Grades 3-5 Elementary Science Toolkit

The Intermediate Elementary Instructional Focus Toolkit has been created to assist teachers with planning instruction. This toolkit is not intended to replace your district's curriculum, but rather to enhance understanding of the Next Generation Sunshine State Standards (NGSSS), support instruction with resources that are well aligned to the benchmarks and to clarify how the information will be assessed on the Grade 5 Statewide Science Assessment.

The intermediate grades 3-5 science content can be broken down into four bodies of knowledge as assessed on the Grade 5 Statewide Science Assessment with a corresponding weight. Bodies of knowledge can then be further broken down into 18 Big Ideas.

Bodies of Knowledge:

Nature of Science (17%)

- Big Idea #1 The Practice of Science
- Big Idea #2 The Characteristics of Scientific Knowledge
- Big Idea #3 The Role of Theories, Laws, Hypotheses, and Models
- Big Idea #4 Science and Society (Not Annually Assessed)

Earth and Space Science (29%)

- Big Idea #5 Earth in Space and Time
- Big Idea #6 Earth Structures
- Big Idea #7 Earth Systems and Patterns

Physical Science (29%)

- Big Idea #8 Properties of Matter
- Big Idea #9 Changes in Matter
- Big Idea #10 Forms of Energy
- Big Idea #11 Energy Transfer and Transformations
- Big Idea #12 Motion of Objects (Not Annually Assessed)
- Big Idea #13 Forces and Change in Motion

Life Science (25%)

- Big Idea #14 Organization and Development of Living Organisms
- Big Idea #15 Diversity and Evolution of Living Organisms
- Big Idea #16 Heredity and Reproduction
- Big Idea#17 Interdependence
- Big Idea #18 Matter and Energy Transformation

Each of the Big Ideas (#1-#18), has essential standards connected to them that help build the unit and provide the foundation for development of the content. These standards are annually assessed and often contain additional supportive standards beneath them. The supportive standards are indicated as "also assesses" on the assessment documents. For example, 5.N.1.1 also assesses 3.N.1.1, 4.N.1.1, 4.N.1.6, 5.N.1.2 and 5.N.1.4. This information is provided in the **Test Item Specifications** for the Grade 05 Statewide Science Assessment.

The Big Ideas and their corresponding standards may be enhanced with hands-on inquiry opportunities, text resources, Model Eliciting Activities (MEAs), animations and tutorials. The activities provided have been selected to enhance these Big Ideas and standards.

Model Eliciting Activities (MEAs)

- open-ended
- interdisciplinary
- problem-based
- integrated for Science, Technology, Engineering and Mathematics (STEM)
- collaborative team building
- teachers as facilitators

For more information about MEA construction and implementation, please visit

http://www.cpalms.org/cpalms/mea.aspx .

Levels of Complexity

- Complexity levels and percentage of questions assessed in each of the levels are provided in the test item specifications. **(See page 16-17 of the Test Items Specs.)**
- On the Grade 05 Statewide Science Assessment over 80 percent of all standards are assessed at the levels of moderate to high.
- Activities in this toolkit have been selected to provide opportunities for moderate and high levels of thinking.

Online Study Tool

www.Floridastudents.org

- interactive
- aligned with elementary grades science standards
- no user name or password
- opportunity for parental support
- works best on Internet Explorer

The following Big Ideas with linked corresponding classroom activities may be used as a basic foundation for classroom investigations aligned tightly to the standards. Each activity is pulled from the CPALMS website. When you follow a link you will find additional teaching resources listed on the right hand side of the webpage.

Big Ideas and Supportive Activities

Big Idea #1: The Practice of Science

You will notice 3rd and 4th grade standards and activities listed in this section. Many of those standards are also assessed in a 5th grade standard. The 3rd and 4th grade standards that aren't assessed on a 5th grade standard are listed separately with corresponding activities as they will be ***directly assessed*** *on the State Science Assessment.*

SC.5.N.1.1

Define a problem, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigations of various types such as: systematic observations; experiments requiring the identification of variables; collecting and organizing data; interpreting data in charts, tables, and graphics; analyze information; make predictions; and defend conclusions.

Prior Knowledge:

Items may require the student to apply science knowledge described in the NGSSS from lower grades. These standards are foundational and necessary for mastery of the intermediate grades content. This benchmark builds upon knowledge from the following elementary grade benchmarks: **SC.3.N.1.1**, **SC.4.N.1.1**, **SC.4.N.1.6**, **SC.5.N.1.2** and **SC.5.N.1.4**

Students will:

- Evaluate a written procedure or experimental setup.
- Identify appropriate forms of record keeping.
- Interpret and analyze data to generate appropriate explanations based on that data.
- Identify examples of or distinguish among observations, predictions, and/or inferences.
- Explain the difference between an experiment and other types of scientific investigations.
- Identify a control group and/or explain its importance in an experiment.

Also Assesses:

SC.3.N.1.1 Raise questions about the natural world, investigate them individually and in teams through free exploration and systematic investigations, and generate appropriate explanations based on those explorations.

SC.4.N.1.1 Raise questions about the natural world, use appropriate reference materials that support understanding to obtain information (identifying the source), conduct both individual and team investigations through free exploration and systematic investigations, and generate appropriate explanations based on those explorations.

SC.4.N.1.6 Keep records that describe observations made, carefully distinguishing actual observations from ideas and inferences about the observations.

SC.5.N.1.2 Explain the difference between an experiment and other types of scientific investigation.

SC.5.N.1.4 Identify a control group and explain its importance in an experiment.

Resources for 5.N.1.1

Introducing the Process of Investigative Science

Students are introduced to the process of investigative science through a guided inquiry activity. Given a testable question and materials, students as a class make predictions, and design an investigation with guidance from the teacher. Then in pairs, students do the investigation, collect data, draw conclusions, and discuss ways to improve on the investigative design. After this activity, students will be able to develop independent investigations in this and other subject areas

Introduction to the Nature Journal

In the lessons here, students exercise the observation skills that are essential to writing, visual art, and science. First, they try to use evocative language in describing pictures of birds from the Smithsonian's National Zoo. They go on to record observations and to make hypotheses as they follow the behavior of animals on the National Zoo's live webcams. They can watch the giant pandas, the tigers, the cheetahs, the gorillas, or any of a dozen other species.

Science Projects Guide

This site provides an overview to approaching science projects.

The Pendulum

In this lab, students will design and conduct an experiment to determine how the length of a string and the weight at the end of the string will affect the number of swings of a pendulum.

SC.4.N.1.4

Attempt reasonable answers to scientific questions and cite evidence in support.

Resources for 4.N.1.4

Plant Hopper, Inc.: A Space Suit Design Company

MEA: Students are asked to evaluate several space suit designs and select the best design based on given data. Students work in collaborative groups to develop a procedure for selecting the best design and share their ideas with the rest of the class. A twist is introduced and the groups are challenged to test the validity of their procedure.

