society (e.g., scientific knowledge and the procedures used by scientists influence the way many individuals in society think about themselves, others, and the environment).</p> <p>IS4.12. Identify ways in which society influences science and technology (e.g., societal challenges often inspire questions for scientific research; social priorities often influence research priorities through the availability of funding for research).</p>

Strand 8: Impact of Science, Technology, and Human Activity

Glossary and Hierarchy of Terms Developed by the Science AGLE Review Committee

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