Second Grade Science: First Nine Weeks

VA Standards of Learning (SOL) Essential Understandings for Instruction	Content Knowledge and Skills	MCPS Adopted Materials	Supporting Materials
2.1 Scientific Investigation • The nature of science refers to the foundational concepts that govern the way scientists formulate explanations about the natural world. The nature of science includes the following concepts: a) the natural world is understandable; b) science is based on evidence, both observational and experimental; c) science is a blend of logic and innovation; d) scientific ideas are durable yet subject to change as new data are collected; e) science is a complex social endeavor; and f) scientists try to remain objective and engage in peer review to help avoid bias. In grade two, an emphasis should be placed on concepts a, b, and e. • Science assumes that the natural world is understandable. Scientific inquiry can provide explanations about nature. This expands students' thinking from just a knowledge of facts to understanding how facts are relevant to everyday life. • Science demands evidence. Scientists develop their ideas based on evidence and they change their ideas when new evidence becomes available or the old evidence is viewed in a different way. • Science is a complex social endeavor. It is a complex social process for producing knowledge about the natural world. Scientific knowledge represents the current consensus as to what is the best explanation for phenomena in the natural world. This consensus does not arise automatically, since scientists with different backgrounds from all over the world may interpret the same data differently. To build a consensus, scientists communicate their findings to other scientists and attempt to replicate one another's findings. In order to model the work of professional scientists, it is essential for second-grade students to engage in frequent	Standard 2.1 does not require a discrete unit on scientific investigation because the inquiry skills that make up the standard should be incorporated in all the other 2nd grade science standards. **Each skill has been connected to specific content within this curriculum guide, but teachers may also provide instruction in any of the skills throughout the school year.** In order to meet this standard, it is expected that students will: • conduct simple experiments, make predictions, gather data from those experiments, repeat observations to improve accuracy, and draw conclusions. • differentiate among simple observations and personal interpretations. • classify items, using two or more attributes such as size, shape, color, texture, and weight. • use centimeters, meters, liters, degrees Celsius, grams, and kilograms in measurement. • use inches, feet, yards, quarts, gallons, degrees Fahrenheit, ounces, and pounds in measurement. • measure time using both digital and analog clocks. • identify conditions that influence a change in an experiment. • construct and interpret simple models (e.g., weathering and erosion of land surfaces — 2.7).	**Five Ponds Press:** Exploring Science All Around Us, Level 2 **Chapter 1:** Science is Awesome!	**AIMS** Primarily Bears Math with M&M Candies® Joys of Jelly Beans Primarily Earth Air Temperature **Seeds of Science Roots of Reading** Gravity and Magnetism Kit

discussions with peers about their understanding of their investigations. • In order to communicate accurately, it is necessary to provide a clear description of exactly what is observed. There is a difference between what one can observe and what can be interpreted from an observation. • An observation is what you actually see, feel, taste, hear, or smell. • The more times an observation is repeated, the greater the chance of ensuring the accuracy of the observation. • It is easier to see how things are related if objects are classified according to their common characteristics. • By constructing and studying simple models, it is sometimes easier to understand how real things work. • Scientific investigations require standard measures, proper tools (e.g., balance, thermometer, ruler, magnifying glasses), and organized collection and reporting of data. The way the data are displayed can make it easier to interpret important information. • When using any standard measurement scale, measure to the marked increment and estimate one more decimal place. Scientists do not round their measurements as this would be inaccurate. • Students should communicate observations and data publicly.	• analyze sets of objects, numerical data, or pictures, and create basic categories to organize the data (descriptive or numerical). • judge which, if any, collected data in a small set appear to be unexpected or unusual. • construct and interpret picture and bar graphs with numbered axes depicting the distribution of data. • communicate observations and data.		

