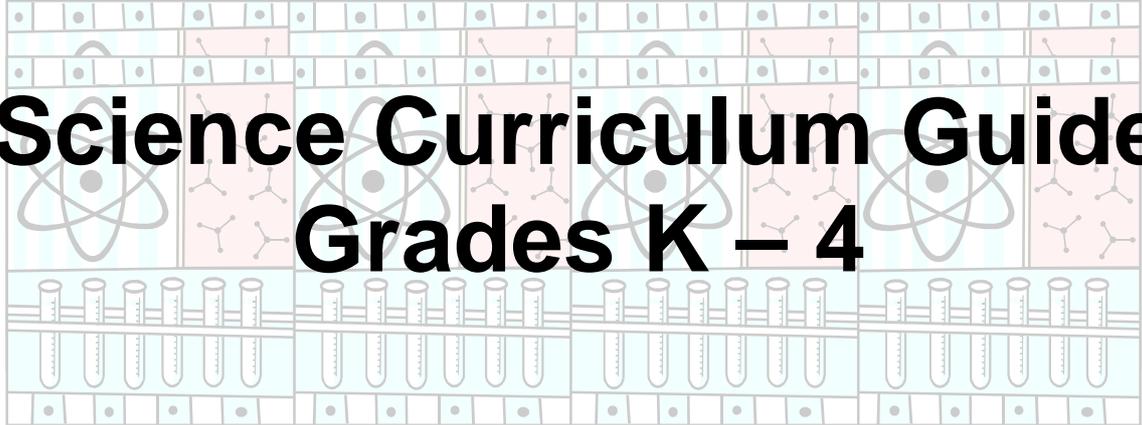


**Mansfield Public Schools
Mansfield, Connecticut**



Science Curriculum Guide Grades K – 4

Gordon Schimmel, Superintendent
Fred Baruzzi, Assistant Superintendent for Curriculum,
Instruction, and Professional Development

K – 4 Science Curriculum Committee

James Palmer, Chairperson

Mary Lee Geary
Karen LeFevre
Sharon McGrath
Christopher Toomey

Kim Kupferschmid
Mickey Maheu
Michelle Terry
Charles Warinsky

To the Teacher:

This Science Curriculum guide was written by Mansfield teachers for Mansfield teachers. It is a work in progress and is designed to be under continuous revision by the K-4 science council. Thus, your feedback is essential to the effective implementation of the curriculum. The unit activities and resources, if unfamiliar to you, have been used or suggested by a district grade level colleague. Consequently, feel free to ask for assistance or explanation.

For every unit you will find a major goal, unit objectives, core activities, supplemental activities, recommended resources and an assessment component. The core activities and assessments are required components of the curriculum to ensure that all students receive the same course of study.

Should you have any questions, please do not hesitate to contact a science curriculum colleague.

Good Luck!

K-4 Science Curriculum Revision Committee Teachers

Kindergarten	Mary Lee Geary	Goodwin School
Kindergarten	Michelle Terry	Vinton School
Grade One	Kim Kupferschmid	Vinton School
Grade One	Karen LeFevre	Vinton School
Grade Two	Mickey Maheu	Southeast School
Grade Three	Christopher Toomey	Vinton School
Grade Three	Sharon McGrath	Goodwin School
Grade Four	Charles Warinsky	Southeast School

Introduction

"I am among those who think that Science has great beauty. A scientist in his laboratory is not only a technician; he is also a child placed before natural phenomena which impress him like a fairy tale."

Marie Sklodowska Curie

The K-4 Science Curriculum Guide for the Mansfield Public Schools has been developed to provide a solid foundation for elementary students in the content and processes of physical, earth, and life sciences. The grade level scope and sequence is designed to build upon prior knowledge and experiences while continuing to reinforce important concepts. In order to provide a useful document, we have targeted core objectives, activities, and assessments for each grade level. These core activities will provide all students with common scientific experiences sequentially and developmentally appropriate for their grade level.

The Mansfield Science Curriculum Guide was designed to provide an integrated and updated K-4 scope and sequence. The new curriculum has been greatly influenced by the recommendations of contemporary reform initiatives. The National Science Teachers Association project, Scope, Sequence, and Coordination, recommends every science, every year, for every student. Thus, we designed our curriculum to include experiences in *Life, Earth, and Physical Science* at every grade level.

Project 2061, Science For All Americans, a project of the American Association for the Advancement of Science (AAAS), and The National Science Education Standards, produced by the National Research Council of the National Academy of Science, emphasize that Science is for all children and that Science literacy should be a fundamental goal. Both further recommend that a common core of Science learned with real understanding is preferable to a mindless march through facts and definitions. In short, *less is more*.

Most importantly, the Science curriculum was revised and improved due to the dedication, experience, wisdom and common sense of the elementary classroom teachers of the Mansfield Public Schools. The curriculum revision committee is indebted to Dr. Ralph J. Yulo, Jr., Science Education Consultant, for his boundless knowledge and insight and for his ongoing support, encouragement, and validation of this project.

Therefore, it is with pride that we forward this guide to our colleagues with hope that you will enjoy sharing the beauty and wonder of Science with your students.

Curriculum Goals

As a result of education in grades K-4 science, students will:

- Understand and apply basic concepts and principles of physical, earth, and life sciences;*
- Participate in scientific activities which are evidence-based and encourage inquiry that leads to a greater understanding of the world;
- Identify and solve problems through scientific exploration, including the formulation of hypotheses, design of experiments, use of technology, analysis of data and drawing of conclusions;*
- Extend and deepen a natural curiosity and a sense of wonder regarding the world around them.

* credit to CSE, Science Curriculum Framework, 12/1997

Science Units

	K	1	2	3	4
PHYSICAL	STRUCTURES	PROPERTIES OF MATTER	SIMPLE MACHINES	MAGNESTISM	ELECTRICITY CHEMISTRY
EARTH	EXPLORING WEATHER	WEATHER: THE SEASONS	WEATHER: STUDYING AND MEASURING	ROCKS AND MINERALS	EARTH HISTORY AND DYNAMICS
LIFE	EXPLORING PLANTS ANIMALS AROUND US	PLANTS: GROWING SEEDS <i>LIVING THINGS IN OUR WORLD</i>	EXPERIMENTING WITH PLANTS ANIMALS: LIFE CYCLES	MORE ABOUT PLANTS ANIMAL ADAPTATION: FORM AND FUNCTION	TREES AND PLANTS IN YOUR BACKYARD (optional) BONES AND MUSCLES

KINDERGARTEN



PHYSICAL SCIENCE

Structures

Goal

The student will be introduced to the concept that structures can be made with a variety of materials that balance and stability are important, and that structures are created for a variety of purposes.

Objectives

1. Students will learn that basic building materials can be used to build a variety of structures. **K.4 A9**
2. Students will learn that the placement of objects can affect the balance and stability of a structure.
3. Students will be able to sort, classify building materials by using one or more of their properties, ***such as flexibility, attraction to magnets, and whether they float or sink in water.*** **K.1 A1 A2 A3**

Structures

Objective #1: Students will learn that basic building materials can be used to build a variety of structures.

Core Activities:

- Construct towers using building materials, e.g. blocks, stones, unifix cubes, and boxes
- Construct walls and passageways using building materials, e.g. blocks, stones, unifix cubes, and boxes
- The Workshop, SAMMY'S SCIENCE, computer program presently in Computer Labs

Supplemental Activities:

- Given a variety of building materials (people made and natural) and various backyard toy animals, students will create a living area for them *Activity can also be use for LIFE SCIENCE: ANIMALS AROUND US, Objective #3
- Invent-A-Game, p.41, PLT ACTIVITY GUIDE
- Newspaper Construction, p. 50, MUDPIES TO MAGNETS

Assessments:

- Students will use building materials to make a structure as prescribed by their teacher, e.g., "Make a bridge"
- Students will use nonstandard materials, e.g. recycled materials to build a structure.
- Participate in the School Invention Convention/Science Fair

Structures

Objective #2: Students will learn that the placement of objects can affect the balance and stability of a structure.

Core Activities:

- Provide pictures of towers using attribute or building blocks then have students try to build the towers using the same materials
- Give each student a tall, narrow block of wood or a cardboard box, challenge student to make a tower that will remain standing in a strong wind, p. 23, CONSTRUCTION
- Nuts For You and Rocks, Too, p. 85, MUDPIES TO MAGNETS
- Create Paper Trash Sculptures, p.54, GOOD EARTH ART

Supplemental Activities:

- Blockbuster, pp. 18-19, CONSTRUCTION, WINDOW 8
- Paper Houses, p. 20, CONSTRUCTION, WINDOW 9

Assessments:

- Provide a picture of a structure using attribute or building blocks, have students predict if it will stand or fall
- Given three blocks of different sizes, students will construct the most stable structure

Structures

4. **Objective #3:** Students will be able to sort, classify building materials by using one or more of their properties, *such as flexibility, attraction to magnets, and whether they float or sink in water.*

Core Activities:

- Provide a variety of natural materials, e.g. stones, leaves, twigs for students to sort and classify in the texture table and building area
- Provide a variety of standard materials *such as wood, paper, and metal for students to sort into groups based on properties such as flexibility, attraction to magnets, and whether they sink or float in water*
- Observe differences and similarities among twigs using the terms “greater than” and “less than,” p.98, PLT ACTIVITY GUIDE

Supplemental Activities:

- Patterns in Nature, p.14, PLT ACTIVITY GUIDE
- Form a Rock Group, SQUIRTS AND SNAILS AND SKINNY GREEN TAILS
- Put Them In A Row, p.40, MUDPIES TO MAGNETS
- Using a combination of pattern blocks, students will determine which blocks will successfully cover a pattern block figure picture, pages 39-40, HANDS ON CREATIVE BLOCKS, Creative Publications, 1986

Assessments:

- Given two groups of objects sorted by one common attribute the student will be able to take a new object and place it in the appropriate group and be able to identify the property he/she used to make the choice

KINDERGARTEN



EARTH SCIENCE

Exploring Weather

Goal

The students will be introduced to the concept that weather has observable conditions and patterns that affect their lives. **K.3 A7 A8**

Objectives

1. Students will know that snow is a form of water.
2. Students will know that rain is falling water.
3. Students will know that weather is always changing.
4. Students will know that the sun warms things.
5. Students will know what seasons exist in New England.

Exploring Weather

Objective #1: Students will know that snow is a form of water.

Core Activities:

- Use black papers as Snow Catchers, letting the students go outside during a Snowy Day
- Read THE SNOWY DAY by Ezra Keats then create a paper Snowflake
- Let It Snow, p.15, SIMPLE WEATHER EXPERIMENTS WITH EVERYDAY MATERIALS
- Mushy, Slushy, Melty Snow, p.66, MUDPIES TO MAGNETS

Supplemental Activities:

- Snow Painting, p.32, GOOD EARTH ART
- How Deep Is Your Snow Drift?, p.86, MUDPIES TO MAGNETS
- Let It Snow, SIMPLE WEATHER EXPERIMENTS WITH EVERYDAY MATERIALS. Can also be used to help meet Objective #4, Weather

Assessments:

- Students will be able to draw, write, and or state what snow becomes when it melts
- When presented with an array of liquids, e.g. milk...water, students will be able to identify which one melted snow will resemble
- Have students keep a Weather Journal with entries that show students are learning that water can have many forms i.e., rain, snow, hail, sleet,...)

Exploring Weather

Objective #2: Students will know that rain is falling water.

Core Activities:

- Use flour in a tray as Rain Catchers, letting students go outside during a Rainy Day to “capture” rain drops on their flour trays
- Read RAIN by Robert Kalan & Donald Crews
- Compare rainwater and tap water for similarities using the senses of sight, touch, and smell
- Freeze and melt rain water and tap water then compare similarities using the senses of sight, touch, and smell

Supplemental Activities:

- Create Ice-y Art, GOOD EARTH ART
- Students can make Rain in the classroom. Have students predict where rain comes from. After making rain, have students describe the sequence of events. Ask students to think about where we find water on our Earth. Make connections between the water in the pan and the water on the earth, page 79, SIMPLE WEATHER EXPERIMENTS, “Be a Rain Maker”

Assessments:

- Have students keep a Weather Journal (entries should include mention of when (what days) it rained, how much it rained, and how it affected the students’ lives and activities).

Exploring Weather

Objective #3: Students will know that weather is always changing.

Core Activities:

- Students will record weather observations using a Weather Station. Information will include graphing weather conditions using sky watch symbols (limit to rain, snow, sun, cloud), recording daily temperature, appropriate dress wear, and dictating a daily weather report, page 10, EARLY THEMES-WEATHER, "Setting Up your Weather Station" by Ann Flagg
- Create "Weather Art," MUDPIES TO MAGNETS
- Weather Machine, SAMMY'S SCIENCE, computer program presently in Computer Lab
- Create A Weather Wheel, NATURESCOPE, WILD ABOUT WEATHER

Supplemental Activities:

- Artist as a Recorder of Reality, PLT ACTIVITY GUIDE
This activity can also be used to meet Objective #5
- Weather Scavenger Hunt, NATURESCOPE, WILD ABOUT WEATHER
- Create a Weather/Season Wind Sock, WENDY'S BOOKWORKS, 1987
*Can also help meet Objective #5, Weather

Assessments:

- Have students keep a Weather Journal in which they use words and pictures to describe daily weather and changes in the weather.

Exploring Weather

Objective #4: Students will know that the sun warms things.

Core Activities:

- Create Easy Sun Prints, GOOD EARTH ART
- What Warms Us? p.10, SIMPLE WEATHER EXPERIMENTS WITH EVERYDAY MATERIALS
- Black, White, and Shiny, p.14, SIMPLE WEATHER EXPERIMENTS WITH EVERDAY MATERIALS

Supplemental Activities:

- Produce Solar Prints, GOOD EARTH ART
- Students will predict what will happen to a piece of black construction paper or black cloth that is placed in the sun for five minutes, “What Does the Sun Do to Objects That It Touches?” repeat activity for longer durations
*Can also be used as an assessment besides the Weather Journal.
- Time In The Sun, p.18, SIMPLE WEATHER EXPERIMENTS WITH EVERYDAY MATERIALS
- The Sun Won’t Shine Through You, p. 68, MUDPIES TO MAGNETS
- Let It Snow, SIMPLE WEATHER EXPERIMENTS WITH EVERYDAY MATERIALS
* Can also be used in meeting Objective #1, Weather

Assessments:

- Have students keep a Weather Journal in which they related sunshine and temperature.

Exploring Weather

Objective # 5: Students will know what seasons exist in New England.

