

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	Physical Properties of Matter	Physical Properties of Matter		Physical Properties of Matter	
	<p>ME1.1. Explore physical properties of objects.</p> <p>a. Recognize that objects have specific properties (i.e., size, shape, color, and/or mass).</p> <p>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>ME1.2. Investigate common materials.</p> <p>a. Identify different materials (e.g., cloth, paper, wood, and/or rock).</p> <p>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>ME1.1. Explore physical properties of objects.</p> <p>a. Recognize that objects have specific properties (i.e., size, shape, color, mass, smell, texture, and/or temperature).</p> <p>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>ME1.2. Investigate common materials.</p> <p>a. Identify different materials (e.g., cloth, paper, wood, and/or rock).</p> <p>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>ME1.4. Match objects.</p> <p>a. Using one physical property (e.g., leaf shapes, size of rocks).</p> <p>b. Using one or more physical properties.</p> <p>ME1.5. Sort objects into groups based on one physical property (i.e., size, shape, color, weight, smell, and/or texture).</p> <p style="text-align: center;">Properties of Matter: Mass, Volume, and Temperature</p> <p>ME1.6. Compare objects using one physical property.</p> <p>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 mass of different objects).</p> <p>b. Compare the size (the amount of space an object occupies) of objects (e.g., will the container hold all the water?).</p>	<p>ME1.1. Explore physical properties of objects.</p> <p>a. Recognize that objects have specific properties (i.e., size, shape, color, mass, smell, texture, and/or temperature).</p> <p>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>c. Identify physical properties of objects.</p> <p>ME1.2. Investigate common materials.</p> <p>a. Identify different materials (e.g., cloth, paper, wood, and/or rock).</p> <p>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>ME1.4. Match objects.</p> <p>a. Using one physical property (e.g., leaf shapes, size of rocks).</p> <p>b. Using one or more physical properties.</p> <p>ME1.5. Sort objects into groups based on one physical property (i.e., size, shape, color, weight, smell, and/or texture).</p> <p>a. Sort objects into groups based on one or more physical properties.</p> <p style="text-align: center;">Properties of Matter: Mass, Volume, and Temperature</p> <p>ME1.6. Compare objects using one physical property.</p> <p>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 mass of different objects).</p> <p>b. Compare the size (the amount of space an object occupies) of objects (e.g., will the container hold all the water?).</p> <p>c. Compare objects using one or more physical properties.</p>	<p>Physical Properties of Matter</p> <p>ME1.1. Explore physical properties of objects.</p> <p>a. Recognize that objects have specific properties (i.e., size, shape, color, mass, smell, texture, and/or temperature).</p> <p>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>c. Identify physical properties of objects.</p> <p>ME1.2. Investigate common materials.</p> <p>a. Identify different materials (e.g., cloth, paper, wood, and/or rock).</p> <p>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>ME1.3. Describe physical properties of objects.</p> <p>ME1.4. Match objects.</p> <p>a. Using one physical property (e.g., leaf shapes, size of rocks).</p> <p>b. Using one or more physical properties.</p> <p>c. Using two or more physical properties.</p> <p>ME1.5. Sort objects into groups based on one physical property (i.e., size, shape, color, weight, smell, and/or texture).</p> <p>a. Sort objects into groups based on one or more physical properties.</p> <p>b. Sort objects into groups based on two or more physical properties.</p> <p style="text-align: center;">Properties of Matter: Mass, Volume, and Temperature</p> <p>ME1.6. Compare objects using one physical property.</p> <p>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 mass of different objects).</p> <p>b. Compare the size (the amount of space an object occupies) of objects (e.g., will the container hold all the water?).</p> <p>c. Compare objects using one or more physical properties.</p> <p>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	Not assessed at this level.	<p>ME1.7. Order objects.</p> <ul style="list-style-type: none"> a. according to mass. b. according size/volume. <p>ME1.8. Measure objects using one physical property.</p> <ul style="list-style-type: none"> a. Measure the mass of objects. b. Measure the amount of liquids using a non-standard unit, measuring cup, or graduated cylinder. 	<p>ME1.7. Order objects.</p> <ul style="list-style-type: none"> a. according to mass. b. according to size/volume. c. according to temperature. <p>ME1.8. Measure objects using one physical property.</p> <ul style="list-style-type: none"> a. Measure the mass of objects. b. Measure the amount of liquids using a non-standard unit, measuring cup, or graduated cylinder. c. Measure the volume of liquids and/or solids using a non-standard unit, measuring cup, or graduated cylinder, using displacement—submerge solids into a liquid. d. Measure the temperature. <p>Mixtures and Solutions</p> <p>ME1.9. Identify objects as “one kind of material” or a mixture (made up of two or more different kinds of material).</p> <p>ME1.10. 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>Density</p> <p>ME1.11. 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> <ul style="list-style-type: none"> a. Experiment with solids that float in water (e.g., wood, ice, plastic toys). b. Experiment with solids that sink in water (e.g., rocks, metals, glass marbles). 	<p>ME1.7. Order objects.</p> <ul style="list-style-type: none"> a. according to mass. b. according to size/volume. c. according to temperature. <p>ME1.8. Measure objects using one physical property.</p> <ul style="list-style-type: none"> a. Measure the mass of objects. b. Measure the amount of liquids using a non-standard unit, measuring cup, or graduated cylinder. c. Measure the volume of liquids and/or solids using a non-standard unit, measuring cup, or graduated cylinder, using displacement—submerge solids into a liquid. d. Measure the temperature. <p>Mixtures and Solutions</p> <p>ME1.9. Identify objects as “one kind of material” or a mixture (made up of two or more different kinds of material).</p> <p>ME1.10. 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>Density</p> <p>ME1.11. 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> <ul style="list-style-type: none"> a. Experiment with solids that float in water (e.g., wood, ice, plastic toys). b. Experiment with solids that sink in water (e.g., rocks, metals, glass marbles). c. 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). d. Identify that matter takes up space and may have weight. <p>ME1.12. 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 - - - continued

		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 ME2.1. Investigate mixtures. a. Identify a mixture (e.g., Cheerios and a bag of M&Ms). b. Observe how mixtures are made by combining solids (e.g., trail mixes). ME2.3 Investigate ways to separate the components of a mixture by one physical property (e.g., sorting different rocks by size, sand sifting).	Properties of Mixtures ME2.1. Investigate mixtures. a. Identify a mixture (e.g., Cheerios and a bag of M&Ms). b. Observe how mixtures are made by combining solids (e.g., trail mixes). ME2.2. Identify mixtures. 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). b. Identify the components in a mixture (e.g., trail mix, conglomerate rock, salad). ME2.3. Investigate ways to separate the components of a mixture by one physical property (e.g., sorting different rocks by size, sand sifting). ME2.4. 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). ME2.5. Experiment with how various solids mix with water.	Properties of Mixtures ME2.1. Investigate mixtures. a. Identify a mixture (e.g., Cheerios and a bag of M&Ms). b. Observe how mixtures are made by combining solids (e.g., trail mixes). ME2.2. Identify mixtures. 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). b. Identify the components in a mixture (e.g., trail mix, conglomerate rock, salad). c. Describe mixtures. d. Describe how mixtures are made. e. Compare between the components in a mixture (e.g., chocolate chip cookies, ingredients in a salad). ME2.3. Investigate ways to separate the components of a mixture by one physical property (e.g., sorting different rocks by size, sand sifting). ME2.4. 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). 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). ME2.5. Experiment with how various solids mix with water. a. Identify how various solids mix with water.	Properties of Mixtures ME2.1. Investigate mixtures. a. Identify a mixture (e.g., Cheerios and a bag of M&Ms). b. Observe how mixtures are made by combining solids (e.g., trail mixes). ME2.2. Identify mixtures. 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). b. Identify the components in a mixture (e.g., trail mix, conglomerate rock, salad). c. Describe mixtures. d. Describe how mixtures are made. e. Compare between the components in a mixture (e.g., chocolate chip cookies, ingredients in a salad). ME2.3. Investigate ways to separate the components of a mixture by one physical property (e.g., sorting different rocks by size, sand sifting). ME2.4. 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). 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). b. Describe ways to separate the components of a mixture by one physical property (e.g., filtration, and/or evaporation). ME2.5. Experiment with how various solids mix with water. a. Identify how various solids mix with water. b. Describe how various solids mix with water. c. Predict which solids will sink or float in water.

