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ABSTRACT

This document presents a sample of the Arkansas science curriculum and identifies the content standards for physical science systems, life science systems, and Earth science/space science systems for fourth grade students. Each content standard is explained and includes student learning expectations, fourth grade benchmarks, assessments, and strategies and activities. (YDS)

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Fourth Grade Level Science Sample Curriculum

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Fourth Grade Level Science

STRAND 1: PHYSICAL SYSTEMS
CONTENT STANDARD 1
Students will demonstrate an understanding of physical systems as a process of inquiry.

Student Learning Expectations	Fourth Grade Benchmarks	Assessments	Strategies/Activities
PS.1.1. Examine the techniques of *scientific inquiry*, problem solving, questioning, reasoning, and creative decision making by utilizing the *scientific method*	Working in groups or individually, students use scientific inquiry to solve teacher-made problems. Students will use the scientific terms hypothesis and theory correctly. Students set up simple experiments. Students know that scientific investigations generally work the same in different locations. Students will make predictions and test them.	Statewide Test Teacher-made Test Teacher Observation Portfolio Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have students predict which of four identical toy cars will travel farther/fastest, etc. on four different speed ramps (vary the height and length). Have students make predictions and experiment with various locations and ramp designs.
PS.1.2. Use simple equipment (microscopes), age-appropriate tools (rulers, thermometers), skills (describing and writing), technology (computers) and mathematics in scientific investigations.	Students are aware of safety rules and can identify these rules on exams. Students will use scientific tools and computers appropriate for their age. Students will use mathematics (calculators) and writing to examine and describe the natural world. Students can measure length, weight, and volume in English and metric systems.	Statewide Test Teacher-made Test Teacher Observation Portfolio Checklist Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Students are tested on safety rules. Have students use science equipment, computers, and calculators to investigate their world and then write about their experiences. Have students use both English and metric units.
PS 1.3. Communicate designs, procedures, and results of scientific investigations (graphs, charts, and writings).	Students can make simple graphs and charts of their results from their observations.	Statewide Test Teacher-made Test Teacher Observation Portfolio Checklist Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have students create and describe graphs and charts based on scientific studies. Have students design an experiment that includes the use of graphs and charts.

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STRAND 1: PHYSICAL SYSTEMS CONTENT STANDARD 2 Students will explore, demonstrate, communicate, apply, and evaluate the knowledge of physical systems.			
Student Learning Expectations	**Fourth Grade Benchmarks**	**Assessments**	**Strategies/Activities**
PS.2.1. Recognize the differences and similarities of *solids, liquids* and *gases.*	Students understand that heating or cooling of matter will speed up or slow down the motion of small particles within matter and that this is what causes a change in state from solid to liquid to gas or the reverse.	Statewide Test Teacher-made Test Teacher Observation Portfolio Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have students explain that the heating or cooling of the small particles of matter causes matter to change states.
PS.2.2. Understand the physical properties of objects.	Students can explain how heating and cooling affect the state of matter.	Statewide Test Teacher-made Test Teacher Observation Portfolio Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have students write about changes in states of matter when it is heated or cooled.
PS.2.3. Learn about the physical world by observing, data collecting, using age-appropriate tools, describing, and hypothesizing.	Students are aware of lab safety rules and can identify these rules on exams. Students make written hypotheses about how the physical world works based on observations.	Statewide Test Teacher-made Test Teacher Observation Portfolio Checklist Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Students can identify lab safety rules on exams. Have students set up a study area on the school ground, note changes over time due to weather, traffic, etc. and develop written hypotheses based on their observations.
PS.2.4. Revise *hypothesis* by sharing and communicating observations through writing.	Students share their hypotheses and then revise them after acquiring additional information.	Statewide Test Teacher-made Test Teacher Observation Portfolio Checklist Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have students write a hypothesis, discuss it, set up an experiment to test it, conduct the experiment, discuss the results and revise the hypothesis.

