

The green font describes how the goal is met by using the Leaf Critters® Curriculum.

SCIENCE :: 2004 :: KINDERGARTEN

Competency Goal 1: The learner will make observations and build an understanding of similarities and differences in animals.

Objectives

- 1.01 Observe and describe the similarities and differences among animals including:
Structure, Growth, Changes, Movement
- 1.02 Observe how animals interact with their surroundings.
- 1.03 Observe the behaviors of several common animals.
- 1.04 Demonstrate how to care for a variety of animals.
- 1.05 Observe the similarities of humans to other animals including:
Basic needs, Growth and change, Movement

Competency Goal 2: The learner will make observations and build an understanding of weather concepts.

Objectives

- 2.01 Observe and report daily weather changes throughout the year.
- 2.02 Identify different weather features including:
Precipitation, Wind, Temperature, Cloud cover.
- 2.03 Identify types of precipitation, changes in wind, force, direction and sky conditions.
- 2.04 Observe and determine the effects of weather on human activities.
- 2.05 Use common tools to measure weather.

Competency Goal 3: The learner will make observations and build an understanding of the properties of common objects.

Objectives

- 3.01 Observe and describe the properties of different kinds of objects (clay, wood, cloth, paper, other) and how they are used.
Paper: Use charcoal and paper to do a leaf rubbing.
Clay: Use a clump of clay and smooth it out using a rolling pin to ¼" thick, then place a leaf onto it and press down to make a leaf imprint. Gently pull the leaf off.
Wood: Press a leaf between two pieces of finished wood.
How did the paper respond to the leaf? How did the clay react to the leaf? How did the leaf react to the wood? Which object was most pliable?

- 3.02 Develop and use a vocabulary associated with the properties of materials:

Color, Size, Shape, Texture

Using leaves:

Colors: What different colors can fall leaves turn? (yellow, orange, red, purplish, brown, green) What colors do fall leaves not turn? (black, white, and blue). Go outside and collect some different leaves.

Size:/Shape: Which leaf is the smallest, largest? Which leaves have jagged edges? Which have smooth edges? Some leaves are shaped like an oval (Dogwood) some are shaped like a heart (Redbud) Some leaves have lobes. Eg. A maple leaf has 5 lobes. A sassafras leaf can have 2 or 3 lobes.

Texture: Feel the texture of pine leaf-needles. Compare these some of the deciduous leaves. The texture of a green spring leaf is much softer and much more pliable that that of a browned, fall leaf. As water leaves any leaf, that leaf becomes more brittle to the touch. Compare the texture of a magnolia leaf to that of a maple leaf. Which one is sturdier? (Magnolia). Which one responds more to the wind with movement of its own? (Maple).

- 3.03 Describe how objects look, feel, smell, taste, and sound using their own senses.

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Describe how a leaf looks, feels, smells, tastes (use a bay leaf or a peppermint leaf) and sounds.

Which leaves are green and supple? (springtime leaves). Which leaves are crunchy? (The brown, dead ones.)

- 3.04 Observe that objects can be described and sorted by their properties.
Sort the leaves by color. Now sort them by number of lobes. Now sort them by their type of edges (smooth or serrated / jagged).
- 3.05 Identify some common objects and organisms that are considered to be natural resources in our world.
Trees. Leaves. Fruit. Flowers. Wood. The sun, water, air.

Competency Goal 4: The learner will use appropriate tools and measurements to increase their ability to describe their world.

Objectives

- 4.01 Describe how tools can be used to make comparisons.
- 4.02 Observe and describe how various tools and units of measure are useful:
Scissors, Pencils, Crayons, Paper clips, Hammers.
- 4.03 Use nonstandard units of measure to describe and compare objects.
Use a leaf (eg. A Dogwood tree leaf) as a nonstandard unit of measure.
- 4.04 Demonstrate the use of standard units of measure and compare with nonstandard units of measure. (Teacher demonstration)
- 4.05 Demonstrate that standard units of measure produce more consistent results than nonstandard units, allowing information to be shared.(Teacher demonstration)

SCIENCE :: 2004 :: GRADE ONE

First Grade Science Objectives:

Competency Goal 1: The learner will conduct investigations and make observations to build an understanding of the needs of living organisms.