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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
B Properties of mixtures depend upon the concentrations, properties, and interactions of particles		<p>Properties of Solutions</p> <p>ME2.6. Explore different solutions (e.g., Kool-Aid, lemonade, iced tea).</p> <p>ME2.7. 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>ME2.6. Explore different solutions (e.g., Kool-Aid, lemonade, iced tea).</p> <p>a. Compare different solutions using their physical properties (e.g., color, smell, and/or taste).</p> <p>ME2.7. 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>ME2.8. 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>ME2.9. 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>ME2.10. Investigate diluted or concentrated solutions.</p> <p>a. Using one or more of the five senses, compare solutions with different concentrations (e.g., salt, saltier; sugar, sweeter; vinegar, smellier; fruit punch mix, redder).</p>	<p>Properties of Solutions</p> <p>ME2.6. Explore different solutions (e.g., Kool-Aid, lemonade, iced tea).</p> <p>a. Compare different solutions using their physical properties (e.g., color, smell, and/or taste).</p> <p>b. Describe different solutions using their physical properties.</p> <p>ME2.7. 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>ME2.8. 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>a. Describe the properties of each component in a mixture/solution.</p> <p>ME2.9. 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>a. Describe water as a liquid that dissolves some materials.</p> <p>ME2.10. Investigate diluted or concentrated solutions.</p> <p>a. Using one or more of the five senses, compare solutions with different concentrations (e.g., salt, saltier; sugar, sweeter; vinegar, smellier; fruit punch mix, redder).</p> <p>ME2.11. Describe diluted or concentrated solutions.</p> <p>a. Order solutions with different concentrations (e.g., add different numbers of food coloring drops in three identical glasses of water).</p> <p>ME2.12. Investigate ways that affect how fast substances dissolve in water (solubility).</p> <p>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>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 - - - continued

	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
Physical changes in the state of matter that result from thermal changes can be explained by the kinetic theory of matter	<p>D</p> <p>States of Matter</p> <p>ME3.1. Explore states of matter. a. Explore solids (e.g., rocks, ice, metal). b. Explore liquids (e.g., water, oil). c. Explore gases (e.g., air, bubbles, helium).</p>	<p>States of Matter</p> <p>ME3.1. Explore states of matter. a. Explore solids (e.g., rocks, ice, metal). b. Explore liquids (e.g., water, oil). c. Explore gases (e.g., air, bubbles, helium). ME3.2. Identify states of matter. a. Identify solids. b. Identify liquids. c. Identify gases (e.g., steam, air, bubbles, helium). ME3.3. 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>ME3.4. Identify matter as solid or liquid from everyday examples (e.g., ice is a solid; water is a liquid).</p> <p>Phase Changes of Matter</p> <p>ME3.6. Identify that matter changes from one state to another. a. Identify that solids can change to liquids (melting). b. Identify that liquids can change to solids (freezing). ME3.7. Identify everyday examples of the water cycle of matter changing in state. a. Melting (e.g., ice cube melts; butter melts; snow melts into water). b. Freezing (e.g., Kool-Aid freezes into a popsicle; water droplets freeze into ice or sleet).</p>	<p>States of Matter</p> <p>ME3.1. Explore states of matter. a. Explore solids (e.g., rocks, ice, metal). b. Explore liquids (e.g., water, oil). c. Explore gases (e.g., air, bubbles, helium). ME3.2. Identify states of matter. a. Identify solids. b. Identify liquids. c. Identify gases (e.g., steam, air, bubbles, helium). ME3.3. 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). 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>ME3.4. Identify matter as solid or liquid from everyday examples (e.g., ice is a solid; water is a liquid). ME3.5. Identify matter as gas from everyday examples (e.g., blowing up a balloon).</p> <p>Phase Changes of Matter</p> <p>ME3.6. Identify that matter changes from one state to another. a. Identify that solids can change to liquids (melting). b. Identify that liquids can change to solids (freezing). c. Identify that liquids can change to gases (evaporation). d. Identify that gases can change to liquids (condensation). ME3.7. Identify everyday examples of the water cycle of matter changing in state. a. Melting (e.g., ice cube melts; butter melts; snow melts into water). b. Freezing (e.g., Kool-Aid freezes into a popsicle; water droplets freeze into ice or sleet). 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>States of Matter</p> <p>ME3.1. Explore states of matter. a. Explore solids (e.g., rocks, ice, metal). b. Explore liquids (e.g., water, oil). c. Explore gases (e.g., air, bubbles, helium). ME3.2. Identify states of matter. a. Identify solids. b. Identify liquids. c. Identify gases (e.g., steam, air, bubbles, helium). ME3.3. 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). a. Compare different states of matter (e.g., gases have no definite volume and shape; liquids and solids are visible; gases are invisible). b. Describe different states of matter. ME3.4. Identify matter as solid or liquid from everyday examples (e.g., ice is a solid; water is a liquid). ME3.5. Identify matter as gas from everyday examples (e.g., blowing up a balloon). a. Classify matter as solid, liquid, or gas from everyday examples using physical properties (e.g., volume, shape, ability to flow).</p> <p>Phase Changes of Matter</p> <p>ME3.6. Identify that matter changes from one state to another. a. Identify that solids can change to liquids (melting). b. Identify that liquids can change to solids (freezing). c. Identify that liquids can change to gases (evaporation). d. Identify that gases can change to liquids (condensation). ME3.7. Identify everyday examples of the water cycle of matter changing in state. a. Melting (e.g., ice cube melts; butter melts; snow melts into water). b. Freezing (e.g., Kool-Aid freezes into a popsicle; water droplets freeze into ice or sleet). 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 Physical changes in the state of matter that result from thermal changes can be explained by the kinetic theory of matter	Not assessed at this level.	Not assessed at this level.	<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 forms clouds).</p> <p>ME3.8. Compare the changes in physical properties of water (i.e., shape, volume) when frozen or melted.</p> <p>Heat and Temperature</p> <p>ME3.9. Identify how 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 forms clouds).</p> <p>ME3.8. 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>ME3.9. Identify how 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>ME3.10. 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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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
G	Not assessed at this level.	<p>Physical Change</p> <p>ME4.1. 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>ME4.1. 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>ME4.2. Identify physical changes in common objects.</p> <p style="padding-left: 20px;">a. Identify mixtures as physical changes (e.g., mixing salt and water).</p> <p style="padding-left: 20px;">b. Identify the physical change that occurs during a change in the state of matter (e.g., melting ice into water).</p> <p>Chemical Change</p> <p>ME4.3. Experiment with chemical changes (i.e., cooking, baking, burning, and/or rusting).</p>	<p>Physical Change</p> <p>ME4.1. 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>ME4.2. Identify physical changes in common objects.</p> <p style="padding-left: 20px;">a. Identify mixtures as physical changes (e.g., mixing salt and water).</p> <p style="padding-left: 20px;">b. Identify the physical change that occurs during a change in the state of matter (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>Chemical Change</p> <p>ME4.3. 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>

Properties of objects and states of matter can change chemically and/or physically

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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
I Mass is conserved during any physical or chemical change	Not assessed at this level.	Not assessed at this level.	<p>Conservation of Matter</p> <p>ME5.1. 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>Conservation of Matter</p> <p>ME5.1. 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>ME5.2. Identify that the 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>ME5.3. 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>

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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	Sound Energy	Sound Energy	Sound Energy	Sound Energy
	<p>ME6.1. 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 vibrating drum).</p> <p>b. Investigate the sounds in everyday life (e.g., alarms, car horns, animals, machines, musical instruments).</p> <p>ME6.2. 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>ME6.1. 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 drum).</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>ME6.2. 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>ME6.3. Identify the properties of sound.</p> <p>a. Identify different loudness.</p> <p>b. Identify different pitches.</p> <p>c. Identify rhythm.</p> <p>ME6.5 Identify that the ear serves as a receiver of sound.</p>	<p>ME6.1. 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 drum).</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>ME6.2. 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>ME6.3. Identify the properties of sound.</p> <p>a. Identify different loudness.</p> <p>b. Identify different pitches.</p> <p>c. Identify rhythm.</p> <p>ME6.4. 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 that rhythm has a pattern that repeats.</p> <p>ME6.5 Identify that the ear serves as a receiver of sound.</p>	<p>ME6.1. 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 drum).</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>ME6.2. 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>ME6.3. Identify the properties of sound.</p> <p>a. Identify different loudness.</p> <p>b. Identify different pitches.</p> <p>c. Identify rhythm.</p> <p>ME6.4. 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 that 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 pitch 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>ME6.5. 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
 - - - continued