Student Learning Expectations	Fourth Grade Benchmarks	Assessments	Strategies/Activities
PS.2.5. Explore energy changes.	Students know a variety of sources of electricity (hydroelectric, nuclear, coal, solar, geothermal, windmills, etc.). Students will give examples of potential and kinetic energy.	Statewide Test Teacher-made Test Teacher Observation Portfolio Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have students develop a list of energy sources. Teacher demonstrates kinetic and potential energy with a rubber ball placed on a table's edge as the ball falls and bounces.
PS.2.6. Identify *chemical* and *physical changes*.	Students can identify a chemical and a physical change.	Statewide Test Teacher-made Test Teacher Observation Portfolio Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Teacher demonstrates folding a piece of paper (physical change) and the burning of paper (a chemical change).
PS.2.7. Classify simple machines and relate them to inventions and discoveries.	Students can identify simple machines in everyday hand tools (hammers, screwdrivers, screws, scissors, etc.). Students understand how simple machines are used to make work easier.	Statewide Test Teacher-made Test Teacher Observation Portfolio Checklist Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Display hand tools and have students identify simple machines. Have students describe how simple machines make work easier by using them to move objects.
PS.2.8. Explore the effects of applying various types of *forces* to an object (push/pull).	Students know that velocity describes a change in distance over time.	Statewide Test Teacher-made Test Teacher Observation Portfolio Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have students walk at different speeds over the same distance for a specific amount of time and compare results.

STRAND 1: PHYSICAL SYSTEMS
CONTENT STANDARD 2
Students will explore, demonstrate, communicate, apply, and evaluate the knowledge of physical systems.

Student Learning Expectations	Fourth Grade Benchmarks	Assessments	Strategies/Activities
PS.2.9. Identify and compare the relationships between *mass/weight*, *force*, and *motion*.	Students know that changes in speed or direction of motion are caused by forces. The greater the force is, the greater the change in motion will be. The more massive an object is, the less effect a given force will have.	Statewide Test Teacher-made Test Teacher Observation Portfolio Checklist Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have students explore the relationships between mass/weight, force, and motion by playing a simulated game of pool with a ball and sticks or by playing croquet. Have students experiment with balls of different masses to knock down blocks or plastic bottles filled with water and draw conclusions about the relationships between mass/weight, force, and motion based on their experience and observations.
PS.2.10. Examine properties, types, and uses of magnets.	Students observe how a magnet affects a directional compass and can write about their results. Students research and describe in writing how magnets are used in everyday machines.	Statewide Test Teacher-made Test Teacher Observation Portfolio Checklist Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have students examine the relationship of the Earth's magnetic field to a large magnet. Have them find north using a compass and then place a magnet near the compass. (A magnet left near a compass will demagnetize the compass needle.) Have students view electric motors and the inside a phone, a radio, and a TV to look for magnets. Then have students describe how magnets are used in these appliances.
PS.2.11. Analyze and compare the relationship between magnets and electricity.	Students can construct electromagnets and experiment with them. Students can explain the relationship between magnets and electricity.	Statewide Test Teacher-made Test Teacher Observation Portfolio Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have students construct an electromagnet with a "D" sized battery, a wire wrapped around a nail and other metal objects and experiment with picking up various objects. Have students record their findings when a magnet is moved near a wire coil attached to a voltmeter.
PS.2.12. Experiment with *static* and *current electricity*.	Students know the difference between static electricity and current electricity. Students can identify a simple circuit.	Statewide Test Teacher-made Test Teacher Observation Portfolio Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have students construct and experiment with a simple circuit using copper wire, a "D" battery, and small bulb. Have students explain the parts of a simple circuit.

Student Learning Expectations	Fourth Grade Benchmarks	Assessments	Strategies/Activities
PS.2.13. Determine the relationship between vibration and sound.	Students can explain that differences in waves affect sound (high and low pitch, loud or soft sound).	Teacher-made Test Teacher Observation Portfolio Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have students observe and experiment with wave characteristics using a Slinky or rope or box with rubber bands, and communicate orally or in writing what they observed and learned. After watching demonstrations on wave properties, students can write about wave attributes.
PS.2.14. Explore the properties of light (e.g., *reflection, refraction, absorption, translucent, transparent,* and opaque).	Students will experiment with concave and convex lenses to see how images look when the lenses are held in front of eyes at different distances.	Teacher-made Test Teacher Observation Portfolio Checklist Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Teacher selects several concave and convex lenses for students to view and record their findings.

STRAND 1: PHYSICAL SYSTEMS
CONTENT STANDARD 3
Students will demonstrate an understanding of the connections and applications of physical science.

Student Learning Expectations	Fourth Grade Benchmarks	Assessments	Strategies/Activities
PS.3.1. Understand that physical science is interwoven into the structure of all disciplines.	Students can illustrate and develop a written plan before construction.	Statewide Test Teacher-made Test Teacher Observation Portfolio Checklist Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have students build the strongest support for a book or other common object using the least amount of supplies. Have students design and build a small structure to support some unbreakable object (book). The structure of such supplies as paper, toothpicks, , tongue depressors, glue, rubber bands, and tape should require the least amount of supplies that will support the selected object.
PS.3.2. Recognize that mathematics is the basis of communication in physical science.	Students can calculate answers using a formula. Students can use both English and metric systems to solve problems.	Statewide Test Teacher-made Test Portfolio Checklist Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have students use simple formulas in both English and metric systems to solve problems (e.g., figuring their weight on the moon in English and metric).