- 1.01 Investigate the needs of a variety of different plants: Air, Water, Light, Space
Trees need all three. Use the “A Living Tree” booklet to discuss the different parts of a tree, what a tree requires for growth, and the different things a tree produces.
- 1.02 Investigate the needs of a variety of different animals: Air, Water, Food, Shelter, Space
Many animals need trees and use trees for both food and shelter. (Eg. Squirrels, birds, frogs, insects, spiders, bees).
- 1.03 Observe the ways in which humans are similar to other organisms.
Humans need and use trees too. We need trees for the clean air they provide, for shade, for food (fruit, nuts and berries), and for wood.
- 1.04 Identify local environments that support the needs of common NC plants and animals.
The mountains, the Piedmont area (forests and fields), and even beaches have different trees that thrive in their environments.
- 1.05 Discuss the wide variety of living things on Earth.
Small plants, large plants (trees), animals,

Competency Goal 2: The learner will make observations and use student-made rules to build an understanding of solid earth materials.

Objectives

- 2.01 Describe and sort a variety of earth materials based on their properties:
Color, Hardness, Shape, Size
- 2.02 Describe rocks and other earth materials in more than one way, using student-made rules.
- 2.03 Observe the various components that combine to make soil.
Use the “What is Soil?” reading page and questions.
- 2.04 Compare the components of soil samples from different places.
Forest soil will have a large component of humus from the fallen leaves and dead trees that decompose. A desert will have soil that is made of sand. The Piedmont of North Carolina has soil with a high percentage of clay.
- 2.05 Explore where useful earth materials are found and how they are used.
Wood is a useful product of trees. Humus is a useful earth material that comes from decomposed trees and leaves as well as other decomposed living things.

Competency Goal 3: The learner will make observations and conduct investigations to build an understanding of the properties and relationship of objects.

Objectives

- 3.01 Describe the differences in the properties of solids and liquids.
- 3.02 Investigate several ways in which objects can be described, sorted or classified.
- 3.03 Classify solids according to their properties:
Color, Texture, Shape (ability to roll or stack), Ability to float or sink in water
- 3.04 Determine the properties of liquids:
Color, Ability to float or sink in water, Tendency to flow.
- 3.05 Observe mixtures including:
Solids with solids, Liquids with liquids, Solids with liquids.

Competency Goal 4: The learner will make observations and conduct investigations to build an understanding of balance, motion and weighing of objects.

Objectives

- 4.01 Describe different ways in which objects can be moved.
- 4.02 Observe that movement of an object can be affected by pushing or pulling.
- 4.03 Investigate and observe that objects can move steadily or change direction.
- 4.04 Observe and describe balance as a function of position and weight.
- 4.05 Describe and observe systems that are unstable and modify them to reach equilibrium.

GRADE TWO SCIENCE OBJECTIVES:

Competency Goal 1: The learner will conduct investigations and build an understanding of animal life cycles.

Objectives

- 1.01 Describe the life cycle of animals including:
Birth, Developing into an adult, Reproducing, Aging and death.
- 1.02 Observe that insects need food, air and space to grow.
- 1.03 Observe the different stages of an insect life cycle.
- 1.04 Compare and contrast life cycles of other animals such as mealworms, ladybugs, crickets, guppies or frogs.

Competency Goal 2: The learner will conduct investigations and use appropriate tools to build an understanding of the changes in weather.

Objectives

- 2.01 Investigate and describe how moving air interacts with objects.
- 2.02 Observe the force of air pressure pushing on objects.
- 2.03 Describe weather using quantitative measures of:
Temperature, Wind direction, Wind speed, Precipitation.
- 2.04 Identify and use common tools to measure weather:
Wind vane and anemometer, Thermometer, Rain gauge
- 2.05 Discuss and determine how energy from the sun warms the land, air and water.
- 2.06 Observe and record weather changes over time and relate to time of day and time of year.

Competency Goal 3: The learner will observe and conduct investigations to build an understanding of changes in properties.

Objectives

- 3.01 Identify three states of matter:
Solid, Liquid, Gas
- 3.02 Observe changes in state due to heating and cooling of common materials.
- 3.03 Explain how heat is produced and can move from one material or object to another.
- 3.04 Show that solids, liquids and gases can be characterized by their properties.
- 3.05 Investigate and observe how mixtures can be made by combining solids, liquids or gases and how they can be separated again.
- 3.06 Observe that a new material is made by combining two or more materials with properties different from the original material.

Competency Goal 4: The learner will conduct investigations and use appropriate technology to build an understanding of the concepts of sound.

