Martinsville City Public Schools’ Instructional Plan of Action

The Curriculum Guides represent Martinsville City Public Schools’ Curriculum, which is based on the Standards of Learning for Virginia Public School and the State Curriculum Framework. In order for curriculum to be effective, it must be composed of three important components: written curriculum, taught curriculum, and assessed curriculum. Each of these components must be aligned to ensure learning at its highest level. The Curriculum Guides are a starting point in this process.

The Written Curriculum: The written curriculum consists of the Curriculum Guide used in conjunction with the State Curriculum Frameworks. The Curriculum Guide provides information on which standards are taught during a given grading period, the essential vocabulary for direct instruction in that standard, the understandings students should gain from instruction in the standard, and the expected student outcomes for this standard. The next step in this process is to study the Curriculum Framework for the identified standard. The Curriculum Framework provides instructional details for how instruction on this standard should look in the classroom.

The Taught Curriculum: The Curriculum Framework helps the teacher “unpack” the written curriculum for aligned “taught curriculum.” It does this by providing the definitions to use in direct vocabulary instruction, content details, and details on instructional strategies to use. The instructional strategy details include explanations of specific instructional methodologies and names instructional tools such as manipulatives and graphic organizers. Using the definitions, methodologies, content details, and instructional tools provided by the Curriculum Framework will ensure alignment in between the written, taught curriculum, and assessed curriculum.

The Assessed Curriculum: Formative assessment is an integral and ongoing part of the instruction process and occurs on a formal and informal basis at many levels. Teachers use informal assessment throughout the learning to check for student understanding formal common assessments to assess student mastery and plan interventions. Another level of formal assessment is the division benchmark assessment, which has as its primary purpose to help the adults know how to adjust instruction for student success. The final level of assessment is the Virginia Standards of Learning Tests, which are based on the Standards of Learning for Virginia Public Schools and the Curriculum Frameworks. Martinsville City Public Schools provides many tools to assist our teachers and administrators in assessment and disaggregation of assessment data. Teachers have access to tools such as Tests for Higher Standards, ExamView at grades two through twelve, PALS phonological awareness and literacy screening for preK through third grade, STAR reading assessment at grades two through twelve, and Algebra Readiness Diagnostic Tests for grades five through twelve. Also, teachers have access to Reports Online Systems for analyzing data from classroom assessments and benchmark assessments. All of this is an integral part of Martinsville’s commitment to “Learning for all; Whatever it takes.”
## Scientific Investigation, Reasoning, and Logic

**4.1** The student will plan and conduct investigations in which

- a) distinctions are made among observations, conclusions, inferences, and predictions;
- b) hypotheses are formulated based on cause-and-effect relationships;
- c) variables that must be held constant in an experimental situation are defined;
- d) appropriate instruments are selected to measure linear distance, volume, mass, and temperature;
- e) appropriate metric measures are used to collect, record, and report data;
- f) data are displayed using bar and basic line graphs;
- g) numerical data that are contradictory or unusual in experimental results are recognized; and
- h) predictions are made based on data from picture graphs, bar graphs, and basic line graphs.

**4.1** The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which

- a) distinctions are made among observations, conclusions, inferences, and predictions;
- b) objects or events are classified and arranged according to characteristics or properties;
- c) appropriate instruments are selected and used to measure length, mass, volume, and temperature in metric units;
- d) appropriate instruments are selected and used to measure elapsed time;
- e) predictions and inferences are made, and conclusions are drawn based on data from a variety of sources;
- f) independent and dependent variables are identified;
- g) constants in an experimental situation are identified;
- h) hypotheses are developed as cause and effect relationships;
- i) data are collected, recorded, analyzed, and displayed using bar and basic line graphs;
- j) numerical data that are contradictory or unusual in experimental results are recognized;
- k) data are communicated with simple graphs, pictures, written statements, and numbers;
- l) models are constructed to clarify explanations, demonstrate relationships, and solve needs; and
- m) current applications are used to reinforce science concepts.

### Technology Resources
- **SOL Scientific Investigation**
- **Method**
- **SMARTBoard Notebook**

### Instructional Notes
- **Bar Graphs Instructional**

- **Refrigerator Cards 4.1**

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2010 Standards

Refer to the Curriculum Framework for actual lesson planning. New SOLs must be taught along with highlighted standards in 2011-2012

Highlighted Material= 2003 Standards Only (will be removed - Summer 2012)

Underlined Material= New to 2010 Standards (Field tested in 2011-2012, SOL tested in 2013)
### Scientific Investigation, Reasoning, and Logic

1st nine weeks

<table>
<thead>
<tr>
<th>Pacing / Time Frame</th>
<th>Unit</th>
<th>Essential Vocabulary</th>
<th>Technology Resources</th>
<th>Print Resources</th>
<th>Instructional notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st nine weeks</td>
<td></td>
<td>Millimeters</td>
<td>Classify Simple &amp; Compound Leaves</td>
<td>“Fish Out of Water” SEMAA lesson</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Centimeters</td>
<td>Grams</td>
<td>“Body in Space” SEMAA lesson</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Meters</td>
<td>Kilograms</td>
<td>“Kool-Aid Lab” SEMAA lesson</td>
<td></td>
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<td></td>
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<td>Kilometers</td>
<td>Milliliters</td>
<td>Harcourt Science Virginia SOL Support for Students p. 67</td>
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<td>Grams</td>
<td>Liters</td>
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<td>Kilograms</td>
<td>Celsius</td>
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<td>Milliliters</td>
<td>Elapsed time</td>
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<td>Litters</td>
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<td>Celsius</td>
<td>Statement</td>
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<td>Elapsed time</td>
<td>Contradictory</td>
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</table>

#### Students will be able to:

- differentiates among simple observations, conclusions, inferences, and predictions, and correctly apply the terminology in oral and written work. **This requires students to comprehend the basic terminology and apply it in novel situations related to fourth grade SOL concepts.**
- analyze a set of 20 or fewer objects, measures, or pictures; classify Sort them into basic categories to organize the data (descriptive or numerical, qualitative or quantitative); and construct bar and line graphs depicting the distribution of those data based on characteristics or properties.
- use millimeters, centimeters, meters, kilometers, grams, kilograms, milliliters, liters, grams, and kilograms and degrees Celsius in measurement.
- choose the appropriate instruments, including centimeter rulers, meter sticks, scales, balances, graduated cylinders, beakers, scales and balances, and Celsius thermometers, for making basic metric measures.
- measure elapsed time using a stopwatch or a clock.
- make predictions, inferences, and draw conclusions using a variety of sources such as based on picture graphs, bar graphs, and basic line graphs.
- analyze the variables in a simple experiment, and decide Identify the independent variable and the dependent variable. Decide which other variable(s) must be held constant (not allowed to change) in order for the investigation to represent a fair test. **This requires students to comprehend what “variables” are and to apply that idea in new situations related to fourth grade SOL-related concepts. Variables are either manipulated or responding.**
### Content: Science

#### Grade Level: 4

<table>
<thead>
<tr>
<th>Pacing / Time Frame</th>
<th>Unit</th>
<th>Essential Vocabulary</th>
<th>Technology Resources</th>
<th>Print Resources</th>
<th>Instructional notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st nine Weeks</td>
<td>2 weeks</td>
<td><strong>Scientific Investigation, Reasoning, and Logic</strong></td>
<td></td>
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<td>4.1 continued</td>
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<td><strong>Students will be able to:</strong></td>
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<td>- create a plausible hypothesis, stated in terms of cause (if) and effect (then), from a set of basic observations that can be tested. This requires a student to comprehend what &quot;cause and effect&quot; is and to be able to apply that idea in new situations. The application should occur in terms of fourth grade SOL-related concepts or other concrete situations. Hypotheses should can be stated in terms such as: “If the water temperature is increased, then the amount of sugar that can be dissolved in it will increase.”</td>
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<td>- organize and analyze data from a simple experiment. Construct bar graphs and line graphs depicting the data.</td>
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<td>- judge which, if any, data in a simple set of results (generally 10 or fewer in number) appear to be considerably outside the expected range. Students should be able to determine the significance of unusual data contradictory or unusual.</td>
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<td>- present results of a simple experiment using graphs, pictures, statements, and numbers.</td>
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<td>- construct a physical model to clarify an explanation, demonstrate a relationship, or solve a need using information related to fourth-grade SOL concepts.</td>
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</tbody>
</table>