Student Learning Expectations	Fourth Grade Benchmarks	Assessments	Strategies/Activities
PS.3.3. Understand that tools allow tasks to be done more easily.	Students can identify and use various kinds of instruments used in science (telescopes, graduated cylinders, beakers, force meters, voltmeters, calipers, cameras, electron microscope, etc.).	Statewide Test Teacher-made Test Teacher Observation Portfolio Checklist Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have students identify and exhibit proper use of science equipment in practice and on lab tests.
PS.3.4. Explore physical science related careers.	Students can name professions in their community that use knowledge about energy and mathematics.	Statewide Test Teacher-made Test Teacher Observation Portfolio Checklist Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have students list and research professions that use knowledge of energy and mathematics in their everyday work.

STRAND 2: LIFE SCIENCE SYSTEMS
CONTENT STANDARD 1
Students will demonstrate an understanding of life science as a process of inquiry.

Student Learning Expectations	Fourth Grade Benchmarks	Assessments	Strategies/Activities
LS.1.1. Utilize the *scientific method* to investigate life sciences.	Students use scientific inquiry to solve problems. Students will use the scientific terms hypothesis and theory correctly. Students can set up simple experiments. Students know that scientific investigations generally work the same in different locations. Students will make predictions and test them.	Statewide Test Teacher-made Test Teacher Observation Portfolio Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have students develop and test a hypothesis about how various lights affect plant growth. Example: Students set up an experiment to grow the same kind of bean plants under low light, no light, red light, yellow light, and grow light. Students determine under which light the plants grow best. Have students set up the same experiment in different environments (temperatures, etc.) to determine whether (and how) location makes a difference.
LS.1.2. Select age-appropriate equipment and utilize technology and mathematics in the inquiry of life science.	Students are aware of lab safety rules and can identify these rules on exams. Students will use scientific tools and computers, appropriate for their age, to study or learn about the natural world in well-equipped science labs. Students will use mathematics (calculators) and writing to examine and describe the natural world.	Statewide Test Teacher-made Test Teacher Observation Portfolio Checklist Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Test students on safety rules. Have students conduct science activities in the classroom using appropriate tools. Have students use mathematics and writing skills in science activities.

	Students can measure length, weight, and volume in English and metric systems.		Have students use of both English and metric measurements in science activities.
LS.1.3. Generate graphs, writings, and charts to communicate life science investigations.	Students can make graphs and charts and describe in writing the meaning of their charts and graphs. Students can use charts and graphs to explain ideas and make interpretations and predictions.	Statewide Test Teacher-made Test Teacher Observation Portfolio Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have students select feeding sites for birds. One site must be six-feet above the ground, and one must be on the ground. Place identical seeds in both locations. Make predictions about the results. Collect data for at least 20 minutes.

STRAND 2: LIFE SCIENCE SYSTEMS
CONTENT STANDARD 2
Students will explore, demonstrate, communicate, apply and evaluate the knowledge of life systems.

Student Learning Expectations	Fourth Grade Benchmarks	Assessments	Strategies/Activities
LS.2.1. Identify and compare characteristics of living and nonliving things.	Students understand that living things consume food, water, minerals, and use energy and that nonliving things do not.	Statewide Test Teacher-made Test Teacher Observation Portfolio Checklist Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Students know that living things consume food, water, minerals, and use energy and that nonliving things do not. They discuss why real bears eat and drink but stuffed bears do not.
LS.2.2. Explore cells in *organisms*.	Students can draw and write about cells viewed under a microscope. Students can identify the cell wall and nucleus when viewing cells in drawings or under a microscope.	Statewide Test Teacher-made Test Teacher Observation Portfolio Checklist Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have students view cells under a microscope or videomicroscope and identify cell parts.
LS.2.3. Identify and investigate the functions of body systems in *organisms*.	Students know the name and function of each system in the human body.	Statewide Test Teacher-made Test Teacher Observation Portfolio Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Draw outlines of students on large paper and have teams draw in the organs and systems or view computer or video programs on body systems.