Life's a Breeze

In this Engineering Design Challenge, students must design a vessel that will carry passengers safely and quickly across a body of water by harnessing the power of the wind. Students will be given the opportunity to test and improve their vessels as they apply various math and science skills.

SC.4.N.1.8

Recognize that science involves creativity in designing experiments.

Resources for 4.N.1.8

Lesson Plan: Creating an Original Experiment!

This lesson should take place once a student is familiar with the scientific method and has previously participated in various science experiments. In this lesson, the students will work in small groups to design and carry out an experiment using common classroom materials.

SC.3.N.1.3

Keep records as appropriate, such as pictorial, written, or simple charts and graphs, of investigations conducted.

Resources for 3.N.1.3

MEA: Dream Skates

A student engineering team is asked by a wheel manufacturer to investigate and develop a plan to select the best model of roller blades.

Thumb Wrestling

Activity: You will measure thumb length, wrist circumference, and thumb circumference to determine which factor plays a bigger part in determining our class thumb-wrestling champion. You will develop a hypothesis based on physical data collected from classmates. You will then test your hypothesis by conducting a thumb wrestling championship. After making observations and analyzing the results, you will form a conclusion to answer the challenge question.

SC.3.N.1.4

Recognize the importance of communication among scientists.

Resources for 3.N.1.4

None available at this time.

SC.3.N.1.6

Infer based on observation.

Resources for 3.N.1.6

Lesson Plan: Does Soap Float?

In this science inquiry lesson, students will form hypotheses and carry out an investigation in order to answer a central question: Does soap float?

Big Idea #2: The Characteristics of Scientific Knowledge

SC.5.N.2.1

Recognize and explain that science is grounded in empirical observations that are testable; explanation must always be linked with evidence.

Prior Knowledge:

Items may require the student to apply science knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge from **SC.2.N.1.5**, **SC.2.N.1.6**, **SC.4.N.1.8**, and **SC.4.N.2.1**.

Students will:

- Identify and/or explain that science is grounded in verifiable observations (empirical) that are testable.
- Distinguish between personal interpretation and verified observation.
- Distinguish between examples of evidence or observations (empirical) and personal opinions.

Also Assesses:

SC.3.N.1.7 Explain that empirical evidence is information, such as observations or measurements that is used to help validate explanations of natural phenomena.

SC.4.N.1.3 Explain that science does not always follow a rigidly defined method ("the scientific method") but that science does involve the use of observations and empirical evidence.

SC.4.N.1.7 Recognize and explain that scientists base their explanations on evidence.

SC.5.N.1.5 Recognize and explain that authentic scientific investigation frequently does not parallel the steps of "the scientific method."

SC.5.N.1.6 Recognize and explain the difference between personal opinion/interpretation and verified observation.

Resources for 5.N.2.1

Demonstrating How to Conduct Controlled Investigations Using Sound

The teacher conducts an investigation to compare the sound produced by two different sized pipes (higher pitch, lower pitch, louder, softer). The teacher conducts the experiment multiple times, each time changing different variables. The students are "directors" and are asked to "cut" the scene when they observe something wrong with the experiment.

Volume Lesson

In this lesson, students explore different methods for calculating volume.

What It's Made Of: A Solute to Mixture or Solution

In this lesson, students will explore samples to determine properties of components of mixtures. Over the course of the exploration, the teacher will guide the students to discover what sets a solution apart. Access points included.

SC.4.N.2.1

Explain that science focuses solely on the natural world.

Resources for 4.N.2.1

MEA: Florida Hurricanes

The governor of Florida needs your students' help in distributing funds among Florida cities. Students will be asked to share a sum of money for hurricane preparedness systems among Florida cities. Students will be given a data set to help them develop a procedure for doing so. In their teams, they will write a letter to the governor of Florida giving their procedures and explanation of the strategy they used. Students will practice adding and subtracting numbers to the millions by filling out the population part of the data set. Rubrics are included to help grade students on their writing.

Everglades Adventure

Students will learn about text features, note taking, and informational writing using a series of short videos about the Everglades. As a final product, students will practice their expository writing by creating an informational brochure about the Everglades.

SC.5.N.2.2

Recognize and explain that when scientific investigations are carried out, the evidence produced by those investigations should be replicable by others.

Prior Knowledge:

Items may require the student to apply science knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge from **SC.2.N.1.2**, **SC.2.N.1.4**, and **SC.3.N.1.4**.

Students will:

- Identify and/or explain the need for replication of scientific investigations.
- Explain the reason for differences in data across groups as a result of using different tools and/or procedures.
- Identify and/or explain the need for repeated trials in a scientific investigation.

Also Assesses:

SC.3.N.1.2 Compare the observations made by different groups using the same tools and seek reasons to explain the differences across groups.

SC.3.N.1.5 Recognize that scientists question, discuss, and check each others' evidence and explanations.

SC.4.N.1.2 Compare the observations made by different groups using multiple tools and seek reasons to explain the differences across groups.

SC.4.N.1.5 Compare the methods and results of investigations done by other classmates.

SC.5.N.1.3 Recognize and explain the need for repeated experimental trials.

Resources for 5.N.2.2

Bridge to Perfection

During this activity, students will read a book about the Brooklyn Bridge. After whole class discussion, children will explore different types of bridges and data, in order to decipher which bridge is the strongest. The students will work collaboratively in groups with assigned student roles. Students will utilized Higher Order thinking to create a solution. The culminating activity is a presentation of solution to whole class.

Introducing the Process of Investigative Science

Students are introduced to the process of investigative science through a guided inquiry activity. Given a testable question and materials, students as a class make predictions, and design an investigation with guidance from the teacher. Then in pairs, students do the investigation, collect data, draw conclusions, and discuss ways to improve on the investigative design. After this activity, students will be able to develop independent investigations in this and other subject areas

Big Idea #3: The Role of Theories, Laws, Hypotheses, and Models

You will notice this is a 3rd grade standard. It is not listed in coursework for 4th or 5th grade, but must be addressed before the SSA as it will be assessed.

SC.3.N.3.1

Recognize that words in science can have different or more specific meanings than their use in everyday language; for example, energy, cell, heat/cold, and evidence.

Resources for 3.N.3.1

Zoom, Zoom, Vroom, Vroom!

In this lesson, students will explore forces, kinetic energy, and potential energy by engineering their own vehicles utilizing via the engineering design process.

SC.4.N.3.1

Explain that models can be three dimensional, two dimensional, an explanation in your mind, or a computer model.

Resources for 4.N.3.1

The Playground Project

Students will enjoy designing their "dream" playground while applying math and science skills in this engineering design challenge lesson. Students will find the area and perimeter of their playground designs. They will also use a budget sheet to make decisions about what to include in their playground, considering the physical properties of the materials they "purchase."

SC.3.N.3.2

Recognize that scientists use models to help understand and explain how things work.

