

Science Curriculum

Strand I. Constructing New Scientific Knowledge

**Grade: Elementary
K-2**

Standard	Standard I.1 Constructing New Scientific Knowledge All students will ask questions that help them learn about the world; design and conduct investigations using appropriate methodology and technology; learn from books and other sources of information; communicate their findings using appropriate technology; and reconstruct previously learned knowledge.
Benchmarks	All students will ask questions that help them learn about the world: I.1.1. Generate questions about the world based on observation. <i>Key concepts:</i> Questions lead to action, including careful observation and testing; questions often begin with “What happens if...?” or “How do these two things differ?” <i>Real-world contexts:</i> Any in the sections on Using Scientific Knowledge.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Based on observations on nature walks, previous explorations, and observations of materials, ask testable questions, such as: <i>What if we...</i> <i>What would happen if...</i> <i>Which would be (faster, hotter, easier, more, less, comparable)?</i> For instance, after observing caterpillar larva eating leaves, students may ask, “Will caterpillars eat anything else?”
Resources	Young Entomologists’ Society, <i>A Beginner’s Guide to Observing and Collecting Insects</i> , Young Entomologists’ Society, Inc. Michigan, 1994 Morgan, Sally, <i>Butterflies, Bugs, and Worms (Young Discoverers: Biological Facts and Experiments Series)</i> Kramer, Stephen, <i>How to Think Like a Scientist</i> , Crowell, 1987

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Benchmarks	All students will design and conduct investigations using appropriate methodology and technology: I.1.2. Develop solutions to problems through reasoning, observation, and investigations.. <i>Key concepts: (K-2) gather information, ask questions, think; (3-5) observe, predict, collect data, draw conclusions, conduct fair test; prior knowledge.</i> <i>Real-world contexts: Any in the sections on Using Scientific Knowledge.</i>
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Set up investigations that will answer testable questions and make predictions. Decide which materials to use, what steps to take, and measure the results. <p>For example, to answer the question, “How can you design a boat that will hold five marbles?” decide which materials to use, make a prediction, decide which steps to take, create boats and test them in water with five marbles.</p>
Resources	Broekel, Ray, <i>Experiments with Air</i> , Children’s Press, 1988 Broekel, Ray, <i>Experiments with Water</i> , Children’s Press, 1988 Corbett, Scott, <i>What makes a Boat Float?</i> Little, Brown Gardner, Robert, <i>Kitchen Chemistry Science Experiments to do at Home</i> , Jullian Nesser Co. <i>Great Explorations in Math and Science, Solids, Liquids, & Gases</i> , G.E.M.S. Zike, Dinah, <i>Cross-Curricular Classrooms Thematic Manipulations: Water, Hydrosphere, Ocean, Fresh Water, Rain Cycle</i> Van Cleave, Janice, <i>Earth Science for Every Kid: Experiments That Really Work</i> , New York, John Wiley & Sons, 1991 Van Cleave, Janice, <i>Astronomy for Every Kid: 101 Easy Experiments That Really Work</i> , 1991

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Benchmarks	All students will design and conduct investigations using appropriate methodology and technology: I.1.3. Use tools and equipment that aid observation and data collection. <i>Tools:</i> various data collection tools suitable for this level, including hand lenses, wind direction indicators, grids for sampling areas of the sky or landscape. <i>Real-world contexts:</i> Any suggested in Using Scientific Knowledge benchmarks for which students would design and/or conduct investigations.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">Select the appropriate tools for investigations. A lever may be made of a ruler, cups, washer, and a dowel would be appropriate for an investigation about the best position for a fulcrum.
Resources	Broekel, Ray, <i>Experiments with Air</i> , Children's Press, 1988 Broekel, Ray, <i>Experiments with Water</i> , Children's Press, 1988 Corbett, Scott, <i>What makes a Boat Float?</i> Little, Brown Gardner, Robert, <i>Kitchen Chemistry Science Experiments to do at Home</i> , Jullian Nesser Co. <i>Great Explorations in Math and Science, Solids, Liquids, & Gases</i> , G.E.M.S. Zike, Dinah, <i>Cross-Curricular Classrooms Thematic Manipulations: Water, Hydrosphere, Ocean, Fresh Water, Rain Cycle</i> Van Cleave, Janice, <i>Earth Science for Every Kid: Experiments That Really Work</i> , New York, John Wiley & Sons, 1991 Van Cleave, Janice, <i>Astronomy for Every Kid: 101 Easy Experiments That Really Work</i> , New York, John Wiley & Sons, 1991

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Benchmarks	All students will design and conduct investigations using appropriate methodology and technology: I.1.4. Use simple measurement devices to make measurements in scientific investigations. <i>Key concepts:</i> Measurement units—milliliters, liters, millimeter, centimeter, meter, gram, teaspoon, tablespoon, ounce, cup. <i>Measurement tools:</i> Measuring cups and spoons, measuring tape, thermometer, graduated cylinder, scale, rulers. <i>Real-world contexts:</i> Making simple mixtures, such as food, play dough, paper mache; measuring height of a person, weight of a ball.
Sample Activity/Assessment tasks	Use hand lenses, grids, rulers, balance scales, spring scales, and thermometers to measure the results of their investigations.
Resources	Broekel, Ray, <i>Experiments with Air</i> , Children's Press, 1988 Broekel, Ray, <i>Experiments with Water</i> , Children's Press, 1988 Corbett, Scott, <i>What makes a Boat Float?</i> Little, Brown Gardner, Robert, <i>Kitchen Chemistry Science Experiments to do at Home</i> , Jullian Nesser Co. <i>Great Explorations in Math and Science, Solids, Liquids, & Gases</i> , G.E.M.S. Zike, Dinah, <i>Cross-Curricular Classrooms Thematic Manipulations: Water, Hydrosphere, Ocean, Fresh Water, Rain Cycle</i> Van Cleave, Janice, <i>Earth Science for Every Kid: Experiments That Really Work</i> , New York, John Wiley & Sons, 1991 Van Cleave, Janice, <i>Astronomy for Every Kid: 101 Easy Experiments That Really Work</i> , New York, John Wiley & Sons, 1991

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Benchmarks	All students will learn from books and other sources of information: I.1.5. Develop strategies and skills for information gathering and problem solving. <i>Tools:</i> Sources of information, such as reference books, trade books, magazines, web sites, other people's knowledge. <i>Real-world contexts:</i> Seeking help from or interviewing peers, adults, experts; using libraries, World Wide Web, CD-ROMs and other computer software, other resources.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Use texts, internet, trade books, games, field trips, and expert speakers to build information about their world.
Resources	Make observations on field trips. A bus trip around the neighborhood of the school and its surrounding area will allow observation of nearby types of land or bodies of water like lakes, ponds, streams, rivers, hills, valleys, and flat areas. After a rain, observe several locations around the school neighborhood with different types of soil. Dig into the soils to see how far the rain soaked down. Compare these soils to determine why the rain would soak down at different rates. Invite a representative from the zoo to visit the class with animals whose characteristics can be compared and contrasted.

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Benchmarks	All students will communicate findings of investigations, using appropriate technology. I.1.6. Construct charts and graphs and prepare summaries of observations. <i>Key concepts:</i> Increase, decrease, no change, bar graph, data table. <i>Tools:</i> Graph paper, rulers, crayons. <i>Real-world contexts:</i> Examples of bar charts like those found in a newspaper.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Show what has been learned using charts, graphs, measurements and illustrations.• Demonstrate through written or verbal presentations a new understanding of a concept.
Resources	Scholastic News Teacher Resources: <i>Making Charts And Graphs</i>

Science Curriculum

Strand II. Reflecting on Scientific Knowledge

**Grade: Elementary
K-2**

Standard	Standard II.1 Reflecting on Scientific Knowledge All students will analyze claims for their scientific merit and explain how scientists decide what constitutes scientific knowledge; how science is related to other ways of knowing; how science and technology affect our society; and how people of diverse cultures have contributed to and influenced developments in science.
Benchmarks	All students will analyze claims for their scientific merit and explain how scientists decide what constitutes scientific knowledge: II.1.1. Develop an awareness of the need for evidence in making decisions scientifically. <i>Key concepts:</i> (K-2) observations; (3-5) data, evidence, sample, fact, opinion. <i>Real-world contexts:</i> Deciding whether an explanation is supported by evidence in simple experiments, or relies on personal opinion.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Give proof (evidence) to back up a statement about has been learned. Example: “I know (<u>what I have learned</u>) because when we (<u>what was tried</u>) it (<u>what happened.</u>)” I know <u>a fulcrum should be placed closer to the load than to the force</u> because when we <u>put the fulcrum close to a load of six washers on a lever, it only took a force of two washers to raise it.</u> When we put the fulcrum farther away from the load, it took more washers to raise it.• Discuss and write journal entries answering the questions: What does the study of science tell us about God? How does God “fit” into science?
Resources	

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Benchmarks	All students will show how science is related to other ways of knowing: II.1.2. Show how science concepts can be illustrated through creative expression such as language arts and fine arts. <i>Key concepts:</i> Poetry, expository work, painting, drawing, music, diagrams, graphs, charts. <i>Real-world contexts:</i> Explaining simple experiments using paintings and drawings; describing natural phenomena scientifically and poetically.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Use poetry, texts, drawings, music, diagrams, graphs, role playing, and charts to explain what has been learned.
Resources	Zike, Dinah (<i>need the name of her book on making presentations using different formats</i>) <i>Hailstones and Halibut Bones</i> Hoban,Tana, <i>Look Book</i> Greenwillow , <i>Books of poems about seasons</i>

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Benchmarks	All students will show how science and technology affect our society: II.1.3. Describe ways in which technology is used in everyday life. <i>Key concepts:</i> Provide faster and farther transportation and communication, organize information and solves problems, save time. <i>Real-world contexts:</i> Cars, other machines, radios, telephones, computer games, calculators, appliances, e-mail, the World Wide Web.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Identify ways in which cars, other machines, computers, chemicals, etc. can help in our everyday lives. For example, list all the ways in which people can travel to school, including walking, riding a bike, using a horse and buggy, a car, or a helicopter.• Role play ways to hear the latest news.• Compare the way pioneers, Native Americans, and modern people communicated their history, news, and stories.• Describe how we use technology to make sure God’s people are protected and cared for in our society.• Describe cleaning chemicals parents use in homes.• Describe ways in which computers are used to solve problems, help with shopping, create art, stories, and letters.• Compare how early people and modern people accomplished tasks like washing clothes, cooking, taking baths, cleaning the house, making sure there is enough food for the family.
Resources	Visit a museum with tools and appliances used by people over the ages.

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Benchmarks	All students will show how science and technology affect our society: II.1.4. Develop an awareness of and sensitivity to the natural world. <i>Key concepts:</i> Appreciation of the balance of nature and the effects organisms have on each other, including the effects humans have on the natural world. <i>Real-world contexts:</i> Any in the sections on Using Scientific Knowledge appropriate to elementary school.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Learn how cars and litter can help or hinder the way we solve problems in our environment.• Identify ways in which cars, other machines, computers, chemicals, and forms of waste, etc. can help or hurt our environment. For example compare a place where healthy plants are growing to a place where plants are dieing, try to determine if (road salt, dumped oil,) makes a difference in how plants grow.• Identify ways in which students can help the environment. For example, determine ways to reuse materials, pick up and dispose of litter, and use recycling systems.• Determine ways to save resources like gasoline or water.
Resources	Have a waste management representative talk to students about how the company disposes of the garbage from student's school and homes. Have city water purification system representative talk to students about dangerous things that people are disposing of in city water resources.

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Benchmarks	All students will show how people of diverse cultures have contributed to and influenced developments in science: II.1.5. Develop an awareness of contributions made to science by people of diverse backgrounds and cultures. <i>Key concepts:</i> Scientific contributions made by people of diverse cultures and backgrounds. <i>Real-world contexts:</i> Any in the sections on Using Scientific Knowledge appropriate to this benchmark.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Read or hear about people of different cultures and backgrounds who make scientific contributions.
Resources	Speakers of different ethnic, gender, nationality, disability, can describe their contributions to science, their science related jobs, or they can explain new science ideas to the children. A person with an east Indian background can help a class create a paper bridge that will hold the most weight. An employee from the local zoo, who uses a wheelchair for mobility, can help the children create a food-web.

Biographies of people of diverse backgrounds and cultures that have made contributions to science.

Science Curriculum

Strand III. Using Scientific Knowledge in Life Science

Grade: Elementary

Standard	Standard III.1 Cells All students will apply an understanding of cells to the functioning of multicellular organisms; and explain how cells grow, develop and reproduce.
Benchmarks	All students will apply an understanding of cells to the functioning of multicellular organisms, including how cells grow, develop and reproduce: (No benchmark about cells at the elementary level)
Sample Activity/Assessment tasks	
Resources	

Science Curriculum

Strand III. Using Scientific Knowledge in Life Science

**Grade: Elementary
K-2**

Standard	Standard III.2 The Organization of Living Things All students will use classification systems to describe groups of living things; compare and contrast differences in the life cycles of living things; investigate and explain how living things obtain and use energy; and analyze how parts of living things are adapted to carry out specific functions.
Benchmarks	All students will use classification systems to describe groups of living things: III.2.1. Explain characteristics and functions of observable body parts in a variety of animals. <i>Key concepts:</i> Observable characteristics—fur, scales, feathers, horns, claws, eyes, quills, beaks, teeth, skeleton, muscles, exoskeleton; functions—insulation, support, movement, food-getting, protection. <i>Real-world contexts:</i> Vertebrate and invertebrate animals, such as humans, cows, sparrows, goldfish, spiders, crayfish, insects.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Observe and describe the characteristics of a variety of plants and animals in woodland freshwater environment.• Observe and compare two fossils, a fern and a sea snail.• Observe and diagram the parts and functions of a caterpillar and a butterfly. Compare the parts and functions of both of them.• Make a mural showing God's creation from Genesis.• Create a mural of animal families.• Create a Venn diagram comparing birds to fish.• Use construction paper to make a fish with all parts. Explain each part and its function.
Resources	Fowler , Allan, <u>It Could Still Be a Worm (Rookie Read-Aloud Science)</u> Lauber Patricia, <u>Furs, Feathers, and Flippers: How Animals Live Where They Do</u> Taylor, Barbara, <u>Animal Hide and Seek</u> Visit a zoo to compare animals in each family.