Student Learning Expectations	Fourth Grade Benchmarks	Assessments	Strategies/Activities
LS.2.4. Recognize patterns and characteristics of *organisms*.	Students know that animals and plants have various life patterns.	Statewide Test Teacher-made Test Teacher Observation Portfolio Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have students write about ways different animals gather and store food, find shelter, defend themselves, and rear their young. Have students write stories about a day in the life of a squirrel, rabbit, Robin, lizard, etc. in which they describe how the animal lives. Have students write about how plants grow from seeds, defend themselves, and grow and disperse seeds.
LS.2.5. Explore the life cycles of *organisms*.	Students know and observe that plants and animals have life cycles.	Teacher-made Test Teacher Observation Portfolio Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have students observe the life cycle of plants, frogs, butterflies, etc. by setting up stations in the room that support the growth and development of these organisms. Have students research the life cycle of an insect, frog, lizard, bird, dog, fern, and tulip.
LS.2.6. Name some common animals that no longer exist (e.g., dinosaurs and mammoths).	Students understand the order in time that some animals have appeared on Earth.	Teacher-made Test Teacher Observation Portfolio Performance-based Test Demonstration Log/Journal Essay Writing	Have students create a timeline of geologic history showing animals and plants in order of appearance.
LS.2.7. Understand that offspring are similar to their parents.	Students understand that traits from both parents are passed to their offspring.	Statewide Test Teacher-made Test Teacher Observation Portfolio Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	With parents' permission, select six or more students who can supply pictures of their parents. Have students list traits the child received from each parent.
LS.2.8. Identify the features of plants and animals that enable them to live in different environments.	Students can name special behaviors (e.g., hibernation, migration, etc.) that enable organisms to live in different environments.	Statewide Test Teacher-made Test Teacher Observation Portfolio Checklist Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Ask students what animals do when snakes get too cold to move in the winter or there is no food for birds in the North. Have them act out the behavior.

Student Learning Expectations	Fourth Grade Benchmarks	Assessments	Strategies/Activities
LS.2.9. Define and describe a *food chain* and a *food web*.	Students can explain each item in a food web or food chain.	Statewide Test Teacher-made Test Teacher Observation Portfolio Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Draw an ecosystem such as a pond. Have students cut out pictures of plants and animals and make food webs. Have students describe the life of one of the web's organisms. Have students write about or draw illustrations of food webs or food chains. Have students construct a model of a food web or food chain and (real or fictional) and can explain the role of each item.
LS.2.10. Understand that *organisms* are interdependent.	Students know that plants and animals interact with each other and with the nonliving environment in an ecosystem (e.g., organization of communities and flow of energy through the food web).	Statewide Test Teacher-made Test Teacher Observation Portfolio Performance-based Test Exhibition Log/Journal Essay Writing	Set up an aquarium. Describe the relationships among the living & nonliving components of this ecosystem. Have students research and explain in writing or labeled drawings how plans and animals interact. Have them include the role of the nonliving in an ecosystem.

STRAND 2: LIFE SCIENCE SYSTEMS CONTENT STANDARD 3 Students will demonstrate an understanding of the connections and applications in life sciences.			
Student Learning Expectations	**Fourth Grade Benchmarks**	**Assessments**	**Strategies/Activities**
LS.3.1. Understand that life sciences are interwoven into all disciplines.	Students know that past events affect the present and that present events affect the future.	Statewide Test Teacher-made Test Teacher Observation Portfolio Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Compile a class book of stories predicting what the world will be like 50 years in the future. Have students write about what the future may be like for all living things. Have students research and communicate the impact of some past event on the present way of life.
LS.3.2. Recognize that mathematics is the basis of communication in life science.	Students can use both English and metric systems to solve problems.	Statewide Test Teacher-made Test Teacher Observation Portfolio Checklist Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have students calculate in both English and metric systems their weight on the Earth and on the moon.

Student Learning Expectations	Fourth Grade Benchmarks	Assessments	Strategies/Activities
LS.3.3. Identify that humans change environments in ways that can be beneficial or detrimental for themselves and other *organisms*.	Students know that human actions can have an impact on the environment.	Statewide Test Teacher-made Test Teacher Observation Portfolio Checklist Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have students develop plans to save resources at school and to reduce harm to the environment. Have students identify human activities that are helpful and harmful to the environment and other organisms.
LS.3.4. Explore careers related to life sciences.	Students can research careers in the life sciences.	Statewide Test Teacher-made Test Teacher Observation Portfolio Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have students use print and nonprint resources to research careers in the life sciences (e.g., geneticists. microbiologists, and paleontologists) and include the educational requirements for such a career.