Core Activities:

- Throughout the year, students will take nature walks on a predetermined, consistent trail to observe seasonal changes, STOP, LOOK, AND LISTEN," Wide-Eyed Nature Walk"
- Keep a drawing/writing Seasons Journal focusing on sensory observations, draw From Nature, GOOD EARTH ART
- Read as an introduction to each season and as a comparison, AUTUMN, WINTER, SPRING, SUMMER by Gail Saunders-Smith
- Acorn Pond, SAMMY'S SCIENCE, computer program presently in the Computer Lab
*Can also be used to meet Objective #1, Animals

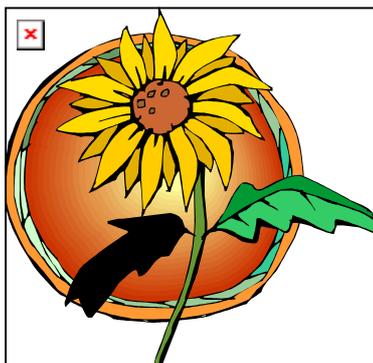
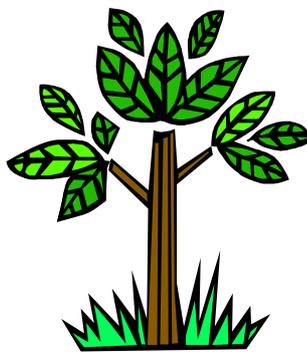
Supplemental Activities:

- Read RED LEAF, YELLOW LEAF by Lois Ehlert for Autumn
- Read DOWN COME THE LEAVES by Bancroft for Autumn
- Read WHAT HAPPENS IN THE SPRING, SUMMER, AUTUMN, WINTER National Geographic Collection
- Seasonally, students will use a color wheel on their nature walk to observe and compare color/season changes, PLT ACTIVITY GUIDE
- Seasons Go Round and Round, p. 90, MUDPIES TO MAGNETS
- Create a Weather/Season Wind Sock, WENDY'S BOOKWORKS, 1987
*Can also be used in meeting Objective #3, Weather

Assessments:

Identify and Sequence the seasons using Picture/Season word cards
Keep a Season Journal in which they use words and pictures to predict and describe changes in activities and clothing that accompany seasonal changes (e.g. dressing warmly and ice skating during the winter).

KINDERGARTEN



LIFE SCIENCE

Exploring Plants

Goal

The student will be introduced to the concept that a seed is an example of the beginning of a plant life.

Objectives

1. Students will know that a seed is a baby plant with a supply of food.
2. Students will know that sun, water, and soil are three requirements for plant life by planting and growing seeds, and observing and recording what is needed to keep plants healthy.
3. Students will be able to classify seeds according to observable characteristics such as shape, size, and color.

Exploring Plants

Objective #1: Students will know that a seed is a baby plant with a supply of food.

Core Activities:

- Experiment with a number of seeds, e.g. kidney, mung beans, pumpkin, corn, peas to observe that each seed consists of a baby plant and food supply (do not use lima beans as they are used in 1st grade)
- Fill texture table with various beans (do not use lima beans as they are used in 1st grade)
Add soil, then water and observe growing cycle- this activity can also be used to meet Objective #2.
- Sequence and record growing stages using the LIFE CYCLE OF A BEAN floor puzzle and read LIFE CYCLE OF A BEAN by Christine Back & Barrie Watts

Supplemental Activities:

- Sequence and record growing stages using the LIFE CYCLE OF A BEAN floor puzzle
- Cooked Beans/Live Beans, BOTANY FOR ALL AGES
- Seed Journey, PLT GUIDE
- A Perfect Package, pp. 102-103, STOP, LOOK, & LISTEN

Assessments:

- Using photographs, students will be able to identify baby plant and supply of food
- Dissecting a variety of soaked seeds, students will be able to identify the baby plants and supplies of food found in the seeds they examine
- Using a Flannel Board Story with the parts of a seed and word labels, students will be able to match the flannel picture with the correct label

Exploring Plants

Objective #2: Students will know that sun, water, and soil are three requirements for plant life by planting and growing seeds, and by observing and recording what is needed to keep plants healthy.

Core Activities:

- This activity allows students to see a seed grow into a plant. Students make “See-through Planters” by growing bean seeds (do not use lima beans) on the sides of plastic cups. They will observe the roots and sprouts through the sides of the cups. Sample lessons: PLAY AND LEARN- GROWING THINGS, by Dawn Sirett and Lara Tankel, DK Publishing, “Growing a Runner Bean.” Seed Power, p.42, MUDPIES TO MAGNETS A Perfect Package, pp.102-103, STOP, LOOK & LISTEN.
- Record with pictures and writing the growth of a “Mystery Seed” using the Kindergarten Seed Sheet. Begin activity by reading, THE TINY SEED by Eric Carle.
- Place numerous seeds in the texture table, and then after a couple of days add soil, then water, then provide sunlight- record results.
- Students will take a field trip to a planting farm, e.g. Hurst Farm in Andover, CT to observe and participate in the planting life cycle.
- Plant, Grow, and Harvest a Kindergarten indoor/outdoor garden, e.g. Vinton School- Sunflower Garden.
- Read SUNFLOWER HOUSE by Eve Bunting.
- SPRING- incoming K’s will be given seeds to take home to plant.
- SUMMER- end of year K’s will plant sunflower seeds in school garden.
- AUTUMN- harvest sunflowers, share with First Grade, trip to Hurst Farm.
- WINTER- sort, classify, estimate seeds, and store some for Spring.
This activity can also be used to in meeting EXPLORING WEATHER, Objective #5 *Other indoor/outdoor garden activities can be found in DIGGING DEEPER & READY TO GROW.
E.g. Windowsill Gardens, Yardstick Gardens

Supplemental Activities:

- Plant and attend a Herb Garden, pp. 62-64, STOP, LOOK, & LISTEN.
- Create a Sunflower House, READY GROW!
- I’ve Got A Hunch, Seed, p.72, MUDPIES TO MAGNETS.
- Eggheads, Eggshell Planters, and Milk Carton Plants, pp. 160-162, GOOD EARTH ART.

Exploring Plants

Objective #2: Students will know that sun, water, and soil are three requirements for plant life by planting and growing seeds, and by observing and recording what is needed to keep plants healthy.

Supplemental Activities (cont'):

- Pumpkins: Beyond the Jack-O'-Lantern, BOTANY FOR ALL AGES
- Windowsill Gardens, BEYOND THE BEAN SEED
- Sorting Station, SAMMY'S SCIENCE, computer program presently in Computer Lab

Assessments:

- Students will draw, write, and/or orally tell that sun, water, and soils are needed by plants.
- Given a set of pictures, students will be able to identify the missing requirement needed for a plant to grow (e.g. sun, water, soil.)
- Students should use and be able to sequence THE GROWING SEEDS storytelling kit.

Exploring Plants

Objective #3: Students will be able to classify seeds according to observable characteristics such as shape, size, and color.

Core Activities:

- Oh I Seed You, p.33, MUDPIES TO MAGNETS
- Classify and sort nuts. Relate to animals storing for winter.
This activity can also be used in meeting ANIMALS AROUND US, Objective # 2
- Go on a Seed Search, PLT GUIDE, draw and label observations
- Nut Collecting, p. 34, ECOLOGY FOR ALL AGES
- Dried Bean Pictures, GOOD EARTH ART

Supplemental Activities:

- Musing On Music, p.69, PLT ACTIVITY GUIDE
- Seed Wiggles and Bean Jars, GOOD EARTH ART
- Place plant related items e.g. pine cones, acorns in math and block area
- Grow A Sock, p.60, MUDPIES TO MAGNETS

Assessments:

Given a novel collection of seeds, students will be able to sort by attributes of shape, size and color.

Make journal entries using words and pictures to illustrate similarities and differences in the seeds they have started.

Animals Around Us

Goal

The students will be introduced to the concept that animals are an integral part of the environment and that humans can affect animals in positive and negative ways.

Objectives

1. Students will identify and describe common animals including those from home, yard, and farm.
2. Students will describe food, water, shelter, and space as basic needs of animals.
3. Students will know that human beings should act responsibly and respectfully towards animals in their care and animals in natural habitats.

Animals Around Us

Objective #1: Students will identify and describe common animals including those from home, yard, and farm.

Core Activities:

- Wildlife Is Everywhere, p. 19, PROJECT WILD
- Visit the UCONN Animal Barns and/or a local animal farm
- Read WHO LIVES IN THE WOODS? by Dena Humphreys and Rudolf Freund
Extension activity - Who Lives Here? Paper, Evan-Moor Corp, 1987
- Children take exploratory walks (repeated seasonally) around the school yard and/or nature trail. They look for animals and for evidence of animals in the area (e.g., nests, droppings, holes) and record their observations in their journals and on experience and/or KWL charts. They examine classroom models and photographs of animals observed during their exploratory walks and identify or predict where each animal might be found.
*Repeat this activity emphasizing farm and home animals.
- Read THE SPIDERS DANCE, and then play The Spider and the Fly, pp.133-134, BEYOND THE BEAN SEED
- View FARM ANIMALS video
- Acorn Pond, SAMMY'S SCIENCE, computer program presently in Computer Lab
*Can also be used to meet Objective #5, Weather

Supplemental Activities:

- School Yard Safari, p.85, PLT ACTIVITY GUIDE
- Color Crazy, p. 11, PROJECT WILD
- Spy A Spider, pp. 57-58, and Watch A Web, pp. 58-59, SQUIRTS AND SNAILS AND SKINNY GREEN TAILS
- Orb-weaver Spiders, ECOLOGY FOR ALL AGES
- Web Art, GOOD EARTH ART
- Read SPIDERS by Gail Gibbons
- Read BARN CAT by Carol P. Saul & Mary Azarian
- Sorting Station, SAMMY'S SCIENCE, computer program presently in Computer Lab

Animals Around Us

Objective #1: Students will identify and describe common animals including those from home, yard, and farm.

Assessments:

- Students will be able to sort and classify using animal models or photographs, which animals may be commonly found in the home, yard, and farm.
- Create a class Venn Diagram with photographs or student drawings with word labels to demonstrate what home, yard, and farm animals have in common.
- Keep an Explorer's Journal, ECOLOGY FOR ALL AGES, to record which animals were observed directly, which were observed indirectly by evidence left behind, when they were observed, and how many of each type was observed.

Animals Around Us

Objective #2: Students will describe food, water, shelter, and space as basic needs of animals.

Core Activities:

- Create a Naturescape, pp. 12, 26, 29,30,56,57, THE COMPLETE BACKYARD NATURE ACTIVITY BOOK.
- Everybody Needs A Home, p. 31, PROJECT WILD
- Water You Know? p. 94, PLT ACTIVITY GUIDE
- Observe and identify some yard, nature trail, or stone wall animals, e.g. chipmunks, squirrels, mice, snakes.
- Read THE CURIOUS CHIPMUNK by Lacey.
- Read FREDERICK by Leo Lionni about a mouse who lives in a stonewall.
- Brainstorm what animals, e.g. squirrels need to live.
- Read NUTS TO YOU! By Lois Ehlert.
- Create a Squirrel Feeder for the yard or nature trail.
- Introduce Pets' Needs with MY PET activity, the read CATS DO, DOGS DON'T by Norma Simon and follow with FURRY FACTS, p. 5. CATS AND DOGS.

Supplemental Activities:

- Establish a Squirrel Watch. Place food (nuts, seeds, pine cones, and fruit) in a designated place in the yard or the nature trail on a consistent basis. Record observations of squirrels. The sorting of food can also be used in meeting EXPLORING PLANTS, Objective #3 Sample Lesson: COPYCAT, pp. 4-6, September/October 1996.
- Read SCAMPER: A GRAY TREE SQUIRREL by Edna Miller.
- Listening With "Dog Ears", BOTANY FOR ALL AGES
- The Purr-fect Smell, p.147, MUDPIES TO MAGNETS

Assessments:

- Students will identify a specific animal in a Learning Journal and demonstrate through drawing, writing, and/or orally telling what that animal needs.
- Students will keep an Explorer's Journal to record through drawing, writing, and/or telling how specific animal(s) and interact with both the physical environment (e.g. weather conditions, land area) and other animals and plants of the area. ECOLOGY FOR ALL AGES.

Animals Around Us

Objective #3: Students will know that human beings should act responsibly and respectfully towards animals in their care and animals in natural habitats.

Core Activities:

- Primary level of Humane Society's KINDNESS NEWSPAPER
Each student should receive his/her own copy of this newspaper to be read and discussed in class.
- Arrange a meeting with a Veterinarian or Veterinarian Technician and visiting pets to discuss proper pet care.
- Provide student copy of Pets Need Our Care, Frank Schaffer Publications.
- Arrange a meeting with an Animal Control Officer and/or Humane Society representative, so students can learn more about humane treatment of animals and responsible behavior.
*Provide students with copies of YOU AND YOUR PUPPY & YOU AND YOUR KITTEN.
- Read HELPING OUR ANIMAL FRIENDS.

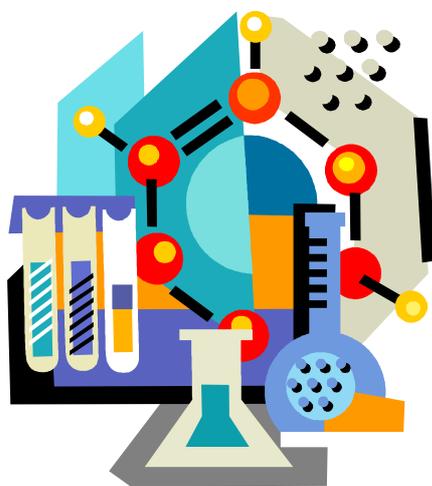
Supplemental Activities:

- Outdoor Manners Coloring Book, p. 147, PLT ACTIVITY GUIDE
- Adopt a local Animal Shelter.
- Sponsor A Cow program.
- Read WHISTLE FOR WILLIE, PET SHOW, & HI, CAT! by Ezra Jack Keats.
- Pet Hall of Fame Bulletin Board, p.6, CATS AND DOGS

Assessments:

- Students' role play situations where they demonstrate humane treatment of animals in their home, yard, and farm.
- Students' will be given a scenario in which they must identify inhumane treatment of animals and then be able to act-out alternative humane ways to resolve the situation(s).

