

	Content Statement	I Can...	Key Vocabulary
Cycles and Patterns in the Solar System (ESS)	<p>1. The solar system includes the sun and all celestial bodies that orbit the sun. Each planet in the solar system has unique characteristics.</p> <p>NOTE: The shape of Earth’s orbit is nearly circular (also true for other planets). Many graphics that illustrate the orbit overemphasize the elliptical shape, leading to the misconception regarding seasonal change being related to how close Earth is to the sun. The discussion of planet characteristics should be at an introductory level for this grade.</p>	<ul style="list-style-type: none"> -Recognize that the eight major planets in the solar system orbit the sun. -Describe characteristics of the eight major planets including: <ul style="list-style-type: none"> -Whether or not they have a moon(s), -General information regarding planetary positions and distance from the sun, -General information about orbital patterns, -Composition and -Recent discoveries and projects (e.g., missions to Mars, etc.). -Recognize the role that gravitational attraction plays in the planets’ and moons’ orbits. -Differentiate between an asteroid, a meteor, a meteoroid, a comet, and a dwarf planet based on their characteristics. -Identify tools and technologies used to study the solar system (e.g., telescope, satellite, etc.). 	<ul style="list-style-type: none"> • Solar system • Orbit • Asteroid • Meteor • Meteoroid • Comet • Dwarf planet • Telescope • Satellite • Celestial body • Ellipse • Gravitational attraction • Orbital patterns • Composition • Major planets • Planetary positions

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Cycles and Patterns in the Solar System (ESS)	2. The sun is one of many stars that exist in the universe.	-Recognize the sun appears large from Earth because it is the closest star to the Earth. -Identify the sun as a medium-sized star and the only star in our solar system. -Recall that there are many other stars in the universe and that they are different sizes. -Differentiate between a red dwarf star, blue giant star, and the sun. -Build and use a scale model of the different planet sizes and orbits in relationship to the sun and the Earth. -Identify places on the Earth that receive direct sunlight and therefore can effectively collect solar energy. -Identify and describe current and new discoveries related to stars and the sun. -Identify a constellation as a pattern of stars that can be used for navigation.	<ul style="list-style-type: none"> • Star • Red dwarf star • Blue giant star • Universe • Scale model • Solar energy • Solar system • Orbit • Constellation

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Cycles and Patterns in the Solar System (ESS)	<p>3. Most of the cycles and patterns of motion between the Earth and sun are predictable.</p> <p>NOTE: The amount of direct sunlight that Earth receives is related to the altitude of the sun, which affects the angle of the sun’s rays, and the amount of time the sun is above the horizon each day.</p> <p>NOTE: Different regions around the world have seasonal changes that are not based solely on average temperature (e.g., rainy season, dry season, monsoon season).</p> <p>NOTE: The names of the moon’s phases are <i>not</i> the emphasis at this grade level. The emphasis is on observational differences. Names of phases are found in grade 7.</p>	<ul style="list-style-type: none"> -Use a three-dimensional model to demonstrate that the tilt of Earth’s axis is related to the amount of direct sunlight received and seasonal temperature changes. -Use models, websites, and investigations to understand the cycle and pattern of day and night, seasons, years, and the amount of direct sunlight Earth receives. -Correlate the average daily temperature with the amount of direct sunlight received. -Identify seasons as a change in average temperature throughout the year. -Recognize that the rotation of Earth on its axis produces day and night, which is why the sun, stars, and moon appear to change position in the sky. -Investigate the seasonal weather patterns around the world (e.g., hurricane season, monsoon season, rainy season, dry season). -Represent the sun, moon and Earth and their orbits graphically and to scale. 	<ul style="list-style-type: none"> • Axis • Seasonal weather pattern • Rotation • Orbit • Seasonal changes • Model • Correlate

