

Course Description:

Grade 4 Science includes the three main domains of science which are physical, life, and earth and space science. Learners will use various kinds of experimenting, including field studies, systematic observations, models, and controlled experiences. The course begins with the explanation of the scientific method which the students continue to use and build upon throughout the course. The big picture of the earth is examined as students review the life on planet earth, salt and fresh water, and fast and slow changes that occur on the planet. Students go beyond planet earth, though, as they study galaxies, the solar system and other planets. Students examine the ways that forces and motion can be measured and the concept that a single kind of matter can exist as a solid, liquid or gas. Grade 4 science uses many modes of instruction including video presentations, enrichment activities, and hands-on experimentation.

Module	Lesson Title	Objectives	Materials Needed
Using Scientific Methods	What Is Science?	<ol style="list-style-type: none"> 1. Define science, and describe why it's important. 2. List common steps in a scientific method. 3. Design and carry out your own simple experiment using the scientific method. 	
	Observations and The Scientific Method	<ol style="list-style-type: none"> 1. In this lesson you will learn about observation. 2. List common steps in a scientific method. 	Optional - shoebox or brown paper bag
	Living On Planet Earth	<ol style="list-style-type: none"> 1. Describe the shape of the Earth. 2. List and define common terms used to describe Earth. 3. Describe at least five reasons that life can exist on Earth. 4. List and describe at least five landforms that exist on Earth's surface. 	One white paper plate Modeling clay in a range of colors (blue, brown, green, white, gray) 10 toothpicks Black marker

4th Grade Science Semester A Syllabus

Module	Lesson Title	Objectives	Materials Needed
	Ocean Features	<ol style="list-style-type: none"> 1. Describe the size and some benefits of the world ocean. 2. Name the five oceans on Earth that make up the world ocean. 3. Describe the role of an oceanographer. 4. Recognize important features of the ocean. 	
	Marine Life	<ol style="list-style-type: none"> 1. In this lesson you will learn about marine life. 	Poster board Optional - Magazines or internet images to make a collage
Freshwater on Earth	Freshwater on Earth	<ol style="list-style-type: none"> 1. Describe lakes, rivers, and other water sources. 2. Explain the water cycle and how it connects fresh and saltwater sources. 3. Define groundwater and key terms related to it. 	Optional - Poster board, markers, and magazines for making a collage Optional - Materials to demonstrate the states of water; pot, stove, freezer, ice cube tray etc.
	Weathering	<ol style="list-style-type: none"> 1. Describe how weathering can cause slow changes on Earth. 	
	Erosion	<ol style="list-style-type: none"> 1. Explain how erosion affects Earth over time. 	
	Deposition	<ol style="list-style-type: none"> 1. Describe the process of deposition and give two examples. 	Optional - Digital camera Optional - Colored pencils or crayons
	Rapid Changes on Earth	<ol style="list-style-type: none"> 1. Describe how volcanoes can cause rapid changes on Earth's surface. 2. Explain how earthquakes can cause rapid changes on Earth's surface. 3. Describe how natural disasters can rapidly cause changes to Earth's surface. 4. Define how mass wasting can rapidly change Earth's surface. 	Optional: Medium-sized box Scissors Plastic bottle (such as a 20 oz. water bottle) Masking tape Medium-sized bowl 1 cup flour 1 cup water Newspaper

4th Grade Science Semester A Syllabus

Module	Lesson Title	Objectives	Materials Needed
			Small, plastic (grocery) bag Water-based paints (red, green, brown and other colors) Paint brushes Rocks, sticks, and pieces of shrubs to decorate Funnel ¼ cup vinegar 2 Tbsp baking soda Red or orange gelatin granules
	Mountains and Ocean Ridges	1. Explain the formation of mountains in the context of the theory of plate tectonics. 2. Describe how fault block and folded mountains are formed. 3. Describe how ocean ridges and ocean trenches are formed.	
The Atmosphere and Air	The Atmosphere	1. Define the atmosphere and describe what it's made up of. 2. Name and describe the five layers of the atmosphere.	
	Characteristics of Air	1. Describe characteristics of water in the atmosphere, including humidity, dew point, evaporation, transpiration, and condensation.	Optional - Balloon Optional - Scale House plant Clear plastic bag
	Weather	1. Define weather and the ingredients needed to make weather.	2-Liter plastic bottle A Match
	Types of Weather and Clouds	1. Give examples of different types of weather and clouds.	