KINDERGARTEN



RESOURCES

ECOLOGY FOR ALL AGES, DISCOVERING NATURE THROUGH ACTIVITIES FOR CHILDREN AND ADULTS, Jorie Hunken, Globe Pequot Press, 1994

PLT ACTIVITY GUIDE K-6, PROJECT LEARNING TREE, American Forest Foundation, 1993

PROJECT WILD GUIDE, ELEMENTARY, Western Regional Environmental Education Council, 1986

BOTANY FOR ALL AGES, DISCOVERING NATURE THROUGH ACTIVITIES FOR CHILDREN AND ADULTS, Jorie Hunken, Globe Pequot Press, 1993

GOOD EARTH ART, ENVIRONMENTAL ART FOR KIDS, MaryAnn F. Kohl & Cindy Gainer, Bright Ring Publishing, 1991

STEVEN CANEY'S INVENTION BOOK, Teacher Created Materials, 1993

CONSTRUCTIONS, Joan Westley, Creative Publications

BEYOND THE BEAN SEED GARDENING ACTIVITIES FOR GRADES K-6, Nancy Allen Jurenka & Rosanne J. Blass, Teachers Ideas Press, 1996

DIGGING DEEPER, INTEGRATING YOUTH GARDENS INTO SCHOOLS & COMMUNITIES, Joseph Kiefer & Martin Kemple, Food Works, 1998

THE COMPLETE BACKYARD NATURE ACTIVITY BOOK, Robin Michael Koontz

NATURE FOR THE VERY YOUNG, Marcia Bowden

HANDS –ON NATURE, Jenepher Lingelbach, Vermont Institute of Natural Science

HUG A TREE, Robert E. Rockwell, Elizabeth A. Sherwood, & Robert A. Williams, Gryphon House, 1986

DISCOVER NATURE IN THE GARDEN, Jim Conrade, Stackpole Press, 1996

THE VICTORY GARDEN KID'S BOOK, Majorie Waters, Globe Pequot, 1994

MUDPIES TO MAGNETS, Robert A. Williams, Robert E. Rockwell, & Elizabeth A. Sherwood, Gryphon House, 1987

SQUIRTS AND SNAILS AND SKINNY GREEN TAILS, Warren Clark

STOP, LOOK, & LISTEN, _____

READY TO GROW, Burpee

LIFE OF A BEAN, FLOOR PUZZLE & TEXT, Christine Back & Barrie Watts, Silver Burdett Press, 1984

SIMPLE WEATHER EXPERIMENTS WITH EVERYDAY MATERIALS, Muriel Mandell & Frances Zweifel, Sterling Press, 1990

RANGER RICK'S NATURESCOPE, WILD ABOUT WEATHER, 1989

RAINY DAY, Imogene Forte, Incentive Publications, 1983

SNOWY DAY, Ezra Jack Keats

SNOWFLAKE BENTLEY, Jacqueline Briggs, Houghton Mifflin, 1998

AUTUMN LEAVES, Ken Robbins, Scholastic Press, 1998

WHAT HAPPENS IN THE SPRING, SUMMER, AUTUMN, WINTER, National Geographic Collection, 1977

SPRING, SUMMER, AUTUMN, WINTER, GAIL SAUNDERS-SMITH, Pebble Book, 1998

I TOOK A WALK, Henry Cole, Greenwillow, 1998

WINTER, SPRING, SUMMER, AUTUM (book series), Gail Saunders-Smith, Capstone Press, 1998

FARM ANIMALS, Sony Kid's Video, 1993

THE COMPLETE BACKYARD NATURE ACTIVITY BOOK, ROBIN Michal Koontz, Learning Triangle Press, 1998

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HI, CAT! EZRA JACK KEATS

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SAMMY'S SCIENCE

-WORKSHOP/Structures

-WEATHER MACHINE/Weather

-SORTING STATION/Animals & Plants

-ACORN POND/Animals & Seasons

GRADE ONE



PHYSICAL SCIENCE

Properties of Matter

Goal

The student will learn to identify, sort and classify objects according to their properties.

Objectives

1. Learn that objects have characteristics or properties that can be used to describe the object.
2. Identify and be able to sort familiar objects using common properties.
3. Learn three states of **matter** (solid, liquid and gas) and know that ***solids tend to maintain their own shapes, while liquids tend to assume the shapes of their containers, and gases fill their containers fully.*** 2.1 A18 3.1 B2
4. Observe and classify objects according to their ability to sink or float. K.1 A2 3.1 B1

Properties of Matter

Objective #1: The students will learn that objects have characteristics or properties that can be used to describe the object (e.g., hard/soft, tough/smooth, large/small, etc.)

Core Activity:

- The students generate a list of property words and use them to describe objects.
- Sample Lessons:
SCIS: Objects in the Classroom
DELTA: What Are Properties/Describing Properties?

Supplemental Activity:

- This objective parallels and reinforces the plant unit objective for sorting and comparing leaves.

Assessment:

- Given a familiar object the student can identify several of its properties.
- Guess the object by giving clues using property words.
- The student can write a riddle for a common object using property words.

Properties of Matter

Objective #2: Identify and be able to sort familiar objects using common properties such as size, color, shape, weight, metallic, etc.

Core Activity:

- The students collect objects and identify their properties. They sort these objects first using only one property. Then sort using more than one property to compare objects.
- Many of your classroom math manipulatives can be used for this activity. Attribute blocks, attribute bears and pattern blocks can be used.

Sample Lessons:

- SCIS Object Hunt, Grandma's Button Box, Object Collections, and Objects Grab-Bag Game.
- DELTA: Size and Color, Shape,
- Texture, and Heavy or Light? ' '

Supplemental Activity:

- Revisiting the sorting and classifying leaves objective from the plant unit as a way to help children see connections.
- Sort seasonal clothing, or colors found in each season.

Assessment:

- Given a small collection of objects the student can sort them by properties and explain what those properties were used to sort and group them.
- Writing in a science learning journal that demonstrates an understanding of how an object's properties (attributes) can be used for identification and classification.

Properties of Matter

Objective #3: Learn three states of *matter* (solid, liquid and gas) and know that *solids tend to maintain their own shapes, while liquids tend to assume the shapes of their containers, and gases fill their containers fully.*

Core Activity:

Conduct the following experiments and note cause and effect relationships:

- Make ice cubes. Use property words to describe the state water is in before placing it into the freezer (liquid). Describe what kind of temperature change is needed to turn the liquid to ice.
- Take the ice cubes from the freezer. Use property words to describe the state the water is in after removal from the freezer (solid). Describe what kind of temperature change is needed to turn the ice to liquid.
- Have students predict what would happen to the ice (solid) if it was heated in a pan. Have the students predict what would happen to water (liquid) if it was heated in a pan. Conduct experiments to find out. Chart the findings. Use property words to describe each state of water.
- Have students inflate balloons. Experiment with other containers (i.e. brown lunch bags, beach balls, inner tubes, etc.). Describe how the gas changed and filled the shape of the container (See Experiment #2: More About Gas in appendix).

Supplemental Activities:

- Mudpies to Magnets: Dunking Raisins
- More Mudpies and Magnets: Water Drop Race, The Automatic Balloon Blower Upper
- Ice Cube Necklaces, Crystal Pops
- Hug a tree: Water Clocks
- Weather objectives #1 and #2 also relate to water in different forms.

Assessment:

- Given an ice cube a student can tell what would happen if it were heated or given an ice cube a student can tell what kind of temperature change would be needed to change it to a liquid.

- Journal writing in a science journal that describes water in each of three states (solid, liquid, and gas) and relates things learned in this unit with learnings from the weather unit (e.g., snow is water in the solid state and rain is water in the liquid state).
- Identify rain as water in liquid form and snow as water in solid form.
- Writing in a science journal describing how a gas can fill a container (i.e. balloon). Describe what happens to the container when the gas has a way to escape.

Properties of Matter

Objective #4: The students will observe and classify objects according to their ability to sink or float.

Core Activity:

The students define the terms sink and float, predict and observe whether objects sink or float and sort objects into sinkers or floaters.

Sample Lessons:

- DELTA: Sink or Float?
- SCIS: Clay Boats
- AIMS: Fruit Float

Supplemental Activity:

- More Mudpies to Magnets: Dance Around Water
- Have the students make boats or floaters out of aluminum foil. See which floater can carry the most cargo before sinking.
- Give out a bag of recycled materials for children to make floaters out of. See which floater can carry the most cargo before sinking. Give awards for most creative, or most stable, load carrying ability, etc.

Assessment:

- Construct an experience table of things from their investigations that floated or sank.
- Use AIMS Sink and Float graph for children to show what floated or sank.
- Have the children handle some clay balls and ask them to predict if clay will float or sink. Then have them place the clay balls in a container of water to test their predictions. Then, ask them if they can get the clay to float by changing its shape. (Those who shape the clay into boats will discover that clay can be made to float.)
- Explain in a science journal how they made the clay ball float.
- Present the students with a new set of objects (i.e., objects not previously tested) and have students first predict and then test to see which ones float and which ones do not.

GRADE ONE



EARTH SCIENCE

Weather: The Seasons

Goal

The student will be introduced to the concept that dynamic processes cause weather changes. They will also learn that these changes are cyclical in nature in New England and that they affect animal and plant behavior.

Objectives

1. Identify rain and snow as falling water.
2. Read a thermometer to measure air temperature. Measure and record daily changes in air temperature in order to see both short-term and seasonal trends.
3. Learn that weather is constantly changing by observing and recording precipitation, temperature and sun and cloud conditions.
4. Describe some of the ways seasonal weather changes affect human, animal and plant activities.
5. ***Describe the apparent movement of the sun across the sky during the seasons and the changes in the length and direction of shadows during the day. 1.1 A11***

Weather: The Seasons

Objective #1: The student will identify rain and snow as falling water.

Core Activities:

- Conduct an experiment by collecting and observing samples of rain and snow and discussing their properties. For example, colorless, wet, soft, hard, white. Help students "see" that these are different forms of water.
- Compare tap water with collected rainwater. Compare tap water with melted snow water.

Supplemental Activities:

- Let the children use the rainwater or melted snow for painting. Discuss how it is the same or different from tap water.
- Put soap into the rainwater or melted snow. Do the same for tap water and compare the similarities and/or differences.
- Pose the question, does rainwater, snow water and tap water act the same when put into a freezer? Conduct an experiment to find out.

Assessment:

- Show photos of different forms of water and ask the student to identify the state of water represented in each photo.
- Have the students write in their science learning journals some descriptions of water in various forms and their thoughts about the importance of water to living things.

Weather: The Seasons

Objective #2: Read a thermometer to measure air temperature. Measure and record daily changes in air temperature in order to see both short-term and seasonal trends.

Core Activities:

- Introduce the concept by asking the children how they know air is all around them. Guide the discussion so that it includes the idea that you can feel the air around you by noting how warm or cold you feel. Ask the children to explain what they think they know about temperature. (how hot or cold something is)
- Explain that people can measure the air temperature using a special instrument called a thermometer. Hand out small thermometers for each student and ask him or her to look at it. Ask the student to explain what they see on the thermometer (numbers, a red line, black lines, etc.)

If you do this activity when the air temperature is dramatically different outside, you can measure the air temperature inside the building and then have them predict what will happen when they take the thermometer outside. It is a great way to show how the thermometer works. (The colder the air, the lower the red line is on the thermometer and reverse for warmer air) If you have been outside in the cold with the thermometers, put them near a heater when you come in to watch the temperature rise (or have the children watch while you place your thumb on the bulb of a large thermometer).

- Read and record daily air temperature during the different seasons. Compare temperatures throughout the year.

Supplemental Activities:

- Mudpies to Magnets: Thermometer Play
- More Mudpies to Magnets: Hot and Cold

Assessments:

- CRT Math Section
- Place a thermometer in a variety of places inside and outside the classroom, such as a freezer, a tub of warm water, near a heater, in the sun, in a cool shady place. Have the student read and record each temperature.
- Given a worksheet, the student can either shade in a thermometer to show a written temperature or can read a thermometer and write the correct temperature.

Weather: The Seasons

Objective #3: The student will learn that weather is constantly changing by observing and recording precipitation, temperature, sun and cloud conditions.

Core Activities:

- Set up a "weather station" in the classroom.
- Have the students observe the weather at some point during the day. (You may want to have an A.M. chart and a P.M. chart to compare how the weather changes in just one day!)
- Have the students construct a graph of observable weather conditions.

Supplemental Activities:

- Ranger Rick's Wild About Weather: The Weather Watchers.
- Scholastic Early Themes: Weather

Assessment:

- Using weather data collected on a graph the student will read the graph to tell about the weather conditions for a period of time.
- Using weather data collected on a calendar, the student will construct a graph to show the weather conditions for a period of time.

Weather: The Seasons

Objective #4: Describe some of the ways the seasonal changes affect human, animal and plant behavior.

Core Activities:

- The students will note changes in the environment during Summer, Fall, Winter and Spring by:
 - a observing and recording when a tree drops leaves, produces buds, and grows new leaves. (This is a part of the plant unit as well)
 - b observing and recording bird/squirrel or other animal behavior during two different seasons.
 - c observing what people wear and do during each season to respond to the weather changes.

Supplemental Activities:

- Mudpies to Magnets: Whether or Not I Should Wear It

Resources:

- Mudpies to Magnets
- Nature for Young Children (lots of seasonal activities that focus on these three different areas)

Assessment:

- The student will write and draw a picture about a favorite season that will include descriptors of the season and explanation of why it is a favorite season.
- Sequence a series of pictures depicting seasonal changes.
- Construct a picture book of the seasons.
- Write a riddle about a season. (For example, I am a tree. My leaves are falling. What season is it?)

Weather: The Seasons

Objective #5: *Describe the apparent movement of the sun across the sky during the seasons and the changes in the length and direction of shadows during the day.*

Core Activities:

- *Begin the unit with a class discussion on what they know about shadows and how the sun effects shadows. List ideas and save.*
- *The students will then note changes in the sky and shadows during the summer, fall, winter, and spring by:*
 - *Observing and recording the sun's position in the sky during various times of the day.*
 - *Observing shadows throughout various times during a day.*

Supplemental Activities:

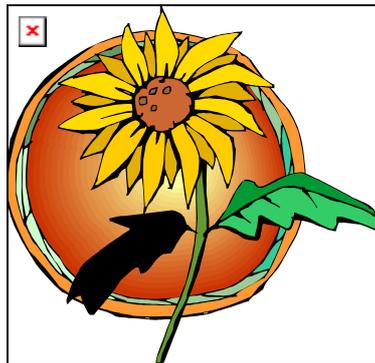
- *Shadow Clock activity*

Resources:

Assessment:

- *Students will review shadow observation sheets from all of the seasons.*
- *Students will complete a sequencing organizer of his/her shadow throughout the day (organizer provided with activity sheets).*
- *Students will write in a science journal about how the sun's position changes in the sky throughout the seasons.*

GRADE ONE



LIFE SCIENCE

Plants: Growing Seeds

Goal

The students will understand that plants grow from seeds and undergo changes through the seasons. **2.2 A19**

Objectives

1. Identify and name some important parts of a seed (seed coat, embryo, food supply).
2. Identify root, stem, leaf, and flower as important parts of a flowering plant.
3. Name some important requirements for plant growth (sun, water, air, and soil).
1.2 A13
4. Show that plants have differences in leaf shape, size and texture.
5. Identify the seasonal changes a tree undergoes in New England.