Resources for 3.N.3.2

Modeling Patterns and Cycles in our Lives

Elementary students use everyday patterns and cycles to learn the cyclical nature of science concepts. This lesson can be used as an “Engage” activity to spark interest in the seasons or Moon phases.

SC.3.N.3.3

Recognize that all models are approximations of natural phenomena; as such, they do not perfectly account for all observations.

Students are asked to help their client select the "best" asteroid to explore given several different factors. Students collaborate in small groups to develop a procedure to rate the asteroids. They are then asked to write a letter back to the client, defending and explaining the procedure they developed. This MEA has been written based on NASA's current mission to explore an asteroid to prepare for the mission to Mars.

Big Idea #5: Earth in Space and Time

SC.5.E.5.1:

Recognize that a galaxy consists of gas, dust, and many stars, including any objects orbiting the stars. Identify our home galaxy as the Milky Way.

Prior Knowledge:

Items may require the student to apply science knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge from **SC.K.E.5.5**, **SC.K.E.5.6**, **SC.1.E.5.1**, and **SC.1.E.5.4.**

Students will:

- Identify the basic components of a galaxy.
- Explain how stars can be different.
- Identify the Sun as a star that emits energy.
  Identify that the Sun's appearance is due to its proximity to Earth.

Also Assesses:

SC.3.E.5.1: Explain that stars can be different; some are smaller, some are larger, and some appear brighter than others; all except the Sun are so far away that they look like points of light.

SC.3.E.5.2 Identify the Sun as a star that emits energy; some of it in the form of light.

SC.3.E.5.3. Recognize that the Sun appears large and bright because it is the closest star to Earth.

Resources for 5.E.5.1

Galaxies and Solar Systems

The students will learn all about outer space in this lesson. They will make a model of a galaxy and learn the vocabulary that relates to this topic. The students will also learn how to classify a planet and describe its features. They will be taught about the Earth's position in the solar system as well as that of the other planets in our solar system. The students will also learn how to classify between the different objects that are in our solar system.

A View of Home from the Front Door and from Space

The world is full of objects large and small, near and far. Models are built as powerful tools to help study large things such as buildings, towns, countries, and even the Earth and the Moon. With models, things beyond our physical reach can be easily explored. To begin to distinguish "home" from "home planet," students can build a model of their home and neighborhood as it appears from the front door of the house, from a tall building, from an airplane, and from outer space.

MEA: Explore a Rock Foundation: The Hunt for an Asteroid!

Students are asked to help their client select the "best" asteroid to explore given several different factors. Students collaborate in small groups to develop a procedure to rate the asteroids. They are then asked to write a letter back to the client, defending and explaining the procedure they developed. This MEA has been written based on NASA's current mission to explore an asteroid to prepare for the mission to Mars.

SC.5.E.5.3

Distinguish among the following objects of the Solar System—Sun, planets, moons, asteroids, comets—and identify Earth's position in it.

Prior Knowledge:

This benchmark grouping is foundational. These concepts have not been introduced in the NGSSS prior to this grade band.

Students will:

- Distinguish among objects in our solar system based on their relative positions and/or their characteristics.
- Identify common characteristics of all planets.
- Compare and/or contrast the common characteristics of inner and outer planet groups.

Also Assesses:

SC.5.E.5.2 Recognize the major common characteristics of all planets and compare/contrast the properties of inner and outer planets.

Resources for 5.E.5.3

This Place is Pretty Big. Where am I in the Universe?

In this lesson, students will explore the solar system using an online interactive tool to understand the vastness of the universe and the objects in it.

Lesson Plan: Telescope Tally

Students will read a passage about Asteroids, Comets and Meteors and discuss the material within their groups. Students will then read an article about telescopes and features of telescopes. As a group, students will rate a list of telescopes by deciding which features they feel are most important. Students will be assessed on their writing skills as well as the science material they learned during the supplemental reading.

SC.4.E.5.4

Relate that the rotation of Earth (day and night) and apparent movements of the Sun, Moon, and stars are connected.

Prior Knowledge:

Items may require the student to apply science knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge from **SC.K.E.5.2, SC.K.E.5.3, and SC.K.E.5.4.**

Students Will:

- Describe how the rotation of Earth and apparent movement of the Sun, Moon, and/or stars are related.
- Identify that the pattern of stars appears to shift across the sky nightly or that different stars can be seen in different seasons.
- Describe the visual changes in the appearance of the Moon. Students will explain that Earth revolves around the Sun in a year.
- Explain that Earth rotates on its axis in a 24-hour day.

Also Assesses:

SC.4.E.5.1 Observe that the patterns of stars in the sky stay the same although they appear to shift across the sky nightly, and different stars can be seen in different seasons.

SC.4.E.5.2 Describe the changes in the observable shape of the Moon over the course of about a month.

SC.4.E.5.3 Recognize that Earth revolves around the Sun in a year and rotates on its axis in a 24-hour day.

Resources for 4.E.5.4

How do Earth's Rotation and Revolution Work?

This lesson demonstrates how the earth rotates creating nights and days. It also demonstrates the revolution of the earth around the sun. The earth and the sun's movements are connected.

Earth in Motion; Seasons

This flash interactive activity is accompanied by a background essay, discussion questions, and alignment to state and national standards. Teachers' Domain is a National Science Foundation funded website requiring free registration beyond a few uses.

Moon Phases

This activity asks students to use models of Earth, the Sun, and the Moon system to discover why moon phases occur. Students use a Styrofoam ball to represent the Moon, which will be lit by a single light source in the classroom, to observe how different portions of the ball are illuminated as they hold it in various positions.

Why do the Stars Seem to Move Across the Sky?

This lesson teaches students why the stars seem to move across the night sky. The lesson also teaches why we see different stars during different times of the year and why constellations are in different positions in the sky during different times of the year.

Big Idea #6: Earth Structures

SC.4.E.6.2

Identify the physical properties of common earthforming minerals, including hardness, color, luster, cleavage, and streak color, and recognize the role of minerals in the formation of rocks.

Prior Knowledge:

Items may require the student to apply science knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge from **SC.1.E.6.1**, **SC.2.E.6.1**, **SC.2.E.6.2**, **SC.2.E.6.3**, **SC.K.P.8.1**, **SC.1.P.8.1**, and **SC.2.P.8.1**.

Students will:

- Identify and/or describe the physical properties of common minerals.
- Describe and/or explain the role of minerals in the formation of rocks.

- Will identify the three categories of rocks and how they were formed.

Also Assesses:

SC.4.E.6.1 Identify the three categories of rocks: igneous, (formed from molten rock); sedimentary (pieces of other rocks and fossilized organisms); and metamorphic (formed from heat and pressure).

Resources for 4.E.6.2

Physical Properties of Minerals Lab

The 5E Learning Cycle lesson introduces students to the concept of minerals and their physical properties of hardness, color, streak color, luster, and cleavage. Students will explore the properties of minerals and learn about and practice determining the specific properties of a mineral sample.

MEA: Mastering Minerals!

