

Subject: Science

Grade: 4

Hallsville R-IV Elementary

4th Grade Science

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Curriculum Strands

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- [Force and Motion](#)
- Living Organisms
- [Ecology/Environments](#)
- [Earth Systems](#)
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4th Grade Science Rationale:

The purpose of the fourth grade science program is to guide the development of scientific minds, to enhance their ability to engage in the scientific processes, and to be aware of the intricate balance between the environment and us.

4th Grade Science Course Description:

Fourth graders learn about science through the study of physical science dealing with magnetism and electricity, and force and motion. Life science studies include units on the human body and the study of plants. Students also study the universe as part of their larger world. Through out the year, the science process skills and investigative techniques are taught and used. The interrelationship of science and technology is also taught through out the year.

Concept: Matter and Energy

[top](#)**Topic Objective:**

Strand 1: Matter and Energy - All students will demonstrate proficiency in the knowledge that changes in properties and states of matter provide evidence of the atomic theory of matter and that energy has a source, can be transferred, and can be transformed into various forms but is conserved between and within systems.

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>1A. Describe and compare the mass of objects to the nearest gram by using balances.</p> <p>1B. Describe and compare the volumes (the amount of space an object takes up) of objects using a graduated cylinder.</p> <p>1C. Recognize that no two objects can occupy the same space at the same time (e.g., water level rises when an object or substance such as a rock is placed in a quantity of water).</p> <p>1D. Classify types of materials (e.g., water, salt, sugar, iron filings, salt water) into substances (materials that have specific physical properties) or mixtures of substances by using their characteristic properties.</p>		SC 1			<p>1A Student finds the mass of various objects using a balance scale. Rank the masses of the objects and make a graph of the masses.</p> <p>1B Students measure different amounts of liquids using a graduated cylinder. Graph the volume of each liquid.</p> <p>1C Students measure a volume of water. Add a solid object to the water and measure volume again. Repeat with different solid objects. QUESTION: What happens to the volume when an object is added? Why?</p> <p>1D Students make Kool-Aid or lemonade. List the substances used and the mixture made.</p>	<p>1A Mass Activity: Successful completion of activity (Scoring Guide)</p> <p>1B Measure Volume Activity: Successful completion of activity (Scoring Guide)</p> <p>1C Volume Activity: Successful completion of activity (Scoring Guide)</p> <p>1D, F, G Kool-Aid: Successful completion of activity (Scoring Guide)</p> <p>1E Gobstopper Activity: Successful completion of activity (Scoring Guide)</p> <p>1H, I Trail Mix Activity: Successful completion of activity (Scoring Guide)</p>

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Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>1E. Identify water as a solvent that dissolves materials (Do NOT assess the term solvent)</p> <p>1F. Observe and describe how mixtures are made by combining solids or liquids, or a combination of these.</p> <p>1G. Distinguish between the components in a mixture (e.g., trail mix, conglomerate rock, salad)</p> <p>1H. Describe ways to separate the components of a mixture by their properties (i.e., sorting, filtration, magnets, or screening)</p> <p>1I. Recognize that the total mass of a material remains constant whether it is together, in parts, or in a different state.</p> <p>1J. Construct and diagram a complete electric circuit by using a source (e.g., battery), a means of transfer (e.g., wires), and a receiver (e.g., resistance bulb, motors, fans)</p> <p>1K. Observe and describe the evidence of energy transfers in a closed series circuit (e.g., lit bulb, moving motor or fan)</p>					<p>1E Gobstopper Activity: Students cover Gobstoppers with water and record the results. Have them make conclusions about the results. Use activity to lead into an introduction on 4 Question Strategy (See Inquiry Strand.)</p> <p>1F Activity: Make Kool- Aid or trail mix.</p> <p>1G With the trail mix or Kool-Aid activity, students identify the materials that make up the mixture.</p> <p>1H With trail mix activity, students separate the mixture into individual components. Brainstorm ideas to separate other mixtures into their components. (Use salt water; chicken noodle soup; paper clips and marble mixture as examples)</p> <p>1I Measure the mass of the trail mix as a mixture and then measure the masses of the components that make up the mixture.</p> <p>1J Students construct a simple electrical circuit. Draw a diagram of the completed circuit.</p>	