	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>ME6.6. Identify that sound travels through air. ME6.7. Identify that sound travels through different mediums (i.e., air, water, and/or solids).</p> <p>Heat Energy</p> <p>ME6.8. Investigate heat and temperature. 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, cooler) by touch.</p> <p>Mechanical Energy</p> <p>ME6.9. Investigate mechanical energy as the energy of motion (e.g., a moving wheelchair has mechanical energy).</p>	<p>ME6.6. Identify that sound travels through air. ME6.7. Identify that sound travels through different mediums (i.e., air, water, and/or solids).</p> <p>Heat Energy</p> <p>ME6.8. Investigate heat and temperature. 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, 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> <p>Mechanical Energy</p> <p>ME6.9. Investigate mechanical energy as the energy of motion (e.g., a moving wheelchair has mechanical energy). a. Identify mechanical energy as the energy of motion (e.g., hand mixers, sound/vibration causes motion).</p>	<p>ME6.6. Identify that sound travels through air. ME6.7. Identify that sound travels through different mediums (i.e., air, water, and/or solids).</p> <p>Heat Energy</p> <p>ME6.8. Investigate heat and temperature. 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, 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> <p>Mechanical Energy</p> <p>ME6.9. Investigate mechanical energy as the energy of motion (e.g., a moving wheelchair has mechanical energy). a. Identify mechanical energy as the energy of motion (e.g., hand mixers, sound/vibration causes motion).</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
 - - - continued

	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>ME6.10. Investigate electrical energy.</p> <ul style="list-style-type: none"> a. Observe evidence of energy transfer in a closed series circuit (e.g., lit bulb, moving motor, fan). b. Investigate static electricity (e.g., observe hair attracted to a rubbed balloon; recognize static electrical shock from a carpet). <p>Light Energy</p> <p>ME6.11. Investigate light energy.</p> <ul style="list-style-type: none"> a. Investigate sources of light energy (e.g., Sun, bulbs, flames, and/or lightning). b. Investigate light intensity (i.e., bright, dim). <p>ME6.13. Investigate light reflection.</p> <ul style="list-style-type: none"> a. Investigate the reflection of visible light by various surfaces (e.g., mirror, smooth and rough surfaces, shiny and dull surfaces, Moon). 	<p>Electrical Energy</p> <p>ME6.10. Investigate electrical energy.</p> <ul style="list-style-type: none"> a. Observe evidence of energy transfer in a closed series circuit (e.g., lit bulb, moving motor, fan). b. Investigate static electricity (e.g., observe hair attracted to a rubbed balloon; recognize static electrical shock from a carpet). c. Investigate materials as electrical conductors (e.g., metal wires, aluminum foil, lemon juice, water, safety issues with electrical wiring). d. Investigate materials as electrical insulators (e.g., wood, plastics, glass, air, water). <p>Light Energy</p> <p>ME6.11. Investigate light energy.</p> <ul style="list-style-type: none"> a. Investigate sources of light energy (e.g., sun, bulbs, flames, and/or lightning). b. Investigate light intensity (i.e., bright, dim). <p>ME6.12. Identify light energy.</p> <ul style="list-style-type: none"> a. Identify sources of light energy. b. Compare light intensity (i.e., brighter, dimmer). c. Identify the three things (light source, object, and surface) necessary to produce a shadow. <p>ME6.13. Investigate light reflection.</p> <ul style="list-style-type: none"> a. Investigate the reflection of visible light by various surfaces (e.g., mirror, smooth and rough surfaces, shiny and dull surfaces, moon). <p>ME6.14. Investigate how different surfaces affect light.</p> <ul style="list-style-type: none"> a. Investigate transparent materials and how light goes through them (e.g., glass, clear plastic, water). b. Investigate translucent materials and how only some of the light goes through them (e.g., paper, translucent plastic). c. Investigate opaque materials and how no light goes through them (e.g., metal, wood, rock).

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
 - - - continued

	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
C	Not assessed at this level.	<p>ME7.1. Explore energy from the Sun and living things.</p> <p>a. Identify light from the Sun as a basic need of most plants.</p>	<p>ME7.1. Explore energy from the Sun and living things.</p> <p>a. Identify light from the Sun as a basic need of most plants.</p> <p>b. Identify the Sun as the primary source of light and food energy on Earth.</p>	<p>ME7.1. Explore energy from the Sun and living things.</p> <p>a. Identify light from the Sun as a basic need of most plants.</p> <p>b. Identify the Sun as the primary source of light and food energy on Earth.</p> <p>c. Identify the Sun as the source of almost all energy used to produce food for living organisms.</p> <p>ME7.2. 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).</p>
Electromagnetic energy from the Sun (solar radiation) is a major source of energy on Earth				

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
 - - - continued

	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>ME8.1. 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>ME8.1. 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>ME8.2. Classify types of energy transformation from everyday examples.</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
A	Position of Objects	Position of Objects		Position of Objects	
	<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>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>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>	
The motion of an object is described as a change in position, direction, and speed relative to another object (frame of reference)	Motion of Objects	Motion of Objects		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>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>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 curved 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	GRADES 9–12
<p>A The motion of an object is described as a change in position, direction, and speed relative to another object (frame of reference)</p>		<p>Speed of Objects</p> <p>FM1.3. Investigate objects moving at different speeds (e.g., using cars with ramps of different inclines).</p>	<p>Speed of Objects</p> <p>FM1.3. Investigate objects moving at different speeds (e.g., 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 a race car 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>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 (e.g., 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 a race car 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 - - - continued				
	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
B An object that is accelerating is speeding up, slowing down, or changing direction	Not assessed at this level.	Not assessed at this level.	Not assessed at this level.	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). 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). FM2.3. Experiment with an object changing direction (e.g., bouncing a ball against a wall, flying a kite).

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
	FM3.1. Explore the relationship between force and motion. a. Explore ways to cause some objects to move (i.e., push and/or pull).	FM3.1. Explore the relationship between force and motion. a. Explore ways to cause some objects to move (i.e., push and/or pull). FM3.2. Identify the relationship between force and motion. a. Identify ways to cause some objects to move by applying force (i.e., push and/or pull). Magnetism FM3.3. Explore magnetic forces. a. Explore magnets that cause some objects to move without touching them (e.g., using magnets to move paper clips). Friction FM3.4. Explore friction. a. Explore friction (e.g., rubbing your hands together or rolling a ball over different surfaces—carpet, wax paper, and/or grass).	FM3.1. Explore the relationship between force and motion. a. Explore ways to cause some objects to move (i.e., push and/or pull). FM3.2. Identify the relationship between force and motion. a. Identify ways to cause some objects to move by applying force (i.e., push and/or pull). b. Identify that objects can change directions (e.g., bouncing a ball or flying a kite). c. Identify the initial and final positions of an object that moves. 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). Magnetism FM3.3. Explore magnetic forces. a. Explore magnets that cause some objects to move without touching them (e.g., using magnets to move paper clips). b. Investigate how two magnets pull and push (attract and repel) each other without touching. c. Describe magnetism as a force that can push or pull other objects without touching them. Friction FM3.4. Explore friction. a. Explore friction (e.g., rubbing your hands together, or rolling a ball over different surfaces—carpet, wax paper, and/or grass). 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). c. Compare motion of an object over different surfaces (e.g., rough and/or smooth).	FM3.1. Explore the relationship between force and motion. a. Explore ways to cause some objects to move (i.e., push and/or pull). FM3.2. Identify the relationship between force and motion. a. Identify ways to cause some objects to move by applying force (i.e., push and/or pull). b. Identify that objects can change directions (e.g., bouncing a ball or flying a kite). c. Identify the initial and final positions of an object that moves. 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). e. Compare the initial and final positions of an object that moves, and determine the distance an object traveled. 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). Magnetism FM3.3. Explore magnetic forces. a. Explore magnets that cause some objects to move without touching them (e.g., using magnets to move paper clips). b. Investigate how two magnets pull and push (attract and repel) each other without touching. c. Describe magnetism as a force that can push or pull other objects without touching them. Friction FM3.4. Explore friction. a. Explore friction (e.g., rubbing your hands together, or rolling a ball over different surfaces—carpet, wax paper, and/or grass). 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). c. Compare motion of an object over different surfaces (e.g., rough and/or smooth).