This MEA requires Students to review data and rank minerals from best to worst in terms of mineral properties, to help a mineral jeweler decide on the best mineral to use to make a necklace. Students will consider hardness, luster, color, cleavage and safety by analyzing the given charts which include these data by mineral. Students will work as a group and create a model for ranking the minerals.

Cemented Together

In this activity the students will create their own sedimentary rock using glue and various pieces of sediments found throughout the school yard. The students will create a model of a sedimentary rock and describe how they would identify a sedimentary rock in the real world.

SC.4.E.6.3

Recognize that humans need resources found on Earth and that these are either renewable or nonrenewable.

Prior knowledge:

Items may require the student to apply science knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge from SC.1.E.6.2.

Students will:

- Identify and/or distinguish between renewable and nonrenewable resources found on Earth.

- Identify resources naturally found in Florida.

Also Assesses:

SC.4.E.6.6 Identify resources available in Florida (water, phosphate, oil, limestone, silicon, wind, and solar energy).

Resources for 4.E.6.3

Video: Energy Video-National Academy of Science

This video, produced by the National Academy of Science, highlights America's role in energy sources and consumption.

Power Up!

This lesson is designed to compare and contrast renewable energy sources, such as the sun, wind, and geothermal, as well as nonrenewable energy sources, such as fossil fuels.

Find WHAT in Florida?

This lesson addresses the topic of resources found in Florida. As 4th grade students learn about Florida, they should also be able to identify natural resources that are found and used within the state. Students have the opportunity to access and use their prior knowledge as they discover what a natural resource is and what resources can be found in Florida. Students will explore some of these resources in a hands on activity. Additional components include a non-fiction article and cooperative learning

SC.4.E.6.4

Describe the basic differences between physical weathering (breaking down of rock by wind, water, ice, temperature change, and plants) and erosion (movement of rock by gravity, wind, water, and ice).

Prior Knowledge:

Items may require the student to apply science knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge from **SC.1.E.6.1**, **SC.1.E.6.3**, and **SC.2.E.6.1**.

Students will:

- Identify and/or describe the processes of physical weathering and/or erosion.
- Compare and contrast the agents and/or the processes of physical weathering and erosion.

Resources for 4.E.6.4

STEM Build: Building Up Beaches

In this STEM build, students will use problem solving skills and teamwork to model an effective way of slowing down beach erosion caused by the ocean. Students also will practice sharing their results through PowerPoint presentations.

Looking at Weathering and Erosion

Students will be divided into small groups to do simple science experiments that illustrate a type of weathering or erosion.

Weathering and Erosion

In this unit, students learn about weathering and erosion (and different types of weathering and erosion) through different models and activities. An engineering design competition asks students to synthesize knowledge about erosion to create an erosion-blocking process/product for the Atlantic Coast.

Big Idea #7 Earth Systems and Patterns

SC.5.E.7.1

Create a model to explain the parts of the water cycle. Water can be a gas, a liquid, or a solid and can go back and forth from one state to another.

Prior Knowledge:

Items may require the student to apply science knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge from **SC.2.E.7.1**, **SC.2.E.7.2**, **SC.2.E.7.3**, and **SC.2.P.8.4**.

Students Will:

Students will identify and/or explain the parts of the water cycle. Students will identify the states of water associated with each part of the water cycle and/or explain the phase changes that occur as water moves from one part of the water cycle to another. Students will identify and/or describe the role of the ocean in the water cycle.

Also Assesses:

SC.5.E.7.2 Recognize that the ocean is an integral part of the water cycle and is connected to all of Earth's water reservoirs via evaporation and precipitation processes.

Resources for 5.E.7.1

Teaching Idea: Water Cycle Song Middle School

Teaching Idea: Water Cycle Song Elementary

This is a great song to help students remember the water cycle. My students love to sing this song. I use it throughout the year, especially when we have a little extra time before lunch or changing classes.

Build Your Own Water Cycle Model

In this lesson, students will investigate the steps of the water cycle. They will describe each step of the water cycle and the state of matter that the water is in during each step. Students will recognize that the sun is a crucial part of the water cycle and that the water's state of matter can go back and forth. Students will demonstrate their understanding of the water cycle by designing and building their own water cycle model.

Project: A Drop of Water

Students will research the parts of the water cycle and create a visual display and final product on what they know about the water cycle.

SC.5.E.7.3

Recognize how air temperature, barometric pressure, humidity, wind speed and direction, and precipitation determine the weather in a particular place and time.

Prior Knowledge:

Items may require the student to apply science knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge from **SC.2.E.7.1**, **SC.2.E.7.2**, **SC.2.E.7.4**, **SC.2.E.7.5**, **SC.2.P.8.4**, and **SC.2.P.8.5**.

Students will:

- Identify and/or describe how air temperature, barometric pressure, humidity, wind speed and direction, and precipitation describe weather in a particular place and time.
- Identify or distinguish the forms of precipitation (rain, snow, sleet, and hail) and their related weather conditions.

- Distinguish weather conditions among different environments.
- Describe the temperature and precipitation of different climate zones as they relate to latitude, elevation, and/or proximity to bodies of water.

Also Assesses:

SC.5.E.7.4 Distinguish among the various forms of precipitation (rain, snow, sleet, and hail), making connections to the weather in a particular place and time.

SC.5.E.7.5 Recognize that some of the weather-related differences, such as temperature and humidity, are found among different environments, such as swamps, deserts, and mountains.
SC.5.E.7.6 Describe characteristics (temperature and precipitation) of different climate zones as they relate to latitude, elevation, and proximity to bodies of water.

Resources for 5.E.7.3

MEA: When Weather is Right…We Camp!

This exciting MEA requires students to review data and rank travel dates from best to worst in terms of weather conditions, to help the Neely Family decide what the best dates would be to go camping in Madison Fl. Students will consider wind speed, air pressure, humidity, air temperature by analyzing the given charts which include these data week by week. Students will work as a groups and create a model for ranking these dates. Students have fun, use problem solving and collaborative strategies while learning about the properties of weather.

Wild Wind

Students will learn the difference between global, prevailing and local winds. In this activity, students will make a wind vane out of paper, a straw and a soda bottle and use it to measure wind direction over time. Finally, they will analyze their data to draw conclusions about the prevailing winds in their area.

Feeling the Pressure — An Engineering Design Challenge

"This Engineering Design Challenge is intended to help students apply the concepts of air pressure from SC.5.E.7.3 as they improve upon a common homemade barometer design to create one that is more accurate. It is not intended as an all- encompassing lesson for this benchmark."

Hey Weatherperson, What's the Forecast?

Hey Weatherperson, What's the Weather?

After researching how to predict weather, student make an oral presentation. Then, they build an anemometer.

Big Idea #8 Properties of Matter

SC.5.P.8.1

Compare and contrast the basic properties of solids, liquids, and gases, such as mass, volume, color, texture, and temperature.

