



Science Curriculum Matrix

Third Grade

August 1, 2009

The Science Vertical Team has revised the Third Grade Science Curriculum Matrix for 2009-2010. In addition to the necessary correlation to the Virginia Science Standards of Learning, the Third Grade science content is organized by both concepts and topics. We encourage you to utilize this document while planning for instruction. A more dynamic version of this matrix is available on our wiki site at <http://acpsscience.pbworks.com/>. We anticipate making additional updates to this document as the school year progresses. Please contact Tony Borash with your comments and suggestions at tborash@k12albemarle.org.

In addition to this document, we recommend that you review the [Third Grade Science Curriculum Framework](#) for additional clarification regarding the Grade 3 Science SOL and the [Third Grade Science Enhanced Scope and Sequence](#) for unit and lesson planning resources.

Thanks,

The Science Vertical Team

Scientific Investigation, Reasoning, and Logic

GRADE: 3

CONCEPT: SCALE: Properties

ENDURING UNDERSTANDING: Measurement represents properties on a numerical scale.

Essential Understandings	Assessment Samples – SOL/Blooms	Vocabulary
<p>Students should understand:</p> <ul style="list-style-type: none"> When we ask questions and seek answers to those questions in a systematic way, we do science. When we do science, we observe, investigate, question, and infer. 	<p>Knowledge/Comprehension Level</p> <ul style="list-style-type: none"> Observe the temperatures on the three different thermometers placed around the room. On your observation sheet, write the different temperatures in degrees Celsius. <p>Application/Analysis Level</p> <ul style="list-style-type: none"> Answer the following questions and write a hypothesis for each (see appendix A). <p>Synthesis/Evaluation Level</p> <ul style="list-style-type: none"> Describe the changes that occur as you complete the last step of the “gloop” (see appendix B) recipe. Why do you think this happens? How might you change the results of this? 	<p>Celsius classify communicate data gram hypothesis mass measure milliliter observation Prediction sequence volume</p>

SOL: 3.1 The student will plan and conduct investigations in which

- predictions and observations are made;
- objects with similar characteristics are classified into at least two sets and two subsets;
- questions are developed to formulate hypothesis;
- volume is measured to the nearest milliliter and liter;
- length is measured to the nearest centimeter;
- mass is measured to the nearest gram;
- data are gathered, charted, and graphed (line plot, picture graph, and bar graph);
- temperature is measured to the nearest degree Celsius;
- time is measured to the nearest minute;
- inferences are made and conclusions are drawn; and
- natural events are sequenced chronologically.

Physical Science: Force, Motion and Energy: Force

GRADE: 3

CONCEPT: SCALE: Properties

ENDURING UNDERSTANDING: Properties characterize objects, organisms and substances.

Essential Understandings	Assessment Samples – SOL/Blooms	Vocabulary
<p>Students should understand:</p> <ul style="list-style-type: none"> • Simple machines make our work easier. • The different types of simple machines (levers, inclined planes, wedges, wheels and axles, screws, and pulleys) have different characteristics and function in different ways to make work easier. • Compound machines combine two or more simple machines. 	<p>Knowledge/Comprehension Level</p> <ul style="list-style-type: none"> • Label pictures from a magazine page, a Kidspiration™ document, or a photograph with the names of the different simple machines. <p>Application/Analysis Level</p> <ul style="list-style-type: none"> • Write a story about how someone can use simple machines in their daily life. (This could be a non-fiction story that reflects the life of the student, or it could be about a fictional person as long as it reflects the use of all six simple machines and at least one compound machine) <p>Synthesis/Evaluation Level</p> <ul style="list-style-type: none"> • Design a new tool using at least two simple machines. Be able to tell what the tool does and how it helps make work easier. Explain why you designed this tool and why you think it would work well. 	<p>work lever inclined plane wedge pulley screw wedge compound machine</p>

SOL: 3.2 The student will investigate and understand simple machines and their uses.

- (a) Types of simple machines (lever, screw, pulley, wheel and axle, inclined plane, and wedge);
- (b) How simple machines function;
- (c) Compound machines (scissors, wheelbarrow, and bicycle);
- (d) Examples of simple and compound machines found in the school, home, and work environments.

Physical Science: Matter

GRADE: 3

CONCEPT: SCALE: Properties

ENDURING UNDERSTANDING: Properties characterize objects, organisms, and substances.

