



# **Science Standards of Learning** ***Curriculum Framework***

Commonwealth of Virginia  
Department of Education  
Richmond, Virginia

## **Grade One**

**Modified to include pacing and resources for instruction by LCPS for SY 2008-09**

Special Thanks to:

Elementary Teachers Serving on the Curriculum Committees



**2008-2009 Grade 1 Science  
Pacing Guide *At a Glance***

Quarter	Month	Topic	Related SOL	Suggested number of Lessons*	Target Date for Completion
1 <sup>st</sup>	Sept, Oct	<b>What Changes in Autumn?</b> Sun and Earth (day and night) Plants (growth, falling leaves) Animals (coverings, preparing for winter) Natural Resources People in the Fall (dress, recreation)	1.6 a, b 1.7 a, 1.1† 1.5, 1.7 b, 1.8a‡ 1.7 c	4 6 4 2	October 31, 2008
2 <sup>nd</sup>	Nov, Dec, Jan	<b>How Do We Adapt To Winter?</b> Sun and Earth (temp, light, precip) Plants (dormant, evergreen, deciduous, changes through the seasons) Animals (life needs, body coverings, habitats related to seasons, hibernation, migration) People in Winter	1.6 a, b 1.4, 1.7, 1.1  1.5, 1.7b  1.7c	4 3  8  2	January 22, 2009
3 <sup>rd</sup>	Feb, Mar	<b>What Moves You?</b> Matter Force, Motion and Energy	1.3, 1.1 1.2, 1.1	6 5	April 3, 2009
4 <sup>th</sup>	Apr, May, June	<b>What Changes in Spring?</b> Sun and Earth (temp, light, precip) Plants (budding and growth) Animals (behaviors in spring) Natural Resources	1.6, 1.7 1.4, 1.7, 1.1 1.7 1.8b, c‡	3 8 2 4	June 19, 2009

\*A lesson is approximately 30- 40 minutes

†Scientific Investigation, Reasoning, and Logic (Science SOL 1.1) is reinforced throughout the year in all science lessons

‡Meaningful Watershed Experience Opportunity

**Essential Skills are listed with each SOL in the framework that follows.**

**All essential skills should be covered with the related SOL.**

## Introduction to Loudoun County's Science Curriculum

This Curriculum Guide and Framework is a merger of the Virginia Standards of Learning (SOL) and the Science Achievement Standards of Loudoun County Public Schools. Many sections are copies or modifications of Virginia's SOL documents. Suggestions on pacing and resources represent the professional consensus of Loudoun's teachers concerning the implementation of these standards.

### Contents

K-12 Safety in the Science Classroom	Page 4
The Role of Instructional Technology in the Science Classroom	Page 5
Internet Safety	Page 6
Meaningful Watershed Educational Experience	Page 7
Investigate and Understand	Page 9
Science Standards of Learning Goals	Page 10
Grade One Resources Grouped by Quarter	Page 11
Science Standard 1.1	Page 15
Resources for 1.1	Page 18
Science Standard 1.2	Page 19
Resources for 1.2	Page 21
Science Standard 1.3	Page 22
Resources for 1.3	Page 24
Science Standard 1.4	Page 25
Resources for 1.4	Page 27
Science Standard 1.5	Page 29
Resources for 1.5	Page 31
Science Standard 1.6	Page 33
Resources for 1.6	Page 35
Science Standard 1.7	Page 37
Resources for 1.7	Page 40
Science Standard 1.8	Page 44
Resources for 1.8	Page 46
Appendix: Focal Points for 1 <sup>st</sup> Grade Science	Page 47

## K-12 Safety in the Science Classroom

In implementing the Science Standards of Learning, students must know how to follow safety guidelines, demonstrate appropriate laboratory safety techniques, and use equipment safely while working individually and in groups.

Safety must be given the highest priority in implementing the K-12 instructional program for science. Correct and safe techniques, as well as wise selection of experiments, resources, materials, and field experiences appropriate to age levels, must be carefully considered with regard to safety precautions for every instructional activity. Safe science classrooms require thorough planning, careful management, and constant monitoring of student activities. Class enrollment should not exceed the designed capacity of the room.