Prior Knowledge:

Items may require the student to apply science knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge from **SC.K.P.8.1**, **SC.1.P.8.1**, **SC.2.P.8.1**, **SC.2.P.8.2**, **SC.2.P.8.3**, **SC.2.P.8.4**, **SC.2.P.8.6**, and **SC.1.E.5.3.**

Students will:

- Compare and/or contrast the physical properties of solids, liquids, and/or gases.
- Describe or classify a material as a solid, liquid, or gas.

Also Assesses:

SC.3.P.8.1 Measure and compare temperatures of various samples of solids and liquids.

SC.3.P.8.2 Measure and compare the mass and volume of solids and liquids.

SC.3.P.8.3 Compare materials and objects according to properties such as size, shape, color, texture, and hardness.

SC.4.P.8.1 Measure and compare objects and materials based on their physical properties including: mass, shape, volume, color, hardness, texture, odor, taste, attraction to magnets.

Resources for 5.P.8.1

Properties of Matter

http://www.pdesas.org/module/content/resources/6099/view.ashx

Students will differentiate between solids, liquids, and gases. Students will define and identify solids, liquids, and gases based on particle activity and explain the difference between volume and mass.

States of Matter and Their Properties - Lesson #1

Matter exists in three different states. Depending on factors such as temperature and pressure, matter can exist as a solid, liquid, or gas. Under specific conditions, matter has precise freezing, melting, and boiling points. This is the first lesson in a unit about matter.

States of Matter and Their Properties - Mass and Volume Lesson #2

When matter changes state, its properties change, too. In most cases, volume will increase when matter is melted from a solid to a liquid. Water is an exception, as its volume decreases when melted from ice to water. If matter is not added or removed, its mass will remain the same when it changes state. In this lesson, students will use if/then logical thinking to bridge the science and computer science concepts. This is lesson 2 of 3 in the States of Matter Unit.

3 Methods for Measuring Volume

This hands-on lesson plan allows students to investigate three methods for measuring volume. Students will learn to measure volume for liquids, regular-sized solids, and irregular sized objects. During the lesson students are exposed to demonstrations from the teacher and will participate in hands-on investigations utilizing three methods for measuring volume that they conduct and report to the class.

What Is Matter?

During this activity students explore in depth their own understanding of what constitutes "matter" and work together as a group to create a definition for matter.

SC.5.P.8.3

Demonstrate and explain that mixtures of solids can be separated based on observable properties of their parts such as particle size, shape, color, and magnetic attraction.

Prior Knowledge:

Items may require the student to apply science knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge from **SC.K.P.8.1** and **SC.1.P.8.1**.

Students will:

- Describe and/or explain how mixtures of solids can be separated.
- Identify common materials that dissolve in water.
- Identify or describe conditions that will speed up or slow down the dissolving process.

Also Assesses:

SC.5.P.8.2 Investigate and identify materials that will dissolve in water and those that will not and identify the conditions that will speed up or slow down the dissolving process.

Resources for 5.P.8.3

To Dissolve or Not To Dissolve, Part 1

This lesson uses the 5E model as students explore how various substances will dissolve. This is the first in a two part lesson. In the second lesson, students will compare how a substance will dissolve in varying temperatures. Students will learn about dissolving, mixtures, solutions and solubility.

To Dissolve or Not To Dissolve, Part 2

This is part 2 of a lesson addressing solubility. Part 1 addresses how varying substances will dissolve in water. Part 2 addresses how temperature will effect solubility. The 5E lesson plan model will include a lab and is aligned with Florida ELA standards.

Separating Solid Mixtures

Have you ever considered that toys in a toy box are a mixture? In this lesson, students will explore how to separate solid mixtures based on observable properties such as particle color, shape, size, and magnetic attraction.

What It's Made Of: A Solute to Mixture or Solution

In this lesson, students will explore samples to determine properties of components of mixtures. Over the course of the exploration, the teacher will guide the students to discover what sets a solution apart. Access points included.

Big Idea #9 Changes in Matter

SC.5.P.9.1 Investigate and describe that many physical and chemical changes are affected by temperature.

Prior Knowledge:

Items may require the student to apply science knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge from SC.K.P.9.1 and SC.2.P.9.1.

Students will:

- Describe how physical and/or chemical changes are affected by temperature.
- Describe the physical changes water undergoes as it is heated and/or cooled.
- Describe how some familiar changes in materials result in other materials with different characteristics.

Also Assesses:

SC.3.P.9.1 Describe the changes water undergoes when it changes state through heating and cooling by using familiar scientific terms such as melting, freezing, boiling, evaporation, and condensation.
SC.4.P.9.1 Identify some familiar changes in materials that result in other materials with different characteristics, such as decaying animal or plant matter, burning, rusting, and cooking.

Resources for 5.P.9.1

Investigating Changes in Matter

In this chemistry lab, students will observe a variety of physical and chemical changes in matter.

Heatin' It Up or Coolin' It Down

Many chemical reactions are accompanied by a change in temperature. Whether it is extreme or barely noticeable, the temperature may go up or it may go down. Investigate these two chemical reactions described in this lesson to experience two different kinds of temperature change.

States of Water- Part 1

Students will be able to describe water as it changes states through melting and freezing.

States of Water Part 2

Students will be able to describe water as it changes state through boiling, evaporation, and condensation.

Water 2: Disappearing Water

Students will observe the amount of water in an open container over time, and they will observe the amount of water in a closed container over time. Students will compare and contrast the sets of

observations over time. This lesson can be used in a unit on water that includes "Water and Ice" and "Melting and Freezing" that are also found on Science NetLinks.

Big Idea #10 Forms of Energy

SC.5.P.10.1 Investigate and describe some basic forms of energy, including light, heat, sound, electrical, chemical, and mechanical

Prior Knowledge:

Items may require the student to apply science knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge from **SC.K.P.10.1** and **SC.2.P.10.1.**

Students will:

- Identify and/or describe some basic forms of energy.
- Describe that light travels in a straight line until it strikes an object or travels from one material to another.
- Explain that heat is produced when two objects are rubbed against each other.
- Explain that sound is produced by vibrations and/or that pitch depends on how fast or slow the object vibrates.

Also Assesses:

SC.3.P.10.1 Identify some basic forms of energy such as light, heat, sound, electrical, and mechanical.
SC.3.P.10.3 Demonstrate that light travels in a straight line until it strikes an object or travels from one medium to another.

SC.3.P.10.4 Demonstrate that light can be reflected, refracted, and absorbed.

SC.3.P.11.1 Investigate, observe, and explain that things that give off light often also give off heat.
SC.3.P.11.2 Investigate, observe, and explain that heat is produced when one object rubs against another, such as rubbing one's hands together.

SC.4.P.10.1 Observe and describe some basic forms of energy, including light, heat, sound, electrical, and the energy of motion.

SC.4.P.10.3 Investigate and explain that sound is produced by vibrating objects and that pitch depends on how fast or slow the object vibrates.

