

FSSD K-5 Science Resource Kits 2017-18

The FSSD Science and Math Resource Center program provides opportunities for students to engage in laboratory experiences that integrate inquiry, technology and engineering, and mathematics in what is commonly referred to as STEM Education. The kits have been purchased from Carolina Biological and are maintained and refurbished by the district to be distributed to the schools.

For more information see:

<http://www.carolinacurriculum.com/stc/>

Kindergarten

Organisms

Using the natural curiosity that young children have about plants and animals, *Organisms* asks students to develop observational skills by caring for and looking at organisms. Students create and maintain an aquarium and a terrarium; making first-hand observations of plants and animals allows students to develop an understanding and sensitivity for living things. The woodland habitat that students build contains pine seedlings, moss, pill bugs, and Bess beetles or millipedes. The freshwater habitat they create consists of *Elodea* and *Cabomba* plants, pond snails, and guppies. Students are able to observe how the animals and plants coexist and determine the basic needs of every living thing as well as needs that are unique to each organism. In a final lesson, students apply what they have learned about organisms to humans, exploring how human beings are similar to and different from other living things.

First Grade

Weather

Weather introduces students to the concept of weather and to the idea that scientific tools can be used to measure the phenomena they observe with their senses. Students observe weather; use thermometers, rain gauges, and wind scales; record their own data; and discuss their findings on cloud cover, precipitation, wind, and temperature. Students are asked to apply their new skills and knowledge to make predictions about the weather in their area. They compare their own weather predictions to the predictions of the local meteorologist and what actually happens with the weather where they live. The lessons in this unit enable students to appreciate how weather changes and how it affects their daily lives.

Solids and Liquids

The investigations in *Solids and Liquids* introduce students to two key concepts of physical science—that solids and liquids are two states of matter and that each state of matter has its own identifiable properties. Students begin by investigating a set of solids,

focusing on properties such as shape, color, texture, and hardness. They conduct experiments to determine whether the solids will float or sink, roll or stack, or attract a magnet. Next, students actively explore the properties of liquids, how they look and feel, their fluidity, how they mix with water, and their degree of absorption. Students communicate their observations and the results of their experiments through discussion, writing, and drawing and improve their ability to follow directions and conduct experiments.

Life Cycle of Butterflies

The *Life Cycle of Butterflies* unit introduces students to the concepts of life cycles by inviting them to investigate one organism—the painted lady butterfly (*Vanessa cardui*) for eight weeks. As students care for the caterpillars and butterflies, they observe, record, and describe in words and drawings the metamorphosis from caterpillar to chrysalis and from chrysalis to butterfly. In many cases, students will get to see a butterfly lay eggs. Some butterflies will die natural deaths, completing students' observations of the life cycle. Through these investigations, students will understand that the term “cycle” implies continuity and that life cycles exist for all living organisms. This experience deepens their understanding of the diversity and complexity of life on earth.

Second Grade

Soils

In *Soils*, students investigate the chief components of soil—sand, clay, and humus— and explore the relationship between soil and plant growth. Early in the unit, students create their own compost bags. This activity enables them to observe the decomposition of organic materials over time. Students observe and read about earthworms to learn about their connection to plant roots and soil. The students also conduct tests that enable them to observe and compare such properties of soil as odor, appearance, and texture. Phenomena such as settling, water content, and soil consistency are explored. These observations are then related to plant growth, as students plant cucumber seeds in a clear plastic tube. By observing root growth, students learn about the role of roots in keeping the plant anchored and upright. In a final activity, students apply what they have learned to investigate a sample of local garden soil.

Changes

With the *Changes* kit students have the opportunity to explore states of matter.

Third Grade

Plant Growth and Development

Students plant their own seeds to begin an eight-week inquiry into the life cycle of a simple plant, the *Brassica rapa* in *Plant Growth and Development*. Using plants that complete their life cycle in 35 days, students are able to watch germination and maturation while learning about the specific parts of a plant and the function each serves. Because they care for their own seedlings, students learn that plants need light, soil, nutrients from soil, and water to survive. In addition, students use dried bees to simulate the pollination process to understand the interdependence of bees and flowers. These activities deepen their understanding of the characteristics of living organisms and their relationship with and dependence on the environment in general. Throughout this unit, students are asked to use their observation and recording skills, complete and analyze data tables, use simple tools, draw diagrams, and apply scientific vocabulary.

Rocks and Minerals

In *Rocks and Minerals*, students are asked to explore the differences between rocks and minerals by observing the properties of rock samples, and sorting them based on those properties. Students also investigate minerals, on which they perform tests similar to those conducted by geologists to determine luster, hardness, color, and ability to transmit light, strengthening their ability to conduct experiments and record and interpret their data. Students compile a Mineral Field Guide, which is the sum total of their observations and discoveries. They use this field guide and their new knowledge of rocks and minerals to identify several unknown samples at the end of the unit. Throughout *Rocks and Minerals*, students read about different minerals and how they are used. Students continue to practice recording data and interpreting their scientific findings to draw conclusions based on evidence.