Essential Understandings	Assessment Samples – SOL/Blooms	Vocabulary
<p>Students should understand:</p> <ul style="list-style-type: none"> • We can observe matter. • Objects are made of one or more parts. • Materials are made of parts that are too small to be seen without magnification. • Properties of materials remain the same even when the size of the materials is altered. 	<p>Knowledge/Comprehension Level</p> <ul style="list-style-type: none"> • Describe the properties of oil and those of water. Mix water and oil and describe what happens by answering the following questions: Do they mix? Does anything about the oil and water change? • Examine two objects and compare/contrast their physical properties. <p>Application/Analysis Level</p> <ul style="list-style-type: none"> • A glass of lemonade weighs 255 grams. A spoonful of sugar weighs 25 grams. Predict how much you think the sweetened lemonade will weigh after you stir in the sugar: (a) less than 255 but more than 230 grams; (b) slightly more than 255 grams but less than 280; (c) 230 grams; (d) 280 grams; or (e) 255 grams. (Have students describe their thinking and explain their answer -from <i>Uncovering Student Ideas in Science</i>, Keely, Eberle, Farrin: NSTA Press). <p>Synthesis/Evaluation Level</p> <ul style="list-style-type: none"> • Create a table of useless items (for example, a glass baseball bat). Describe the properties that make it “useless” (not strong enough, shatters when it hits a ball). Name some other examples (rubber mirror, wooden bicycle tires, aluminum foil tissues) and have them create some of their own (from McGraw Hill Science 3, p. E7). 	<p>physical properties materials matter mass volume characteristics</p>

SOL: 3.3 The student will investigate and understand that objects are made of materials that can be described by their physical properties.

- (a) Objects are made of one or more materials;
- (b) Materials are composed of parts that are too small to be seen without magnification; and
- (c) Physical properties remain the same even if the material is reduced in size.

Life Science: Life Processes

GRADE: 3

CONCEPT: CHANGE AND CONSTANCY: Cause & Effect

ENDURING UNDERSTANDING: Observable changes occur in nature, and inferences can be made to explain their causes.

Essential Understandings	Assessment Samples – SOL/Blooms	Vocabulary
<p>Students should understand:</p> <ul style="list-style-type: none"> Survival depends upon an animal's ability to adapt to its environment. 	<p>Knowledge/Comprehension Level</p> <ul style="list-style-type: none"> Have students look at these pictures (a monarch and viceroy butterfly, an insect or lizard upon the trunk of a tree protected by camouflage) and ask them to label each adaptation they observe. See also Science Enhanced Scope and Sequence (grade 3), page 87 and 88, for sample assessment items. <p>Application/Analysis Level</p> <ul style="list-style-type: none"> Have students design an animal to thrive in a particular habitat; if a student chooses the woods, have him or her consider animal characteristics that would make the animal most suitable for life in the woods (ability to camouflage, etc). <p>Synthesis/Evaluation Level</p> <ul style="list-style-type: none"> Think about all of the different types of animal adaptations you have learned about. Of these adaptations, which would you choose to have if you were a different kind of animal. Why would you want to be able to adapt this way? How do you think it would help you survive? 	<p>adaptation hibernation migration camouflage mimicry instinct learned behavior survive</p>

SOL: 3.4 The student will investigate and understand that behavioral and physical adaptations allow animals to respond to life needs.

(a) Methods of gathering and storing food, finding shelter, defending themselves, and rearing young; and

(b) Hibernation, migration, camouflage, mimicry, instinct, and learned behavior.

Life Science: Living Systems: Ecology

GRADE: 3

CONCEPT: SYSTEMS: Interactions

ENDURING UNDERSTANDING: Systems are an organized collection of parts, which display observable and predictable patterns.

Essential Understandings	Assessment Samples – SOL/Blooms	Vocabulary
<p>Students should understand:</p> <ul style="list-style-type: none"> • Energy transfers from the sun to plants to animals in a food chain. • Animals have different roles in the food chain. 	<p>Knowledge/Comprehension Level</p> <ul style="list-style-type: none"> • Order the parts of a food chain using pictures of animals, plants, and the sun. • Read a nonfiction story (from Ranger Rick, for example) about different animals and name the herbivores, carnivores, and omnivores in the story. <p>Application/Analysis Level</p> <ul style="list-style-type: none"> • Research to find several organisms that live together and create a food chain. Then, have them make a waterfall book (one in which the paper protrudes in increments from the sheet before) of the chain. Have them maintain proper sequence as they write the names of the chain’s elements on the protruding edges. Finally, have them glue a picture of each element on its page and write at least two facts about that element. When the book is finished and closed, it will be a perfect food chain and resemble the example shown in the appendix. • Classify pictures of animals as herbivores, carnivores, or omnivores. Choose an animal picture and defend reasons it is a herbivore, carnivore, or omnivore. <p>Synthesis/Evaluation Level</p> <ul style="list-style-type: none"> • What would happen to the rest of the plants and animals in the habitat if one aspect of the food chain was removed? How would the food chain be affected? Describe the impact that this would have upon living systems with detail. • Choose the classification of carnivore, herbivore, or omnivore as the most efficient type of consumer. Ask that they give three reasons for choosing this consumer type. 	<p>producers consumers herbivore carnivore decomposer predator prey</p>

SOL: 3.5 The student will investigate and understand relationships among organisms in aquatic and terrestrial food chains.