Resources for 5.P.10.1

All Sorts of Energy

This lesson will explore six forms of energy including mechanical, heat, electrical, chemical, sound and nuclear. Through the 5E lesson plan model, students will become engaged in this hands-on lesson. This

lesson will take place over 5 days, allowing students an introduction and summary as well as hands-on opportunities to explore the 6 forms of energy.

How Light Moves

Students are fascinated with light. In this lesson plan, students investigate some of the properties of how light is propagated, and using observations from simple experiments, test their predictions about the paths that light takes with different materials.

When Things Start Heating Up

This lesson is intended to give students a general idea of how heat is produced from human-based activities and mechanical and electrical machines. The lesson provides activities for student understanding as to how and why heat is produced from things that give off light, from machines, or when one thing is rubbed against another.

Let's Hear It For Sound

This lesson will help students build an understanding of the concepts of sound (vibration, pitch) through participation in a variety of hands-on experiments.

SC.5.P.10.2

Investigate and explain that energy has the ability to cause motion or create change.

Prior Knowledge:

Items may require the student to apply science knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge from **SC.K.P.10.1**, **SC.K.P.12.1**, **SC.1.P.12.1** and **SC.K.P.13.1**, **SC.1.P.13.1**, and **SC.2.P.13.1**.

Students will:

- Explain that energy has the ability to cause motion or create change.
- Identify and/or describe examples where energy has caused motion or created changes.
- Describe and/or explain how water and/or air are sources of energy.

Also Assesses:

SC.3.P.10.2 Recognize that energy has the ability to cause motion or create change.

SC.4.P.10.2 Investigate and describe that energy has the ability to cause motion or create change.
SC.4.P.10.4 Describe how moving water and air are sources of energy and can be used to move things.

Resources for 5.P.10.2

Solar Cooking

This is a 5th grade MEA designed to have students compare different types of solar cookers based on temperature, cook time, dimensions, weight, and customer reviews.

Transformation of Energy: Constructing an Electromagnet

In this hands-on lesson, students will work in groups to construct an electromagnet. This lesson focuses energy, forms of energy, and how energy is transformed in a circuit. This lesson also can be used to address variables in an experiment, conductors and insulators, data tables and graphs, and open and closed circuits.

What Makes 'Em Move: By Water or Air

In this lesson, 4th grade students read and discuss to determine differences and similarities between machines that transfer energy from renewable natural resources: water (hydro) and air (wind). This lesson also includes independent access point for this standard.

SC.5.P.10.4

Investigate and explain that electrical energy can be transformed into heat, light, and sound energy, as well as the energy of motion.

Prior Knowledge:

Items may require the student to apply science knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge from **SC.2.P.10.1**.

Students will:

- Explain that electrical energy can be transformed into heat, light, and/or sound energy, as well as the energy of motion.
- Explain that energy from the Sun can be used to heat objects, and that when sunlight is not present, heat may be lost. Students will identify the flow of heat between hot and cold objects and/or that heat may cause objects to change temperature.
- Identify common materials that conduct heat well or poorly.
- Explain that an electrically charged object can attract an uncharged object and/or either attract or repel another charged object without any contact between the objects.

- Determine that the flow of electricity requires a closed circuit.
- Identify and/or classify materials that conduct electricity and materials that do not.

Also Assesses:

SC.3.E.6.1 Demonstrate that radiant energy from the Sun can heat objects and when the Sun is not present, heat may be lost.

SC.4.P.11.1 Recognize that heat flows from a hot object to a cold object and that heat flow may cause materials to change temperature.

SC.4.P.11.2 Identify common materials that conduct heat well or poorly.

SC.5.P.10.3 Investigate and explain that an electrically charged object can attract an uncharged object and can either attract or repel another charged object without any contact between the objects.
SC.5.P.11.1 Investigate and illustrate the fact that the flow of electricity requires a closed circuit (a complete loop).

SC.5.P.11.2 Identify and classify materials that conduct electricity and materials that do not.

Resources for 5.P.10.4

Transformation of Electrical Energy

This lesson helps students learn that electrical energy can be transformed into: sound, heat, and light energy. In this lesson, students will participate in a hands-on lab to explore what forms of energy electrical energy will be transformed into. This lesson can be completed in one 60 minute science block.

Electricity--Energy Lighting the Way!

Students will investigate and illustrate complete circuits using a battery, wires, light bulb and various conductors and insulators. They will understand that electricity is a form of energy that can be converted into other forms of energy such as heat and light.

Static Electricity

This online manipulative models and simulates common static electricity concepts such as transfer of charge.

Big Idea #11 Energy Transfers and Transformations

This Big Idea is assessed through Big Idea #10.

Big Idea #13 Forces and Changes in Motion

SC.5.P.13.1 Identify familiar forces that cause objects to move, such as pushes or pulls, including gravity acting on falling objects.

Prior Knowledge:

Items may require the student to apply science knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge from **SC.K.E.5.1**, **SC.1.E.5.2**, **SC.K.P.13.1**, **SC.1.P.13.1**, **SC.2.P.13.1**, **SC.2.P.13.2**, **SC.2.P.13.3,** and **SC.2.P.13.4.**

Students Will:

- Identify familiar forces that affect how objects move.
- Identify scenarios whereby gravity is overcome.
- Identify and/or describe examples of magnetic attraction and repulsion.

Also Assesses:

SC.3.E.5.4 Explore the Law of Gravity by demonstrating that gravity is a force that can be overcome.
SC.4.P.8.4 Investigate and describe that magnets can attract magnetic materials and attract and repel other magnets.

Resources for 5.P.13.1

Blast Off - An Engineering Design Challenge

This Engineering Design Challenge is intended to help students apply the concepts of forces from SC.5.P.13.1 and SC.5.P.13.2 by building and launching straw rockets. It may also be used as introductory instruction of the content.

Friction Time!!!

In this lesson, students explore friction using ramps, matchbox cars, books, and a beach towel. The beach towels are used to increase the friction between the cars and the surface. The books are used to increase the speed in which the car travels, and later changing the number of text books allows the students to explore the effect of mass on friction.

Exploring Magnets

In this lesson, students observe and record their observations of magnets attracting and repelling each other and other objects.

SC.5.P.13.2

Investigate and describe that the greater the force applied to it, the greater the change in motion of a given object.

Prior Knowledge:

Items may require the student to apply science knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge from **SC.K.P.13.1**, **SC.1.P.13.1**, **SC.2.P.13.1**, and **SC.2.P.13.4**.

Students will:

- Describe the relationship among mass, force, and motion.
- Identify and/or describe that an object in motion always changes its position and may change its direction.
- Will describe that the speed of an object is determined by the distance an object travels and the time it takes the object to travel that distance.

Also Assesses:

SC.4.P.12.1 Recognize that an object in motion always changes its position and may change its direction.
SC.4.P.12.2 Investigate and describe that the speed of an object is determined by the distance it travels in a unit of time and that objects can move at different speeds.