See list on previous 4.1 pages

SOL 4.1 Scientific Process
- PowerPoint [http://www.sps.k12.va.us/schools/npes/Grade%20Level%20SOL%20activities/4th%20grade/Science%20PP/scientificmethod/SOL%204.1%20Scientific%20Process.ppt](http://www.sps.k12.va.us/schools/npes/Grade%20Level%20SOL%20activities/4th%20grade/Science%20PP/scientificmethod/SOL%204.1%20Scientific%20Process.ppt)

Harcourt Science WORKBOOK p. WB350-377

"Unit Experiments” Harcourt Science Virginia SOL Support for Students p. 67-70

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**Martinsville City Public Schools Curriculum & Pacing Guide**

**Content: Science**

**Grade Level: 4**

<table>
<thead>
<tr>
<th>Pacing / Time Frame</th>
<th>Unit</th>
<th>Essential Vocabulary</th>
<th>Technology Resources</th>
<th>Print Resources</th>
<th>Instructional notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1st nine Weeks</strong></td>
<td><strong>Earth Patterns, Cycles, and Change</strong></td>
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<td>6 weeks</td>
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</table>

4.7 The student will investigate and understand the relationships among the Earth, moon, and sun. Key concepts include

- a) the motions of the Earth, moon, and sun (revolution and rotation);
- b) the causes for the Earth’s seasons and phases of the moon;
- c) the relative size, position, age, and makeup of the Earth, moon, and sun; and
- d) historical contributions in understanding the Earth-moon-sun system.

4.7 The student will investigate and understand the organization of the solar system. Key concepts include

- a) the planets in the solar system;
- b) the order of the planets in the solar system; and
- c) the relative sizes of the planets.

4.8 The student will investigate and understand the relationships among Earth, the moon, and the sun. Key concepts include

- a) the motions of Earth, the moon, and the sun;
- b) the causes for Earth’s seasons;
- c) the causes for the phases of the moon;
- d) the relative size, position, age, and makeup of Earth, the moon, and the sun; and
- e) historical contributions in understanding the Earth-moon-sun system.

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### Earth Patterns, Cycles, and Change

4.7 & 4.8 continued

**Students will be able to:**
- name the eight planets and describe whether they are a terrestrial planet or a gas giant.
- sequence the eight planets in the solar system based on their position from the sun. (Mercury is the first from the sun, Venus is the second, etc.)
- sequence the eight planets in the solar system based on size (Jupiter is the largest, Saturn is next, etc.)
- construct a simple model of the sun and the planets in our solar system.
- differentiate between rotation and revolution.
- describe how the Earth’s axial tilt causes the seasons.
- model the formation of the eight moon phases, sequence the phases in order, and describe how the phases occur.
- describe the major characteristics of the sun, including its approximate size, color, age, and overall composition.
- create and describe a model of the Earth-moon-sun system with approximate scale distances and sizes.
- compare and contrast the surface conditions of the Earth, the moon, and the sun.
- compare and contrast an Earth-centered to the sun-centered model of the solar system.
- analyze the differences in what Aristotle, Ptolemy, Copernicus, and Galileo observed and what influenced their conclusions.
- describe a contribution of the NASA Apollo missions to our understanding of the moon.

<table>
<thead>
<tr>
<th>Essential Vocabulary</th>
<th>Technology Resources</th>
<th>Print Resources</th>
<th>Instructional Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formation</td>
<td>Planets</td>
<td></td>
<td>“What’s the Difference?” SEMAA lesson</td>
</tr>
<tr>
<td>Moon phases</td>
<td>Adventure</td>
<td></td>
<td>“The Play’s the Thing” SEMAA lesson</td>
</tr>
<tr>
<td>Approximate Size</td>
<td>The Space Quiz Game</td>
<td></td>
<td>“Moon Phases” SEMAA lesson</td>
</tr>
<tr>
<td>Color</td>
<td><a href="http://www.pragogo.com/space/index.html">http://www.pragogo.com/space/index.html</a></td>
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<td>“Graphing the Stars” SEMMA Lesson</td>
</tr>
<tr>
<td>Composition</td>
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<td>Earth-moon-sun system</td>
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<td>Scale distance</td>
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<td>Surface conditions</td>
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<td>Compare</td>
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<td>Contrast</td>
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<td>Earth-centered model</td>
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<td>Sun-centered model</td>
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<tr>
<td>Aristotle</td>
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<td>Ptolemy</td>
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<td>Copernicus</td>
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<td>Galileo</td>
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<td>NASA</td>
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<td>Apollo missions</td>
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</tbody>
</table>

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## Force, Motion, and Energy

### 4.3 The student will investigate and understand the characteristics of electricity.

**Key concepts include**
- a) conductors and insulators;
- b) basic circuits (open/closed, parallel/series);
- c) static electricity;
- d) the ability of electrical energy to be transformed into heat, light, and mechanical energy;
- e) simple electromagnets and magnetism; and
- f) historical contributions in understanding electricity.

### 4.3 The student will investigate and understand the characteristics of electricity.

**Key concepts include**
- a) conductors and insulators;
- b) basic circuits;
- c) static electricity;
- d) the ability of electrical energy to be transformed into light and motion, and to produce heat;
- e) simple electromagnets and magnetism; and
- f) historical contributions in understanding electricity.

<table>
<thead>
<tr>
<th>Pacing / Time Frame</th>
<th>Unit</th>
<th>Essential Vocabulary</th>
<th>Technology Resources</th>
<th>Print Resources</th>
<th>Instructional notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd nine Weeks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 weeks</td>
<td></td>
<td>Electricity</td>
<td>4.3 Static Electricity</td>
<td>“Inventors” Enhanced Scope and Sequence</td>
<td>Use the SEMAA Electricity Bin to have students create circuits</td>
</tr>
<tr>
<td></td>
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<td>Conductor</td>
<td>Millionaire</td>
<td>“Circuits, Batteries, and Bulbs” Enhanced Scope and Sequence</td>
<td>Create an electromagnet using wire, iron nail and a battery</td>
</tr>
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<td></td>
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<td>Insulator</td>
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<td>Electrical circuit</td>
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<td>Closed circuit</td>
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<td>Differentiate</td>
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<td></td>
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<td>Dry cell</td>
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<td>Dry cell symbols (-) &amp; (+)</td>
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<td>Diagram</td>
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<td></td>
<td>Functioning</td>
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<td>Series circuit</td>
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<td>Parallel circuit</td>
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<td>Switches</td>
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## Content: Science

<table>
<thead>
<tr>
<th>Pacing / Time Frame</th>
<th>Unit</th>
<th>Essential Vocabulary</th>
<th>Technology Resources</th>
<th>Print Resources</th>
<th>Instructional notes</th>
</tr>
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<table>
<thead>
<tr>
<th>Pacing / Time Frame</th>
<th>Unit</th>
<th>Essential Vocabulary</th>
<th>Technology Resources</th>
<th>Print Resources</th>
<th>Instructional notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 weeks</td>
<td>4.3 continued</td>
<td>• construct a simple electromagnet using a wire, nail, or other iron-bearing object, and a dry cell. • design and perform an investigation to determine the strength of an electromagnet. (The manipulated independent variable could be the number of coils of wire and the responding dependent variable could be the number of paperclips the magnet can attract.) • describe the contributions of Ben Franklin, Michael Faraday, and Thomas Edison to the understanding and harnessing of electricity.</td>
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## Force, Motion, and Energy

4.2 The student will investigate and understand characteristics and interaction of moving objects. Key concepts include:
   a) motion is described by an object’s direction and speed;
   b) forces cause changes in motion;
   c) friction is a force that opposes motion; and
   d) moving objects have kinetic energy.

