

**LESA
Science Curriculum
2008**

1. Strand: Unifying Concepts and Processes	(NSES, IL 12)
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C. Standard: Change, Constancy, and Measurement

<u>The student will know:</u>	<u>The student will be able to:</u>	<u>Suggested Activities</u>	<u>Suggested Resources</u>
1. Objects can be organized by similar characteristics.	1. Establish appropriate characteristics to sort items into groups containing like objects.	1. Give students a group of pictures of plants or animals. Students should establish the rules for organizing the pictures into like groups.	
2. Changes and constancy can be measured using proper tools or through observation.	2. Use measurement tools appropriately (ruler, thermometer, scale, magnifiers) to make observations.	2. Use magnifiers to look closely at pieces of nature (e.g. leaves, feathers, etc.). Compare observations with and without the use of magnifiers.	
3. Data gathered through inquiry processes can be organized to be more easily understood and used.	3. Record data using an appropriate method for recording- charts, graphs, journaling.	3. Use a thermometer to accurately measure the temperature every day for a week. Record the temperatures in a science journal. Chart the temperatures on a graph to compare them.	

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E. Standard: Form and Function

The student will know:

1. Living things have parts designed for specific purposes.

The student will be able to:

1. Identify and describe the component parts of living things (e.g. birds have feathers; people have bones, blood, hair, skin) and their major functions.

Suggested Activities

1. Draw a diagram of a plant. Label the parts (roots, stem, leaves, flower) and tell the function of each part.

Suggested Resources

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2. Strand: Science As Inquiry	(NSES, IL 11, MO 7)
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A. Standard: Abilities Necessary to Do Scientific Inquiry

<u>The student will know:</u>	<u>The student will be able to:</u>	<u>Suggested Activities</u>	<u>Suggested Resources</u>
1. Objects and events are often observed and described quantitatively.	1. Use whole numbers and simple fractions to measure and describe things.	1. Use simple measuring tools to measure an object that is usually described qualitatively and describe it using numbers.	
2. Sometimes two people can observe the same object or event and describe it differently.	2. Carefully distinguish actual observations from ideas and speculations about what was observed; use information processing skills to develop and clarify ideas and perspectives.	2. Use a kalidescope and develop an explanation of how it works. Work in groups to compare explanation and develop new understanding based on the explanations of the group.	
3. Knowledge can be gained by careful observation.	3. Gain scientific knowledge through observation in scientific experiments.	3. Students make observations of the changing seasons by recording their observations of changes in a tree outside the classroom window throughout the school year. Compare observations as the seasons change to draw conclusions about seasonal changes.	

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B. Standard: Understandings About Scientific Inquiry

The student will know:

1. The processes of scientific inquiry are important for engaging in science and applying scientific methods.

The student will be able to:

- 1a. Describe an observed event.
- 1b. Develop questions on scientific topics.
- 1c. Collect data for investigations using measuring instruments and technology.
- 1d. Record and store data using available technologies.
- 1e. Arrange data into logical patterns and describe the patterns.
- 1f. Compare observations of individual and group results.

Suggested Activities

1. Use the process of scientific inquiry while performing an experiment; collect and record data; compare and evaluate the results.

Suggested Resources

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3. Strand: Physical Science	(NSES, IL 12, MO 1, 2)
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A. Standard: Properties of Object and Materials

<u>The student will know:</u>	<u>The student will be able to:</u>	<u>Suggested Activities</u>	<u>Suggested Resources</u>
1. Objects can be described by observable properties including size, weight, shape, color, and temperature.	1. Observe and describe objects using words that describe properties of size, weight, shape, color, and temperature.	1. Use a hand lens to observe different objects. Write or draw what each object looks like before and after using the lens.	
2. Matter can be classified as solid, liquid, or gas.	2. Identify materials as solids, liquids, or gases and classify objects according to their properties.	2. Observe and describe water in three states: solid, liquid, and gas- over a period of time record observations of each state of matter in a science journal.	<i>What Is The World Made Of? All About Solids, Liquids, and Gases</i> by Kathleen Weidner Zoehfeld
3. Weight is a measurement of the attraction of gravity on a mass. Mass is the amount of matter of an object.	3. Use the appropriate tools to weigh an object, then find its mass.	3a. Use a scale to weigh an apple; use a balance to measure the same apple; compare numbers. Repeat with other objects. 3b. Using a balance and standard or nonstandard units, weigh an orange (unpeeled). Record the weight. Peel the orange, saving the peeling; weigh the peeled orange and the peeling. Compare the weights.	<i>Matter: See It, Touch It, Taste It, Smell It</i> by Darlene Stille

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4. Matter has mass and takes up space.