SC.5.P.13.3 Investigate and describe that the more mass an object has, the less effect a given force will have on the object's motion.

SC.5.P.13.4 **I**nvestigate and explain that when a force is applied to an object but it does not move, it is because another opposing force is being applied by something in the environment so that the forces are balanced.

Resources for 5.P.13.2

Pendulum Inquiry - Wrecking Balls

In this lesson, students will mimic a wrecking ball by manipulating the variables of a pendulum in order to move objects with different masses. It is recommended this lesson follow Pendulum Inquiry (see Related CPALMS Resources), which will build students' content knowledge on pendulums. Students can apply their understanding of pendulums gained from the lesson Pendulum Inquiry to assist them in designing wrecking ball pendulums in this lesson.

Wondrous Water Parks

This activity requires students to apply their knowledge of force, motion, speed, and division to solve the problem of which water park their class should choose to go on for their 5th grade class trip.

When the Wind Blows

This is an engineering design process lesson that covers forces and motion. It is designed to engage students using hands-on problem solving strategies.

Newton's Third Law of Motion

This lesson plan is the third in a series of connected lessons on Sir Isaac Newton's laws of motion published to CPALMS. This lesson plan teaches Newton's third law of motion.

Big Idea #14 Organization and Development of Living Organisms

SC.3.L.14.1

Describe structures in plants and their roles in food production, support, water and nutrient transport, and reproduction.

Prior Knowledge:

Items may require the student to apply science knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge from **SC.K.L.14.3**, **SC.1.L.14.1**, **SC.1.L.14.2**, and **SC.1.L.14.3**.

Students will:

- Identify and/or describe the parts of plants and/or the part's role.
- Describe how plants respond to stimuli.
- Describe processes of sexual reproduction in flowering plants.

Also Assesses:

SC.3.L.14.2 Investigate and describe how plants respond to stimuli (heat, light, gravity), such as the way plant stems grow toward light and their roots grow downward in response to gravity.

SC.4.L.16.1 Identify processes of sexual reproduction in flowering plants, including pollination, fertilization (seed production), seed dispersal, and germination.

Resources for 3.L.14.1

Exploring Plants

Students will be introduced to the study of plants in this lesson. First they will sprout bean seeds on moistened paper towels, then make drawings and measurements of their growth. They will watch time-lapse videos that illustrate a plant's major growth stages. Another clip covers fruits and asks students to consider how their seeds are spread. They will gather seeds by walking outside with an old sock over one of their shoes, then plant their sock to observe the resulting plants.

Parts of a Plant - Dissection and Diagram

http://www.cpalms.org/Public/PreviewResourceLesson/Preview/46624

Tropisms: http://plantsinmotion.bio.indiana.edu/plantmotion/movements/tropism/tropisms.html

In this lesson, students will watch two videos about and read an article on flowering plant parts and their functions. Students will then dissect their own plants, draw a diagram, and write an informative structured paragraph describing the plant parts and their functions. Good lesson to use in science journals!

SC.5.L.14.1

Identify the organs in the human body and describe their functions, including the skin, brain, heart, lungs, stomach, liver, intestines, pancreas, muscles and skeleton, reproductive organs, kidneys, bladder, and sensory organs.

Prior Knowledge:

Items may require the student to apply science knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge from **SC.K.L.14.1**, **SC.K.L.14.3**, and **SC.2.L.14.1**.

Students will:

- Identify organs in the human body and/or describe their functions.

Resources for 5.L.14.1

All Systems are Go!

In this online activity, a fictional character, Arnold is missing a number of body parts. You will be presented with a body system and a variety of organs. Drag and drop all the organs that belong in that particular body system to Arnold's body. Once all four systems are complete, a clothed Arnold will appear.

Note: If you drag in an organ that doesn't belong, all the organs pop out and you will have to start that system over. This exercise can also be found at Kineticcity.com under mind games.

Body Swatter

Students work in cooperative groups to research and write questions for an active game designed to review the major organs of the systems of the human body (digestive, respiratory, circulatory, and excretory system).

Ready, Set, Digest!

Students will explore the functions and organs of the digestive system through a mini relay race.

"Beating On and On…"

Have you ever wondered why we have a heart? What is the hearts function within our body? In this lesson students will identify the parts of the heart and its functions in conjunction with the circulatory system. Students will be exposed to an interactive diagram where the parts of the heart are displayed individually its functions are explained. Students will get hands-on by completing several pulse experiments with their own heartbeat.

Are you Inspiring?

Have you ever wondered why we have lungs? What really controls our breathing? In this lesson, students will identify parts of the lungs and explain their functions. Students will also create a working model of the lungs.

Is My Epidermis Showing?

Have you ever wondered why we have skin? What is the skins function for our body? In this lesson, students will identify the parts of the skin and its functions in conjunction with the integumentary system. Students will be exposed to an interactive diagram where the parts of the skin are displayed individually its functions are explained. Students will get hands-on by creating a 3-dimensional model of the skin and its parts.

Kidney Filtering

In this activity, students filter different substances through a plastic window screen, different sized hardware cloth and poultry netting. Their model shows how the thickness of a filter in the kidney is imperative in deciding what will be filtered out and what will stay within the blood stream.

The Skeletal System Rap Song

Educational hip-hop video reviewing the human skeletal system.

Kids Health: How the Body Works

This site has videos, articles, quizzes, and games for children to learn how the body and its systems work.

Human Body WebQuest

This activity will help students understand that the human body is made up of a number of levels of organization, and that each smaller level combines to make up the next level. Each student will select an organ to research and write a report on- from the perspective of the organ to the "Human Body Corporation," defending what the organ's role is in the human body. Students will learn all about an organ of their choosing: where it is located, what systems it works with, the other organs it works with and its functions. This lesson would help students in learning more about the organs while developing writing skills.

Systems of the human body

To understand that there are different systems within the body and that they work independently and together to form a functioning human body.

SC.5.L.14.2

Compare and contrast the function of organs and other physical structures of plants and animals, including humans, for example: some animals have skeletons for support— some with internal skeletons, others with exoskeletons—while some plants have stems for support.

Prior Knowledge:

Items may require the student to apply science knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge from **SC.K.L.14.3**, **SC.1.L.14.3**, and **SC.2.L.14.1**.

Students will:

- Compare and/or contrast the function of organs and/or other physical structures of plants and/or animals.
- Classify animals into major groups according to their physical characteristics and behaviors.

- Classify flowering and/or nonflowering plants into major groups according to their physical characteristics.

Also Assesses:

SC.3.L.15.1 Classify animals into major groups (mammals, birds, reptiles, amphibians, fish, arthropods, vertebrates and invertebrates, those having live births and those which lay eggs) according to their physical characteristics and behaviors.

SC.3.L.15.2 Classify flowering and nonflowering plants into major groups such as those that produce seeds, or those like ferns and mosses that produce spores, according to their physical characteristics.

