ELEMENTARY SCIENCE GRADE 4 CURRICULUM

Course 50420

Fourth grade students will review some of the basic principles and practices of science. They will learn vocabulary and principles in a variety of topics from biology, physical science, Earth science, and ecology. Student will conduct simple investigations posing questions, making observations, using scientific tools, collecting data and posing conclusions. Students will use pictures, charts, diagrams, models, and maps to understand and represent scientific concepts.

FOURTH GRADE SCIENCE OUTLINE:

Goals	Skills	Summative Assessments	Time Frame	Main Resources
• Explore some examples of how plants and animals interact within their environment. • Learn about microorganisms and their role in our lives. • Examine some of the processes that shape our Earth • Learn some basic principles of rocks and minerals. • Explore how electricity works in some familiar appliances. • Learn basic information about simple machines. • Survey the topics of the Solar System and Weather.	• Distinguish between a scientific fact and an opinion, providing clear explanations that connect observations and results • Observe and record change by using time and measurement. • Generate questions about objects, organisms, or events that can be answered through scientific investigations. • Select appropriate tools for making observations.	Unit Assessments PSSA Science Test	1-year	Daily Science Grade 4

FOURTH GRADE SCIENCE MAP:

TIME FRAME	BIG IDEAS	CONCEPTS	ESSENTIAL QUESTIONS	STANDARDS	OBJECTIVES	DIFFERENTIATION	ASSESSMENT
Unit 1 (Weeks 1-2)	• Scientific names	1. Exploring the importance of scientific inquiry, investigation, and discovery.	• What is science? • What is a scientist? • What tools are used in science? • What is the scientific method?	S4.A.1.1.1 Distinguish between a scientific fact and an opinion, providing clear explanations that connect observations and results (e.g., a scientific fact can be supported by making observations). S4.A.1.3.1 Observe and record change by using time and measurement. S4.A.1.3.1a Identify changes to objects and living things. S4.A.1.3.2 Describe relative size, distance, or motion. S4.A.1.3.4 Explain what happens to a living organism when its food supply, access to water, shelter, or space is changed (e.g., it might die, migrate, change behavior, eat something else). S4.A.2.1.1 Generate questions about objects, organisms, or events that can be answered through scientific investigations. S4.A.2.1.2 Design and describe an investigation (a fair test) to test one variable. S4.A.2.1.3 Observe a natural phenomenon (e.g., weather changes, length of daylight/night, movement of shadows, animal migrations,	• The student will be able to complete an interactive science notebook with the assistance of the teacher by the end of September. • The student will be able to differentiate between scientific fact and opinion by completing a unit quiz at the conclusion of our interactive notebook.	Tier 1: Students will take notes in their interactive notebook while teacher directs notes and instruction. Tier 2: Students will be allotted additional time and assistance to complete daily interactive notes. Tier 3: Students will be given guided notes to complete in their interactive notebook with guidance from the teacher. Extra time will be allotted as needed.	Daily interactive notebook checks. Weekly assignments via computer or paper to check for understanding. End of unit Science Quiz.

				growth of plants), record observations, and then make a prediction based on those observations. S4.A.2.1.4 State a conclusion that is consistent with the information/data. S4.A.2.1.4a Recognize the observation that supports a scientific fact. S4.A.2.2.1 Identify appropriate tools or instruments for specific tasks and describe the information they can provide (e.g., measuring: length - ruler, mass - balance scale, volume - beaker, temperature - thermometer; making observations: hand lens, binoculars, telescope). S4.A.2.2.1a Select appropriate tools to perform basic measurement tasks (limited to length, weight, volume, and temperature). Alternate Eligible Content is designed for students assessed using the PA Alternate System of Assessment (PASA). S4.A.2.2.1b Select appropriate tools for making observations (limited to hand lens, binoculars, microscope, and telescope).			
Unit 2 (Weeks 3-7)	• Plant and animal dependency	1. Animals, plants, adaptations, traits and heredity 2. Ecosystems 3. Classification.	• Why do beavers build dams? • Why do some plants have fruit? • Do all bees make honey?	3.1.4.A2 Describe the different resources that plants and animals need to live. S4.A.1.3.1 Observe and record change by using time and measurement. S4.A.1.3.4	• Students will be able to read and construct animal life cycle diagrams • Students will be able to compare differences	Tier 1: Students will take notes in their interactive notebook while teacher directs notes and instruction. Tier 2: Students will be allotted	Weekly quizzes and unit assessments