4. Demonstrate measurement of solids, liquids, and gases.

4a. Use a balance and measuring cup to measure mass and volume of a golf ball.

4b. Explore measuring with nonstandard and standard units of measurement for solids, liquids, and gases.

5. Heat causes materials to increase in temperature and feel warmer, or change state (gas, liquid, or solid).

5. Select and apply strategies to show how heat causes materials to increase in temperature and makes it feel warmer.

5a. Predict what will happen to different materials when they are placed under a lamp. Compare predictions with the results.

5b. Use a light bulb and a thermometer to compare how heat flows through different materials (e.g., aluminum, air, colored paper, cloth).

6. A mixture is a combination of various things that can be separated into its individual parts.

6. Demonstrate understanding of a mixture by creating a mixture of the student's own selection.

6. Provide edible items such as cereal, raisins, dry fruit, etc. Students choose items to include in their own mixture. In writing, students describe their mixture.

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B. Standard: Position and Motion of Objects

The student will know:

1. An object's position can be described relative to another object (above, below, left of, right of, behind, or in front).
2. The movement of an object depends on the force applied and how much mass it has.
3. Force is any push or pull exerted by one object on another.
4. Simple machines are useful in making work easier.

The student will be able to:

1. Describe the position of an object relative to another object.
2. Identify and analyze how much force is needed to move a variety of objects.
3. Identify the forces on a moving object and predict the direction it will go.
- 4a. Identify levers, wheels, pulleys, inclined planes, and screws as simple tools.
4b. Demonstrate how to use tools and machines to apply force through pushes and pulls to make things move.

Suggested Activities

1. Describe the position of a student's desk in relation to the teacher's desk or another student's desk.
2. Using various objects in the classroom, determine which are easier to move.
- 3a. Describe the forces acting on a ball thrown straight up.
3b. Describe the forces acting on a moving toy and predict the movement it might take.
4. Use a variety of simple machines to move a heavy object in the classroom.

Suggested Resources

- Forces Make Things Move*
by Kimberly B. Bradley
- Motion- Push and Pull, Fast and Slow*
by Darlene Stille

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C. Standard: Light, Heat, Electricity, and Magnetism

The student will know:

1. Objects that give off light may also give off heat.

2. Energy can be converted into different forms.

3. Magnets attract and repel each other and certain kinds of other materials.

4. A magnet can attract or repel only those objects that are in its magnetic field.

5. Energy sources are found in nature and can be man-made.

The student will be able to:

1. Identify and consider a variety of light sources to determine which give off heat.

2. Identify and describe the transformation of energy from one form to another.

3. Identify objects containing iron as magnetic; objects made from glass, paper, wood, or plastic as nonmagnetic.

4. Recognize that a magnetic field does not pass through all materials and identify materials through which a magnetic field can pass.

5. Identify and compare sources of energy (e.g., batteries, the sun).

Suggested Activities

1. Compare the heat from several light sources (e.g., incandescent bulb, florescent bulb, sun, halogen bulb).

2. Use a lamp to demonstrate how electricity is transformed to light and heat energy.

3. Test a variety of objects to determine if they are magnetic. Classify the objects as magnetic and nonmagnetic.

4. Suspend a paper clip on a string. Place a variety of materials between the paper clip and a bar magnet (paper, aluminum foil, cardboard, plastic sheet). Test each material by placing a bar magnet underneath to test for a magnetic field.

