Course Title/ Course #: First Grade
Start day: 1

Meetings: 180 days

Course Description

The first-grade standards continue to stress basic science skills in understanding familiar objects and events. Students are expected to begin conducting simple experiments and be responsible for some of the planning. Students are introduced to the concept of classifying plants and animals based on simple characteristics. Emphasis is placed on the relationships among objects and their interactions with one another. Students are expected to know the basic relationships between the sun and Earth, and between seasonal changes and plant and animal activities. Students will also begin to develop an understanding of moving objects, simple solutions, and important natural resources.

Pacing Resources Assessments MP1

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<tr>
<th>Time Frame</th>
<th>Standards of Learning</th>
<th>Units/ Topics/ Concepts</th>
<th>Resources</th>
<th>Assessments</th>
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</thead>
<tbody>
<tr>
<td>3 weeks</td>
<td>1.1a–j (1.1 is ongoing throughout the year)</td>
<td>Scientific Investigation: Nature of Science &amp; Introduction to Science Fair</td>
<td>Virginia Department of Education Enhanced Scope and Sequence Lessons:</td>
<td>• Use interactive achievement to create an assessment of 10 questions.</td>
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<td>● 15-Bean Soup</td>
<td>• KWL chart</td>
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<td>Careers:</td>
<td>• Test/assessment</td>
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<td>Career Connection</td>
<td>• Graph making and reading</td>
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<td>Websites:</td>
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</table>
• **Unit Resource: Scientific Investigation**
• **Brainpop Jr-Making Observations**
• **First Peas to the Table**
• **Study Jams-Identifying Outcomes and Making Predictions**
• **I’m Determined**
• **Brainpop Jr. Scientific Method**
• **Study Jams-Scientific Method**
• **Scientific Method Song-You Tube Video**

**Activities:**

- **Earthworm Investigation**
- **Scientific Method Poster**- Directions for teacher to create poster
- **Sort It**
- **Quia Vocabulary 1.1a**
- **Quia Vocabulary 1.1 b**
- **Guess Who? Observation Skills**
- **Grouping Animals and Plants**
- **Which tool?**
- **Science Inquiry Activities**
- Develop a **KWL chart** about scientists. Read What Do Scientists Do? By: Marcie Bovetz to encourage a discussion with the students.
- Make a web using Kidspiration software to show what scientists do and the tools they use.
- Students explore and engage in being scientists, while keeping a science journal on things they observe around the classroom and also outside the school. 1-3 days should be spent on each of the following skills: use 5 senses, use instruments, classify into two groups, communicate data with oral, written words, pictures and graphs, make inferences and ask questions, make predictions, conduct

• Students will draw themselves as a scientist. Illustrations must include what the student is studying and the use of two simple tools within the investigation.

• Teacher observation of students engaged in cooperative learning investigations.

• Science notebook (questions, predictions, observations, summaries, charts, drawings)

• Conduct simple experiments using simple tools.

• Record data on scientific investigations performed

• **PALS-Hey Look Me Over!**
Science experiments.

**United Streaming/Discovery Education:**

- [Discovering Math: Beginner: Statistics and Data Analysis](#) (Gr. K-2). Run time: 13:24
- [Video math: Size](#) (Gr. K-2). Run time: 15:24
- [Learning aboutSorting and Grouping](#) (K-2). 15:00
- [Problem and Solutions](#) (Gr. K-2). Run time: 1:10
- [Investigations](#) (Gr. K-2). Run time: 1:24
- [Using Information](#) (Gr. K-2). Run time: 1:58

**Trade Books:**

- Bovetz, Marcie. *What Do Scientists Do?*
- Canizares, Susan and Chessen, Betsey. *Science Outside* (Scholastic)
- Canizares, Susan and Chessen, Betsey. *Science Tools* (Scholastic)
- Canizares, Susan and Chanko, Pamela. *Look, Listen and Learn* (Scholastic)
- Chanko, Pamela and Berger, Samantha. *Scientists* (Scholastic)
- Gelman, Rita Golden. *What are Scientists? What Do They Do? Let’s Find Out* (also available in Spanish)
- Kramer, Stephen. *How to Think Like a Scientist*
- Lehn, Barbara. *What is a Scientist?*
- Rotner, Shelly and Kreisler, Ken. *Nature Spy*
- Scieszka, Jon. *Science Verse*
- Trumbauer, Lisa. *Everyone is a Scientist*
<table>
<thead>
<tr>
<th>2 weeks</th>
<th>1.7 a-c; 1.1 (ongoing)</th>
<th>Earth Patterns, Cycles &amp; Change: Weather/Seasons</th>
<th>Virginia Department of Education Enhanced Scope and Sequence Lessons:</th>
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<tr>
<td></td>
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<td>● The Four Seasons</td>
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<td>● Seasonal Changes (PDF) / (Word)</td>
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<td>● Weather Patterns and Seasonal Changes (PDF) / (Word)</td>
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</tbody>
</table>

Careers:

Career Connection

Websites:

● Brainpop Jr. Seasons
● Sid the Kid-Rain Observations
● Word Wall Cards 1.7 a
● Word Wall Cards 1.7 b
● Seasons
● Word Wall Cards 1.7 c
● Season Songs
● Peep and the Big Wide World: Stormy Weather-You Tube Video
● People and the Seasons- You Tube Video

Activities:

● Dress Bobingo
● Seasons
● Weather and Us
● What’s the Weather?
● What should We Wear?

Assess students’ knowledge at the end of each season to make sure they can match the correct weather and precipitation to each month/season of the year.

KWL chart where children tell what they know about each season, what they want to know, and at the end of the unit what they learned about each season.

Students will complete a complex sorting activity where they put each plant, animal, or human behavior in the appropriate category and season.

Students will complete a Venn diagram comparing animal, plant, and human changes during the spring and fall seasons.

Students will create two seasons for a new land. The seasons must be seasons that are different from ones that we experience in the United States. Students should also
- **Weather Journals** - Students will complete a monthly weather journal throughout the school year. Students will record clothing, temperature, light, and weather conditions and how they relate to the current and past month.

- Students chart the daily weather on a monthly weather graph. Graphs may be kept in a weather log to make monthly comparisons. Teacher may also choose to enlarge one graph to complete as a class and display the graphs as a timeline to observe yearly weather patterns.

- For each season, make a class chart with three columns: Plants, Animals, and People. Record the answers to the essential questions as they relate to each season. Display charts throughout the year.

- Students illustrate themselves dressed appropriately for the season doing a recreational activity unique to the season. Students may also write about their illustrations. Pages are kept and compiled into a book titled “Me and the Seasons”.

- Students create a class line graph called Weekly Friday Weather Graph and graph the temperature every Friday for the year. Teacher may choose to use a different colored pen for each season. Students can compare this graph to their monthly weather graphs to relate temperature and weather conditions.

- Read book The Seasons of Arnold’s Apple Tree by Gail Gibbons. Students use a paper plate divided into fourths to draw an apple tree through the seasons.

- Students observe pictures of people in nature indicate what the temperature and weather is like during the two seasons. Look for connection between temperature/weather and animal/plant/human behavior.

- Chart what students know about precipitation, weather and light. Chart types of weather, clothing and activities during each season in a four square block.

- At the end of the school year students can use their Weather Journal to draw conclusions about temperature, light and precipitation as it is related to seasons and months of the school year.

- Observation of sorts-have children sort pictures of seasonal dress and recreational and work activities based on the four seasons.

- Observation of sorts-have children sort pictures of plants and/or animals based on seasonal changes.

- Draw and label-draw a plant or animal in each of the four seasons.
and infer the season. Students give two reasons to explain their inference.

**United Streaming/Discovery Education:**

- [Magical Mother Nature: The Four Seasons](#). (Gr. K-2). Run time: 15:28
- [The Four Seasons](#). (Gr. K-2). Run time: 15:00
- [Play with Digger and Splat: Seasons](#). (Gr. K-2). Run time: ??
- [Through the Season with Birds: Fall](#). (Gr. K-2). Run time: 13:48
- [Through the Season with Birds: Spring](#). (Gr. K-2). Run time: 14:41
- [Through the Season with Birds: Summer](#). (Gr. K-2). Run time: 13:06
- [Through the Season with Birds: Winter](#). (Gr. K-2). Run time: 13:13
- [Science is Elementary: Let’s Explore Weather and the Seasons](#). (Gr. K-2).