Plants: Growing Seeds

Objective #1: Identify and name some important parts of a seed (seed coat, embryo, food supply).

Core Activities:

- Conduct an experiment where students examine an unsoaked lima bean seed and list its properties on chart paper.
- Ask students to predict what will happen to the seed when soaked overnight in water. Ask the children what changes might take place. Ask what they might be able to see about the seed.
- Soak the beans in water overnight. Have students examine the beans the next day. Discuss the changes they see and chart them next to the observations on the unsoaked lima beans. Present early on that the seeds have different parts. Ask the students if they can identify what those parts might be. See if they can come up with definitions as to what the parts might be. Introduce names for the parts. .
- Resource: "Inside a Seed" : AIMS Primarily Plants:

Supplemental Activity:

- Use other beans or seeds and repeat the same experiment. Ask, do all seeds look alike when split open? Can you always find the embryo easily? Does the food supply always look the same? (**CAUTION:** Peanuts are a good seed to use to find seed parts, but you need to be careful around children who might have allergies to this seed).
- Resource: "Observing Bulbs" : AIMS Primarily Plants:

Assessment:

- When presented with a soaked seed, the student will identify and name the seed coat, embryo and food supply.
- Student will correctly label a diagram of a seed.
- Using flannel board pieces the student will correctly identify the seed coat, embryo and food supply.
- Student will describe what was learned in a science journal and answer the question, "Do all seeds look the same when split open?"

Plants: Growing Seeds

Objective #2: Identify root, stem, leaf and flower as important parts of a flowering plant.

Core Activity:

- Have the students select a young flowering plant and tape or glue it to a piece of construction paper. Then have them locate and label the root, stem, leaf, and flower. A good plant to use for this experiment is the marigold. You can have your students grow them from seed or you can purchase the already grown plant from a local nursery. In any case, the most fascinating part of this experiment is to ask the students where they might find the seeds to the plant. Locating the seeds takes careful dissection and observation. If your students have grown the plants from seed, they will already know the shape and size of the seed they are looking for. If not, the surprise is a joyful part of the process. You can have your students then take the seeds home for planting or plant them in the classroom to see if they will grow.

Supplemental Activities:

- Put the “Build a Plant” game in the science center.
- “Stem Study”: AIMS Primarily Plants
- “Root Study”: AIMS Primarily Plants
- “Flowers”: AIMS Primarily Plants
- “Marigolds”: Look At Seeds in More Mudpies to Magnets Science for Young Children

Assessment:

- Presented with a different flowering plant, the student can identify the root, stem, leaf and flower.
- The student can complete a test diagram by cutting out and gluing the parts of a flowering plant to their proper place and labeling the parts correctly.

Plants: Growing Seeds

Objective: #3: Name some important requirements for plant growth (sun, water, air, and soil).

Core Activity:

- Use any or all of the following activities taken from AIMS Primarily Plants:
“A Seed Grows” - students grow a bean seed and watch how a plant begins.
“A Plant Begins” - students keep a log of their plant's growth over time.
“Make a Terrarium”.
“It's in the Bag” - students plant seeds in a plastic bag and observe and measure the growth of roots, stems and leaves.
- The main activity should be that the students plant a seed or seeds in soil and place them in a sunny place to grow and be responsible for watering them regularly. The Second grade conducts experiments that show the impact of missing variables on the growing plant, so you do not have to emphasize that now.

Supplemental Activities:

- Use the booklet, “What do Plants Need?” in AIMS Primarily Plants for a culminating activity or to help explain plant needs. Year round plant care is another way for children to "see" what plants need for growth. Have green plants in the classroom and let the children be responsible for their daily care. Re-potting plants shows children that plants, like people, need more food and space as they grow.
- How Does Your Dandelion Grow in Hug A Tree Seedbed in a Bag in Hug A Tree

Assessment:

- Students use plant journals to describe, record, and track plant growth.
- Explain in a learning science journal what plants need for growth and how they learned that plants needed such things as sunlight and water in order to grow and thrive.

Plants: Growing Seeds

Objective: #4: Show that plants have differences in leaf shape, size and texture.

Core Activity:

- Have the students gather or collect leaves to sort and compare. (Don't let the leaves dry out. Use a press to preserve them.)
- Conduct the following lessons from AIMS Primarily Plants:
Observe a Leaf
Leaf Safari
- The main activity should be to show students that leaves have distinct shapes. And that leaves come in a variety of sizes and textures.

Supplemental Activities:

- The Texture Collector in Hug a Tree (use leaves only Leaf Catchers in Mudples to Magnets Leaf Hunt Relay In Mudpies to Magnets ')

Assessment:

- Presented with a set of leaf pictures or drawings the student can match the correct leaf from a collection of leaves and explain the properties or features used to make the match.
- Have the student collect and mount at least five different leaves and then describe some similarities and differences for the five leaves.

• Plants: Growing Seeds

Objective # 5: Identify the seasonal changes a tree undergoes in New England.

Core Activity:

- Students observe and record changes in a tree throughout the year.
- Pick a tree close to the school or have the children adopt a tree. You may even have the children learn about the specific kind of tree they are observing. For example, a maple tree or a crabapple tree. In each season discuss the properties of the tree and the condition of the tree at that time (full green leaves or leaves at the top changing to yellow or the branches are bare now) Make sure to connect the seasonal weather changes to what is happening to the tree. For example, many trees need drop their leaves in the fall and remains bare during the winter.
- Read THE SEASONS OF ARNOLD'S APPLE TREE and do sequence activities based on the apple tree.

Supplemental Activities:

- Use the National Geographic tape and book, Apple Tree to help explain the seasonal changes taking place for trees in New England.
- Observe the seasonal changes to other outdoor plants around the children. Grass is a good one. Shrubs and small bushes another.
- Compare trees. Do all trees drop their leaves in winter?

Assessment:

- Sequence a series of pictures of trees in different seasons.
- The student can draw a picture of a tree in each of the seasons.

Living Things in Our World

Goal

The student will learn that living things have certain characteristics that distinguish them from nonliving things, including growth, movement, and offspring. K.2 A4 A5 A6

Objectives

- 1. Students will describe characteristics that distinguish **living from nonliving things**. K.2 A6***
- 2. Students will describe the similarities and differences in the appearance and behaviors of plants, birds, fish, insects, reptiles, amphibians, and mammals (including humans). K.2 A4***
- 3. Students will describe the similarities and differences in the appearance and behaviors of adults and their offspring. K.2 A5***
- 4. Students will identify the basic needs of **animals** as food, air, water, and shelter (building homes, food storage, raising young). 1.2 A12***

Living Things in Our World

- **Objective #1:** *Students will describe characteristics that distinguish **living** from **nonliving** things.*

Core Activities:

- *The students explore the characteristics of living and non-living things by making a chart and collage. (See All About Animals activities “Living and Non-Living Collages”)*
- *The students will explore the characteristics of living and non-living things in their outdoor environment (See Looking Outside worksheet in appendix).*

Supplemental Activities:

- *Act. #1 Seed vs. rock: Living Things vs. Non-Living Things*
- *Act. #2 Home activity: Collections*

Assessment:

Embedded in collage activity.

Living Things in Our World

Objective #2: ***Students will describe the similarities and differences in the appearance and behaviors of plants, birds, fish, insects, reptiles, amphibians, and mammals (including humans).***

Core Activity:

- ***Students brainstorm all types of animals they know and sort animals according to different characteristics. Describe similarities and differences.***
- ***Using toy animals sort animals according to different characteristics. Describe similarities and differences.***

Supplemental Activities:

- ***Animal sorting cards (see appendix).***

Assessment:

The student will describe differences in behaviors of living things in their science journal.

The student will use words and drawings to show how a group of animals and/or plants is similar/different. A Venn Diagram may be used.

Living Things in Our World

Objective #3: ***Students will describe the similarities and differences in the appearance and behaviors of adults and their offspring.***

Core Activities:

- ***Who Is My Mother? matching activity.***
- ***Animal Life Begins***
- ***Forest Babies***

(worksheets found in appendix)

Supplemental Activity:

- ***Visiting a zoo.***
- ***Inviting animal programs into classrooms (i.e. Science Center, Goodwin conservation, etc.).***

Assessment:

- ***The students will write of their own experiences with animals and their offspring in a science journal.***

Living Things in Our World

Objective #4: *Students will identify the basic needs of animals as food, air, water, and shelter (building homes, food storage, raising young).*

Core Activities:

- *The students should have opportunities to observe animals first hand. You may decide on another class pet. The following are places where ant farms, ladybugs or other kinds of live insects can be purchased. Ant farms are particularly easy to set up and easy to care for.*

1. *Insect Lore Products; PO Box 1535; Shater, CA 93263; 1-805-746-6047*
2. *Delta Education, Inc.; PO Box M; Nashua, NH 03061; 1-800-258-1302*
3. *Carolina Biological Supply Co.; 2700 York Road Burlington, NC 27215-3398; 1-800-3345551*

- *Students research an animal and write a riddle. Attach paper to an envelope and put picture inside. Share riddles with class.*

Supplemental Activities:

- *Eric Cane's books "The Grouchy Ladybug" and "The Very Hungry Caterpillar" are two stories that could be jumping off points for discussion on the needs of insects.*
- *Observe the activity in an ant farm, fish tank, terrarium, etc.*
- *Nature walks where children are likely to find animals in their natural environment. Bugs under fallen logs or beneath tree bark on a fallen log are two examples.*
- *"Learning About Animals" – Animal Homes, Who Lives Here?, Pet Homes, Desert Animal Homes*

Assessment:

- *Animal Reports (see worksheets in appendix)*
- *The students will act out an animal as it gathers food. The students will build a three-dimensional model of an animal's shelter.*
- *The student will name three places he/she can find an animal in its natural environment.*
- *Writing in a science journal the student will explain what an animal needs to live.*
- *The student will draw and label a diagram of an animal's habitat.*

Resources:

Bugs to Bunnies Hands on Animal Science for Young Children by Goin, K., Ripp, E., Solomon, K Chatterbox Press NY 1989.

Animal Homes and Societies by Billy Goodman Little, Brown and Co., 1991

Learning About Animals by Moore, JoEllen – Evans, Joy. Evan-Moor, 1987

GRADE TWO



PHYSICAL SCIENCE

Simple Machines

Goal

The students will become familiar with various simple machines and understand their operation and purpose.

Objectives

1. The students will identify an example of the following simple machines: *inclined plane, lever, pulley, screw, wedge, and wheel and axle.*
2. The students will state the following:
Force is a “push” or “pull,”
Motion is the movement an object demonstrates,
Friction is a mysterious force that slows down moving objects or keeps stationary objects from moving,
Work is done when a force moves an object through a distance.
3. The students will **observe an object in motion and discover that force (push or pull) can alter the movement of the object**; students will describe some of the variables (**friction, mass**) that **modify the movement of an object** (e.g. lubrication, rough surfaces). **4.1 B9 A10**
4. The students will provide examples of how simple machines can make life easier (e.g. moving a heavy object).
5. The students will be able to identify the simple machines within a compound machine when shown a picture or example of a compound machine. (optional)

Simple Machines

Objective #1: The students will identify an example of the following simple machines: *inclined plane, lever, pulley, screw, wedge, and wheel and axle.*

Core Activities:

- Given a variety of simple machines, students should be provided with ample time to free explore and manipulate these machines. Once this has been accomplished, students should be taken through the following directed activities:
- Sample lessons: The following lessons are taken from:
Step-by-Step Science Series, Grades K-3, "Simple Machines," Carson-Dellosa Publishing Company, Inc. (See attachment)
 - a The Inclined Plane: p. 23-24
 - b The Wedge: p. 28-29
 - c The Screw: p. 31-32
 - d The Lever: p. 35-36
 - e There Is a Trick to Levers: p. 37-38
 - f The Wheel and Axle: p. 42-43
 - g The Pulley: p. 46-47

Supplemental Activities:

- Sample lessons: The following lessons are taken from:
Step-by-Step Science Series, Grades K-3, "Simple Machines," Carson-Dellosa Publishing Company, Inc. (See attachment)
 - Inclined Planes Are Everywhere: p. 25
 - Learning More about Inclined Planes: p. 26-27
 - Which Is a Wedge? p. 30
 - Experiment with Screws: p. 33
 - Experiment with More Screws: p. 34
 - You Must Pay the Piper (Levers): p. 39
 - Using Levers: p. 40-41
 - Some Surprising Wheels and Axles: p. 44-45
 - Using a Movable Pulley: p. 48

Assessment:

- Have students keep a Learning Journal describing what was learned about each simple machine, including the definition or description of the simple machine and how the machine functions.

Simple Machines

Objective #1: The students will identify an example of the following simple machines: *inclined plane, lever, pulley, screw, wedge, and wheel and axle.*

Assessment (con't):

- Given an assortment of simple machines, students will be able to correctly identify each machine.

Simple Machines

Objective #2: The students will state the following:

- **Force** is a “push” or “pull,”
- **Motion** is the movement an object demonstrates,
- **Friction** is a mysterious force that slows down moving objects or keeps stationary objects from moving,
- **Work** is done when a force moves an object through a distance.

Core Activities:

- The following activities are designed to teach students about *force*, *friction*, and *work*.
- Sample lessons: The following lessons are taken from:
Step-by-Step Science Series, Grades K-3, “Simple Machines,” Carson-Dellosa Publishing Company, Inc. (See Attachment)
 - What Is Force? p. 6-7
 - Pushing or Pulling: p. 8
 - What Is Friction? p. 9-10
 - What Is Work? p. 16-17

Supplemental Activities:

- Sample lessons: The following lessons are taken from:
Step-by-Step Science Series, Grades K-3, “Simple Machines,” Carson-Dellosa Publishing Company, Inc. (See attachment)
 - Friction between Different Surfaces: p. 11-12
 - Make a Parachute: p. 15
 - To Work or Not to Work: p. 18
 - How Would You Go up the Mountain? p. 19

Assessment:

- Have students keep a Learning Journal in which they define the terms *force*, *friction*, and *work*.
- Have students provide everyday examples of *force*, *friction*, and *work* in action by creating a poster presentation, a diorama, or working models.

Simple Machines

Objective #3: The students will *observe an object in motion and discover that force (push or pull) can alter the movement of the object*; students will describe some of the variables (*friction, mass*) that *modify the movement of an object* (e.g. lubrication, rough surfaces, *size*).

Core Activities:

- This activity may be conducted following the *friction* activities for Objective #2.
- Sample lesson: The following lesson is taken from:

Step-by-Step Science Series, Grades K-3, "Simple Machines," Carson-Dellosa Publishing Company, Inc. (See attachment)

Reducing Friction: p. 13-14.