STRAND 3: EARTH/SPACE SYSTEMS

CONTENT STANDARD 1
Students will demonstrate an understanding of the inquiry process through the study of earth and space systems.

Student Learning Expectations	Fourth Grade Benchmarks	Assessments	Strategies/Activities
ES.1.1. Utilize the *scientific method* to investigate earth/space systems.	Students use scientific inquiry to solve problems. Students will use the scientific terms hypothesis and theory correctly. Students set up observations. Students know that scientific investigations generally work the same in different locations. Students will make predictions and test them.	Statewide Test Teacher-made Test Teacher Observation Portfolio Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Gather 50 ml of four different types of soil. Have students decide by feel which sample has the most sand content. Place the samples into identical jars and add water and a drop of dishwasher soap and shake. Three days later the soil particles will have settled into layers. Have students record amounts of sand. Discuss if this experiment should work in other parts of the state.

Student Learning Expectations	Fourth Grade Benchmarks	Assessments	Strategies/Activities
ES.1.2. Select appropriate equipment and utilize technology and mathematics in the inquiry of earth/space systems.	Students are aware of safety rules and can identify these rules on exams. Students will use scientific tools and computers, appropriate for their age, to study or learn about the natural world in well-equipped science labs. Students will use mathematics (calculators) and writing to examine and describe the natural world. Students can measure length, weight, and volume in English and metric systems.	Statewide Test Teacher-made Test Teacher Observation Portfolio Checklist Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Students can identify safety rules on a teacher-made test. Have students use the tools of science and calculators, write about their scientific studies, and measure in English and metric systems systems.
ES.1.3. Generate graphs, writings, and charts to communicate earth/space systems investigations.	Students can make graphs and charts and describe in writing the meaning of their charts and graphs. Students can use charts and graphs to explain ideas and make interpretations and predictions.	Statewide Test Teacher-made Test Teacher Observation Portfolio Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have students make scientific observations and graph or chart their findings and interpret their findings.

STRAND 3: EARTH/SPACE SYSTEMS

CONTENT STANDARD 2
Students will explore, demonstrate, communicate, apply and evaluate knowledge of the properties of earth and space systems.

Student Learning Expectations	Fourth Grade Benchmarks	Assessments	Strategies/Activities
ES.2.1. Recognize and classify different types of earth materials.	Students can identify different kinds of rocks (e.g., igneous, metamorphic, and sedimentary rocks and common fossils). Students understand the stages of the rock cycle.	Teacher-made Test Teacher Observation Portfolio Checklist Performance-based Test Exhibition Log/Journal Essay Writing	Most rocks in Arkansas are sedimentary. Show students examples of igneous and metamorphic rocks. Have students group rocks with similar characteristics/processes. Have students create a model of the rock cycle.
ES.2.2. Describe major features of the earth's surface and how it is affected by natural changes.	Students can explain the processes by which mountains are formed.	Statewide Test Teacher-made Test Teacher Observation Portfolio Checklist Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have students demonstrate how mountains are made by folding, uplifting or faulting, and how mountains erode by using different colors of clay to make the rock layers and bending or slicing the clay layers to show folding, uplifting or faulting.

Student Learning Expectations	Fourth Grade Benchmarks	Assessments	Strategies/Activities
ES.2.3. Identify the natural divisions of Arkansas.	Students can name the characteristics (geology, plants, animals, land uses) of each of the six natural divisions of Arkansas.	Teacher-made Test Teacher Observation Portfolio Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have students create a bulletin board or other display of the natural divisions of Arkansas showing the characteristics of each division. (See resource list.)
ES.2.4. Understand that the Earth is layered (*crust, mantle, and core*).	Students understand that the Earth is composed of three distinct layers that are motile.	Statewide Test Teacher-made Test Teacher Observation Portfolio Performance-based Test Exhibition Demonstration Log/Journal	Have students research the Internet for images of the layers of the Earth. (See K-4 Crusade for activity titled "Apple as the Earth.")
ES.2.5. Investigate seasonal changes in weather and factors that affect weather conditions.	Students can make predictions about weather. Students can locate N, NE, E, SE, S, SW, W, and NW.	Statewide Test Teacher-made Test Teacher Observation Portfolio Checklist Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have students make weather predictions using a variety of sources (e.g., wind directions, barometer readings, and clouds) and can compare them to local media forecasts. Have students locate north, south, east and west on their playground.
ES.2.6. Describe the *water cycle.*	Students can describe how the water cycle is influenced by temperature and landforms.	Statewide Test Teacher-made Test Teacher Observation Portfolio Checklist Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have students label a diagram of a mountain to show how altitude, temperature, and geographic features affect the water cycle.
ES.2.7. Discuss land forms in the ocean and how they change.	Students can identify the landforms in the ocean and describe how they change.	Statewide Test Teacher-made Test Teacher Observation Portfolio Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Teams of students construct with clay ocean-bottom relief maps.