**Trade Books:**

- The Season’s of Arnold’s Apple Tree by Gail Gibbons.
- Adams, Simon. The Best book of Weather
- Berger, Melvin. Wild Weather, Weather Words
- Bundey, Nikki Drought and People
- Bundey, Nikki. Drought and the Earth
- Bundey, Nikki. Rain and the Earth
<table>
<thead>
<tr>
<th>2 weeks</th>
<th>1.5a; 1.1 (ongoing)</th>
<th>Life Processes: Animals (Habitats)</th>
<th>Virginia Department of Education Enhanced Scope and Sequence Lessons:</th>
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<td>• Amazing Animals</td>
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<td>• All About Animals (PDF) / (Word)</td>
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<td>• Word Wall Cards 1.5 a</td>
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<td>• Brainpop Jr. Animals Habitats</td>
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<td>• Habitats of the World</td>
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<td>• Macauley Animal Library</td>
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<td>• Where does it Live?</td>
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<td>• Where do I Live?</td>
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<td>• Animals and Plant in the Local Environment</td>
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- **KWL chart:** one can be done for each category (basic needs, habitat, physical characteristics)
- Discuss what the class knows about animals, leading them to focus on the main categories.
- Daily observation of the activities.
- Make a list of or draw the basic needs for lower groups.
- Assign each student an animal and have them write about what it needs, where it lives, and its characteristics for enrichment groups.
- Test/Quiz
- Venn diagram of the different categories (this could be used as a whole class activity or for enrichment groups to do individually or in partners).
United Streaming/Discovery Education:

- **Habitat Scat-Song**
- **Everyone Needs Shelter** (Gr. K-2) Run time: 13:00
- **Seahouse** (whole series). (Gr. K-2). Run time: 5:00 (each video)
- **Animal Features and Their Functions.** (Gr. K-2). Run time: 11:53
- **Animal Groups: Beginning Classification.** (Gr. K-2). Run time: 16:00
- **Animals in Action.** (Gr. K-2). Run time: 20:00
- **Wild by Nature for Kids: Beaver.** (Gr. K-2). Run time: 3:01
- **Wild by Nature for Kids: Arctic Hare.** (Gr. K-2). Run time: 3:00
- **Beyond the Bars: Zoos and Zoo Animals.** (Gr. K-2). Run time: 15:00

Trade Books:

- **Afternoon on the Amazon** (Magic Tree House, No. 6), by Mary Pope Osborne and Sal Murdocca
- **On the Way to the Beach** by Henry Cole
- Amsel, Sheri. *Deserts*
- Amsel, Sheri. *Grasslands*
- Amsel, Sheri. *Mountains*
- Amsel, Sheri. *Rain Forests*
- **The Arctic Habitat**, by Mary Aloian and Bobbie Kalman
- **Rain Forests** (Magic Tree House Research Guide), by Will Osborne and Mary Pope
### Pacing Resources Assessments MP2

<table>
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<th>Time Frame</th>
<th>Standards of Learning</th>
<th>Units/ Topics/ Concepts</th>
<th>Resources</th>
<th>Assessments</th>
</tr>
</thead>
</table>
| 2 weeks    | 1.5 b, c; 1.1(ongoing) | Life Processes: Animal Needs & Characteristics | Virginia Department of Education Enhanced Scope and Sequence Lessons:  
- All About Animals (PDF) / (Word)  
- Classifying Animals (PDF) / (Word)  
- Amazing Animals  
  **Careers:**  
  Career Connection  
  **Websites:**  
  - Brainpop Jr. – Classifying Animals  
  - Word Wall Cards 1.5 b  
  - Word Wall Cards 1.5 c  
  - Habitat Needs  
  - The Needs of Living Things  
|            | Review all objectives needed for portfolios. | • Use interactive achievement to create an assessment. |
|            | Review all objectives needed for portfolios. | • Teacher observation of students engaged in cooperative learning investigations. |

- **Careers:**
  - Career Connection

- **Websites:**
  - Brainpop Jr. – Classifying Animals
  - Word Wall Cards 1.5 b
  - Word Wall Cards 1.5 c
  - Habitat Needs
  - The Needs of Living Things
• **Plants, Animals & Ecosystems**

**Activities:**
- **Plants & Animals: Same/Different**
- **Animals Here or There**
- **Animal Homes**
- **Animals Everywhere**
- Have students compare a fish and a bird using a Venn diagram. Have them include the survival needs, body coverings, appendages, and movement of each in their comparison.
- Students will create a picture of an animal and include all things the animal needs to survive.
- Have students label an animal’s body parts and specific characteristics of the animal.
- Have students compare characteristics of birds and mammals to create a list of common characteristics of each.

**United Streaming/Discovery Education:**
- **Farm Animals: A First Look** (Gr. K-2). Run time: 19:00
- **Everybody Need: Food** (Gr. K-2). Run time: 19:00
- **The Difference between Wants and Needs** (Gr. K-2). Run time: 16:00
- **The Bear Facts** (Gr. K-2) Run time 2:38
- **Animals Around Us** (Gr. K-2) Run time 21:04

**Trade Books:**
- Chanko, Pamela and Moreton, Daniel. *Who Beats the Heat?* (Scholastic)
- Cazinares, Susan and Moreton, Daniel. *Who picture of an animal and include all things the animal needs to survive.
- Have students label an animal’s body parts and specific characteristics of the animal.
- Have students compare a fish and a bird using a Venn diagram. Have them include the survival needs, body coverings, appendages, and movement of each in their comparison.
- Have students compare characteristics of birds and mammals to create a list of common characteristics of each.
- Students will then examine a picture of a bat and explain why it doesn’t fit the pattern.
<table>
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<tr>
<th>3 weeks</th>
<th><strong>1.4a-c; 1.1(ongoing)</strong></th>
<th><strong>Life Processes: Plant Needs &amp; Characteristics</strong></th>
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<td>• Fun with Plants</td>
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<td>• Parts of a Flower</td>
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<td>• Peep and the Big Wide World Plants a Seed-You Tube Video</td>
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<td>• What Plants Need to Live</td>
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<td>• Germination Journal</td>
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- Teacher observation of students engaged in cooperative learning investigations.
- KWL
- Living organisms v. non-living things.
- Science notebook (questions, predictions, observations, summaries, charts, drawings)
- Conduct simple experiments using simple tools
- Students observe plant growth and record
Activities:

- **Seasonal Changes**
- **Nonedible vs Edible**
- **Plant Characteristics**
- **Walk In the Forest: Tree ID**
- **Plant Needs**
- **About Plants**

- **Growing Plants Two**
  
  Take a walk outside and have your students observe different plants. Have students see if they can come up how plants might be classified: flowering/non-flowering, edible/non-edible, evergreen/deciduous.

- **Plant Parts Salad.** On-line game that shows parts of plants used in a salad. Introduce vocabulary edible and non-edible. [www.hhmi.org/coolscience/vegquiz/index.html](http://www.hhmi.org/coolscience/vegquiz/index.html)

- Students plant seeds and observe their growth. Students record observations in science notebook or journal. Students should illustrate plants at various stages of growth, measure the plants, and label the parts. Students should make daily records of what they give their plants and tell why.

  - Test/assessment

  - Teacher reads while students complete plant test. Teacher may help students with specific vocabulary in classification section by giving definitions.

- Students can choose a plant they found most interesting and create a sign in which would inform others what kind of plant they are observing. (This doesn’t need to be exact...just something that the students create to show their understanding.)

- The class can “adopt” a plant to monitor throughout the school year and discuss, draw, write about changes that the plant goes through during different seasons and weather conditions.