			• Where do animals get food in the winter?	Explain what happens to a living organism when its food supply, access to water, shelter, or space is changed (e.g., it might die, migrate, change behavior, eat something else). S4.A.2.1.1 Generate questions about objects, organisms, or events that can be answered through scientific investigations. S4.A.2.1.2 Design and describe an investigation (a fair test) to test one variable. S4.A.2.1.4 State a conclusion that is consistent with the information/data. S4.A.2.2.1a Select appropriate tools to perform basic measurement tasks (limited to length, weight, volume, and temperature). S4.A.2.2.1b Select appropriate tools for making observations (limited to hand lens, binoculars, microscope, and telescope). S4.A.3.1.2 Explain a relationship between the living and nonliving components in a system (e.g., food web, terrarium). S4.A.3.1.3 Categorize the parts of an ecosystem as either living or nonliving and describe their roles in the system. S4.A.3.3.1a Identify patterns, cycles or trends seen in nature (e.g.,	between animal life cycles • Students will be able to identify and describe the following animal body systems: circulation and respiration, digestion, removing waste, and perception and motion • Students will be able to classify fruits and vegetables as plant parts • Students will be able to identify plant parts and their functions • Students will be able to describe how plants make their own food • Students will be able to identify plant parts and their functions • Students will be able to describe and construct flowering plant life cycles • Students will be able to describe and construct conifer life cycles • Students will be able to identify the following animal adaptations: beaks, mouths, necks, feet, limbs, skins, and body coverings. • Students will be able to create a hypothesis for	additional time and assistance to complete daily interactive notes. Tier 3: Students will be given guided notes to complete in their interactive notebook with guidance from the teacher. Extra time will be allotted as needed.	

				seasonal, day/night, life cycles). S4.A.3.3.2 Predict future conditions/events based on observable patterns (e.g., day/night, seasons, sunrise/sunset, lunar phases). S4.B.1.1.1 Identify life processes of living things (e.g., growth, digestion, respiration). S4.B.1.1.3 Describe basic needs of plants and animals (e.g., air, water, food). S4.B.1.1.4 Describe how different parts of a living thing work together to provide what the organism needs (e.g., parts of plants: roots, stems, leaves). S4.B.1.1.5 Describe the life cycles of different organisms (e.g., moth, grasshopper, frog, seed-producing plant). S4.B.2.1.1 Identify characteristics for plant and animal survival in different environments (e.g., wetland, tundra, desert, prairie, deep ocean, forest). S4.B.2.1.2 Explain how specific adaptations can help a living organism survive (e.g., protective coloration, mimicry, leaf sizes and shapes, ability to catch or retain water). S4.B.3.1.1 Describe the living and nonliving components of a local ecosystem (e.g., lentic	what affects traits after making observations • Students will be able to match offspring to parents using inherited traits • Students will be able to describe and identify inherited and acquired traits • Students will be able to read a plant and animal pedigree chart • Students will be able to identify and describe ecosystems • Students will be able to identify roles in food chains and how matter moves in various food chains • Students will be able to interpret food webs • Students will be able to identify the differences between living and nonliving things • Students will be able to identify mammals, birds, fish, reptiles, and amphibians • Students will use evidence to classify animals • Students will describe, classify, and compare kingdoms		

				and lotic systems, forest, cornfield, grasslands, city park, playground).			
Unit 3 (Weeks 6-12)	• Microorganisms	1. Bacteria 2. Mold 3. Fungi	• Why does garbage smell? • How do bacteria create cavities? • Are all germs bad? • Is it safe to eat moldy food?	4.1.4.E Explain that ecosystems change over time due to natural and/ or human influences. BIO.B.4.2.4 Describe how ecosystems change in response to natural and human disturbances (e.g., climate changes, introduction of nonnative species, pollution, fires). BIO.B.4.2.5 Describe the effects of limiting factors on population dynamics and potential species extinction. S4.A.1.1.1 Distinguish between a scientific fact and an opinion, providing clear explanations that connect observations and results (e.g., a scientific fact can be supported by making observations). S4.A.1.1.2 Identify and describe examples of common technological changes past to present in the community (e.g., energy production, transportation, communications, agriculture, packaging materials) that have either positive or negative impacts on society or the environment. S4.A.1.1.2a Identify common technologies that benefit society.	• Students will be able to identify the functions of plant and animal cell parts • Students will be able to identify and label parts of plant and animal cells when given a diagram • Students will be able to compare plant and animal cells	Tier 1: Students will take notes in their interactive notebook while teacher directs notes and instruction. Tier 2: Students will be allotted additional time and assistance to complete daily interactive notes. Tier 3: Students will be given guided notes to complete in their interactive notebook with guidance from the teacher. Extra time will be allotted as needed.	Weekly quizzes and unit assessments