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
<p>B</p> <p>Every object exerts a gravitational force on every other object</p>		<p>Gravity</p> <p>FM3.5. Explore gravity.</p> <p>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).</p>	<p>Gravity</p> <p>FM3.5. Explore gravity.</p> <p>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).</p> <p>b. Compare the weight of two different objects (e.g., which is heavier, which is lighter).</p> <p>c. Measure the weight of different objects (e.g., measuring/weighing produce).</p>	<p>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> <p>Gravity</p> <p>FM3.5. Explore gravity.</p> <p>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).</p> <p>b. Compare the weight of two different objects (e.g., which is heavier, which is lighter).</p> <p>c. Measure the weight of different objects using a spring scale (e.g., measuring/weighing produce).</p> <p>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 Earth instead of floating).</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
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 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). 	<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). <p>Laws of Motion</p> <p>FM4.2. Investigate the distances traveled by objects of different weight after applying the same amount of force in the same direction.</p> <p>FM4.3. Identify the distances traveled by objects with the same weight after a 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 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 a 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).

Newton's Laws of Motion explain the interaction of mass and forces, and are used to predict changes in motion

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
Newton's Laws of Motion explain the interaction of mass and force, and are used to predict changes in motion	D			
	Not assessed at this level.			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 - - - continued				
	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	Not assessed at this level.	<p>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.</p> <p>FM5.2. Explore levers. a. Investigate that levers can raise an object (e.g., seesaw/teeter totter, bottle opener).</p> <p>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.</p> <p>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).</p>	<p>FM5.1. Explore inclined planes. a. Investigate the amount of effort (force) needed to raise an object to a given height with and without using inclined planes (ramps) of different slope. b. Identify inclined planes.</p> <p>FM5.2. Explore levers. a. Investigate that levers can raise an object (e.g., seesaw/teeter totter, bottle opener, pulling a nail with a hammer).</p> <p>FM5.3. Identify levers.</p> <p>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.</p> <p>FM5.5. Identify pulleys.</p> <p>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.</p> <p>FM5.7. Recognize that simple machines decrease the amount of effort and/or change the direction of force.</p> <p>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).</p>	<p>FM5.1. Explore inclined planes. a. Investigate the amount of effort (force) needed to raise an object to a given height with and without using inclined planes (ramps) of different slope. b. Identify inclined planes.</p> <p>FM5.2. Explore levers. a. Investigate that levers can raise an object (e.g., seesaw/teeter totter, bottle opener, pulling a nail with a hammer). b. Describe inclined planes.</p> <p>FM5.3. Identify levers. a. Describe levers.</p> <p>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.</p> <p>FM5.5. Identify pulleys. a. Describe pulleys.</p> <p>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.</p> <p>FM5.7. Recognize that simple machines decrease the amount of effort and/or change the direction of force.</p> <p>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).</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
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	Not assessed at this level.			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; using a wrench for fixing things). 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).

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
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. a. Identify the early stage of common organisms (e.g., seedling, duckling, human baby). 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 go 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 that 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. a. Identify the early stage of common organisms (e.g., seedling, duckling, human baby). 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. a. Match offspring with parent (e.g., puppy, dog; kitten, cat; chick, hen; cub, bear). 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 go 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 the stages of a life cycle (e.g., eggs, larvae, pupa, chrysalis, young adult, adult).</p> <p>LO2.9. Identify the 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 that 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. a. Identify the early stage of common organisms (e.g., seedling, duckling, human baby). 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. a. Match offspring with parent (e.g., puppy, dog; kitten, cat; chick, hen; cub, bear). 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 go 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 the stages of a life cycle (e.g., eggs, larvae, pupa, chrysalis, young adult, adult).</p> <p>LO2.9. Identify the 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>
	Organisms progress through life cycles unique to different types of organisms			

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
C	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 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>LO3.3. Identify that individual cells have the same needs for survival as organisms (e.g., cells need oxygen, cells need food, cells reproduce).</p>
	Cells are the fundamental units of structure and function of all living things			

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	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>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>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>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 bring 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>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 bring 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. 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 - - - continued				
	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
F	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	GRADES 9–12
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 make their own food.	Photosynthesis LO6.1. Identify that plants need sunlight to make their own food. 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 make their own food. 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 - - - continued

	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
C Complex multicellular organisms have systems that interact to carry out life processes through physical and chemical means	Not assessed at this level.	L07.1. 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 into different food coloring and observe the change in color).	L07.1. 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 into different food coloring and observe the change in color). L07.2. Identify the path of water and nutrients as they move through the transport system of a plant. L07.4. Explore the major life processes of animal systems (e.g., support, reproductive, response). L07.6. Explore the major life processes of plant systems (e.g., support, reproductive, photosynthesis, transport).	L07.1. 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 into different food coloring and observe the change in color). L07.2. Identify the path of water and nutrients as they move through the transport system of a plant. L07.3. Describe the path of water and nutrients as they move through the transport system of a plant. L07.4. Explore the major life processes of animal systems (e.g., support, reproductive, response). L07.5. Identify the major life processes of animal systems. L07.6. Explore the major life processes of plant systems (e.g., support, reproductive, photosynthesis, transport). L07.7. Identify the major life processes of plant systems. L07.8. Investigate different levels of organization in multicellular organisms. <ol style="list-style-type: none"> a. Investigate organs (e.g., heart pumps blood, lungs take in oxygen, brain processes information). 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).

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>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>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 - - - continued

	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.	LO9.1. Identify that living things have offspring.	LO9.1. Identify that living things have offspring.
		<p>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).</p> <p>LO9.3. Explore the similarities and/or differences between animal parents and their offspring (e.g., long neck, skin pattern).</p>	<p>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).</p> <p>LO9.3. Explore the similarities and/or differences between animal parents and their offspring (e.g., long neck, skin pattern).</p> <p>LO9.4. Identify the similarities and/or differences between animal parents and their offspring (e.g., compare pictures of children and their biological parents).</p>	<p>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).</p> <p>LO9.3. Explore the similarities and/or differences between animal parents and their offspring (e.g., long neck, skin pattern).</p> <p>LO9.4. Identify the similarities and/or differences between animal parents and their offspring (e.g., compare pictures of children and their biological parents).</p> <p>LO9.5. Describe the similarities and/or differences between animal parents and their offspring.</p>
There is heritable variation within every species of an organism		LO9.7. Explore similarities and 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).	LO9.6. Compare young animals to their parents (e.g., giraffe, rabbit, human, chicken).	LO9.6. Compare young animals to their parents (e.g., giraffe, rabbit, human, chicken).
		LO9.10. Explore the similarities and/or differences between plants and their offspring (i.e., seedlings).	<p>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).</p> <p>LO9.8. Identify similarities and/or differences among multiple offspring of an animal parent.</p> <p>LO9.10. Explore the similarities and/or differences between plants and their offspring (i.e., seedlings).</p> <p>LO9.11. Identify the similarities and/or differences between plants and their offspring.</p>	<p>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).</p> <p>LO9.8. Identify similarities and/or differences among multiple offspring of an animal parent.</p> <p>LO9.9. Describe similarities and/or differences among multiple offspring of an animal parent.</p> <p>LO9.10. Explore the similarities and/or differences between plants and their offspring (i.e., seedlings).</p> <p>LO9.11. Identify the similarities and/or differences between plants and their offspring.</p> <p>LO9.12. Describe the similarities and/or differences between plants and their offspring.</p> <p>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).</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	EC1.1.	<p>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>EC1.1. 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., end of 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>EC1.1. 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., end of 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>EC1.1. 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., end of 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>
	EC1.4.	<p>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>EC1.4. 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>EC1.4. 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>EC1.4. 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>
	EC1.7.	<p>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>EC1.7. 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>EC1.7. 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>EC1.7. 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 - - - continued

	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
<p>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>		<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 - - - continued

	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
Living organisms have the capacity to produce populations of infinite size, but environments and resources are finite	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 moths, 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>
	B			

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

1. Organisms are interdependent with one another and with their environment - - - continued				
	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.	<p>EC3.1. Investigate one or more possible negative effects of human interactions with ecosystems (e.g., farming, waste disposal, pollution, logging, mining).</p> <p>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).</p>

