



**Dover Area School District Curriculum K-U-D
Fourth Grade Science**

	Eligible Content	Know	Understand	Do
3.2.4.A: Identify and use the nature of scientific and technological knowledge. Know the pros and cons of possible solutions to scientific and technological problems in society.	3.8.4.C: 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.	Fact, Opinion, Observation, Evidence, Inference	Scientific, environmental, or technological knowledge can be applied to solve problems	Distinguish between scientific fact and opinion, providing clear explanations that connect observations and results.
3.7.4.A. Explore the use of basic tools, simple materials and techniques to safely solve problems. 3.7.4.B. Select appropriate instruments to study materials.	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).	Hand Lens, Binoculars, Telescope, Ruler, Scale Balance Thermometer Beaker Graduated Cylinder Stopwatch	Depending on the purpose, different tools and instruments are used and give different information	Identify appropriate tools or instruments for specific tasks describing the information they can provide
3.2.4.C Recognize and use the elements of scientific inquiry to solve problems. 3.2.4.D Recognize and use the technological design process to solve problems.	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, 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.	Inquiry Investigation Observation Data Evidence Fair Test Variable Independent Variable Dependent Variable Controlled Variable	Scientists solve problems in different ways such as conducting experiments or designing solutions.	Generate questions about objects, organisms, or events that can be answered through scientific investigation. Design and describe an investigation to test one variable. Observe a natural phenomenon, record observations, and then make a prediction based on those observations. State a conclusion that is consistent with the information/data.
3.1.4.A. Know that natural and human-made objects are made up of parts. 4.4.4.C. Know that food and fiber originate from plants and animals. 4.6.4.A. Understand that living things are dependent on nonliving things in the environment for survival. 4.6.4.B. Understand the concept of cycles. 4.6.4.C. Identify how ecosystems change over time.	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.3.1.2 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.	System Ecosystem Agriculture Human-Made Natural System	Systems are made up of parts with different functions.	Identify systems and describe relationships among parts of a familiar system. Categorize systems as either natural or human-made. Explain a relationship between the living and nonliving components of a system. Categorize the parts of an ecosystem as either living or nonliving and describe their roles in systems. Identify the parts of the food and fiber systems as they relate to agricultural products from the source to the consumer.
3.1.4.B. Know models as useful simplifications of objects or processes. 4.3.4.C. Understand that the elements of natural systems are interdependent	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.A.3.2.3 Use appropriate, simple modeling tools and techniques to describe or illustrate a system (e.g., two cans and string to model a communications system, terrarium to model an ecosystem).	Model Diorama Engineer Terrarium 2-Dimensional 3-Dimensional	Models are used to represent objects, events or ideas.	Identify what different models represent. Use models to make observations to explain how systems work. Use appropriate, simple modeling tools and techniques to describe or illustrate a system.
3.1.4.C. Illustrate patterns that regularly occur and reoccur in nature. 3.2.4.B. Describe objects in the world using the five senses.	S4.A.3.3.1 Identify and describe observable patterns (e.g., growth patterns in plants, weather, water cycle). S4.A.3.3.2 Predict future conditions/events based on observable patterns (e.g., day/night, seasons, sunrise/sunset, lunar phases).	Pattern Prediction	Patterns have parts that repeat in a certain order and are often found in nature.	Identify and describe observable patterns. Predict future conditions/based on observable patterns.