**United Streaming/Discovery Education:**

- [How Plants Grow](https://www.discoveryeducation.com/howplantsgrow) (Gr. K-2). Run time: 19:00
- Debbie Greenthumb: [The Importance of Plants to Our World](https://www.discoveryeducation.com/theimportanceofplants toourworld) (Gr. K-2). Run time: 13:46
- Debbie Greenthumb: [Where Plants Come From](https://www.discoveryeducation.com/whereplantscomefrom) (Gr. K-2). Run time: 12:54
- [Plant Life Cycles](https://www.discoveryeducation.com/plantlifecycles) (Gr. K-2). Run time: 10:15
- [Plant Life Cycles](https://www.discoveryeducation.com/plantlifecycles) (Gr. K-2) Run time: 20:00
- [Forest habitats](https://www.discoveryeducation.com/foresthabitats) (Gr. K-2). Run time: 15:00

**Trade Books:**

- Greenaway, Theresa. [Plant Kingdom: A](https://www.amazon.com/Plant-Kingdom-Theresa-Greenaway/dp/0531173867)
<table>
<thead>
<tr>
<th>2 weeks</th>
<th>1.6a, b; 1.1(ongoing)</th>
<th>Interrelationships: Sun &amp; Earth</th>
<th>Virginia Department of Education Enhanced Scope and Sequence Lessons:</th>
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<td>- Light and Dark</td>
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<td>- Energy from the Sun (PDF) / (Word)</td>
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<td>- Apple Tree-Seasonal Changes-Lesson plans</td>
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<td>- Act out rotation of the Earth with a flashlight and the globe. Reinforce that the rotation of the Earth is what causes day and night and also that the sun provides light to the Earth.</td>
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<td>- Earth, Sun and Moon</td>
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<td>- Create watercolor wash painting of day and</td>
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- Teacher observation of students engaged in cooperative learning investigations.
- KWL
- Science notebook (questions, predictions, observations, summaries, charts, drawings)
- Students self-assessment and group assessment
- Observations of role playing the Earth’s rotation around the sun.
- Come to group and share what they know and use KWL chart. Have the students draw a large sun. Use words and drawings to tell what you would see during a day.
night: students will divide a piece of white drawing paper in half. On one-half they will illustrate the day and the other half will be the night. They will color with crayons, leaving the sky white in both pictures. Once the pictures are colored, the students will use watercolor paints to “wash” the paintings to represent day and night, blue for day and a light black for night.

- **Sunrise, Sunset**

- Create a sun diagram and with five rays. On each ray, the students should record five important facts about the sun. Student responses should include 1. Sun is the source of heat and light that warms the Earth, land and water, 2. Night and day are caused by the rotation of the Earth, 3. Sun is a star, 4. Apparent sizes of objects change with distance, 5. Length of day changes from season to season.

- Create a class Venn diagram of day and night.

- **Share the Sky**

- Illustrate pictures of what would happen if there was no sun.

- **BBC Sun**

- Sun paper collage: Take a paper plate and tissue paper collage the front of it with orange and yellow tissue paper and watered down white school glue. Have the students

- Review S.O.L K.8 about shadows and talk about what they learned in kindergarten about the sun. Write as a language experience on chart paper what they have shared in the they know in one column and what they want to learn in the want to learn next.

- Keep a Science journal and record entries each day of your observations.
write down what they have learned about the sun on the other side of the plate. These can be hung around the room.

- **Sun Song**

**United Streaming/Discovery Education:**

- **A First Look: The Sky Above,** (Gr. K-2). Run time: 17:00
- **A First Look: Weather,** (Gr. K-2). Run time: 17:00
- **Learning to Use a Calendar,** (Gr. K-2). Run time: 19:00
- **Junior Environmental Scientist: Our Special Place in Space,** (Gr. K-2). Run time: 13:56
- **A Closer Look at Space: The Sun and Stars,** (Gr. K-2). Run time: 20:59

**Trade Books:**

- Armstrong, Jennifer. **Sunshine, Moonshine**
- Berger, Melvin. **The Four Seasons**
- Canizares, Susan and Moreton, Daniel. **Arctic Winter, Arctic Summer** (Scholastic)
- Canizares, Susan and Moreton, Daniel. **Sun** (Scholastic)
- Cole, Michael. **Sun: The Center of the Solar System**
- Fowler, Allan. **The Sun’s Family of Planets**
- Keo, Ena. **We Like the Sun**
- Kleven, Elisa. **Sun Bread**
- Leuck, Laura. **Sun Is Falling, Night Is**
| 2 weeks | 1.1, 1.4, 1.5, 1.6 | Review/Benchmark Test/Portfolio Evaluation | Review objectives needed for portfolio | Review objectives needed for portfolio |

**Calling**  
- London, Jonathan. *Like Butter on Pancakes*  
- Petro, Eva. *The Sun, Day and Night*  
- Polacco, Patricia. *I Can Hear the Sun: A Modern Myth*  
- Spohn, Kate. *Night Goes By*  
- Tafuri, Nancy. *What the Sun Sees; What the Moon Sees*
<table>
<thead>
<tr>
<th>Time Frame</th>
<th>Standards of Learning</th>
<th>Units/ Topics/ Concepts</th>
<th>Resources</th>
<th>Assessments</th>
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<td>3 weeks</td>
<td>1.3 a-c; 1.1 (ongoing)</td>
<td>Matter: Water Properties</td>
<td>Virginia Department of Education Enhanced Scope and Sequence Lessons:</td>
<td>• Teacher observation of students engaged in cooperative learning investigations.</td>
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<td>Mix It Up: In Hot Water</td>
<td>• KWL</td>
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<td>Mix It Up: In the Kitchen</td>
<td>• Science notebook (questions, predictions, observations</td>
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<td>Mix It Up: In the Yard</td>
<td>• Position, motion and physical properties of an object can be described (summaries, charts, drawings)</td>
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<td>Dissolving Solids (PDF) / (Word)</td>
<td>• conduct simple experiments using simple tools.</td>
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<td>Dissolving Solids in Hot and Cold Water (PDF) / (Word)</td>
<td>• scientific investigations using different substances and water at different temperatures</td>
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<td>Careers:</td>
<td>• Test/assessment</td>
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<td>Career Connection</td>
<td>• Students will use 2 different common solids and water to conduct an experiment. They will then illustrate to compare and contrast how they interact with water, including their interaction as well as the water temperature.</td>
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<td>• Bitesize Science</td>
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<td>• Brainpop Jr.</td>
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<td>• Kids Know It Network</td>
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<td>• Oil in Water</td>
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<td>• Properties of Matter Song</td>
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<td>• Solids and Liquids</td>
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<td>• Solid, Liquid, Gases Drop &amp; Drag</td>
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<td>• Changing States</td>
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<td>• Mixture Lab</td>
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<td>• Create a table to classify liquids and solids into those that will dissolve in water and</td>
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those that will not.

- **Feel it!** Divide the students into three groups. Give each group a paper bag filled with solids. (Example: stuffed animals, blocks, pencils, small book, fruit, rose/flowers, etc.). Ask each student to take a turn feeling the items and writing down what they think they are in the science notebook. They will then take turns selecting items and seeing if their data is correct. Ask the students to classify the items into different groups using colored construction paper mats. Have them record how they classified the item.

**United Streaming/Discovery Education:**

- [Science Facts and Fun: Everything is Something](https://www.discoveryeducation.com/). (Gr. K-2). Run time: 15:00
- [A First Look: Solids, Liquids and Gases](https://www.discoveryeducation.com/). (Gr. K-2). Run time: 17:00
- [Junior Electrician: Static Electricity](https://www.discoveryeducation.com/). (Gr. K-2). Run time: 15:00

