

# Oakwood City School District

## Fifth Grade Science

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This course features an integrated science curriculum that offers the student learning experiences in the areas of Earth & Space Science, Life Science. Emphasis is placed on gaining an understanding of basic concepts through a variety of classroom activities and laboratories. Students are given the opportunity to solve problems and extend their critical thinking skills, as well as to work cooperatively with their fellow students.

#### Science Inquiry and Application

During the years of grades 5-8 all students must use the following scientific processes with appropriate laboratory safety techniques to construct their knowledge and understanding in all science content areas:

- Identify questions that can be answered through scientific investigations;
- Design and conduct a scientific investigation;
- Use appropriate mathematics, tools and techniques to gather data and information;
- Analyze and interpret data;
- Develop descriptions, models, explanations and predictions;
- Think critically and logically to connect evidence and explanations;
- Recognize and analyze alternative explanations and predications; and
- Communicate scientific procedures and explanations.

#### English Language Arts Standards for Science & Technical Subjects Grades 3-5

**Key Ideas and Details**

**Craft and Structure**

**Integration of Knowledge and Ideas**

**Range of Reading and Level of Text Complexity**

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### Content Standards

#### Earth and Space Science

- I **Cycles and Patterns in the Solar System:** This topic focuses on the characteristics, cycles and patterns in the solar system and within the universe.
  - A The solar system includes the sun and all celestial bodies that orbit the sun. Each planet in the solar system has unique characteristics.
    - 1 Eight major planets in the solar system orbit the sun.
    - 2 Some of the planets have a moon or moons that orbit them. Earth is a planet that has a moon that orbits it.
    - 3 The planets' orbits are because of their gravitational attraction to the sun. Moons orbit around planets because of their gravitational attraction to the planets.
    - 4 Asteroids are metallic, rocky bodies that orbit the sun but are too small to be classified as a planet. A meteor appears when a particle or chunk of metallic or stony matter called a meteoroid enters Earth's atmosphere from outer space. Comets are a mixture of ices (both water and frozen gases) that are not part of a planet. Pluto is classified as a dwarf planet (definition from <http://www.nasa.gov>).
    - 5 General information regarding planetary positions, orbital patterns, planetary composition and recent discoveries and projects (e.g., missions to Mars) are included in this content. Tools and technology are an essential part of understanding the workings within the solar system.
  - B The sun is one of many stars that exist in the universe.
    - 1 The sun is the closest star to the Earth. Scaled models (3-D or virtual) and graphics can be used to show the vast difference in size between the sun and the Earth.
    - 2 The sun is a medium-sized star and is the only star in our solar system.
    - 3 There are many other stars of different sizes in the universe. Because they are so far away, they do not appear as large as the sun.
    - 4 General facts about the size and composition of the sun are introduced. Details (e.g., age of the sun, specific composition, temperature values) are above grade level.

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- 5 The emphasis should be on general characteristics of stars and beginning to understand the size and distance of the sun in relationship to the Earth and other planets.
  - 6 Current and new discoveries related to stars and the sun must be included.
- C Most of the cycles and patterns of motion between the Earth and sun are predictable.
- 1 Earth's revolution around the sun takes approximately 365 days. Earth completes one rotation on its axis in a 24-hour period, producing day and night.
  - 2 This rotation makes the sun, stars and moon appear to change position in the sky.
  - 3 Earth's axis is tilted at an angle of  $23.5^{\circ}$ . This tilt, along with Earth's revolution around the sun, affects the amount of direct sunlight that the Earth receives in a single day and throughout the year.
  - 4 The average daily temperature is related to the amount of direct sunlight received. Changes in average temperature throughout the year are identified as seasons.

**Note 1:** 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.

**Note 2:** Different regions around the world have seasonal changes that are not based solely on average temperature (e.g., rainy season, dry season, monsoon season).