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Interconnections within Ecosystems (LS)	<p>4. Organisms perform a variety of roles in an ecosystem.</p> <p>NOTE: It is recommended that the content statements for fifth-grade life science be combined and taught as a whole. For example, it is important that the ecological role of organisms is interwoven with a clear understanding that all living things require energy.</p> <p>NOTE: At this grade, species can be defined by using Ernst Mayer’s definition “groups of actually or potentially interbreeding natural populations, which are reproductively isolated from other such groups.” Assessments will not include the definition of species.</p>	<ul style="list-style-type: none"> -Identify plants and some microorganisms as producers. -Describe characteristics of producers including how they get energy and their role in an ecosystem. -Identify animals as consumers and many form predator-prey relationships. -Describe characteristics of consumers including how they get their energy and their role in an ecosystem. -Identify decomposers as primarily bacteria & fungi. -Describe the characteristics of decomposers including how they get their energy and their role in an ecosystem. -Recognize that a food web is a representation of intertwining food chains within the same biological community. -Create a food web of an ecosystem that includes producers, consumers, and decomposers. -Explain how a member of a food web may occupy different positions during their lives. -Differentiate between symbiotic relationships including: mutualism, commensalism, and parasitism. -Conduct an investigation of locally threatened or endangered species and the effects of remediation programs, species loss and the introduction of a new species on the local environment over time. -Classify a list of organisms and their interactions within an environment as producers, consumers, decomposers. -Classify the symbiotic relationships between a given list of organisms and their interactions within an environment as mutualism, commensalism, or parasitism. 	<ul style="list-style-type: none"> • Producer • Microorganism • Food web • Consumer • Decomposer • Ecosystem • Symbiotic relationship • Mutualism • Commensalism • Parasitism • Threatened species • Endangered species • Bacteria • Species loss • Predator-prey relationship • Community • Fungi • Classify • Food chain • Remediation program • Species

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	Content Statement	I Can...	Key Vocabulary
Interconnections within Ecosystems (LS)	<p>5. All of the processes that take place within organisms require energy.</p> <p>NOTE: It is recommended that the content statements for fifth-grade life science be combined and taught as a whole. For example, it is important that the ecological role of organisms is interwoven with a clear understanding that all living things require energy.</p> <p>NOTE: Virtual simulations and investigations can help demonstrate energy flow through the trophic levels.</p> <p>NOTE: The chemical details of photosynthesis will be addressed in grade 10. This is just an introduction of the process, not the details of the process.</p>	<ul style="list-style-type: none"> -Understand that energy flows through an ecosystem in one direction: from photosynthetic organisms to consumers (herbivores, omnivores to carnivores) and decomposers. -Create food webs using arrows to illustrate the flow of energy in order to represent the exchange of energy in an ecosystem. -Properly identify the producers and consumers in a food web. -Explain ways that humans can improve the health of ecosystems (e.g., recycling wastes, establishing rain gardens, planting native species). -Understand that all processes of life for all organisms require a continual supply of energy. -Use the information gained from satellite imaging, remote sensing or other digital-research formats to help visualize what happens in an ecosystem when new producers (e.g., Tamarisk plants) are introduced. -Use the information gained from satellite imaging, remote sensing or other digital-research formats to determine the relationship between the producers and consumers within an ecosystem. -Design experiments to observe what happens when one environmental factor of an ecosystem is changed. 	<ul style="list-style-type: none"> • Ecosystem • Producers • Consumers • Herbivores • Omnivores • Carnivores • Decomposers • Food web • Photosynthesis • Satellite imaging • Remote sensing • Digital-research • Environmental factor