**Trade Books:**

- Ansary, Mir Tamim. *Matter: Solids, Liquids and Gases*
- Aragon, Jan C. *Salt Hands*
- Baylor, Byrd. *Everybody Needs A Rock*
- Buxbaum, Susan K and Gelman, Rita G. *Splash! All About Baths*
- Canizares, Susan and Chanko, Pamela. *Matter What Can You Do With It*
- Canizares, Susan and Chanko, Pamela.
<table>
<thead>
<tr>
<th>3 weeks</th>
<th>1.8a, b, c; 1.1(ongoing)</th>
<th>Earth Resources: Natural Resources, Air/Water Quality, &amp; Recycling</th>
<th>Virginia Department of Education Enhanced Scope and Sequence Lessons:</th>
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<td></td>
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<td>Place two hula hoops on the floor. Pass out pictures to students of manmade items and natural resources. Sort them as a group.</td>
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<td>Provide students with a paper divided into columns marked ‘Man Made’ and ‘Natural Resource’. Have students draw pictures in the appropriate column.</td>
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<td>Students will be assessed by completing a sheet indicating which items are natural resources, and which items can be recycled, reused, and reduced.</td>
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<td>Students will show knowledge of recycling and reusing by performing hands-on activities.</td>
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<td>Test/Quiz</td>
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<td><strong>Water</strong></td>
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<td>• Cartwright, Sally. <em>Water Is Wet</em></td>
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<td>• Cobb, Vicki. <em>Why Can’t You Unscramble an Egg?</em></td>
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<td>• Cole, Joanna. <em>The Magic School Bus At the Water Works</em></td>
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<td>• deBrunhoff, Laurent. <em>About Water</em></td>
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<td>• Simon, Seymour. <em>Water on Your Street</em></td>
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<td>• Stille, Darlene R. <em>See It, Touch It, Taste It, Smell It</em></td>
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<td>• Zoehfeld, Kathleen W. <em>What Is the World Made of? : All About Solids, Liquids and Gases</em></td>
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<td>Earth’s Natural Resources (PDF) / (Word)</td>
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<td>Earth’s Resources: Air and Water (PDF) / (Word)</td>
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<td><strong>Websites:</strong></td>
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<td>• <a href="#">Ways to save Resources</a></td>
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<td>• <a href="#">Nature is All Around</a></td>
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<td>• <a href="#">Where’s the Wood</a></td>
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<td>• <a href="#">Keeping Our Waterways Clean</a></td>
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<td>• <a href="#">People can avoid Wasting</a></td>
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<td>• <a href="#">Word Wall Cards</a> 1.8 a, b</td>
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<td>Activities:</td>
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| • Make something from recycled materials.  
*Example:* Have students bring in a used/empty water bottle and other recyclable materials. Students will use their imagination and creativity to create something using these materials.  
| • Students will take turns selecting real items from a collection and placing them in the appropriate recycling containers provided. (i.e. empty aluminum cans, aluminum pie plates, milk jugs, plastic water or soda bottles, other plastic containers, newspapers, sales papers, magazines, etc.)  
| • Students will select an egg carton or a plastic bottle to create a “caterpillar” or “sand art” or item of their choosing to show that they can reuse an item.  
| • Mining for ‘coal’ using a chocolate chip cookie (Use a toothpick-have student’s removes the ‘coal’ from the ‘land’. Can they restore the land to its original state? How important are our natural resources….can we use them all?  )  
| • Send a request letter home to parents and ask them to supply egg cartons, plastic bottles, milk cartons, soda cans, and other containers they may normally throw away. Use these items to construct a structure or mobile using the “trash.”  
| • Make a garbage museum. Bag your garbage is sealed plastic baggies. Hang it up. Draw your garbage and write three words to describe it. Check it every day and observe the changes.  
| • Set up a recycling bin. Label boxes for |
metal, plastic, paper and things you can use for art projects.

- **A River Ran Wild: An Environmental History** by Lynne Cherry. Teacher reads book and class discusses pollution of our waterways.

- **The Wartville Wizard** by Don Madden. In the story the old man could tell a piece of trash to stick to the person who threw it. Have students pretend they are characters in the story and draw and write about what kind of trash would stick to them.

- **A Tree Can Be….** by Judy Nayer. Talk about the many uses for a living tree.

- **The Giving Tree** by Shel Silverstein and talk about other ways a tree can be used.

- Read Dr. Seuss’s **The Lorax**. Have students pretend they are working with the Lorax to save trees and design a “Save a Tree” poster.

**United Streaming/Discovery Education:**

- **Peep and the Big Wide World: The Spring Thing** - You Tube Video

- **Reading Rainbow: Two Old Potatoes and Me**. (Gr. K-2). Run time: 27:25

- **Learning about Natural Resources**. (Gr. K-2). Run time: 22:00

- **Taking Care of Our Earth**. (Gr. K-2). Run time: 17:00

- **The Blue Dragon: What a Waste!** (Gr. K-2). Run time: 13:10

- **What do You Recycle?** (Gr. K-2). (Activity)

- **Holiday Facts and Fun: Earth Day**. (Gr. K-2). Run time: 14:05
| Junior Environmental Scientist: Land: Pollution and Solutions. (Gr. K-2). Run time: 15:44 |
| Junior Environmental Scientist: Water: Pollution and Solutions. (Gr. K-2). Run time: 12:17 |
| Junior Environmental Scientist: Air: Pollution and Solutions. (Gr. K-2). Run time: 13:04 |

**Trade Books:**
- Amos, Janine. *Waste and Recycling*
- Bacon, Ronald Leonar. *Save Our Earth*
- Bailey, Donna. *Wasting Water*
- Benson, Laura Lee. *This is Our Earth*
- Denton, Peter. *World Wildlife Fund*
- Earthways, *Earthwise: Poems on Conservation*
- Greene, Carol. *Caring For Our People*
- Hare, Tony. *Recycling*
- Holmes, Anita. *I Can Save the Earth: A Kids' Handbook*
- Lowery, Linda. *Earthwise at Play*
- Lowery, Linda. *Earthwise at School*
- Madden, Don. *The Wartville Wizard.*
- Nayer, Judy. *A Tree Can Be….*
- Parker, Steve. *Waste, Recycling, and Re-use*
- Patent, Dorothy Hins. *Children Save the Rain Forest*
- Patent, Dorothy Hins. *Habitats: Saving Wild Places*
- Schwartz, Linda. *Save the Earth*
- Seuss, Dr. *The Lorax*
- Share, Marjorie L. *Animal Tracks*
- Shanks, Ann Zane. *About Garbage and*
<table>
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<tr>
<th>3 weeks</th>
<th>1.1, 1.3, 1.8</th>
<th>Review/Benchmark Test/Portfolio Evaluation</th>
<th>Review objectives needed for portfolio</th>
<th>Review objectives needed for portfolio</th>
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<td>Stuff</td>
<td>Silverstein, Shel. The Giving Tree</td>
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<td>Time Frame</td>
<td>Standards of Learning</td>
<td>Units/ Topics/ Concepts</td>
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<td>3 weeks</td>
<td>1.2 a-c; 1.1 (ongoing)</td>
<td>Matter: Force and Motion</td>
<td>Virginia Department of Education Enhanced Scope and Sequence Lessons:</td>
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<td>- Let’s Be Motion Detectives</td>
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<td>- Sail On.</td>
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<td>- Motion of Objects (PDF) / (Word)</td>
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<td>- Vibrations (PDF) / (Word)</td>
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<td>How Things Move?</td>
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<td>Word Wall Cards 1.2 a</td>
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<td>Word Wall Cards 1.2 c</td>
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<td>Brainpop Jr.</td>
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<td>Where is the Power?</td>
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<td>Rollercoaster Builder</td>
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<td>Pushes and Pull</td>
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<td>How Things Move. (Gr. K-2). Run time: 16:00</td>
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- Teacher observation of students engaged in cooperative learning investigations.
- KWL
- Science notebook (questions, predictions, observations, summaries, charts, drawings) Conduct simple experiments using simple tools.
- Record data on scientific investigations performed.
- Students record observations of various moving objects.
- Students use vocabulary (straight, circular, curved, and back and forth) to describe the motions observed.
- Students observe the movement of a yo-yo
• **The Wonder of Sound**, (Gr. K-2). Run time: 13:00
• **A First Look: Simple Machines**, (Gr. K-2). Run time: 17:00
• **Discovering Simple Machines: Work and Energy**, (Gr. K-2). Run time: 13:00
• **Simple Machines**, (Gr. K-2). Run time: 16:00
• **A First Look: Magnets**, (Gr. K-2). Run time: 17:00
• **Junior Electrician: Magnetism**, (Gr. K-2). Run time: 15:00
• **A First Look: Sound**, (Gr. K-2). Run time: 17:00

**Trade Books:**

• Althea. *What Makes things Move*
• Ardley, Neil. *Muscles to Machines*
• Frisch, Joy. *Motion & Movement*
• Lafferty, Peter. *Forces and Motion*
• Leontovich, M. *Force, of course! : Force & Motion*
• Pinna, Simon de. *Forces and Motion*
• Riley, Peter D. *Forces and movement*
• Schaefer, Lola M. *All about Motion & Balance*
• Schaefer, Lola M. *Back and Forth*
• Schaefer, Lola M. *Circular Movement*
• Schaefer, Lola M. *How Things Move*
• Schaefer, Lola M. *Start and Stop*
• Schaefer, Lola M. *Zigzag Movement*
• Stille, Darlene R. *Motion: Push and Pull, Fast and Slow*
• Taylor, Barbara *Force and Movement*
• Trumbauer, Lisa. *Forces and Motion*

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and explain the two forces that change its direction (push and pull).