4th Grade Science Semester A Syllabus

Module	Lesson Title	Objectives	Materials Needed
	Observing Weather	1. Provide examples of instruments scientists use to measure and predict weather.	
	Understanding Climate	1. Identify several key factors that affect climate. 2. Describe several types of climate.	
	Types of Climate and the Seasons	1. Explain how climate is related to the seasons.	Inflatable Globe Lamp from your home or school Black marker
	Human Effects on Climate	1. Explain examples of human effects upon climate.	
Galaxies and Stars	The Universe	1. Be able to tell the difference between a solar system, a galaxy, and the universe.	
	The Sun and Other Stars	1. Identify key properties of the sun, including location and movement.	Straight pin
	The Solar System	1. Describe our solar system.	Optional - Marble, walnut, golf ball, acorn, basketball, soccer ball, softball, small grapefruit
	Inner and Outer Planets	1. Identify and describe the four inner planets.	
	The Inner Planets and Space Objects	1. Describe the inner planets and space objects.	
	The Outer Planets	1. Identify and describe the four outer planets.	
	Natural Resources	1. Identify several key types of natural resources.	

4th Grade Science Semester A Syllabus

Module	Lesson Title	Objectives	Materials Needed
	Renewable and Nonrenewable	1. Distinguish between renewable and nonrenewable natural resources.	
	Conservation	1. Explain how to conserve natural resources.	
Measurements and Instruments	Customary vs. Metric	1. Describe the differences between metric and customary units of measurement.	Liquid Measuring Cup 3 Liquids (pint of milk, bottle or water, can of juice etc.)
	Measuring Length	1. In this lesson you will learn about measuring length.	
	Measuring Mass	1. In this lesson you will learn about measuring mass.	
	Measuring Temperature	1. Learn about measuring temperature.	Rubbing alcohol Water bottle Food coloring (any color will work) Clear plastic drinking straw Modeling clay
	Science Instruments	1. Identify several important scientific instruments and describe how they are used.	
	Properties of Matter	1. Describe observable properties of matter.	2 Clear drinking glasses 2 eggs Table salt Measuring spoon
	Property of Measurement	1. In this lesson you will learn about the property of measurement.	2 Clear drinking glasses 2 eggs Table salt Measuring spoon
	Three Categories of Matter	1. Describe the three main categories of matter. 2. Identify the boiling and freezing/melting points of water.	

4th Grade Science Semester A Syllabus

Module	Lesson Title	Objectives	Materials Needed
	States of Matter	1. Name three common states of matter and describe their key properties.	Can of frozen-concentrate orange juice Large spoon Pitcher Several paper cups Wooden craft sticks Aluminum foil 2-Liter bottle of soda Balloon Watch or clock
	Conservation of Mass	1. Explain the law of conservation of mass.	
Building Blocks of Matter	Building Blocks	1. Describe the building blocks of matter: elements, atoms, and molecules.	Large leaf Bag of gumdrops Box of toothpicks
	Periodic Table	1. Form a basic understanding of the periodic table of elements.	
	Mixtures and Compounds	1. Explain the difference between a mixture and a compound.	
	Solutions	1. Define a solution, and give several examples.	3 Clear drinking glasses 3 Index cards Black marker Measuring cup Measuring spoon 4 and 1/2 teaspoons of regular granular sugar Clock or watch 6 Sugar cubes Spoon 8 glass jars with lids 1 Cup and 1/2 Teaspoon Vinegar 1/2 Teaspoon Rubbing alcohol 1/2 Teaspoon Solid

4th Grade Science Semester A Syllabus

Module	Lesson Title	Objectives	Materials Needed
			laundry soap 1/2 Teaspoon Liquid soap 1/2 Teaspoon Flour 1 Teaspoon Cooking oil 1/2 Teaspoon Ground up chalk 1/2 Teaspoon Dirt
	Motion	1. Define motion and position.	
	Forces and Movement	1. Explain how forces cause changes in motion.	
	Friction	1. Describe how the position and motion of an object can be changed.	3 Small toy cars of different sizes Flat piece of plywood 3 or 4 hard covered books Towel 3 or 4 pieces of sandpaper Mirror Ruler

Course Description:

Semester B of Grade 4 Science focuses on the relationship between heat, light, sound, and electrical energy and the way they can be transferred between each other. Learners distinguish between natural objects and objects made by humans as they examine technology and the role it plays in science. Students also look at life cycles of animals, plants, and humans and how they interact with each other. The course ends by looking at the ways that humans interact with the environment. Students will use research skills, watch videos, and get their hands dirty as they complete projects that require them to dig through dirt and trash in order to learn broader lessons that have to do with helping the environment.