- (a) Producer, consumer, decomposer;
- (b) Herbivore, carnivore, omnivore; and
- (c) Predator and prey.

Life Science: Living Systems: Ecology

GRADE: 3

CONCEPT: SCALE: Properties

ENDURING UNDERSTANDING: Properties characterize objects, organisms, and substances.

Essential Understandings	Assessment Samples – SOL/Blooms	Vocabulary
<p>Students should understand:</p> <ul style="list-style-type: none">• Environments support a diversity of plants and animals that share limited resources.	<p>Knowledge/Comprehension Level</p> <ul style="list-style-type: none">• Label pictures of different environments (marsh, desert, etc.) and give examples of plants and animals that live in each. <p>Application/Analysis Level</p> <ul style="list-style-type: none">• What would happen if desert animals were suddenly moved to live in the tundra? What adaptations would they need in order to survive? <p>Synthesis/Evaluation Level</p> <ul style="list-style-type: none">• Choose the terrestrial environment that is the best supporter of life. Defend your reasons for choosing this environment.	<p>environment fresh water salt water ponds marsh swamp stream river ocean desert grassland rainforest forest population community</p>

SOL: 3.6 The student will investigate and understand that environments support a diversity of plants and animals that share limited resources.

- (a) Water-related environments (pond, marshland, swamp, stream, river, and ocean environments);
- (b) Dry-land environments (desert, grassland, rain forest, and forest environments); and
- (c) Population and community.

Earth Science: Interrelationships in Earth/Space Systems: Soil

GRADE: 3

CONCEPT: SCALE: Properties

ENDURING UNDERSTANDING: Properties characterize objects, organisms, and substances.

Essential Understandings	Assessment Samples – SOL/Blooms	Vocabulary
<p>Students should understand:</p> <ul style="list-style-type: none">• Soil is necessary for plant growth• Soil takes a long time to form and should be conserved.	<p>Knowledge/Comprehension Level</p> <ul style="list-style-type: none">• Diagram of a cross-section of soil with the names of the different layers. <p>Application/Analysis Level</p> <ul style="list-style-type: none">• Research a plant. Experiment growing this plant in different types of soil. Write a paragraph about what type of soil would allow this plant to grow best based upon your research and the conclusions you draw from your experiments. <p>Synthesis/Evaluation Level</p> <ul style="list-style-type: none">• Why is soil so important to us? Write a story or create a poster or different media to explain why we need soil. Convince the class why it is more than just dirt.• Create a new miracle soil that brings dead plants back to life! What’s in this soil? How do you know that the parts of your soil help?• Which do you think is more important to plant growth – light or soil? Defend your answer.	<p>soil topsoil subsoil bedrock rock clay silt sand humus nutrients resource</p>

SOL: 3.7 The student will investigate and understand the major components of soil, its origin, and importance to plants and animals, including humans.

- (a) Soil provides the support and nutrients necessary for plant growth;
- (b) Topsoil is a natural product of subsoil and bedrock;
- (c) Rock, clay, silt, sand, and humus are components of soils; and
- (d) Soil is a natural resource and should be conserved.

Earth Science: Earth Patterns, Cycles and Change

GRADE: 3

CONCEPT: SYSTEMS: Interaction

ENDURING UNDERSTANDING: Systems are an organized collection of parts, which display observable and predictable patterns.

Essential Understandings	Assessment Samples – SOL/Blooms	Vocabulary
<p>Students should understand:</p> <ul style="list-style-type: none">• Many of Earth’s events occur in patterns and cycles.	<p>Knowledge/Comprehension Level</p> <ul style="list-style-type: none">• Create a moon phase flip book (from McGraw Hill Science 3, D-64). <p>Application/Analysis Level</p> <ul style="list-style-type: none">• Compare rotation vs. revolution by labeling a diagram of Earth in orbit around the sun, completing a Venn diagram, and/or writing about this comparison in a science notebook or journal.• You wake up one morning and the news on the TV informs you that Earth has stopped rotating! What will happen now? <p>Synthesis/Evaluation Level</p> <ul style="list-style-type: none">• Is rotation or revolution more important to life on Earth? Why? Give three reasons to defend your answer.	<p>pattern cycle season moon phase tide rotation life cycle</p>

SOL: 3.8 The student will investigate and understand basic patterns and cycles occurring in nature.