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<p>3.3.4.A. Know the similarities and differences of living things.</p> <p>3.3.4.B. Know that living things are made up of parts that have specific functions.</p> <p>4.3.4.C. Understand that the elements of natural systems are interdependent.</p>	<p>S4.B.1.1.1 Identify life processes of living things (e.g., growth, digestion, respiration).</p> <p>S4.B.1.1.2 Compare similar functions of external characteristics of organisms (e.g., anatomical characteristics: appendages, type of covering, body segments).</p> <p>S4.B.1.1.3 Describe basic needs of plants and animals (e.g., air, water, food).</p> <p>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).</p> <p>S4.B.1.1.5 Describe the life cycles of different organisms (e.g., moth, grasshopper, frog, seed-producing plant).</p>	<p>Organisms</p> <p>Reproduce</p> <p>Digestion</p> <p>Respiration</p> <p>Life Cycle</p> <p>Vertebrate</p> <p>Invertebrate</p> <p>Lungs</p> <p>Gills</p> <p>Roots</p> <p>Stems</p> <p>Leaves</p> <p>Structure</p>	<p>Although all living things share common characteristics, they have differences as well.</p>	<p>Identify life processes of living things</p> <p>Describe basic needs of plants and animals</p> <p>Describe how different parts of a living thing work together to provide what the organism needs</p> <p>Describe the life cycles of different organisms</p>
<p>4.7.4.B. Know that adaptations are important for survival.</p>	<p>S4.B.2.1.1 Identify characteristics for plant and animal survival in different environments (e.g., wetland, tundra, desert, prairie, deep ocean, forest).</p> <p>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).</p>	<p>Adaptation.</p> <p>Environment.</p> <p>Camouflage.</p> <p>Mimicry.</p> <p>Migrate.</p> <p>Hibernate.</p> <p>Predator</p> <p>Prey</p> <p>Biomes</p> <p>Tundra</p> <p>Wetland</p> <p>Desert</p> <p>Grassland</p> <p>Aquatic</p> <p>Rainforest</p>	<p>Identify and explain how adaptations help organisms to survive</p>	<p>Identify characteristics for plants and animal survival in different environments.</p> <p>Explain how specific adaptations can help a living organism survive.</p>
<p>3.3.4.C. Know that characteristics are inherited and, thus, offspring closely resemble their parents.</p> <p>4.7.4.A. Identify differences in living things.</p>	<p>S4.B.2.2.1 Identify physical characteristics (e.g., height, hair color, eye color, attached earlobes, ability to roll tongue) that appear in both parents and could be passed on to offspring.</p>	<p>Reproduction</p> <p>Offspring</p> <p>Trait</p> <p>Heredity</p> <p>Genes</p> <p>Inherited</p> <p>Instinct</p>	<p>Offspring look like their parents because they inherit characteristics from them.</p>	<p>Identify physical characteristics that appear in both parents and could be passed on to offspring.</p>
<p>4.6.4.A. Understand that living things are dependent on nonliving things in the environment for survival.</p>	<p>S4.B.3.1.1 Describe the living and nonliving components of a local ecosystem (e.g., lentic and lotic systems, forest, cornfield, grasslands, city park, playground).</p> <p>S4.B.3.1.2 Describe interactions between living and nonliving components (e.g. plants – water, soil, sunlight, carbon dioxide, temperature; animals – food, water, shelter, oxygen, temperature) of a local ecosystem.</p>	<p>Producer</p> <p>Consumer</p> <p>Decomposer</p> <p>Food Chain</p> <p>Habitat</p> <p>Community</p> <p>Population</p>	<p>Living and nonliving things interact within an environment.</p>	<p>Describe the living and nonliving components of a local ecosystem.</p> <p>Describe interactions between living and nonliving components of a local ecosystem</p>
<p>4.3.4.C. Understand that the elements of natural systems are interdependent.</p> <p>4.6.4.C. Identify how ecosystems change over time.</p>	<p>S4.B.3.2.1 Describe what happens to a living thing when its habitat is changed.</p> <p>S4.B.3.2.2 Describe and predict how changes in the environment (e.g., fire, pollution, flood, building dams) can affect systems.</p> <p>S4.B.3.2.3 Explain and predict how changes in seasons affect plants, animals, or daily human life (e.g., food availability, shelter, mobility).</p>	<p>Extinct</p> <p>Pollution</p> <p>Pollutant</p>	<p>If one part of a system changes, it can affect the other parts. Some changes are natural and others are caused by humans.</p>	<p>Describe what happens to a living thing when its habitat is changed.</p> <p>Describe and predict how changes in environment can affect systems.</p> <p>Explain and predict how changes in seasons affect plants, animals, or daily human life.</p>