Objectives

- 4.01 Demonstrate how sound is produced by vibrating objects and vibrating columns of air.
- 4.02 Show how the frequency can be changed by altering the rate of the vibration
- 4.03 Show how the frequency can be changed by altering the size and shape of a variety of instruments.
- 4.04 Show how the human ear detects sound by having a membrane that vibrates when sound reaches it.
- 4.05 Observe and describe how sounds are made by using a variety of instruments and other "sound makers" including the human vocal cords.

GRADE THREE SCIENCE OBJECTIVES:

- 1.01 Observe and measure how the quantities and qualities of nutrients, light, and water in the environment affect plant growth.
Use the “A Living Tree” booklet to see how trees thrive.
- 1.02 Observe and describe how environmental conditions determine how well plants survive and grow in a particular environment.
A forest cannot survive without adequate rain. A tree that requires a lot of sunlight will grow taller faster than its close tree neighbors that do not require as much light.
- 1.03 Investigate and describe how plants pass through distinct stages in their life cycle including: Growth, Survival, Reproduction.
Trees need water, sunlight, soil (space) to grow and to survive. To reproduce they must have these elements in abundance or they will pull back and not produce fruit. The production of fruit can only happen when the tree can get what it needs to survive and thrive. Pollination of a tree’s flowers must occur in order for the tree to reproduce by growing seeds.
- 1.04 Explain why the number of seeds a plant produces depends on variables such as light, water, nutrients, and pollination.
See above, plus pollination requires the introduction of wind, insects such as bees, or small animals to bring pollen from one tree’s male flowers to another tree’s female flowers.
- 1.05 Observe and discuss how bees pollinate flowers.
Using the Leaf Critters® Celebrate Trees Learning Pack, show the children the flower blossoms for each tree. Now discuss how bees drink pollen from one tree’s blossoms and then travel to another tree’s blossoms. The pollen from one flower sticks to the underbelly and other parts of the bee and is brought directly to another tree’s flowers. Very handy!
- 1.06 Observe, describe and record properties of germinating seeds.
- 2.01 Observe and describe the properties of soil: Color, Texture, Capacity to hold water.
Use the “What is Soil” reading page and questions.
- 2.03 Determine the ability of soil to support the growth of many plants, including those important to our food supply.
Use the “What is Soil” reading page and questions to point out the key role that humus plays in plant growth.
- 2.04 Identify the basic components of soil:
Use the “What is Soil” reading page and questions.
- 2.05 Determine how composting can be used to recycle discarded plant and animal material.
Leaf litter can be added to a compost area and it will eventually turn to nutrient-rich humus.
- 3.01 Observe that light travels in a straight line until it strikes an object and is reflected and/or absorbed.
Leaves absorb sunlight and turn it into food for the tree. The color of leaves appears to change in the fall as the different pigments that are in the leaves begin to show forth as the dominant pigment, chlorophyll begins to die out (as the sunlight grows dimmer in fall). The sunlight is bouncing against different pigments and reflects different colors. This information is provided in the lesson pages in the Celebrate Trees Teacher’s Guide.

Competency Goal 1: The learner will conduct investigations and build an understanding of plant growth and adaptations.

Objectives

- 1.01 Observe and measure how the quantities and qualities of nutrients, light, and water in the environment affect plant growth.
- 1.02 Observe and describe how environmental conditions determine how well plants survive and grow in a particular environment.
- 1.03 Investigate and describe how plants pass through distinct stages in their life cycle including.

- Growth. See “About Trees, Their Leaves, and Age” in Leaf Critters® Celebrate Trees Teacher’s Guide

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- Survival. See “About Trees, Their Leaves, and Age” in Leaf Critters® Celebrate Trees Teacher’s Guide
 - Reproduction. See “Pollination” activity sheets
- 1.04 Explain why the number of seeds a plant produces depends on variables such as light, water, nutrients, and pollination. See “About Trees, Their Leaves, and Age” in Leaf Critters® Celebrate Trees kit.
- 1.05 Observe and discuss how bees pollinate flowers.
- 1.06 Observe, describe and record properties of germinating seeds.

Competency Goal 2: The learner will conduct investigations to build understanding of soil properties.