- (a) Patterns of natural events (day and night, seasonal changes, phases of the moon, and tides); and
- (b) Animal and plant life cycles.

Earth Science: Earth Patterns, Cycles, and Change: Water Cycle

GRADE: 3

CONCEPT: SYSTEMS: Processes

ENDURING UNDERSTANDING: Systems consist of organized groups of interactive and related parts that form a whole.

Essential Understandings	Assessment Samples – Bloom’s Levels	Vocabulary
<p>Students should understand:</p> <ul style="list-style-type: none"> The water cycle is essential for life on Earth. 	<p>Knowledge/Comprehension Level</p> <ul style="list-style-type: none"> Label the stations of the water cycle. <p>Application/Analysis Level</p> <ul style="list-style-type: none"> Take two plastic cups and fill each half way with water. Place one cup in a warm place. Place the other cup in a cool place. Predict in which cup the water level will change the most. <p>Synthesis/Evaluation Level</p> <ul style="list-style-type: none"> What would happen if any one of the parts of the water cycle stopped happening? What would happen if there was no condensation? No precipitation? No evaporation? You are very concerned about the effect of pollution on the water cycle. Write a letter to the person that represents you and describe your concerns. What effects does pollution have on the water cycle? 	<p>energy water cycle evaporation condensation precipitation water sources conservation pollution</p>

SOL: 3.9 The student will investigate and understand the water cycle and its relationship to life on Earth.

- (a) The energy from the sun drives the water cycle;
- (b) Processes involved in the water cycle (evaporation, condensation, precipitation);
- (c) Water is essential for living things; and
- (d) Water supply and water conservation.

Earth Science: Resources

GRADE: 3

CONCEPT: CHANGE AND CONSTANCY: Cause and Effect

ENDURING UNDERSTANDING: Natural processes and human activity can cause changes over time.

Essential Understandings	Assessment Samples – SOL/Blooms	Vocabulary
<p>Students should understand:</p> <ul style="list-style-type: none"> Natural events and human influences can affect the survival of species. 	<p>Knowledge/Comprehension Level</p> <ul style="list-style-type: none"> Sort the following events into these categories: <i>Human/Natural</i> or <i>Harmful/Helpful</i> Events: fire, flood, disease, erosion. <p>Application/Analysis Level</p> <ul style="list-style-type: none"> Examine the impact of some of the steps humans take to control the destructive effects of natural events. Research controlled burns, flood levees and other man made influences upon natural events. How do these influences help ease the impact of floods, fires, etc? How are they similar to the natural event? How are they different? <p>Synthesis/Evaluation Level</p> <ul style="list-style-type: none"> What do you believe is the best way to prevent erosion? Which method has the biggest, most long lasting impact? Defend your reasoning. Design a ship that is well defended from creating an oil spill. What would your ship need to accomplish this? Draw a picture of this vessel and describe your innovations, telling how and why they work well. 	<p>interdependency fire flood disease erosion organism survival</p>

SOL: 3.10 The student will investigate and understand that natural events and human influences can affect the survival of species.

- (a) The interdependency of plants and animals;
- (b) Human effects on the quality of air, water, and habitat;
- (c) The effects of fire, flood, disease, and erosion on organisms; and
- (d) Conservation and resource renewal.

Earth Science: Resources

GRADE: 3

CONCEPT: SCALE: Properties

ENDURING UNDERSTANDING: Properties characterize objects, organisms, and substances.

Essential Understandings	Assessment Samples – SOL/Blooms	Vocabulary
<p>Students should understand:</p> <ul style="list-style-type: none">We must learn how to use the different sources of energy available to us responsibly.	<p>Knowledge/Comprehension Level</p> <ul style="list-style-type: none">Label the following pictures with the terms renewable resource and nonrenewable resource (sample pictures can be found p. c40-41, McGraw Hill-Science). <p>Application/Analysis Level</p> <ul style="list-style-type: none">Compare the different types of energy available. What are their differences? For what types of jobs are the different forms of energy best suited? <p>Synthesis/Evaluation Level</p> <ul style="list-style-type: none">Design an energy efficient house using what you believe to be the best energy resources for the different functions they will perform. Be sure to explain why you believe these energy resources are the best. How do they perform their different jobs efficiently? How do they make the best use of limited resources?	<p>energy source sun water wind electricity wood fuel renewable non-renewable coal oil natural gas fossil fuels</p>

SOL: 3.11 The student will investigate and understand different sources of energy.

- (a) The sun's ability to produce light and heat energy;
- (b) Sources of energy (sunlight, water, wind);
- (c) Fossil fuels (coal, oil, natural gas) and wood; and
- (d) Renewable and nonrenewable energy resources.