Science Curriculum

Strand III. Using Scientific Knowledge in Life Science

**Grade: Elementary
K-2**

Standard	Standard III.2 The Organization of Living Things All students will use classification systems to describe groups of living things; compare and contrast differences in the life cycles of living things; investigate and explain how living things obtain and use energy; and analyze how parts of living things are adapted to carry out specific functions.
Benchmarks	All students will use classification systems to describe groups of living things: III.2.2. Compare and contrast (K-2) or classify (3-5) familiar organisms on the basis of observable physical characteristics. <i>Key concepts:</i> Plant and animal parts—backbone, skin, shell, limbs, roots, leaves, stems, flowers, feathers, scales. <i>Real-world contexts:</i> Animals that look similar—snakes, worms, millipedes; flowering and non-flowering plants; pine tree, oak tree, rose, algae.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Use Venn diagrams to compare and contrast and show similarities and differences in: Animals: guppies and snails Plants: moss and tree seedlings• Observe and diagram the parts and functions of a caterpillar and a butterfly. Compare the parts and functions of both of them.
Resources	Guppies and snails can be purchased at local pet stores. Tree seedlings and moss may be purchased through county extension offices or local nurseries. Visit a “bug house” in a local zoo or educational institution. Have trained docents show the students different characteristics of the insects. Have an entomologist come to the building and talk to the students about insects and their parts. Nash, Pamela, <i>See How It Grows Series</i> , Modern Curriculum Press, Cleveland, 1983

Good, Rona and Nancy, *Insect Metamorphosis From Egg to Adult*, Macmillan, New York, 1990

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**Grade: Elementary
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Standard	Standard III.2 The Organization of Living Things All students will use classification systems to describe groups of living things; compare and contrast differences in the life cycles of living things; investigate and explain how living things obtain and use energy; and analyze how parts of living things are adapted to carry out specific functions.
Benchmarks	All students will compare and contrast differences in the life cycles of living things: III.2.3. Describe life cycles of familiar organisms. <i>Key concepts:</i> Life cycle stages—egg, young, adult; seed, plant, flower, fruit; larva, pupa. <i>Real-world contexts:</i> Common plants and animals such as bean plants, apple trees, butterflies, grasshoppers frogs, birds.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Observe behaviors of woodland and freshwater animals. Observable Life Cycle --Snails will lay eggs on sides of aquarium. Look for and circle with a laundry pen. --Guppies often have babies (and will eat them).• Observe, draw, and describe a monarch butterfly as it grows through its life stages. (and /or tadpoles to frogs, newts to salamanders)• Make connection between the life cycle of a butterfly and new life from the sacraments of Reconciliation and First Communion.
Resources	Hogan, Paula, <i>The Life Cycle of the Butterfly</i> , Platt and Munk, New York, 1992 Kent, Jack, <i>The Caterpillar and the Polliwog</i> , Prentice-hall, New Jersey, 1982

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Strand III. Using Scientific Knowledge in Life Science

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K-2**

Standard	<p>Standard III.2 The Organization of Living Things All students will use classification systems to describe groups of living things; compare and contrast differences in the life cycles of living things; investigate and explain how living things obtain and use energy; and analyze how parts of living things are adapted to carry out specific functions.</p>
Benchmarks	<p>All students will investigate and explain how living things obtain and use energy: III.2.4. Compare and contrast food, energy, and environmental needs of selected organisms. <i>Key concepts:</i> Life requirements—food, air, water, minerals, sunlight, space, habitat. See LEC-III.5 e.2. <i>Real-world contexts:</i> Germinating seeds, such as beans, corn; aquarium or terrarium life, such as guppy, goldfish, snail.</p>
Sample Activity/Assessment tasks	<ul style="list-style-type: none"> • Set up an aquarium and/or a terrarium to show an understanding of the basic needs of plants and animals: water, sunlight, food, and shelter. • Throw a hula hoop onto different areas—shaded/sunlight. Compare kinds and numbers of living things and amount of water and relationship between amount of water and living things. • Use clear container plantings to observe the growth from seed to plant. • Create a prayer praising God for providing everything an organism needs to survive. • Create a prayer asking God to help us take care of His living things. • Create a play about the life of a chicken.
Resources	<p>Tekulsky, Matthew, <i>The Butterfly Garden: Turning Your Garden Windowbox or Backyard into a Beautiful Home for Butterflies</i>, The Harvard Common Press, Massachusetts, 1985 Titherington, Jeanne, <i>Pumpkin, Pumpkin</i>, Scholastic Romanova, Natalia, <i>Once There Was A Tree</i>, Dial books for Young Readers, 1985 Viorst, Judith, <i>The Tenth Good Thing About Barney</i>, Atheneum, New York 1971 Visit a farm or greenhouse and see what is done during the entire year. Ask them how the weather affects their choices of plants they grow. Invite a farmer to show types of soil that would work well for plants to grow and which wouldn't. Have him</p>

explain how earthworms change the soil.

Visit a chicken farm. Explain how chickens survive in their habitat on the chicken farm. Have him explain how the chickens and their products are part of the food chain.

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Benchmarks	All students will analyze how parts of living things are adapted to carry out specific functions: III.2.5. Explain functions of selected seed plant parts. <i>Key concepts:</i> Plant parts—roots, stems, leaves, flowers, fruits, seeds. <i>Real-world contexts:</i> Common edible plant parts, such as bean, cauliflower, carrot, apple, tomato, spinach. (See LE-III.4 e.2 about functions of selected animal body parts)
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Use a clear container of plantings to observe the grown from seed to plant.• Observe plant and name the parts of plants: roots, stem, leaves, flowers, fruit, and seed.
Resources	What's Inside? Plants, Dorling Kindersley, Inc., New York http://www.dir.yahoo.com/science/biology/botany/plants/giant-pumpkins http://www.nyu.edu/projects/Julian/ Heller, Ruth, <i>The Reason for a Flower</i> , Grosset & Dunlap, New York, 1983 Heller, Ruth, <i>Plants That Never Bloom</i> , Putman & Grosset Book Group, New York 1992 Fisher, Aileen, <i>Petals Yellow and Petals Red, The Ways of Plants</i> , Bowmar Nature Series Burnie, David, <i>Plants (Eyewitness Books)</i> , Alfred A knopf, New York, 1988 Burnie, David, <i>Flowers (Eyewitness Books)</i> , Dorling Kindersley, Inc. , New York 1992 Braithwaite, Althea, <i>Trees and Leaves</i> , Troll Associates, Mahwah, new jersey, 1990

Visit a greenhouse to observe plants in different stages, from seedling to fruit.
 Arrange for a visit to a local arboretum to discover a variety of plants in different stages of growth and in different habitats.

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Strand III. Using Scientific Knowledge in Life Science

**Grade: Elementary
K-2**

Standard	<p>Standard III.3 Heredity All students will investigate and explain how characteristics of living things are passed on through generations; explain why organisms within a species are different from one another; and explain how new traits can be established by changing or manipulating genes.</p>
Benchmarks	<p>All students will investigate and explain how characteristics of living things are passed on through generations: III.3.1. Give evidence that characteristics are passed from parents to young. <i>Key concepts:</i> Characteristics—hair and feather color, eye color, leaf shape, flower structure. <i>Real-world contexts:</i> Example of mature and immature organisms, such as dogs/puppies, cats/kittens, maple trees/saplings, beans/seedlings.</p>
Sample Activity/Assessment tasks	<ul style="list-style-type: none"> • Observe characteristics of self—eye color, hair color. Using photographs, compare with parents. Tabulate and graph findings. • Compare photographs of parents and siblings to see which characteristics passed from parents to child. • Observe and match animal babies with parents. • Observe, label, and illustrate the life cycles of animals and insects: frogs, butterflies, animals. • Observe the life cycle of plants. • Observe the germination of seeds in clear containers and chart their progress. • Identify and describe the function of observable body parts of animals and insects. (limbs, feathers, shells, skin, scales, and other body coverings). • Reinforce life and dignity of the Human Person. That every person is created in the image of God.
Resources	<p>Bigger Than Martin Just Like Kyla</p>

Keller, *Growing Like Me* Harcourt
Fisher, *You Don't Look Like Your Mother*, Mondo

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Strand III. Using Scientific Knowledge in Life Science

**Grade: Elementary
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Standard	Standard III.3 Heredity All students will explain how scientists construct and scientifically test theories concerning the origin of life and evolution of species; compare ways that living organisms are adapted (suited) to survive and reproduce in their environments; and analyze how species change through time.
Benchmarks	All students will explain how new traits can be established by changing or manipulating genes: III.3.2. No benchmarks at this level
Sample Activity/Assessment tasks	
Resources	

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Benchmarks	All students will explain how new traits can be established by changing or manipulating genes: III.3.3. No benchmarks at this level
Sample Activity/Assessment tasks	
Resources	

Science Curriculum

Strand III. Using Scientific Knowledge in Life Science

**Grade: Elementary
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Standard	Standard III.4 Evolution All students will explain how scientists construct and scientifically test theories concerning the origin of life and evolution of species; compare ways that living organisms are adapted (suited) to survive and reproduce in their environments; and analyze how species change through time.
Benchmarks	All students will explain how scientists construct and scientifically test theories concerning the origin of life and evolution of species: III.4.1. Explain how fossils provide evidence about the nature of ancient life. <i>Key concepts:</i> Types of evidence—fossil, extinct, ancient, modern life forms. See EG-V.1 e.4 (rocks and fossils provide evidence of history of the earth). <i>Real-world contexts:</i> Common contexts—plant and animal fossils, museum dioramas and paintings/drawings of ancient life and/or habitats.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Use fossil sample and pictures to describe animals and plants that lived in ancient times, and explain the term <i>extinct</i> with examples.• Make a layered cup with play dough. The 1st layer with a shell; the 2nd layer with a small bone or orange rind. Students explain that the 1st layer is the oldest because it was laid down first.• Recognize God's mystery in nature by visiting a museum with dinosaurs and fossil collections.
Resources	Have a representative from a museum of natural history to discuss fossils, where they were found. Aliko, <i>Dinosaur Bones</i> , New York, Thomas Crowell, 1988 Butler, Daphne, <i>First Look Under the Ground</i> , Milwaukee, Gareth Stevens Children's Books, 1991 Riechecky, Janet, <i>Pachycephalosaurus</i> , Mankato, MN, Child's World 1991 Schwartz, David M., <i>How Much Is A Million?</i> New York, Lothrop, Lee & Shepard Books, 1985

Van Cleave, Janice *Earth Science for Every Kid: Experiments That Really Work* New York, John Wiley & Sons, 1991

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K-2**

Standard	Standard III.4 Evolution All students will explain how scientists construct and scientifically test theories concerning the origin of life and evolution of species; compare ways that living organisms are adapted (suited) to survive and reproduce in their environments; and analyze how species change through time.
Benchmarks	All students will compare ways that living organisms are adapted (suited) to survive and reproduce in their environments and explain how species change through time: III.4.2. Explain how physical and behavioral characteristics of animals help them to survive in their environments. <i>Key concepts:</i> Characteristics—adaptation, instinct, learning, habit. Traits and their adaptive values—sharp teeth or claws for catching and killing prey, color for camouflage, behaviors. <i>Real-world contexts:</i> Common vertebrate adaptations, such as white polar bears, sharp claws and sharp canines for predators, changing colors of chameleon; behaviors, such as migration, communication of danger.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Observe the behaviors and describe the attributes of animals that help them survive in their habitats. Example: camouflage, pupils in light and dark.• Describe a habitat in terms of what it provides to living things.• Participate in predator/prey role playing games.• Recognize God's mystery in nature by visiting a museum with dinosaurs and fossil collections.
Resources	Have a representative from a museum of natural history to discuss fossils, where they were found. Aliko, <i>Dinosaur Bones</i> , New York, Thomas Crowell, 1988 Butler, Daphne, <i>First Look Under the Ground</i> , Milwaukee, Gareth Stevens Children's Books, 1991 Riechecky, Janet, <i>Pachycephalosaur</i> , Mankato, MN, Child's World 1991

Schwartz, David M., *How Much Is A Million?* New York, Lothrop, Lee & Shepard Books, 1985
 Van Cleave, Janice *Earth Science for Every Kid: Experiments That Really Work* New York, John Wiley & Sons, 1991

Science Curriculum

Strand III. Using Scientific Knowledge in Life Science

**Grade: Elementary
K-2**

Standard	<p>Standard III.5 Ecosystems All students will explain how parts of an ecosystem are related and how they interact; explain how energy is distributed to living things in an ecosystem; investigate and explain how communities of living things change over a period of time; describe how materials cycle through an ecosystem and get reused in the environment; and analyze how humans and the environment interact.</p>
Benchmarks	<p>All students will explain how parts of an ecosystem are related and how they interact: III.5.1. Identify familiar organisms as part of a food chain or food web and describe their feeding relationships within the web. <i>Key concepts:</i> Producer, consumer, predator, prey, decomposer, habitat, community. <i>Real-world contexts:</i> Food chains and food webs involving organisms, such as rabbits, birds, snakes, grasshoppers, plants.</p>
Sample Activity/Assessment tasks	<ul style="list-style-type: none"> • Diagram a food chain or a food web including plants and decomposers. • Make a food web with string. • Play a food web game using cards with plant, animal and decomposer (bugs) pictures. • Describe what happens to plants and animals in a field when humans build houses there. • Recognize that God is the creator of all life and all life is good. Create a prayer asking God for help in teaching us to take care of our world.
Resources	

Science Curriculum

Strand III. Using Scientific Knowledge in Life Science

**Grade: Elementary
K-2**

Standard	Standard III.5 Ecosystems All students will explain how parts of an ecosystem are related and how they interact; explain how energy is distributed to living things in an ecosystem; investigate and explain how communities of living things change over a period of time; describe how materials cycle through an ecosystem and get reused in the environment; and analyze how humans and the environment interact.
Benchmarks	All students will explain how energy is distributed to living things in an ecosystem: III.5.2. Describe the basic requirements for all living things to maintain their existence. <i>Key concepts:</i> Needs of life—food, habitat, water, shelter, air, light, minerals. See LO-III.2 e.4. <i>Real-world contexts:</i> Selected ecosystems, such as an aquarium, rotting log, terrarium, backyard, local pond or wetland, wood lot.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Describe the needs for life within a habitat: water, food, light, and shelter.• Using a poster picture of a habitat, pick a plant or animal and illustrate what that organism uses for survival in this habitat.• Take a nature walk in the school neighborhood to observe and record plants and animals that were seen. Choose a plant or an animal and list things in its habitat that help it survive. Describe what would happen if one item on their list were taken away.• Visit a chicken farm. Explain how chickens survive in their habitat on the chicken farm. Have him explain how the chickens and their products are part of the food chain.
Resources	

Science Curriculum

Strand III. Using Scientific Knowledge in Life Science

**Grade: Elementary
K-2**

Standard	Standard III.5 Ecosystems All students will explain how parts of an ecosystem are related and how they interact; explain how energy is distributed to living things in an ecosystem; investigate and explain how communities of living things change over a period of time; describe how materials cycle through an ecosystem and get reused in the environment; and analyze how humans and the environment interact.
Benchmarks	All students will investigate and explain how communities of living things change over a period of time: III.5.3. Design systems that encourage growing of particular plants or animals. <i>Key concepts:</i> Needs of life—food, habitat, water, shelter, air, light, minerals. <i>Real-world contexts:</i> Ecosystems managed by humans, including farms, ranches, gardens, lawns, potted plants.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Identify and produce a habitat for woodland (terrarium) and freshwater (aquarium). Include plants: tree seedlings and moss for terrarium and/or 2 freshwater plants: cabomba and elodea for freshwater.
Resources	Terrarium plants can be purchased at local nurseries or extension offices. Freshwater plants can be purchased at local pet store in aquarium departments

Science Curriculum

Strand III. Using Scientific Knowledge in Life Science

**Grade: Elementary
K-2**

Standard	Standard III.5 Ecosystems All students will explain how parts of an ecosystem are related and how they interact; explain how energy is distributed to living things in an ecosystem; investigate and explain how communities of living things change over a period of time; describe how materials cycle through an ecosystem and get reused in the environment; and analyze how humans and the environment interact.
Benchmarks	All students will analyze how humans and the environment interact: III.5.4. Describe positive and negative effects of humans on the environment. <i>Key concepts:</i> Human effects on the environment—garbage, habitat destruction, land management, renewable and non-renewable resources. <i>Real-world contexts:</i> Household wastes, school wastes, waste water treatment, habitat destruction due to community growth, reforestation projects, establishing parks or other green spaces, recycling.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Identify what is needed to protect the environment.• Take a nature walk to pick up litter.• Recycle paper.• Discuss safe ways to use water and limit its use.• Identify better ways to dispose of toxic materials like oil, paint, batteries, and aerosol.• Make paper from construction paper scraps from the classroom.• Identify ways that sin destroys God's creation in nature.
Resources	Have a waste management representative discuss the benefits of recycling and reusing.