Teachers must be knowledgeable of the properties, use and proper disposal of all chemicals that may be judged as hazardous prior to their use in an instructional activity. Such information is referenced through the MSDS forms (Materials Safety Data Sheets). The identified precautions involving the use of goggles, gloves, aprons, and fume hoods must be followed as prescribed.

While no comprehensive list exists to cover all situations, the following should be reviewed to avoid potential safety problems. Appropriate safety procedures should be used in the following situations:

- Observing wildlife; handling living and preserved organisms; and contact with natural hazards such as poison ivy, ticks, mushrooms, insects, spiders, and snakes
- Field activities in, near, or over bodies of water
- Handling of glass tubing, sharp objects, glassware, and labware
- Natural gas burners, Bunsen burners, and other sources of flame/heat
- Hazards associated with direct sunlight (sunburn and eye damage)
- Use of extreme temperatures and cryogenic materials
- Hazardous chemicals including toxins, carcinogens, flammable and explosive materials
- Acid/base neutralization reactions/dilutions
- Production of toxic gases or situations where high pressures are generated
- Biological cultures, their appropriate disposal, and recombinant DNA
- Power equipment/motors
- High voltage/exposed wiring
- Laser beam, UV, and other radiation

The use of human body fluids or tissues is generally prohibited for classroom lab activities. Further guidance from the following sources may be taken into account:

- OSHA (Occupational Safety and Health Administration)
- ISEF (International Science and Engineering Fair Rules)
- Public health departments and local school division protocols.

For more detailed information about safety in science, consult the *LCPS Science Safety Manual*.  
<http://www.intranet.lcps>

## **The Role of Instructional Technology in Science Education**

The use of current and emerging technologies is essential to the K-12 science instructional program.

Specifically, technology must

- Assist in improving every student's functional literacy. This includes improved communication through reading/information retrieval (the use of telecommunications), writing (word processing), organization and analysis of data (databases, spreadsheets, and graphics programs), selling one's idea (presentation software), and resource management (project management software).
- Be readily available and used regularly as an integral and ongoing part in the delivery and assessment of instruction.
- Include instrumentation oriented toward the instruction and learning of science concepts, skills, and processes. Technology, however, should not be limited to traditional instruments of science such as microscopes, labware, and data-collecting apparatus but should also include computers, robotics, interactive-optical laser discs, video-microscopes, graphing calculators, CD-ROMs, global positioning systems (GPS), probeware, on-line telecommunication, software and appropriate hardware, as well as other emerging technologies.
- Be reflected in the "instructional strategies" generally developed at the local school division level.

In most cases, the application of technology in science should remain "transparent" unless it is the actual focus of the instruction. One must expect students to "do as a scientist does" and not simply hear about science if they are truly expected to explore, explain, and apply scientific concepts, skills, and processes.

As computer/technology skills are essential components of every student's education, it is important that these skills are a shared responsibility of teachers of all disciplines and grade levels.

## Internet Safety

The Internet allows students to learn from a wide variety of resources and communicate with people all over the world. Students should develop skills to recognize valid information, misinformation, biases, or propaganda. Students should know how to protect their personal information when interacting with others and about the possible consequences of online activities such as social networking, e-mail, and instant messaging.

- Students need to know that not all Internet information is valid or appropriate.
- Students should be taught specifically how to maximize the Internet's potential while protecting themselves from potential abuse.
- Internet messages and the people who send them are not always what or who they seem.
- Predators and cyberbullies anonymously use the Internet to manipulate students. Students must learn how to avoid dangerous situations and get adult help.

Cybersafety should be addressed when students research online resources or practice other skills through interactive sites. Science teachers should address underlying principles of cybersafety by reminding students that the senses are limited when communicating via the Internet or other electronic devices and that the use of reasoning and logic can extend to evaluating online situations.

Listed below are ways of integrating the teaching of internet safety with the 1<sup>st</sup> Grade Science Virginia Standards of Learning.

### **Remind students that the senses cannot be used in many online communications.**

#### *Five Senses Lesson*

[http://www.eduref.org/Virtual/Lessons/Health/Body\\_Systems\\_and\\_Senses/BSS0005.html](http://www.eduref.org/Virtual/Lessons/Health/Body_Systems_and_Senses/BSS0005.html)

Use a blindfold to explain the five senses and point out that many senses are absent when using modern communication devices.