### Instructional notes
Create a ramp and use different materials to change the friction of a car rolling down it.

### Technology Resources
- Millionaire Kinetic Energy SOL 4.2
- Energy: Fling the Teacher
  - http://eclassroom.110mb.com/Games/energy.swf
- BBC: Force, Motion, Friction
  - http://www.bbc.co.uk/schools/ks2bitesize/science/

### Print Resources
- SOL 4.2 & 4.3 Study Guide
  - http://mal.sbohampton.k12.va.us/fourth/sci/sci3guide.htm
- Study Book on 4.2
  - http://www.augusta.k12.va.us/6687372584019/lib/6687372584019/files/SOL_Study_Book_4.2_force_and_Motion.doc

### List is continued on the next page
## Martinsville City Public Schools Curriculum & Pacing Guide

### Content: Science

<table>
<thead>
<tr>
<th>Pacing / Time Frame</th>
<th>Unit</th>
<th>Essential Vocabulary</th>
<th>Technology Resources</th>
<th>Print Resources</th>
<th>Instructional notes</th>
</tr>
</thead>
</table>

**Students will be able to:**
- describe the position of an object.
- collect and display in a table and line graph time and position data for a moving object.
- explain that speed is a measure of motion.
- interpret data to determine if the speed of an object is increasing, decreasing, or remaining the same.
- identify the forces that cause an object’s motion.
- describe the direction of an object’s motion: up, down, forward, backward.
- infer that objects have kinetic energy.
- design an investigation to test the following hypothesis: “If the mass of an object increases, then the force needed to move it will increase.”
- design an investigation to determine the effect of friction on moving objects. Write a testable hypothesis, and identify the dependent variable, the independent variable, and the constants. Conduct a fair test, collect and record the data, analyze the data, and report the results of the data.

Refer to the Curriculum Framework for actual lesson planning.  
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### Life Processes

#### 4.4 The student will investigate and understand basic plant anatomy and life processes. Key concepts include:
- a) the structures of typical plants (leaves, stems, roots, and flowers);
- b) processes and structures involved with reproduction (pollination, stamen, pistil, sepal, embryo, spore, and seed);
- c) photosynthesis (sunlight, chlorophyll, water, carbon dioxide, oxygen, and sugar); and
- d) dormancy.

#### 3rd nine weeks

#### 3 weeks

#### 4.4 The student will investigate and understand basic plant anatomy and life processes. Key concepts include:
- a) the structures of typical plants and the function of each structure;
- b) processes and structures involved with plant reproduction;
- c) photosynthesis; and
- d) adaptations allow plants to satisfy life needs and respond to the environment.

<table>
<thead>
<tr>
<th>Essential Vocabulary</th>
<th>Technology Resources</th>
<th>Print Resources</th>
<th>Instructional notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common plant</td>
<td>Rags to Riches</td>
<td>“Little Sprouts” Enhanced Scope and Sequence</td>
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<td>BBC Plants</td>
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<td></td>
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<td>“Photosynthesis” Enhanced Scope and Sequence</td>
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<tr>
<td>Model</td>
<td></td>
<td>“Flower Dissections” Enhanced Scope and Sequence</td>
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<td>Reproductive process</td>
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<td></td>
</tr>
</tbody>
</table>

List is continued on the next page

Dissect a daffodil to see the different reproductive parts of a flower
<table>
<thead>
<tr>
<th>Pacing / Time Frame</th>
<th>Unit</th>
<th>Essential Vocabulary</th>
<th>Technology Resources</th>
<th>Print Resources</th>
<th>Instructional notes</th>
</tr>
</thead>
</table>

**Students will be able to:**

- analyze a common plant: identify the roots, stems, leaves, and flowers, and explain the function of each.
- create a model/diagram illustrating the parts of a flower and its reproductive processes. Explain your model/diagram using the following terminology: pollination, (stamen, stigma, pistil, sepal, embryo, spore, ovary, ovule, seed).
- create a model/diagram illustrating the reproductive processes in typical flowering plants, and explain the processes.
- compare and contrast different ways plants are pollinated.
- explain that ferns and mosses reproduce with spores rather than seeds.
- explain the process of photosynthesis, using the following terminology: sunlight, chlorophyll, water, carbon dioxide, oxygen, and sugar.
- design an investigation to determine the relationship between the presence of sunlight and plant growth.
- explain the role of dormancy for adaptations of common plants to include dormancy, response to light, and response to moisture.

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### Living Systems

**4.5** The student will investigate and understand how plants and animals, including humans, in an ecosystem interact with one another and with the nonliving components in the ecosystem. Key concepts include

- a) plant and animal adaptations;
- b) organization of populations, communities, and ecosystems and how they interrelate;
- c) flow of energy through food webs;
- d) habitats and niches;
- e) changes in an organism’s niche at various stages in its life cycle; and
- f) influences of human activity on ecosystems.

**Essential Vocabulary**
- Ecology
- Structural adaptations
- Behavioral adaptations
- Organization of communities
- Flow of energy through food webs
- Habits and niches
- Life cycles
- Influence of human activity on ecosystems

**Technology Resources**
- BBC Food Chain
- iPad Ecosystem App

**Instructional notes**
- Have students create a food web with pictures and yarn

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## Martinsville City Public Schools Curriculum & Pacing Guide

**Content: Science**

**Grade Level: 4**

<table>
<thead>
<tr>
<th>Pacing / Time Frame</th>
<th>Unit</th>
<th>Essential Vocabulary</th>
<th>Technology Resources</th>
<th>Print Resources</th>
<th>Instructional notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3rd nine Weeks</strong></td>
<td>Living Systems</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3 weeks</strong></td>
<td></td>
<td>Food web</td>
<td>BrainPop: Ecosystems</td>
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<td>“What Can We Do?”</td>
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<td>Enhanced Scope and Sequence</td>
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**3rd nine Weeks**

**Living Systems**

4.5 continued

**Students will be able to:**

- distinguish between structural (physical) and behavioral adaptations.
- investigate and infer the function of basic adaptations and provide evidence for the conclusion.
- understand that adaptations allow an organism to succeed in a given environment.
- explain how different organisms use their unique adaptations to meet their needs.
- describe why certain communities exist in given habitats.
- illustrate the food webs in a local area.
- and compare and contrast the niches of several different organisms within the community.
- compare and contrast the differing ways an organism interacts with its surroundings at various stages of its life cycle. Specific examples include a frog and a butterfly.
- differentiate among positive and negative influences of human activity on ecosystems.

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<table>
<thead>
<tr>
<th>Pacing / Time Frame</th>
<th>Unit</th>
<th>Essential Vocabulary</th>
<th>Technology Resources</th>
<th>Print Resources</th>
<th>Instructional notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Earth Resources</strong></td>
<td></td>
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<td></td>
<td></td>
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</tr>
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<td>3rd nine weeks</td>
<td>4.8</td>
<td>The student will investigate and understand important Virginia natural resources. Key concepts include: a) watershed and water resources; b) animals and plants; c) minerals, rocks, ores, and energy sources; and d) forests, soil, and land.</td>
<td>Natural resources</td>
<td>Chesapeake Bay and its Watershed Web Quest</td>
<td>Take a nature walk and have the students take an inventory of what is in their environment.</td>
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<tr>
<td></td>
<td>4.9</td>
<td>The student will investigate and understand important Virginia natural resources. Key concepts include: a) watersheds and water resources; b) animals and plants; c) minerals, rocks, ores, and energy sources; and d) forests, soil, and land.</td>
<td>Human-made resources</td>
<td>NASA Science Files: The Case of the Disappearing Dirt</td>
<td>Students, after their nature walk, can talk about ways to prevent erosion, negative human impacts, etc.</td>
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<td>3 weeks</td>
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**Students will be able to:**
- compare and contrast natural and human-made resources.
- distinguish among rivers, lakes, and bays; describe characteristics of each; and name an example of each in Virginia.
- create and interpret a model of a watershed. Evaluate the statement: “We all live downstream.”
- identify watershed addresses.
- recognize the importance of Virginia’s mineral resources, including coal, limestone, granite, and sand and gravel.
- appraise the importance of natural and cultivated forests in Virginia.
- describe a variety of soil and land uses important in Virginia.
## Content: Science

### Grade Level: 4

<table>
<thead>
<tr>
<th>Pacing / Time Frame</th>
<th>Unit</th>
<th>Essential Vocabulary</th>
<th>Technology Resources</th>
<th>Print Resources</th>
<th>Instructional Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interrelationships in Earth/Space Systems</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4th nine Weeks</td>
<td>3 weeks</td>
<td>4.6 The student will investigate and understand how weather conditions and phenomena occur and can be predicted. Key concepts include: a) weather measurements and meteorological tools (air pressure – barometer, wind speed – anemometer, rainfall – rain gauge, and temperature – thermometer); and b) weather phenomena (fronts, clouds, and storms).</td>
<td>Weather conditions, Weather patterns, Phenomena, Predict, Thermometer, Air temperature, Air pressure, Barometer, High pressure, Low pressure, Air masses, Warm front, Cold front, Clouds, Cirrus, Stratus</td>
<td>SOL Weather Matching Game <a href="http://www.quia.com/cm/81172.html">http://www.quia.com/cm/81172.html</a></td>
<td>“Air Matters” SEMAA lesson</td>
</tr>
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<td>Harcourt Science Virginia SOL Support for Students p. 45-48</td>
</tr>
</tbody>
</table>