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Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>1L. Classify materials as conductors or insulators of electricity when placed within a circuit (e.g., wood, pencil lead, plastic, glass, aluminum foil, lemon juice, air, water)</p> <p>1M. Identify the evidence of energy transformations (temperature change, light, sound, motion, and magnetic effects) that occur in electrical circuits.</p> <p>1N. Predict the effects of an electrostatic force (static electricity) on the motion of objects (attract or repel)</p>					<p>1K Construct a simple electrical circuit. Experiment with adding batteries and/or bulbs to the circuit. Explain the results.</p> <p>1L Conductor/Insulator Activity: Students predict which items will transfer electricity and which items won't. Experiment to determine insulators and conductors. Classify objects as insulators and conductors of electricity.</p> <p>1M After observing several electrical set-ups, (Fan, electromagnet, light bulb, glue gun) Students identify how the energy is expressed in each set-up.</p>	
Resources:				Instructional Methods:		
Enrichment/ Special Needs:						

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+Key to Integrated Skills

DS = Disability Equity
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Concept: Force and Motion

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Topic Objective:
Strand 2: Properties and Principles of Force and Motion - All students will demonstrate proficiency in the knowledge that the motion of objects is described by its change in position relative to another object or point and that forces affect motion.

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>2A. Identify the forces acting on a load and use a spring scale to measure the weight (resistance force) of the load.</p> <p>2B. Describe how friction affects the amount of force needed to do work over different surfaces or through different media.</p> <p>2C. Explain how work can be done on an object (force applied and distance moved) (No formula calculations at this level).</p> <p>2D. Recognize that simple machines change the amount of effort force and/or direction of force.</p> <p>2E. Compare the measures of effort force (measured using a spring scale to the nearest Newton) needed to lift a load with and without the use of simple machines.</p>		SC 2			<p>2A Introduce students to the use of a spring scale and the unit of measure Newton. Students measure the gravitational force (weight) of various objects in Newtons. Explore the force needed (measured in Newtons) to move various objects. Record findings in Science notebook.</p> <p>2B With students in small groups, give them various materials, such as waxed paper, foil, sandpaper and other different types of paper. Their purpose is to investigate how different surfaces affect the movement of a block. The groups decide how to set up their investigation and report to the class for feedback/suggestions before beginning the investigation. Students conduct the investigation and record data in the science notebook. After groups report their findings back to the class, have a discussion about friction and its effects. Students then find other examples of friction in</p>	<p>2A (PE) Spring Scale: Recorded data (Scoring Guide)</p> <p>2B (PE) Surface Materials: Completion of notebook and examples of friction (Scoring Guide)</p> <p>2C (PE) Ramp and Slider: Predictions, completion of activity, data table from investigation (Scoring Guide)</p> <p>2D (PE) Catapult: Notebook entries (Scoring Guide)</p> <p>2E (PE) Force: Graph of data (Scoring Guide)</p> <p>2F (PE) Power Point Presentation: (Scoring Guide)</p>

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>2F. Identify the simple machines in common tools and household items.</p>					<p>their daily life.</p> <p>2C Use a ramp and slider set-up to lead into an investigation of force. Before the demonstration, have students predict (in their Science notebooks) what they think will happen. Share their predictions and use their predictions to build on their prior knowledge to clear up misconceptions. Have students complete Paper Slider activity. QUESTION: How can you change the distance the object travels? After the investigation, students post their results.</p> <p>2D Using an inclined plane or lever, students develop an investigation on how the use of a simple machine changes the direction/amount of force when moving an object. (catapult)</p> <p>2E Students use a spring scale to measure the Newtons needed to lift weight. Students lift the same weight using a pulley and measure the force in Newtons. With this background have students in small groups conduct investigations using inclined plane, wheel and axle, and lever to move objects. Students measure force in Newtons and record data in a</p>	

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					<p>graph form. Each group will share their findings with the rest of the class.</p> <p>2F Students use "Inventor's Workshop" website to learn about simple machines. Use the digital camera to take pictures of simple machines in the school. Use Clip-art and scanned pictures to create a Power Point presentation about simple machines.</p>	

Resources:

Instructional Methods:

Enrichment/ Special Needs:

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Topic Objective:
Strand 4: Changes in Ecosystems and Interactions of Organisms within their Environments - All students will demonstrate proficiency in the knowledge that organisms are interdependent with one another and with their environment.