• Have students draw ways to change the motion of objects
• Have student label pictures of different kinds of motion.
• Have student analyze two groups of objects to determine the similarities between the objects in each group.
• Students will decide what kind of motion rubber bands make and defend their choice.
• Test/assessment
• Students compare and contrast two different objects in motion.
• Students record two ways the objects move in the same way and two ways the objects move in different ways. Objects should have a distinct difference, such as rolls straight (ball) or
| 3 weeks | **1.1a-j** | **Scientific Investigation: Review** | **Virginia Department of Education Enhanced Scope and Sequence Lessons:**  
* 15-Bean Soup | **Hands on activities**  
**Test/assessment**  
**Portfolios** |
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<td>3 weeks</td>
<td><strong>Review 1.1 – 1.8</strong></td>
<td><strong>Review/Benchmark Test/Portfolio Evaluation</strong></td>
<td><strong>Use inquiry cards to make sure students have mastered 1.1</strong></td>
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Science Standards of Learning

Curriculum Framework 2010

Grade One

Board of Education
Commonwealth of Virginia
Virginia Science Standards of Learning Curriculum Framework 2010
Introduction

The Science Standards of Learning Curriculum Framework amplifies the Science Standards of Learning for Virginia Public Schools and defines the content knowledge, skills, and understandings that are measured by the Standards of Learning tests. The Science Curriculum Framework provides additional guidance to school divisions and their teachers as they develop an instructional program appropriate for their students. It assists teachers as they plan their lessons by identifying essential understandings and defining the essential content knowledge, skills, and processes students need to master. This supplemental framework delineates in greater specificity the minimum content that all teachers should teach and all students should learn.

School divisions should use the Science Curriculum Framework as a resource for developing sound curricular and instructional programs. This framework should not limit the scope of instructional programs. Additional knowledge and skills that can enrich instruction and enhance students’ understanding of the content identified in the Standards of Learning should be included as part of quality learning experiences.

The Curriculum Framework serves as a guide for Standards of Learning assessment development. Assessment items may not and should not be a verbatim reflection of the information presented in the Curriculum Framework. Students are expected to continue to apply knowledge and skills from Standards of Learning presented in previous grades as they build scientific expertise.

The Board of Education recognizes that school divisions will adopt a K–12 instructional sequence that best serves their students. The design of the Standards of Learning assessment program, however, requires that all Virginia school divisions prepare students to demonstrate achievement of the standards for elementary and middle school by the time they complete the grade levels tested. The high school end-of-course Standards of Learning tests, for which students may earn verified units of credit, are administered in a locally determined sequence.

Each topic in the Science Standards of Learning Curriculum Framework is developed around the Standards of Learning. The format of the Curriculum Framework facilitates teacher planning by identifying the key concepts, knowledge and skills that should be the focus of instruction for each standard. The Curriculum Framework is divided into two columns: Understanding the Standard (K-5); Essential Understandings (middle and high school); and Essential Knowledge, Skills, and Processes. The purpose of each column is explained below.

Understanding the Standard (K-5)
This section includes background information for the teacher. It contains content that may extend the teachers’ knowledge of the standard beyond the current grade level. This section may also contain suggestions and resources that will help teachers plan instruction focusing on the standard.

Essential Understandings (middle and high school)
This section delineates the key concepts, ideas and scientific relationships that all students should grasp to demonstrate an understanding of the Standards of Learning.

Essential Knowledge, Skills and Processes (K-12)
Each standard is expanded in the Essential Knowledge, Skills, and Processes column. What each student should know and be able to do in each standard is outlined. This is not meant to be an exhaustive list nor a list that limits what is taught in the classroom. It is meant to be the key knowledge and skills that define the standard.
Scientific Investigation, Reasoning, and Logic

This strand represents a set of systematic inquiry skills that defines what a student will be able to do when conducting activities and investigations, and represents the student understanding of the nature of science. The various skill categories are described in the “Investigate and Understand” section of the Introduction to the Science Standards of Learning, and the skills in science standard 1.1 represent more specifically what a student should achieve during the course of instruction in the first grade. Across the grade levels, the skills in the first standards form a nearly continuous sequence of investigative skills and an understanding of the nature of science. It is important that the classroom teacher understands how the skills in standard 1.1 are a key part of this sequence (i.e., K.1, K.2, 1.1, 2.1, 3.1, 4.1, 5.1, and 6.1).
Standard 1.1

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

a) the senses are used to observe differences in physical properties;
b) observations are made from multiple positions to achieve a variety of perspectives and are repeated to ensure accuracy;
c) objects or events are classified and arranged according to characteristics or properties;
d) simple tools are used to enhance observations;
e) length, mass, volume, and temperature are measured using nonstandard units;
f) inferences are made and conclusions are drawn about familiar objects and events;
g) a question is developed from one or more observations;
h) predictions are made based on patterns of observations;
i) observations and data are recorded, analyzed, and communicated orally and with simple graphs, pictures, written statements, and numbers; and
j) simple investigations and experiments are conducted to answer questions.

Overview

Standard 1.1 is intended to define the “investigate” component of all other first-grade standards (1.2–1.8). The intent of standard 1.1 is that students will continue to develop a range of inquiry skills, achieve proficiency with those skills, and continue to develop an understanding of the nature of science in the context of the concepts developed in first grade. **Standard 1.1 does not require a discrete unit be taught on scientific investigation because the skills that make up the standard should be incorporated in all other first-grade standards.** It is also intended that by developing these skills, students will achieve greater understanding of scientific inquiry and the nature of science as well as more fully grasp the content-related SOL concepts.
Standard 1.1
Strand: Scientific Investigation, Reasoning, and Logic

1.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which
   a) the senses are used to observe differences in physical properties;
   b) observations are made from multiple positions to achieve a variety of perspectives and are repeated to ensure accuracy;
   c) objects or events are classified and arranged according to characteristics or properties;
   d) simple tools are used to enhance observations;
   e) length, mass, volume, and temperature are measured using nonstandard units;
   f) inferences are made and conclusions are drawn about familiar objects and events;
   g) a question is developed from one or more observations;
   h) predictions are made based on patterns of observations;
   i) observations and data are recorded, analyzed, and communicated orally and with simple graphs, pictures, written statements, and numbers;
   and
   j) simple investigations and experiments are conducted to answer questions.

Understanding the Standard
(Background Information for Instructor Use Only)

- The nature of science refers to the foundational concepts that govern the way scientists formulate explanations about the natural world. The nature of science includes the following concepts:
  a) the natural world is understandable;
  b) science is based on evidence, both observational and experimental;
  c) science is a blend of logic and innovation;
  d) scientific ideas are durable yet subject to change as new data are collected;
  e) science is a complex social endeavor; and
  f) scientists try to remain objective and engage in peer review to help avoid bias.

In grade one, an emphasis should be placed on concepts a, b, and e.

- Science assumes that the natural world is understandable. Scientific inquiry can provide explanations about nature. This expands students’ thinking from just a knowledge of facts to understanding how facts are relevant to everyday life.

Essential Knowledge, Skills, and Processes

In order to meet this standard, it is expected that students will

- use their senses and simple tools, such as a magnifying glass and a balance to enhance their observations of physical properties.
- make repeated observations of an object or event from multiple positions.
- classify and arrange objects or events according to at least two attributes or properties so that similarities and differences become apparent.
- measure length, mass, and volume, using nonstandard units.
- use familiar events and objects to make inferences and draw conclusions.
- develop a question from one or more observations.
- predict outcomes based on actual observations and evidence rather than random guesses.
Standard 1.1  

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

1. a) the senses are used to observe differences in physical properties;
2. b) observations are made from multiple positions to achieve a variety of perspectives and are repeated to ensure accuracy;
3. c) objects or events are classified and arranged according to characteristics or properties;
4. d) simple tools are used to enhance observations;
5. e) length, mass, volume, and temperature are measured using nonstandard units;
6. f) inferences are made and conclusions are drawn about familiar objects and events;
7. g) a question is developed from one or more observations;
8. h) predictions are made based on patterns of observations;
9. i) observations and data are recorded, analyzed, and communicated orally and with simple graphs, pictures, written statements, and numbers; and
10. j) simple investigations and experiments are conducted to answer questions.