Sample Friction lesson: Put an object on an inclined plane and attach a rope to the object. Bring the rope over the top of the incline, attach a can or pail to it, and gradually add weights to the can. How much weight does it take to move the object? Change the surface by covering it with waxed paper, foil, or sandpaper and compare the amount of weight needed. Change the surface again by using lubricants. The experiment can also be conducted using a spring scale instead of weights to measure the amount of force needed to move the objects along the different surfaces.

Sample Mass lesson: Following a similar procedure to the previous lesson, use objects of varying mass to lead students to the conclusion that more force or energy is to move objects of greater mass.

Sample Motion and Mass lesson: Demonstrate how the motion of an object can change when force (push or pull) is applied to the object. Then ask students to predict what would happen when two rolling balls of varying mass (e.g. basketball and tennis ball) collide with each other. Lead students to determine the effect that the mass of an object can have on its motion.

Supplemental Activities:

- Sample lesson: The following lesson is taken from:

Step-by-Step Science Series, Grades K-3, "Simple Machines," Carson-Dellosa Publishing Company, Inc. (See attachment)

Friction between Different Surfaces: p. 11-12

- Sample lesson: Have races using toy cars and a small inclined plane track. How can cars be made to go faster? How can the surface be prepared to increase the speed of the cars?
- Sample lesson: Have tug-of-war contests. Have each group stand on a different surface (grass vs. pavement, carpet vs. smooth floor) to see if it gives an advantage to one team. Can you explain the results?

Assessment:

- Have students keep a Learning Journal in which they describe how friction can be reduced.
- Have students design and construct experiments in which they demonstrate how an object can be moved more easily after the friction is reduced.

Simple Machines

Objective #4: The students will provide examples of how simple machines can make life easier (e.g. moving a heavy object).

Core Activities:

- This objective can provide students with many opportunities to demonstrate how simple machines can make life easier.

- Sample lesson: The following lesson is taken from:

Step-by-Step Science Series, Grades K-3, "Simple Machines," Carson-Dellosa Publishing Company, Inc. (See attachment)
How Do Machines Help Us Work? p. 2-3

Supplemental Activities:

- Drive a nail into a piece of wood (wedge, lever).
- Lift a heavy box using a lever and fulcrum.
- Slide a heavy box up a ramp (inclined plane).
- Demonstrate how much easier it is to screw a wood screw into a piece of wood rather than try to push it into a piece of wood (inclined plane).
- Push two heavy objects apart with a wedge.
- Saw a piece of wood (wedge).
- Put a heavy box on a skateboard to move it across the room (wheel and axle).
- Construct a simple pulley to lift an object.

Assessment:

- Have students describe examples in their Learning Journals of everyday machines that make their lives easier.
- Have students construct a bulletin board of everyday machines that make life easier.

Simple Machines

Objective #5: The students will be able to identify the simple machines within a compound machine when shown a picture or example of a compound machine. (optional)

Core Activities:

- Provide students with pictures of various compound machines, or provide the actual machines. Have students locate simple machines within the compound machines. (assessment embedded)

Supplemental Activities:

- Provide students with tools and building materials. Have them construct a device that contains various simple machines.

Assessment:

- Identification of simple machines is embedded within the core activity.
- Have students identify the simple machines created within their compound machines and how these simple machines help to make the devices function.

Simple Machines

Resources

Primary Resource:

- Step-by-Step Science Series, Grades K-3, "Simple Machines," Carson-Dellosa Publishing Company, Inc.

Supplementary Resources:

- "Big Buildings" from United American Video, 1991 United American Video, P.O. Box 7647, Charlotte, NC 28241
- Physical Science Activities for Grades 2-8, Marvin N. Tolman & James O. Morton, Science Curriculum Activities Library, Parker Publishing Company, Inc.
- Science Through Children's Literature: An Integrated Approach, Carol M. Butzow & John W. Butzow
- Simple Machines Projects for Students, School House Global Enterprises, P.O. Box 441028, Fort Washington, MD, 20749

GRADE TWO



EARTH SCIENCE

Weather: Studying and Measuring

Goal

The students will be introduced to the concept that dynamic processes cause weather changes, which affect their everyday lives.

Objectives

1. The students will learn that weather is constantly changing by observing, describing and recording daily weather conditions.
2. The students will be able to read a simple weather map and recognize some basic weather symbols used (sun, clouds, partly cloudy, rain, snow, wind).
3. The students will describe or sketch the water cycle, using the terms *precipitation*, *condensation*, and *evaporation*. **3.1 B2 4.3 B12**
4. The students will identify the basic cloud types (cumulus, cirrus, stratus) and relate them to weather.
5. The students will recognize some common weather instruments (e.g. barometer, thermometer, wind vane, rain gauge, etc.), state what they measure, and use them to collect data. **1.4 A17**

Weather: Studying and Measuring

Objective #1: The students will learn that weather is constantly changing by observing, describing and recording daily weather conditions.

Core Activities:

- Introduce the study of weather by reading aloud “The Weather Master” (taken from Ranger Rick’s NatureScope: Wild About Weather, page 7-8). Discuss the story and record the roles of the weather makers on chart paper.
- Other activities to introduce the weather unit can be found in “Strategies to Raise Curiosity” on pages 16 – 19 of Weather Watch: Using Nonfiction to Promote Literacy Across the Curriculum. These activities also can be used to meet Objective #5.
- Have students brainstorm weather-related words and record on chart paper.
- Have students construct simple classroom weather charts for daily weather observations and recordings.

Supplemental Activities:

- Have students keep a weather chart for a week as a homework assignment. Help students to construct the chart and develop a weather key using common weather symbols (see Objective #2).
(Note: When students include wind direction and cloud type, it indicates knowledge of the factors that are reliable weather predictors...embedded assessment.)
- Construct bar graphs of the weather for each month. Compare the graphs from month to month. Compile the graphs into a weather graph of the school year.
- Read the weather section of the daily newspaper to learn about today’s prediction and to verify the accuracy of yesterday’s prediction.
- Have students construct a weather watcher “Make a Simple Weather Watcher” (taken from Ranger Rick’s NatureScope: Wild About Weather, page 38).
- Have students construct a weather wheel “Make a Weather Wheel” (taken from Ranger Rick’s NatureScope: Wild About Weather, page 29).
- To use the study of weather to extend students’ math skills, see “Make Way for Math” on pages 56 – 57 of Weather Watch: Using Nonfiction to Promote Literacy Across the Curriculum.
- To use the study of weather to extend students’ writing skills, see “Writing Arena” on pages 58 – 61 of Weather Watch: Using Nonfiction to Promote Literacy Across the Curriculum.
- For interdisciplinary activities related to weather observation, first read The Storm Book by Charlotte Zolotow. Then see “The Storm Book” on pages 31 – 36 of Clouds, Rain, Wind, and Snow (see attachment). Page 36 also addresses weather maps and symbols for Objective #2.

Weather: Studying and Measuring

Objective #1: The students will learn that weather is constantly changing by observing, describing, and recording daily weather conditions.

Assessment:

- Have students keep a Learning Journal in which they record and describe the day to day weather conditions.
- Construction of weather charts by the students provides opportunities for embedded assessment.

Weather: Studying and Measuring

Objective #2: The students will be able to read a simple weather map and recognize some basic weather symbols used (sun, clouds, partly cloudy, rain, snow, wind).

Core Activities:

- Introduce students to basic weather symbols using “Say It with Symbols” (taken from Ranger Rick’s NatureScope: Wild About Weather, pages 39 and 45).

OR

- Use page 45 of Weather: Primary Whole Language Theme Units (see attachment).
- Have students use the weather map from the weather section of the daily newspaper to report today’s weather. To have then record their report, see page 41 of Weather: Primary Whole Language Theme Units (see attachment). This can be done as a homework assignment.

Supplemental Activities:

- Videotape the local television weather forecast. Watch the video with the students and have them explain the weather symbols used by the forecaster.
- Distribute copies of a map of Connecticut. Have students design weather symbols and place them on the map to portray today’s weather.
- Read and discuss Cloudy with a Chance of Meatballs by Judi Barrett. Have students construct a weather map and weather report of their favorite foods. See “Cloudy with a Chance of Meatballs” on pages 61 – 62 of Clouds, Rain, Wind, and Snow (see attachment).

Assessment:

- Using the weather map from the weather section of the daily newspaper, have each student interpret the weather symbols and describe the day’s weather.

Weather: Studying and Measuring

Objective #3: The students will describe or sketch the water cycle, using the terms *precipitation, condensation, and evaporation*.

Core Activities:

- This objective lends itself to several opportunities for using literature to learn about the water cycle. Several resources to consider are:

The Magic Schoolbus at the Waterworks by Joanna Cole

What Makes It Rain: The Story of a Raindrop by Keith Brandt

Follow a Raindrop by Elsie Ward

In addition, there are a number of quality activities in chapter 21 of Science Through Children's Literature: An Integrated Approach, Carol M. Butzow & John W. Butzow that are based upon The Magic Schoolbus at the Waterworks (see attachment).

- Construct a classroom mural, which portrays the water cycle. See the mural in The Magic Schoolbus at the Waterworks by Joanna Cole as a guide.

OR

- Create a bulletin board of the water cycle. See page 19 of Weather: Primary Whole Language Theme Units (see attachment).

- Demonstrate the water cycle by setting up the following experiment:

Place a hot plate inside an empty aquarium. Fill a heat proof bowl with water and place on the hot plate. Turn on the hot plate.

Cover the aquarium. Place frozen ice packs on top of the cover.

Have students observe what happens as the water is heated. It evaporates, condenses into steam, and precipitates as it comes into contact with the cold cover.

Supplemental Activities:

- Demonstrate evaporation by swiping a wet sponge across the chalkboard. Have students observe as the water marks disappear. Have them explain what is happening.
- Demonstrate condensation by placing several ice cubes in a glass. Have students observe as water droplets form on the outside surface of the glass. Have them explain what is happening.
- Writing Activity: Read aloud "The Adventures of Drip Drop" on page 8 of Weather: Primary Whole Language Theme Units (see attachment). Have students pretend that they are raindrops. Have each student write about an adventure he/she experiences as he/she journeys through the stage of the water cycle. Have students use the terms *precipitation, condensation, and evaporation* in their stories.

- To compare evaporation in the sun and shade, and to practice using a thermometer, see “Evaporation in the Sun and Shade” on pages 28 – 29 of Weather Watch: Using Nonfiction to Promote Literacy Across the Curriculum. This activity also relates to Objective #5.

Assessment:

- Have students define *precipitation*, *condensation*, and *evaporation* in their Learning Journals.
- Have students describe in their Learning Journals what happened in the aquarium water cycle experiment.
- Have students complete the worksheet “The Water Cycle” on page 60 of Clouds, Rain, Wind, and Snow (see attachment).

Weather: Studying and Measuring

Objective #4: The students will identify the basic cloud types (cumulus, cirrus, stratus) and relate them to weather.

Core Activities:

- Read and discuss The Cloud Book by Tomie dePaola with the students. For interdisciplinary activities related to clouds, see “The Cloud Book” on pages 41 - 44 of Clouds, Rain, Wind, and Snow (see attachment).
- Sample lesson: “Observing Clouds” from Weather Instruments, Teacher’s Guide, A Delta Science Module, pages 18 - 19 and Worksheets 7 - 8.

Supplemental Activities:

- Learn more about clouds using the Internet. Go to: www.proteacher.com
- This teacher resource provides a number of student lessons and suggested activities in a variety of disciplines, including weather and clouds.
- Construct a cloud book “A Fold-Out Cloud Book” (taken from Ranger Rick’s NatureScope: Wild About Weather, page 29).
- For additional activities related to clouds, see “Clouds” on pages 34 - 37 of Weather Watch: Using Nonfiction to Promote Literacy Across the Curriculum.
- For an art activity on clouds, see pages 62 - 63 of Weather Watch: Using Nonfiction to Promote Literacy Across the Curriculum.

Assessment:

- Have students define the clouds in their Learning Journals. Include the type of weather associated with the particular cloud.
- Have students draw a picture for each cloud type (see attachment).
- Have students go outdoors and identify the clouds they see and relate their findings to the weather.

Weather: Studying and Measuring

Objective #5: The students will recognize some common weather instruments (e.g. barometer, thermometer, wind vane, rain gauge, etc.), state what they measure, and use them to collect data.

Core Activities:

- Have students build a classroom weather station using commercially purchased weather instruments or instruments they make for themselves. Have students use the instruments to record the weather over an extended period of time. (embedded assessment)
- The following resources provide detailed instructions for building various weather instruments:

Earth Science Activities for Grades 2-8, by Marvin N. Tolman and James O. Morton
Education Goes Outdoors, by Johns, Fiske, and Evans, Addison-Wesley (see attachment)

Simple Weather Experiments with Everyday Materials by Muriel Mandell (see attachment)

Weather Instruments, Teacher's Guide, A Delta Science Module

- Conduct a lesson on how to use and read a thermometer in both Fahrenheit and Celsius. Then have students practice measuring the temperature in various places or situations. Have them record their results. See page 34 of Weather: Primary Whole Language Theme Units (see attachment).

Supplemental Activities:

- Discuss with the students the role that animals have played in weather folklore. See "Feathered and Furry Forecasters" (taken from Ranger Rick's NatureScope: Wild About Weather, pages 38 and 44).
- Have students identify errors in faulty forecasts. See "Fishy Forecasts" (taken from Ranger Rick's NatureScope: Wild About Weather, pages 40 and 46).
- To find out how the sun affects temperature and evaporation, see "The Sun" on pages 26 - 27 of Weather Watch: Using Nonfiction to Promote Literacy Across the Curriculum.
- To observe wind changes in a variety of way, see "Wind" on pages 30 - 33 of Weather Watch: Using Nonfiction to Promote Literacy Across the Curriculum.
- Create a temperature line graph from page 28 of Weather: Primary Whole Language Theme Units (see attachment). Use a colored marker to predict temperatures. Use a different colored marker to record actual temperatures. Compare.

Weather: Studying and Measuring

Objective #5: The students will recognize some common weather instruments (e.g. barometer, thermometer, wind vane, rain gauge, etc.), state what they measure, and use them to collect data.

Assessment:

- Have students define the following weather instruments and their functions in their Learning Journals: *thermometer*, *barometer*, *weather (or wind) vane*, and *anemometer*.
- Have students construct a working weather station using recycled materials (e.g. pinwheel, rain gauge). Have students gather and record data and share it with other classes.