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2.4 a The student will investigate and understand that animals undergo a series of orderly changes in their life cycles. • Throughout their lives, plants and animals undergo a series of orderly and identifiable changes. • Changes in organisms over time occur in cycles and differ among the various plants and animals. • Some animals, such as mealworms, pill bugs, frogs, and butterflies go through distinct stages as they mature to adults. Other animals, such as crickets, praying mantises, gray squirrels, and white-tailed deer, resemble their parents from birth to maturity and do not have distinct stages. • White-tailed deer are the largest herbivores in Virginia. They are found in all areas of Virginia including forests, open fields, mountain tops, coastal islands, and in cities and towns. Their diet consists of grasses, leaves, nuts, fruits, and fungi. Virginia's white-tailed deer have few predators. Fawns may be taken by bobcat. Other mortality factors include hunting, motor vehicles, poaching, and trains. • Newborn white-tailed deer are called fawns. They become yearlings at 14 to 18 months of age. As adults, males are called bucks and females are called does. White-tailed deer are tan or reddish brown in the summer and grayish brown in the winter. The underside and throat are white, and the tail is brown above and white below. • A white-tailed deer's lifespan averages eight years.	In order to meet this standard, it is expected that students will: • describe changes in the life cycles of a butterfly and a white-tailed deer. • compare and contrast life cycles of a butterfly and a white-tailed deer. • construct and interpret models/diagrams of animal life cycles. **Skills** b. observations are differentiated from personal interpretation. d. two or more characteristics or properties are used to classify items. j. conclusions are drawn. k. observations and data are communicated.	**Five Ponds Press:** Exploring Science All Around Us, Level 2 **Chapter 4:** How Things Grow	**AIMS** Cycles of Knowing and Growing A Time of their Own Butterfly Song Critters Mealworms on Stage **Enhanced Scope and Sequence Plus** Looking at Life Cycles Printouts of life cycles **SHIP** Butterfly Life Cycle Relay **Virginia Animals & Their Habitats** White-tailed Deer in the Classroom This page is designed to provide additional resources on Virginia's deer for students and teachers.

Second Grade Science: First Nine Weeks

VA Standards of Learning (SOL) Essential Understandings for Instruction	Content Knowledge and Skills	MCPS Adopted Materials	Supporting Materials
2.5 The student will investigate and understand that living things are part of a system. • Living organisms are dependent on other living organisms and their nonliving surroundings for survival. • All of the interactions between and among living organisms and their nonliving surroundings are referred to as a system. • Shelter may be living (coral, tree) or nonliving (caves, houses). • The habitat of an animal includes adequate food, water, shelter or cover, and space. If any of the basic elements of an animal's habitat are absent, the animal's survival is threatened. The animal may adapt or leave the area. • The habitats of living organisms, such as forests, grasslands, rivers, and streams, change due to many human or natural influences (e.g., forest fires, hurricanes, and droughts). Habitats change from season to season. • Fossils found provide scientists with information about plants and animals that lived on Earth many years ago. (e.g., The rise and fall of sea level is recorded in the richly fossiliferous rocks of Virginia's coastal plain. An abundance of marine fossils – fossil clams, snails, sand dollars, shark's teeth, and whalebones – can be found in Virginia's coastal plains.) • Virginia's state fossil, Chesapecten jeffersonius, is a large extinct species of scallop that dates to approximately 4.5 million years ago. It was the first fossil ever described in North America and is named after Thomas Jefferson, one of our founding fathers, and an amateur paleontologist.	In order to meet this standard, it is expected that students will: • classify objects as to whether they are living or nonliving. • describe the basic components of an animal habitat (food, water, shelter or cover, and space). • classify the parts of an animal's habitat as living or nonliving. • construct and interpret simple models of different kinds of habitats, including a forest and a stream. • predict and describe seasonal changes in habitat and their effects on plants and animals, for example, how trees change through the seasons and how animals respond to changes in the seasons. • describe how animals are dependent on their surroundings, for example, how squirrels and other animals are affected by the loss of forest habitat. • describe how scientists use the study of fossils to show past weather/climate conditions and environmental characteristics. **Skills** b. observations are differentiated from personal interpretation. g. conditions that influence a change are identified and inferences are made. j. Conclusions are drawn.	**Five Ponds Press:** Exploring Science All Around Us, Level 2 **Chapter 5:** How to Survive	**AIMS** Cycles of Knowing and Growing Dirt Baggers MINTS Science in the Schoolyard Hands-on Science Kit **Virginia Animals & Their Habitats** A second-grade cross-curricular unit that integrates the content areas of science, language arts, mathematics, and history and social science; and addresses 40 grade-two Virginia *Standards of Learning*. Students will develop an understanding of Virginia animals and their habitats through active research, investigation and data collection, mathematical analysis, and communication. The unit utilizes inquiry, student teamwork, project-based learning, student journals, and fosters responsible actions toward wildlife and related natural resources. The unit is enhanced when paired with Project WILD materials.