#### *Great Communications Inventions* [http://www.cybersmartcurriculum.org/lesson\\_plans/45\\_21.asp](http://www.cybersmartcurriculum.org/lesson_plans/45_21.asp)

This lesson provides students the opportunity to explore modern communications technologies, including the advantages and disadvantages. Internet safety is a natural component to explore.

Additional information about Internet safety may be found on the Virginia Department of Education's Website at

<http://www.doe.virginia.gov/VDOE/Technology/OET/internet-safety-guidelines.shtml>

## Meaningful Watershed Educational Experiences

The “Stewardship and Community Engagement” Commitment of the *Chesapeake 2000* agreement clearly focuses on connecting individuals and groups to the Bay through their shared sense of responsibility and action. The goal of this Commitment formally engages schools as integral partners *to undertake initiatives* in helping to meet the Agreement.

Two objectives developed as part of this goal describe more specific outcomes to be achieved by the jurisdictions in promoting stewardship and assisting schools. These are:

*Beginning with the class of 2005, provide a meaningful Bay or stream outdoor experience for every school student in the watershed before graduation from high school.*

*Provide students and teachers alike with opportunities to directly participate in local restoration and protection projects, and to support stewardship efforts in schools and on school property.*

There is overwhelming consensus that knowledge and commitment build from firsthand experience, especially in the context of one’s neighborhood and community. Carefully selected experiences driven by rigorous academic learning standards, engendering discovery and wonder, and nurturing a sense of community will further connect students with the watershed and help reinforce an ethic of responsible citizenship.

### **Defining a Meaningful Bay or Stream Outdoor Experience**

A *meaningful* Bay or stream outdoor experience should be defined by the following.

#### **Experiences are investigative or project oriented.**

Experiences include activities where questions, problems, and issues are investigated by the collection and analysis of data, both mathematical and qualitative. Electronic technology, such as computers, probeware, and GPS equipment, is a key component of these kinds of activities and should be integrated throughout the instructional process.

The nature of these experiences is based on learning standards and should include the following kinds of activities.

- Investigative or experimental design activities where students or groups of students use equipment, take measurements, and make observations for the purpose of making interpretations and reaching conclusions.
- Project-oriented experiences, such as restoration, monitoring, and protection projects, that are problem solving in nature and involve many investigative skills.

#### **Experiences are richly structured and based on high-quality instructional design.**

#### **Experiences are an integral part of the instructional program.**

#### **Experiences are part of a sustained activity.**

#### **Experiences consider the watershed as a system.**

**Experiences involve external sharing and communication.**

**Experiences are enhanced by natural resources personnel.**

**Experiences are for all students.**

Experiences such as tours, gallery visits, simulations, demonstrations, or “nature walks” may be instructionally useful, but alone do not constitute a *meaningful* experience as defined here.

*The preceding text contains excerpts from:*

*Chesapeake Bay Program Education Workgroup*

**STEWARDSHIP AND MEANINGFUL WATERSHED EDUCATIONAL EXPERIENCES**

[http://www.chesapeakebay.net/pubs/doc-c2k\\_meaningful\\_bay\\_experience.pdf](http://www.chesapeakebay.net/pubs/doc-c2k_meaningful_bay_experience.pdf)

The link is found in the Virginia Department of Education Instructional Resources for Science:

<http://www.doe.virginia.gov/VDOE/Instruction/Science/>

Each LCPS K-12 Science Pacing Guide indicates where the Meaningful Watershed Educational Experiences fit into the Virginia Standards of Learning. Resources for these experiences are cited in the *Resources* section of each standard.

Many of the resources are from *Lessons from the Bay* and *Virginia's Water Resources a Toolkit for Teachers*. These and other watershed resources are posted on the LCPS intranet at:

<http://www.intranet.lcps>

## Investigate and Understand

Many of the standards in the Science Standards of Learning begin with the phrase “Students will investigate and understand.” This phrase was chosen to communicate the range of rigorous science skills and knowledge levels imbedded in each standard. Limiting a standard to one observable behavior such as “describe” or “explain” would have narrowed the interpretation of what was intended to be a rich, highly rigorous, and inclusive content standard.