Understanding the Standard  
(Background Information for Instructor Use Only)

- Science demands evidence. Scientists develop their ideas based on evidence and they change their ideas when new evidence becomes available or the old evidence is viewed in a different way.
- Science is a complex social endeavor. It is a complex social process for producing knowledge about the natural world. Scientific knowledge represents the current consensus as to what is the best explanation for phenomena in the natural world. This consensus does not arise automatically, since scientists with different backgrounds from all over the world may interpret the same data differently. To build a consensus, scientists communicate their findings to other scientists and attempt to replicate one another’s findings. In order to model the work of professional scientists, it is essential for first-grade students to engage in frequent discussions with peers about their understanding of their investigations.
- To communicate an observation accurately, one must provide a clear description of exactly what is observed and nothing more.
- Observations should be made from multiple positions (e.g., observations of the same object from the front of the object, from the back of the object, and from above).

Essential Knowledge, Skills, and Processes

- communicate observations and data with simple graphs and pictures, oral and written statements, and with numbers.
- answer questions by conducting simple experiments/investigations, using nonstandard measuring units and simple tools, such as a magnifying glass or a balance. A simple experiment is one that changes only one thing at a time (tests only one variable), gives quick results, and provides easily observable changes.
- record observations of movement (length/distance) using nonstandard units.
- compare the movement of objects, using graphs, pictures, and/or numbers.
Standard 1.1

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

- a) the senses are used to observe differences in physical properties;
- b) observations are made from multiple positions to achieve a variety of perspectives and are repeated to ensure accuracy;
- c) objects or events are classified and arranged according to characteristics or properties;
- d) simple tools are used to enhance observations;
- e) length, mass, volume, and temperature are measured using nonstandard units;
- f) inferences are made and conclusions are drawn about familiar objects and events;
- g) a question is developed from one or more observations;
- h) predictions are made based on patterns of observations;
- i) observations and data are recorded, analyzed, and communicated orally and with simple graphs, pictures, written statements, and numbers; and
- j) simple investigations and experiments are conducted to answer questions.

### Understanding the Standard

(Background Information for Instructor Use Only)

- Observations should be repeated multiple times to assure accuracy.
- Once the characteristics of several objects or several events have been observed and recorded, the objects or events can be arranged by those characteristics (e.g., several objects sorted by color, several events sorted on a timeline by age, etc.).
- Simple tools, such as a magnifying glass and a balance can extend the observations that people can make.
- Nonstandard units such as paper clips, a student’s foot, index cards, etc., can be used to measure the length of objects. The mass of two objects can be compared by holding each object in a different hand. The volume of various liquids can be compared by pouring them in cups of the same size. Variations in temperature of different objects can be compared by the difference that is felt when each object is touched. Variations in air temperature can be compared by observing the differences one feels when in different environments (e.g., inside the classroom vs. outside on the playground in winter, inside the freezer compartment of a

### Essential Knowledge, Skills, and Processes
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- j) simple investigations and experiments are conducted to answer questions.

Understanding the Standard
(Background Information for Instructor Use Only)

- An inference is a tentative explanation based on background knowledge and available data.
- A conclusion is a summary statement based on data from the results of an investigation.
- Questions about what is observed can be developed.
- A prediction is a forecast about what may happen in some future situation. It is based on information and evidence. A prediction is different from a guess.
- Graphs are powerful ways to display data, making it easier to recognize important information. Describing things as accurately as possible is important in science because it enables people to compare their observations with those of others.
- Data should be displayed in bar graphs and picture graphs at the grade one level.
- An experiment is a fair test designed to answer a question.
Standard 1.1

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

a) the senses are used to observe differences in physical properties;
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Understanding the Standard
(Background Information for Instructor Use Only)

Essential Knowledge, Skills, and Processes
Force, Motion, and Energy

This strand focuses on student understanding of what force, motion, and energy are and how the concepts are connected. The major topics developed in this strand include magnetism, types of motion, simple and compound machines, and energy forms and transformations, especially electricity, sound, and light. This strand includes science standards K.3, 1.2, 2.2, 3.2, 4.2, 4.3, 5.2, 5.3, 6.2, and 6.3.
1.2 The student will investigate and understand that moving objects exhibit different kinds of motion. Key concepts include
a) objects may have straight, circular, and back-and-forth motions;
b) objects may vibrate and produce sound; and
c) pushes or pulls can change the movement of an object.

Overview

Physical science includes topics that give students a chance to increase their understanding of the characteristics of objects and materials that they encounter daily. Knowledge about objects develops through learning how they move and change position and shape in relation to the viewer, as when we look at objects from different angles. Students learn about objects by observing them and noting similarities and differences and by acting on them by applying force. This concept relates to science standard K.3, in which magnets push and pull objects. It is intended that students will actively develop scientific investigation, reasoning, and logic skills (1.1) in the context of the key concepts presented in this standard.
1.2 The student will investigate and understand that moving objects exhibit different kinds of motion. Key concepts include
a) objects may have straight, circular, and back-and-forth motions;
b) objects may vibrate and produce sound; and
c) pushes or pulls can change the movement of an object.

<table>
<thead>
<tr>
<th>Understanding the Standard</th>
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<tbody>
<tr>
<td>An object’s motion may be described by tracing and measuring its</td>
<td>In order to meet this standard, it is expected that students will</td>
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<tr>
<td>position over time. The motion of objects may be straight, circular,</td>
<td>make and communicate observations about moving objects. Examples</td>
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<tr>
<td>curved, or back-and-forth.</td>
<td>should include balls, objects with wheels, windup toys, tops, rubber</td>
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<tr>
<td>One kind of back-and-forth motion is vibration. Vibrations may create</td>
<td>bands, and playground equipment.</td>
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<tr>
<td>sound.</td>
<td>predict an object’s movement, using its size, shape, and the force of</td>
</tr>
<tr>
<td>Pushing or pulling can change the position and motion of objects.</td>
<td>the push or pull on it.</td>
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<tr>
<td>For the same object, the size of the change is related to the strength of the push or pull.</td>
<td>manipulate objects in order to describe and classify the motion of each</td>
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<td>object as straight, circular, or back-and-forth.</td>
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<tr>
<td></td>
<td>understand that vibrations may create sound, such as humming, strumming a guitar, or plucking a rubber band.</td>
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<td></td>
<td>record observations of movement (length/distance), using nonstandard units.</td>
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</table>
Grade One
Science Strand

Matter

This strand focuses on the description, physical properties, and basic structure of matter. The major topics developed in this strand include concepts related to the basic description of objects, phases of matter (solids, liquids, and gases – especially water), phase changes, mass and volume, and the structure of classification of matter. This strand includes science standards K.4, K.5, 1.3, 2.3, 3.3, 5.4, 6.4, 6.5, and 6.6.
1.3 The student will investigate and understand how different common materials interact with water. Key concepts include:

a) some liquids will separate when mixed with water, but others will not;
b) some solids will dissolve in water, but others will not; and

c) some substances will dissolve more readily in hot water than in cold water.

Overview

Students continue their study of water by examining and qualitatively describing water and its behavior with other matter. When carefully observed, described, and measured, the properties of objects in or with water, and the changes that occur when materials interact with water, provide the necessary foundation for more abstract ideas in the upper grade levels. This concept is related to science standard K.5 in which students identify water in its different phases (solid, liquid, gas). It is intended that students will actively develop scientific investigation, reasoning, and logic skills (1.1) in the context of the key concepts presented in this standard.
Standard 1.3

The student will investigate and understand how different common materials interact with water. Key concepts include:

a) some liquids will separate when mixed with water, but others will not;
b) some solids will dissolve in water, but others will not; and

c) some substances will dissolve more readily in hot water than in cold water.