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

1. Organisms are interdependent with one another and with their environment - - - continued				
	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
D The diversity of species within an ecosystem is affected by changes in the environment, which can be caused by other organisms or outside processes	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>EC4.2. 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>EC4.1. 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>EC4.3. 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>EC4.1. 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>EC4.3. 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>EC4.5. 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>EC4.7. 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>EC4.9. 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>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, giraffes).</p> <p style="padding-left: 20px;">c. Explore common carnivores (e.g., dogs, lions, wolves).</p> <p style="padding-left: 20px;">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, giraffes).</p> <p style="padding-left: 20px;">b. Identify one or more examples of herbivores.</p> <p style="padding-left: 20px;">c. Explore common carnivores (e.g., dogs, lions, wolves).</p> <p style="padding-left: 20px;">d. Identify one or more examples of carnivores.</p> <p style="padding-left: 20px;">e. Explore common omnivores (e.g., bears, humans, chickens).</p> <p style="padding-left: 20px;">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, giraffes).</p> <p style="padding-left: 20px;">b. Identify one or more examples of herbivores.</p> <p style="padding-left: 20px;">c. Explore common carnivores (e.g., dogs, lions, wolves).</p> <p style="padding-left: 20px;">d. Identify one or more examples of carnivores.</p> <p style="padding-left: 20px;">e. Explore common omnivores (e.g., bears, humans, chickens).</p> <p style="padding-left: 20px;">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	GRADES 9–12
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>EC6.4 Explore fossils from the past as evidence of organisms that exist today.</p> <p>EC6.7. Explore fossils as evidence that some organisms are extinct and no longer live today.</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 from the past as evidence of organisms that exist today.</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>EC6.8. 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>EC6.1. Explore one or more common fossils found in Missouri (i.e., trilobites, ferns, crinoids, gastropods, bivalves, fish, and/or mastodons). Identify one or more common fossils found in Missouri.</p> <p>EC6.2. Describe one or more common fossils found in Missouri.</p> <p>EC6.4. Explore fossils from the past as evidence of organisms that exist today.</p> <p>EC6.5. Identify fossils as evidence of some types of organisms that once lived in the past.</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>EC6.9. 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	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).</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).</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).</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 their surroundings).</p>

Natural selection is the process of sorting individuals based on their ability to survive and reproduce within their ecosystem

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>ES1.1. Explore soil using one or more of the five senses.</p>	<p>ES1.1. Explore soil using one or more of the five senses. ES1.2. Identify soil from other common objects (e.g., glass, metal, paper, plastic). 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>ES1.5. Explore the physical properties (e.g., odor, color, appearance) of soil.</p>	<p>ES1.1. Explore soil using one or more of the five senses. ES1.2. Identify soil from other common objects (e.g., glass, metal, paper, plastic). 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). ES1.4. Identify the components of soil (e.g., plant roots, leaves, grass, bacteria, fungi, worms, types of rock). ES1.5. Explore the physical properties (e.g., odor, color, appearance) of soil. ES1.6. Identify the physical properties (e.g., odor, color, texture) of soil.</p>	<p>ES1.1. Explore soil using one or more of the five senses. ES1.2. Identify soil from other common objects (e.g., glass, metal, paper, plastic). 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). ES1.4. Identify the components of soil (e.g., plant roots, leaves, grass, bacteria, fungi, worms, types of rock). ES1.5. Explore the physical properties (e.g., odor, color, appearance) of soil. ES1.6. Identify the physical properties (e.g., odor, color, texture) of soil. 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>ES1.8. Explore rocks using one or more of the five senses.</p>	<p>ES1.8. Explore rocks using one or more of the five senses. ES1.9. Identify rocks from other common objects and/or materials (e.g., grass, wood, leaves, paper, plastic). 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>ES1.8. Explore rocks using one or more of the five senses. ES1.9. Identify rocks from other common objects and/or materials (e.g., grass, wood, leaves, paper, plastic). 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. 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>ES1.8. Explore rocks using one or more of the five senses. ES1.9. Identify rocks from other common objects and/or materials (e.g., grass, wood, leaves, paper, plastic). 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. 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
<p>A</p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">Earth’s crust is composed of various materials, including soil, minerals, and rocks, with characteristic properties</p>				<p>Minerals</p> <p>ES1.12. Investigate one or more types of rocks (e.g., 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>

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
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.	<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 - - - continued

		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 particle	ES3.1. Explore wind as moving air (e.g., using a folding paper fan and/or a pinwheel).	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.	ES3.1. 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. ES3.4. 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.	ES3.1. 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. ES3.4. 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.
			ES3.4. 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).	ES3.7. 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.
		ES3.10. Explore air as 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 an 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 an invisible substance that takes up space.	ES3.10. Explore air as an 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 an invisible substance that takes up space.	ES3.8. Identify clouds and/or fogs as being made of tiny droplets of water. ES3.9. Describe clouds and/or fogs as being made of tiny droplets. ES3.10. Explore air as an 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 an 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 - - - continued

	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., thunderstorms, 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
A Earth’s systems (geosphere, atmosphere, and hydrosphere) interact with one another as they undergo change by common processes	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 one or more of the major landforms on Earth (i.e., mountains, plains, oceans, river valleys, coastlines, and/or 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 - - - continued				
	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 - - - 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	Not assessed at this level	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). ES7.3. 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). 	ES7.1. 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). ES7.3. 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, and 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 Constantly changing properties of the atmosphere occur in patterns which are described as weather	<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>ES8.2. 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>ES8.1. 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>ES8.2. 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>ES8.3. 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 a 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 a 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 a 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 a 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>ES8.7. 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>ES8.5. 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>ES8.7. Explore the general weather conditions that occur in your region during each season.</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>ES8.7. 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				
	Constantly changing properties of the atmosphere occur in patterns which are described as weather	<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>a. Cold fronts (e.g., strong and shifty winds, sudden drops in temperature, heavy rain with possibility of hail, thunder and lightning).</p> <p>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’s 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 (e.g., strong thunderstorms, tornadoes, and/or 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
Human Activity is dependent upon and affects Earth’s resources and systems	A	Exploring Earth’s Resources	Exploring Earth’s Resources	Exploring Earth’s Resources
	<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 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 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 increased 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 increased 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
Human activity is dependent upon and affects Earth’s resources and systems	<p>A</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>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, sewage) 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, sewage) 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>