“Investigate” refers to scientific methodology and implies systematic use of the following inquiry skills:

- Observing
- Classifying and sequencing
- Communicating
- Measuring
- Predicting
- Hypothesizing
- Inferring
- Defining, controlling, and manipulating variables in experimentation
- Designing, constructing, and interpreting models
- Interpreting, analyzing, and evaluating data

“Understand” refers to various levels of knowledge application. In the Science Standards of Learning these knowledge levels include the ability to

- Recall or recognize important information, key definitions, terminology, and facts
- Explain the information in one’s own words, comprehend how the information is related to other key facts, and suggest additional interpretations of its meaning or importance
- Apply the facts and principles to new problems or situations, recognizing what information is required for a particular situation, explaining new phenomena with the information, and determining when there are exceptions
- Analyze the underlying details of important facts and principles, recognizing the key relations and patterns that are not always readily visible
- Arrange and combine important information, facts, and principles to produce a new idea, plan, procedure, or product
- Make judgments about information in terms of accuracy, precision, consistency, or effectiveness.

Therefore, the use of “investigate and understand” allows each content standard to become the basis for a broad range of teaching objectives, which the local school division will develop and refine to meet the intent of the Science Standards of Learning.

## **Science Standards of Learning**

### Goals

The purpose of scientific investigation and discovery are to satisfy humankind's quest for knowledge and understanding and to preserve and enhance the quality of the human experience. Therefore, as a result of science instruction, students will be able to:

1. Develop and use an experimental design in scientific inquiry
2. Use the language of science to communicate understanding
3. Investigate phenomena using technology
4. Apply scientific concepts, skills, and processes to everyday experiences
5. Experience the richness and excitement of scientific discovery of the natural world through the historical and collaborative quest for knowledge and understanding.
6. Make informed decisions regarding contemporary issues taking into account the following:
  - public policy and legislation
  - economic costs/benefits
  - validation from scientific data and the use of scientific reasoning and logic
  - respect for living things
  - personal responsibility
  - history of scientific discovery
7. Develop scientific dispositions and habits of mind including:
  - curiosity
  - demand for verification
  - respect for logic and rational thinking
  - consideration of premises and consequences
  - respect for historical contributions
  - attention to accuracy and precision
  - patience and persistence
8. Explore science-related careers and interest.

# Resources Grouped by Quarter

## First Quarter – “What Changes in Autumn?”

### Sun and Earth (1.6 a, b)

*THE SUNSHINE MAKES THE SEASONS* Franlyn Branley  
*THE REASON FOR THE SEASONS* Gail Gibbons  
*SEASONS* Gail Gibbons  
*TEMPERATURE AND YOU* Betsy and Giulio Maestro  
*WHEN SUMMER ENDS* Susi Gregg Fowler  
*MY FAVORITE TIME OF YEAR* Susan Pearson  
*SEASONS* Illa Podendorf

### Plants (growth, falling leaves) (1.7 a)

*PUMPKIN CIRCLE: STORY OF A GARDEN* George Levenson  
*THE TINY SEED* Eric Carle  
*WHY DO LEAVES CHANGE COLORS?* Betsy Maestro  
*A BOOK OF SEASONS* Alice and Martin Provensen  
*APPLES AND PUMPKINS* Annie Rockwell  
AIMS: “Observe a Tree”, The Budding Botanist  
AIMS: “Leaf Safari”, Primarily Plants  
AIMS: “Apples A-Peel to Me”, Fall Into Math and Science

### Animals (coverings, preparing for winter) (1.5, 1.7 b)

*RACCOONS AND RIPE CORN* Jim Arnosky  
*AUTUMN STORY* Jill Barklem  
*IN THE WOODS: WHO'S BEEN HERE?* Lindsay Barrett George  
*THE CINNAMON HEN'S AUTUMN DAY* Sandra Dutton  
*DO NOT DISTURB* Margery Facklam