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### Life Science

- I **Interconnections within Ecosystems:** This topic focuses on foundational knowledge of the structures and functions of ecosystems. Cells are the fundamental unit of life.
  - A Organisms perform a variety of roles in an ecosystem.
    - 1 Plants and some microorganisms are producers. They are the foundation of the food web.
    - 2 Producers transform energy from the sun and make food through a process called photosynthesis.
    - 3 Animals get their energy by eating plants and other animals that eat plants.
    - 4 Animals are consumers and many form predator-prey relationships.
    - 5 Decomposers (primarily bacteria and fungi) are consumers that use waste materials and dead organisms for food.
    - 6 Decomposers also return nutrients to the ecosystem.
    - 7 One way ecosystem populations interact is centered on relationships for obtaining energy.
    - 8 Food webs are defined in many ways, including as a scheme of feeding relationships, which resemble a web. This web serves as a model for feeding relationships of member species within a biological community.
    - 9 Members of a species may occupy different positions during their lives.
    - 10 Food chains and webs are schematic representations of real-world interactions. For this grade level, it is enough to recognize that food webs represent an intertwining of food chains within the same biological community. See the content statement for details on grade-appropriate food webs.
    - 11 Organisms have symbiotic relationships in which individuals of one species are dependent upon individuals of another species for survival.
    - 12 Symbiotic relationships can be categorized as mutualism where both species benefit, commensalism where one species benefits and the other is unaffected, and parasitism where one species benefits and the other is harmed.
    - 13 Investigations of locally threatened or endangered species must be conducted and include considerations of the effects of remediation programs, species loss and the introduction of new species on the local environment.

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- B All of the processes that take place within organisms require energy.
- 1 For ecosystems, the major source of energy is sunlight.
  - 2 Energy entering ecosystems as sunlight is transferred and transformed by producers into energy that organisms use through the process of photosynthesis. That energy then passes from organism to organism as illustrated in food webs.
  - 3 In most ecosystems, energy derived from the sun is transferred and transformed into energy that organisms use by the process of photosynthesis in plants and other photosynthetic organisms.
  - 4 Energy flows through an ecosystem in one direction, from photosynthetic organisms to consumers (herbivores, omnivores to carnivores) and decomposers.
  - 5 The exchange of energy that occurs in an ecosystem can be represented as a food web.
  - 6 The exchange of energy in an ecosystem is essential because all processes of life for all organisms require a continual supply of energy.
  - 7 Satellite imaging, remote sensing or other digital-research formats can be used to help visualize what happens in an ecosystem when new producers (e.g., Tamarisk plants) are introduced into an ecosystem. The information gained should be used to determine the relationship between the producers and consumers within an ecosystem.

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### Physical Science

- I **Light, Sound, and Motion:** This topic focuses on the forces that affect motion. This includes the relationship between the change in speed of an object, the amount of force applied, and the mass the object. Light and sound are explored as forms of energy that move in predicable ways, depending on the matter through which they move.
  - A Light and sound are forms of energy that behave in predicable ways.
    - 1 Light can travel through some materials, such as glass or water.
    - 2 Light also can travel through empty space, like from the sun to Earth.
    - 3 When light travels from one location to another, it goes in a straight line until it interacts with another object or material.
    - 4 When light strikes objects through which it cannot pass, shadows are formed.
    - 5 As light reaches a new material, it can be absorbed, refracted, reflected or can continue to travel through the new material; one of these interactions may occur or many may occur simultaneously, depending on the material.
    - 6 Light can be absorbed by objects, causing them to warm. How much an object's temperature increases depends on the material of the object, the intensity of and the angle at which the light striking its surface, how long the light shines on the object and how much light is absorbed. Investigating and experimenting with temperature changes caused by light striking different surfaces can be virtual
    - 7 or in a lab setting.
    - 8 When light passes from one material to another, it is often refracted at the boundary between the two materials and travels in a new direction through the new material (medium). For example, a magnifying lens bends light and focuses it toward a single point.
    - 9 A prism bends white light and separates the different colors of light. Experiment with prisms and magnifying lenses to observe the refraction of light.
    - 10 Visible light may be emitted from an object (like the sun) or reflected by an object (like a mirror or the moon). The reflected colors are the only colors visible when looking at an object. For example, a red apple looks red because the red light that hits the apple is reflected while the other colors are absorbed.

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- B The amount of change in movement of an object is based on the weight of the object and the amount of force exerted.
- 1 The motion of an object can change by speeding up, slowing down or changing direction. Forces cause changes in motion
  - 2 Movement is measured by speed (how fast or slow the movement is). Speed is measured by time and distance traveled (how long it took the object to go a specific distance).
  - 3 An object that moves with constant speed travels the same distance in each successive unit of time.