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			
		UN1.1. Explore one or more objects in the sky (i.e., the Sun, Moon, and/or stars).	UN1.1. Explore one or more objects in the sky (i.e., the Sun, Moon, and/or stars).	UN1.1. Explore one or more objects in the sky (i.e., the Sun, Moon, and/or stars).	UN1.1. Explore one or more objects in the sky (i.e., the Sun, Moon, and/or stars).	UN1.1. Explore one or more objects in the sky (i.e., the Sun, Moon, and/or stars).	UN1.1. Explore one or more objects in the sky (i.e., the Sun, Moon, and/or stars).		
				UN1.2. Investigate one or more objects within the solar system (i.e., the Sun, planets, moons, asteroids, comets, and/or meteors).		UN1.2. Investigate one or more objects within the solar system (i.e., the Sun, planets, moons, asteroids, comets, and/or meteors).			
				UN1.4. 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 relative to the Earth.		UN1.3. Identify objects within the solar system as a star, a planet, or a moon.	UN1.4. 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 relative to the Earth.		
						UN1.5. 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	
		UN1.6. Identify that there are more stars in the sky than can be easily counted.	UN1.6. Identify that there are more stars in the sky than can be easily counted.	UN1.6. Identify that there are more stars in the sky than can be easily counted.	UN1.6. Identify that there are more stars in the sky than can be easily counted.	UN1.6. Identify that there are more stars in the sky than can be easily counted.	UN1.6. Identify that there are more stars in the sky than can be easily counted.		
		UN1.7. Identify that the stars are not spaced evenly in the sky.	UN1.7. Identify that the stars are not spaced evenly in the sky.	UN1.7. Identify that the stars are not spaced evenly in the sky.	UN1.7. Identify that the stars are not spaced evenly in the sky.	UN1.7. Identify that the stars are not spaced evenly in the sky.	UN1.7. Identify that the stars are not spaced evenly in the sky.		
		UN1.8. Identify that the stars vary in brightness.	UN1.8. Identify that the stars vary in brightness.	UN1.8. Identify that the stars vary in brightness.	UN1.8. Identify that the stars vary in brightness.	UN1.8. Identify that the stars vary in brightness.	UN1.8. Identify that the stars vary in brightness.		
		UN1.9. Identify our Sun as a star.	UN1.9. Identify our Sun as a star.	UN1.9. Identify our Sun as a star.	UN1.9. Identify our Sun as a star.	UN1.9. Identify our Sun as a star.	UN1.9. Identify our Sun as a star.		
UN1.10. Identify our Sun as the source of energy for our solar system.	UN1.10. Identify our Sun as the source of energy for our solar system.	UN1.10. Identify our Sun as the source of energy for our solar system.	UN1.10. Identify our Sun as the source of energy for our solar system.	UN1.10. Identify our Sun as the source of energy for our solar system.	UN1.10. Identify our Sun as the source of energy for our solar system.				
		The Moon		The Moon		The Moon			
		UN1.11. Identify that the Moon reflects light from the Sun.	UN1.11. Identify that the Moon reflects light from the Sun.	UN1.11. Identify that the Moon reflects light from the Sun.	UN1.11. Identify that the Moon reflects light from the Sun.				
			UN1.12. Identify that the Moon (a natural satellite) orbits the Earth.	UN1.12. Identify that the Moon (a natural satellite) orbits the Earth.	UN1.12. Identify that the Moon (a natural satellite) orbits the Earth.				
			UN1.13. Investigate one or more moons on other planets within the solar system.	UN1.13. Investigate one or more moons on other planets within the solar system.	UN1.13. Investigate one or more moons on other planets within the solar system.				
		Earth and Other Planets		Earth and Other Planets		Earth and Other Planets			
		UN1.14. Explore one or more planets other than the Earth in the solar system.	UN1.14. Explore one or more planets other than the Earth in the solar system.	UN1.14. Explore one or more planets other than the Earth in the solar system.	UN1.14. Explore one or more planets other than the Earth in the solar system.				
		UN1.15. Identify that planets look like stars in the night sky.	UN1.15. Identify that planets look like stars in the night sky.	UN1.15. Identify that planets look like stars in the night sky.	UN1.15. Identify that planets look like stars in the night sky.				
			UN1.16. Investigate that different planets have different characteristics (e.g., size, relative distance from the Sun).	UN1.16. Investigate that different planets have different characteristics (e.g., size, relative distance from the Sun).	UN1.16. 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).				
				UN1.17. Compare the planets in the solar system.	UN1.17. Compare the planets in the solar system.				
				UN1.18. Describe one or more planets in the solar system.	UN1.18. 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 - - - continued				
	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
B Earth has a composition and location suitable to sustain life	Not assessed at this level.	UN2.1. Explore one or more features of the Earth that allow life to exist (i.e., air, water, and/or temperature).	UN2.1. Explore one or more features of the Earth that allow life to exist (i.e., air, water, and/or temperature). UN2.2. Investigate how air on Earth allows life to exist (e.g., oxygen in air is required for humans and other animals to survive). UN2.3. 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). UN2.4. Investigate how the temperature on Earth allows life to exist (e.g., life will not exist if the temperature is too hot or too cold).	UN2.1. Explore one or more features of the Earth that allow life to exist (i.e., air, water, and/or temperature). UN2.2. Investigate how air on Earth allows life to exist (e.g., oxygen in air is required for humans and other animals to survive). UN2.3. 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). UN2.4. Investigate how the temperature on Earth allows life to exist (e.g., life will not exist if the temperature is too hot or too cold). UN2.5. Compare physical features of Earth to those of the Sun (e.g., the temperature of the Sun is too high to sustain life). UN2.6. Compare physical features of Earth to those of the Moon (e.g., the Moon has no air to support life). UN2.7. 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). UN2.8. 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).

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

1. The universe has observable properties and structure - - - continued

	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>UN3.1. Investigate the distance between stars.</p> <p>UN3.2. 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>UN3.3. Identify that distance makes stars appear smaller than they are because they are so far away (e.g., the sun is 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
<p>A The apparent position of the Sun and other stars, as seen from Earth, changes in observable patterns</p>	<p>UN4.1. Identify the Sun from other objects in the sky.</p> <p>UN4.2. Identify that the Sun can be seen only during the daytime.</p> <p>UN4.3. Identify that the Sun appears to move across the sky from morning to night.</p>	<p>UN4.1. Identify the Sun from other objects in the sky.</p> <p>UN4.2. Identify that the Sun can be seen only during the daytime.</p> <p>UN4.3. Identify that the Sun appears to move across the sky from morning to night.</p> <p>UN4.4. Investigate how the Sun appears to move slowly across the sky (from east to west) during the day.</p>	<p>UN4.1. Identify the Sun from other objects in the sky.</p> <p>UN4.2. Identify that the Sun can be seen only during the daytime.</p> <p>UN4.3. Identify that the Sun appears to move across the sky from morning to night.</p> <p>UN4.4. Investigate how the Sun appears to move slowly across the sky (from east to west) during the day.</p> <p>UN4.5. 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>UN4.1. Identify the Sun from other objects in the sky.</p> <p>UN4.2. Identify that the Sun can be seen only during the daytime.</p> <p>UN4.3. Identify that the Sun appears to move across the sky from morning to night.</p> <p>UN4.4. Investigate how the Sun appears to move slowly across the sky (from east to west) during the day.</p> <p>UN4.5. 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>UN4.6. 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>UN4.7. 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
 - - - continued

	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>UN5.1. Identify that/how the Moon is different.</p> <p>UN5.2. Identify that the Moon can be seen sometimes at night and sometimes during the day.</p>	<p>UN5.1. Identify that/how the Moon is different.</p> <p>UN5.2. Identify that the Moon can be seen sometimes at night and sometimes during the day.</p> <p>UN5.3. Identify that the shape of the Moon appears to change.</p> <p>UN5.4. Investigate how the Moon appears to move across the sky (from east to west).</p>	<p>UN5.1. Identify that/how the Moon is different.</p> <p>UN5.2. Identify that the Moon can be seen sometimes at night and sometimes during the day.</p> <p>UN5.3. Identify that the shape of the Moon appears to change.</p> <p>UN5.4. Investigate how the Moon appears to move across the sky (from east to west).</p> <p>UN5.5. Explore the shape of the Moon (e.g., sketch the shape of the Moon once a week and observe the pattern).</p> <p>UN5.6. 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>UN5.1. Identify that/how the Moon is different.</p> <p>UN5.2. Identify that the Moon can be seen sometimes at night and sometimes during the day.</p> <p>UN5.3. Identify that the shape of the Moon appears to change.</p> <p>UN5.4. Investigate how the Moon appears to move across the sky (from east to west).</p> <p>UN5.5. Explore the shape of the Moon (e.g., sketch the shape of the Moon once a week and observe the pattern).</p> <p>UN5.6. 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>UN5.7. Identify that the Moon appears to rise later each day (The Moon goes around the Earth in a counterclockwise motion).</p> <p>UN5.8. Identify that the Moon is observable 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>UN5.9. Identify that one half of the Moon is always facing the Sun and is always reflecting light.</p> <p>UN5.10. 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
 - - - 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	Seasons UN6.1. Explore the characteristics of summer in your region (e.g., warm, long days). UN6.2. Explore the characteristics of fall in your region (e.g., leaves falling). UN6.3. Explore the characteristics of winter in your region (e.g., cold, short days). UN6.4. Explore the characteristics of spring in your region (e.g., flowers blooming).	Seasons UN6.1. Explore the characteristics of summer in your region (e.g., warm, long days). UN6.2. Explore the characteristics of fall in your region (e.g., leaves falling). UN6.3. Explore the characteristics of winter in your region (e.g., cold, short days). UN6.4. Explore the characteristics of spring in your region (e.g., flowers blooming). Earth's Motions UN6.6. Identify that there is a day/night cycle every 24 hours. UN6.7. Explore the changes in length and/or position (direction) of shadows during the day.	Seasons UN6.1. Explore the characteristics of summer in your region (e.g., warm, long days). UN6.2. Explore the characteristics of fall in your region (e.g., leaves falling). UN6.3. Explore the characteristics of winter in your region (e.g., cold, short days). UN6.4. Explore the characteristics of spring in your region (e.g., flowers blooming). Earth's Motions UN6.6. Identify that there is a day/night cycle every 24 hours. UN6.7. Explore the changes in length and/or position (direction) of shadows during the day. UN6.8. Identify the relationship between the Sun's position in the sky and the changes in length and/or position of the shadows. UN6.9. Identify a day as the time it takes Earth to make a full rotation about its axis. UN6.10. Identify the path the Earth travels as it goes around (revolves) the Sun (e.g., draw a diagram of Earth orbiting the Sun). UN6.11. Identify a year as the time it takes Earth to go around the Sun once. Moon Phases UN6.12. 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).	Seasons UN6.1. Explore the characteristics of summer in your region (e.g., warm, long days). UN6.2. Explore the characteristics of fall in your region (e.g., leaves falling). UN6.3. Explore the characteristics of winter in your region (e.g., cold, short days). UN6.4. Explore the characteristics of spring in your region (e.g., flowers blooming). UN6.5. Investigate the tilting of Earth's axis and the 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 UN6.6. Identify that there is a day/night cycle every 24 hours. UN6.7. Explore the changes in length and/or position (direction) of shadows during the day. UN6.8. Identify the relationship between the Sun's position in the sky and the changes in length and/or position of the shadows. UN6.9. Identify a day as the time it takes Earth to make a full rotation about its axis. UN6.10. Identify the path the Earth travels as it goes around (revolves) the Sun (e.g., draw a diagram of Earth orbiting the Sun). UN6.11. Identify a year as the time it takes Earth to go around the Sun once. Moon Phases UN6.12. 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). UN6.13. 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
<p>C</p> <p>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>			<p>UN6.14. Identify on a class calendar one or more phases of the Moon.</p> <p>UN6.16. 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>UN6.18. Explore solar eclipses (e.g., using pictures and drawings).</p> <p>UN6.19. Explore lunar eclipses (e.g., using pictures and drawings).</p>	<p>UN6.14. Identify on a class calendar one or more phases of the Moon.</p> <p>UN6.15. Predict on a calendar one or more upcoming phases of the Moon.</p> <p>UN6.16. 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>UN6.17. 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>UN6.18. Explore solar eclipses (e.g., using pictures and drawings).</p> <p>UN6.19. Explore lunar eclipses (e.g., using pictures and drawings).</p> <p>UN6.20. Investigate solar eclipses (e.g., using the relative positions of Earth, the Moon, and the Sun; using models).</p> <p>UN6.21. 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
 - - - continued