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>4A. Identify the ways a specific organism may interact with other organisms or with the environment (e.g., pollination, shelter, seed dispersal, camouflage, migration, hibernation, defensive mechanism).</p> <p>4B. Recognize different environments (i.e., pond, forest, prairie) support the life of different types of plants and animals.</p> <p>4C. Identify examples in Missouri where human activity has had a beneficial or harmful effect on other organisms (e.g., feeding birds, littering vs. picking up trash, hunting/conservation of species, paving/restoring green space).</p> <p>4D. Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem.</p>		SC 4			<p>4A Students make an Inspiration web or picture that shows an organism in a certain environment. Label the interactions such as pollution, migration, and camouflage, and other relationships.</p> <p>4B Students match organisms to the different environments they would live in (prairie, pond, forest)</p> <p>4C "Land Use" lesson from "Fishing for Answers" book.</p> <p>4D Use Pond Ecosystem poster and have students identify some of the organisms in that environment. Students then classify those organisms into groups of consumers, producers, and decomposers.</p> <p>4E Post Ecosystem poster activity - Sub classify consumers into herbivore, carnivore, or omnivore.</p>	<p>4A Picture/Inspiration Web: Successful completion of activity (Scoring Guide)</p> <p>4B Habitat Activity: (Scoring Guide)</p> <p>4C Land Use: Successful completion of activity (Scoring Guide)</p> <p>4D, E, K Pond Ecosystem Poster: Successful completion of activity (Scoring Guide)</p> <p>4F Food Chain Game: Successful completion of activity (Scoring Guide)</p> <p>4G Fossil Cards: Successful completion of activity (Scoring Guide)</p> <p>4H Plant Cards: Successful completion of activity (Scoring Guide)</p>

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Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>4E. Differentiate between the three types of consumers (herbivore, carnivore, omnivore)</p> <p>4F. Categorize organisms as predator or prey in a given ecosystem.</p> <p>4G. Compare and contrast common fossils found in Missouri (i.e., trilobite, ferns, crinoids, gastropods, bivalves, fish, mastodons) to organisms that are present on Earth today.</p> <p>4H. Identify specialized structures and describe how they help plants survive in their environment (e.g., root, cactus needles, thorns, winged seed, waxy leaves).</p> <p>4I. Identify specialized structures and senses and describe how they help animals survive in their environment (e.g., antenna, body covering, teeth, beaks, whiskers, appendages).</p>					<p>4F Food Chain Game: Give each student a card with the name of an organism on it. Strings will be attached to each card with a list of food sources. Students work together to make a food web using the cards. After the activity, students list the organisms that they preyed on and the organisms that they were prey for.</p> <p>4G Using fossil cards, students try to match the fossils to organisms that are alive today.</p> <p>4H Given a variety of plant cards, students identify a part of each plant that helps it to survive.</p> <p>4I Given a variety of animal cards, students identify a part of each animal that helps it survive.</p> <p>4J Give students different situations involving plants and animals in an environment. Identify the cause/effect of the animal/plant behavior (hunger/hunting, lack of light/change in growth)</p>	<p>4I Animal Cards: Successful completion of activity (Scoring Guide)</p> <p>4J Cause/Effect: Successful completion of activity (Scoring Guide)</p>

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Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>4J. Recognize internal cues (e.g., hunger) and external cues (e.g., changes in the environment) that cause organisms to behave in certain ways (e.g., hunting, migration, hibernation)</p> <p>4K. Predict which plant or animal will be able to survive in a specific environment based on its special structures or behaviors.</p>					<p>4K Using the Pond Ecosystem poster, students identify which organism will survive in different situations and why they will survive.</p>	
<p>Resources:</p> <p>"Fishing for Answers" book Food Web cards Plant/Animal cards Conservation posters</p>				<p>Instructional Methods:</p>		
<p>Enrichment/ Special Needs:</p>						

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Concept: Earth Systems

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Topic Objective:
Strand 5: Processes and Interactions of the Earth's Systems - All students will demonstrate proficiency in the knowledge that Earth's systems (Geosphere, Atmosphere, and Hydrosphere) have common components and unique structures; and interact with one another as they undergo change by common processes.