<p>4.3.4.B. Identify how human actions affect environmental health.</p> <p>4.4.4.B. Identify the role of the sciences in Pennsylvania agriculture.</p> <p>4.5.4.C. Understand society's need for integrated pest management.</p> <p>3.8.4.C. Know the pros and cons of possible solutions to scientific and technological problems in society.</p>	<p>S4.B.3.3.1 Identify everyday human activities (e.g., driving, washing, eating, manufacturing, farming) within a community that depend on the natural environment.</p> <p>S4.B.3.3.2 Describe the human dependence on the food and fiber systems from production to consumption (e.g., food, clothing, shelter, products).</p> <p>S4.B.3.3.3 Identify biological pests (e.g., fungi – molds, plants – foxtail, purple loosestrife, Eurasian water milfoil; animals – aphides, ticks, zebra mussels, starlings, mice) that compete with humans for resources.</p> <p>S4.B.3.3.4 Identify major land uses in the urban, suburban and rural communities (e.g., housing, commercial, recreation).</p> <p>S4.B.3.3.5 Describe the effects of pollution (e.g., litter) in the community.</p>	<p>Dependence</p> <p>Production</p> <p>Consumption</p> <p>Invasive Species</p>	<p>Humans depend on the environment to meet their needs.</p>	<p>Identify everyday human activities within a community that depend on the natural environment</p> <p>Describe the human dependence on the food and fiber systems from production to consumption</p> <p>Identify biological pests that compete with human resources</p> <p>Identify major land uses in the urban, suburban and rural communities.</p> <p>Describe the effects of pollution in the community.</p>



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3.4.4.A. Recognize basic concepts about the structure and properties of matter. 3.2.4.B. Describe objects in the world using the five senses.	S4.C.1.1.1 Use physical properties [e.g., mass, shape, size, volume, 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.	Physical Property. Characteristic. Mass Volume Conductors Texture Magnetism	Flexibility Evaporation Condensation Solid Liquid Gas	Almost everything on Earth is made of matter which can be described using observable properties. Use physical properties to describe matter Categorize and group objects using physical characteristics
3.4.4.B. Know basic energy types, sources and conversions. 3.4.4.C. Observe and describe different types of force and motion.	S4.C.2.1.1 Identify energy forms, energy transfer, and energy examples (e.g., light, heat, electrical). S4.C.2.1.2 Describe the flow of energy through an object or system (e.g., feeling radiant heat from a light bulb, eating food to get energy, using a battery to light a bulb or run a fan). S4.C.2.1.3 Recognize or illustrate simple direct current series and parallel circuits composed of batteries, light bulbs (or other common loads), wire, and on/off switches. S4.C.2.1.4 Identify characteristics of sound (e.g., pitch, loudness, reflection).	Potential. Kinetic. Energy Light. Sound. Pitch Wavelength Frequency Volume	Heat Mechanical Energy Electrical Energy Chemical Energy Parallel Circuit Series Circuit Insulator	Identify energy forms, energy transfer, and energy examples Describe the flow of energy through an object or system Recognize or illustrate simple direct current series and parallel circuits composed of batteries, light bulbs, wire, and on/off switches Identify characteristics of sound
3.4.4.C. Observe and describe different types of force and motion. 3.6.4.C. Know physical technologies of structural design, analysis and engineering, finance, production, marketing, research and design. 3.2.4.B. Describe objects in the world using the five senses.	S4.C.3.1.1 Describe changes in motion caused by forces (e.g., magnetic, pushes or pulls, gravity, friction). S4.C.3.1.2 Compare the relative movement of objects or describe types of motion that are evident (e.g., bouncing ball, moving in a straight line, back and forth, merry-go-round). S4.C.3.1.3 Describe the position of an object by locating it relative to another object or a stationary background (e.g., geographic direction, left, up). S4.A.1.3.3 Observe and describe the change to objects caused by temperature change or light.	Motion Position Force Friction Gravity Speed Acceleration	Forces can make objects move in different ways.	Describe changes in motion caused by forces Compare the relative movement of objects or describe types of motion that are evident. Describe the position of an object by locating it relative to another object or a stationary background. Describe relative size, distance, or motion
3.5.4.A. Know basic landforms and earth history.	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.1.1.3 Describe the composition of soil as weathered rock and decomposed organic remains.	Landforms Geography Mountain. Volcano. Hill Coast. Island Plain Plateau Valleys. Canyon.	Caves Sinkhole Lake River Delta Bay Weathering Sediment Glaciers Soil Peninsula	Describe how prominent Earth features in Pennsylvania were formed Identify various Earth structures through the use of models. Describe the composition of soil as weathered rock and decomposed organic matter.