	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
D Gravity is a force of attraction between objects in the solar system and governs their motion	Not assessed at this level.	Not assessed at this level.	Not assessed at this level.	UN7.1. 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). UN7.2. Identify that the Sun’s gravitation pull keeps the Earth and other planets in their orbits around the Sun.

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	<p>IN1.1. Ask questions.</p> <p>a. Ask questions about objects (e.g., what color is the ball?).</p> <p>IN1.2. Investigate to answer a question.</p> <p>a. Follow one or more related directions.</p>	<p>IN1.1. 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., of what is the table made?).</p> <p>c. Ask questions about events in the environment (e.g., what is the weather today?).</p> <p>IN1.2. 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., on which ramp will the marble go faster?; which material is magnetic?).</p>	<p>IN1.1. 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., of what is the table made?).</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>IN1.2. 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., on which ramp will the marble go faster?; which material is magnetic?).</p>	<p>IN1.1. 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., of what is the table made?).</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>IN1.2. 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., on which ramp will the marble go faster?; 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>

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

Strand 7: Scientific Inquiry

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

		GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
Scientific inquiry relies upon gathering evidence from qualitative and quantitative observations	B	Qualitative Observations IN2.1. Make qualitative observations using one or more of the five senses (e.g., the ball is big; the music is loud).	Qualitative Observations IN2.1. Make qualitative observations using one or more of the five senses (e.g., the ball is big; the music is loud). IN2.2. Use tools, equipment, and/or techniques. a. Make observations using simple tools and/or equipment (e.g., magnifiers/hand lenses, magnets, equal arm balances).	Qualitative Observations IN2.1. Make qualitative observations using one or more of the five senses (e.g., the ball is big; the music is loud). IN2.2. 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).	Qualitative Observations IN2.1. Make qualitative observations using one or more of the five senses (e.g., the ball is big; the music is loud). IN2.2. 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 IN2.3. 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 mass with non-standard units (e.g., use marbles as weight units with an equal arm balance).	Quantitative Observations IN2.3. 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 mass with non-standard units (e.g., use marbles as weight units with an equal arm balance). c. Compare amounts/measurements.	Quantitative Observations IN2.3. 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 mass 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 mass 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.

Strand 7: Scientific Inquiry

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

	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
C	Not assessed at this level.	<p>Observations and Data</p> <p>IN3.1. 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>IN3.1. 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 travels).</p>	<p>Observations and Data</p> <p>IN3.1. 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 travels).</p> <p>d. Use observations and data to make predictions.</p> <p>Errors</p> <p>IN3.2. 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 - - - continued

	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
D Scientific inquiry includes evaluation of explanations (hypotheses, laws, theories) in light of scientific principles (understandings)	Not assessed at this level.	IN4.1. Make explanations using prior knowledge.	IN4.1. Make explanations using prior knowledge. IN4.2. Investigate the reasonableness of an explanation (e.g., is it reasonable that it is snowing if it is 100 degrees outside?).	IN4.1. Make explanations using prior knowledge. IN4.2. Investigate the reasonableness of an explanation (e.g., is it reasonable that it is snowing if it is 100 degrees outside?).

Strand 7: Scientific Inquiry

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

	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>IN5.1. 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>IN5.1. 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>IN5.2. Communicate simple procedures using words, symbols, pictures, objects, and/or actions (e.g., outline the steps in separating a mixture).</p>	<p>IN5.1. 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>IN5.2. Communicate simple procedures using words, symbols, pictures, objects, and/or actions (e.g., outline the steps in separating a mixture).</p> <p>IN5.3. Communicate results of an investigation using words, symbols, pictures, objects, and/or actions (e.g., using data tables or graphs).</p>	<p>IN5.1. 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>IN5.2. Communicate simple procedures using words, symbols, pictures, objects, and/or actions (e.g., outline the steps in separating a mixture).</p> <p>IN5.3. Communicate results of an investigation using words, symbols, pictures, objects, and/or actions (e.g., using data tables or graphs).</p> <p>IN5.4. Communicate explanations using words, symbols, pictures, objects, and/or actions.</p>

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	Not assessed at this level.	<p>ST1.1. Explore objects that occur in nature in their natural environments (e.g., soil, rock, trees, water).</p> <p>ST1.2. Explore objects that have been designed and made by people (e.g., houses, cars, airplanes, pencils, telephones).</p>	<p>ST1.1. Explore objects that occur in nature in their natural environments (e.g., soil, rock, trees, water).</p> <p>ST1.2. Explore objects that have been designed and made by people (e.g., houses, cars, airplanes, pencils, telephones).</p> <p>ST1.3. Identify objects that occur in nature (e.g., mountain, ocean, the Sun, Earth, the Moon).</p> <p>ST1.4. Identify objects that have been designed and/or made by people to solve human problems (e.g., wheels, books) and/or enhance quality of life (e.g., wheelchair, elevator).</p>	<p>ST1.1. Explore objects that occur in nature in their natural environments (e.g., soil, rock, trees, water).</p> <p>ST1.2. Explore objects that have been designed and made by people (e.g., houses, cars, airplanes, pencils, telephones).</p> <p>ST1.3. Identify objects that occur in nature (e.g., mountain, ocean, the Sun, Earth, the Moon).</p> <p>ST1.4. Identify objects that have been designed and/or made by people to solve human problems (e.g., wheels, books) and/or enhance quality of life (e.g., wheelchair, elevator).</p> <p>ST1.5. 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).</p>

Designed objects are used to do things better or more easily and to do some things that could not otherwise be done at all

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 - - - continued

	GRADES K–2	GRADES 3–5	GRADES 6–8	GRADES 9–12
C	Not assessed at this level.	Not assessed at this level.	<p>ST2.1. 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>ST2.3. 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>ST2.5. 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 meteorologists to generate a forecast to help farmers plant and harvest their crops–positive).</p>	<p>ST2.1. 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>ST2.2. Describe positive and/or negative effects of communication technologies.</p> <p>ST2.3. 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>ST2.4. Describe positive and/or negative effects of transportation technologies.</p> <p>ST2.5. 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 meteorologists to generate a forecast to help farmers plant and harvest their crops–positive).</p> <p>ST2.6. 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 People, alone or in groups, are always making discoveries about nature and inventing new ways to solve problems and get work done	Not assessed at this level.	ST3.1. 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).	ST3.1. 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). ST3.2. Describe a problem that was solved based on scientific discoveries and technological advances. ST3.3. Identify a current problem that can be solved by scientific discoveries and/or technological advances (e.g., cancer, air pollution, global warming).	ST3.1. 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). ST3.2. Describe a problem that was solved based on scientific discoveries and technological advances. ST3.3. Identify a current problem that can be solved by scientific discoveries and/or technological advances (e.g., cancer, air pollution, global warming). ST3.4. 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).