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>5A. Identify and describe the components of soil (e.g., plant roots and debris, bacteria, fungi, worms, types of rock) and its properties (e.g., odor, color, resistance to erosion, texture, fertility, relative grain size, absorption rate)</p> <p>5B. Compare the physical properties (i.e, size, shape, color, texture, layering, presence of fossils) of rocks (mixture of different Earth materials, each with observable physical properties)</p> <p>5C. Observe and describe the breakdown of plant and animal material into soil through decomposition processes (i.e., decay, rotting, composting, digestion)</p> <p>5D. Identify the major landforms on earth (i.e., mountains, plains, oceans, river valleys, coastlines, and canyons)</p>		SC 5			<p>5A Give each student group a soil sample. Have them find components from the soil.</p> <p>5A Give each student group a variety of different soil samples and have them classify the samples and sort them.</p> <p>5B Give each student group a rock sampler set and have the students group and classify rock to different attributes.</p> <p>5C Give each student group a soil sample and have them identify any plant or animal debris in the sample. Have the students correctly sequence the events of decaying and decomposing.</p>	<p>5A, F "Who Killed Roger Frisby?": (Scoring Guide)</p> <p>5B Classify Rocks: Successful completion of activity (Scoring Guide)</p> <p>5C Soil Sample: Successful completion of activity (Scoring Guide)</p> <p>5C Soil/Tree Sequencing Sheet: (Scoring Guide)</p> <p>5E Weathering Photo: Successful completion of activity (Scoring Guide)</p> <p>5G, H Erosion: Successful completion of activity (Scoring Guide)</p>

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Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>5E. Describe how weathering agents (e.g., water, temperature, wind, and plants) cause surface changes that create and/or change earth's surface materials and/or landforms.</p> <p>5F. Describe how erosional processes (i.e., action of gravity, waves, wind, rivers, and glaciers) cause surface changes that create and/or change earth's surface materials and/or landforms.</p> <p>5G. Identify the ways humans affect the erosion and deposition of earth materials (e.g., clearing of land, planting vegetation, paving land, construction of new buildings)</p> <p>5H. Propose ways to solve simple environmental problems (e.g., recycling, composting, ways to decrease soil erosion) that result from human activity.</p>					<p>5D Give students a map of North America and have them identify the lakes, plains, oceans, and other landforms (Social Studies connection)</p> <p>5E Give students a photograph of a landscape with evidence of weathering and have them write a possible explanation for the condition of the landscape.</p> <p>5F Give students a photograph of a landscape with evidence of erosion and have them write a possible explanation for the condition of the landscape.</p> <p>5G, H Erosion lesson from "Fishing for Answers" - identify the ways humans have effected erosion in the diagram and explain how the problems could be solved.</p>	
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Concept: Science Inquiry

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Topic Objective:
Strand 7: Science Inquiry - All students will demonstrate proficiency in the knowledge that science understanding is developed through the use of science process skills and scientific knowledge in combination with scientific investigation, reasoning, and critical thinking.

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>7A. Formulate testable questions and explanations (hypotheses).</p> <p>7B. Recognize the characteristics of a fair and unbiased test.</p> <p>7C. Conduct a fair test to answer a question.</p> <p>7D. Make qualitative observations using the five senses.</p> <p>7E. Observe using simple tools and equipment (e.g., hand lenses, magnets, thermometers, metric rulers, balances, graduated cylinders, spring scale)</p> <p>7F. Measure length to the nearest centimeter, mass using grams, temperature using degrees Celsius, volume to the nearest millimeter, weight to the nearest Newton)</p> <p>7G. Compare amounts/measurements.</p>		SC 7			<p>7A Given the purpose of identifying the effect of simple machines on completing work, design an investigation with a testable question.</p> <p>7B Given examples of science investigations identify the elements that make the investigation a fair or unfair test.</p> <p>7C Given a question, design a fair, complete science investigation. Use four question strategy to develop an investigation.</p> <p>7D During "Gobstopper" activity, make qualitative observations</p> <p>7E During Paper worm activity, use rulers and magnifying lenses to gather data and observations.</p>	<p>7A Investigation: Successful completion of activity (scoring Guide)</p> <p>7B Fair Test: successful completion of activity (Scoring Guide)</p> <p>7C Design an Investigation: Successful completion of activity (Scoring Guide)</p> <p>7D Gobstopper Activity: Successful completion of activity (Scoring Guide)</p> <p>7E Math Connection: Measurement activities using metric system (Scoring Guides)</p>