5. Read *Energy Makes Things Happen*. Make a class list of sources of energy.

Suggested Resources

What Makes a Magnet?
Harper Collins Publishers

Energy Makes Things Happen by Kimberly B. Bradley

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4. Strand: Life Sciences

(NSES, IL 12, MO 3, 4)

A. Standard: Characteristics of Organisms

The student will know:

1. Organisms have parts that enable them to live and survive in the world.

2. Organisms can be grouped by specific structures.

The student will be able to:

1. Organize data, information, and ideas about how body parts enable the organism to live and survive.

2a. Group organisms according to similar specific structures.
2b. Compare living things using one or more structure attributes.

Suggested Activities

1a. Identify and discuss the functions of arms, legs, mouth, eyes, etc., in seeking and consuming food.
1b. Identify the functions of various plant structures in growth and development.
1c. Discuss and compare the functions of fins, wings, and legs for animal movement.

2a. Group students by hair color, eye color, etc.
2b. Distinguish between types of plants by comparing size, leaves,
2c. Sort pictures of animals by physical traits such as: exoskeletons, shells, hair, feathers, scales.

Suggested Resources

A Tree is a Plant by Clyde Robert Bulla
Roots are Food Finders by Franklyn M. Branley
What Color Is Camouflage? by Carolyn Otto

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B. Standard: Life Cycles of Organisms

The student will know:

1. Organisms go through life cycles.

2. Living things produce offspring that resemble their parents but have individual differences.

3. Some animals change form as they grow from baby to adult. Changing structures help them function in different environments.

The student will be able to:

1. Observe and record the phases in the life cycle of various organisms and compare the differences between species.

2. Sort animals into groups including baby and adult animals, understanding that many animals are born looking like their parents, but are smaller and may have a different body covering.

3. Explain the life cycle of a butterfly; showing understanding of the stages: egg, larva, pupa, adult.

Suggested Activities

1a. Discuss the human life cycle and generate some reasonable questions about differences in various developmental stages- new born, child, adolescent, adult, elderly.
1b. Create an illustration that depicts physical changes in an animal from birth to maturity.

2. Give students a group of pictures containing animals at different stages of the life cycle. Put the pictures correctly in groups.

3. Observe the life cycle of a butterfly by hosting a butterfly house in the classroom. Record observations of development in a science journal.

Suggested Resources

From Seed to Pumpkin
by Wendy Pfeffer
How Do Apples Grow? by
Betsy Maestro

The Very Hungry Caterpillar
by Eric Carle

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C. Standard: Organisms and Environments

The student will know:

1. All organisms depend on one another and their environment to live and grow.

The student will be able to:

1a. Identify the common basic needs of organisms and the ways in which they depend on each other and their environment.

1b. Define and explain the concept of a food chain, showing an understanding of where the student fits into the plan.

Suggested Activities

1a. Study an aquarium and record how each organism contributes to the natural system of the aquarium.

1b. Identify several animals that live in the local area. Investigate what food and environment they need to survive.

1c. Investigate and discuss how different types of seeds are designed to be dispersed and the process of dispersal.

1d. Design a fictitious animal or plant with the physical characteristics that will let it live and grow in a particular environment.

1e. Read the book *The Great Kapok Tree*. Discuss the integration of the food chain as illustrated in the story. Use the diagrams in the AIMS unit to visually illustrate the food web of the rainforest.

Suggested Resources

Who Eats What? Food Chains and Food Webs
by Patricia Lauber

Honey In a Hive
by Anne Rockwell

Crawdad Creek
by Scott Russell Sanders

River of Life
by Debbie S. Miller

The Great Kapok Tree
by Lynne Cherry
"The Great Kapok Tree"
rainforest unit available online
from AIMS

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2. All organisms including humans, cause changes in their environments that can be either beneficial or harmful to the organisms in the ecosystem.

2. Observe and record environmental changes and the reactions of organisms to these changes over time.

2a. Change the environment of a terrarium by changing the temperature and record how the invertebrates react.

2b. Select a local area and investigate the influence of human activity on that area.

2c. Investigate how modifications in a plant's environment (soil, moisture, sunlight) affect its growth and survival.