Unit 4 (Weeks 13-17)	• Slow and rapid processes	4. Earth's surface is constantly changing.	• How was the Grand Canyon Formed? • Do glaciers really move? • What makes a volcano erupt? • What causes earthquakes?	3.3.4.A1 Describe basic landforms. Identify the layers of the earth. Recognize that the surface of the earth changes due to slow processes and rapid processes. S4.A.3.2.1 Identify what different models represent (e.g., maps show physical features, directions, distances; globes represent Earth; drawings of watersheds depict terrain; dioramas show ecosystems; concept maps show relationships of ideas). S4.A.3.2.2 Use models to make observations to explain how systems work (e.g., water cycle, Sun-Earth-Moon system). S4.C.1.1.2 Categorize/group objects using physical characteristics. S4.D.1.1.1 Describe how prominent Earth features in Pennsylvania (e.g., mountains, valleys, caves, sinkholes, lakes, rivers) were formed. S4.D.1.1.2 Identify various Earth structures (e.g., mountains, watersheds, peninsulas, lakes, rivers, valleys) through the use of models.	• Students will be able to identify minerals and their individual properties • Students will be able to identify rocks using their individual properties • Students will be able to describe how sedimentary rocks form • Students will be able to classify rocks as igneous, sedimentary, or metamorphic • Students will be able to describe how rock layers form	Tier 1: Students will take notes in their interactive notebook while teacher directs notes and instruction. Tier 2: Students will be allotted additional time and assistance to complete daily interactive notes. Tier 3: Students will be given guided notes to complete in their interactive notebook with guidance from the teacher. Extra time will be allotted as needed.	Weekly quizzes and unit assessments
Unit 5 (Weeks 18-22)	• Properties of rocks and minerals	1. Rocks are composed of different minerals. 2. Rocks are made in different ways and have different properties.	• What's the difference between a rock and a mineral? • Where do rocks come from?	3.3.4.A2 Identify basic properties and uses of Earth's materials including rocks, soils, water, and gases of the atmosphere. S4.C.1.1.1 Use physical properties [e.g., mass, shape, size, volume,	• Students will be able to identify physical and chemical changes • Students will be able to compare physical and	Tier 1: Students will take notes in their interactive notebook while teacher directs notes and instruction.	Weekly quizzes and unit assessments

			• Are some rocks valuable? • Do all rocks come from Earth?	color, texture, magnetism, state (i.e., solid, liquid, and gas), conductivity (i.e., electrical and heat)] to describe matter. S4.C.1.1.2 Categorize/group objects using physical characteristics. S4.D.1.1.3 Describe the composition of soil as weathered rock and decomposed organic remains. S4.D.1.2.1 Identify products and by-products of plants and animals for human use (e.g., food, clothing, building materials, paper products). S4.D.1.2.2 Identify the types and uses of Earth materials for renewable, nonrenewable, and reusable products (e.g., human-made products: concrete, paper, plastics, fabrics).	chemical changes • Students will be able to identify various types of mixtures • Students will be able to identify and classify fossils • Students will be able to compare fossils to modern day organisms • Students will be able to interpret evidence from fossils in rock layers	Tier 2: Students will be allotted additional time and assistance to complete daily interactive notes. Tier 3: Students will be given guided notes to complete in their interactive notebook with guidance from the teacher. Extra time will be allotted as needed.	
Unit 6 (Weeks 23-26)	• Electrical energy	1. Electrical energy can be converted into other forms of energy.	• How do toasters work? • What lights a digital clock? • How do hearing aids help people hear? • How do electric cars work?	3.2.3.B4 Identify and classify objects and materials that are conductors or insulators of electricity. Identify and classify objects and materials as magnetic or non-magnetic. S3.C.2.1.1 Identify basic forms and sources of energy (e.g., Sun, heat, light, sound). S3.C.2.1.2 Identify simple transformations of energy (e.g., eating food to get energy, rubbing hands together to create heat). S3.C.2.1.3	• Students will be able to identify properties of static electricity • Students will be able to predict heat flow when given a problem • Students will be able to predict temperature changes • Students will be able to describe how temperature is related to thermal energy	Tier 1: Students will take notes in their interactive notebook while teacher directs notes and instruction. Tier 2: Students will be allotted additional time and assistance to complete daily interactive notes. Tier 3: Students will be given guided notes to complete in their interactive notebook with guidance from the teacher. Extra time	Weekly quizzes and unit assessments