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### Interrelationships in Earth/Space Systems

4.6 continued

**Students will be able to:**
- **use a thermometer** design an investigation in which a thermometer is used to compare air temperatures over a period of time.
- analyze the changes in air pressure occurring over time, using a barometer, and predict what the changes mean in terms of changing weather patterns.
- illustrate and label high and low pressures on a map.
- differentiate between the types of weather associated with high and low pressure air masses. Illustrate and label high and low pressure air masses and warm and cold fronts.
- differentiate between cloud types (i.e., cirrus, stratus, cumulus, and cumulonimbus clouds) and the associated weather.
- compare and contrast the formation of different types of precipitation (e.g., rain, snow, sleet, and hail).
- recognize a variety of storm types, describe the weather conditions associated with each, and explain when they occur (e.g., thunderstorms, hurricanes, and tornadoes).
- analyze and report information about temperature and precipitation on weather maps.
- measure wind speed, using an anemometer.
- measure precipitation with a rain gauge.
- design an investigation in which weather data are gathered using meteorological tools and charted to make weather predictions.

<table>
<thead>
<tr>
<th>Essential Vocabulary</th>
<th>Technology Resources</th>
<th>Print Resources</th>
<th>Instructional notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Cumulus</td>
<td>- Weather Patterns</td>
<td>- SOL 4.6 Study Book</td>
<td>Refrigerator Cards SOL 4.6</td>
</tr>
<tr>
<td>- Cumulonimbus</td>
<td>- Matching Game</td>
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</tr>
</tbody>
</table>
## Martinsville City Public Schools Curriculum & Pacing Guide

### Content: Science

### Grade Level: 4

<table>
<thead>
<tr>
<th>Pacing / Time Frame</th>
<th>Unit</th>
<th>Essential Vocabulary</th>
<th>Technology Resources</th>
<th>Print Resources</th>
<th>Instructional notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>4th nine Weeks</td>
<td>All Units</td>
<td>See previous vocabulary lists for each Science SOL</td>
<td>See previous technology resources for each Science SOL</td>
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<tr>
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<td>4.1 – 4.9 Cumulative Review</td>
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</tr>
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Highlighted Material=2003 Standards Only (will be removed- Summer 2012)

Underlined Material= New to 2010 Standards (Field tested in 2011-2012, SOL tested in 2013)
Martinsville City Public Schools Technology Resources

Content: Science

Based on the 2010 Science SOLs

Grade Level: 4

Some general links:

Rockingham County Public Schools
http://www.rockingham.k12.va.us/resources/elementary/4science.htm#1sol

STAR: Suffolk Teaching Activities and Resources
http://star.spsk12.net/science/science_04.htm

MacDougal Littell CLASSZONE

GCPS 4th Grade Science Resources
http://gets.gc.k12.va.us/elementary/science4.htm

4th Grade Science Reviews
http://www.salem.k12.va.us/staff/jcox/powerpoints/science.htm

Internet4Classrooms
http://www.internet4classrooms.com/skills_4th_science.htm

Science Tests & Resources
http://www.quia.com/pages/hostetterssciencecs.html

4th Grade Science Links
http://teachers.cr.k12.de.us/~galgano/4science.htm

Science: Mrs. Hammersley – 4th Grade Science Activities
http://www.quia.com/pages/sciencemrshammersley.html

4th Grade Science Activities – Culpepper Schools
http://www.culpeperschools.org/hammersley/science.html

SOL Teacher: 4th Grade Science
https://sites.google.com/a/solteacher.com/solteacher-com/home/4th-grade/4th-grade-science

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Learning for All; Whatever it Takes

Specific Links based on Science SOLs:

Science 4.1 – Also see other technology resources listed in the Curriculum Guide

- **BrainPop.com**

- **SOL Pass Scientific Method: Walk the Plank**
  [http://www.solpass.org/5s/Games/ScientificMethodPlank.html](http://www.solpass.org/5s/Games/ScientificMethodPlank.html)

- **Quia – Scientific Method: Ordering Activity**

- **McGraw-Hill – BrainPop: Scientific Methods**

- **Create a Graph**

- **UnitedStreaming.com**
  - The Magic School Bus Shows and Tells

- **Put it to the Test (song)**
  [http://www.youtube.com/watch?v=9kf51FpBuXQ](http://www.youtube.com/watch?v=9kf51FpBuXQ)

Science 4.2 – Also see other technology resources listed in the Curriculum Guide

- **BrainPop.com**

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- **Underlined Material**: New to 2010 Standards (Field tested in 2011-2012, SOL tested in 2013)
Science 4.2 - continued

Energy SOL SMARTBoard Notebook
http://www.rockingham.k12.va.us/resources/elementary/files/energy.notebook

Force, Motion, and Energy Senteo Test
http://www.rockingham.k12.va.us/resources/elementary/files/4forcemotionenergytestsenteo.notebook

Energy Transformation
http://www.exchange.smarttech.com/details.html?id=3e268036152057fc820bdc601bdaa94d169ac3224381016ed5216990b255051a

Electricity Jeopardy
http://www.rockingham.k12.va.us/resources/elementary/files/electricityjeopardy.ppt

Energy and Machines PowerPoint
http://www.salem.k12.va.us/staff/jcox/powerpoints/energyMachines.ppt

Kinetic vs. Potential Energy
http://www.hazelwood.k12.mo.us/~cdavis01/map2000/5th/eric03.ppt

The Magic School Bus: Getting Energized

Force, Motion, and Energy PowerPoint
http://www.spsk12.net/departments/STAR/science/4/sol%204.2%20fme.ppt

BBC Forces & Actions
http://www.bbc.co.uk/schools/scienceclips/ages/10_11/forces_action_fs.shtml

BBC Friction
http://www.bbc.co.uk/schools/scienceclips/ages/8_9/friction_fs.shtml
Science 4.3 – *Also see other technology resources listed in the Curriculum Guide*

**Hot Line: All About Electricity**


**BrainPop.com**


**BBC Magnets & Springs**

[http://www.bbc.co.uk/schools/scienceclips/ages/7_8/magnets_springs.shtml](http://www.bbc.co.uk/schools/scienceclips/ages/7_8/magnets_springs.shtml)

**BBC Changing Circuits**

[http://www.bbc.co.uk/schools/scienceclips/ages/10_11/changing_circuits_fs.shtml](http://www.bbc.co.uk/schools/scienceclips/ages/10_11/changing_circuits_fs.shtml)

**BBC Circuits & Conductors**

[http://www.bbc.co.uk/schools/scienceclips/ages/8_9/circuits Conductors_fs.shtml](http://www.bbc.co.uk/schools/scienceclips/ages/8_9/circuits Conductors_fs.shtml)
Science 4.3 - continued

**UnitedStreaming.com**
- The Magic School Bus: Batteries and Electricity
- The Magic School Bus Gets Charged
- The Magic School Bus: Getting Energized

**Bill Nye the Science Guy: Static Electricity**
[http://www.youtube.com/watch?v=Z-77IzaXGcg](http://www.youtube.com/watch?v=Z-77IzaXGcg)

Science 4.4 – *Also see other technology resources listed in the Curriculum Guide*

**Plant Parts SMARTboard Lesson**

**Flowers Instructional**

**Label the Flower Structure**

**Pollination Instructional**

**Structure of Plants Instructional**
[http://www.rockingham.k12.va.us/resources/elementary/files/Radfordcollege/SOL44aStructuresplants.notebook](http://www.rockingham.k12.va.us/resources/elementary/files/Radfordcollege/SOL44aStructuresplants.notebook)

**Plant Parts and Life Cycles Review**
[http://www.exchange.smarttech.com/details.html?id=23fc329749c999c54e80512050a2f856468ea8d6c29e3b8958b73894df94ee0c](http://www.exchange.smarttech.com/details.html?id=23fc329749c999c54e80512050a2f856468ea8d6c29e3b8958b73894df94ee0c)
Science 4.4 – continued

**BrainPop.com**

**Seeds Sprouting Video**

**A World Without Photosynthesis**

**Web Quest on Plants**
[http://laika.ed.csuohio.edu/SUM00/ETE567/plants/plants2.htm](http://laika.ed.csuohio.edu/SUM00/ETE567/plants/plants2.htm)