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<thead>
<tr>
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<tbody>
<tr>
<td>Different types of materials act differently when mixed with water.</td>
<td>In order to meet this standard, it is expected that students will</td>
</tr>
<tr>
<td>Some liquids will mix with water, while others will not.</td>
<td>• describe and apply the term dissolve.</td>
</tr>
<tr>
<td>Some solids will dissolve in water, while others will not.</td>
<td>• predict and describe how various materials (vinegar, milk, baking soda, powdered drink mix, sugar, salt, sand, oil, soil, rocks) act when mixed with water.</td>
</tr>
<tr>
<td>The temperature of the water affects how easily a substance will dissolve in it.</td>
<td>• classify liquids and solids into those that will dissolve in water and those that will not. Use tables and/or charts to record and display the information.</td>
</tr>
<tr>
<td></td>
<td>• infer that some substances will dissolve more easily in hot water than in cold water by conducting investigations using water at different temperatures.</td>
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</table>
Grade One Science Strand

Life Processes

This strand focuses on the life processes of plants and animals and the specific needs of each. The major topics developed in the strand include basic needs and life processes of organisms, their physical characteristics, orderly changes in life cycles, behavioral and physical adaptations, and survival and perpetuation of species. This strand includes science standards K.6, K.7, 1.4, 1.5, 2.4, 3.4, and 4.4.
The student will investigate and understand that plants have basic life needs and functional parts and can be classified according to certain characteristics. Key concepts include:

a) plants need nutrients, air, water, light, and a place to grow;
b) basic parts of plants; and
c) plants can be classified based on a variety of characteristics.

Overview

Young children have a natural curiosity about the living things that they encounter. Observation is a method by which students can answer questions about how plants live, their parts, and characteristics. All plants need nutrients, air, water, light, and a place with sufficient space to grow. They have specific structures to meet their needs. Students need to know the concepts, not the definitions, of the terms edible, nonedible, evergreen, and deciduous. They need to know that we eat certain plants (edible) but not others (nonedible). They need to know that some plants stay green all year long (evergreen) while others lose their leaves each fall (deciduous). The concepts in this standard build upon the Life Processes strand (K.6 and K.7), in which students investigate and understand basic needs and life processes of plants and animals. It is intended that students will actively develop scientific investigation, reasoning, and logic skills (1.1) in the context of the key concepts presented in this standard.
1.4 The student will investigate and understand that plants have basic life needs and functional parts and can be classified according to certain characteristics. Key concepts include
   a) plants need nutrients, air, water, light, and a place to grow;
   b) basic parts of plants; and
   c) plants can be classified based on a variety of characteristics.

### Understanding the Standard
(Background Information for Instructor Use Only)

- Plants have basic needs, including nutrients, air, water, light, and a place with sufficient space to grow.
- Plants have different structures that serve different functions in growth, survival, and reproduction.
- The functions of plant parts include the roots which hold plants in place and absorb water, seeds which make new plants, leaves which make food for the plant, and stems which hold the plants upright and transport materials up and down the plant.
- Plants can be categorized by their different characteristics, such as edible/nonedible, flowering/nonflowering, and evergreen/deciduous. **Students do not need to know the terms nonedible, edible, evergreen, and deciduous. The focus should be on the concept, not the terminology.**

### Essential Knowledge, Skills, and Processes

In order to meet this standard, it is expected that students will
- conduct simple experiments/investigations related to plant needs by changing one variable (nutrients, air, water, light, or place to grow) at a time. Students do not need to know the term variable.
- create and interpret a model/drawing of a plant, including seeds, roots, stems, leaves, flowers, and fruits.
- identify the functions of the seed, root, stem, and leaf.
- classify plants by the characteristics of edible/nonedible, flowering/nonflowering, and evergreen/deciduous, using charts.
### Standard 1.5

**Strand: Life Processes**

1.5 The student will investigate and understand that animals, including humans, have basic needs and certain distinguishing characteristics. Key concepts include:

   a) basic needs include adequate air, food, water, shelter, and space (habitat);

   b) animals, including humans, have many different physical characteristics; and

   c) animals can be classified according to a variety of characteristics.

---

### Overview

This standard focuses on the idea that animals move, need food, breathe, and reproduce. Animals have a variety of ways in which they accomplish these activities. Each type of animal has features that allow it to function in unique and specific ways to obtain food, reproduce, and survive in a particular place. This standard builds upon the Life Processes strand (K.6 and K.7), in which students are introduced to the concept of living and nonliving, and investigate and understand basic needs and life processes of plants and animals. It is intended that students will actively develop scientific investigation, reasoning, and logic skills (1.1) in the context of the key concepts presented in this standard.
Standard 1.5

The student will investigate and understand that animals, including humans, have basic needs and certain distinguishing characteristics. Key concepts include:

a) basic needs include adequate air, food, water, shelter, and space (habitat);
b) animals, including humans, have many different physical characteristics; and

c) animals can be classified according to a variety of characteristics.

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| Animals, including people, have basic life needs, including air, food, water, shelter, and space (habitat). Students do not need to know the term habitat. The focus should be on the items that are necessary components of a habitat, not on the terminology. | In order to meet this standard, it is expected that students will:

  • make and communicate observations of live animals, including humans, about their needs, physical characteristics, and where they live. |

| Body coverings include hair, fur, feathers, scales, and shells. |  • describe the life needs of animals, including air, food, water, shelter, and space. |

| Appendages are parts, such as arms, legs, wings, fins, and tails, which extend from the main body and have specific functions. Students do not need to know the term appendage. The focus should be on the concept, not the terminology. |  • identify and chart simple characteristics by which animals can be classified, including body coverings (hair, fur, feathers, scales, and shells), body shape, appendages (arms, legs, wings, fins, and tails), methods of movement (walking, crawling, flying, and swimming), wild or domestic, and water homes or land homes. |

| Methods of movement may include walking, crawling, flying, and swimming. |  • distinguish between wild animals (raccoon, hawk, squirrel, shark) and domestic animals (dog, cat, sheep) and recognize examples of each. |

| Simple ways to classify animals are whether they are wild or domestic and whether they live on land or in water. |  • infer types of animal homes (water or land), using the physical characteristics of the animals, such as scales and fins that allow fish to live and move in water or fur and legs that allow dogs to live and move on land. |

| classify animals by where they live (their homes). |
Interrelationships in Earth/Space Systems

This strand focuses on student understanding of relationships within and among Earth and space systems. The topics developed include shadows; relationships between the sun and Earth; weather types, patterns, and instruments; properties of soil; characteristics of the ocean environment; and organization of the solar system. This strand includes science standards K.8, 1.6, 2.6, 3.7, 4.6, 5.6, and 6.8.
1.6 The student will investigate and understand the basic relationships between the sun and Earth. Key concepts include
a) the sun is the source of energy and light that warms the land, air, and water; and
b) the sun’s relative position in the morning is east and in the late afternoon is west.

Overview
This standard focuses on some of the important relationships between the sun and Earth. Students need to understand that the sun is a source of energy, and that energy provides light and warmth for Earth. This standard builds upon science standard K.8 about light and shadow. It is intended that students will actively develop scientific investigation, reasoning, and logic skills (1.1) in the context of the key concepts presented in this standard.
1.6 The student will investigate and understand the basic relationships between the sun and Earth. Key concepts include
   a) the sun is the source of energy and light that warms the land, air, and water; and
   b) the sun’s relative position in the morning is east and in the late afternoon is west.