Weather: Studying and Measuring

Resources

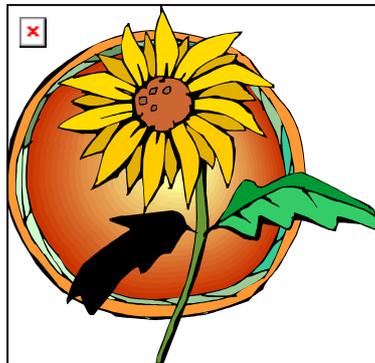
Primary Resources:

- Earth Science Activities for Grades 2-8, by Marvin N. Tolman and James O. Morton
- Ranger Rick's NatureScope: Wild About Weather
- Simple Weather Experiments with Everyday Materials by Muriel Mandell
- The Cloud Book by Tomie dePaola
- The Magic Schoolbus at the Waterworks by Joanna Cole
- Weather Instruments, Teacher's Guide, A Delta Science Module
- Weather: Primary Whole Language Theme Units, Instructional Fair, Inc.
- Weather Watch: Using Nonfiction to Promote Literacy Across the Curriculum, by Doris Roettger, Fearon Teacher Aids, Simon and Schuster Supplementary Education Group

Supplementary Resources:

- Clouds, Rain, Wind, and Snow, by Marti Abbott and Betty Jane Polk, Fearon Teacher Aids, Simon and Schuster Supplementary Education Group
- Cloudy with a Chance of Meatballs by Judi Barrett
- Education Goes Outdoors, by Johns, Fiske, and Evans, Addison-Wesley
- Follow a Raindrop by Elsie Ward
- Science Through Children's Literature: An Integrated Approach, Carol M. Butzow & John W. Butzow
- The Storm Book by Charlotte Zolotov
- What Makes It Rain: The Story of a Raindrop by Keith Brandt

GRADE TWO



LIFE SCIENCE

Experimenting with Plants

Goal

The students will understand some of the important variables that affect plant growth and development.

Objectives

1. The students will know the effects that particular variables can have on plant growth and development (i.e. air, light, water, and temperature). **2.2 A20**
2. The students will use science inquiry skills (e.g. measuring, observing, hypothesizing, experimenting, and communicating) to investigate the effect a selected variable has on plant growth and development. **1.4 A17**

Experimenting with Plants

Objective #1: The students will know the effects that particular variables can have on plant growth and development (i.e. air, light, water, and temperature).

Note: Objective #2 may be accomplished simultaneously if students accomplish any one of the experiments below.

Core Activities:

- The following experiments are taken from Science Matters by Weekly Reader Instructional Materials:
- Conduct an experiment to show that plants need to breathe air. Start with two identical healthy plants. Coat the undersides of the leaves of one of the plants with petroleum jelly. Water both plants as needed. Predict, observe, and record what happens over the course of a week. See page 6 of “Be a Plant Scientist” (See attachment).
- Conduct an experiment to show what happens to plants when they do not get enough water. Start with two identical healthy plants. Water one plant and not the other. Predict, observe, and record what happens over the course of a week. See page 7 of “Hold Back on Water” (See attachment).
- Conduct an experiment to show what happens to plants without enough light. Start with two identical healthy plants. Place one plant in a sunny location and the other in a dark location. Water both plants as needed. Predict, observe, and record what happens over the course of a week. See page 7 of “Lights Out” (See attachment).
- The following experiments are taken from Primarily Plants: AIMS Activities for Grades K-3 by AIMS Education Foundation:
 - Conduct an experiment to determine which soils provide the best medium for plant growth. See “Which Soil Works Best?” pages 43 – 44 (See attachment). Modify experiment to include soil enriched with compost or other fertilizing agent. Predict, observe, and record what happens over the course of a week.
 - Conduct an experiment to determine how temperature affects plant growth. See “Which What Temperature Is Best?” pages 53 – 54 (See attachment). Predict, observe, and record what happens over the course of a week.

Supplemental Activities:

The following alternative experiment is taken from Primarily Plants: AIMS Activities for Grades K-3 by AIMS Education Foundation:

- Conduct this combination experiment to demonstrate four plant needs: soil, water, light, and air. See “What Do Plants Need to Grow?” pages 50 – 52.

Experimenting with Plants

Objective #1: The students will know the effects that particular variables can have on plant growth and development (i.e. air, light, water, and temperature).

Assessment:

Have students keep a Learning Journal describing the experiments that were conducted, the observations and data that were collected, and what the student learned about important variables that influence plant growth.

Experimenting with Plants

Objective #2: The students will use science inquiry skills (e.g. measuring, observing, hypothesizing, experimenting, and communicating) to investigate the effect a selected variable has on plant growth and development.

Core Activities:

- Conduct a mini-science fair on plant experimentation. Have each student choose one of the components that plants need for growth or survival. Have the student use science process skills to demonstrate the necessity of that component.

Supplemental Activities:

- Have students brainstorm ideas about other factors that may or may not affect plant growth [e.g. music (rock/classical, loud/soft), colored light vs. regular sunlight, water vs. cola, crowded vs. spaced seedlings]. Then, have them test their ideas by designing experiments that investigate variables identified during the brain storming sessions.

Assessment:

- The experiments conducted by the students are embedded assessments.
- Each student will prepare a poster summarizing the results of his/her experiment.

Experimenting with Plants

Resources

Primary Resources:

- Primarily Plants: AIMS Activities for Grades K-3 by AIMS Education Foundation
- Science Matters by Weekly Reader Instructional Materials

Animals: Life Cycles

Goal

The students will understand that animals and plants have life cycles with distinct stages. **1.3 A15 A16**

Objectives

1. The students will sequence and describe the life cycle of a plant, insect, and animal.
2. The students will describe changes in the appearance and habits of an organism that occur during the stages of its life cycle.
3. The students will define the term *life cycle* as a series of distinct stages that every living creature goes through in its lifetime.
4. The students will compare the life cycle of one living thing to another (e.g. insect to mammal).(optional)

Animals: Life Cycles

Objective #1: The students will sequence and describe the life cycle of a plant, insect, or other animal.

(PLEASE NOTE: Objectives #1 and #2 are closely interrelated and thus should be taught simultaneously.)

Core Activities:

- Read aloud Love You Forever by Robert Munsch. Discuss the changes that are occurring in the lives of the boy and his mother. Then introduce the theme of life cycles by having the children create a time-line of their own lives, beginning when they were babies, and continuing through the toddler, kindergarten, and second grade years. Have children project how they will look and what they may be doing in middle school, high school, adulthood, and finally, as a senior citizen. (See “This Is My Life” attachment.)
- Have the children read and discuss The Very Hungry Caterpillar by Eric Carle. Set up a “butterfly garden” in the classroom. (See Growing Caterpillars: page 29 of Life Cycles: Butterflies, Chicks, Frogs, and More! by Maria L. Chang.) Place monarch or painted lady caterpillars in the garden and have children observe them as they form their chrysalises and emerge as butterflies. Have children write about or draw the stages.
- Set up a window garden. Give each child a bean seed, soil, and a planting pot. Have the students grow bean plants, discussing and documenting the stages of the plants as they sprout and ultimately bear fruit.
- Have the students read The Caterpillar and the Polliwog by Jack Kent or Fish Is Fish by Leo Lionni. Set up a classroom aquarium and collect frog eggs during the springtime. Have the students observe the eggs as they hatch and develop into tadpoles and finally frogs. Have children write about or draw the stages. (See The Life Cycle of a Frog: page 40 of Life Cycles: Butterflies, Chicks, Frogs, and More! by Maria L. Chang.)

Supplemental Activities:

- Circle of Life: page 25 of Life Cycles: Butterflies, Chicks, Frogs, and More! by Maria L. Chang. This lesson will help children learn how a chick develops.
- For a variety of activities related to the life cycle of a butterfly, see The Butterfly Curriculum: Suggested Activities for Kindergarten through Grade Two Using the Butterfly Garden School Kit.
- Teach the students the song “Life of a Butterfly” by Meish Goldish from The Life of a Butterfly by Scholastic (See attachment) to reinforce the life stages of the butterfly.

Animals: Life Cycles

Objective #1: The students will sequence and describe the life cycle of a plant, insect, and animal.

Supplemental Activities (con't):

- For various handouts relative to the life cycles of frogs, butterflies, chickens, and mealworms, see Animal Life Cycles by Jo Ellen Moore and Joy Evans (See attachment).

Assessments:

- Have students keep a Learning Journal describing each stage of a plant, insect, or animal's life cycle in its proper sequence.
- Given pictures of the various stages of an organism's life cycle, students will place the pictures in the proper sequence.

Animals: Life Cycles

Objective #2: The students will describe changes in the appearance and habits of an organism that occur during the stages of its life cycle.

(PLEASE NOTE: Objectives #1 and #2 are closely interrelated and thus should be taught simultaneously.)

Core Activities:

- This objective can be accomplished simultaneously with Objective #1.

Supplemental Activities:

- Have the students read Now One Foot, Now the Other by Tomie dePaola. This book depicts the dependency of the infant. It also shows how the senior citizen may require additional care as his/her health begins to fail. Ask the students to describe the changes they see occurring in the boy and his grandfather.
- Visit a local senior citizen or nursing home. Have students share their time-lines from Objective #1, and ask the senior citizens to share the stages of their lives with the students.

Assessments:

- Have students keep a Learning Journal in which they describe the changes in the appearances and habits of the organisms they are studying as these organisms progress through their life cycles.
- After the students complete the "This Is My Life" activity from Objective #1, ask them to describe the changes that occurred to them as they grew. How did they change physically? How did their abilities and interests change?

Animals: Life Cycles

Objective #3: The students will define the term *life cycle* as a series of distinct stages that every living creature goes through in its lifetime (e.g. for many insects: egg, larva, pupa, adult).

(PLEASE NOTE: Objectives #3 and #4 are closely interrelated and thus can be taught simultaneously.)

Core Activities:

- This activity may serve as unit closure. Construct a chart that lists the life stages of each organism studied. Have students name and describe each stage. Lead them to understand that every organism goes through distinct stages in its lifetime.

(The chart can be used to compare and contrast the life stages of each organism for Objective #4.)

Supplemental Activities:

- Have each student select a different life form from a particular family of life forms studied. Research its life cycle, drawing or writing about its life stages.

Assessment:

- Have students define *life cycle* in their Learning Journals.

Animals: Life Cycles

Objective #4: The students will compare the life cycle of one living thing to another (e.g. insect to mammal). (optional)

Core Activities:

- Construct a Venn Diagram to show the similarities and differences amongst the organisms studied in this unit.

Assessment:

- Present students with two different organisms from those studied. Have them complete a Venn Diagram to show the similarities and differences in the life stages of these organisms.

Animals: Life Cycles

Resources

Primary Resource:

- Fish Is Fish by Leo Lionni
- Life Cycles: Butterflies, Chicks, Frogs, and More!" by Maria L. Chang, Scholastic Professional Books
- Love You Forever by Robert Munsch
- The Butterfly Curriculum: Suggested Activities for Kindergarten through Grade Two Using the Butterfly Garden Kit
- The Caterpillar and the Polliwog by Jack Kent (can be found in Garden Gates basal, Silver Burdett & Ginn)
- The Very Hungry Caterpillar by Eric Carle

Supplementary Resources:

- Animal Life Cycles by Jo Ellen Moore and Joy Evans, Evan-Moor Corp. 1986
- Now One Foot, Now the Other by Tomie dePaola
- The Life Cycle of a Butterfly, I Can Read About Science Library, Scholastic

GRADE THREE



PHYSICAL SCIENCE

Magnetism

Goal

The students will understand some basic principles and characteristics of magnetism.

Objectives

1. The students will understand that magnets can attract some materials (metals such as iron, steel, nickel, cobalt) but do not attract many common materials (e.g. glass, plastic, leather, wood, paper.) **3.1 B1 4.4 B16**
2. The students will understand that magnets have poles and that like poles repel one another and opposite poles attract each other.
3. The students will understand that magnetic force can pass through non-magnetic material but not through magnetic ones (e.g. iron, nickel, steel).
4. The students will understand that magnets can move some objects without touching them. **4.4 B16**
5. *The students will understand that the size of the change in an object's motion is related to the strength of a magnet's push or pull.* **4.1 B.8**

Magnetism

Objective #1: Students will understand that magnets can attract some materials, (metals such as iron, steel, nickel, cobalt) but do not attract many common materials (e.g., glass, plastic, leather, wood, paper)

Core Activity:

- Given a variety of materials, students predict which items magnets will attract. Then the students will test the object to see if their prediction is correct.

Lesson:

AIMS Magnets: "What Will a Magnet Attract?" AIMS Magnets: "Mighty Magnet"

- Students will listen to Big Book The Mystery of Magnets.
- Given different types of metal, students will see what metals are attracted to the magnet.
- Students will use a magnet to separate magnetic material from a mixture of solid materials, e.g. iron filings and salt.

Supplemental Activity:

- Students will learn the poem "Magnets."

Lesson:

Celebration of Excellence '88: Lesson #2

Assessment:

Students will review data from the summary chart they completed for Core Activity #1 and write a paragraph detailing the conclusions they drew.

Magnetism

Objective #2: The students will understand that magnets have poles and that like poles repel one another and opposite poles attract each other.

Core Activity:

Predict what will happen when like and unlike poles are put together.

Sample Lessons:

AIMS: Magnets: "Face to Face"

Magnets: "Floating Magnets,"

"Push or Pull?" worksheet

- Students will build magnet shapes using different shaped magnets called Magnashapes.
- Students will read Mickey's Magnet.

Supplemental Activity:

- Two shoebox covers with two magnets taped underneath so that the like poles are facing one another on one cover and unlike poles facing one another on the other. Sprinkle iron filings onto cover and discuss results.

Assessment:

- Series of pictures of different type magnets facing in various combinations. Students will predict what will happen in each case.

Magnetism

Objective #3: The students will understand that magnetic force can pass through non-magnetic materials, but not through magnetic ones (e.g. iron, nickel, steel).

Core Activity:

- Given materials, students will predict and test whether a magnetic force will pass through them.

Sample Lessons:

AIMS-Magnets: "Will a Magnet Attract Through These?"

- Given iron filings and different type magnets, students will see that iron filings can be used to show the force field that surrounds each magnet.

Sample Lesson:

Learning 92, January "Force Fields "

Supplemental Activity:

- A light thread tied to a paper clip is attached to the top of a paper cup. Students will suspend the paper clip using magnetic force. Students will pass different objects between the magnet and the paper clip to determine what materials allow the force to pass through.

Assessment:

- Given some new materials, the student will predict and then test which ones the magnetic force will pass through.

Magnetism

Objective #4: **The students will understand that magnets can move some objects without touching them.**

Core Activity:

- Students will make an object move by holding a magnet at a distance.

Lesson #1:

AIMS: Magnets: “How Close Can You Get?”