*ANIMALS AND WHERE THEY LIVE* John Feltwell  
*POSSUM'S HARVEST MOON* Anne Hunter  
*THE BEARS' AUTUMN* Keizaburo Tejima  
*A COLOR OF HIS OWN* Leo Lionni  
*FREDERICK* Leo Lionni  
*THE STRANGER* Chris Van Allsburg  
AIMS: “Under Cover”, Critters

### People in the Fall (dress, recreation) (1.7 c)

*WHAT WILL THE WEATHER BE LIKE TODAY?* Paul Rogers  
*HENRY AND MUDGE UNDER THE YELLOW MOON* Cynthia Rylant  
AIMS: “Weather Wear”, Fall Into Math and Science

### *15 Bean Soup*

### *Light and Dark*

### *The Four Seasons*

### *Amazing Animals*

Investigations from the VA Department of Education Science  
Enhanced Scope and Sequence – Grade 1.

<http://www.doe.virginia.gov/VDOE/EnhancedSandS/science.shtml>

# Second Quarter

## “How Do We Adapt to Winter?”

### **Sun and Earth (temp, light, precip) (1.6 a, b)**

*THE SUNSHINE MAKES THE SEASONS* Franlyn Branley

*THE REASON FOR THE SEASONS* Gail Gibbons

*SEASONS* Gail Gibbons

*TEMPERATURE AND YOU* Betsy and Giulio Maestro

*WINTER ACROSS AMERICA* Seymour Simon

*SNOW* Nancy Elizabeth Wallace

*THE BIGGEST SNOWSTORM EVER* Diane Paterson

Seasons Podendorf

*A BOOK OF SEASONS* Provensen

*WINTER, DISCOVERING THE SEASONS* Louis Santrey

*SNOW* Steve Sanfield

*SNOW* Roy McKie and P.D. Eastman

*WINTER MAGIC* Eveline Hasler

*WINTER* by Ron Hirschi

*DEAR REBECCA, WINTER IS HERE* Jean Craighead George

*WHEN IT STARTS TO SNOW* Phillis Gershtator

### **Plants (dormant, evergreen, deciduous, changes through the seasons) (1.4, 1.7)**

*PAPERWHITE* by Nancy Elizabeth Wallace

AIMS: “Observing Bulbs”, Primarily Plants

AIMS: “Evergreen”, Magazine Volume 7 Issue 5

### **Animals (life needs, body coverings, habitats related to seasons, hibernation, migration) (1.5, 1.7 b)**

*ANIMALS IN WINTER* Ron Fisher

*ANIMALS IN WINTER* Henrietta Bancroft and Richard G. Van

Gelder

*IN THE SNOW: WHO’S BEEN HERE?* Lindsey Barrett  
George

*WHAT DO ANIMALS DO IN WINTER* Melvin and Gilda  
Berger

*STOPPING BY WOODS ON A SNOWY EVENING* Robert  
Frost/Susan Jeffers

*GEOFFREY GROUNDHOG PREDICTS THE WEATHER*  
Bruce Koscielniak

*BACKYARD BIRDS OF WINTER* Carol Lerner

*KEEP LOOKING* Millicent Selsam

*How to be a Nature Detective* Millicent Selsam

*OWL MOON* Jane Yolen

*MOUSEKIN’S FROSTY FRIEND* Edna Miller

*MOUSEKIN’S WOODLAND SLEEPERS* Edna Miller

*WHOSE TRACKS ARE THESE?* Jim Nail

AIMS: “Hide and Seek”, Critters

AIMS: “Under Cover”, Critters

### **People in Winter (1.7 c)**

*WINTER FUN* Rita Schlachter

AIMS: “Weather Wear”, Fall Into Math and Science

AIMS: “Mighty Mittens”, Glide Into Winter with Math and Science

### ***Light and Dark***

***Fun with Plants***

***The Four Seasons***

***Amazing Animals***

Investigations from the VA Department of Education Science  
Enhanced Scope and Sequence – Grade 1.