Objectives

- 2.01 Observe and describe the properties of soil: Color, Texture, Capacity to hold water
Use the “What is Soil” article and questions sheets.
- 2.02 Investigate and observe that different soils absorb water at different rates.
Use the “What is Soil” article and questions sheets.
- 2.03 Determine the ability of soil to support the growth of many plants, including those important to our food supply.
Use the “What is Soil” reading page and questions to point out the key role humus plays in plant growth.
- 2.04 Identify the basic components of soil: Sand, Clay, Humus
Use the “What is Soil” article and questions sheets.
- 2.05 Determine how composting can be used to recycle discarded plant and animal material.
- 2.06 Determine the relationship between heat and decaying plant matter in a compost pile.

Competency Goal 3: The learner will make observations and use appropriate technology to build an understanding of the earth/moon/sun system.

Objectives

- 3.01 Observe that light travels in a straight line until it strikes an object and is reflected and/or absorbed.
- 3.02 Observe that objects in the sky have patterns of movement including: Sun, Moon, Stars
- 3.03 Using shadows, follow and record the apparent movement of the sun in the sky during the day.
- 3.04 Use appropriate tools to make observations of the moon.
- 3.05 Observe and record the change in the apparent shape of the moon from day to day over several months and describe the pattern of changes.
- 3.06 Observe that patterns of stars in the sky stay the same, although they appear to move across the sky nightly.

Competency Goal 4: The learner will conduct investigations and use appropriate technology to build an understanding of the form and function of the skeletal and muscle systems of the human body.

Objectives

- 4.01 Identify the skeleton as a system of the human body.
- 4.02 Describe several functions of bones: Support, Protection, Locomotion
- 4.03 Describe the functions of different types of joints: Hinge, Ball and Socket, Gliding
- 4.04 Describe how different kinds of joints allow movement and compare this to the movement of mechanical devices.
- 4.05 Observe and describe how muscles cause the body to move.

GRADE FOUR SCIENCE OBJECTIVES:

Competency Goal 1: The learner will make observations and conduct investigations to build an understanding of animal behavior and adaptation.

Objectives

- 1.01 Observe and describe how all living and nonliving things affect the life of a particular animal including:
- 1.01 Observe and describe how all living and nonliving things affect the life of a particular animal including:
- Other animals.
 - Plants.
 - Weather.
 - Climate.
- Discuss how each of the 2008 trees grows in different regions of the United States of America and how the regions are divided up by climate.
Discuss how each of the 5 trees in the Leaf Critters – Celebrate Trees Curriculum grows in different regions of the United States of America and how the regions are divided up by climate. See “A Tree as an Ecosystem”
- 1.02 Observe and record how animals of the same kind differ in some of their characteristics and discuss possible advantages and disadvantages of this variation.
- 1.03 Observe and discuss how behaviors and body structures help animals survive in a particular habitat.
- 1.04 Explain and discuss how humans and other animals can adapt their behavior to live in changing habitats.
- 1.05 Recognize that humans can understand themselves better by learning about other animals

Competency Goal 2: The learner will conduct investigations and use appropriate technology to build an understanding of the composition and uses of rocks and minerals.

Objectives

- 2.01 Describe and evaluate the properties of several minerals.
- 2.02 Recognize that minerals have a definite chemical composition and structure, resulting in specific physical properties including:
- Hardness.
 - Streak color.
 - Luster.
 - Magnetism.
- 2.03 Explain how rocks are composed of minerals.
- 2.04 Show that different rocks have different properties.
- 2.05 Discuss and communicate the uses of rocks and minerals.
- 2.06 Classify rocks and rock-forming minerals using student-made rules.
- 2.07 Identify and discuss different rocks and minerals in North Carolina including their role in geologic formations and distinguishing geologic regions.

Competency Goal 3: The learner will make observations and conduct investigations to build an understanding of magnetism and electricity.

Objectives

- 3.01 Observe and investigate the pull of magnets on all materials made of iron and the pushes or pulls on other magnets.
- 3.02 Describe and demonstrate how magnetism can be used to generate electricity.
- 3.03 Design and test an electric circuit as a closed pathway including an energy source, energy conductor, and an energy receiver.
- 3.04 Explain how magnetism is related to electricity.

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- 3.05 Describe and explain the parts of a light bulb.
- 3.06 Describe and identify materials that are conductors and nonconductors of electricity.
- 3.07 Observe and investigate that parallel and series circuits have different characteristics.
- 3.08 Observe and investigate the ability of electric circuits to produce light, heat, sound, and magnetic effects.
- 3.09 Recognize lightning as an electrical discharge and show proper safety behavior when lightning occurs.

Competency Goal 4: The learner will conduct investigations and use appropriate technology to build an understanding of how food provides energy and materials for growth and repair of the body.