Lesson #2:

“Make and Do” worksheet

Supplemental Activity:

- Make a magnetic puppet show.

Assessment:

- Teacher will observe that each student can use a magnet to move an object without touching it.

Magnetism

Objective #5: *The students will understand that the size of the change in an object's motion is related to the strength of a magnet's push or pull.*

Core Activities:

- Test the distance a paper clip is moved using a single magnet, 2 magnets together, and then 3 magnets together.
- Lesson: "How Strong is a Magnet?"- Scholastic Super Science Red, March 1993.

Supplemental Activities:

Use different numbers of disk magnets to repel another magnet.
Lesson: "Repelling Disks" - Adventures in Science: Magnetism (Educational Insights)

Students study the effects of a magnet swinging as a pendulum over a number of stationary magnets.
Lesson: "Strange Attractor" Science NetLinks.

Assessment:

Students will review data from the summary chart they completed for the Core Activity and write a paragraph detailing the conclusions they drew.

GRADE THREE



EARTH SCIENCE

Rocks and Minerals

Goal

The students will learn the basic principles of rock and mineral classification and the major geological layers of the earth. **3.3 B5 B6**

Objectives

1. The students will classify rocks and minerals according to a number of attributes such as color, texture, layering, hardness, streak, and magnetic properties.
2. The students will understand that rocks are composed of two or more minerals.
3. The students will understand that many materials used in their daily lives are derived from rocks and minerals.
4. The students will identify the parts of the Earth: crust, mantle outer core, and inner core.

Rocks and Minerals

Objective #1: The students will classify rocks and minerals according to a number of attributes such as color, texture, layering, hardness, streak, and magnetic properties.

Core Activities:

- Given a group of rocks, students will brainstorm words to describe attributes.
- Using specific rocks, students complete an attribute chart.

Sample Lesson:

AIMS Primarily Earth: "Rock Groups"

- Students perform various tests on specific rocks.

Sample Lesson:

AIMS Primarily Earth: "Test Stations"

Supplemental Activity:

Assessment:

4. Rock Collection: Students will gather, organize, and identify ten rocks from their home environment. See attached. (This assessment evaluates the first three objectives in the unit.)

Rocks and Minerals

Objective #2: The students will understand that rocks are composed of two or more minerals.

Core Activities:

- Teacher will define rock and mineral. Students will examine specimens to determine whether they are rocks or minerals.

Sample Lesson:

"Minerals" Carson-Dellosa Rocks and Minerals

Sharon's granite lesson

Children will grow crystals from such substances as sugar and/or salt.

Sample Lesson:

"Let's Make Salt Crystals" -Creative Classroom (12/87)

Supplemental Activity:

GEMS: "Chocolate Chip Geology"

Assessment:

Rock Collection: See objective #1

Rocks and Minerals

Objective #3: The students will understand that many materials used in their daily lives are derived from rocks and minerals.

Core Activities:

Students will identify ways rocks and minerals are used in our environment.

Sample Lessons:

AIMS Primarily Earth: "The Earth Has What We Need"

Students will go on a Scavenger Hunt to find objects that are made from minerals.

Sample Lessons:

NatureScope: "Rock and Mineral Scavenger Hunt"

Supplemental Activities:

Assessment:

Rock Collection: See objective #1

Rocks and Minerals

Objective #4: The students will identify the parts of the Earth: crust, mantle, outer core, and inner core.

Core Activities:

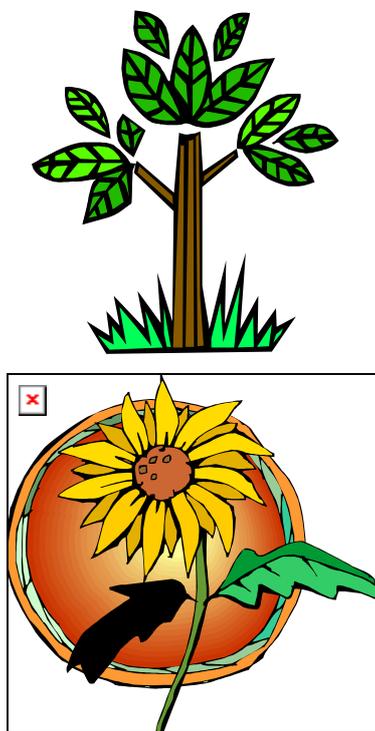
- Students will compare an apple to the Earth.
- Sample Lesson:
"Inside the Earth" -AIMS Primarily Earth
- Read Magic School Bus: Inside the Earth. Students will then make a clay model of the Earth using different colors to show crust, mantle, outer core, and inner core.

Supplemental Activities:

Assessment:

- When given a diagram of the parts of the earth, students will label it correctly.

GRADE THREE



LIFE SCIENCE

More About Plants

Goal

The students will understand some of the functions of plant parts and some variables that have an impact on plant growth.

Objectives

1. The students will describe the effects of different types of growing media on plant growth (e.g. sandy soil, vermiculite, gravel, compost) in order to understand the choices that farmers make. **2.3 A22**
2. The students will understand the function(s) of roots, stems, leaves and flowers, **and their adaptations in land and water habitats.** **1.2 A12 3.2 B3 B4**
3. The students will identify and classify the edible parts of plants.
4. The students will learn proper procedures for transplanting a seedling.

More About Plants

Objective #1: The students will describe the effects of different types of growing media on plant growth (e.g., sandy soil, vermiculite, gravel, compost) in order to understand the choices that farmers make.

Core Activities:

- Plant the same kind of plant in several different media.
- Sample lesson: AIMS: "Which Soil Works Best?"

Supplemental Activities:

- Experiment with different plants growing in a variety of soil types and in water.

Assessment:

- While performing the core activities, students will keep a plant diary that includes a summary of their findings and illustrations which show how plants grew in the different types of soil.

More About Plants

Objective #2: The students will understand the function(s) of roots, stems, leaves and flowers, *and their adaptations in land and water habitats.*

Core Activities:

- Observe and describe the function of roots using several different plants.

Sample lesson: AIMS Primarily Plants: "Root Study"

- Observe and describe the function of stems.

Sample lesson: AIMS Primarily Plants: "Stem Study"

- Observe and describe the function of leaves

Sample lesson: Instructional Fair: "Color-fall Leaves"

- Students observe and describe the function of the flower .

Sample lesson: Read The Reason for a Flower by Ruth Heller .

Scholastic: Integrated Theme Units: "Focus on a Flower"

- Sample lesson: Play "Plant Habitat Game" - www.nps.gov/grsa/resources/curriculum/elem/plants.htm.

Supplemental Activities:

- Complete a crossword puzzle about plants.
- Place a sweet potato, avocado or onion in water and observe root growth.
- Place a cutting of a coleus plant in water to observe root growth.
- Place a freshly cut white carnation in colored water to observe capillary action.
- Play "Plant Adaptation Search"—www.nps.gov/grsa/resources/curriculum/elem/plants.htm. Explore the website "The Great Plant Escape" to review plant parts and their functions.

Assessment:

- Students will identify the root, stem, leaves, and flowers of a plant not previously used in their studies, and describe the function(s).
- Given a different environment (e.g. desert) students will design a plant to fit the habitat, labeling and describing the functions of all four parts.

More About Plants

Objective #3: The students will identify and classify the edible parts of plants.

Core Activities:

- Using samples of fruits and vegetables, students will classify them according to plant parts.

Supplemental Activities:

- Looking at pictures of food, students will name the plant parts, then classify the foods according to plant parts.

Sample lesson: " Stem, Root, Leaf, or Fruit"

Scholastic Thematic Science Unit-Plants: "Part Chart"

Assessment:

- Students will complete an evaluation chart which will show common fruits and vegetables and will identify the plant parts commonly used.

More About Plants

Objective #4: The students will learn proper procedures for transplanting a seedling.

Core Activities:

- Students will report a young plant e.g. tomato plants, potatoes, marigolds, etc, into a large container.
- Sample lesson: The Growing Classroom: "Transplanting or Let's Move Them Out"

Supplemental Activities:

- Transplant rooted sweet potato, avocado, or onion to a soil medium. Remove root cuttings from water and plant in soil medium. Measure the growth of plants that have been transplanted.

Assessment:

- Teacher observation or
- Teacher will complete an observational chart (see attached) or
- Students will write a paragraph explaining the steps of transplanting.

Animal Adaptation: Form and Function

Goal

The students will acquire a basic understanding that animal adaptations aid survival of the species, and that “form follows function.” **1.2 A12 A14**

Objectives

1. The students can identify physical adaptations (webbing, talons, color, wings, camouflage, etc.) that enable animals to survive ***in land and water habitats***.
2. The students will understand how hibernation and migration enable animals to survive.
3. The students will understand that food, water, space, shelter, ***and environmental changes (natural phenomena and human activities)*** affect the survival of living things. **4.2 B11**
4. The students will describe the interdependence of living things (food webs, omnivore, carnivore, herbivore). **4.2 B10**

Animal Adaptation: Form and Function

Objective #1: The students can identify physical adaptations (webbing, talons, color, camouflage, etc.) that enable animals to survive *in land and water habitats*.

Core Activities:

- Students will observe a variety of physical adaptations to see how they affect animal survival.

Lesson: Science Scope : "Beaks" or Nature Scope: "Fill the Bill"

Lesson: What's Up Outside: "Up in the Canopy" pp. 22-24, 29

Lesson: AIMS Critters: "Table Manners" pp. 96-99

Lesson: AIMS Critters: " Missing Moth " pp. 113-115

Lesson: AIMS Critters: "Gone Fishing" pg. 109

Lesson: Nature Scope: "Feet are Neat" pg. 28

Lesson: Observe pictures of various fish (www.enchantedlearning.com) and identify physical adaptations that help each animal survive in its environment.

Supplemental Activities:

- Students will create their own animal from a variety of art materials, and camouflage it to match its habitat. OBIS "Create a creature"
- Using the website "Creature World" (www.pbs.org/kratts/world/content.html), students list an animal from each continent, describe the climate and three animal adaptations specific to the environment.

Assessment:

- "Different Feet For Different Birds" worksheet. Paper/pencil matching activity
- Label the physical adaptations on pictures of animals from a pond habitat and explain how each one helps the animal survive in a water habitat.

Animal Adaptation: Form and Function

Objective #2: The students will understand how hibernation and migration enable animals to survive.

Core Activities:

- Students will perform a play about migration to demonstrate the reasons behind migration and the risks involved.

Lesson: "Flying Feathers" puppet show Hands On Nature pg 135.

- Students will play a game to determine whether or not an animal must migrate.

Lesson: "Why Migrate? Hands-On Nature pg 133

- Students will play Animal Bingo to learn where animals spend the winter months.

Lesson: Hands-On Nature pg 90-91.

Supplemental Activities:

- Students will view a video on hibernation or migration.

Assessment:

- Students will complete an assessment chart, which requires them to identify animals that hibernate, are inactive, migrate, etc.

Animal Adaptation: Form and Function

Objective #3: The students will understand that food, water, space, shelter, *and environmental changes (natural phenomena and human activities)* affect the survival of living things.

Core Activities:

- Students will role play the different elements that influence the survival of living things.
- Lesson: Project Wild -"Oh Dear"
- Lesson: Keeper of the Animals Adapt and Survive P. 170

Lesson: Read "Two Days in May" (Houghton Mifflin Anthology Book 3 – Horizons) and discuss how human activity and environmental changes affected the deer's habitat.

Supplemental Activities:

- Caring for classroom animals.
- Lesson: Each child builds own habitat for preying mantis or other animal and cares for it until released.

Assessment:

- Write a story about an animal which includes what it needs to survive (writing prompt) or
- Nature Trail: Each child will identify an animal and tell what it needs to survive.

Animal Adaptation: Form and Function

Objective #4: The students will understand the interdependence of living things (food webs, omnivore, herbivore, carnivore).

Core Activities:

- Students will dissect owl pellets and create a skeleton of animal that is found.
- Lesson: Kaleidoscope: Owl Pellets
- Students will build a mobile to show the interrelationship of living things.

Supplemental Activities:

- Students will play the "Predator" game.
- Students will investigate life in a log to see the nature food web in process.
- Lesson: Animals Found Under Logs."
- Students will have a necklace with a magazine picture that identifies a plant or animal. At the end of the card, there are three strings. The student will connect these strings to three things (other students) they depend on for survival. Once this is accomplished, detach one of the strings and tell how this will affect the animal or plant.

Assessment:

- Make a diorama that demonstrates the interrelationship of organisms in a certain habitat and include a written description of the diorama.

GRADE FOUR



PHYSICAL SCIENCE

Electricity

GOAL

The students will understand some basic principles of electricity and how electricity plays a role in his/her daily life.

OBJECTIVES

The students will learn that static electricity can be created by rubbing objects together.

The students will know that like charges repel while opposite charges attract. **A10**

The students will understand that a complete circuit is necessary in order for electric current to flow ***and be transferred into light, heat, sound, and magnetic effects.***
3.1 B1 4.4 B14 B15

The students will identify conductors and insulators of electricity (e.g. plastic, paper, wood, metal). **4.4 B15**

Electricity

Objective #1: The students will learn that static electricity can be created by rubbing objects together.

Core activities:

Students will explore what materials produce static electricity. (e.g. balloons, combs, aluminum foil, Styrofoam pieces).

Sample Lesson: AIMS Electrical Connections pgs. 4-8, 27-28
"Static Strokes" pgs. 6-8

Assessments:

Given a collection of new objects, the students will conduct an experiment that produces static electricity.

Electricity

Objective #2: The students will know that like charges repel while opposite charges attract.

Core Activities:

Students will experiment with static electricity to learn that like charges repel and unlike charges attract.

Sample Lesson: AIMS [Electrical Connections](#) pgs. 9-12, 14-17

Assessment:

Students will identify which balloon pair has like, unlike; or neutral charges.

Electricity

Objective #3: The students will understand that a complete circuit is necessary in order for electric current to flow *and be transferred into light, heat, sound, and magnetic effects.*

Core Activities:

Students will make complete circuits and experiment with them.

Sample Lessons: AIMS Electrical Connections "Path Finders" pgs. 31-34 "Sparky's Light Kit" pgs. 29-30 "Make a Switch" pgs. 48-50

(Note: This was moved up from Supplemental Activities. Verify that the activity is appropriate to the modified objective. Add additional activities to reflect modifications.)

AIMS (Electromagnetism) pgs. 69-80

Students will create a circuit to produce sound as outlined on pg 236 of The Science Book.

Supplemental Activities:

- *Secret Signals: Hands on Science Mystery and Magic Step by Step Activity Projects*. Gareth Stevens Publishing 1555 North RiverCenter Dr., Suite 201 Milwaukee, Wisconsin 53212. ISBN 0-8368-0958-0.