Module	Lesson Title	Objectives	Materials Needed
1	Sound	<ol style="list-style-type: none"> Describe how vibrating objects produce sound. Define pitch, and explain how it can be varied. 	<p>All the materials listed are optional</p> <p>Materials to create a homemade musical instrument</p> <p>Walking spring toy, such as a Slinky®</p> <p>Medium-sized bowl</p> <p>Plastic cling wrap (for covering food)</p> <p>Rubber band</p> <p>Several grains of uncooked rice</p> <p>Metal clothes hanger with no plastic coating</p> <p>2 pieces of string about 1 meter long</p> <p>Plastic ruler</p> <p>9 drinking glasses, the same size if possible</p> <p>Pitcher</p> <p>Metal spoon</p>
	Light	<ol style="list-style-type: none"> Describe how light travels. Explain how light is reflected, refracted, and absorbed. 	<p>All the supplies listed are optional</p> <p>Plastic report cover, clear</p> <p>Pen or marker</p> <p>Metric ruler</p> <p>Scissors</p> <p>Clear tape</p> <p>Cardboard paper towel tube, cut to 20 cm long</p> <p>10 cm square of black construction paper, of plastic wrap, and of waxed paper</p> <p>Small, colorful, and lightweight objects such as transparent beads, shiny confetti, and sequins</p> <p>Rubber band</p> <p>Magazines</p> <p>Poster board</p>

4th Grade Science Semester B Syllabus

Module	Lesson Title	Objectives	Materials Needed
			Quarter Shallow pan, such as a cake pan 3 index cards Ruler Mounting tack (for holding cards upright) Flashlight Sheet of black construction paper
	Heat and Temperature	1. Describe how heat can be produced. 2. Understand the difference between heat and temperature. 3. Explain how heat can move from one object to another.	2–3 trays of ice cubes 3 small zip-close plastic bags Clock or watch 3 bowls 3 identical plastic cups Materials for wrapping cups (such as bubble wrap, aluminum foil, plastic bags, newspaper, cardboard, or cloth) Tape or rubber bands Large, shallow baking pan Thermometer
2	Electricity	1. Define electricity, describe its importance, and name some people who discovered how to put that energy to use. 2. Describe static electricity and how it forms. 3. Describe current electricity, electric circuits, and materials that allow for the transfer of electricity.	D battery Tape Indoor holiday light wire with one bulb (use an old chain that doesn't work anymore) with the ends bared Wire Cork or plastic-foam 2 metal thumbtacks Metal and non-metal objects 1 pair of socks 2 balloons tap water Long string Lemon Zinc nail (galvanized nails are zinc coated) Copper nail (or thick piece of copper wire)
	Magnetism	1. Describe how magnets affect one another and objects around them. 2. Describe the effects of Earth's magnetism. 3. Understand that an electrical current can create a magnetic field, and name some uses for electromagnets.	All materials listed are optional 2 bar-shaped or cylindrical magnets, of the same type Objects to test for magnetic attraction 10 small steel paper clips Large steel paper clip 10 small metal washers, all the same size (about 2 cm in diameter) Masking tape

4th Grade Science Semester B Syllabus

Module	Lesson Title	Objectives	Materials Needed
			1 Needle 1 Cork Sharp knife and an adult helper to use it Small dish Large iron or steel nail 60 cm of insulated copper wire, with the insulation stripped off of both ends 1 D battery Strong tape, such as packing tape or duct tape
	Science & Technology	1. Distinguish between natural objects and objects made by humans. 2. Describe the relationship between science and technology. 3. Understand the technological design process.	materials for making a poster (optional) newspaper transparent tape scissors meter stick or tape measure digital camera
3	History of Life on Earth	1. Describe how the type of organisms living on Earth has changed over time. 2. Describe how fossils can provide evidence about the plants and animals that lived long ago and the nature of the environment at that time. 3. Explain how fossils can be compared to one another and to present day organisms to find similarities and differences.	Optional - Digital or physical materials to create a visual of organisms from geologic time periods Sponge (simple, inexpensive sponge with no scrubber side) Scissors Plastic cup Saucer Sand Bath salts (such as Epsom salts--they must contain magnesium sulfate)
	Characteristics of Life	1. Describe the basic needs of all living organisms. 2. Explain how organisms rely upon their environments. 3. Give examples of plant and animal structures that serve essential functions.	All materials listed are optional 1 Apple an earthworm (in a jar with soil) 1 Rock 2 drinking glasses Leaf 4 shallow trays (could be cookie sheet, pie tin, cake pan, etc.) 50 cereal O's 50 dry spaghetti sticks 50 marbles 50 raisins Timer