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

3. Science and technology affect, and are affected by, society - - continued

	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 and progress of science and technology	Not assessed at this level.	<p>ST4.1. Explore physical problems that may be overcome using science and technology (e.g., wheelchairs, artificial limbs, robotics).</p> <p>ST4.4. Explore environmental problems that may be overcome using science and technology (e.g., the need for clean alternative fuels; waste disposal; diseases).</p>	<p>ST4.1. Explore physical problems that may be overcome using science and technology (e.g., wheelchairs, artificial limbs, robotics).</p> <p>ST4.2. Identify physical problems that may be overcome using science and technology.</p> <p>ST4.4. Explore environmental problems that may be overcome using science and technology (e.g., the need for clean alternative fuels; waste disposal; diseases).</p> <p>ST4.5. Identify environmental problems that may be overcome using science and technology.</p> <p>ST4.7. Identify economic problems that may be overcome using science and technology (e.g., automation, mechanized farming equipment, alternative fuels).</p> <p>ST4.9. Identify social problems that may be overcome using science and technology (e.g., space travel, mass transit, cars, drug research).</p>	<p>ST4.1. Explore physical problems that may be overcome using science and technology (e.g., wheelchairs, artificial limbs, robotics).</p> <p>ST4.2. Identify physical problems that may be overcome using science and technology.</p> <p>ST4.3. Describe physical problems that may be overcome using science and technology.</p> <p>ST4.4. Explore environmental problems that may be overcome using science and technology (e.g., the need for clean alternative fuels; waste disposal; diseases).</p> <p>ST4.5. Identify environmental problems that may be overcome using science and technology.</p> <p>ST4.6. Describe environmental problems that may be overcome using science and technology.</p> <p>ST4.7. Identify economic problems that may be overcome using science and technology (e.g., automation, mechanized farming equipment, alternative fuels).</p> <p>ST4.8. Describe economic problems that may be overcome using science and technology.</p> <p>ST4.9. Identify social problems that may be overcome using science and technology (e.g., space travel, mass transit, cars, drug research).</p> <p>ST4.10. Describe social problems that may be overcome using science and technology.</p> <p>ST4.11. 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>ST4.12. 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>

Science and Technology
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.
- **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.
- **Atmosphere (air):** consists of all the gaseous matter enveloping and surrounding Earth.
- **Balance:** an instrument used to measure the mass of an object.
- **Biodiversity:** the number and variety of organisms found in a particular habitat or ecosystem.
- **Biotic:** pertaining to the living part of the environment.
- **Carnivores:** meat eaters.
- **Cell:** the basic building block for all organisms.
- **Chemical change:** when one or more substances are changed into new substance(s) with new and different properties.
- **Circulatory system:** a collection of organs (e.g., heart, arteries, veins) that move blood throughout an organism.
- **Community:** a group of plants and animals living and interacting with one another in the same ecosystem.
- **Condensation:** the physical change of matter going from a gaseous state to a liquid state.
- **Consumer:** an organism that feeds on other organisms or on material derived from them.
- **Crescent moon:** as being observed on Earth less than half of the Moon is reflecting light.
- **Decomposer:** an organism, especially a bacterium or fungus that causes organic matter to rot or decay.
- **Deposition:** when transported earth materials are dropped in another location.
- **Displacement:** the weight or volume of fluid displaced by a floating or submerged body.
- **Ecosystem:** a localized group of interdependent organisms together with the environment that they inhabit and depend on.
- **Electromagnetic spectrum:** energy in wave form that can be transmitted through a vacuum or different medium.
- **Erosion:** movement of weathered rock and soil.
- **Evaporation:** the process by which a liquid becomes a gas (vapor).
- **Fission:** an asexual reproductive process in which a unicellular organism divides into two or more independently maturing daughter cells.
- **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.
- **Force:** a quantity that produces an acceleration in the direction of its application; it is directly proportional to mass and acceleration ($F = M \times A$).
- **Fossil:** the traces or 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.
- **Friction:** a force that resists the relative motion or tendency to such motion of two bodies in contact.
- **Full moon:** the entire face of the Moon is reflecting light as being observed on Earth.
- **Gas:** matter that has no definite shape or volume.
- **Genetic information:** hereditary information that is unique to an organism and is stored in sequences within DNA molecules.
- **Geosphere (land):** also known as lithosphere, the outer part of the Earth that is solid, consisting of the crust and upper mantle.
- **Gibbous moon:** more than half of the Moon as being observed on Earth is reflecting light.

Science and Technology
GLOSSARY (continued)

- **Gravity:** a force that acts to pull objects together.
- **Habitat:** part of an ecosystem where organisms get food and shelter.
- **Herbivores:** 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.
- **Humidity:** amount of water vapor in the atmosphere.
- **Hydrosphere (water):** consists of all the water (solid, liquid, and gas) on Earth.
- **Igneous rock:** a rock that forms when melted rock (lava or magma) cools and crystallizes.
- **Life cycle:** the complete process of change and development during an organism's lifetime.
- **Liquid:** matter that has a definite volume but takes the shape of the container holding it.
- **Living:** anything that utilizes energy to grow, respond to stimuli, move, respire, and eliminate waste.
- **Lunar eclipse:** the Moon appears dark when sunlight is blocked by Earth.
- **Mass:** the amount of matter in something.
- **Matter:** anything that has mass and takes up space.
- **Metamorphic rock:** a rock that forms when other rocks are changed by intense heat and pressure.
- **Metamorphosis:** to undergo a complete or marked change of bodily form while developing into an adult animal.
- **Migration:** the seasonal movement of organisms from one location to another.
- **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).
- **Moon phases:** shapes of the light-reflecting part of the Moon as being observed on Earth.
- **Natural selection:** changes in a population as a response to changes in their environment over time.
- **Non-living:** anything that does not (or never did) exhibit the characteristics of living things.
- **Offspring:** the descendants of organisms.
- **Omnivores:** organisms that consume both plants and meat.
- **Orbiting:** an object travels around another object in a circular or an elliptical path.
- **Organ system:** a system, such as circulatory, digestive, or respiratory, that consists of a collection of organs to perform a specific function.
- **Organ:** a differentiated part of an organism, such as an eye, heart, or leaf that performs 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.
- **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.
- **Population:** organisms of the same species in a specified habitat.

Science and Technology GLOSSARY (continued)

- **Precipitation:** any form of water that falls to earth from a cloud.
- **Producer:** an organism that provides (makes) its own food (e.g., plants).
- **Quarter moon:** half of the Moon's face as observed from Earth is reflecting light.
- **Reproduce:** to produce offspring or new individuals through a sexual or an asexual process.
- **Revolve:** going around an object in a circular or an elliptical path.
- **Rotate:** spinning around an axis.
- **Runoff:** water that flows over the land surface outside of a channel.
- **Satellite (natural and artificial):** a smaller object that orbits a larger, more massive object.
- **Scale:** an instrument used to measure the weight or force of an object (e.g., a spring scale).
- **Seasons:** a period of time characterized by weather and other natural events caused by the tilt of Earth's axis as it is orbiting the Sun.
- **Sediment:** pieces of rocks.
- **Sedimentary rock:** a rock that forms through cementation of sediments or through processes such as evaporation and compaction.
- **Sexual reproduction:** reproduction that involves the union of male and female reproductive cells, each contributing half of the genetic makeup of the resulting offspring.
- **Simple machine:** a simple device, such as a lever, pulley, inclined plane, or a wheel and axle.
- **Skeletal system:** a collection of organs (e.g., bones, hard outer shells for insects) that provide structural support for an organism.
- **Solar eclipse:** the Sun appears dark when sunlight is blocked by the Moon.
- **Solution:** a homogenous mixture in which one substance dissolves into another.
- **Speed:** distance traveled per unit time.
- **Survival:** to manage to stay alive or continue to exist, especially in difficult situations.
- **Waning:** the light-reflecting part of the Moon is shrinking.
- **Water cycle:** a model describing the movement of water in, on, and above the earth.
- **Waxing:** the light-reflecting part of the Moon is getting larger.
- **Weathering:** a slow and continuous process of breaking down rocks chemically or mechanically.
- **Weight:** measure of the force of gravity on an object or the amount of matter (mass) as weighed on Earth.
- **Work:** the transfer of energy to a body by the application of a force that moves the body in the direction of the force ($W = F \times d$).

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).