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard	Standard IV.1 Matter and Energy All students will measure and describe the things around us; explain what the world around us is made of; identify and describe forms of energy; and explain how electricity and magnetism interact with matter.
Benchmarks	All students will measure and describe the things around us: IV.1.1. Classify common objects and substances according to observable attributes/properties. <i>Key concepts:</i> Texture—rough, smooth. Flexibility— rigid, stiff, firm, flexible, strong. Hardness. Smell—pleasant, unpleasant. States of matter—solid, liquid, gas. Magnetic properties—attract, repel, push, pull. Size—larger, smaller (K-2); length, width, height (3-5). Sink, float. Color—common color words. Shape—circle, square, triangle, rectangle, oval. Weight—heavy, light, heavier, lighter. See PWVIV. 4 e.4 (shadows: objects that let light pass through or block light); PME-IV.1 e.2 (materials that conduct electricity); C-I.1 e.4 (use measuring devices). <i>Real-world contexts:</i> Common objects, such as desks, coins, pencils, buildings, snowflakes; common substances, including—solids, such as copper, iron, wood, plastic, Styrofoam; liquids, such as water, alcohol, milk, juice; gases such as air, helium, water vapor.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Use metric rulers, balance, spring scales, and graduated cylinders to measure objects.• Compare sandpaper, cotton, aluminum foil, and wood for texture flexibility, and hardness.• Test the sense of smell with clear glasses containing clear liquids such as almond extract, water, and white vinegar. Compare and describe the differences.• Cross curricular<ul style="list-style-type: none">Math—compare the measurement of masses with a balance, length with a ruler, weight with a spring balance, and volume (water and alcohol) with graduated cylinders.Art---Compare the colors of different fruits or vegetables.
Resources	<u>Amazing Water</u> <u>It Could Still be Water</u>

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard	Standard IV.1 Matter and Energy All students will measure and describe the things around us; explain what the world around us is made of; identify and describe forms of energy; and explain how electricity and magnetism interact with matter.
Benchmarks	All students will measure and describe the things around us: IV.1.2. Identify properties of materials which make them useful. <i>Key concepts:</i> Useful properties—unbreakable, water-proof, light-weight, conducts electricity (see PME-IV.1 e.4, electric circuits), conducts heat, attracted to a magnet, clear. See EG-V.1 e.4 (uses of earth materials). <i>Real-world contexts:</i> Appropriate selection of materials for a particular use, such as waterproof raincoat, cotton or wool for clothing, glass for windows, metal pan to conduct heat, copper wire to conduct electricity.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Compare several materials like plastic wrap, tissue paper, construction paper, and aluminum foil to see if light will pass through them.• In determining what materials could be used for a boat, find test materials to see if they are waterproof.
Resources	

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard	Standard IV.1 Matter and Energy All students will measure and describe the things around us; explain what the world around us is made of; identify and describe forms of energy; and explain how electricity and magnetism interact with matter.
Benchmarks	All students will identify and describe forms of energy: IV.1.3. Identify forms of energy associated with common phenomena. <i>Key concepts:</i> Heat, light, sound, food energy, energy of motion, electricity (see PCM-IV.2 e.1 about heat, PWV-IV.4 e.1-4 about light and sound, PME-IV.1 e.4 about electricity, LEC-III.5 e.2 about energy from food). <i>Real-world contexts:</i> Appropriate selection of energy and phenomena, such as appliances like a toaster or iron that use electricity, sun's heat to melt chocolate, water wheels, wind-up toys, warmth of sun on skin, windmills, music from guitar, simple electrical circuits with batteries, bulbs and bells.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Shine a light on thermometers in a black and a white construction paper pocket over a period of time and record the differences in temperature to see if color affects how much heat is absorbed in a material.• Use toys with wind up springs or rubber bands and describe what makes them move.• Place chocolate chips and candy kisses on a plate in the sun to see which will melt first.• Compare the difference between looking into a tightly closed box through a tube to see a small object and lifting the lid of the box.
Resources	

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard	Standard IV.1 Matter and Energy All students will measure and describe the things around us; explain what the world around us is made of; identify and describe forms of energy; and explain how electricity and magnetism interact with matter.
Benchmarks	All students will explain how electricity (and magnetism; see PMO) interact with matter: IV.1.4. Construct simple, useful electrical circuits. (3-5) <i>Key concepts and tools:</i> Complete loop; batteries, bulbs, bells, motors, wires, electrical switches (see PME-IV.1 e.2, materials that conduct electricity). <i>Real-world contexts:</i> Flashlights, battery-powered toys.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Test objects made of metal, plastic, glass, fabric, and wood to see if they are attracted to magnets.• Complete a loop to create an electrical circuit. Give each child two AA batteries and a flashlight to put together to light the flashlight.
Resources	

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard	Standard IV.1 Matter and Energy All students will measure and describe the things around us; explain what the world around us is made of; identify and describe forms of energy; and explain how electricity and magnetism interact with matter.
Benchmarks	All students will explain how electricity (and magnetism; see PMO) interact with matter: IV.1.5. Describe possible electrical hazards to be avoided at home and at school. (K-2) <i>Key concepts:</i> Shock, wall outlet, hazards; see PMEIV. 1 e.3 (electrical energy). <i>Real-world contexts:</i> Electric outlets, power lines, frayed electric cords, electric appliances, lightning, hair dryers in sinks and tubs.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Name dangerous situations where electricity is involved including electrical outlets, downed power lines, lightning and frayed cords.• Discuss the safe use of electrical appliances.
Resources	

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard	Standard IV.2 Changes in Matter All students will investigate, describe and analyze ways in which matter changes; describe how living things and human technology change matter and transform energy; explain how visible changes in matter are related to atoms and molecules; and how changes in matter are related to changes in energy.
Benchmarks	All students will investigate, describe and analyze ways in which matter changes: IV.2.1. Describe common physical changes in matter—size, shape; melting, freezing (K-2); dissolving, evaporating (3-5). <i>Key concepts:</i> States of matter—solid, liquid, gas. Changes in size and shape—bending, tearing, breaking. Processes that cause changes of state: heating, cooling. Se EH-V.2.e1)water in three states). <i>Real-world contexts:</i> Changes in size or shape of familiar objects, such as making snowballs, breaking glass, crumbling cookies, making clay models, carving wood, breaking bones; changes in state of water or other substances, such as freezing of ice cream, or ponds, melting wax or steel, puddles drying up.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Melt ice cubes using a hot plate. Use a mirror to collect steam. Demonstrate solid, liquid, and gas in states of water.• Demonstrate wax in its liquid and solid form.• Pour liquid into different shaped containers to demonstrate that water takes the shape of its container.• Blow up a balloon to show that gas is collected. Discuss if it's a solid, liquid or gas. Put a piece of paper on a table. Loosen grip on balloon to blow paper across table.• Blow up a balloon and let air out into a plastic baggie. Demonstrate and discuss the fact that you can't see the gas, but you know it's there.• Lift a book with an inflated balloon.• Draw an example of a solid, liquid and gas.• Change the shape of clay with a push or a pull, and the shape of paper with a fold or with scissors.

Resources

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard

Standard IV.2 Changes in Matter

All students will investigate, describe and analyze ways in which matter changes; describe how living things and human technology change matter and transform energy; explain how visible changes in matter are related to atoms and molecules; and how changes in matter are related to changes in energy.

Benchmarks

All students will investigate, describe and analyze ways in which matter changes:

IV.2.2. Prepare mixtures and separate them into their component parts.

Key concepts: Mixture, solution. Separation techniques—(K-2) filtration, using sieves, using magnets, floating vs. sinking; (3-5) dissolving soluble substances, evaporating.

Tools: Filter paper, funnels, magnets, sieves, beakers, solar stills.

Real-world contexts: Mixtures of various kinds—salt and pepper, iron filings and sand, sand and sugar, rocks and wood chips, sand and gravel, sugar or salt solutions.

Sample Activity/Assessment tasks

- Combine mixture of solids i.e. rice, macaroni, dried peas. Give each child $\frac{1}{2}$ teaspoon full on paper towel. Have children sort using tweezers. Graph results. Summarize graph results—How many pieces of rice? Macaroni? Peas? Which had the most? Least?
- Combine a mixture of solid and liquid i.e. water and aquarium rocks. Use a clear cup. E.g., each child has a cup of water and aquarium rock mixture. Separate mixture with tweezers.
- Dissolve salt into hot water. Separate salt and water by painting a picture on black construction paper. Water will evaporate leaving a salt picture.

Resources

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

Grade: Elementary

Standard	Standard IV.2 Changes in Matter All students will investigate, describe and analyze ways in which matter changes; describe how living things and human technology change matter and transform energy; explain how visible changes in matter are related to atoms and molecules; and how changes in matter are related to changes in energy.
Benchmarks	All students will explain how visible changes in matter are related to atoms and molecules: There are no elementary benchmarks about atoms or molecules.
Sample Activity/Assessment tasks	
Resources	

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard

Standard IV.2 Changes in Matter

All students will investigate, describe and analyze ways in which matter changes; describe how living things and human technology change matter and transform energy; explain how visible changes in matter are related to atoms and molecules; and how changes in matter are related to changes in energy.

Benchmarks

All students will explain how changes in matter are related to changes in energy and how living things and human technology change matter and transform energy.

For a related elementary benchmark, see PCM-IV.2e.1 heating and cooling cause melting and freezing.

Sample Activity/Assessment tasks

- Melt ice cubes using a hot plate. Use a mirror to collect steam. Demonstrate solid, liquid, and gas in states of water.
- Demonstrate wax in its liquid and solid form.

Resources

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard	Standard IV.3 Motion of Objects All students will describe how things around us move and explain why things move as they do; demonstrate and explain how we control the motions of objects; and relate motion to energy and energy conversions.
Benchmarks	All students will describe how things around us move, explain why things move as they do, and demonstrate and explain how we control the motions of objects: IV.3.1. Describe or compare motions of common objects in terms of speed and direction. <i>Key concepts:</i> Words—east, west, north, south, right, left, up, down. Speed words—fast, slow, faster, slower. <i>Real-world contexts:</i> Motions of familiar objects in two dimensions, including rolling or thrown balls, wheeled vehicles, sliding objects.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Prove that nothing changes its motion without a push or a pull by observing an object that is still and then by pushing or pulling it. Stop an object that is moving with a push or a pull.• Explain vocabulary—words with er and est—fast, faster, fastest Directional words—under, over, up, down, below• Compare gravity to friction and describe how these two forces impact the motion of objects. Respond to the pull of gravity on a paper ball tossed straight up, straight down, and horizontally.• Rub hands together to feel the frictional warmth. Rub hands flat across a desk with marbles under hands and with soapy water on the desk to compare the amount of friction.
Resources	

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard	Standard IV.3 Motion of Objects All students will describe how things around us move and explain why things move as they do; demonstrate and explain how we control the motions of objects; and relate motion to energy and energy conversions.
Benchmarks	All students will describe how things around us move, explain why things move as they do, and demonstrate and explain how we control the motions of objects: IV.3.2. Explain how forces (pushes or pulls) are needed to speed up, slow down, stop, or change the direction of a moving object. <i>Key concepts:</i> Changes in motion—speeding up, slowing down, turning. Common forces—push, pull, friction, gravity. Size of change is related to strength of push or pull. <i>Real-world contexts:</i> Playing ball, moving chairs, sliding objects.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Compare gravity to friction and describe how these two forces impact the movements of an object.• Describe motion in terms of speed, direction, and force.• Rub hands together to feel the frictional warmth. Rub hands flat across a desk with marbles under hands and with soapy water on the desk to compare the amount of friction.• Change the movement of a ball by pushing or pulling it. Show the movement of a ball can be started, stopped, increased or decreased in speed.
Resources	

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard	Standard IV.3 Motion of Objects All students will describe how things around us move and explain why things move as they do; demonstrate and explain how we control the motions of objects; and relate motion to energy and energy conversions.
Benchmarks	All students will describe how things around us move, explain why things move as they do, and demonstrate and explain how we control the motions of objects: IV.3.3. Describe patterns of interaction of magnetic materials with other magnetic and non-magnetic materials. <i>Key concepts:</i> Magnetic poles, magnetic attraction and repulsion. <i>Tools:</i> Magnets, variety of magnetic and nonmagnetic materials (K-2), magnetic compass (3-5). <i>Real-world contexts:</i> Common magnets, using a magnetic compass to find direction.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Compare two poles of magnets. Define vocabulary: repel and attract• Categorize objects that can and cannot be attracted to magnets.• Pick up magnets with each of the ends of the magnet. Record the numbers. Graph which part is the strongest.• Discover if magnets can be attracted through different materials.• Extension: Create toys using magnetic attraction, e.g., Cut out a tissue paper kite. Attach thread and a paper clip. Tape the thread's tail to a table. Use a magnet to pick up kite without touching it.
Resources	

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard	Standard IV.3 Motion of Objects All students will describe how things around us move and explain why things move as they do; demonstrate and explain how we control the motions of objects; and relate motion to energy and energy conversions.
Benchmarks	All students will describe how things around us move, explain why things move as they do, and demonstrate and explain how we control the motions of objects: IV.3.4. Identify and use simple machines and describe how they change effort. <i>Key concepts:</i> Inclined planes, levers, pulleys, wedges, wheel and axle; force, distance. <i>Real-world contexts:</i> Block and tackles, ramps, screwdrivers and screws, can openers, see-saws.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Make simple machines (levers, screws, inclined planes, wheel and axles, pulleys, and wedges) and describe how they work.
Resources	

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard	Standard IV.3 Motion of Objects All students will describe how things around us move and explain why things move as they do; demonstrate and explain how we control the motions of objects; and relate motion to energy and energy conversions.
Benchmarks	All students will describe how things around us move, explain why things move as they do, and demonstrate and explain how we control the motions of objects: IV.3.5. Manipulate simple mechanical devices and explain how their parts work together. <i>Key concepts:</i> Names and uses for parts of machines, such as levers, wheel and axles, pulleys, inclined planes, gears, screws, wedges. <i>Real-world contexts:</i> Simple mechanical devices, such as bicycles, bicycle pumps, pulleys, faucets, clothespins, can openers.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Make simple toys that move with twisted rubber bands, air, wheels and axles moving down a ramp, simple pulleys. Explain what causes them to change their motion.
Resources	

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard	Standard IV.4 Waves and Vibrations All students will describe sounds and sound waves; explain shadows, color, and other light phenomena; measure and describe vibrations and waves; and explain how waves and vibrations transfer energy.
Benchmarks	All students will describe sounds and sound waves: IV.4.1. Describe sounds in terms of their properties. <i>Key concepts:</i> Properties: Pitch—high, low. Loudness—loud, soft. <i>Real-world contexts:</i> Sound from common sources, such as musical instruments, radio, television, animal sounds, thunder, human voices.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Using different thickness of rubber bands around a small box, compare the different pitches.• Pluck a rubber band stretched to different lengths to compare the different pitches.• Hit small and large tuning forks off the edge of a shoe. Describe the pitch.• Create loud and soft sounds by hitting an object harder and softer.
Resources	

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard	Standard IV.4 Waves and Vibrations All students will describe sounds and sound waves; explain shadows, color, and other light phenomena; measure and describe vibrations and waves; and explain how waves and vibrations transfer energy.
Benchmarks	All students will describe sounds and sound waves: IV.4.2. Explain how sounds are made. <i>Key concepts:</i> Vibrations—fast, slow, large, small. <i>Real-world contexts:</i> Sounds from common sources, such as musical instruments, radio, television, animal sounds, thunder, human voices.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Create vibrations with a yardstick placed on a table with varying lengths hanging off the end.• Listen to the pitch of the sounds of the sounds of the vibrations.• Make paper cup telephones.
Resources	

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard	Standard IV.4 Waves and Vibrations All students will describe sounds and sound waves; explain shadows, color, and other light phenomena; measure and describe vibrations and waves; and explain how waves and vibrations transfer energy.
Benchmarks	All students will explain shadows, color, and other light phenomena: IV.4.3. Use prisms and filters with light sources to produce various colors of light. <i>Key Concepts:</i> White light is composed of different colors. <i>Tools:</i> Prisms, color filters, colored lights. <i>Real-world contexts:</i> Light from common sources, such as sun, stars, light bulb, colored lights, firefly, candle, flashlight, various prisms.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Create rainbows using prisms, bubbles and water with light shining through them.• Show that the path of light can change by reflecting light off mirrors and directing it to a target.• Show that light is dimmer as it travels away by observing the light from a flashlight as it moves closer, then far away.• Demonstrate that dark colors absorb more heat from light than light colors do by shining a light on a thermometer wrapped in black vs. white construction paper.• Explain that an object absorbs all colors from light except the color seen, and that color is reflected to our eyes.• Show that light is necessary for us to see colors, shapes, and sizes by looking into a tube that is connected to a closed and taped box.
Resources	

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard	Standard IV.4 Waves and Vibrations All students will describe sounds and sound waves; explain shadows, color, and other light phenomena; measure and describe vibrations and waves; and explain how waves and vibrations transfer energy.
Benchmarks	All students will explain shadows, color, and other light phenomena: IV.4.4. Explain how shadows are made. <i>Key concepts:</i> Shadow, blocked path, surface, object, light moves outward from source in straight lines. <i>Real-world contexts:</i> Shadows made on surfaces by putting objects in the path of light from common sources, including sunlight, light bulbs, projectors. Changes in size of shadows due to distance from object.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Describe the path of light as straight. They can shine a light through a box with holes in it to see where the light comes out.• Create shadows by having an object block light.
Resources	