**Science Labeling Game: Structure of a Flower**

**BBC Plant Life Cycle**
[http://www.bbc.co.uk/schools/scienceclips/ages/9_10/life_cycles_fs.shtml](http://www.bbc.co.uk/schools/scienceclips/ages/9_10/life_cycles_fs.shtml)

**UnitedStreaming.com**
- The Magic School Bus Goes to Seed

**Photosynthesis (song)**
[http://www.youtube.com/watch?v=LgYPeeABoUs&feature=related](http://www.youtube.com/watch?v=LgYPeeABoUs&feature=related)
Science 4.5 – Also see other technology resources listed in the Curriculum Guide

BrainPop.com
- Behavior [http://www.brainpop.com/science/ecologyandbehavior/behavior/]
- Camouflage [http://www.brainpop.com/science/ecologyandbehavior/camouflage/]
- Ecosystems [http://www.brainpop.com/science/ecologyandbehavior/ecosystems/]
- Extinction [http://www.brainpop.com/science/ourfragileenvironment/extinction/]
- Food Chains [http://www.brainpop.com/science/ecologyandbehavior/foodchains/]
- Migration [http://www.brainpop.com/science/ecologyandbehavior/migration/]

Animal Adaptations
[http://www.nisd.net/lockehill/webquests/animalsadapt/animaladapt.htm]

BBC Interdependence and Adaptation
[http://www.bbc.co.uk/schools/scienceclips/ages/10_11/interdependence_fs.shtml]

Fun With Food Webs
[http://www.harcourtschool.com/activity/food/food_menu.html]

Food Chains
[http://www.bbc.co.uk/schools/ks2bitesize/science/living_things/food_chains/play.shtml]

How Animals Meet Their Needs
[http://www.harcourtschool.com/activity/animalneeds/]

UnitedStreaming.com
- The Magic School Bus In the City
- The Magic School Bus in the Arctic
- The Magic School Bus in the Rain Forest
- The Magic School Bus Goes Upstream
- The Magic School Bus Hops Home
- The Magic School Bus: All Dried Up
- The Magic School Bus Meets the Rot Squad

It’s the Food Web (song)
[http://www.youtube.com/watch?v=sbWyrcY5i3s]
Science 4.5 – continued

Food Chain Information & Game
http://www.sheppardsoftware.com/content/animals/kidscorner/games/foodchaingame.htm
http://www.sheppardsoftware.com/content/animals/kidscorner/foodchain/foodchain.htm

Carnivores, Herbivores, and Omnivores Information & Game
http://www.sheppardsoftware.com/content/animals/kidscorner/games/producersconsumersgame.htm
http://www.sheppardsoftware.com/content/animals/kidscorner/games/animaldietgame.htm
http://www.sheppardsoftware.com/content/animals/kidscorner/animaldiet/omnivore.htm

Life Cycles – Game & Movie

Science 4.6 – Also see other technology resources listed in the Curriculum Guide

BrainPop.com
Weather http://www.brainpop.com/science/weather/weather/
Wind http://www.brainpop.com/science/weather/wind/
Hurricanes http://www.brainpop.com/science/weather/hurricanes/
Thunderstorms http://www.brainpop.com/science/weather/thunderstorms/
Tornadoes http://www.brainpop.com/science/weather/tornadoes/
Clouds http://www.brainpop.com/science/weather/clouds/
Snowflakes http://www.brainpop.com/science/weather/snowflakes/
Temperature http://www.brainpop.com/science/energy/temperature/
Humidity http://www.brainpop.com/science/weather/humidity/
Natural Disasters http://www.brainpop.com/science/earthsystem/naturaldisasters/

Refer to the Curriculum Framework for actual lesson planning.  New SOLs must be taught along with highlighted standards in 2011-2012
Highlighted Material=2003 Standards Only (will be removed- Summer 2012)
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BBC: What is Weather?  
http://www.bbc.co.uk/schools/whatisweather/aboutweather/flash_menu.shtml

Compare and Contrast Warm and Cold Fronts  

iPad Weather Bug  

The Weather Channel  
http://www.weather.com

Weather SOL Review SMARTBoard  
http://www.rockingham.k12.va.us/resources/elementary/files/WeatherReview46.notebook

Hurricanes Instructional  
http://www.rockingham.k12.va.us/resources/elementary/files/RadfordCollege/SOL46hurricanes.notebook

Cirrus and Cumulus Clouds Instructional  
http://www.rockingham.k12.va.us/resources/elementary/files/Radfordcollege/SOL46cirrcuscumulusclouds.notebook

Thunderstorms and Tornados Instructional  
http://www.rockingham.k12.va.us/resources/elementary/files/Radfordcollege/SOL46cirrcuscumulusclouds.notebook

About Clouds Instructional  
http://www.rockingham.k12.va.us/resources/elementary/files/4aboutclouds.notebook

Anemometers and Wind Speed Instructional  
http://www.rockingham.k12.va.us/resources/elementary/files/Radfordcollege/SOL46anemometerswindspeed.notebook

Differentiate Cloud Types  
http://www.rockingham.k12.va.us/resources/elementary/files/Radfordcollege/SOL46Differentiatebetweencloudtypes.notebook

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Science 4.6 – continued

Using Barometers Instructional
http://www.rockingham.k12.va.us/resources/elementary/files/Radfordcollege/SOL46usingbarometers.notebook

Weather Jeopardy Game
http://www.rockingham.k12.va.us/Resources/elementary/files/weatherreview.ppt

SOL Weather Jeopardy

Weather Vocabulary Instructional

Forecasting and Weather Instruments

Weather Experiments
http://weatherwizkids.com/weather-experiments.htm

Weather Chart
http://www.rockingham.k12.va.us/resources/elementary/files/4weatherchartwall.notebook

Captivating Clouds Web Quest
http://www.bristolvaschools.org/mwarren/cloudquest.htm

Web Weather for Kids
http://eo.ucar.edu/webweather/

EdHeads: Weather
http://www.edheads.org/activities/weather/frame_loader.htm

UnitedStreaming.com
The Magic School Bus: Wet All Over
The Magic School Bus Kicks Up a Storm

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Science 4.7 – *Also see other technology resources listed in the Curriculum Guide*

**BrainPop.com**

**Apples 4 The Teacher: Interactive Solar System**
[http://www.apples4theteacher.com/starwarp2.html](http://www.apples4theteacher.com/starwarp2.html)

**Our Solar System – Kids Astronomy**
[http://www.kidsastronomy.com/solar_system.htm](http://www.kidsastronomy.com/solar_system.htm)

**The Solar System – Mrs. Renz 4th Grade Science**
[http://www.mrsrenz.net/solarsystem.htm](http://www.mrsrenz.net/solarsystem.htm)

**Star Child**

**Cool Cosmos**
[http://coolcosmos.ipac.caltech.edu/cosmic_kids/AskKids/](http://coolcosmos.ipac.caltech.edu/cosmic_kids/AskKids/)

**Blast Off on a Trip into Our Solar System!**

**Windows 2 The Universe**
[http://www.windows2universe.org/our_solar_system/solar_system.html](http://www.windows2universe.org/our_solar_system/solar_system.html)

**UnitedStreaming.com**
- The Magic School Bus: Out of this World
- The Magic School Bus Gets Lost in Space
Science 4.7 – continued

**Animaniacs: Our Solar System Song**
http://www.youtube.com/watch?v=s8eFFnJsCjs

Science 4.8 – *Also see other technology resources listed in the Curriculum Guide*

**BrainPop.com**
- Sun  http://www.brainpop.com/science/space/sun/
- Moon  http://www.brainpop.com/science/space/moon/
- Apollo Project  http://www.brainpop.com/science/space/apolloproject/
- Telescopes  http://www.brainpop.com/science/space/telescopes/

**Lunar Phases Interactive**
http://highered.mcgraw-hill.com/sites/007299181x/student_view0/chapter2/lunar_phases_interactive.html

**Lunar Phases**
http://highered.mcgraw-hill.com/olcweb/cgi/pluginpop.cgi?it=swf::800::600::/sites/dl/free/007299181x/78778/Lunar_Nav.swf::Lunar%20Phases%20Interactive