			Enhanced Scope and Sequence Plus There's No Place Like Home Habitat Changes over Time Fossil Fun

Second Grade Science: Second Nine Weeks

VA Standards of Learning (SOL) Essential Understandings for Instruction	Content Knowledge and Skills	MCPS Adopted Materials	Supporting Materials
2.7a The student will investigate and understand that weather and seasonal changes affect plants, animals, and their surroundings. • Living organisms respond to weather and seasonal changes. This can be reflected in changes in growth and behavior. • Adverse conditions of weather may slow the growth and development of plants and animals, whereas optimal weather conditions may accelerate the growth and development of plants and animals. • Dormancy is a state of reduced metabolic activity adopted by many organisms (both plants and animals) under conditions of environmental stress or when such stressful conditions are likely to appear, such as in winter. • Many trees produce new leaves in the spring and lose them in the fall due to seasonal changes in temperature and light. • The outward coloration and coloration patterns of many animals are similar in appearance to the plants in the places in which they live. This similarity to background is referred to as camouflage, and it enables animals to hide and avoid those that may eat or harm them. • Some animals (e.g., geese, monarch butterflies, tundra swans) travel from one place to another and back again (migration) in search of a new temporary habitat because of climate, availability of food, season of the year, or reproduction. • Some animals (e.g., groundhogs, black bears) go into a deep sleep (hibernation) due to seasonal changes. Hibernation is a condition of biological rest or inactivity where growth, development, and metabolic processes slow down. • Some animals undergo physical changes (e.g., thickening of dog fur in the winter and shedding in the summer) from season to season.	In order to meet this standard, it is expected that students will: • identify growth and behavioral responses of plants and animals to weather and seasonal changes. Examples of responses that are adaptive include migration, hibernation, camouflage, and dormancy. • identify animals that migrate, hibernate, or show other changes throughout the seasons or in the presence of adverse environmental conditions. • evaluate the usefulness of camouflage in an animal's habitat (for example, coloration patterns of frogs). • compare and contrast the responses of plants and animals to weather and seasonal changes. • model the effects of weathering and erosion on the land surface. **Skills** g. conditions that influence a change are identified and inferences are made.	**Five Ponds Press:** Exploring Science All Around Us, Level 2 **Chapter 5:** How to Survive	**AIMS** Critters Hide and Seek **Enhanced Scope and Sequence Plus** What Changes When the Seasons Change? Erosion Simulation **SHIP** Five Corner Animal Adaptations

• Land surfaces are subject to the agents of weathering and erosion. Land surfaces that are not covered with or protected by plants are more likely to be subject to the loss of soil by wind and water. • Weathering is the breaking down of rocks, which usually happens over long periods of time. • Erosion is the process by which the products of weathering are moved from one place to another. Erosion may happen quickly (e.g., during a flood or a hurricane) or over a long period of time.			