Science Curriculum

Strand V. Using Scientific Knowledge in Earth Science

**Grade: Elementary
K-2**

Standard	Standard V.1 The Geosphere All students will describe the earth's surface; describe and explain how the earth's features change over time; and analyze effects of technology on the earth's surface and resources.
Benchmarks	All students will describe the earth's surface: V.1.1. Describe major features of the earth's surface. <i>Key concepts:</i> Types of landforms—mountains, plains, valleys; bodies of water—rivers, oceans, lakes (see EH-V.2 e.2); deserts. <i>Real-world contexts:</i> Examples of Michigan surface features, such as hills, valleys, rivers, waterfalls, Great Lakes; pictures of global land features, including mountains, deserts.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Recognize that the earth has land and water. Predict whether the earth has more land or water. Use an inflatable globe to toss around. Notice where right index finger is when the globe is caught. Record with tally marks, then graph the tally marks as to the number of marks for water and land areas. (K-1)• Construct land types—hills, mountains, plains, and valleys. Use moistened sand to construct models of each of these land types. (1)• Identify areas that rivers flow and lakes form by using the sand model. (1)
Resources	

Science Curriculum

Strand V. Using Scientific Knowledge in Earth Science

**Grade: Elementary
K-2**

Standard	Standard V.1 The Geosphere All students will describe the earth's surface; describe and explain how the earth's features change over time; and analyze effects of technology on the earth's surface and resources.
Benchmarks	All students will describe the earth's surface: V.1.2. Recognize and describe different types of earth materials. <i>Key concepts:</i> Materials—mineral, rock, boulder, gravel, sand, clay, soil. <i>Tools:</i> Hand lens. <i>Real-world contexts:</i> Samples of natural earth materials, such as rocks, sand, soil, ores.
Sample Activity/Assessment tasks	
Resources	

Science Curriculum

Strand V. Using Scientific Knowledge in Earth Science

**Grade: Elementary
K-2**

Standard	Standard V.1 The Geosphere All students will describe the earth's surface; describe and explain how the earth's features change over time; and analyze effects of technology on the earth's surface and resources.
Benchmarks	All students will describe and explain how the earth's features change over time: V.1.3. Describe natural changes in the earth's surface. <i>Key concepts:</i> Causes of changes—volcanoes, earthquakes, erosion (water, wind, gravity, glaciers). Results of change—valleys, hills, lakes, widened rivers, mountains, cracks, movement of earth materials (boulders, gravel, sand, clay). <i>Real-world contexts:</i> Places around the school where erosion has occurred, such as gullies formed in down-hill gravel areas, cracks in asphalt. Places beyond the school where changes have occurred, such as volcanic mountains, shorelines, landslides, sand dunes, slopes, river valleys.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Observe the results of erosion on a sand model by using a spray bottle/mister and watch what happens to the sand.
Resources	

Science Curriculum

Strand V. Using Scientific Knowledge in Earth Science

**Grade: Elementary
K-2**

Standard

Standard V.1 The Geosphere

All students will describe the earth's surface; describe and explain how the earth's features change over time; and analyze effects of technology on the earth's surface and resources.

Benchmarks

All students will describe and explain how the earth's features change over time:

V.1.4. Explain how rocks and fossils are used to understand the history of the earth.

Key concepts: Fossils, extinct plants and animals, ages of fossils, rock layers. See LE-III.4 e.1 (ancient life.)

Real-world contexts: Fossils found in gravel, mines, quarries, beaches (Petosky stones), museum displays; Michigan examples of layered rocks; specific examples of extinct plants and animals, such as dinosaurs.

Sample Activity/Assessment tasks

Resources

Science Curriculum

Strand V. Using Scientific Knowledge in Earth Science

**Grade: Elementary
K-2**

Standard	Standard V.1 The Geosphere All students will describe the earth's surface; describe and explain how the earth's features change over time; and analyze effects of technology on the earth's surface and resources.
Benchmarks	All students will analyze effects of technology on the earth's surface and resources: V.1.5. Describe uses of materials taken from the earth. <i>Key concepts:</i> Transportation, building materials, energy, water (see EH-V.2 e.3.) <i>Real-world contexts:</i> Examples of uses of earth materials, such as gravel into concrete for walls, gypsum into drywall, sand into glass for windows, road salt, ores into metal for chairs, oil into gasoline for cars, coal burned to produce electricity, water for hydroelectric power. Samples of manufactured materials, such as concrete, drywall, asphalt, iron and steel.
Sample Activity/Assessment tasks	
Resources	

Science Curriculum

Strand V. Using Scientific Knowledge in Earth Science

**Grade: Elementary
K-2**

Standard	Standard V.1 The Geosphere All students will describe the earth's surface; describe and explain how the earth's features change over time; and analyze effects of technology on the earth's surface and resources.
Benchmarks	All students will analyze effects of technology on the earth's surface and resources: V.1.6. Demonstrate ways to conserve natural resources and reduce pollution through reduction, reuse, and recycling of manufactured materials. <i>Key concepts:</i> Materials that can be recycled—paper, metal, glass, plastic. Conservation and anti-pollution activities—reduce, reuse, recycle. <i>Real-world contexts:</i> Collections of recyclable materials, plans for recycling at home and school, composting, ways of reusing or reducing the use of paper.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Discuss uses of water—drinking, bathing, swimming, etc.• Discuss ways the importance of and ways to conserve water.
Resources	

Science Curriculum

Strand V. Using Scientific Knowledge in Earth Science

**Grade: Elementary
K-2**

Standard	Standard V.2 The Hydrosphere All students will demonstrate where water is found on earth; describe the characteristics of water and how water moves; and analyze the interaction of human activities with the hydrosphere.
Benchmarks	All students will describe the characteristics of water and demonstrate where water is found on earth: V.2.1. Describe how water exists on earth in three states. <i>Key concepts:</i> Liquid (K-2)—visible, flowing, melting, dew. Solid (K-2)—hard, visible, freezing, ice. Gas (3-5)—invisible, water vapor, moisture, evaporating. See PCM-IV.2 e.1. <i>Real-world contexts:</i> Examples of water in each state, including dew, rain, snow, ice, evidence of moisture in the air, such as “fog” on cold bathroom mirrors; examples of melting, freezing, and evaporating.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Demonstrate knowledge of melting ice from a solid into a liquid. (1)
Resources	

Science Curriculum

Strand V. Using Scientific Knowledge in Earth Science

**Grade: Elementary
K-2**

Standard	Standard V.2 The Hydrosphere All students will demonstrate where water is found on earth; describe the characteristics of water and how water moves; and analyze the interaction of human activities with the hydrosphere.
Benchmarks	All students will describe how water moves: V.2.2. Trace the path that rain water follows after it falls. <i>Key concepts:</i> Precipitation—see EAW-V.3 e.1. Flow—downhill, to rivers, into the ground. Bodies of water—streams, rivers, lakes, oceans. See EG-V.1 e.1 (earth features). <i>Real-world contexts:</i> Examples of water flowing locally, including gutters, drains, streams, wetlands.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Trace or draw the path of a raindrop after it falls from a cloud. (1)• Compare salt water and fresh water by taste. Identify fresh water as drinking water. (1)

Resources	<u>The River Grows</u>
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Science Curriculum

Strand V. Using Scientific Knowledge in Earth Science	Grade: Elementary K-2
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Standard	Standard V.2 The Hydrosphere All students will demonstrate where water is found on earth; describe the characteristics of water and how water moves; and analyze the interaction of human activities with the hydrosphere.
Benchmarks	All students will analyze the interaction of human activities with the hydrosphere: V.2.3. Identify sources of water and its uses. <i>Key concepts:</i> Water sources—wells, springs, Great Lakes, rivers. Household uses—drinking, cleaning, food preparation. Public uses—generate electricity, recreation, irrigation, transportation, industry. <i>Real-world contexts:</i> Examples of local sources of drinking water, including wells, rivers, lakes. Examples of local occasions when water is used, including car wash, swimming, fire hydrants, drinking, food preparation, cleaning, watering lawn, bathing, fishing, boating, shipping on the Great Lakes.
Sample Activity/Assessment tasks	<ul style="list-style-type: none"> • Identify the source of water, in particular, ground water, springs, lakes, and rivers. • Identify and draw uses of water within the school and community. (1) • Identify water uses for transportation, cleaning, recreation, growing plants, and an important drink for animals. (1)

Resources

Science Curriculum

Strand V. Using Scientific Knowledge in Earth Science

**Grade: Elementary
K-2**

Standard

Standard V.3 The Atmosphere and Weather

All students will investigate and describe what makes up weather and how it changes from day to day, from season to season and over long periods of time; explain what causes different kinds of weather; and analyze the relationships between human activities and the atmosphere.

Benchmarks

All students will investigate and describe what makes up weather and how it changes from day to day, from season to season and over long periods of time:

V.3.1. Describe weather conditions.

Key concepts: Atmosphere is a blanket of air around the earth, air is a substance; see PME-IV.1 e.1 (attributes of substances). Air has temperature— cold, hot, warm, cool. Cloud cover—cloudy, partly cloudy; foggy. Precipitation—rain, snow, hail, freezing rain. Wind—breezy, windy, calm. Severe weather— thunderstorms, lightning, tornadoes, high winds, blizzards.

Tools: Thermometer, wind sock, rain gauge.

Real-world contexts: Daily changes in weather; examples of severe weather.

Sample Activity/Assessment tasks

- Graph weather and temperature daily during calendar time. (1)
- Identify weather as a system of air temperature and movement with water in its solid, liquid and gas forms as fog, clouds, rain, snow, hail, sleet, and water vapor. (2)
- Read a satellite picture of clouds over Midwest states to determine which areas may have precipitation and which may have fair weather. (2)

Resources

Science Curriculum

Strand V. Using Scientific Knowledge in Earth Science

**Grade: Elementary
K-2**

Standard

Standard V.3 The Atmosphere and Weather

All students will investigate and describe what makes up weather and how it changes from day to day, from season to season and over long periods of time; explain what causes different kinds of weather; and analyze the relationships between human activities and the atmosphere.

Benchmarks

All students will investigate and describe what makes up weather and how it changes from day to day, from season to season and over long periods of time:

V.3.2. Describe seasonal changes in Michigan’s weather.

Key concepts: Seasons and types of weather—fall, cool nights and warm days; winter—snowy and constantly cold, getting dark early in the evening; spring—warmer days, often rainy with thunderstorms; summer—hot days and warm nights, daylight lasting until late in the evening.

Real-world contexts: Examples of visible seasonal changes in nature.

Sample Activity/Assessment tasks

- Relate planned activities to weather reports. (2)
- Match clothes they would wear to weather. (K)
- Identify and chart seasonal trends in weather. (2)

Resources

Science Curriculum

Strand V. Using Scientific Knowledge in Earth Science

**Grade: Elementary
K-2**

Standard	Standard V.3 The Atmosphere and Weather All students will investigate and describe what makes up weather and how it changes from day to day, from season to season and over long periods of time; explain what causes different kinds of weather; and analyze the relationships between human activities and the atmosphere.
Benchmarks	All students will analyze the relationships between human activities and the atmosphere: V.3.3. Explain appropriate safety precautions during severe weather. <i>Key concepts:</i> Safety precautions—safe locations, sirens, radio broadcasts, severe weather watch and warning. <i>Real-world contexts:</i> Examples of local severe weather, including thunderstorms, tornadoes and blizzards, examples of local community safety precautions, including weather bulletins and tornado sirens.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Explain how to protect oneself during extreme weather like tornados, blizzards, and thunderstorms.

Resources

Science Curriculum

Strand V. Using Scientific Knowledge in Earth Science

**Grade: Elementary
K-2**

Standard

Standard V.4 The Solar System, Galaxy and Universe

All students will compare and contrast our planet and sun to other planets and star systems; describe and explain how objects in the solar system move; explain scientific theories as to the origin of the solar system; and explain how we learn about the universe.

Benchmarks

All students will compare and contrast our planet and sun to other planets and star systems.

V.4.1. Compare and contrast characteristics of the sun, moon and earth.

Key concepts: Planet, star, sphere, space, solar system, larger/smaller, closer/farther, heat, light.

Real-world contexts: Observations of the moon, earth, and safe observations of the sun.

**Sample
Activity/Assessment
tasks**

- Identify telescopes, space explorers, satellites, observation to recognize patterns in the movements of objects in space as ways to learn about our solar system.
- Identify the sun, moon, and earth. (2)
- Compare and contrast the characteristics of the sun, moon, and earth. (2)

Resources	
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Science Curriculum

Strand V. Using Scientific Knowledge in Earth Science	Grade: Elementary K-2
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Standard	<p>Standard V.4 The Solar System, Galaxy and Universe All students will compare and contrast our planet and sun to other planets and star systems; describe and explain how objects in the solar system move; explain scientific theories as to the origin of the solar system; and explain how we learn about the universe.</p>
Benchmarks	<p>All students will describe and explain how objects in the solar system move. V.4.2. Describe the motion of the earth around the sun and the moon around the earth. <i>Key concepts:</i> Spin, orbit, length of day, nighttime, month, year, observed movement of the sun and stars across the sky, observed movement of the moon from day to day, calendar. <i>Real-world contexts:</i> Outdoor observing of the sun's and star's motions during the night and moon's motions over several days.</p>
Sample Activity/Assessment tasks	<ul style="list-style-type: none"> • Describe and act out the rotation of the earth in front of the sun, which causes daytime and nighttime. (2) • Act out the orbit of the moon around the earth and record the patterns of moon shapes one month and describe that pattern. (2) • Describe the orbit of the earth around the sun as a yearly event. (2)

Resources	

Science Curriculum

Strand I. Constructing New Scientific Knowledge

**Grade: Elementary
K-2**

Standard	Standard I.1 Constructing New Scientific Knowledge All students will ask questions that help them learn about the world; design and conduct investigations using appropriate methodology and technology; learn from books and other sources of information; communicate their findings using appropriate technology; and reconstruct previously learned knowledge.
Benchmarks	All students will ask questions that help them learn about the world: I.1.1. Generate questions about the world based on observation. <i>Key concepts:</i> Questions lead to action, including careful observation and testing; questions often begin with “What happens if...?” or “How do these two things differ?” <i>Real-world contexts:</i> Any in the sections on Using Scientific Knowledge.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Based on observations on nature walks, previous explorations, and observations of materials, ask testable questions, such as: <i>What if we...</i> <i>What would happen if...</i> <i>Which would be (faster, hotter, easier, more, less, comparable)?</i> For instance, after observing caterpillar larva eating leaves, students may ask, “Will caterpillars eat anything else?”
Resources	Young Entomologists’ Society, <i>A Beginner’s Guide to Observing and Collecting Insects</i> , Young Entomologists’ Society, Inc. Michigan, 1994 Morgan, Sally, <i>Butterflies, Bugs, and Worms (Young Discoverers: Biological Facts and Experiments Series)</i> Kramer, Stephen, <i>How to Think Like a Scientist</i> , Crowell, 1987

Science Curriculum

Strand I. Constructing New Scientific Knowledge

**Grade: Elementary
K-2**

Standard	Standard I.1 Constructing New Scientific Knowledge All students will ask questions that help them learn about the world; design and conduct investigations using appropriate methodology and technology; learn from books and other sources of information; communicate their findings using appropriate technology; and reconstruct previously learned knowledge.
Benchmarks	All students will design and conduct investigations using appropriate methodology and technology: I.1.2. Develop solutions to problems through reasoning, observation, and investigations.. <i>Key concepts: (K-2) gather information, ask questions, think; (3-5) observe, predict, collect data, draw conclusions, conduct fair test; prior knowledge.</i> <i>Real-world contexts: Any in the sections on Using Scientific Knowledge.</i>
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Set up investigations that will answer testable questions and make predictions. Decide which materials to use, what steps to take, and measure the results. <p>For example, to answer the question, “How can you design a boat that will hold five marbles?” decide which materials to use, make a prediction, decide which steps to take, create boats and test them in water with five marbles.</p>
Resources	Broekel, Ray, <i>Experiments with Air</i> , Children’s Press, 1988 Broekel, Ray, <i>Experiments with Water</i> , Children’s Press, 1988 Corbett, Scott, <i>What makes a Boat Float?</i> Little, Brown Gardner, Robert, <i>Kitchen Chemistry Science Experiments to do at Home</i> , Jullian Nesser Co. <i>Great Explorations in Math and Science, Solids, Liquids, & Gases</i> , G.E.M.S. Zike, Dinah, <i>Cross-Curricular Classrooms Thematic Manipulations: Water, Hydrosphere, Ocean, Fresh Water, Rain Cycle</i> Van Cleave, Janice, <i>Earth Science for Every Kid: Experiments That Really Work</i> , New York, John Wiley & Sons, 1991 Van Cleave, Janice, <i>Astronomy for Every Kid: 101 Easy Experiments That Really Work</i> , 1991