**The Earth’s Tilt & The Seasons Millionaire Game**
http://www.quia.com/rr/37247.html

**Moon and Earth Matching Game**
http://www.quia.com/jg/338645.html

**Put the Phases of the Moon in Order**
http://www.quia.com/rd/11413.html

**Moon Phases – Definitions & Pictures**
http://www.quia.com/jg/431146.html

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Science 4.8 – continued

Phases of the Moon - Harcourt

Earth, Sun, and Moon
http://www.bbc.co.uk/schools/ks2bitesize/science/physical_processes/earth_sun_moon/play.shtml

Moon Phases Instructional
http://www.rockingham.k12.va.us/resources/elementary/files/RadfordCollege/SOL47moonphases.notebook

Rotation and Revolution of Earth and Moon Instructional

Moon Base Alpha Game – NASA
http://www.nasa.gov/offices/education/programs/national/ltp/games/moonbasealpha/index.html

Sun Instructional
http://www.rockingham.k12.va.us/resources/elementary/files/Radfordcollege/SOL47Sun.notebook

Moon Cycles
http://www.rockingham.k12.va.us/resources/elementary/files/4mooncycles.notebook

Aristotle and Ptolemy Instructional
http://www.rockingham.k12.va.us/resources/elementary/files/Radfordcollege/SOL47aristotleptolemy.notebook

Earth, Moon, and Sun PowerPoint

SOL Jeopardy
http://www.rockingham.k12.va.us/Resources/elementary/files/solarsys.ppt

4.7 Instructional
http://www.rockingham.k12.va.us/resources/elementary/files/moon.notebook

Earth, Moon, and Sun Instructional SOL PowerPoint
http://www.augusta.k12.va.us/66877372584019/lib/66877372584019/_files/Earth_and_Moon.ppt
Science 4.8 – continued

Moon Phases Pictures PowerPoint
http://www.spsk12.net/departments/STAR/science/4/PhaseoftheMoon.ppt

Earth, Moon, Sun SOL Review

Earth Patterns, Cycles, and Changes Vocabulary PowerPoint
http://www.spsk12.net/departments/STAR/science/4/sc4.7_Earth%20Patterns,%20Cycles.ppt

A Closer Look at Space: Earth
http://player.discoveryeducation.com/index.cfm?guidAssetId=0304D77C-109C-4D4B-B80B-A84CCE27EB9F&blnFromSearch=1&productcode=US

Reasons for the Seasons

Why Does the Sun Shine? (song)
http://www.youtube.com/watch?v=Zbgul1NpEA8

Science 4.9 – Also see other technology resources listed in the Curriculum Guide

BrainPop.com
Natural Resources http://www.brainpop.com/science/ourfragileenvironment/naturalresources/
Water Pollution http://www.brainpop.com/science/ourfragileenvironment/waterpollution/
Fossil Fuels http://www.brainpop.com/technology/energytechnology/fossilfuels/

Virginia Naturally
http://www.vanaturally.com/guide/agriculture.html
Science 4.9 – continued

Virginia Watersheds

Natural Resources
http://www.rockingham.k12.va.us/resources/elementary/files/naturalresourcesSB.notebook

Important Natural Resources
http://www.rockingham.k12.va.us/resources/elementary/files/Radfordcollege/SOL48ImportanceNaturalResources.notebook

Watershed SMARTBoard
http://www.rockingham.k12.va.us/resources/elementary/files/Radfordcollege/SOL48Watersheds.notebook

Coal and Limestone Instructional
http://www.rockingham.k12.va.us/resources/elementary/files/Radfordcollege/SOL48CoalandLimestone.notebook

Instructional PowerPoint
http://www.rockingham.k12.va.us/resources/elementary/files/48science.ppt

Mineral Instructional
http://www.augusta.k12.va.us/66871258415627/lib/66871258415627/Chapter_4_-_Minerals_new.ppt

The Biggest Treasure Chest: Our Natural Resources
http://www.unitedstreaming.com/search/assetDetail.cfm?guidAssetID=488B01B6-AA0F-4055-B404-17CA7A871683&rand=E8B756F9-19BB-2E77-32B40C8C8BABBBA17

Learning about Natural Resources
http://www.unitedstreaming.com/search/assetDetail.cfm?guidAssetID=2C0D0AA6-C2A6-40DE-8143-7E62BE406ECB

The Watershed Game
http://www.bellmuseum.org/distancelearning/watershed/watershed2.html

UnitedStreaming.com
The Magic School Bus Gets Swamped
The Magic School Bus Rocks and Rolls
Martinsville City Public Schools Print Resources

Content: Science  
Grade Level: 4

Based on the 2010 Science SOLs

Science 4.1 – Also see other print resources listed in the Curriculum Guide

Sciencea-z.com
“What is a Hypothesis”
“Observations vs. Inferences”
“Identify and Control Variables”

Science 4.2 – Also see other print resources listed in the Curriculum Guide

Enhanced Scope and Sequence
“Where am I?”
“Investigating Motion, Using the Incline Plane”
“On Your Mark!/Start Your Engines”
“May the Force Be with You”

Dinah Zike’s Big Book of Science
“Energy” p. 61
“Friction” p. 65

Harcourt Science Virginia SOL Support for Students
Kinetic Energy p. 61
Science 4.2 – continued

_Harcourt Science WORKBOOK_
“Motion—Forces at Work” p. WB314-331

_Harcourt Science Text_
“Motion—Forces at Work” p. F36-65

Science 4.3 – Also see other print resources listed in the Curriculum Guide

_Harcourt Science Virginia SOL Support for Students_
Virginia’s Energy Resources p. 39-42

Sciencea-z.com
“Heat Energy”
“Energy Resources”
“Light”
“Electricity and Magnetism”

Science 4.4 – Also see other print resources listed in the Curriculum Guide

_The NASA Sci Files_
The Case of the Prize-Winning Plants

_Dinah Zike’s Big Book of Science_
“Angiosperms” (Plants) p. 46
“Flowers” p. 64
“Plants” p. 91
“Sun” p. 104

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Science 4.4 – continued

Harcourt Science Virginia SOL Support for Students
    Virginia’s Plants p. 11-16
    Plant Growth Cycles p. 43-44

Harcourt Science WORKBOOK
    “Plant Growth and Adaptations” p. WB42-59

Harcourt Science Text
    “What are Plants with Seeds?” p. A18-A23
    “Plant Growth and Adaptations” p. A68-93

Sciencea-z.com
    “The Wonderful World of Plants”

Science 4.5 – Also see other print resources listed in the Curriculum Guide

The NASA Sci Files
    The Case of the Zany Animal Antics

The NASA “Why?” Files
    The Case of the Inhabitable Habitat

Harcourt Science WORKBOOK
    “Animal Growth and Adaptations” p. WB24-41
    “Ecosystems” p. WB78-105

Harcourt Science Text
    “Animal Growth and Adaptations” p. A36-67
    “Ecosystems” p. B2-B47

Harcourt Science Virginia SOL Support for Students
    Virginia’s Animals p. 5-10
Science 4.5 – continued

Sciencea-z.com
“Life Cycles”
“Habitats/Environment”
“Food Chains”
“Adaptations”

Science 4.6 – Also see other print resources listed in the Curriculum Guide

Enhanced Scope and Sequence
   Precipitation and Temperature
   Name that Cloud
   Air Pressure
   Storm Warning

Dinah Zike’s Big Book of Science
   “Tornadoes” p. 108
   “Weather” p. 113

Harcourt Science WORKBOOK
   “Weather Conditions” p. WB160-177

Harcourt Science Text
   “Weather Conditions” p. D2-D29

Experiment with Weather Information sheets
   http://teacher.scholastic.com/activities/wwatch/gather_data/

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Science 4.6 – continued

**Readinga-z.com**
- “Severe Weather”
- “Violent Weather”
- “Storm Chasers”
- “Hurricanes”

**Sciencea-z.com**
- “Clouds, Winds, and Storms”

**SEMMAA Atmospheric Detectives**
- “Clouds in a Bottle” p. 11

Science 4.7 – *Also see other print resources listed in the Curriculum Guide*

**Dinah Zike’s Big Book of Science**
- Planets: “Mercury” through “Neptune” p. 86-89

**Harcourt Science Virginia SOL Support for Students**
- How People Have Viewed the Solar System p. 55-60

**Harcourt Science WORKBOOK**
- “Planets and Other Objects in Space” p. WB196-218

**Readinga-z.com**
- “Our Solar System”
- “Venus: Beauty and Beast”
- “Jupiter’s Secrets Revealed”

**Solar System Coloring Book**

**Sciencea-z.com**
- “The Solar System”
Science 4.8 – Also see other print resources listed in the Curriculum Guide

SOL Study Book
http://www.augusta.k12.va.us/6687372584019/lib/6687372584019/_files/SOL_Study_Book_4.7_Earth_Patterns.doc