Sound

In *Sound*, students use tuning forks, slide whistles, strings, and other sound-producing objects to investigate the characteristics of sound. Students discover that sound is caused by vibrations, and they experiment with vibrating air columns, strings, and rulers. Through their experiments, students are able to relate pitch and volume to the frequency and amplitude of the vibrations. Once students understand the mechanics of sound, they learn how it travels. The human ear is integral to sound, and students build a model eardrum to learn how the ear functions and how to protect ears from sound. Students apply what they have learned by designing and building their own musical instruments. This activity not only assesses how much information students learned during the unit, but also examines their ability to develop and execute a plan and communicate what they built and why they built it.

Fourth Grade

Land and Water

Using a stream table, students explore different interactions between land and water, such as how runoff causes stream formation; how groundwater forms; how soil is eroded, transported, and deposited; and how water shapes land. The unit *Land and Water* invites students to manipulate their model, create hills, build dams, and grow vegetation to observe how these things affect land and water interactions. Students come to understand how water shapes the land and how, in turn, the land directs the flow of water. Connections between the stream tables and the real world are made as students

apply the concepts they have learned to photographs of land and water on earth. Finally, students have the opportunity to plan and create a landscape in their stream tables. Students use the concepts from the unit to predict the flow of water and how the landscape they create will alter the direction and flow of the water or how the shape of the land may change. Students design and conduct experiments and test their predictions.

Animal Studies

By caring for and observing three unique animals during the *Animal Studies* unit—the dwarf African frog, the fiddler crab, and the millipede—students are able to focus on animal behavior, comparing and contrasting the needs, behaviors, and anatomical structures of each organism. Each student creates and maintains a personal observation log in which he or she records notes about each animal throughout the unit. Students apply what they learn about body structure, habitat, survival needs, and behavior to a fourth animal—the human—identifying ways that humans are similar to and different from other animals. Students practice observing and recording data in their logs as well as in Venn diagrams, class webs, tables, and drawings. Students conduct a research-based inquiry that moves students away from general observations and asks them to apply their scientific process skills as they gather and synthesize information about their animals' behavior.

Electric Circuits

In *Electric Circuits*, students investigate electricity by wiring a circuit to light a bulb. They come to understand that a circuit must form a complete circle through which electric current can pass in order to light the bulb. Students use this knowledge to explore other electrical concepts, such as what conductors and insulators are and how they work and how diodes affect the flow of electricity. Students also learn about the symbolic language of electricity and use it to read and draw diagrams for wiring circuits and constructing a flashlight. Students apply what they learn about electricity and electrical safety to a final activity in which they design and implement a wiring plan for a cardboard house. These activities cultivate students' abilities to analyze problems, think critically, and develop solutions.

Fifth Grade

Ecosystems

In *Ecosystems*, students set up terrariums for crickets and isopods. Duckweed, algae, *Elodea*, guppies, and snails are introduced to an aquarium. Connecting the two habitats to create an “ecocolumn,” students observe the relationship between the two environments and the organisms living within them. Students simulate the effects of pollutants—road salt, fertilizer, and acid rain—on the environment. To discover how pollutants might affect the organisms in their ecocolumn, students create a food chain and make inferences about the effects of pollutants based on the relationships between the organisms in their ecocolumns. Students explore the Chesapeake Bay as a model ecosystem, analyzing the environmental problems present there from various perspectives. Applying their knowledge of ecosystems to a real-world situation, students generate possible solutions to the pollution problem and share their conclusions with the class. This activity enables students to appreciate the trade-offs necessary to reach mutually acceptable solutions to environmental problems.

Motion and Design

The *Motion and Design* unit combines the physics of forces and motion with technological design. Students use plastic construction materials, weights, rubber bands, and propellers to design and build vehicles, then test how those vehicles respond to different forces of motion, like pushes, pulls, or rubber band energy. They explore, through experiments and multiple trials, how forces like friction, gravity, and air resistance work

against motion to slow their vehicles down. Students must apply the concepts they learn to a design challenge, designing a vehicle that can perform to certain specifications, but also meets certain “cost” requirements. Collaboratively, student teams must design a vehicle, calculate the cost, test it, and refine their design. This unit develops skills in recording design through drawing, making accurate measurements, completing and analyzing data tables, making and testing predictions, and communicating results and experimental data.

Microworlds

In *Microworlds*, students explore magnifiers, learning that tools like lenses and microscopes can be used to extend the sense of sight to view objects in greater detail. By observing everyday objects with a variety of lenses, students learn that a magnifier must be transparent and curved. Students use a microscope, learn the functions of all its parts, and practice proper lighting and focusing techniques. Preparing their own slides, students are able to view onion skin under magnification. Students turn their attention to living specimens and view three microorganisms—Volvox, Blepharisma, and vinegar eels. Observing the structure of these microorganisms, and how they move, feed, grow, and multiply, develops the students’ sense of microbial life and interactions among living things and between living things and their environment.