Science Curriculum

Strand I. Constructing New Scientific Knowledge

**Grade: Elementary
K-2**

Standard	Standard I.1 Constructing New Scientific Knowledge All students will ask questions that help them learn about the world; design and conduct investigations using appropriate methodology and technology; learn from books and other sources of information; communicate their findings using appropriate technology; and reconstruct previously learned knowledge.
Benchmarks	All students will design and conduct investigations using appropriate methodology and technology: I.1.3. Use tools and equipment that aid observation and data collection. <i>Tools:</i> various data collection tools suitable for this level, including hand lenses, wind direction indicators, grids for sampling areas of the sky or landscape. <i>Real-world contexts:</i> Any suggested in Using Scientific Knowledge benchmarks for which students would design and/or conduct investigations.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Select the appropriate tools for investigations. A lever may be made of a ruler, cups, washer, and a dowel would be appropriate for an investigation about the best position for a fulcrum.
Resources	Broekel, Ray, <i>Experiments with Air</i> , Children's Press, 1988 Broekel, Ray, <i>Experiments with Water</i> , Children's Press, 1988 Corbett, Scott, <i>What makes a Boat Float?</i> Little, Brown Gardner, Robert, <i>Kitchen Chemistry Science Experiments to do at Home</i> , Jullian Nesser Co. <i>Great Explorations in Math and Science, Solids, Liquids, & Gases</i> , G.E.M.S. Zike, Dinah, <i>Cross-Curricular Classrooms Thematic Manipulations: Water, Hydrosphere, Ocean, Fresh Water, Rain Cycle</i> Van Cleave, Janice, <i>Earth Science for Every Kid: Experiments That Really Work</i> , New York, John Wiley & Sons, 1991 Van Cleave, Janice, <i>Astronomy for Every Kid: 101 Easy Experiments That Really Work</i> , New York, John Wiley & Sons, 1991

Science Curriculum

Strand I. Constructing New Scientific Knowledge

**Grade: Elementary
K-2**

<p>Standard</p>	<p>Standard I.1 Constructing New Scientific Knowledge All students will ask questions that help them learn about the world; design and conduct investigations using appropriate methodology and technology; learn from books and other sources of information; communicate their findings using appropriate technology; and reconstruct previously learned knowledge.</p>
<p>Benchmarks</p>	<p>All students will design and conduct investigations using appropriate methodology and technology: I.1.4. Use simple measurement devices to make measurements in scientific investigations. <i>Key concepts:</i> Measurement units—milliliters, liters, millimeter, centimeter, meter, gram, teaspoon, tablespoon, ounce, cup. <i>Measurement tools:</i> Measuring cups and spoons, measuring tape, thermometer, graduated cylinder, scale, rulers. <i>Real-world contexts:</i> Making simple mixtures, such as food, play dough, paper mache; measuring height of a person, weight of a ball.</p>
<p>Sample Activity/Assessment tasks</p>	<p>Use hand lenses, grids, rulers, balance scales, spring scales, and thermometers to measure the results of their investigations.</p>
<p>Resources</p>	<p>Broekel, Ray, <i>Experiments with Air</i>, Children’s Press, 1988 Broekel, Ray, <i>Experiments with Water</i>, Children’s Press, 1988 Corbett, Scott, <i>What makes a Boat Float?</i> Little, Brown Gardner, Robert, <i>Kitchen Chemistry Science Experiments to do at Home</i>, Jullian Nesser Co. <i>Great Explorations in Math and Science, Solids, Liquids, & Gases</i>, G.E.M.S. Zike, Dinah, <i>Cross-Curricular Classrooms Thematic Manipulations: Water, Hydrosphere, Ocean, Fresh Water, Rain Cycle</i> Van Cleave, Janice, <i>Earth Science for Every Kid: Experiments That Really Work</i>, New York, John Wiley & Sons, 1991 Van Cleave, Janice, <i>Astronomy for Every Kid: 101 Easy Experiments That Really Work</i>, New York, John Wiley & Sons, 1991</p>

Science Curriculum

Strand I. Constructing New Scientific Knowledge

**Grade: Elementary
K-2**

Standard	Standard I.1 Constructing New Scientific Knowledge All students will ask questions that help them learn about the world; design and conduct investigations using appropriate methodology and technology; learn from books and other sources of information; communicate their findings using appropriate technology; and reconstruct previously learned knowledge.
Benchmarks	All students will learn from books and other sources of information: I.1.5. Develop strategies and skills for information gathering and problem solving. <i>Tools:</i> Sources of information, such as reference books, trade books, magazines, web sites, other people's knowledge. <i>Real-world contexts:</i> Seeking help from or interviewing peers, adults, experts; using libraries, World Wide Web, CD-ROMs and other computer software, other resources.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Use texts, internet, trade books, games, field trips, and expert speakers to build information about their world.
Resources	Make observations on field trips. A bus trip around the neighborhood of the school and its surrounding area will allow observation of nearby types of land or bodies of water like lakes, ponds, streams, rivers, hills, valleys, and flat areas. After a rain, observe several locations around the school neighborhood with different types of soil. Dig into the soils to see how far the rain soaked down. Compare these soils to determine why the rain would soak down at different rates. Invite a representative from the zoo to visit the class with animals whose characteristics can be compared and contrasted.

Science Curriculum

Strand I. Constructing New Scientific Knowledge

**Grade: Elementary
K-2**

Standard	Standard I.1 Constructing New Scientific Knowledge All students will ask questions that help them learn about the world; design and conduct investigations using appropriate methodology and technology; learn from books and other sources of information; communicate their findings using appropriate technology; and reconstruct previously learned knowledge.
Benchmarks	All students will communicate findings of investigations, using appropriate technology. I.1.6. Construct charts and graphs and prepare summaries of observations. <i>Key concepts:</i> Increase, decrease, no change, bar graph, data table. <i>Tools:</i> Graph paper, rulers, crayons. <i>Real-world contexts:</i> Examples of bar charts like those found in a newspaper.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Show what has been learned using charts, graphs, measurements and illustrations.• Demonstrate through written or verbal presentations a new understanding of a concept.
Resources	Scholastic News Teacher Resources: <i>Making Charts And Graphs</i>

Science Curriculum

Strand II. Reflecting on Scientific Knowledge

**Grade: Elementary
K-2**

Standard	Standard II.1 Reflecting on Scientific Knowledge All students will analyze claims for their scientific merit and explain how scientists decide what constitutes scientific knowledge; how science is related to other ways of knowing; how science and technology affect our society; and how people of diverse cultures have contributed to and influenced developments in science.
Benchmarks	All students will analyze claims for their scientific merit and explain how scientists decide what constitutes scientific knowledge: II.1.1. Develop an awareness of the need for evidence in making decisions scientifically. <i>Key concepts:</i> (K-2) observations; (3-5) data, evidence, sample, fact, opinion. <i>Real-world contexts:</i> Deciding whether an explanation is supported by evidence in simple experiments, or relies on personal opinion.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Give proof (evidence) to back up a statement about has been learned. Example: “I know (<u>what I have learned</u>) because when we (<u>what was tried</u>) it (<u>what happened.</u>)” I know <u>a fulcrum should be placed closer to the load than to the force</u> because when we <u>put the fulcrum close to a load of six washers on a lever, it only took a force of two washers to raise it.</u> When we put the fulcrum farther away from the load, it took more washers to raise it.• Discuss and write journal entries answering the questions: What does the study of science tell us about God? How does God “fit” into science?
Resources	

Science Curriculum

Strand II. Reflecting on Scientific Knowledge

**Grade: Elementary
K-2**

Standard	Standard II.1 Reflecting on Scientific Knowledge All students will analyze claims for their scientific merit and explain how scientists decide what constitutes scientific knowledge; how science is related to other ways of knowing; how science and technology affect our society; and how people of diverse cultures have contributed to and influenced developments in science.
Benchmarks	All students will show how science is related to other ways of knowing: II.1.2. Show how science concepts can be illustrated through creative expression such as language arts and fine arts. <i>Key concepts:</i> Poetry, expository work, painting, drawing, music, diagrams, graphs, charts. <i>Real-world contexts:</i> Explaining simple experiments using paintings and drawings; describing natural phenomena scientifically and poetically.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Use poetry, texts, drawings, music, diagrams, graphs, role playing, and charts to explain what has been learned.
Resources	Zike, Dinah (<i>need the name of her book on making presentations using different formats</i>) <i>Hailstones and Halibut Bones</i> Hoban,Tana, <i>Look Book</i> Greenwillow , <i>Books of poems about seasons</i>

Science Curriculum

Strand II. Reflecting on Scientific Knowledge

**Grade: Elementary
K-2**

Standard	Standard II.1 Reflecting on Scientific Knowledge All students will analyze claims for their scientific merit and explain how scientists decide what constitutes scientific knowledge; how science is related to other ways of knowing; how science and technology affect our society; and how people of diverse cultures have contributed to and influenced developments in science.
Benchmarks	All students will show how science and technology affect our society: II.1.3. Describe ways in which technology is used in everyday life. <i>Key concepts:</i> Provide faster and farther transportation and communication, organize information and solves problems, save time. <i>Real-world contexts:</i> Cars, other machines, radios, telephones, computer games, calculators, appliances, e-mail, the World Wide Web.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Identify ways in which cars, other machines, computers, chemicals, etc. can help in our everyday lives. For example, list all the ways in which people can travel to school, including walking, riding a bike, using a horse and buggy, a car, or a helicopter.• Role play ways to hear the latest news.• Compare the way pioneers, Native Americans, and modern people communicated their history, news, and stories.• Describe how we use technology to make sure God’s people are protected and cared for in our society.• Describe cleaning chemicals parents use in homes.• Describe ways in which computers are used to solve problems, help with shopping, create art, stories, and letters.• Compare how early people and modern people accomplished tasks like washing clothes, cooking, taking baths, cleaning the house, making sure there is enough food for the family.
Resources	Visit a museum with tools and appliances used by people over the ages.

Science Curriculum

Strand II. Reflecting on Scientific Knowledge

**Grade: Elementary
K-2**

Standard	Standard II.1 Reflecting on Scientific Knowledge All students will analyze claims for their scientific merit and explain how scientists decide what constitutes scientific knowledge; how science is related to other ways of knowing; how science and technology affect our society; and how people of diverse cultures have contributed to and influenced developments in science.
Benchmarks	All students will show how science and technology affect our society: II.1.4. Develop an awareness of and sensitivity to the natural world. <i>Key concepts:</i> Appreciation of the balance of nature and the effects organisms have on each other, including the effects humans have on the natural world. <i>Real-world contexts:</i> Any in the sections on Using Scientific Knowledge appropriate to elementary school.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Learn how cars and litter can help or hinder the way we solve problems in our environment.• Identify ways in which cars, other machines, computers, chemicals, and forms of waste, etc. can help or hurt our environment. For example compare a place where healthy plants are growing to a place where plants are dieing, try to determine if (road salt, dumped oil,) makes a difference in how plants grow.• Identify ways in which students can help the environment. For example, determine ways to reuse materials, pick up and dispose of litter, and use recycling systems.• Determine ways to save resources like gasoline or water.
Resources	Have a waste management representative talk to students about how the company disposes of the garbage from student's school and homes. Have city water purification system representative talk to students about dangerous things that people are disposing of in city water resources.

Science Curriculum

Strand II. Reflecting on Scientific Knowledge

Grade: Elementary
K-2

Standard	Standard II.1 Reflecting on Scientific Knowledge All students will analyze claims for their scientific merit and explain how scientists decide what constitutes scientific knowledge; how science is related to other ways of knowing; how science and technology affect our society; and how people of diverse cultures have contributed to and influenced developments in science.
Benchmarks	All students will show how people of diverse cultures have contributed to and influenced developments in science: II.1.5. Develop an awareness of contributions made to science by people of diverse backgrounds and cultures. <i>Key concepts:</i> Scientific contributions made by people of diverse cultures and backgrounds. <i>Real-world contexts:</i> Any in the sections on Using Scientific Knowledge appropriate to this benchmark.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Read or hear about people of different cultures and backgrounds who make scientific contributions.
Resources	Speakers of different ethnic, gender, nationality, disability, can describe their contributions to science, their science related jobs, or they can explain new science ideas to the children. A person with an east Indian background can help a class create a paper bridge that will hold the most weight. An employee from the local zoo, who uses a wheelchair for mobility, can help the children create a food-web.

Biographies of people of diverse backgrounds and cultures that have made contributions to science.

Science Curriculum

Strand III. Using Scientific Knowledge in Life Science

Grade: Elementary

Standard	Standard III.1 Cells All students will apply an understanding of cells to the functioning of multicellular organisms; and explain how cells grow, develop and reproduce.
Benchmarks	All students will apply an understanding of cells to the functioning of multicellular organisms, including how cells grow, develop and reproduce: (No benchmark about cells at the elementary level)
Sample Activity/Assessment tasks	
Resources	

Science Curriculum

Strand III. Using Scientific Knowledge in Life Science

**Grade: Elementary
K-2**

Standard	Standard III.2 The Organization of Living Things All students will use classification systems to describe groups of living things; compare and contrast differences in the life cycles of living things; investigate and explain how living things obtain and use energy; and analyze how parts of living things are adapted to carry out specific functions.
Benchmarks	All students will use classification systems to describe groups of living things: III.2.1. Explain characteristics and functions of observable body parts in a variety of animals. <i>Key concepts:</i> Observable characteristics—fur, scales, feathers, horns, claws, eyes, quills, beaks, teeth, skeleton, muscles, exoskeleton; functions—insulation, support, movement, food-getting, protection. <i>Real-world contexts:</i> Vertebrate and invertebrate animals, such as humans, cows, sparrows, goldfish, spiders, crayfish, insects.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Observe and describe the characteristics of a variety of plants and animals in woodland freshwater environment.• Observe and compare two fossils, a fern and a sea snail.• Observe and diagram the parts and functions of a caterpillar and a butterfly. Compare the parts and functions of both of them.• Make a mural showing God's creation from Genesis.• Create a mural of animal families.• Create a Venn diagram comparing birds to fish.• Use construction paper to make a fish with all parts. Explain each part and its function.
Resources	Fowler , Allan, <u>It Could Still Be a Worm (Rookie Read-Aloud Science)</u> Lauber Patricia, <u>Furs, Feathers, and Flippers: How Animals Live Where They Do</u> Taylor, Barbara, <u>Animal Hide and Seek</u> Visit a zoo to compare animals in each family.

