

## Curriculum Guide

### Foundational Science Skills for STEM Scholars Hub, Aligned with NGSS Standards

Lesson Title	NGSS Standard	Concept	Objective	Practical Application	Grade Level	Suggested Days to Teach
Introduction to Science	3-PS2-4	What is Science?	Introduce the concept of science as a way of solving problems and exploring the world.	Observing nature, discussing what science is.	<b>3rd-5th Grade</b>	1 day
The Scientific Method	3-PS2-4	Steps of the Scientific Method	Teach the steps of the scientific method: question, hypothesis, experiment, observation, conclusion.	Use the method to explore a simple experiment (e.g., planting seeds).	<b>3rd-5th Grade</b>	2 days
Observations and Data Collection	3-PS2-4	Making Observations	Learn how to gather data and make observations using senses or tools.	Use a nature walk to observe and record data (weather, plants).	<b>3rd-5th Grade</b>	2 days
Forming Hypotheses	3-PS2-4	What is a Hypothesis?	Teach students how to make a testable prediction based on observations.	Predict what happens when objects are mixed (e.g., mixing vinegar and baking soda).	<b>3rd-5th Grade</b>	1 day
Introduction to Forces (Pushes and Pulls)	3-PS2-4	Understanding Forces	Teach the concept of forces, including pushes and pulls, and how they affect motion.	Use toys or objects to show how forces work (e.g., pushing a ball).	<b>3rd-5th Grade</b>	2 days
Gravity and Motion	3-PS2-4	Understanding Gravity	Teach students how gravity affects objects, causing them to fall towards Earth.	Drop different objects and observe how they fall.	<b>3rd-5th Grade</b>	2 days

Investigating Matter	3-PS2-4	States of Matter	Teach students to classify matter as solid, liquid, or gas.	Explore ice melting, water evaporating, and steam formation.	<b>3rd-5th Grade</b>	2 days
Energy and Motion: Newton's Laws of Motion	5-PS2-1	Newton's Laws of Motion	Introduce Newton's laws and how they explain object movement.	Use activities like rolling balls or jumping to demonstrate motion.	<b>5th-8th Grade</b>	3 days
Introduction to Simple Machines	4-PS3-3	Simple Machines (Lever, Pulley, etc.)	Teach the six types of simple machines and how they make work easier.	Build a lever or pulley system to lift objects.	<b>4th-8th Grade</b>	3 days
Investigating Sound and Light	4-PS3-4	Properties of Sound and Light	Teach the basic properties of sound and light waves and their interactions.	Create sound waves with tuning forks, investigate how light bends.	<b>4th-8th Grade</b>	3 days
Weather and Climate	3-ESS2-1, 5-ESS2-1	Earth's Weather Systems	Teach the difference between weather and climate, and how they are influenced by various factors.	Monitor local weather patterns and compare to climate averages.	<b>3rd-8th Grade</b>	3 days
The Water Cycle	3-ESS2-1	Water Cycle and States of Water	Teach the processes of evaporation, condensation, precipitation, and collection.	Simulate the water cycle using a plastic bag and water.	<b>3rd-5th Grade</b>	2 days
Forces in Action: Friction	3-PS2-4	Friction	Teach students how friction affects movement and speeds.	Slide objects across different surfaces and measure speed changes.	<b>3rd-5th Grade</b>	2 days
Magnetism and Electricity	4-PS3-2	Magnetism and Electric Forces	Introduce the concepts of magnetism and electricity and how they interact.	Use magnets to show attraction and repulsion, build a simple circuit.	<b>4th-8th Grade</b>	3 days
Photosynthesis and Plant Growth	3-LS1-1	Plant Growth and Photosynthesis	Teach how plants make their own food through photosynthesis.	Grow plants and track growth with varying light or water conditions.	<b>3rd-5th Grade</b>	3 days
Ecosystems and Interactions	5-ESS3-1	Ecosystem Relationships	Teach the interactions between organisms in an	Create a simple ecosystem in a jar and	<b>5th-8th Grade</b>	3 days