3. People depend on other organisms and earth's resources for clothing, shelter, and food.

3. Identify ways humans depend on other organisms for food, clothing, and shelter, etc.

3a. Determine the sources of the different materials used to make clothes.

3b. Chart the processes by which food is grown, processed, and brought to our home.

3c. List common building materials and categorize them into "natural" or "human-made".

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5. Strand: Earth and Space Science (NSES, IL 12, MO 5, 6)

A. Standard: Properties of Earth Materials

<u>The student will know:</u>	<u>The student will be able to:</u>	<u>Suggested Activities</u>	<u>Suggested Resources</u>
1. Earth's surface is composed of rocks, soils, water, and living organisms. Differences in these components can be used to classify them.	1. Apply knowledge and skills to classify a variety of rocks or soil according to their physical characteristics.	1. Collect a variety of rocks or soil and classify them according to one type of physical property.	<i>Soil</i> by Christin Ditchfield
2. Rocks change over time by weathering and erosion.	2. Conduct research to develop and evaluate information to show how rocks change over time by weathering and erosion.	2a. Observe and describe signs of weathering on a brick building, statue, bridge, cliff, etc. 2b. Observe changes in landscapes that are readily changed by water or other natural devices.	<i>Let's Go Rock Collecting</i> by Roma Gans
3. Fossils provide clues about plants and animals that lived in the past.	3. Describe fossils and explain how fossils provide clues about plants and animals that lived in the past.	3a. Examine fossils which show examples of plants and animals in the past. 3b. Using clay, make "new" fossils.	<i>Fossils Tell of Long Ago</i> by Alik

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B. Standard: Objects in the Sky

The student will know:

1. The atmosphere has physical properties that are measurable and predictable.

2. Objects in our solar system, such as the sun, the planets, and the moon, have properties, locations, and movements that can be observed and described.

3. Earth's rotation causes day and night; earth's revolution around the sun causes the seasons.

4. The reflection of the sun's light on the moon and the moon's orbit around the earth change how the moon looks throughout a month.

The student will be able to:

1. Conduct research to develop and evaluate information about the atmosphere; plan and make a written, oral, and visual presentation of the patterns of change over a period of time.

2. Identify and describe characteristics of the sun, earth, and moon as familiar objects in the solar system.

3. Identify daily, seasonal and annual patterns related to the earth's rotation and revolution (e.g., night/day, seasons).

4. Observe the moon daily for a month, record observations on a chart, and explain why the moon appears to change.

Suggested Activities

1. Keep a journal of temperatures and weather conditions for a month or two. Identify patterns.

2a. Read *The Sun- Our Nearest Star*. Discuss the importance of the sun in our solar system.
2b. Make a model of the solar system to scale.

3. Compare the seasonal changes and describe how humans have adapted to them.

4. Observe the moon daily for a month. Record observations on a calendar. At the end of the month, evaluate the observations, looking for changes and patterns. If observations are continued over several months, the students can observe more patterns in the phases of the moon.

Suggested Resources

The Sun - Our Nearest Star
by Franklyn M. Branley

The Planets in Our Solar System
by Franklyn M. Branley

Sunshine Makes the Seasons
by Franklyn M. Branley

The Moon Seems to Change
by Franklyn M. Branley

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C. Standard: Changes in Earth and Sky

The student will know:

1. Water moving from earth to the air and back is called the water cycle. Water reaches earth in different forms (snow, hail, rain, fog, etc.).

2. The surface of the earth changes slowly (e.g. erosion, weathering) or quickly (e.g. earthquakes, floods, rock/mud slides, volcanic activity).

3. Earth's natural resources are limited.

The student will be able to:

1a. Recognize daily weather patterns.
1b. Demonstrate understanding of the water cycle - correctly use the terms evaporation, condensation, and precipitation.
1c. Describe different kinds of weather.

2. Present perceptions and ideas on ways the surface of earth changes slowly or quickly.

3a. Identify renewable and nonrenewable natural resources.
3b. Research to find out ways that people use and abuse earth's natural resources.