Resources for 5.L.14.2

Comparing Plants and Animals

In this tutorial you will

- identify the basic needs of living things,
- identify the ways living things protect, support and reproduce, and
- compare and contrast how plants and animals meet their basic needs.

Big Idea #15: Diversity and Evolution of Living Organisms

SC.5.L.15.1 (Will be assessed with SC.5.L.17.1)

Describe how, when the environment changes, differences between individuals allow some plants and animals to survive and reproduce while others die or move to new locations.

Resources for 5.L.15.1

(See SC.5.L.17.1)

SC.4.L.16.4

Compare and contrast the major stages in the life cycles of Florida plants and animals, such as those that undergo incomplete and complete metamorphosis, and flowering and nonflowering seed-bearing plants.

Prior Knowledge:

Items may require the student to apply science knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge from **SC.2.L.16.1**.

Students will:

- Identify, compare, and/or contrast the major life cycles of Florida plants and/or animals.

Resources for 4.L.16.4

Have I Morphed Yet?

In this sequence of observations, students will observe the life cycles of butterflies, darkling beetles, preying mantises, and grasshoppers to compare and contrast complete metamorphosis (butterflies and darkling beetles) and incomplete metamorphosis (preying mantis, grasshoppers, termites).

This sequence is a long-term investigation. The initial cycle requires a 45-60 minute period to introduce and model journal entries, but after that it only requires 5-10 minutes per day to make observations. Research can be done throughout the cycle at a Reading center. At the conclusion of each cycle, another 45 minute session is needed for wrap-up and assessment.

SPECIAL NOTE: To fully implement this benchmark, the teacher should repeat this basic investigation format with plants. Beans and daisies work well as flowering plants and allow the students to proceed through the entire life cycle (seed, seedling, adult, back to the seed stage). This can be done in conjunction with benchmark SC.4.L.16.1: *Identify processes of sexual reproduction in flowering plants, including pollination, fertilization (seed dispersal), and germination.* For non-flowering, seed-bearing plants (conifers), you can't go through an entire life cycle within the classroom. However, this website has an image that goes through the life cycle of a conifer: http://legacy.butler.edu/herbarium/trees/tree-identification/conifers-life-cycle/

Plants Parts and Life Cycles

In this unit, students learn about various plants, their parts, their life cycles, and the importance of bees in plant reproduction.

Big Idea #17 Interdependence

SC.5.L.17.1

Compare and contrast adaptations displayed by animals and plants that enable them to survive in different environments such as life cycle variations, animal behaviors, and physical characteristics.

Prior Knowledge:

Items may require the student to apply science knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge from **SC.1.L.16.1**, **SC.2.L.17.1**, and **SC.2.L.17.2**.

Students will:

- Explain, compare, and/or contrast how adaptations displayed by animals or plants enable them to survive in different environments.
- Describe or explain how animals and/or plants respond to changing seasons.
- Distinguish plant or animal characteristics that are inherited from those that are affected by the environment.
- Identify characteristics of animals that are inherited or distinguish inherited characteristics from those that are shaped by learning.
- Compare the seasonal changes in Florida plants and/or animals to those in other regions of the country.
- Identify ways in which plants and/or animals can impact the environment.
- Describe how, when the environment changes, differences between organisms allow some plants and animals to survive and reproduce while others die or move to new locations.

Also Assesses:

SC.3.L.17.1 Describe how animals and plants respond to changing seasons.

SC.4.L.16.2 Explain that although characteristics of plants and animals are inherited, some characteristics can be affected by the environment.

SC.4.L.16.3 Recognize that animal behaviors may be shaped by heredity and learning.

SC.4.L.17.1 Compare the seasonal changes in Florida plants and animals to those in other regions of the country.

SC.4.L.17.4 Recognize ways plants and animals, including humans, can impact the environment.

SC.5.L.15.1 Describe how, when the environment changes, differences between individuals allow some plants and animals to survive and reproduce while others die or move to new locations.

Resources for 5.L.17.1

Bird Beaks

This lesson focuses on bird beaks, exploring the relationship between a bird's beak and its ability to find food and survive in a given environment.

Adaptations: Will You Survive?

This unit begins by classifying animals into major groups (mammals, birds, reptiles, amphibians, fish, vertebrates and those having live births and those which lay eggs) according to their physical characteristics and behaviors.

Students will review the path of the flow of energy from the Sun as it is transferred along the food chain through the producers to the consumers, and recognize ways plants and animals, including humans, can impact the environment.

Students will compare and contrast adaptations of animals and plants that enable them to survive.

Adaptation

In this activity, students examine some of the behaviors and physical characteristics that enable organisms to live successfully in their environment.

Specialized Structures and Environments

This investigation will show students specialization in species as it applies to heredity and adaptation of species to their given environment.

Do not disturb! A lesson on hibernating and migration

Have you ever wondered why animals hibernate or why they migrate? Have you also ever wondered which animals do? In this lesson, students will learn which common animals hibernate and which ones migrate. They will also learn the importance of hibernation and migration on animals during the winter season. Students will be able to write down their learning, sort picture cards, and complete a Compare and Contrast Chart demonstrating their understanding of hibernation and migration.

SC.4.L.17.3

Trace the flow of energy from the Sun as it is transferred along the food chain through the producers to the consumers.

Prior Knowledge:

Items may require the student to apply science knowledge described in the NGSSS from lower grades. This benchmark requires prerequisite knowledge from **SC.1.L.17.1**.

Students will:

- Describe or explain how energy is transferred from the Sun through a food chain.

- Explain that plants make their own food using carbon dioxide, water, and energy from the Sun.
- Explain that animals obtain energy from the plants and/or animals they eat.

Also Assesses:

SC.3.L.17.2 Recognize that plants use energy from the Sun, air, and water to make their own food.
SC.4.L.17.2 Explain that animals, including humans, cannot make their own food and that when animals eat plants or other animals, the energy stored in the food source is passed to them.

Resources for 4.L.17.3

Dramatic Food Chains

This fun lesson gives students the chance to "act out" food chains. By really putting themselves into food chains, students will better understand the transfer of energy through the food chain, as well as understand that the sun is the primary source of energy in a food chain. This lesson ends with students constructing their own food chains, and writing an explanatory paragraph to explain the flow of energy through the food chain they constructed.

Food Webs

In this activity about food webs, students learn that producers make all of the molecules they need from simple substances and energy from the sun, other living things depend on producers for food, and living things that must eat other organisms as food are known as consumers. Food webs show all of the various interactions among producers and consumers in an ecosystem. Following an introduction to the content, students are divided into six groups and given a set of six cards, each of which represents a producer or consumer, unique to one of six different ecosystems. From the set of cards, students identify the producers and consumers, discuss who might eat whom, and construct an illustration of the possible food web configurations.

Plant Cycles: Photosynthesis and Transpiration

Students examine the effects of light and air on green plants, learning the processes of photosynthesis and transpiration.