Science Curriculum

Strand III. Using Scientific Knowledge in Life Science

**Grade: Elementary
K-2**

Standard	Standard III.2 The Organization of Living Things All students will use classification systems to describe groups of living things; compare and contrast differences in the life cycles of living things; investigate and explain how living things obtain and use energy; and analyze how parts of living things are adapted to carry out specific functions.
Benchmarks	All students will use classification systems to describe groups of living things: III.2.2. Compare and contrast (K-2) or classify (3-5) familiar organisms on the basis of observable physical characteristics. <i>Key concepts:</i> Plant and animal parts—backbone, skin, shell, limbs, roots, leaves, stems, flowers, feathers, scales. <i>Real-world contexts:</i> Animals that look similar—snakes, worms, millipedes; flowering and non-flowering plants; pine tree, oak tree, rose, algae.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Use Venn diagrams to compare and contrast and show similarities and differences in: Animals: guppies and snails Plants: moss and tree seedlings• Observe and diagram the parts and functions of a caterpillar and a butterfly. Compare the parts and functions of both of them.
Resources	Guppies and snails can be purchased at local pet stores. Tree seedlings and moss may be purchased through county extension offices or local nurseries. Visit a “bug house” in a local zoo or educational institution. Have trained docents show the students different characteristics of the insects. Have an entomologist come to the building and talk to the students about insects and their parts. Nash, Pamela, <i>See How It Grows Series</i> , Modern Curriculum Press, Cleveland, 1983

Good, Rona and Nancy, *Insect Metamorphosis From Egg to Adult*, Macmillan, New York, 1990

Science Curriculum

Strand III. Using Scientific Knowledge in Life Science

**Grade: Elementary
K-2**

Standard	Standard III.2 The Organization of Living Things All students will use classification systems to describe groups of living things; compare and contrast differences in the life cycles of living things; investigate and explain how living things obtain and use energy; and analyze how parts of living things are adapted to carry out specific functions.
Benchmarks	All students will compare and contrast differences in the life cycles of living things: III.2.3. Describe life cycles of familiar organisms. <i>Key concepts:</i> Life cycle stages—egg, young, adult; seed, plant, flower, fruit; larva, pupa. <i>Real-world contexts:</i> Common plants and animals such as bean plants, apple trees, butterflies, grasshoppers frogs, birds.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Observe behaviors of woodland and freshwater animals. Observable Life Cycle --Snails will lay eggs on sides of aquarium. Look for and circle with a laundry pen. --Guppies often have babies (and will eat them).• Observe, draw, and describe a monarch butterfly as it grows through its life stages. (and /or tadpoles to frogs, newts to salamanders)• Make connection between the life cycle of a butterfly and new life from the sacraments of Reconciliation and First Communion.
Resources	Hogan, Paula, <i>The Life Cycle of the Butterfly</i> , Platt and Munk, New York, 1992 Kent, Jack, <i>The Caterpillar and the Polliwog</i> , Prentice-hall, New Jersey, 1982

Science Curriculum

Strand III. Using Scientific Knowledge in Life Science

**Grade: Elementary
K-2**

Standard	<p>Standard III.2 The Organization of Living Things All students will use classification systems to describe groups of living things; compare and contrast differences in the life cycles of living things; investigate and explain how living things obtain and use energy; and analyze how parts of living things are adapted to carry out specific functions.</p>
Benchmarks	<p>All students will investigate and explain how living things obtain and use energy: III.2.4. Compare and contrast food, energy, and environmental needs of selected organisms. <i>Key concepts:</i> Life requirements—food, air, water, minerals, sunlight, space, habitat. See LEC-III.5 e.2. <i>Real-world contexts:</i> Germinating seeds, such as beans, corn; aquarium or terrarium life, such as guppy, goldfish, snail.</p>
Sample Activity/Assessment tasks	<ul style="list-style-type: none"> • Set up an aquarium and/or a terrarium to show an understanding of the basic needs of plants and animals: water, sunlight, food, and shelter. • Throw a hula hoop onto different areas—shaded/sunlight. Compare kinds and numbers of living things and amount of water and relationship between amount of water and living things. • Use clear container plantings to observe the growth from seed to plant. • Create a prayer praising God for providing everything an organism needs to survive. • Create a prayer asking God to help us take care of His living things. • Create a play about the life of a chicken.
Resources	<p>Tekulsky, Matthew, <i>The Butterfly Garden: Turning Your Garden Windowbox or Backyard into a Beautiful Home for Butterflies</i>, The Harvard Common Press, Massachusetts, 1985 Titherington, Jeanne, <i>Pumpkin, Pumpkin</i>, Scholastic Romanova, Natalia, <i>Once There Was A Tree</i>, Dial books for Young Readers, 1985 Viorst, Judith, <i>The Tenth Good Thing About Barney</i>, Atheneum, New York 1971 Visit a farm or greenhouse and see what is done during the entire year. Ask them how the weather affects their choices of plants they grow. Invite a farmer to show types of soil that would work well for plants to grow and which wouldn't. Have him</p>

explain how earthworms change the soil.

Visit a chicken farm. Explain how chickens survive in their habitat on the chicken farm. Have him explain how the chickens and their products are part of the food chain.

Science Curriculum

Strand III. Using Scientific Knowledge in Life Science

**Grade: Elementary
K-2**

Standard	Standard III.2 The Organization of Living Things All students will use classification systems to describe groups of living things; compare and contrast differences in the life cycles of living things; investigate and explain how living things obtain and use energy; and analyze how parts of living things are adapted to carry out specific functions.
Benchmarks	All students will analyze how parts of living things are adapted to carry out specific functions: III.2.5. Explain functions of selected seed plant parts. <i>Key concepts:</i> Plant parts—roots, stems, leaves, flowers, fruits, seeds. <i>Real-world contexts:</i> Common edible plant parts, such as bean, cauliflower, carrot, apple, tomato, spinach. (See LE-III.4 e.2 about functions of selected animal body parts)
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Use a clear container of plantings to observe the grown from seed to plant.• Observe plant and name the parts of plants: roots, stem, leaves, flowers, fruit, and seed.
Resources	What's Inside? Plants, Dorling Kindersley, Inc., New York http://www.dir.yahoo.com/science/biology/botany/plants/giant-pumpkins http://www.nyu.edu/projects/Julian/ Heller, Ruth, <i>The Reason for a Flower</i> , Grosset & Dunlap, New York, 1983 Heller, Ruth, <i>Plants That Never Bloom</i> , Putman & Grosset Book Group, New York 1992 Fisher, Aileen, <i>Petals Yellow and Petals Red, The Ways of Plants</i> , Bowmar Nature Series Burnie, David, <i>Plants (Eyewitness Books)</i> , Alfred A knopf, New York, 1988 Burnie, David, <i>Flowers (Eyewitness Books)</i> , Dorling Kindersley, Inc. , New York 1992 Braithwaite, Althea, <i>Trees and Leaves</i> , Troll Associates, Mahwah, new jersey, 1990

Visit a greenhouse to observe plants in different stages, from seedling to fruit.
 Arrange for a visit to a local arboretum to discover a variety of plants in different stages of growth and in different habitats.

Science Curriculum

Strand III. Using Scientific Knowledge in Life Science

**Grade: Elementary
K-2**

Standard	<p>Standard III.3 Heredity All students will investigate and explain how characteristics of living things are passed on through generations; explain why organisms within a species are different from one another; and explain how new traits can be established by changing or manipulating genes.</p>
Benchmarks	<p>All students will investigate and explain how characteristics of living things are passed on through generations: III.3.1. Give evidence that characteristics are passed from parents to young. <i>Key concepts:</i> Characteristics—hair and feather color, eye color, leaf shape, flower structure. <i>Real-world contexts:</i> Example of mature and immature organisms, such as dogs/puppies, cats/kittens, maple trees/saplings, beans/seedlings.</p>
Sample Activity/Assessment tasks	<ul style="list-style-type: none"> • Observe characteristics of self—eye color, hair color. Using photographs, compare with parents. Tabulate and graph findings. • Compare photographs of parents and siblings to see which characteristics passed from parents to child. • Observe and match animal babies with parents. • Observe, label, and illustrate the life cycles of animals and insects: frogs, butterflies, animals. • Observe the life cycle of plants. • Observe the germination of seeds in clear containers and chart their progress. • Identify and describe the function of observable body parts of animals and insects. (limbs, feathers, shells, skin, scales, and other body coverings). • Reinforce life and dignity of the Human Person. That every person is created in the image of God.
Resources	<p>Bigger Than Martin Just Like Kyla</p>

Keller, *Growing Like Me* Harcourt
Fisher, *You Don't Look Like Your Mother*, Mondo

Science Curriculum

Strand III. Using Scientific Knowledge in Life Science

**Grade: Elementary
K-2**

Standard	Standard III.3 Heredity All students will explain how scientists construct and scientifically test theories concerning the origin of life and evolution of species; compare ways that living organisms are adapted (suited) to survive and reproduce in their environments; and analyze how species change through time.
Benchmarks	All students will explain how new traits can be established by changing or manipulating genes: III.3.2. No benchmarks at this level
Sample Activity/Assessment tasks	
Resources	

Science Curriculum

Strand III. Using Scientific Knowledge in Life Science

Grade: Elementary

Standard	Standard III.3 Heredity All students will explain how scientists construct and scientifically test theories concerning the origin of life and evolution of species; compare ways that living organisms are adapted (suited) to survive and reproduce in their environments; and analyze how species change through time.
Benchmarks	All students will explain how new traits can be established by changing or manipulating genes: III.3.3. No benchmarks at this level
Sample Activity/Assessment tasks	
Resources	

Science Curriculum

Strand III. Using Scientific Knowledge in Life Science

**Grade: Elementary
K-2**

Standard	Standard III.4 Evolution All students will explain how scientists construct and scientifically test theories concerning the origin of life and evolution of species; compare ways that living organisms are adapted (suited) to survive and reproduce in their environments; and analyze how species change through time.
Benchmarks	All students will explain how scientists construct and scientifically test theories concerning the origin of life and evolution of species: III.4.1. Explain how fossils provide evidence about the nature of ancient life. <i>Key concepts:</i> Types of evidence—fossil, extinct, ancient, modern life forms. See EG-V.1 e.4 (rocks and fossils provide evidence of history of the earth). <i>Real-world contexts:</i> Common contexts—plant and animal fossils, museum dioramas and paintings/drawings of ancient life and/or habitats.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Use fossil sample and pictures to describe animals and plants that lived in ancient times, and explain the term <i>extinct</i> with examples.• Make a layered cup with play dough. The 1st layer with a shell; the 2nd layer with a small bone or orange rind. Students explain that the 1st layer is the oldest because it was laid down first.• Recognize God's mystery in nature by visiting a museum with dinosaurs and fossil collections.
Resources	Have a representative from a museum of natural history to discuss fossils, where they were found. Aliko, <i>Dinosaur Bones</i> , New York, Thomas Crowell, 1988 Butler, Daphne, <i>First Look Under the Ground</i> , Milwaukee, Gareth Stevens Children's Books, 1991 Riechecky, Janet, <i>Pachycephalosaurus</i> , Mankato, MN, Child's World 1991 Schwartz, David M., <i>How Much Is A Million?</i> New York, Lothrop, Lee & Shepard Books, 1985

Van Cleave, Janice *Earth Science for Every Kid: Experiments That Really Work* New York, John Wiley & Sons, 1991

Science Curriculum

Strand III. Using Scientific Knowledge in Life Science

**Grade: Elementary
K-2**

Standard	Standard III.4 Evolution All students will explain how scientists construct and scientifically test theories concerning the origin of life and evolution of species; compare ways that living organisms are adapted (suited) to survive and reproduce in their environments; and analyze how species change through time.
Benchmarks	All students will compare ways that living organisms are adapted (suited) to survive and reproduce in their environments and explain how species change through time: III.4.2. Explain how physical and behavioral characteristics of animals help them to survive in their environments. <i>Key concepts:</i> Characteristics—adaptation, instinct, learning, habit. Traits and their adaptive values—sharp teeth or claws for catching and killing prey, color for camouflage, behaviors. <i>Real-world contexts:</i> Common vertebrate adaptations, such as white polar bears, sharp claws and sharp canines for predators, changing colors of chameleon; behaviors, such as migration, communication of danger.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Observe the behaviors and describe the attributes of animals that help them survive in their habitats. Example: camouflage, pupils in light and dark.• Describe a habitat in terms of what it provides to living things.• Participate in predator/prey role playing games.• Recognize God’s mystery in nature by visiting a museum with dinosaurs and fossil collections.
Resources	Have a representative from a museum of natural history to discuss fossils, where they were found. Aliko, <i>Dinosaur Bones</i> , New York, Thomas Crowell, 1988 Butler, Daphne, <i>First Look Under the Ground</i> , Milwaukee, Gareth Stevens Children’s Books, 1991 Riechecky, Janet, <i>Pachycephalosaurius</i> , Mankato, MN, Child’s World 1991

Schwartz, David M., *How Much Is A Million?* New York, Lothrop, Lee & Shepard Books, 1985
 Van Cleave, Janice *Earth Science for Every Kid: Experiments That Really Work* New York, John Wiley & Sons, 1991

Science Curriculum

Strand III. Using Scientific Knowledge in Life Science

**Grade: Elementary
K-2**

Standard	<p>Standard III.5 Ecosystems All students will explain how parts of an ecosystem are related and how they interact; explain how energy is distributed to living things in an ecosystem; investigate and explain how communities of living things change over a period of time; describe how materials cycle through an ecosystem and get reused in the environment; and analyze how humans and the environment interact.</p>
Benchmarks	<p>All students will explain how parts of an ecosystem are related and how they interact: III.5.1. Identify familiar organisms as part of a food chain or food web and describe their feeding relationships within the web. <i>Key concepts:</i> Producer, consumer, predator, prey, decomposer, habitat, community. <i>Real-world contexts:</i> Food chains and food webs involving organisms, such as rabbits, birds, snakes, grasshoppers, plants.</p>
Sample Activity/Assessment tasks	<ul style="list-style-type: none"> • Diagram a food chain or a food web including plants and decomposers. • Make a food web with string. • Play a food web game using cards with plant, animal and decomposer (bugs) pictures. • Describe what happens to plants and animals in a field when humans build houses there. • Recognize that God is the creator of all life and all life is good. Create a prayer asking God for help in teaching us to take care of our world.
Resources	

Science Curriculum

Strand III. Using Scientific Knowledge in Life Science

**Grade: Elementary
K-2**

Standard	Standard III.5 Ecosystems All students will explain how parts of an ecosystem are related and how they interact; explain how energy is distributed to living things in an ecosystem; investigate and explain how communities of living things change over a period of time; describe how materials cycle through an ecosystem and get reused in the environment; and analyze how humans and the environment interact.
Benchmarks	All students will explain how energy is distributed to living things in an ecosystem: III.5.2. Describe the basic requirements for all living things to maintain their existence. <i>Key concepts:</i> Needs of life—food, habitat, water, shelter, air, light, minerals. See LO-III.2 e.4. <i>Real-world contexts:</i> Selected ecosystems, such as an aquarium, rotting log, terrarium, backyard, local pond or wetland, wood lot.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Describe the needs for life within a habitat: water, food, light, and shelter.• Using a poster picture of a habitat, pick a plant or animal and illustrate what that organism uses for survival in this habitat.• Take a nature walk in the school neighborhood to observe and record plants and animals that were seen. Choose a plant or an animal and list things in its habitat that help it survive. Describe what would happen if one item on their list were taken away.• Visit a chicken farm. Explain how chickens survive in their habitat on the chicken farm. Have him explain how the chickens and their products are part of the food chain.
Resources	

Science Curriculum

Strand III. Using Scientific Knowledge in Life Science

**Grade: Elementary
K-2**

Standard	Standard III.5 Ecosystems All students will explain how parts of an ecosystem are related and how they interact; explain how energy is distributed to living things in an ecosystem; investigate and explain how communities of living things change over a period of time; describe how materials cycle through an ecosystem and get reused in the environment; and analyze how humans and the environment interact.
Benchmarks	All students will investigate and explain how communities of living things change over a period of time: III.5.3. Design systems that encourage growing of particular plants or animals. <i>Key concepts:</i> Needs of life—food, habitat, water, shelter, air, light, minerals. <i>Real-world contexts:</i> Ecosystems managed by humans, including farms, ranches, gardens, lawns, potted plants.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">Identify and produce a habitat for woodland (terrarium) and freshwater (aquarium). Include plants: tree seedlings and moss for terrarium and/or 2 freshwater plants: cabomba and elodea for freshwater.
Resources	Terrarium plants can be purchased at local nurseries or extension offices. Freshwater plants can be purchased at local pet store in aquarium departments

Science Curriculum

Strand III. Using Scientific Knowledge in Life Science

**Grade: Elementary
K-2**

Standard	Standard III.5 Ecosystems All students will explain how parts of an ecosystem are related and how they interact; explain how energy is distributed to living things in an ecosystem; investigate and explain how communities of living things change over a period of time; describe how materials cycle through an ecosystem and get reused in the environment; and analyze how humans and the environment interact.
Benchmarks	All students will analyze how humans and the environment interact: III.5.4. Describe positive and negative effects of humans on the environment. <i>Key concepts:</i> Human effects on the environment—garbage, habitat destruction, land management, renewable and non-renewable resources. <i>Real-world contexts:</i> Household wastes, school wastes, waste water treatment, habitat destruction due to community growth, reforestation projects, establishing parks or other green spaces, recycling.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Identify what is needed to protect the environment.• Take a nature walk to pick up litter.• Recycle paper.• Discuss safe ways to use water and limit its use.• Identify better ways to dispose of toxic materials like oil, paint, batteries, and aerosol.• Make paper from construction paper scraps from the classroom.• Identify ways that sin destroys God's creation in nature.
Resources	Have a waste management representative discuss the benefits of recycling and reusing.