<http://www.doe.virginia.gov/VDOE/EnhancedSandS/science.shtml>

# Third Quarter

## “What Moves You?”

### **Matter (1.3)**

AIMS: “Blue Wave”, Spring Into Math and Science

AIMS: “Lucky Shamrocks”, Spring Into Math and Science

AIMS: “Leaf the Dyeing to Us”, Fall Into Math and Science

*SPECTACULAR SCIENCE* Lee Bennett Hopkins

*SNOW* Helen Frost

*WHAT IS THE WORLD MADE OF? ALL ABOUT SOLIDS*

*LIQUIDS AND GASES* Kathleen Zoehfeld

*SOLIDS, LIQUIDS AND GASES* Ontario Science Center

*SPLISH SPLASH* Joan Bransfield Graham

### **Force, Motion and Energy (1.2)**

*THE SCIENCE BOOK OF MOTION* Neil Ardley

*THE SCIENCE BOOK OF SOUND* Neil Ardley

*FAST AND SLOW* Jack Challoner

*FORCE, MOTION AND ENERGY* Robert Friedhoffer

*PUSH AND PULL* Mike and Maria Gordan

*AMUSEMENT PARK MACHINES* Christine Hahn

*BATHTUBS, SLIDES, ROLLERCOASTERS: SIMPLE MACHINES THAT ARE REALLY INCLINED PLANES*

Christopher Lampton

*FORCES* Karen Bryant Mole

*SOUNDS ALL AROUND* Wendy Pfeffer

*FORCES AND MOTION* Simon de Pina

*PUSH AND PULL* Lola M. Schafer

*TELL ME HOW FAST IT GOES* Willis Shirley

*SOUND* Darlene Stille

*FORCE AND MOVEMENT* Barbara Taylor

*SOUND* Angela Webb

*HOW DO YOU LIFT A LION* Robert E. Wells

AIMS: “Why Wheels?”, Magazine Volume 13 Issue 2

AIMS: “Sound is Vibration”, Primarily Physics

AIMS: “Huff and Puff”, Spring Into Math and Science

AIMS: “Feather Relays”, Magazine Volume 13 Issue 4

*Mix It Up: In Hot Water*

*Mix It Up: In the Kitchen*

*Mix It Up: In the Yard*

*Let’s Be Motion Detectives*

*Sail On*

Investigations from the VA Department of Education Science  
Enhanced Scope and Sequence – Grade 1.