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Light, Sound and Motion (PS)	<p>6. The amount of change in movement of an object is based on the mass of the object and the amount of force exerted.</p> <p>NOTE: This content can be taught in conjunction with the following ESS content: Everything on or anywhere near Earth is pulled toward Earth’s center by gravitational force. Weight is a measure of this force. The planets are kept in orbit due to their gravitational attraction for the sun.</p> <p>NOTE: While concepts are related to Newton’s second law, remain conceptual at this grade. Knowing the name of the law is not required. Memorizing and reciting words to describe Newton’s second law is not appropriate.</p> <p>NOTE: Although mathematics is applied to the concept of speed at this grade level, its use should support deeper understanding of the concept of speed and not be taught as the primary definition of speed.</p> <p>NOTE: In Ohio, students will not be assessed on the differences between mass and weight until Grade 6. The distinction between mass and weight will be introduced at the middle school level.</p>	<ul style="list-style-type: none"> -Identify the 3 ways that forces can cause changes in the motion of an object: speed up, slow down or change direction. -Investigate what happens to an object’s speed when a force is applied in the same direction of an object’s motion and in the opposite direction of an object’s motion. -Recognize that generally the greater the force acted on an object, the greater the change in motion. -Recognize that generally the greater the mass an object has, the less influence a given force will have on its motion. -Recall that if no forces act on an object, the object does not change its motion and moves at constant speed in a given direction. -Recall that an object will remain at rest if it is not moving and no force acts on it. -Describe movement as a measure of speed (how fast or slow the movement is). -Describe speed as a measurement of the time and distance traveled (how long it took the object to go a specific distance). -Calculate speed as distance divided by time. -Use real-world settings to investigate the speed of an object both inside and outside of the classroom (virtual investigations and simulations). -Explain that an object that moves with constant speed travels the same distance in each successive unit of time and in the same amount of time, a faster object moves a greater distance than a slower object. -Understand that when an object is speeding up, the distance it travels increases with each successive unit of time and when it is slowing down, the distance it travels decreases with each successive unit of time. -Represent time, distance, and speed data graphically. -Describe weight as a measure of the gravitational force between an object and the Earth. 	<ul style="list-style-type: none"> • Force • Speed • Mass • Weight • Constant speed • Gravitational force

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Light, Sound and Motion (PS)	<p>7. Light and sound are forms of energy that behave in predictable ways.</p> <p>NOTE: Students are not responsible for knowing the additive rules for color mixing of light other than the fact that white light is a mixture of many colors.</p> <p>NOTE: The wave nature of sound and light are not introduced at this level nor are parts of the electromagnetic spectrum other than visible light.</p> <p>NOTE: At this grade, how sound travels through the medium is not appropriate as atoms and molecules are not introduced until grade 6.</p>	<ul style="list-style-type: none"> -Understand that light can travel through some materials such as glass, water, and empty space. -Recall that light travels in a straight line until it interacts with another object or material. -Describe when shadows are created. -Investigate the differences between absorption, refraction and reflection. -Determine if light is absorbed, refracted, reflected, traveled through or a combination of these when it hits different materials. -Investigate how light can change the temperature of an object based on the material of the object, the intensity of and the angle at which the light strikes the surface, how long the light shines on the object, and how much light is absorbed. -Experiment with prisms (bends white light and separates the different colors of it) and magnifying lenses (bends light and focuses it toward a single point) to observe the refraction of light. -Understand that visible light can be emitted from an object or reflected by an object. -Realize that reflected colors are the only colors visible when looking at an object (e.g., red apples look red because the red light that hits the apple is reflected while the other colors are absorbed). -Use an object to produce a low pitch (object vibrates slowly) and a high pitch (object vibrates quickly). -Plan and implement an investigation to determine how the length of a tube affects the pitch it creates. -Recognize that sound can travel through solids, liquids or gases at different speeds. -Recognize that sound can be absorbed, travel through, reflected, or a combination of these when it hits a new material. -Recall that light travels faster than sound. -Experiment, test, and investigate the properties of light and sound. -Recognize that sound must travel through a material (medium) to move from place to place. 	<ul style="list-style-type: none"> • Light • Absorb • Reflect • Refract • Pitch • Sound • Energy • Empty space • Prism • Magnifying lenses • Visible light • Medium (material)

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