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard	Standard IV.1 Matter and Energy All students will measure and describe the things around us; explain what the world around us is made of; identify and describe forms of energy; and explain how electricity and magnetism interact with matter.
Benchmarks	All students will measure and describe the things around us: IV.1.1. Classify common objects and substances according to observable attributes/properties. <i>Key concepts:</i> Texture—rough, smooth. Flexibility— rigid, stiff, firm, flexible, strong. Hardness. Smell—pleasant, unpleasant. States of matter—solid, liquid, gas. Magnetic properties—attract, repel, push, pull. Size—larger, smaller (K-2); length, width, height (3-5). Sink, float. Color—common color words. Shape—circle, square, triangle, rectangle, oval. Weight—heavy, light, heavier, lighter. See PWVIV. 4 e.4 (shadows: objects that let light pass through or block light); PME-IV.1 e.2 (materials that conduct electricity); C-I.1 e.4 (use measuring devices). <i>Real-world contexts:</i> Common objects, such as desks, coins, pencils, buildings, snowflakes; common substances, including—solids, such as copper, iron, wood, plastic, Styrofoam; liquids, such as water, alcohol, milk, juice; gases such as air, helium, water vapor.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Use metric rulers, balance, spring scales, and graduated cylinders to measure objects.• Compare sandpaper, cotton, aluminum foil, and wood for texture flexibility, and hardness.• Test the sense of smell with clear glasses containing clear liquids such as almond extract, water, and white vinegar. Compare and describe the differences.• Cross curricular<ul style="list-style-type: none">Math—compare the measurement of masses with a balance, length with a ruler, weight with a spring balance, and volume (water and alcohol) with graduated cylinders.Art---Compare the colors of different fruits or vegetables.
Resources	<u>Amazing Water</u> <u>It Could Still be Water</u>

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard	Standard IV.1 Matter and Energy All students will measure and describe the things around us; explain what the world around us is made of; identify and describe forms of energy; and explain how electricity and magnetism interact with matter.
Benchmarks	All students will measure and describe the things around us: IV.1.2. Identify properties of materials which make them useful. <i>Key concepts:</i> Useful properties—unbreakable, water-proof, light-weight, conducts electricity (see PME-IV.1 e.4, electric circuits), conducts heat, attracted to a magnet, clear. See EG-V.1 e.4 (uses of earth materials). <i>Real-world contexts:</i> Appropriate selection of materials for a particular use, such as waterproof raincoat, cotton or wool for clothing, glass for windows, metal pan to conduct heat, copper wire to conduct electricity.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Compare several materials like plastic wrap, tissue paper, construction paper, and aluminum foil to see if light will pass through them.• In determining what materials could be used for a boat, find test materials to see if they are waterproof.
Resources	

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard	Standard IV.1 Matter and Energy All students will measure and describe the things around us; explain what the world around us is made of; identify and describe forms of energy; and explain how electricity and magnetism interact with matter.
Benchmarks	All students will identify and describe forms of energy: IV.1.3. Identify forms of energy associated with common phenomena. <i>Key concepts:</i> Heat, light, sound, food energy, energy of motion, electricity (see PCM-IV.2 e.1 about heat, PWV-IV.4 e.1-4 about light and sound, PME-IV.1 e.4 about electricity, LEC-III.5 e.2 about energy from food). <i>Real-world contexts:</i> Appropriate selection of energy and phenomena, such as appliances like a toaster or iron that use electricity, sun's heat to melt chocolate, water wheels, wind-up toys, warmth of sun on skin, windmills, music from guitar, simple electrical circuits with batteries, bulbs and bells.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Shine a light on thermometers in a black and a white construction paper pocket over a period of time and record the differences in temperature to see if color affects how much heat is absorbed in a material.• Use toys with wind up springs or rubber bands and describe what makes them move.• Place chocolate chips and candy kisses on a plate in the sun to see which will melt first.• Compare the difference between looking into a tightly closed box through a tube to see a small object and lifting the lid of the box.
Resources	

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard	Standard IV.1 Matter and Energy All students will measure and describe the things around us; explain what the world around us is made of; identify and describe forms of energy; and explain how electricity and magnetism interact with matter.
Benchmarks	All students will explain how electricity (and magnetism; see PMO) interact with matter: IV.1.4. Construct simple, useful electrical circuits. (3-5) <i>Key concepts and tools:</i> Complete loop; batteries, bulbs, bells, motors, wires, electrical switches (see PME-IV.1 e.2, materials that conduct electricity). <i>Real-world contexts:</i> Flashlights, battery-powered toys.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Test objects made of metal, plastic, glass, fabric, and wood to see if they are attracted to magnets.• Complete a loop to create an electrical circuit. Give each child two AA batteries and a flashlight to put together to light the flashlight.
Resources	

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard	Standard IV.1 Matter and Energy All students will measure and describe the things around us; explain what the world around us is made of; identify and describe forms of energy; and explain how electricity and magnetism interact with matter.
Benchmarks	All students will explain how electricity (and magnetism; see PMO) interact with matter: IV.1.5. Describe possible electrical hazards to be avoided at home and at school. (K-2) <i>Key concepts:</i> Shock, wall outlet, hazards; see PMEIV. 1 e.3 (electrical energy). <i>Real-world contexts:</i> Electric outlets, power lines, frayed electric cords, electric appliances, lightning, hair dryers in sinks and tubs.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Name dangerous situations where electricity is involved including electrical outlets, downed power lines, lightning and frayed cords.• Discuss the safe use of electrical appliances.
Resources	

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard	Standard IV.2 Changes in Matter All students will investigate, describe and analyze ways in which matter changes; describe how living things and human technology change matter and transform energy; explain how visible changes in matter are related to atoms and molecules; and how changes in matter are related to changes in energy.
Benchmarks	All students will investigate, describe and analyze ways in which matter changes: IV.2.1. Describe common physical changes in matter—size, shape; melting, freezing (K-2); dissolving, evaporating (3-5). <i>Key concepts:</i> States of matter—solid, liquid, gas. Changes in size and shape—bending, tearing, breaking. Processes that cause changes of state: heating, cooling. Se EH-V.2.e1)water in three states). <i>Real-world contexts:</i> Changes in size or shape of familiar objects, such as making snowballs, breaking glass, crumbling cookies, making clay models, carving wood, breaking bones; changes in state of water or other substances, such as freezing of ice cream, or ponds, melting wax or steel, puddles drying up.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Melt ice cubes using a hot plate. Use a mirror to collect steam. Demonstrate solid, liquid, and gas in states of water.• Demonstrate wax in its liquid and solid form.• Pour liquid into different shaped containers to demonstrate that water takes the shape of its container.• Blow up a balloon to show that gas is collected. Discuss if it's a solid, liquid or gas. Put a piece of paper on a table. Loosen grip on balloon to blow paper across table.• Blow up a balloon and let air out into a plastic baggie. Demonstrate and discuss the fact that you can't see the gas, but you know it's there.• Lift a book with an inflated balloon.• Draw an example of a solid, liquid and gas.• Change the shape of clay with a push or a pull, and the shape of paper with a fold or with scissors.

Resources

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard

Standard IV.2 Changes in Matter

All students will investigate, describe and analyze ways in which matter changes; describe how living things and human technology change matter and transform energy; explain how visible changes in matter are related to atoms and molecules; and how changes in matter are related to changes in energy.

Benchmarks

All students will investigate, describe and analyze ways in which matter changes:

IV.2.2. Prepare mixtures and separate them into their component parts.

Key concepts: Mixture, solution. Separation techniques—(K-2) filtration, using sieves, using magnets, floating vs. sinking; (3-5) dissolving soluble substances, evaporating.

Tools: Filter paper, funnels, magnets, sieves, beakers, solar stills.

Real-world contexts: Mixtures of various kinds—salt and pepper, iron filings and sand, sand and sugar, rocks and wood chips, sand and gravel, sugar or salt solutions.

Sample Activity/Assessment tasks

- Combine mixture of solids i.e. rice, macaroni, dried peas. Give each child $\frac{1}{2}$ teaspoon full on paper towel. Have children sort using tweezers. Graph results. Summarize graph results—How many pieces of rice? Macaroni? Peas? Which had the most? Least?
- Combine a mixture of solid and liquid i.e. water and aquarium rocks. Use a clear cup. E.g., each child has a cup of water and aquarium rock mixture. Separate mixture with tweezers.
- Dissolve salt into hot water. Separate salt and water by painting a picture on black construction paper. Water will evaporate leaving a salt picture.

Resources

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

Grade: Elementary

Standard	Standard IV.2 Changes in Matter All students will investigate, describe and analyze ways in which matter changes; describe how living things and human technology change matter and transform energy; explain how visible changes in matter are related to atoms and molecules; and how changes in matter are related to changes in energy.
Benchmarks	All students will explain how visible changes in matter are related to atoms and molecules: There are no elementary benchmarks about atoms or molecules.
Sample Activity/Assessment tasks	
Resources	

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard

Standard IV.2 Changes in Matter

All students will investigate, describe and analyze ways in which matter changes; describe how living things and human technology change matter and transform energy; explain how visible changes in matter are related to atoms and molecules; and how changes in matter are related to changes in energy.

Benchmarks

All students will explain how changes in matter are related to changes in energy and how living things and human technology change matter and transform energy.

For a related elementary benchmark, see PCM-IV.2e.1 heating and cooling cause melting and freezing.

Sample Activity/Assessment tasks

- Melt ice cubes using a hot plate. Use a mirror to collect steam. Demonstrate solid, liquid, and gas in states of water.
- Demonstrate wax in its liquid and solid form.

Resources

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard	Standard IV.3 Motion of Objects All students will describe how things around us move and explain why things move as they do; demonstrate and explain how we control the motions of objects; and relate motion to energy and energy conversions.
Benchmarks	All students will describe how things around us move, explain why things move as they do, and demonstrate and explain how we control the motions of objects: IV.3.1. Describe or compare motions of common objects in terms of speed and direction. <i>Key concepts:</i> Words—east, west, north, south, right, left, up, down. Speed words—fast, slow, faster, slower. <i>Real-world contexts:</i> Motions of familiar objects in two dimensions, including rolling or thrown balls, wheeled vehicles, sliding objects.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Prove that nothing changes its motion without a push or a pull by observing an object that is still and then by pushing or pulling it. Stop an object that is moving with a push or a pull.• Explain vocabulary—words with er and est—fast, faster, fastest Directional words—under, over, up, down, below• Compare gravity to friction and describe how these two forces impact the motion of objects. Respond to the pull of gravity on a paper ball tossed straight up, straight down, and horizontally.• Rub hands together to feel the frictional warmth. Rub hands flat across a desk with marbles under hands and with soapy water on the desk to compare the amount of friction.
Resources	

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard	Standard IV.3 Motion of Objects All students will describe how things around us move and explain why things move as they do; demonstrate and explain how we control the motions of objects; and relate motion to energy and energy conversions.
Benchmarks	All students will describe how things around us move, explain why things move as they do, and demonstrate and explain how we control the motions of objects: IV.3.2. Explain how forces (pushes or pulls) are needed to speed up, slow down, stop, or change the direction of a moving object. <i>Key concepts:</i> Changes in motion—speeding up, slowing down, turning. Common forces—push, pull, friction, gravity. Size of change is related to strength of push or pull. <i>Real-world contexts:</i> Playing ball, moving chairs, sliding objects.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Compare gravity to friction and describe how these two forces impact the movements of an object.• Describe motion in terms of speed, direction, and force.• Rub hands together to feel the frictional warmth. Rub hands flat across a desk with marbles under hands and with soapy water on the desk to compare the amount of friction.• Change the movement of a ball by pushing or pulling it. Show the movement of a ball can be started, stopped, increased or decreased in speed.
Resources	

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard	Standard IV.3 Motion of Objects All students will describe how things around us move and explain why things move as they do; demonstrate and explain how we control the motions of objects; and relate motion to energy and energy conversions.
Benchmarks	All students will describe how things around us move, explain why things move as they do, and demonstrate and explain how we control the motions of objects: IV.3.3. Describe patterns of interaction of magnetic materials with other magnetic and non-magnetic materials. <i>Key concepts:</i> Magnetic poles, magnetic attraction and repulsion. <i>Tools:</i> Magnets, variety of magnetic and nonmagnetic materials (K-2), magnetic compass (3-5). <i>Real-world contexts:</i> Common magnets, using a magnetic compass to find direction.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Compare two poles of magnets. Define vocabulary: repel and attract• Categorize objects that can and cannot be attracted to magnets.• Pick up magnets with each of the ends of the magnet. Record the numbers. Graph which part is the strongest.• Discover if magnets can be attracted through different materials.• Extension: Create toys using magnetic attraction, e.g., Cut out a tissue paper kite. Attach thread and a paper clip. Tape the thread's tail to a table. Use a magnet to pick up kite without touching it.
Resources	

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard	Standard IV.3 Motion of Objects All students will describe how things around us move and explain why things move as they do; demonstrate and explain how we control the motions of objects; and relate motion to energy and energy conversions.
Benchmarks	All students will describe how things around us move, explain why things move as they do, and demonstrate and explain how we control the motions of objects: IV.3.4. Identify and use simple machines and describe how they change effort. <i>Key concepts:</i> Inclined planes, levers, pulleys, wedges, wheel and axle; force, distance. <i>Real-world contexts:</i> Block and tackles, ramps, screwdrivers and screws, can openers, see-saws.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Make simple machines (levers, screws, inclined planes, wheel and axles, pulleys, and wedges) and describe how they work.
Resources	

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard	Standard IV.3 Motion of Objects All students will describe how things around us move and explain why things move as they do; demonstrate and explain how we control the motions of objects; and relate motion to energy and energy conversions.
Benchmarks	All students will describe how things around us move, explain why things move as they do, and demonstrate and explain how we control the motions of objects: IV.3.5. Manipulate simple mechanical devices and explain how their parts work together. <i>Key concepts:</i> Names and uses for parts of machines, such as levers, wheel and axles, pulleys, inclined planes, gears, screws, wedges. <i>Real-world contexts:</i> Simple mechanical devices, such as bicycles, bicycle pumps, pulleys, faucets, clothespins, can openers.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Make simple toys that move with twisted rubber bands, air, wheels and axles moving down a ramp, simple pulleys. Explain what causes them to change their motion.
Resources	

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard	Standard IV.4 Waves and Vibrations All students will describe sounds and sound waves; explain shadows, color, and other light phenomena; measure and describe vibrations and waves; and explain how waves and vibrations transfer energy.
Benchmarks	All students will describe sounds and sound waves: IV.4.1. Describe sounds in terms of their properties. <i>Key concepts:</i> Properties: Pitch—high, low. Loudness—loud, soft. <i>Real-world contexts:</i> Sound from common sources, such as musical instruments, radio, television, animal sounds, thunder, human voices.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Using different thickness of rubber bands around a small box, compare the different pitches.• Pluck a rubber band stretched to different lengths to compare the different pitches.• Hit small and large tuning forks off the edge of a shoe. Describe the pitch.• Create loud and soft sounds by hitting an object harder and softer.
Resources	

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard	Standard IV.4 Waves and Vibrations All students will describe sounds and sound waves; explain shadows, color, and other light phenomena; measure and describe vibrations and waves; and explain how waves and vibrations transfer energy.
Benchmarks	All students will describe sounds and sound waves: IV.4.2. Explain how sounds are made. <i>Key concepts:</i> Vibrations—fast, slow, large, small. <i>Real-world contexts:</i> Sounds from common sources, such as musical instruments, radio, television, animal sounds, thunder, human voices.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Create vibrations with a yardstick placed on a table with varying lengths hanging off the end.• Listen to the pitch of the sounds of the sounds of the vibrations.• Make paper cup telephones.
Resources	

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard	Standard IV.4 Waves and Vibrations All students will describe sounds and sound waves; explain shadows, color, and other light phenomena; measure and describe vibrations and waves; and explain how waves and vibrations transfer energy.
Benchmarks	All students will explain shadows, color, and other light phenomena: IV.4.3. Use prisms and filters with light sources to produce various colors of light. <i>Key Concepts:</i> White light is composed of different colors. <i>Tools:</i> Prisms, color filters, colored lights. <i>Real-world contexts:</i> Light from common sources, such as sun, stars, light bulb, colored lights, firefly, candle, flashlight, various prisms.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Create rainbows using prisms, bubbles and water with light shining through them.• Show that the path of light can change by reflecting light off mirrors and directing it to a target.• Show that light is dimmer as it travels away by observing the light from a flashlight as it moves closer, then far away.• Demonstrate that dark colors absorb more heat from light than light colors do by shining a light on a thermometer wrapped in black vs. white construction paper.• Explain that an object absorbs all colors from light except the color seen, and that color is reflected to our eyes.• Show that light is necessary for us to see colors, shapes, and sizes by looking into a tube that is connected to a closed and taped box.
Resources	

