

# Oakwood City School District Kindergarten Science

## Kindergarten Science

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 PreK-4 all students become proficient in the use of the following scientific processes, with appropriate laboratory safety techniques, to construct their knowledge and understanding in all science content areas:

- Observe and ask questions about the natural environment
- Plan and conduct simple investigations
- Employ simple equipment and tools to gather data and extend the senses
- Use appropriate mathematics with data to construct reasonable explanations
- Communicate about observations, investigations and explanations
- Review and ask questions about the observations and explanations of others

### English Language Arts Standards for Science & Technical Subjects Grades K-2

**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 **Daily and Seasonal Changes:** This topic focuses on observing, exploring, describing and comparing weather changes, patterns in the sky and changing seasons.
  - A The moon, sun and stars can be observed at different times of the day.
    - 1 The moon, sun and stars are in different positions at different times of the day or night. Sometimes the moon is visible during the night, sometimes the moon is visible during the day and at other times, the moon is not visible at all. The observable shape of the moon changes in size very slowly throughout each day of every month. The sun is visible only during the day.
    - 2 The sun's position in the sky changes in a single day and from season to season. Stars are visible at night, some are visible in the evening or morning and some are brighter than others.
  - B Weather changes are long-term and short-term. These changes occur due to changing energy.
    - 1 Weather changes occur throughout the day and from day to day.
    - 2 Air is a nonliving substance that surrounds Earth and wind is air that is moving.
    - 3 Wind, temperature and precipitation can be used to document short-term weather changes that are observable.
    - 4 Yearly weather changes (seasons) are observable patterns in the daily weather changes.

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### Life Science

I **Physical and Behavioral Traits of Living Things** This topic focuses on observing, exploring, describing and comparing living things in Ohio.

A Living things are different than non-living things.

- 1 Living things include anything that is alive or has ever been alive.
- 2 Living things have specific characteristics and traits.
- 3 Living things grow and reproduce.
- 4 Living things are found almost everywhere in the world. There are somewhat different kinds in different places.
- 5 The emphasis of this content statement is to build a grade-appropriate understanding of what it means to be living, not to distinguish living and nonliving.
- 6 There are different kinds of living things. The focus is on familiar organisms (e.g., grass, trees, flowers, cats, dogs, horses). Some grade-appropriate characteristics include that living things respond to stimuli, grow and require energy.
- 7 Living things respond to stimuli. The responses described must be easy to observe (e.g., fish in an aquarium respond to a stimulus – food). Living things grow (e.g., plant seeds or seedlings and watch them grow). Observing plants growing toward a light source can lead to experiments and explorations of what happens when the plant is placed in a different place in the classroom (e.g., on the floor, in a closet, on a desk) or rotated 90 degrees. Some observations also can be done virtually.
- 8 Animals need food; plants make their own food. Read grade-appropriate, non-fiction books to students or by students (e.g., picture books) that accurately describe the characteristics of living things found in Ohio. Technology also can be used to find photographs and stories or take photographs of living things in Ohio.

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- 9 When studying living things, ethical treatment of animals and safety must be employed. Respect for and proper treatment of living things must be modeled. For example, shaking a container, rapping on insect bottles, unclean cages or aquariums, leaving living things in the hot sun or exposure to extreme temperatures (hot or cold) must be avoided. The National Science Teachers Association (NSTA) has a position paper to provide guidance in the ethical use and treatment of animals in the classroom at <http://www.nsta.org/about/positions/animals.aspx>.

**B Living things have physical traits and behaviors, which influence their survival.**

- 1 Living things are made up of a variety of structures.
- 2 Some of these structures and behaviors influence their survival.
- 3 At this grade level, providing exposure through personal observation and stories to a large variety of living things is required. The focus is not on naming the parts of living things, but associating through interaction and observation that living things are made of parts, and because of those parts, living things can do specific things. The scientific explanations of how those parts function will come later. Identify and discuss examples such as birds have wings for flying and beaks for eating. Dogs have eyes for seeing, teeth for chewing and legs for moving. Trees have leaves and trunks.
- 4 Concrete experiences are necessary to deepen knowledge of the traits and behaviors of living things. Technology can be used to compare data on the number of honeybees observed in the schoolyard with other schools. Additional inquiry investigations include conducting observations of pond water (e.g., using a hand lens, focusing on macroscopic organisms), raising a classroom pet, planting seeds and watching them grow, and noting differences between different types of plants or bird watching.