Second Grade Science: Second Nine Weeks

VA Standards of Learning (SOL) Essential Understandings for Instruction	Content Knowledge and Skills	MCPS Adopted Materials	Supporting Materials
2.2 The student will investigate and understand that natural and artificial magnets have certain characteristics and attract specific types of metals. • Magnets have a north and a south pole. • Unlike magnetic poles attract and like poles repel. The north pole of one magnet attracts the south pole of a second magnet, while the north pole of one magnet repels the other magnet's north pole. • A magnet creates an invisible area of magnetism all around it called a magnetic field. • The north end of a magnetic compass always points roughly toward Earth's North Pole and the south end of the compass needle always points toward Earth's South Pole. That is because Earth itself contains magnetic materials and behaves like a gigantic magnet. • When a magnetized metal, such as a compass needle, is allowed to swing freely, it displays the interesting property of aligning with Earth's magnetic fields. • A magnet is strongest at its poles. • The farther away the magnetic poles are from each other, the weaker the magnetic force. • If you cut a bar magnet in half, you get two new, smaller magnets, each with its own north and south pole. • Magnets can attract objects made of iron, nickel, or cobalt. • Magnets can be artificially made from special metals or can occur naturally. Naturally occurring magnets are composed of a mineral called magnetite or lodestone. • Magnets have important applications and uses in everyday life.	In order to meet this standard, it is expected that students will: • identify the north and south magnetic poles of magnets. • use magnetic compasses to determine the directions of north and south poles. • predict which materials will be attracted to magnets, test the predictions, and create a chart that shows the results, classifying materials as to whether they are attracted to magnets or not. • conduct an investigation to determine how the different poles of magnets react to the poles of other magnets. • identify important applications of magnets in everyday life: - refrigerator magnets and chalkboard letters - toys - door latches - paper clip holders - computers - motors - credit card magnetic strips. • compare natural magnets (lodestone or magnetite) and artificial magnets. • create a new application for using a magnet. **Skills** a. observations and predictions are made and questions are formed. c. Observations are repeated to ensure accuracy. m. Current applications are used to reinforce science concepts.	**Five Ponds Press:** Exploring Science All Around Us, Level 2 **Chapter 2:** All About Magnets	**AIMS** Mostly Magnets Stick to It What Will a Magnet Attract? Fish and Clips Holding Power How Close Can You Get? Face to Face **Enhanced Scope and Sequence Plus** Magnets and Magnetism **Seeds of Science Roots of Reading** Gravity & Magnetism Kit **SHIP** Magnets Attract

Second Grade Science: Third Nine Weeks

VA Standards of Learning (SOL) Essential Understandings for Instruction	Content Knowledge and Skills	MCPS Adopted Materials	Supporting Materials
2.3 The student will investigate and understand basic properties of solids, liquids, and gases. • All substances are made of matter. • Matter is anything that has mass and takes up space. • Solids have a defined shape and volume. • Liquids have a definite volume and take the shape of the container. • Gases will completely fill any closed container (take the shape of its container) and assume the volume of its container. (e.g., Helium gas put into a balloon takes the shape of the balloon because the balloon defines its shape.) • Mass is a measure of the amount of matter. • Weight is the measure of the gravitational pull on an object. • Volume is the measure of the amount of space occupied by matter. • Matter most commonly occurs in three phases: solids, liquids, and gases. • Matter can change from one phase to another. • When matter changes from one phase to another, these changes are referred to as physical changes. • Changes from solid to liquid to gas require the addition of energy.	In order to meet this standard, it is expected that students will: • classify materials as to whether they are liquids, solids, or gases. • describe and identify examples of condensation, evaporation, melting, and freezing of water. • measure the mass of solids and the volume of liquids in metric and standard English units. • examine and describe the transformation of matter from one phase to another, i.e., solid water (ice) to liquid (water) to gas (water vapor). • conduct an investigation to observe the condensation of water. • design and conduct an investigation to determine basic factors that affect the evaporation of water. • identify the phases of water and the uses of water in its various phases in the home and at school. **Skills** e. length, volume, mass, and temperature are measured in metric units and standard English units using the proper tools. l. simple physical models are designed and constructed to clarify explanations and show relationships.	**Five Ponds Press:** Exploring Science All Around Us, Level 2 **Chapter 3:** Meet Matter	**Enhanced Scope and Sequence Plus** What Makes a Solid a Solid? Let's Find the Mass & the Volume The Water Cycle **Science Is** Making Goo p. 157 Search for Matter p. 44 Water in a Jar p. 45 **SHIP** Matter Relay **Gifted Resource** What's the Matter