Science Curriculum

Strand IV. Using Scientific Knowledge in Physical Science

**Grade: Elementary
K-2**

Standard	Standard IV.4 Waves and Vibrations All students will describe sounds and sound waves; explain shadows, color, and other light phenomena; measure and describe vibrations and waves; and explain how waves and vibrations transfer energy.
Benchmarks	All students will explain shadows, color, and other light phenomena: IV.4.4. Explain how shadows are made. <i>Key concepts:</i> Shadow, blocked path, surface, object, light moves outward from source in straight lines. <i>Real-world contexts:</i> Shadows made on surfaces by putting objects in the path of light from common sources, including sunlight, light bulbs, projectors. Changes in size of shadows due to distance from object.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Describe the path of light as straight. They can shine a light through a box with holes in it to see where the light comes out.• Create shadows by having an object block light.
Resources	

Science Curriculum

Strand V. Using Scientific Knowledge in Earth Science

**Grade: Elementary
K-2**

Standard	Standard V.1 The Geosphere All students will describe the earth's surface; describe and explain how the earth's features change over time; and analyze effects of technology on the earth's surface and resources.
Benchmarks	All students will describe the earth's surface: V.1.1. Describe major features of the earth's surface. <i>Key concepts:</i> Types of landforms—mountains, plains, valleys; bodies of water—rivers, oceans, lakes (see EH-V.2 e.2); deserts. <i>Real-world contexts:</i> Examples of Michigan surface features, such as hills, valleys, rivers, waterfalls, Great Lakes; pictures of global land features, including mountains, deserts.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Recognize that the earth has land and water. Predict whether the earth has more land or water. Use an inflatable globe to toss around. Notice where right index finger is when the globe is caught. Record with tally marks, then graph the tally marks as to the number of marks for water and land areas. (K-1)• Construct land types—hills, mountains, plains, and valleys. Use moistened sand to construct models of each of these land types. (1)• Identify areas that rivers flow and lakes form by using the sand model. (1)
Resources	

Science Curriculum

Strand V. Using Scientific Knowledge in Earth Science

**Grade: Elementary
K-2**

Standard	Standard V.1 The Geosphere All students will describe the earth's surface; describe and explain how the earth's features change over time; and analyze effects of technology on the earth's surface and resources.
Benchmarks	All students will describe the earth's surface: V.1.2. Recognize and describe different types of earth materials. <i>Key concepts:</i> Materials—mineral, rock, boulder, gravel, sand, clay, soil. <i>Tools:</i> Hand lens. <i>Real-world contexts:</i> Samples of natural earth materials, such as rocks, sand, soil, ores.
Sample Activity/Assessment tasks	
Resources	

Science Curriculum

Strand V. Using Scientific Knowledge in Earth Science

**Grade: Elementary
K-2**

Standard	Standard V.1 The Geosphere All students will describe the earth's surface; describe and explain how the earth's features change over time; and analyze effects of technology on the earth's surface and resources.
Benchmarks	All students will describe and explain how the earth's features change over time: V.1.3. Describe natural changes in the earth's surface. <i>Key concepts:</i> Causes of changes—volcanoes, earthquakes, erosion (water, wind, gravity, glaciers). Results of change—valleys, hills, lakes, widened rivers, mountains, cracks, movement of earth materials (boulders, gravel, sand, clay). <i>Real-world contexts:</i> Places around the school where erosion has occurred, such as gullies formed in down-hill gravel areas, cracks in asphalt. Places beyond the school where changes have occurred, such as volcanic mountains, shorelines, landslides, sand dunes, slopes, river valleys.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Observe the results of erosion on a sand model by using a spray bottle/mister and watch what happens to the sand.
Resources	

Science Curriculum

Strand V. Using Scientific Knowledge in Earth Science

**Grade: Elementary
K-2**

Standard	Standard V.1 The Geosphere All students will describe the earth's surface; describe and explain how the earth's features change over time; and analyze effects of technology on the earth's surface and resources.
Benchmarks	All students will describe and explain how the earth's features change over time: V.1.4. Explain how rocks and fossils are used to understand the history of the earth. <i>Key concepts:</i> Fossils, extinct plants and animals, ages of fossils, rock layers. See LE-III.4 e.1 (ancient life.) <i>Real-world contexts:</i> Fossils found in gravel, mines, quarries, beaches (Petosky stones), museum displays; Michigan examples of layered rocks; specific examples of extinct plants and animals, such as dinosaurs.
Sample Activity/Assessment tasks	
Resources	

Science Curriculum

Strand V. Using Scientific Knowledge in Earth Science

**Grade: Elementary
K-2**

Standard	Standard V.1 The Geosphere All students will describe the earth's surface; describe and explain how the earth's features change over time; and analyze effects of technology on the earth's surface and resources.
Benchmarks	All students will analyze effects of technology on the earth's surface and resources: V.1.5. Describe uses of materials taken from the earth. <i>Key concepts:</i> Transportation, building materials, energy, water (see EH-V.2 e.3.) <i>Real-world contexts:</i> Examples of uses of earth materials, such as gravel into concrete for walls, gypsum into drywall, sand into glass for windows, road salt, ores into metal for chairs, oil into gasoline for cars, coal burned to produce electricity, water for hydroelectric power. Samples of manufactured materials, such as concrete, drywall, asphalt, iron and steel.
Sample Activity/Assessment tasks	
Resources	

Science Curriculum

Strand V. Using Scientific Knowledge in Earth Science

**Grade: Elementary
K-2**

Standard	Standard V.1 The Geosphere All students will describe the earth's surface; describe and explain how the earth's features change over time; and analyze effects of technology on the earth's surface and resources.
Benchmarks	All students will analyze effects of technology on the earth's surface and resources: V.1.6. Demonstrate ways to conserve natural resources and reduce pollution through reduction, reuse, and recycling of manufactured materials. <i>Key concepts:</i> Materials that can be recycled—paper, metal, glass, plastic. Conservation and anti-pollution activities—reduce, reuse, recycle. <i>Real-world contexts:</i> Collections of recyclable materials, plans for recycling at home and school, composting, ways of reusing or reducing the use of paper.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Discuss uses of water—drinking, bathing, swimming, etc.• Discuss ways the importance of and ways to conserve water.
Resources	

Science Curriculum

Strand V. Using Scientific Knowledge in Earth Science

**Grade: Elementary
K-2**

Standard	Standard V.2 The Hydrosphere All students will demonstrate where water is found on earth; describe the characteristics of water and how water moves; and analyze the interaction of human activities with the hydrosphere.
Benchmarks	All students will describe the characteristics of water and demonstrate where water is found on earth: V.2.1. Describe how water exists on earth in three states. <i>Key concepts:</i> Liquid (K-2)—visible, flowing, melting, dew. Solid (K-2)—hard, visible, freezing, ice. Gas (3-5)—invisible, water vapor, moisture, evaporating. See PCM-IV.2 e.1. <i>Real-world contexts:</i> Examples of water in each state, including dew, rain, snow, ice, evidence of moisture in the air, such as “fog” on cold bathroom mirrors; examples of melting, freezing, and evaporating.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Demonstrate knowledge of melting ice from a solid into a liquid. (1)
Resources	

Science Curriculum

Strand V. Using Scientific Knowledge in Earth Science

**Grade: Elementary
K-2**

Standard	Standard V.2 The Hydrosphere All students will demonstrate where water is found on earth; describe the characteristics of water and how water moves; and analyze the interaction of human activities with the hydrosphere.
Benchmarks	All students will describe how water moves: V.2.2. Trace the path that rain water follows after it falls. <i>Key concepts:</i> Precipitation—see EAW-V.3 e.1. Flow—downhill, to rivers, into the ground. Bodies of water—streams, rivers, lakes, oceans. See EG-V.1 e.1 (earth features). <i>Real-world contexts:</i> Examples of water flowing locally, including gutters, drains, streams, wetlands.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Trace or draw the path of a raindrop after it falls from a cloud. (1)• Compare salt water and fresh water by taste. Identify fresh water as drinking water. (1)

Resources	<u>The River Grows</u>
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Science Curriculum

Strand V. Using Scientific Knowledge in Earth Science	Grade: Elementary K-2
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Standard	Standard V.2 The Hydrosphere All students will demonstrate where water is found on earth; describe the characteristics of water and how water moves; and analyze the interaction of human activities with the hydrosphere.
Benchmarks	All students will analyze the interaction of human activities with the hydrosphere: V.2.3. Identify sources of water and its uses. <i>Key concepts:</i> Water sources—wells, springs, Great Lakes, rivers. Household uses—drinking, cleaning, food preparation. Public uses—generate electricity, recreation, irrigation, transportation, industry. <i>Real-world contexts:</i> Examples of local sources of drinking water, including wells, rivers, lakes. Examples of local occasions when water is used, including car wash, swimming, fire hydrants, drinking, food preparation, cleaning, watering lawn, bathing, fishing, boating, shipping on the Great Lakes.
Sample Activity/Assessment tasks	<ul style="list-style-type: none"> • Identify the source of water, in particular, ground water, springs, lakes, and rivers. • Identify and draw uses of water within the school and community. (1) • Identify water uses for transportation, cleaning, recreation, growing plants, and an important drink for animals. (1)

Resources

Science Curriculum

Strand V. Using Scientific Knowledge in Earth Science

**Grade: Elementary
K-2**

Standard

Standard V.3 The Atmosphere and Weather

All students will investigate and describe what makes up weather and how it changes from day to day, from season to season and over long periods of time; explain what causes different kinds of weather; and analyze the relationships between human activities and the atmosphere.

Benchmarks

All students will investigate and describe what makes up weather and how it changes from day to day, from season to season and over long periods of time:

V.3.1. Describe weather conditions.

Key concepts: Atmosphere is a blanket of air around the earth, air is a substance; see PME-IV.1 e.1 (attributes of substances). Air has temperature— cold, hot, warm, cool. Cloud cover—cloudy, partly cloudy; foggy. Precipitation—rain, snow, hail, freezing rain. Wind—breezy, windy, calm. Severe weather— thunderstorms, lightning, tornadoes, high winds, blizzards.

Tools: Thermometer, wind sock, rain gauge.

Real-world contexts: Daily changes in weather; examples of severe weather.

Sample Activity/Assessment tasks

- Graph weather and temperature daily during calendar time. (1)
- Identify weather as a system of air temperature and movement with water in its solid, liquid and gas forms as fog, clouds, rain, snow, hail, sleet, and water vapor. (2)
- Read a satellite picture of clouds over Midwest states to determine which areas may have precipitation and which may have fair weather. (2)

Resources

Science Curriculum

Strand V. Using Scientific Knowledge in Earth Science

**Grade: Elementary
K-2**

Standard

Standard V.3 The Atmosphere and Weather

All students will investigate and describe what makes up weather and how it changes from day to day, from season to season and over long periods of time; explain what causes different kinds of weather; and analyze the relationships between human activities and the atmosphere.

Benchmarks

All students will investigate and describe what makes up weather and how it changes from day to day, from season to season and over long periods of time:

V.3.2. Describe seasonal changes in Michigan’s weather.

Key concepts: Seasons and types of weather—fall, cool nights and warm days; winter—snowy and constantly cold, getting dark early in the evening; spring—warmer days, often rainy with thunderstorms; summer—hot days and warm nights, daylight lasting until late in the evening.

Real-world contexts: Examples of visible seasonal changes in nature.

**Sample
Activity/Assessment
tasks**

- Relate planned activities to weather reports. (2)
- Match clothes they would wear to weather. (K)
- Identify and chart seasonal trends in weather. (2)

Resources

Science Curriculum

Strand V. Using Scientific Knowledge in Earth Science

**Grade: Elementary
K-2**

Standard	Standard V.3 The Atmosphere and Weather All students will investigate and describe what makes up weather and how it changes from day to day, from season to season and over long periods of time; explain what causes different kinds of weather; and analyze the relationships between human activities and the atmosphere.
Benchmarks	All students will analyze the relationships between human activities and the atmosphere: V.3.3. Explain appropriate safety precautions during severe weather. <i>Key concepts:</i> Safety precautions—safe locations, sirens, radio broadcasts, severe weather watch and warning. <i>Real-world contexts:</i> Examples of local severe weather, including thunderstorms, tornadoes and blizzards, examples of local community safety precautions, including weather bulletins and tornado sirens.
Sample Activity/Assessment tasks	<ul style="list-style-type: none">• Explain how to protect oneself during extreme weather like tornados, blizzards, and thunderstorms.

Resources

Science Curriculum

Strand V. Using Scientific Knowledge in Earth Science

**Grade: Elementary
K-2**

Standard

Standard V.4 The Solar System, Galaxy and Universe

All students will compare and contrast our planet and sun to other planets and star systems; describe and explain how objects in the solar system move; explain scientific theories as to the origin of the solar system; and explain how we learn about the universe.

Benchmarks

All students will compare and contrast our planet and sun to other planets and star systems.

V.4.1. Compare and contrast characteristics of the sun, moon and earth.

Key concepts: Planet, star, sphere, space, solar system, larger/smaller, closer/farther, heat, light.

Real-world contexts: Observations of the moon, earth, and safe observations of the sun.

**Sample
Activity/Assessment
tasks**

- Identify telescopes, space explorers, satellites, observation to recognize patterns in the movements of objects in space as ways to learn about our solar system.
- Identify the sun, moon, and earth. (2)
- Compare and contrast the characteristics of the sun, moon, and earth. (2)

Resources	
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Science Curriculum

Strand V. Using Scientific Knowledge in Earth Science	Grade: Elementary K-2
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Standard	<p>Standard V.4 The Solar System, Galaxy and Universe All students will compare and contrast our planet and sun to other planets and star systems; describe and explain how objects in the solar system move; explain scientific theories as to the origin of the solar system; and explain how we learn about the universe.</p>
Benchmarks	<p>All students will describe and explain how objects in the solar system move. V.4.2. Describe the motion of the earth around the sun and the moon around the earth. <i>Key concepts:</i> Spin, orbit, length of day, nighttime, month, year, observed movement of the sun and stars across the sky, observed movement of the moon from day to day, calendar. <i>Real-world contexts:</i> Outdoor observing of the sun's and star's motions during the night and moon's motions over several days.</p>
Sample Activity/Assessment tasks	<ul style="list-style-type: none"> • Describe and act out the rotation of the earth in front of the sun, which causes daytime and nighttime. (2) • Act out the orbit of the moon around the earth and record the patterns of moon shapes one month and describe that pattern. (2) • Describe the orbit of the earth around the sun as a yearly event. (2)

Resources	

Resources from Grades K-2 Committee

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- Fisher, Aileen. *Petals Yellow and Petals Red: The Ways of Plants.* Bowmar Nature Series.
- Fisher. *You Don't Look Like Your Mother.* Mondo.
- Fowler, Allan. *It Could Still be a Worm.* Rookie Read-Aloud Science.
- Gardner, Robert. *Kitchen Chemistry Science Experiments to do at Home.* Jullian Nesser co.
- Great Explorations in Math and Science.* Solids, Liquids, Gases. G.E.M.S.
- Hailstones and Halibut Bones*
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The River Grows.

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Science Internet Resources Grades K-2

www.bookadventure.org (Sylvan)

www.nsta.org National Science Teachers Association

www.internet4classrooms.com/science-elem.htm

www.aims.org AIMS Science. Excellent resources

[www.teachers.esus.org/indike/discuss/msgreader\\$1](http://www.teachers.esus.org/indike/discuss/msgreader$1)

www.monroe.k12.mi.us/science-book-list.html

www.marcopoloeducation.org. Most excellent resource in Science NetLinks American Association for the Advancement of Science. Has interactive tools, resources, lessons, cross curricular activities. K-2, 3-5, 6-8, 9-12 segments. Excellent resource.

www.brainpop.com

www.energy.gov/engine/content.do?BT_CODE=KIDS

www.amazon.com Listmania- Critique of available books.

www.earthcharter.org

www.scilinks.org

ARS Science for Kids, Department of Agriculture

Ask a Scientist- answers 7000 science questions, Department of Energy

Ask an Astronomer for Kids, National Aeronautics and Space Administration

Ask a Geologist Student e-mail questions about volcanoes, mountains, rocks, maps, ground water, lakes or rivers. U.S. Geological Survey

Ask Dr. Global Change www.gcrio.org

Air Force Link, Jr. History of flight

Library of Congress- Alexander Graham Bell

www.esteme.org website Galleries- Interactive site, etc. music and plants

www.earthday.net K-12 resources

www.earthcharter.org A global document that challenges universal responsibility for the future of Earth and its people and communities.