<http://www.doe.virginia.gov/VDOE/EnhancedSandS/science.shtml>

# Fourth Quarter

## “What Changes in Spring”

### **Sun and Earth (temp, light, precip) (1.6, 1.7)**

*SPRING* Ron Hirschi

*SUMMER* Ron Hirshi

*THE SUNSHINE MAKES THE SEASONS* Franlyn Branley

*THE REASON FOR THE SEASONS* Gail Gibbons

*SEASONS* Gail Gibbons

### **Plants (budding and growth) (1.4, 1.7)**

*SUNFLOWER HOUSE* Eve Bunting

*THE VERY HUNGRY CATERPILLAR* Eric Carle

*WILD WILD SUNFLOWER CHILD* Nancy White Carlstrom

*THE BOY WHO DIDN'T BELIEVE IN SPRING* Lucille Clifton

*UNDER THE GREEN WILLOW* Elizabeth Coatsworth

*MISS RUMPHIUS* Barbara Cooney

*THE TINY SEED* Eric Carle

*GROWING VEGETABLE SOUP* Lois Ehlert

*EATING THE ALPHABET* Lois Ehlert

*PLANTING A RAINBOW* Lois Ehlert

*FROM SEED TO PLANT* Gail Gibbons

*MUSHROOM IN THE RAIN* Mirra Ginsburg

*THE REASON FOR A FLOWER* Ruth Heller

*TREE TRUNK TRAFFIC* Bianca Lavies

*PUMPKIN CIRCLE: Story of a Garden* George Levenson

*ALISON'S ZINNIA* Anita Lobel

*THE ROSE IN MY GARDEN* Arnold Lobel

*HOW DO APPLES GROW?* Betsy Maestro

*THE FLOWER ALPHABET BOOK* Jerry Pallotta

*THE LEGEND OF THE BLUEBONNET* Tomie de Paola

*HOW PLANTS GROW* Angela Rouston

*LIFE CYCLE OF A SUNFLOWER* Royston

*TOPS AND BOTTOMS* Janet Stevens

*THE VICTORY GARDEN* Jerry Pallotta and Bob Thomson

*THE GIFT OF THE TREE* Alvin Tresselt

*JUNE 29, 1999* David Wiesner

*WORKING COTTON* Sherley Anne Williams

AIMS: “It’s in the Bag”, Primarily Plants

AIMS: “What Do Plants Need?”, Primarily Plants

AIMS: “Inside a Seed”, Primarily Plants

AIMS: “The Seed Within”, Primarily Plants

AIMS: “Observe a Leaf”, Primarily Plants

AIMS: “Stem Study”, Primarily Plants

AIMS: “Root Study”, Primarily Plants

AIMS: “Flowers”, Primarily Plants

AIMS: “Don’t Leaf Out the Vegetables”, Primarily Plants

### **Animals (behaviors in spring) (1.7)**

BEAR WANTS MORE

### **Natural Resources (1.8)**

OUR EARTH Anne Rockwell

THE GREAT TRASH BASH Loreen Leedy

RECYCLE EVERY DAY! Nancy Elizabeth Wallace

AIMS: “Just a Little Drip”, Magazine Volume 9 Issue 9

AIMS: “Let’s Recycle”, Magazine Volume 5 Issue 4

AIMS: “Drip, Drop, Flip Flop”, Water Precious Water

AIMS: “A New Look at the Old Bag”, Cycles of Knowing and Growing

### **What are Natural Resources?**

*Let the Sun Shine In!*

*Reduce, Reuse, Recycle*

*The Is-It-Litter? Box*

*Henry Heron: A Litter Story*

Investigations from the VA Department of Education Science

Enhanced Scope and Sequence – Grade 1.

<http://www.doe.virginia.gov/VDOE/EnhancedSandS/science.shtml>

**The Science Standards of Learning are listed successively in the pages that follow. See the pacing guide for teaching sequence.**

### **Scientific Investigation, Reasoning, and Logic**

This strand represents a set of systematic inquiry skills that defines what a student should be able to do when conducting activities and investigations. Note that 25% of items on the 3<sup>rd</sup> grade SOL assessment measure these skills.

#### **Standard 1.1**

The student will conduct investigations in which

- a) differences in physical properties are observed using the senses;
- b) simple tools are used to enhance observations;
- c) objects or events are classified and arranged according to attributes or properties;
- d) observations and data are communicated orally and with simple graphs, pictures, written statements, and numbers;
- e) length, mass, and volume are measured using standard and nonstandard units;
- f) predictions are based on patterns of observation rather than random guesses;
- g) simple experiments are conducted to answer questions; and
- h) inferences are made and conclusions are drawn about familiar objects and events.

#### **Understanding the Standard**

The skills described in standard 1.1 are 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 and achieve proficiency with those skills in the context of the concepts developed at the first grade. Standard 1.1 does not require a discrete unit on scientific investigation because the inquiry 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

Overview	Essential Knowledge, Skills, and Processes
<p>The concepts developed in this standard include the following:</p> <ul style="list-style-type: none"><li>• To communicate an observation accurately one must provide a clear description of exactly what is observed, and nothing more.</li><li>• Simple tools, such as a magnifying glass, a ruler, and a thermometer can extend the observations that people can make.</li><li>• 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.</li><li>• Standard measures are important for describing an object because standard measures are recognized by everyone. Many non-standard measures, such as hand or finger length, vary considerably.</li><li>• An inference is a conclusion based on evidence about events that have already occurred.</li></ul>	<p>In order to meet this standard, it is expected that students should be able to:</p> <ul style="list-style-type: none"><li>• use their senses and simple tools, such as a magnifying glass, ruler, thermometer to enhance their observations of physical properties.</li><li>• classify and arrange objects or events according to at least two attributes or properties so that similarities and differences become apparent.</li><li>• communicate observations made and data collected orally and with simple graphs, pictures, written statements, and numbers.</li><li>• measure length, mass, and volume using standard and nonstandard units and appropriate instruments. By the third grade students will be expected to have basic facility with metric measures including centimeters, grams, and liters.</li><li>• use familiar events and objects to make inferences and draw conclusions.</li></ul>