3.5.4.B. Know types and uses of earth materials. 3.5.4.D. Recognize the earth's different water resources. 4.2.4.B. Identify products derived from natural resources. 4.8.4.D. Know the importance of natural resources in daily life.	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). S4.D.1.2.3 Recognize ways that humans benefit from the use of water resources (e.g., agriculture, energy, recreation).	Natural Resource Renewable Nonrenewable Fossil Fuels Recycle Recreation	Earth's resources are used in many different ways.	Identify products and by-products of plants and animals for human use. Identify the types of uses of Earth materials for renewable, nonrenewable, and reusable products. Recognize ways that humans benefit from the use of water resources.



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4.1.4.A. Identify various types of water environments. 4.1.4.D. Identify a wetland and the plants and animals found there. 4.1.4.E. Recognize the impact of watersheds and wetlands on animals and plants.	S4.D.1.3.1 Describe types of freshwater and saltwater bodies (e.g., lakes, rivers, wetlands, oceans). S4.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 (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).	Bay Saltwater Freshwater Wetland Watershed Lotic Lentic Water Cycle Water Vapor Condensation Precipitation Evaporation Ground Water Runoff	Earth is made up of different kinds of water that cycles between the water bodies, air, and land.	Describe types of freshwater and saltwater bodies. Explain how water goes through phase changes. Describe or compare lentic systems and lotic systems. Explain the role and relationship of a watershed or wetland on water sources.
3.5.4.C. Know basic weather elements. 3.7.4.B. Select appropriate instruments to study materials. 3.2.4.B. Describe objects in the world using the five senses.	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.	Weather Climate Meteorologist Thermometer Precipitation Rain Gauge Weather Vane Windsock Anemometer Barometer Air Pressure Cirrus Stratus Cumulus Cumulonimbus Hygrometer	Weather changes, and scientists use tools to observe and predict weather patterns.	Identify basic cloud types and make connections to basic elements of weather. Identify weather patterns from data charts or graphs of data. Identify appropriate instruments to study weather and what they measure.
3.4.4.D. Describe the composition and structure of the universe and the earth's place in it.	S4.D.3.1.1 Describe motions of the Sun - Earth - Moon system. S4.D.3.1.2 Explain how the motion of the Sun - Earth - Moon system relates to time (e.g., days, months, years). S4.D.3.1.3 Describe the causes of seasonal change as they relate to the revolution of Earth and the tilt of Earth's axis.	Rotate Revolve Day Year Axis Orbit Moon Phases Gibbous Crescent	The motions of Earth, the sun, and the moon relate to one another and affect things that happen on Earth.	Describe motions of the Sun-Earth-Moon System. Explain how the motion of the Sun-Earth-Moon system relates to time. Describe the causes of seasonal change as they relate to the revolution of Earth and the tilt of Earth's axis.