Second Grade Science: Third Nine Weeks

VA Standards of Learning (SOL) Essential Understandings for Instruction	Content Knowledge and Skills	MCPS Adopted Materials	Supporting Materials
2.6 The student will investigate and understand basic types, changes, and patterns of weather. • Earth's weather changes continuously from day to day. • Changes in the weather are characterized by daily differences in wind, temperature, and precipitation. • Precipitation occurs when water, previously evaporated, condenses out of the air and changes its phase from a gas to a liquid (rain) or to a solid (snow or sleet). • Extremes in the weather, such as too little or too much precipitation, can result in droughts or floods. • Storms have powerful winds, which may be accompanied by rain, snow, or other kinds of precipitation. • Weather data are collected and recorded using instruments. This information is very useful for predicting weather and determining weather patterns. • Weather influences human activity. • Scientists collect weather data over time to study trends and patterns. These trends and patterns help them to make future weather predictions.	In order to meet this standard, it is expected that students will: • observe and describe seasonal weather patterns and local variations. • observe and record daily weather conditions, such as sunny, cloudy, windy, rainy, or snowy. • record and interpret daily temperature, using a graph with numbered axes. • measure and record weather data, using weather instruments, including a thermometer, rain gauge, and weather vane (standard English and metric measures). • describe weather in terms of temperature, wind, and precipitation. • observe and describe precipitation in terms of evaporation and condensation of water. • observe and describe types of precipitation, including rain, snow, and ice (sleet and hail). • describe how tracking weather data over time helps scientists make future weather predictions. • evaluate the influence of daily weather conditions on personal activities and dress. • identify common types of storms. Examples include hurricanes, tornadoes, blizzards, and thunderstorms. • compare and contrast droughts and floods. **Skills** c. observations are repeated to ensure accuracy. e. length, volume, mass, and temperature are measured in metric units and standard English units using the proper tools. f. time is measured using the proper tools.	**Five Ponds Press:** Exploring Science All Around Us, Level 2 **Chapter 6:** Stormy Weather	**AIMS** Water Precious Water Moving Raindrops Through the Water Cycle **Enhanced Scope and Sequence Plus** Weather: Storms and other Weather Phenomena Collecting Weather Data **Website** http://www.weatherclassroom.com/ **Gifted Resource** Weather Reporter

Second Grade Science: Third Nine Weeks

VA Standards of Learning (SOL) Essential Understandings for Instruction	Content Knowledge and Skills	MCPS Adopted Materials	Supporting Materials
2.7b The student will investigate and understand that weather and seasonal changes affect plants, animals, and their surroundings. The concepts developed in this standard include the following: • Land surfaces are subject to the agents of weathering and erosion. Land surfaces that are not covered with or protected by plants are more likely to be subject to the loss of soil by wind and water. • Weathering is the breaking down of rocks. • Erosion is the process by which the products of weathering are moved from one place to another.	In order to meet this standard, it is expected that students will: • Model the effects of weathering and erosion on the land. **Skills** c. observations are repeated to ensure accuracy. e. length, volume, mass, and temperature are measured in metric units and standard English units using the proper tools.	**Five Ponds Press:** Exploring Science All Around Us, Level 2 **Chapter 7:** Secrets of Survival	**AIMS** Primarily Earth Agent Erosion Ice Breakers Water Precious Water Rain Away Don't Rain Away **Enhanced Scope and Sequence Plus** Erosion Simulation