Suggested Activities

1. Observe the weather everyday for a week. Record observations on a chart. Evaluate data and look for patterns in the weather; make predictions about possible future weather.

2. Choose a natural disturbance (flood, heat wave, snow, ice storm) and identify the changes it caused and how it affected plants, animals, and humans.

3a. Construct posters that promote responsible use of water or trees.
3b. Discuss ways to cut down on the use of gasoline. Make posters to promote these ideas.

Suggested Resources

Air Is All Around You, Down Came the Rain, Snow Is Falling by Franklyn M. Branley

Earthquakes by Franklyn M. Branley

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6. Strand: Science and Technology

(NSES, IL 13, MO 8)

A. Standard: Abilities of Technological Design

The student will know:

1. The application of concepts, principles, and processes of technological design are useful in problem solving.

The student will be able to:

- 1a. Given a simple design problem, formulate possible solutions.
- 1b. Design a device that will be useful in solving the problem.
- 1c. Build the device using the materials and tools provided.
- 1d. Test the device and record results using given instruments, techniques and measurement tools.
- 1e. Communicate findings accurately using oral, written, and pictorial presentations and use evidence to support conclusions.

Suggested Activities

1. Students work in small groups to build a bridge that will hold the most pennies. Materials to use: paper, styrofoam cups (2 per group), and pennies. Students work together to design their bridge, test the sturdiness of the bridge, and continue to work toward building their strongest bridge. Students then share their designs and ideas with the class.

Suggested Resources

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B. Standard: Understands About Science and Technology

The student will know:

1. Science has an affect on the daily lives of people.

The student will be able to:

1. Identify and describe ways that science and technology affect people's everyday lives (e.g. transportation, medicine, agriculture, sanitation, communication occupations).

Suggested Activities

1. Discuss with students how science affects their daily lives. Students draw a picture and write about one way science affects their daily life.

Suggested Resources

C. Standard: Abilities to Distinguish Between Natural Objects and Objects Made by Humans

The student will know:

1. All things are God-made or man-made.

2. All things can be classified as living, non-living, or once-living.

The student will be able to:

1. Identify things created by God and things made by man.

2. Sort items according to the group catagories of living, non-living, and once-living.

Suggested Activities

1. Make a class list of things created by God and things made by man.

2. Collect items during a nature walk around the school yard. Sort the items and group them according to living, non-living, and once-living. Discuss the students' choices.

Suggested Resources

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7. Strand: Science in Personal and Social Perspectives	(NSES, IL 12, MO 8)
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A. Standard: Personal Health

The student will know:

1. Basic safety practices to follow when performing science experiments.

The student will be able to:

1. Use basic safety practices (e.g., not tasting materials without permission, "stop/drop/roll").

Suggested Activities

1. Review and discuss safety procedures with students when using science materials and equipment.

Suggested Resources

D. Standard: Changes in the Environment

The student will know:

1. People have a responsibility to take care of the earth and its resources.

The student will be able to:

1. Demonstrate ways to reduce, reuse, and recycle materials.

Suggested Activities

1a. Use a recycling bin in the classroom, encouraging classroom recycling.
1b. Make posters to illustrate ways to reduce, reuse, and recycle.

Suggested Resources

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8. Strand: History and Nature of Science

(NSES, IL 13)

A. Standard: Science as a Human Endeavor

The student will know:

1. All people are scientists as they investigate the world and develop new processes and ideas.

2. Men and women from many backgrounds and countries have made extraordinary advances in the area of science.

The student will be able to:

1. Affirm that everyone can demonstrate an understanding of science by generating new products, processes, and ideas.

2. Give examples of men and women from various backgrounds and abilities who have made significant contributions in the fields of science and technology (e.g. George Washington Carver, Thomas Edison, Benjamin Franklin, Galileo Galilei, Louis Pasteur, Rachel Carson, etc.).

Suggested Activities

1. As activities are conducted, encourage all students to be participants; each having an active role in expressing his/her own ideas.

2. Read biographies about persons who have made important contributions to science. Students give a report about the scientist they have learned about.

Suggested Resources