Refrigerator Cards SOL 4.7
http://www.rockingham.k12.va.us/resources/elementary/files/RefrigeratorCard47.pdf

Dinah Zike’s Big Book of Science
“Moon” p. 81

Reading A-Z
“The Sun”
“The Sun, Earth, and Moon”

Science 4.9 – Also see other print resources listed in the Curriculum Guide

Refrigerator Cards

SEMAA Lesson – Blue Notebook
“Forests”
“Virginia’s Natural Resources”

Dinah Zike’s Big Book of Science
“Erosion and Deposition” p. 62
“Weathering and Erosion” p. 114
Science 4.9 – continued

Harcourt Science Virginia SOL Support for Students
Virginia’s Watershed p. 17-22
Virginia’s Water Resources 23-26
Virginia’s Soil p. 27-30
Virginia’s Forests p. 31-34
Virginia’s Rocks and Minerals p. 35-38

Harcourt Science WORKBOOK
“Protecting Ecosystems” p. WB106-123

Harcourt Science Text
“Protecting Ecosystems” p. B48-78
Science 4.1

Analyze- to study something in order to understand it
Bar graph- a graph that uses rectangles to show data
Cause & Effect- when one thing leads to another thing happening
Celsius- metric unit of measuring heat
Centimeter- metric unit of length
Characteristic- special quality; trait
Conclusion- a statement that a person thinks is true based on the results of an investigation
Constant- things in an experiment that are purposefully not changed but remain the same throughout the experiment
Contradictory- not matching what you think it should be
Data- information
Dependent variable- the result a scientist gets from changing the independent variable
Elapsed time- the amount of time that has passed
Evidence- proof
Experiment- a fair test driven by a hypothesis
Fair test- a carefully controlled test in which only one variable is compared
Gram- metric unit of mass (light things)
Hypothesis- an educated guess or prediction about what will happen based on what you already know and what you have learned from your research; must be “testable”
Independent variable- a condition that a scientist changes in different parts of an experiment
Inference- an explanation that is based on what you know and observe
Judge- to evaluate and make a decision about
Kilogram- metric unit of mass (heavy things)
Kilometer- metric unit of distance
Line graph- a chart in which line segments join points representing different values
Liters- metric unit of liquid volume
Meter- metric unit of length
Milliliter- metric unit of liquid volume
Millimeter- metric unit of length
Observation- a clear description using one or more of the senses to identify an object or an event
Organize- to unite or put in order; classify
Physical- something you can touch
Picture graph- a chart using pictures
Prediction- an educated guess about a future event
Properties- observable characteristics
Qualitative data- deal with descriptions and data that can be observed, but not measured; describes
Quantitative data- data that can be counted or measured and the results can be recorded using numbers; defines
Results- information obtained by a scientific investigation
Scientific Investigation- the method of using specific steps to test a hypothesis
Statement- a record of an activity
Unusual- uncommon
Variable- something that can change, or vary, in an experiment

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Science 4.2

Analyze- to study or find out about  
Backward- toward a position behind  
Cause- what leads something else to happen  
Collect- to gather  
Data- information  
Decreasing- getting smaller  
Direction- the path that a moving object follows  
Display- show  
Down- toward a lower position  
Effect- what happens due to a cause  
Force- a push or pull  
Forward- toward a position in front  
Friction- a force that acts between two surfaces that touch or rub together  
Increasing- getting bigger  
Infer- to explain based on what you know and observe  
Kinetic energy- the energy of movement  
Mass- the amount of matter that makes up an object  
Motion- movement or change in position of an object  
Position- the place where something is located  
Record- to write down information  
Report- to tell about  
Results- information obtained by a scientific investigation  
Speed- the measure of how far an object moves in a certain amount of time
Learning for All; Whatever it Takes

**Table** - an arrangement of facts and figures

**Testable** - able to be tested in a scientific experiment

**Up** - toward a position above

### Science 4.3

**Appliance** - a household item that runs on electricity such as a toaster or blender

**Attract** - to pull toward

**Ben Franklin** - conducted an experiment that proved electricity was in lightning

**Bulb holder** - what hold the light bulb in place

**Bulb** - a device that uses electricity to light up

**Circuit** - a pathway taken by an electric current

**Closed circuit** - allows the movement of electrical energy

**Coils** - wire wrapped around an iron-bearing material

**Conductor** - a material that electricity flows through easily

**Diagram** - a drawing or chart that makes something easier to understand

**Differentiate** - to tell the difference between

**Dry cell** - a small battery

**Dry cell symbol** (-) – negative charge

**Dry cell symbol** (+) – positive charge

**Electric motor** - a machine that uses electromagnets to do work; changes electric energy into mechanical energy

**Electricity** - a form on energy found in nature or created by generators/ rubbing certain objects together

**Electromagnet** - a magnet that is made by using electrical current (can be created by wrapping a wire around certain iron-bearing metals and creating a closed circuit)

**Energy** - the ability to do work or cause change

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Functioning - doing its job; working
Generated - brought into existence
Harness – to capture
Insulator - a material that electricity does not flow through easily
Iron-bearing object - a material that has iron in it to make it magnetic (ex: iron nail)
Lightning - the discharge of static electricity in the atmosphere
Magnet - a piece of metal that can pull some other metal objects toward itself
Magnetic field - the area around a magnet where it can pull or push
Mechanical energy - the energy of motion used to do work
Michael Faraday - inventor of the electromagnet and electric motor
Open circuit - prevents the movement of electrical energy
Parallel circuit - an electrical circuit in which two or more devices are connected to one source in separate loops
Permanent magnet - a magnet that will always be charged
Radiant energy - the energy of electromagnetic waves
Repel - to push away
Series circuit - an electrical circuit in which two or more devices are connected to a source in one loop
Static electricity - a buildup of electric charge on an object (can be created by rubbing certain materials together)
Strength - how strong something is
Switch - can close or open a circuit
Thermal energy - heat energy
Thomas Edison - inventor of the light bulb
Transform - to change
Weak - not strong
Wires - a line of wire for conducting electrical current

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Science 4.4

Adaptation- a special trait that helps an organism survive
Analyze- to find out about
Carbon dioxide- a gas that animals breathe out and plants breathe in
Chlorophyll- a green material in plants that traps the energy of sunlight
Diagram- a picture that shows information
Dormancy- a period when a living thing is not active or growing
Embryo- a tiny plant inside a seed
Fern- a kind of plant with fronds that reproduces with spores
Flower- a plant part in which seeds form
Function- what it does
Leaf- a plant part that uses sunlight to make food for a plant
Model- to show
Moss- a kind of plant that grows in patches (like carpeting) that reproduces with spores
Oxygen- a gas that plants breathe out and animals breathe in
Parts of a flower- special parts that have their own function
Photosynthesis- the process by which plants use the energy of sunlight to make their own food
Pistil- the female part of a flower
Pollination- the process in which pollen moves from a stamen to the pistil of a flower
Reproductive process- how an organism makes more of its own kind
Response to light- a plant’s need of light energy
Response to moisture- a plant’s need of water
Root- a plant part that takes in water and nutrients from the soil
Seed- a plant part that contains a tiny new plant; the seed protects the new plant and contains food to help it start growing

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**Sepal** - green, leafy part at the base of a flower that helps protect it while it buds

**Spore** - a tiny plant cell that can grow into a new plant (ferns and mosses reproduce with spores)

**Stamen** - the male part of a flower

**Stem** - a plant part that moves water and nutrients from the roots to the leaves and other parts of the plant; also supports the leaves, flowers, and fruit