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### Physical Science

- I **Properties of Everyday Objects and Materials** This topic focuses on the production of sound and on observing, exploring, describing and comparing the properties of objects and materials with which the student is familiar.
  - A Objects and materials can be sorted and described by their properties.
    - 1 Objects can be sorted and described by the properties of the materials from which they are made. Some of the properties can include color, size and texture.
    - 2 In Kindergarten, the concept that objects are made of specific materials (e.g., clay, cloth, paper, metal, glass) is reinforced.
    - 3 Objects have certain properties (e.g., color, shape, size, temperature, odor, texture, flexibility) that can be described, compared and sorted.
    - 4 Temperature observations must be limited to descriptors such as hot, warm and cold.
    - 5 Observation of weight must be limited to describing objects as heavy or light.
    - 6 Comparisons must be used to sort and describe objects (e.g., *is the wooden block heavier or lighter than the plastic block?*).
    - 7 Standard and nonstandard measuring tools can give additional information about the environment and can be used to make comparisons of objects and events.
    - 8 Magnifiers can be used to see detail that cannot be seen with the unaided eye.
    - 9 Familiar objects from home, the classroom or the natural environment must be explored and investigated.
  - B Some objects and materials can be made to vibrate to produce sound.
    - 1 Sound is produced by touching, blowing or tapping objects. The sounds that are produced vary depending on the properties of objects. Sound is produced when objects vibrate.

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(a) Sound can be made in many ways. Objects like cymbals, the tabletop or drums can be tapped to produce sound. Objects like a rubber band or a guitar string can be plucked to produce sound. Objects like a bottle or a trumpet can be blown into to produce sound. A wide variety of sounds can be made with the same object (e.g., a plastic bottle could be tapped or blown into). The connection between sound energy and the vibration of an object must be made. Vibrations can be made visible when water splashes from a cymbal or triangle placed in water or rice vibrates on the top of a banging drum. The concepts of pitch (low vs. high notes) and loudness are introduced. The pitch of sound can be changed by changing how fast an object vibrates. Objects that vibrate slowly produce low pitches; objects that vibrate quickly produce high pitches. Sound must be experienced, investigated and explored through observations and experimentation. Standard, virtual and student-constructed instruments must be used to explore sound. Note: Wave descriptions of sound and the propagation of sound energy are not appropriate at this grade.

2 Investigate sounds made with homemade instruments.

- (a) Design and make an instrument that can make different sounds by tapping, plucking or blowing.
- (b) Give suggestions to other students about how their instruments may make different types of sounds.
- (c) Experiment to determine how many different ways sounds can be made from an object (e.g., horn, cymbals, rubber band, guitar, plastic bottle).
- (d) Compare different ways to make loud and soft sounds by tapping, blowing or plucking objects.
- (e) Identify three ways to make sounds from objects.

3 Investigate how the stretch of plucked rubber bands affects the sound.

- (a) Use questions to investigate and experiment pitch. Ask:  
*How are pitch (higher/lower notes) and vibration changed as a rubber band is stretched further and further?*

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- (b) Use graphics (e.g., digital photographs, virtually composed graphics) to represent the observations from the experiment.
  - (c) Compare the notes made from rubber bands that are stretched different amounts.
  - (d) Compare the relative speed of vibration (faster/slower) to the pitch (higher/lower notes) of the sound produced.
  - (e) Recall that objects that vibrate quickly produce high notes and objects that vibrate slowly produce low notes.
- 4 Investigate how the properties of a drum affect the sound.
- (a) Experiment and investigate with vibrations and sound.  
*Ask: How does changing a property of a homemade drum (e.g., width, depth, stretch of material) affect the vibration and the sound of the drum?*
  - (b) Use graphics (e.g., digital photographs, virtually composed graphics) to represent the observations from the experiment.
  - (c) Compare the sounds made from drums with different properties.
  - (d) Recognize that sound is caused by vibrating objects.
  - (e) Recall that objects that vibrate quickly produce high notes and objects that vibrate slowly produce low notes.