Objectives

- 4.01 Explain why organisms require energy to live and grow.
Explain how one living organism, the tree, requires sunlight to create food for itself via photosynthesis. See “A Tree as an Ecosystem”
- 4.02 Show how calories can be used to compare the chemical energy of different foods.
- 4.03 Discuss how foods provide both energy and nutrients for living organisms.
- 4.04 Identify starches and sugars as carbohydrates.
- 4.05 Determine that foods are made up of a variety of components:

GRADE FIVE SCIENCE OBJECTIVES:

Competency Goal 1: The learner will conduct investigations to build an understanding of the interdependence of plants and animals.

Objectives

- 1.01 Describe and compare several common ecosystems (communities of organisms and their interaction with the environment).
Describe how a tree can support a variety of organisms. See “A Tree as an Ecosystem”
- 1.02 Identify and analyze the functions of organisms within the population of the ecosystem:
 - Producers.
 - Consumers.
 - Decomposers.Trees are producers of fresh air, fruit, nuts, and wood. They are also consumers of water, CO₂, minerals; and they can decompose entirely. See “A Tree as an Ecosystem”
- 1.03 Explain why an ecosystem can support a variety of organisms.
Describe how a tree can support a variety of organisms. See “A Tree as an Ecosystem”
- 1.04 Discuss and determine the role of light, temperature, and soil composition in an ecosystem's capacity to support life.
- 1.05 Determine the interaction of organisms within an ecosystem.
Describe how a tree can support a variety of organisms. See “A Tree as an Ecosystem”
- 1.06 Explain and evaluate some ways that humans affect ecosystems.
 - Habitat reduction due to development.
 - Pollutants.
 - Increased nutrients.See “A Tree as an Ecosystem”
- 1.07 Determine how materials are recycled in nature.
See “A Tree as an Ecosystem”

Competency Goal 2: The learner will make observations and conduct investigations to build an understanding of landforms.

Objectives

- 2.01 Identify and analyze forces that cause change in landforms over time including.

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- Water and Ice
 - Wind
 - Gravity.
- 2.02 Investigate and discuss the role of the water cycle and how movement of water over and through the landscape helps shape land forms.
- 2.03 Discuss and consider the wearing away and movement of rock and soil in erosion and its importance in forming:
- Canyons.
 - Valleys.
 - Meanders.
 - Tributaries.
- 2.04 Describe the deposition of eroded material and its importance in establishing landforms including:
- Deltas.
 - Flood Plains.
- 2.05 Discuss how the flow of water and the slope of the land affect erosion.
- 2.06 Identify and use models, maps, and aerial photographs as ways of representing landforms.
- 2.07 Discuss and analyze how humans influence erosion and deposition in local communities, including school grounds, as a result of:
- Clearing land.
 - Planting vegetation.
 - Building dams.

Competency Goal 3: The learner will conduct investigations and use appropriate technology to build an understanding of weather and climate.

Objectives

- 3.01 Investigate the water cycle including the processes of:
- Evaporation.
 - Condensation.
 - Precipitation.
 - Run-off.
- 3.02 Discuss and determine how the following are affected by predictable patterns of weather:
- Temperature.
 - Wind direction and speed.
 - Precipitation.
 - Cloud cover.
 - Air pressure.
- 3.03 Describe and analyze the formation of various types of clouds and discuss their relation to weather systems.
- 3.04 Explain how global atmospheric movement patterns affect local weather.
- 3.05 Compile and use weather data to establish a climate record and reveal any trends.
- 3.06 Discuss and determine the influence of geography on weather and climate:
- Mountains
 - Sea breezes
 - Water bodies.

Competency Goal 4: The learner will conduct investigations and use appropriate technologies to build an understanding of forces and motion in technological designs.

Objectives

- 4.01 Determine the motion of an object by following and measuring its position over time.
- 4.02 Evaluate how pushing or pulling forces can change the position and motion of an object.
- 4.03 Explain how energy is needed to make machines move.
- Moving air.

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- Gravity.
- 4.04 Determine that an unbalanced force is needed to move an object or change its direction.
- 4.05 Determine factors that affect motion including:
 - Force
 - Friction.
 - Inertia.
 - Momentum
- 4.06 Build and use a model to solve a mechanical design problem.
 - Devise a test for the model.
 - Evaluate the results of test.
- 4.07 Determine how people use simple machines to solve problems.