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Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>7H. Judge whether measurements and computations of quantities are reasonable.</p> <p>7I. Use quantitative and qualitative data to construct reasonable explanations.</p> <p>7J. Use data as support for observed patterns and relationships, and to make predictions to be tested.</p> <p>7K. Evaluate the reasonableness of an explanation.</p> <p>7L. Analyze whether evidence supports proposed explanations.</p> <p>7M. Communicate the procedures and results of investigations and explanations through:</p> <ul style="list-style-type: none">* oral presentations* drawings and maps* data tables* graphs (bar, single line, pictographs)* writings						

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Concept: Impact of Science

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Topic Objective:
Strand 8: Impact of Science, Technology and Human Activity - All students will demonstrate proficiency in the knowledge that the nature of technology is advanced by and can advance science as it seeks to apply scientific knowledge in ways that meet human needs and that science is a human endeavor.

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>8A. Design and construct a machine using materials and/or existing objects that can be used to perform a task (ASSESS LOCALLY).</p> <p>8B. Design and construct an electrical device, using materials and/or existing objects that can be used to perform a task (ASSESS LOCALLY).</p> <p>8C. Describe how new technologies have helped scientists make better observations and measurements for investigations (e.g., telescopes, magnifiers, balances, microscopes, computers, stethoscopes, thermometers).</p> <p>8D. Identify how the effects of inventions or technological advances (e.g., different types of light bulbs, semiconductors/integrated circuits and electronics, satellite imagery, robotics, communication,</p>		SC 8			<p>8A Given a variety of objects and a problem/purpose, students build a machine - Make a Machine activity.</p> <p>8B Given wires, bulbs, and batteries, students build a switch, fan, and other devices that use an electrical current.</p> <p>8C After studying about the invention of the microscope/telescope, students write a short paragraph about how the changes in the invention have helped scientists (Hubble Telescope - Famous Missourian connection)</p> <p>8D Students choose an invention and list the benefits/advantages and the drawbacks/disadvantages of that invention.</p>	<p>8A Build a Machine: Successful completion of activity (Scoring Guide)</p> <p>8B Build a Switch: Successful completion of activity (Scoring Guide)</p> <p>8C Writing Connection - Paragraph of the Week: Inventions (Scoring Guide)</p> <p>8D Advantage/Disadvantage: Successful completion of activity (Scoring Guide)</p> <p>8E Wizards of Inventions: Successful completion of activity (Scoring Guide)</p> <p>8F Invention Timeline: Successful completion of activity (Scoring Guide)</p>

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Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>transportation, generation of energy, renewable materials) can be helpful and sometimes they are harmful (ASSESS LOCALLY).</p> <p>8E. Research biographical information about various scientists and inventors from different gender, ethnic and cultural backgrounds and describe how their work contributed to science and technology (ASSESS LOCALLY)</p> <p>8F. Identify a question that was asked or could be asked or a problem that needed to be solved when given a brief scenario (fiction or nonfiction stories of people working alone or in groups solving everyday problems or learning through discovery)</p> <p>8G. Work with a group to solve a problem, giving due credit to the ideas and contributions of each group member (ASSESS LOCALLY).</p>					<p>8E Read a biography about George Washington Carver ("Pocketful of Goobers") and discuss the importance of his life.</p> <p>8E Wizards of Inventions activity</p> <p>8F Read a biography on Thomas Alva Edison, George Washington Carver, Eli Whitney, etc. and identify the problem(s) he/she needed to address and how it was solved.</p> <p>8F Identify the person/people who invented common inventions - (Invention Timeline Activity)</p> <p>8G Group work on Invention in a Bag activity</p>	<p>8G Invention in a Bag: Successful completion of activity (Scoring Guide)</p>

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Resources:

"Invention " magazine
Invention Convention packet
"Wizard of Sound"
"Pocketful of Goobers"
Lego Dacta sets
"The Man Who Can Make Anything"

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