4th Grade Science Semester B Syllabus

Module	Lesson Title	Objectives	Materials Needed
			Toothpick Pair of tweezers Clothespin Spoon Brown paper lunch bag (you could substitute a medium-sized bowl)
	Animal and Plant Cells	1. Describe the building blocks of life. 2. Describe the structure and functions of an animal cell. 3. Describe the structure and functions of a plant cell. 4. Compare animal and plant cells	
4	Classifying Animals and Plants	1. Explain why scientists use a system for classifying animals and plants. 2. Name the parts of the classification system. 3. Describe how animals are classified. 4. Describe how plants are classified.	49 Index cards Colored pencils or markers
	Plant Systems	1. Describe the main parts of a plant. 2. Explain the system plants use to grow. 3. Explain the system plants use to reproduce.	4 different vegetables from different parts of plants (leaf, root, stem, fruit, flower) Fork Knife Salad bowl Salad dressing 2 small glasses 2 different colors of food coloring (dark colors are best) Large stalk of celery 3 different types of flowers All materials listed are optional 2 different types of seed pods Magnifying glass Drawing paper Colored pencils
	Human Body Systems	1. Describe how the skeletal, muscular, and nervous systems work together to help humans	Drawing paper Colored pencils

4th Grade Science Semester B Syllabus

Module	Lesson Title	Objectives	Materials Needed
		<p>move.</p> <p>2. Describe how the respiratory, circulatory, and digestive systems work together to bring essential materials to all parts of the body.</p> <p>3. Understand that the human body contains many systems for carrying out different functions, and that these systems depend on one another.</p>	
5	Human Nutrition and Health	<p>1. Define and give examples of basic nutrients.</p> <p>2. Describe tools you can use to improve your health.</p> <p>3. List several key benefits of regular exercise.</p>	Colored pencils
	Life Cycles	<p>1. Describe and provide examples of plant life cycles.</p> <p>2. Describe and provide examples of animal life cycles.</p> <p>3. Define the stages of the human life cycle.</p> <p>4. Describe the difference between learned and inherited traits.</p>	<p>All materials listed are optional</p> <p>Variety of fruits, vegetables, and nuts</p> <p>Materials to create a seed display</p> <p>Drawing paper</p> <p>Colored pencils</p> <p>Long piece of paper or 3–4 pieces taped together</p> <p>Metric ruler</p> <p>Index cards</p> <p>2 different-colored markers</p>
	Natural Responses	<p>Describe how the senses allow us to gather information about the world around us.</p> <p>Explain how internal and external cues influence behavior.</p> <p>Provide examples of the natural responses of plants.</p>	<p>All materials listed are optional</p> <p>Dark scarf or bandana for a blindfold</p> <p>2 objects that are interesting to touch</p> <p>2 objects that are interesting to taste</p> <p>2 objects that are interesting to smell</p> <p>2 objects that make sounds</p> <p>Deck of cards</p> <p>Small box, like a shoe box</p> <p>Scissors</p> <p>Cardboard or heavy paper to make dividers</p> <p>Tape</p> <p>Black paper</p> <p>Small bean plant</p>

4th Grade Science Semester B Syllabus

Module	Lesson Title	Objectives	Materials Needed
6	The Web of Life	<ol style="list-style-type: none"> 1. Describe how energy flows through a food chain. 2. Describe how a food web shows multiple energy relationships in an ecosystem. 3. Explain how even small changes in an environment can have a big impact on the organisms that live there. 	<p>All materials listed are optional</p> <p>200 of one color plastic building brick or block</p> <p>20 of another color of block</p> <p>2 of a third color of block</p> <p>1 of a fourth color of block</p>
	Biodiversity & Extinction	<ol style="list-style-type: none"> 1. Describe the major parts of an ecosystem. 2. Explain how an ecosystem can become balanced or unbalanced. 3. Describe biodiversity. 4. Define threats to biodiversity. 	<p>Box for a diorama</p> <p>Scissors</p> <p>Cardboard, heavy paper, and/or modeling clay to make creatures</p> <p>Markers</p> <p>Tape</p>
	Humans and the Environment	<ol style="list-style-type: none"> 1. Explain how to balance human needs with environmental protection. 2. Describe human population growth and why it causes concern. 3. Explain actions humans are taking to protect the environment. 	<p>All materials listed are optional</p> <p>1 Apple</p> <p>Knife (for an adult to handle)</p> <p>Napkin</p> <p>Objects from the trash or recycling to make recycled art</p> <p>Art supplies for creating recycled art</p>