				Identify characteristics of sound (i.e., pitch, and loudness).		will be allotted as needed.	
Unit 7 (Weeks 27-30)	• Simple machines	1. People invented machines to make work easier.	• Why do some building entrances have ramps? • What's the difference between a nail and a screw? • How do elevators work? • How does a wheelbarrow make work easier?	3.4.4.A1 Understand that tools, materials, and skills are used to make things and carry out tasks. S4.A.2.2.1 Identify appropriate tools or instruments for specific tasks and describe the information they can provide (e.g., measuring: length - ruler, mass - balance scale, volume - beaker, temperature - thermometer; making observations: hand lens, binoculars, telescope). S4.A.2.2.1a Select appropriate tools to perform basic measurement tasks (limited to length, weight, volume, and temperature). Alternate Eligible Content is designed for students assessed using the PA Alternate System of Assessment (PASA). S4.A.2.2.1b Select appropriate tools for making observations (limited to hand lens, binoculars, microscope, and telescope). Alternate Eligible Content is designed for students assessed using the PA Alternate System of Assessment (PASA). S4.A.3.1.1 Categorize systems as either natural or human-made (e.g., ballpoint pens, simple electrical circuits, plant anatomy, water cycle). S4.A.3.1.1a Identify whether a system is natural or human-made (e.g., plants vs. electrical systems). Alternate Eligible Content is designed for students	• Students will be able to identify the direction of forces • Students will be able to describe how balanced and unbalanced forces affect motion • Students will be able to describe how mass affects force and acceleration.	Tier 1: Students will take notes in their interactive notebook while teacher directs notes and instruction. Tier 2: Students will be allotted additional time and assistance to complete daily interactive notes. Tier 3: Students will be given guided notes to complete in their interactive notebook with guidance from the teacher. Extra time will be allotted as needed.	Weekly quizzes and unit assessments

				assessed using the PA Alternate System of Assessment (PASA). S4.A.3.1.2 Explain a relationship between the living and nonliving components in a system (e.g., food web, terrarium). S4.A.3.1.3 Categorize the parts of an ecosystem as either living or nonliving and describe their roles in the system. S4.A.3.1.4 Identify the parts of the food and fiber systems as they relate to agricultural products from the source to the consumer.			
Unit 8 (Weeks 31-32)	• States of matter.	1. Matter can exist as a solid or a liquid, depending on the temperature. 2. Solids have a definite shape. 3. Liquids take the shape of the container. 4. When something dissolves it does not disappear. 5. Materials in mixtures keep their properties. (ie: In a salad, one can distinguish the ingredients: tomatoes, lettuce, cucumbers, carrots.) 6. Matter changes. 7. Changes that happen very fast or very slowly are	• What are physical properties of matter? • How can matter be classified? What are the states of matter? • What is a physical change of matter?	3.2.K.A3 Describe the way matter can change. S.K-2.C.1.1.1 Describe basic changes to properties of matter (e.g., formation of mixtures and solutions, baking and cooking, freezing, heating, evaporating, melting).	• Students will be able to calculate an object's density • Students will be able to apply their knowledge of conservation of matter when using graphs • Students are able to sort solids, liquids, and gases • Students will be able to create and interpret states of matter diagrams • Students will be able to describe heating, cooling, and how they affect the changes in states of matter	Tier 1: Students will take notes in their interactive notebook while teacher directs notes and instruction. Tier 2: Students will be allotted additional time and assistance to complete daily interactive notes. Tier 3: Students will be given guided notes to complete in their interactive notebook with guidance from the teacher. Extra time will be allotted as needed.	Weekly quizzes and unit assessments