Student Learning Expectations	Fourth Grade Benchmarks	Assessments	Strategies/Activities
ES.2.8. Analyze the features and motions of the sun, moon, earth and other celestial bodies (e.g., *solar system*, moon phases, earth's *rotation* and *revolution*).	Students know the phases of the moon are caused by its angle to the sun and earth. Students know the characteristics of Mercury, Venus, Earth, and Mars. Students know the relative positions of the planets in the night sky. Students know the Earth revolves around the Sun every 365 days. Students know that the tilt of the earth affects the seasons.	Statewide Test Teacher-made Test Teacher Observation Portfolio Checklist Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Set up flashlight models to illustrate the phases of the moon. Have students use print and nonprint resources to research the characteristics of the planets and their paths in the night's sky. Set up flashlight models to illustrate the Earth's revolution around the sun in 365 days and how the tilt of the Earth affects the seasons.

STRAND 3: EARTH/SPACE SYSTEMS
CONTENT STANDARD 3
Students will demonstrate an understanding of the connections and applications of earth and space systems.

Student Learning Expectations	Fourth Grade Benchmarks	Assessments	Strategies/Activities
ES.3.1. Understand and appreciate the uses of water.	Students understand the sources and availability of water and recognize the significance of water in maintaining life forms.	Statewide Test Teacher-made Test Teacher Observation Portfolio Checklist Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have teams of students research how much clean water exists on Earth. Compare numbers and discuss differences. Have students describe various kinds of water sources and how water is used. Have students research and report on the availability of usable water exists on Earth.
ES.3.2. Describe uses and conservation of materials taken from the earth.	Students can write about a variety of sources of energy (hydroelectric, nuclear, coal, solar, geothermal, windmills, etc.), and which sources conserve other resources.	Statewide Test Teacher-made Test Teacher Observation Portfolio Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Create a situation in which a town must choose to develop a new power plant. Divide the class into teams to develop plans using different sources.

Student Learning Expectations	Fourth Grade Benchmarks	Assessments	Strategies/Activities
ES.3.3. Identify the effect humans have on the environment (e.g., use and misuse).	Students recognize that humans affect the environment. Students can develop written plans to save resources in their country.	Statewide Test Teacher-made Test Portfolio Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have students create research reports on how people harm the environment and how to correct this harm. Have students write about how the country can save resources. Have students plan and carry out a conservation project.
ES.3.4. Understand how earth/space systems connect to other disciplines.	Students recognize that the sciences and the arts interact.	Statewide Test Teacher-made Test Teacher Observation Portfolio Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Have students write about, exhibit, role play, and apply what they learn in science to learning in other subject areas (e.g., music, technology, social studies, etc.).
ES.3.5. Recognize the importance of mathematics as the basis of communication in earth/space systems.	Students can apply mathematics to solve science problems.	Statewide Test Teacher-made Test Teacher Observation Portfolio Performance-based Test Exhibition Demonstration Log/Journal	Have students use mathematics with and without calculators to solve science experiments.
ES.3.6. Use age-appropriate equipment, tools, techniques, technology, and mathematics in *scientific investigation* of earth/space systems.	Students are aware of safety rules and can identify these rules on exams. Students will use scientific tools and computers, appropriate for their age, to study or learn about the natural world in well-equipped science labs. Students will use mathematics (calculators) and writing to examine and describe the natural world. Students can measure length, weight, and volume in English and metric systems.	Statewide Test Teacher-made Test Teacher Observation Portfolio Checklist Performance-based Test Exhibition Demonstration Log/Journal Essay Writing	Students can identify safety rules on exams. Students use all appropriate science tools in their classroom. Students use math to solve science problems. Students and teacher can both use English and metric systems in the classroom
ES.3.7. Explore careers related to earth/space science.	Students can identify and gather information about careers in earth and space science.	Teacher-made Test Teacher Observation Portfolio Performance-based Test Exhibition Log/Journal Essay Writing	Have students use print and nonprint resources to collect information about the work done by earth and space scientists and the educational requirements to prepare for those careers.

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