**Stigma** - the upper part of the pistil of a flower which receives the pollen grains and on which they start to grow

**Sugar** - food that a plant makes for itself

**Sunlight** - light energy from the sun

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**Science 4.5**

**Adaptation** - a special trait that helps an organism survive

**Behavioral adaptations** - actions that an organism does that help it survive

**Carnivore** - a consumer that eats only animals

**Community** - all the different populations that live in the same place at the same time

**Consumer** - any organism that eats the food producers make or eats other consumers

**Decomposer** - an organism that breaks down wastes and the remains of dead organisms

**Distinguish** - tell the difference between

**Ecology** - the study of how living and nonliving things interact

**Ecosystem** - the populations and nonliving things in an environment that interact with each other

**Environment** - the surroundings of an organism (living and nonliving)

**Exist** - to continue to be; to be real

**Food web** - the whole group of interacting food chains in a community
Function- a job; what it does
Habitat- the place or kind of place in which an animal or plant naturally lives; provides everything it needs to survive: food, water, shelter, safety.
Herbivore- a consumer that eats only plants
Human activity- what people do that affects their environment
Infer- to arrive at as a conclusion
Interact- to come together and have an effect on each other
Investigate- explore; find out about
Life cycle- the stages of growth and change of an organisms life
Needs- what you require to survive
Negative influences- bad changes
Niche- the part that a particular living thing plays in a community
Omnivore- a consumer that eats both plants and animals
Organism- any living thing
Population- all the organisms of the same species that live in the same place at the same time
Positive influences- good changes
Predator- an organism that lives by preying on other organisms
Producer- an organism, such as a plant, that makes its own food
Stages- steps in a process or development
Structural (physical) adaptations- features of an organism’s body that help it survive
Surroundings- the things around you
Unique- special or different
Science 4.6
Air mass- a large body of air that has the same temperature and humidity throughout
Air pressure- the weight of the atmosphere pressing in all directions at a certain place
Air temperature- how warm the air is
Anemometer- a tool that measures wind speed
Associated weather- weather that usually goes along with certain clouds
Barometer- a tool that measures air pressure
Chart- graph
Cirrus cloud- a high, wispy feathery cloud made up of ice crystals; associated with fair weather; often indicate that rain or snow will fall within several hours
Cloud- a mass of tiny water droplets or ice crystals
Cold front- a cold air mass bumps up against a warm air mass; causes strong winds; thunderstorms or snowstorms are likely; when a cold front passes, the temperature drops; represented on a weather map with triangles
Cumulo-nimbus- a tall dark cloud that produces rain and thunderstorms (sometimes called a thunderhead)
Cumulus cloud- a fluffy white cloud with a flat bottom that is seen in nice weather
Formation- the forming of or creation of
Front- the boundary between air masses of different temperature and humidity
Hail- small lumps of ice that fall from clouds sometimes during thunderstorms
High pressure- usually brings fair weather; represented on a weather map with an “H”
Hurricane- a large storm with very high winds and heavy rain
Low pressure- usually brings storms; represented on a weather map with an “L”
Meteorological tools- instruments used to help predict weather
Meteorologist- a scientist who gathers data by using a variety of instruments
Phenomena- an event
Precipitation- water that falls to the ground from clouds in the form of rain, snow, sleet, or hail
Predict- to make a guess about what will happen in the future

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Rain - water falling in drops from clouds
Rain gauge - a tool for measuring the amount of precipitation
Sleet - frozen or partly frozen rain
Snow - small white ice crystals formed directly from water vapor in the air
Storm types - kinds of storms
Stratus cloud - a low, gray cloud that forms a sheet across the sky; light rain and drizzle can occur
Temperature - a measure of how warm something is
Thermometer - a tool for measuring temperature of the air
Thunderstorm - a heavy rainstorm with lightning and thunder
Tornado - a whirling wind that looks like a dark cloud in the shape of a funnel
Warm front - warm air meets a colder air mass and slowly rides up over it; sheets of gray clouds form; often bring rain; after a warm front passes, the temperature rises; represented on a weather map with samicircles
Weather - the state of the atmosphere in regard to heat or cold, wetness or dryness, calm or storm, clearness or cloudiness
Weather conditions - how one would describe the weather
Weather map - shows what the weather is like in an area at a certain time
Weather patterns - weather conditions that repeat
Wind speed - how fast the wind is blowing

Science 4.7/4.8

Age - how old something is
Apollo missions - trips where humans landed on the moon (1963-1972)
Approximate - a measure that is rounded
Aristotle - Greek philosopher and scientist who believed in an earth-centered universe; thought the heavens moved naturally and endlessly in a complex circular motion
Learning for All; Whatever it Takes

Characteristic- trait
Compare- tell how it is similar
Composition- what it’s made out of
Contrast- tell how it’s different
Copernicus- Believed in a sun-centered universe (Heliocentric) where Earth orbits the sun in a circular motion; did not publish his theory until his death because of the Catholic Church
Differentiate- show how it’s different
Earth- the planet where we live; third planet from the Sun; one of the four inner rocky planets; has large amounts of life-supporting water and oxygen-rich atmosphere
Earth’s axial tilt- the angle Earth spins on (causes the changing seasons)
Earth-centered model- the theory that Earth stayed in place and everything else revolved around it (Aristotle and Ptolemy)
Earth-moon-sun system- the model that shows how the sun is the center of the solar system and everything else revolves around it (Galileo and Copernicus)
Formation- how something was made
Galileo- Built a telescope and discovered mountains and craters on the moon; observed the phases of Venus and Sun Spots; upheld Copernicus’s sun-centered theory; placed under house arrest for life by the Catholic
Gas giant- a large planet made of gas (Jupiter, Saturn, Uranus, Neptune)
Jupiter- Jupiter is fifth from the sun. Jupiter is the largest planet in the solar system and is considered a gas giant. Jupiter has no solid surface.
Mars- Mars is fourth from the sun. The atmosphere on Mars is thin and there is a vast network of canyons and riverbeds on the red planet. Scientists hypothesize that Mars once supported a wet, warm Earth-like climate.
Mercury- Mercury is closest to the sun and is a small, heavily cratered planet. Mercury looks like our moon. Since Pluto’s reclassification from planet to dwarf planet, Mercury is now the smallest planet in our solar system.
Model- a representation
Moon phases- the different shapes of the moon that we see from Earth
NASA- National Aeronautics and Space Administration
Neptune- Neptune is eighth from the sun. Neptune appears blue through telescopes and is a gas giant.

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Ordinal positions- the number order where something is

Planet- a large, round object in space that moves in an orbit around a star

Ptolemy- astronomer and mathematician who believed the earth was stationary and was the center of the universe

Reflect- to bounce light off of

Relationship- how two or more things compare and contrast

Revolution- the circular movement around an object

Rotation- the spinning motion of an object

Saturn- Saturn is sixth from the sun. Early scientists thought Saturn was the only planet with rings, but we now know that all four gas giants (Jupiter, Saturn, Uranus, and Neptune) have rings.

Scale- a smaller model of something with relative size and distance

Seasons- caused by Earth’s axial tilt

Sequence- order in which something happens

Size- how big or small something is

Solar system- the sun with the planets, moons, asteroids, and comets that orbit it

Sun-centered model- shows how the sun is the center of our solar system

Surface conditions- what the ground is like on a planet

Telescope- a tool used for viewing objects that are very far away

Terrestrial planet- Planet with a rocky surface (Mercury, Venus, Earth, Mars

The Moon- small rocky satellite ¼ the diameter of Earth; extreme temperatures; no atmosphere, water, or life

The Sun- an average-sized yellow star; very hot and made of gases (hydrogen and helium); 110 times the diameter of the Earth; approximately 4.6 billion years old.

Uranus- Uranus is seventh from the sun. Uranus is a gas giant.

Venus- Venus is second from the sun. It is similar to Earth in size and mass, and has a permanent blanket of clouds that trap so much heat that the temperatures on the surface of Venus are hot enough to melt lead.

Waning- getting smaller

Waxing- getting bigger
Science 4.9

Bay - an area of the ocean partly surrounded by land
Coal - a black or brownish solid fossil fuel used for energy
Cultivated forest - a forest where humans plant and cut down trees for their use
Downstream - in the direction a stream is flowing
Granite - a very hard rock that can be polished and used in buildings and monuments
Gravel - small pieces of rock and pebbles
Human-made resources - things created by people (tools, factories, technology, roads, etc.)
Lake - a large body of water with land all around it (usually contains fresh water)
Land - the solid part of Earth’s surface
Land uses - how people use land
Limestone - natural mineral used to make concrete
Natural forests - forests created by nature (without human help)
Natural resource - a material supplied by nature that is useful to people
Pollutant - a harmful substance released into the environment
River - a large natural stream of freshwater
Sand - very tiny pieces of broken rock
Soil - the material in which most plants grow; covers most of Earth’s land
Variety of soil - different kinds of soil (sand, silt, clay)
Virginia’s mineral resources - natural solid, nonliving materials (sand, gravel, limestone, crushed stone, granite)
Watershed - an area of land that drains into a river, lake, or other body of water