		sometimes hard to see. 8. Changing temperature can cause a substance to change form but it can still remain the same substance. (e.g. melting and freezing)					
Unit 9 (Weeks 33-34)	• Solar system	1. Earth and space. The student knows there are recognizable patterns in the natural world and among objects in the sky.	• What makes up our solar system? • How many planets are there in our solar system and what are their names? • What is the order of the planets in terms of distance from the sun? • What are some distinct features that can be used to identify or compare the different planets that make up our solar system?	S4.A.3.1 Identify systems and describe relationships among parts of a familiar system (e.g., digestive system, simple machines, water cycle). S6.A.1.1.1 Explain how certain questions can be answered through scientific inquiry and/or technological design (e.g., consumer product testing, common usage of simple machines, modern inventions).	• Students will be able to identify major lunar phases • Students will be able to identify the planets in our solar system and their basic characteristics • Students will be able to explain time (days and seasons) using solar system motions • Students will be able to describe effects of Earth being tilted on its axis	Tier 1: Students will take notes in their interactive notebook while teacher directs notes and instruction. Tier 2: Students will be allotted additional time and assistance to complete daily interactive notes. Tier 3: Students will be given guided notes to complete in their interactive notebook with guidance from the teacher. Extra time will be allotted as needed.	Weekly quizzes and unit assessments
Unit 10 (Weeks 35-36)	• Weather	1. Weather changes over time. 2. Weather can be observed and measured. 3. Weather affects decisions people make?	• Why do scientists collect and analyze weather data over time? • What tools are used when collecting weather data?	3.3.4.A5 Describe basic weather elements. Identify weather patterns over time. S4.A.3.2.1 Identify what different models represent (e.g., maps show physical features, directions, distances; globes represent Earth; drawings of watersheds depict terrain; dioramas show	• Students will be able to read a thermometer • Students will be able to compare temperatures when given a thermometer • Students will be able to collect and graph temperature data	Tier 1: Students will take notes in their interactive notebook while teacher directs notes and instruction. Tier 2: Students will be allotted additional time and assistance to	Weekly quizzes and unit assessments

				ecosystems; concept maps show relationships of ideas). S4.A.3.2.2 Use models to make observations to explain how systems work (e.g., water cycle, Sun-Earth-Moon system). S4.A.3.3.1 Identify and describe observable patterns (e.g., growth patterns in plants, weather, water cycle). S4.D.1.1.1 Describe how prominent Earth features in Pennsylvania (e.g., mountains, valleys, caves, sinkholes, lakes, rivers) were formed. S4.D.1.1.2 Identify various Earth structures (e.g., mountains, watersheds, peninsulas, lakes, rivers, valleys) through the use of models. S4.D.1.2.3 Recognize ways that humans benefit from the use of water resources (e.g., agriculture, energy, recreation). S4.D.1.3.1 Describe types of freshwater and saltwater bodies (e.g., lakes, rivers, wetlands, oceans). S 4.D.1.3.2 Explain how water goes through phase changes (i.e., evaporation, condensation, freezing, and melting). S4.D.1.3.3 Describe or compare lentic systems (i.e., ponds, lakes, and bays) and lotic systems	• Students will be able to describe the difference between weather and climate • Students will be able to describe basic climate differences and weather events around the world • Students will be able to use climate data to make predictions • Students will use data to describe climate	complete daily interactive notes. Tier 3: Students will be given guided notes to complete in their interactive notebook with guidance from the teacher. Extra time will be allotted as needed.	

				(i.e., streams, creeks, and rivers). S4.D.1.3.4 Explain the role and relationship of a watershed or a wetland on water sources (e.g., water storage, groundwater recharge, water filtration, water source, water cycle). S4.D.2.1.1 Identify basic cloud types (i.e., cirrus, cumulus, stratus, and cumulonimbus) and make connections to basic elements of weather (e.g., changes in temperature, precipitation). S4.D.2.1.2 Identify weather patterns from data charts or graphs of the data (e.g., temperature, wind direction, wind speed, cloud types, precipitation). S4.D.2.1.3 Identify appropriate instruments (i.e., thermometer, rain gauge, weather vane, anemometer, and barometer) to study weather and what they measure.			