			ecosystem and their environment.	observe interactions.		
Introduction to Atoms and Molecules	MS-PS1-1	Structure of Matter	Teach the basic structure of matter, including atoms and molecules.	Use ball models to demonstrate atomic structure.	<b>6th-8th Grade</b>	3 days
Chemical Reactions	MS-PS1-5	Understanding Chemical Reactions	Teach how chemical reactions occur when substances interact.	Mix substances like vinegar and baking soda to observe reactions.	<b>6th-8th Grade</b>	3 days
Renewable and Nonrenewable Resources	4-ESS3-1	Types of Resources	Teach the difference between renewable and nonrenewable resources.	Explore how we use and conserve natural resources in daily life.	<b>4th-8th Grade</b>	3 days
Light and Color	4-PS3-4	Light and Color	Teach how light interacts with objects to create colors.	Use prisms to separate light into a spectrum.	<b>4th-8th Grade</b>	2 days
Sound Waves and Vibration	4-PS3-4	Sound Waves	Teach how sound travels through different materials and how pitch changes.	Use tuning forks and sound tubes to create vibrations.	<b>4th-8th Grade</b>	3 days
Human Impact on the Environment	5-ESS3-1	Environmental Impact	Teach how human activities impact the environment, including pollution and conservation.	Explore recycling and energy-saving activities.	<b>5th-8th Grade</b>	3 days
The Solar System	5-ESS1-1	Planets and Their Movements	Teach about the solar system and the movement of planets around the sun.	Create a model of the solar system with orbiting planets.	<b>5th-8th Grade</b>	3 days
Introduction to Coding	3-PS2-4	Basic Coding Concepts	Teach basic coding principles using block-based or text-based programming.	Use platforms like Scratch or Blockly to create simple programs.	<b>5th-8th Grade</b>	4 days
Coding for Games and Animation	MS-ETS1-4	Coding for Games and Animation	Apply coding skills to create simple games or animations.	Create a simple animation or interactive game.	<b>5th-8th Grade</b>	5 days

Building a Simple Circuit	4-PS3-2	Electrical Circuits	Teach how electricity flows through circuits, and how to build a simple circuit.	Build a basic circuit using a battery, wires, and light bulbs.	<b>4th-8th Grade</b>	2 days
The Role of Technology in Society	5-ETS1-1	Technology in Everyday Life	Teach how technology impacts various aspects of society.	Investigate the role of technology in communication, transport, and health.	<b>5th-8th Grade</b>	3 days
Energy Transfer and Conservation	4-PS3-4	Conservation of Energy	Teach about energy transfer, conservation, and renewable sources.	Design and build energy-efficient models (e.g., solar ovens).	<b>4th-8th Grade</b>	3 days
Soil and Water Conservation	5-ESS3-1	Soil Conservation and Water Resources	Teach the importance of conserving soil and water resources in environmental science.	Implement a water filtration experiment or observe soil erosion.	<b>5th-8th Grade</b>	3 days
Space Exploration and Technology	5-ESS1-1	Space Exploration	Introduce space exploration and technology used in studying space.	Explore space missions, create a model of a rocket, or simulate a moon landing.	<b>5th-8th Grade</b>	4 days

Note: The **Next Generation Science Standards (NGSS)** were chosen for this science-focused curriculum because they provide a comprehensive and widely adopted framework for science education across the United States, ensuring consistency in teaching essential scientific concepts and practices. Unlike Common Core, which primarily addresses English Language Arts and Mathematics, NGSS is specifically tailored for science, promoting hands-on learning, inquiry, and critical thinking, which are vital for developing STEM skills. These standards are flexible and applicable across various grade levels, making them suitable for elementary and middle school students, and they are adopted by most states, ensuring that the lessons can be implemented nationwide in schools, regardless of regional differences.

[www.stemscholarshub.net](http://www.stemscholarshub.net) for STEM Scholars Hub

**Reference:**

Next Generation Science Standards. (2013). *Next Generation Science Standards: For States, By States*. The National Academies Press. <https://doi.org/10.17226/18290>

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