Assessment:

Test card #1 from Batteries & Bulbs ESS

Electricity

Objective #4: The students will identify conductors and insulators of electricity (e.g., plastic, paper, wood, metal)

Core Activities:

Students will identify which materials will conduct electricity and which will not.
Sample Lesson: "Conductor or Insulator?" AIMS Electrical Connections pgs. 40-43

Assessment:

Given a new set of objects, the student will first predict which ones are likely to be conductors and which ones might be insulators. Then, the student will design and conduct experiments that support or disprove their predictions.

Electricity

RESOURCES

Electrical Connections: AIMS

Elementary Science Studies: Batteries and Bulbs

The Science Book. Sara Stein. Workman Publishing 1 West 39 St. N.Y. N.Y. 10018

Secret Signals: Hands on Science Mystery and Magic Step by Step Activity Projects.
Gareth Stevens Publishing 1555 North RiverCenter Dr., Suite 201 Milwaukee, Wisconsin
53212. ISBN 0-8368-0958-0.

Chemistry

Goal

The students will understand that matter can go through physical and/or chemical change.

Objectives

The students will describe and give examples of a physical change (e.g. crushing rock, mixing oil and water, blowing bubbles, *dissolving material in water*). **3.1 B1**

The students will describe and give examples of chemical change (e.g., baking bread, combining baking soda and vinegar).

Chemistry

Objective # 1: The students will describe and give examples of a physical change (e.g. crushing rock, mixing oil and water, blowing bubbles, *dissolving material in water*).

Core Activities:

Given a set of materials, students will predict and describe what kind of physical changes occurred in that material.

Sample Learning Activities:

- Cutting an oranges
- Blowing bubbles
- Crunching macaroni
- Bending paper clip
- Freezing and melting water
- Melting butter
- Dissolving a sugar cube in water***

Assessment:

The sample learning activities have an imbedded assessment e.g., the child can say that the paper clip is still made of iron even though its shape has changed.

Student will create a poster describing the physical changes of everyday objects. (large 18 x 36)

Chemistry

Objective # 2: The students will describe and give examples of chemical change (e.g. borax and glue, baking soda and vinegar).

Core activities:

Given a set of materials, students will predict and describe what change has taken place in the materials.

Sample Lesson:

- Chemistry for Every Kid Van Cleave, pgs. 94-95
- Boom Academy Pg. 47 "Toilet Paper Cannon"

Given a set of materials, students will differentiate between a physical and chemical change.

Sample Lesson: Boom Academy, pgs. 21-22

Supplementary Activities:

Chemistry for Every Kid, Chapter 4

Assessment:

Students will create a poster describing chemical changes of everyday objects/materials.

Chemistry

Objective # 3: The students will differentiate between physical and chemical changes.

Core Activities:

Find chemical (baking bread, burning candle) and physical changes (cutting paper, crushing a sugar cube) in the school environment.

Assessment:

The students will bring in two examples demonstrating a chemical and physical change that took place at home.

Chemistry

RESOURCES

Chemistry for Every Kid: Van Cleave
Boom Academy

GRADE FOUR



EARTH SCIENCE

Earth History and Dynamics

Goal

The students will understand the composition of soil and some of the dynamic forces affecting the Earth's surface, *such as particle size, color, and water retention*. **2.3 A21 A22**

Objectives

1. The students will know that soil is composed of weathered rock, plant and animal remains and living organisms, and be able to describe the function(s) of each component of the soil (*including the ability to retain water*). **2.3 A21 A22**

2. The students will understand how the Earth's surface is constantly being changed by weathering and erosion. **4.3 B13**

3. The students will demonstrate understanding of how ice, wind, and water shape and reshape the Earth's land surface. **4.3 B13**

4. The students will understand how fossils are tangible proof of past life.

Earth History And Dynamics

Objective #1: The students will know that soil is composed of weathered rock, plant and animal remains, and living organisms and be able to describe the function(s) of each component of the soil (*including the ability to retain water*).

Core Activities:

Students will analyze soil samples to understand soil components.

Sample Lessons:

Consider the Earth. J. M. Gates pgs. 5 & 6 "Soil Formation

Consider the Earth pgs. 6 & 7 "Soil Composition"

Students will conduct an experiment to test a soil sample's ability to retain water.

Materials: Paper towels, fresh soil samples (top soil /gravelly subsoil/ clay/etc.), sieves or fine wire mess, spoon, transparent plastic cups, water, and eyedroppers.

Time: 45 minutes

Procedure:

1. Prepare 3 different soil mixes before the lesson. Portion each mix into 4 samples, coding each sample for later identification. Set aside two sets of each sample for later use.
2. Place students into 6 small groups and give each a soil sample in a paper towel. Instruct each group member to squeeze the soil sample in the paper towel as hard as possible.

After each group member has squeezed the sample, empty the soil sample on another paper towel and inspect the first towel for moisture. Have the students answer and discuss the following questions: Is water a part of soil? Does soil always contain the same amount of water?

Earth History And Dynamics

3. Then pass out to each group one of the following: eye dropper, sieve/fine wire mess, transparent plastic cup, spoon, water, and a new soil sample from the samples set aside for later use.

Place the sieve or wire mess on top of the empty plastic cup and fill it with the soil sample. Fill the eyedropper with water and squeeze it onto the soil sample. Count how many times it takes to repeat this procedure until water starts to drip out from the soil sample and record.

Come together as a class and share the results in order to determine which soil sample was able to retain the most water before it started to leak from the bottom. Have students discuss how farmers or gardeners might use this knowledge to help grow food.

4. If time permits have groups work with different soil samples to come up with a class average for each sample.
5. An extension could be made to create ideal soil mixes in which to grow plants with different moisture needs. (i.e. cactus, beans...)

Assessment:

Students will write an essay describing soil components and their respective functions.

Earth History And Dynamics

Objective # 2: **The students will understand how the Earth's surface is constantly being changed by weathering and erosion.**

Core Activities:

Students will see evidence of erosion and weathering on their schoolyards and in simple experiments.

Sample Lesson

Consider the Earth., Erosion and Soil Loss" pg. 29 - 30

AIMS - Primarily Earth, pgs. 46 - 59

Assessment:

Students will create a poster illustrating evidence of weathering and erosion and name the agent responsible for the changes.

PLEASE NOTE: This poster project will assess objectives #2 and #3.

Earth History And Dynamics

Objective # 3: The students will demonstrate understanding of how ice; wind, and water shape and reshape the Earth's land surface.

Core Activities:

Students will understand how ice, wind, and water shape the Earth through a variety of experiments and experiences.

Sample Lessons:

Consider the Earth - Wind Erosion, pg. 140

Crustal Encounter, Dohertz and Evans pgs. 53, 65 - 67

Supplemental Activities:

Good Apple –“Floods and Droughts”

Assessments:

See assessment for objective #2

Earth History And Dynamics

Objective # 4: The students will understand fossils are tangible evidence of past life.

Core Activities:

Students will make model fossils (e.g. plaster of Paris casts) in order to better understand how fossils were formed from other living things.

Sample Lessons: AIMS- Primarily Earth; pas. 106-10ia

- Nature Scope- Geology; pgs. 42, 45

Assessment:

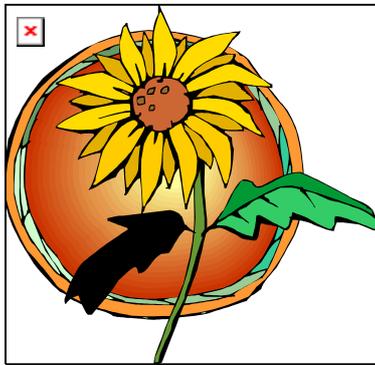
Students will write an essay to explain how fossils give us better understanding of the past.

Earth History and Dynamics

Resources

AIMS Primarily Earth
Consider the Earth : J. M. Gates
Crustal Encounter : Dohertz and Evans
Nature Scope Geology

GRADE FOUR



LIFE SCIENCE

Bones And Muscles

Goal

The students will understand that bones, muscles, and joints perform important functions to help creatures survive.

Objectives

The students will identify supportive and protective bones and explain their respective functions.

The students will identify and describe the functions of 3 types of skeletal joints found in skeletons. (i.e. ball and socket, hinge, and pivot joints.)

The students will identify two functions of muscle movement. (i.e. move bones, food, and blood through the body.)

Bones & Muscles

Objective #1: The students will identify supportive and protective bones and explain their respective functions.

Core Activities:

Given a sheet of large construction paper, students in groups of 3-4 will illustrate what they think a skeleton looks like and list ideas (in statement form) of what they know/think about the topic. Then have students share their information. Keep these for later reference/discussion. (This is intended as an engagement activity; K. W. L. charts, and other such devices that generate interest/curiosity/responses on the topic can be used.) Given an illustration or model of a human skeleton, students will identify supportive and protective bones and describe what they look like. (This is when a teacher would share the objective and help explain/define concepts/vocabulary).

Sample Lessons:

- You and Your Body: Muscles & Bones, p 6&7. Jane Saunderson ISBN 08167-2089-4 Troll Associates
- "The Human Body 1: Skeletal; Muscle Systems" p11-16, Ruth Snow, Remedial Publications.

Given a set of bones, students identify and reconstruct a skeleton and guess what type of animal it is. (They should be able to justify bone placement: supportive-protective). This is an extension activity where students elaborate on what they have learned from the previous 2 activities/Compare what they have learned from posters done in first activity. Modify or add any information as necessary.

Set of bones (i.e. chicken, turkey, etc.) a full skeleton would be or paper cutouts of bones can be a reasonable substitute.

Supplemental Activities:

Aims: Head to Toe-Dem Bones gr. 5-9

Aims: Jaw Breaker & Heart Thumper Measure Up – p. 6

Students construct supportive bones from 1 sheet of construction paper to see which form can hold or support the most weight. (Use examples from skeleton to get ideas).

Assessment:

Students construct a model or illustrate the skeleton of a hypothetical animal. The student should be able to explain which bones are protective and supportive.

Bones and Muscles

Objective 2: The students will identify and describe the functions of 3 types of skeletal joints found in skeletons. (i.e. the ball and socket, hinge, and pivot joints.)

Core Activities:

Given a sheet of large construction paper, students in groups of 3 to 4 will illustrate and briefly describe movements they can make with their bodies (i.e. bend at the knees, move arms in a circle, etc). Then have students share their info. (This is intended as an engagement activity. Any other activity that generates interest/curiosity/ or responses on the topic can be used.)

Given models of hinges, ball and socket, and pivot joints (i.e.-door hinge, chair foot, legos, etc.), students will identify corresponding joints on a human (or other) skeleton and describe the set of motions they allow.

Sample Lessons:

Your Body: Muscles & Bones p14 &15 Jane Saunderson, ISBN-8167-2089-4
Troll Associates

The Human Body 1:Skeletal & Muscle System p17-21 Ruth Snow Remedial
Publications

The Human Body gr. 5-8, p 5&6 ISBN 0-88012-827-5 Instructional Fair,inc.

Supplemental Activities:

Bones and Muscles, gr. 4 packet.

Assessment:

Using the hypothetical animal created in the assessment of objective 1, student will identify the skeletal joints found in it, and describe how each joint functions.

Bones & Muscles

Objective #3: The students will identify two functions of muscle movement (i.e. move bones, food, and help move blood through the body).

Core Activities:

Given a sheet of large construction paper, students in groups of 3-4 will illustrate functions that muscles perform for an organism (e.g. movement, defense, lifting, walking, etc.) and/or facts they might know (e.g. "your heart is a muscle, muscles are attached to bones, etc.) Then have students share their information. Keep the posters for later referral/ discussion. The intent of this activity is to engage the students to generate interest/ curiosity/ responses on the topic. Other devices may be used to stimulate interest.

Given a set of material, students will construct a model of a hinge joint (knee or elbow) to demonstrate and explain how skeletal muscles work in opposing pairs.

Sample Lessons: Blood and Guts p 39 Linda Allison ISBN 0-316-03443-6 Brown Paper School Book

Bones and Muscles grade 4 packet.

Students conduct an experiment to identify and explain how muscles help move materials through the body.

Sample Lessons: What's it like to be a bat? Grade 4 packet.

Supplemental Activities:

Muscles & Bones Jane Saunderson ISBN 0-8167-2089-4 Troll Associates

Assessment:

Using the hypothetical creature from assessment 1, students will take a closer look at a portion of the creature to demonstrate how the muscles work in opposing pairs to move bones and transport other materials (i.e. legs, shoulders, wings, stomach, esophagus).

Bones And Muscles

Resources

Blood and Guts: Linda Allison, Brown paper School Book

Muscles and Bones: Jane Saunderson, Troll Associates

The Human Body: Instructional Fair, Inc.

The Human Body 1: Skeletal & Muscle System: Ruth Snow

You and Your Body: Muscles & Bones: Ruth Snow, Remedial Publications

Your Body: Muscles & Bones: Ruth Saunderson, Troll Associates

Trees and Plants in Your Backyard

Goal

The students will develop a basic understanding of how to identify plant life in the local environment.

Objectives

Students will describe the characteristics of vascular and non-vascular plants e.g. club, mosses, ferns, and true mosses.

Students will identify common flowering plants in the school nature area.

Students will identify five different species of coniferous (evergreen) trees found in the Connecticut forest ecosystem.

Trees and Plants in Your Backyard

Objective #1: Students will describe the characteristics of vascular and non-vascular plants e.g. club, mosses, ferns, and true mosses.

Core Activities:

Given a variety of sample mosses students have collected, students will classify them as non-vascular or vascular.

Students will make a collection of mosses and ferns using a plant press or other preserving method.

Sample lessons:

Beyond the Bean Seed, "Ferns and Friends: Dinosaur Plants", pgs. 79-80.

Assessment:

Given a sample moss, club moss, or fern students will identify whether it is vascular or non-vascular.

Trees and Plants in Your Backyard

Objective #2: Students will identify common flowering plants in the school nature area.

Core Activities:

Observe a variety of flowers in the school nature area and notice differences between them.

Flower Hunt activity

Sample lessons: Hands-on-Nature, pg. 162

Assessment:

Given a sample wild flower, student will be able to identify it.

Trees and Plants in Your Backyard

Objective #3: Students identify five different species of coniferous (evergreen) trees found in the Connecticut forest ecosystem.

Core Activities:

Using dichotomous keys and identification guides, students will identify trees.

Sample lessons: Trees are Terrific, “Keying Out Trees”, pp. 14, 21-22.

SNAP Activity – “Twig Detective”

SNAP Activity – “Winter Tree Investigation”

Assessment:

When shown one or more trees similar to those previously studied, the student can use simple keys to identify the trees, and tell whether the trees are deciduous or coniferous.