Second Grade Science: Fourth Nine Weeks

VA Standards of Learning (SOL) Essential Understandings for Instruction	Content Knowledge and Skills	MCPS Adopted Materials	Supporting Materials
2.4b The student will investigate and understand that plants undergo a series of orderly changes in their life cycles. • Of the more than 200,000 kinds of vascular plants in the world today over 95 percent flower at some time in their lives. The best-known flowers are bright and colorful but others, like those of grasses, are small and inconspicuous. • The basic stages in the life cycle of flowering plants include: seeds, germination of the seed, growth of the stem and roots, growth of leaves, growth of flowers, fertilization (pollination) of the flowers, production of fruit/new seeds, and death.	In order to meet this standard, it is expected that students will: • identify the stages in the life cycle of a flowering plant. • construct and interpret models/diagrams of plant life cycles. **Skills** h. Data are collected and recorded, and bar graphs are constructed using numbered axes. i. Data are analyzed and unexpected or unusual quantitative data are recognized.	**Five Ponds Press:** Exploring Science All Around Us, Level 2 **Chapter 8:** We Need Plants!	**AIMS** Cycles of Knowing and Growing Growing Bulbs What a Corny Life Primarily Plants Reaching Up Toward the Sun **Enhanced Scope and Sequence Plus** Looking at Life Cycles **Websites** Plant Products in Virginia **Gifted Resource** Budding Botanists at Work Plants: Science Works for Kids Series

Second Grade Science: Fourth Nine Weeks

VA Standards of Learning (SOL) Essential Understandings for Instruction	Content Knowledge and Skills	MCPS Adopted Materials	Supporting Materials
2.8 The student will investigate and understand that plants produce oxygen and food, are a source of useful products, and provide benefits in nature. • Plants provide many useful products and materials, which benefit human beings as well as other living organisms. • Plant products include such essentials as oxygen and food, as well as materials useful for clothing and shelter. • Plants may grow well in certain geographic areas, thus enabling the production of plant products that allow humans to live in and thrive in those areas. • Some examples of plants that grow in Virginia's geographic regions include: - Coastal Plains (Tidewater): peanuts, cotton, soybeans; - Piedmont: apples, tobacco, cabbage; - Blue Ridge Mountains: evergreens, apples, corn; - Valleys and Ridges: evergreens, apples, corn; and - Appalachian Plateau: tobacco. • Plants provide homes and food sources for many animals. • Plants are important in the prevention of soil erosion. • Products from plants include, but are not limited to, cinnamon from the bark of trees; fiber from reeds, grasses and trees; cotton from a cotton plant; spices from various plant parts; lumber from wood; rubber from rubber trees; and medicines (e.g., aloe vera from the aloe plant, quinine from the bark of Cinchona trees found in South America to treat malaria).	In order to meet this standard, it is expected that students will: • understand that plants produce oxygen and food. • classify and identify the sources and uses of plant products, such as fiber, cotton, oil, spices, lumber, rubber, medicines, and paper. • describe how the availability of certain plant products in a geographic area would affect the development of that area. • describe plant products grown in Virginia that are useful to people, including wood, fruits, and vegetables. List and classify plant products (e.g., peanuts, cotton, soybeans, apples, evergreens). • compare and contrast different ways animals use plants as homes and shelters. • construct and interpret a chart illustrating the plant foods consumed by different animals. • construct and interpret a model that demonstrates how plants reduce soil erosion. **Skills** h. data are collected and recorded, and bar graphs are constructed using numbered axes. i. data are analyzed and unexpected or unusual quantitative data are recognized.	**Five Ponds Press:** Exploring Science All Around Us, Level 2 **Chapter 8:** We Need Plants!	**AIMS** Primarily Plants People Need Plants **Enhanced Scope and Sequence Plus** We Need Plants! **Websites** www.agintheclass.org