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<tbody>
<tr>
<td>(Background Information for Instructor Use Only)</td>
<td>In order to meet this standard, it is expected that students will</td>
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<tr>
<td>• The sun provides Earth with light (a form of radiant energy) and thermal energy.</td>
<td>• infer that sunlight striking an object makes the object warmer.</td>
</tr>
<tr>
<td>• By transferring thermal energy to Earth, Earth’s atmosphere and land are heated. Thermal energy may be transferred from one substance to another by three means: conduction, convection, and radiation.</td>
<td>• conduct simple experiments to show how sunlight changes the temperature of land, air, and water.</td>
</tr>
<tr>
<td>• The sun provides energy, which warms the land, air, and water on Earth.</td>
<td>• interpret the relationship between the sun’s position in the sky and the general time of day. This includes the sun’s relative position in the morning (east), at noon, and in the late afternoon (west).</td>
</tr>
<tr>
<td>• The sun’s relative position in the morning is east and in the late afternoon is west.</td>
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Earth Patterns, Cycles, and Change

This strand focuses on student understanding of patterns in nature, natural cycles, and changes that occur both quickly and slowly over time. An important idea represented in this strand is the relationship among Earth patterns, cycles, and change and their effects on living things. The topics developed include noting and measuring changes, weather and seasonal changes, the water cycle, cycles in the Earth-moon-sun system, our solar system, and change in Earth’s surface over time. This strand includes science standards K.9, K.10 1.7, 2.7, 3.8, 3.9, 4.7, and 5.7.
Standard 1.7

1.7 The student will investigate and understand weather and seasonal changes. Key concepts include
a) changes in temperature, light, and precipitation affect plants and animals, including humans;
b) there are relationships between daily and seasonal changes; and
  c) changes in temperature, light, and precipitation can be observed and recorded over time.

Overview

The focus of this standard is on temperature, light, and precipitation as they relate to life changes in plants, animals, and people. There are many ways to acquaint children with Earth science-related phenomena that they will come to understand later as being cyclic, and this standard introduces those ideas. It is enough for young children to observe the pattern of daily changes without getting deeply into the nature of climate. They should notice how these changes affect plants and animals. This is observable and can be charted over short and intermediate time periods. Students need to understand the concepts of migration, hibernation, and habitat, but they do not necessarily need to know the terms at first grade. This standard builds upon science standard K.9 in which students investigate and understand simple patterns in their daily lives. It is intended that students will actively develop scientific investigation, reasoning, and logic skills (1.1) in the context of the key concepts presented in this standard.
Standard 1.7

The student will investigate and understand weather and seasonal changes. Key concepts include:

a) changes in temperature, light, and precipitation affect plants and animals, including humans;
b) there are relationships between daily and seasonal changes; and

c) changes in temperature, light, and precipitation can be observed and recorded over time.

Understanding the Standard

(Background Information for Instructor Use Only)

- Seasonal changes bring about changes in plants, animals, and people.
- With seasonal changes come changes in weather, including temperature, light, and precipitation.
- Precipitation includes rain, snow, and ice.
- Changes in plants include budding, growth, and losing leaves.
- Some animals hibernate and some animals migrate as a result of seasonal changes, resulting in changes in habitat. Students do not need to know the terms migration, hibernation, and habitat. The focus should be on the concepts, not the terminology.
- Hibernation is a state of greatly reduced metabolic activity and lowered body temperature adopted by certain mammals as an adaptation to adverse winter conditions. Most animals are not “true hibernators” but rely on a combination of reserve body fat, stored food supplies (in rodents only), and a protected den to enable it to survive the winter. At intervals of several weeks the animal elevates its body temperature, awakens, moves about, feeds, and then returns to its state of torpor.
- Migration is the regular, usually seasonal, movement of all or part of an animal population to and from a given area. The distance traveled may be a few miles or several thousands of miles. Animals migrate for many different reasons. Some animals migrate to find better sources of food, water, or shelter. Other animals migrate to visit particular breeding grounds, rear their young, or find warmer climates. The frequency of animals’ migrations also differs.
- An animal’s living place is called its habitat. Most animals are only

Essential Knowledge, Skills, and Processes

In order to meet this standard, it is expected that students will

- identify types of precipitation as rain, snow, and ice and the temperature conditions that result in each one.
- relate a temperature, light, and precipitation chart to the corresponding season (daily or weekly).
- observe and chart changes in plants, including budding, growth, and losing leaves. Recognize in what season budding and losing leaves will most likely occur.
- predict how an outdoor plant would change through the seasons.
- compare and contrast the four seasons of spring, summer, fall (autumn) and winter in terms of temperature, light, and precipitation.
- compare and contrast the activities of some common animals (e.g., squirrels, chipmunks, butterflies, bees, ants, bats, frogs, and humans) during summer and winter by describing changes in their behaviors and body covering.
- compare and contrast how some common plants (e.g., oak trees, pine trees, and lawn grass) appear during summer and winter.
- comprehend at an introductory level that some animals respond to seasonal changes by hibernating (e.g., frogs, bats) or migrating (e.g., some birds and butterflies). (It may be useful to recognize common Virginia animals that hibernate and migrate, but the specific names of animals are not the focus of student learning here.)
- infer what the season is from people’s dress, recreational activities,
1.7 The student will investigate and understand weather and seasonal changes. Key concepts include
   a) changes in temperature, light, and precipitation affect plants and animals, including humans;
   b) there are relationships between daily and seasonal changes; and
   c) changes in temperature, light, and precipitation can be observed and recorded over time.

### Understanding the Standard
(Background Information for Instructor Use Only)

adapted to live in one or two habitats. Earth has many different environments, varying in temperature, moisture, light, and many other factors. Each of these habitats has distinct life forms living in it, forming complex communities of interdependent organisms. A habitat must include a source of food for the animal, a source of water for the animal, access to some sort of shelter for the animal, and an adequate amount of space so that enough habitat components are available to the animal. Some animals’ habitats are very small, but some animals require a large amount of space.

- The body coverings of some animals change with the seasons. This includes thickness of fur and coloration.
- Changes made by people include their dress, recreation, and work.

### Essential Knowledge, Skills, and Processes

and work activities.
Grade One
Science Strand

Earth Resources

This strand focuses on student understanding of the role of resources in the natural world and how people can utilize those resources in a sustainable way. An important idea represented in this strand is the concept of management of resource use. This begins with basic ideas of conservation and proceeds to more abstract consideration of costs and benefits. The topics developed include conservation of materials, soil and plants as resources, energy use, water, Virginia’s resources, and how public policy impacts the environment. This strand includes science standards K.11, 1.8, 2.8, 3.10, 3.11, 4.9, and 6.9.
Standard 1.8

1.8 The student will investigate and understand that natural resources are limited. Key concepts include
a) identification of natural resources;
b) factors that affect air and water quality; and
c) recycling, reusing, and reducing consumption of natural resources.

Overview
This standard focuses on identifying what natural resources are; basic ways we can help conserve those natural resources, especially water and air; and the preservation of land to use as parks. The standard extends the perception of young students from the present to the future and from self to their community. Standard K.11 establishes a foundation for this standard. It is intended that students will actively develop scientific investigation, reasoning, and logic skills (1.1) in the context of the key concepts presented in this standard.
Standard 1.8

The student will investigate and understand that natural resources are limited. Key concepts include
a) identification of natural resources;
 b) factors that affect air and water quality; and
  c) recycling, reusing, and reducing consumption of natural resources.

### Understanding the Standard
(Background Information for Instructor Use Only)

- Natural resources provide us with the things we need in order to live, including food, clothing, water, air, shelter, land, and energy.
- What we put into the air, especially the products of the fuels we burn, affects the quality of the air. Waste produced by animals, including humans, and factories can affect the quality of water. Some pollution washes from yards, streets, and farms.
- Many natural resources are limited and cannot be renewed. Other resources are limited and cannot be renewed, but they may last a very long time.
- Recycling recovers used materials. Many materials can be recycled and used again, sometimes in different forms. Recycling helps to save our natural resources. An example of a recycled material is newspapers that are turned into writing tablets.
- Reusing materials means using them more than once. Examples include using dishes and utensils that are washed after use rather than using paper plates and plastic utensils and putting them in the trash.
- Resources will last longer if we recycle them, reuse them, or reduce consumption of them.
- The creation of parks can help preserve land. Parks have many uses, including recreation.

### Essential Knowledge, Skills, and Processes

In order to meet this standard, it is expected that students will

- identify natural resources such as plants and animals, water, air, land, minerals, forests, and soil.
- recognize that many natural resources are limited.
- compare and contrast ways of conserving resources. This includes recycling, reusing, and reducing consumption of natural resources.
- classify factors that affect air and water quality.
- describe ways students and schools can help improve water and air quality in our communities.
- determine some basic factors that affect water quality by conducting simple investigations in the school environment. Students should be able to make and record observations of what happens to runoff water on rainy days. (Related to 1.3.)
- predict what would happen if natural resources were used up, and explain ways to prevent this from happening.
- discuss the value of parks to wildlife and to people.