**Standard 1.1 (continued)**

<b>Overview</b>	<b>Essential Knowledge, Skills, and Processes</b>
<ul style="list-style-type: none"><li>• A prediction is a forecast about what <i>may happen</i> in some future situation. It is based on information and evidence. A prediction is different from a guess.</li><li>• An experiment is a fair test designed to answer a question.</li></ul>	<ul style="list-style-type: none"><li>• predict outcomes based on actual observations and evidence rather than random guesses.</li><li>• answer questions by conducting simple experiments/investigations using simple tools, such as thermometer, ruler, or magnifying glass. A simple experiment is one that changes only one thing at a time (tests only one variable), gives quick results, and provides easily observed changes.</li></ul>

## Standard 1.1

Resources	Teacher Notes
<p><i>ZOO-OLOGY</i> Joelle Jolivet  <i>SINKING AND FLOATING</i> Pam Munoz Ryan  <i>HOW TO THINK LIKE A SCIENTIST</i> Stephen Kramer  <i>MY FIVE SENSES</i> Alike Brandenberg  <i>SOLIDS, LIQUIDS AND GASES</i> Ontario Science Centre</p> <p>AIMS: “Rocks and More Rocks”, <u>Primarily Earth</u>  AIMS: “Sandpile”, <u>Primarily Earth</u>  AIMS: “Rock Groups”, <u>Primarily Earth</u>  AIMS: “Air Temperature”, <u>Primarily Earth</u>  AIMS: “Dirt Baggers”, <u>Cycles of Knowing and Growing</u>  AIMS: “Animal Crackers”, <u>Spring Into Math and Science</u>  AIMS: “If the Shoe Fits”, <u>Glide Into Winter with Math and Science</u>  AIMS: “Goody, Goody Gumballs”, <u>Fall Into Math and Science</u>  AIMS: “Seed Sort”, <u>Primarily Plants</u>  AIMS: “You Can Count On Us”, <u>Fall Into Math and Science</u>  AIMS: “How Tall Are You?”, <u>Fall Into Math and Science</u>  AIMS: “A Weigh We Go”, <u>Fall Into Math and Science</u>  AIMS: “Sponge Garden”, <u>Spring Into Math and Science</u>  AIMS: “A Time of Their Own”, <u>Cycles of Knowing and Growing</u>  AIMS: “My Rock”, <u>Primarily Earth</u>  AIMS: “Lucky Shamrocks”, <u>Spring Into Math and Science</u>  AIMS: “Whoa -That’s Heavy !”, <u>Glide Into Winter with Math and Science</u>  AIMS: “Feet Findings”, <u>Spring Into Math and Science</u>  AIMS: “Rocks and More Rocks : Rock Trains”, <u>Primarily Earth</u>  AIMS: “Polar Bear Pie”, <u>Glide Into Winter With Math and Science</u>  AIMS: “Leaf the Dyeing to Us”, <u>Fall Into Math and Science</u>  AIMS: “Melt an Ice Cube”, <u>Primarily Physics</u></p> <p><i>15 Bean Soup</i> an Investigation from the VA Department of Education Science Enhanced Scope and Sequence – Grade 1.  <a href="http://www.doe.virginia.gov/VDOE/EnhancedSandS/science.shtml">http://www.doe.virginia.gov/VDOE/EnhancedSandS/science.shtml</a></p> <p>Correlations to VA Science SOL (AIMS and Children’s Literature) found on the LCPS intranet at:  <a href="http://www.intranet.lcps">http://www.intranet.lcps</a></p> <p>Standards of Learning Literature Correlation searchable database  “Connections”:<a href="http://www.fcps.k12.va.us/cpsapps/connections/">http://www.fcps.k12.va.us/cpsapps/connections/</a></p>	

**Force, Motion, and Energy**

This strand focuses on students understanding of what force, motion, and energy are and how the concepts are connected.

**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;
- c) pushes or pulls can change the movement of an object; and
- d) the motion of objects may be observed in toys and in playground activities.

**Understanding the Standard**

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.

## Standard 1.2

<b>Overview</b>	<b>Essential Knowledge, Skills, and Processes</b>
<p>The concepts developed in this standard include the following:</p> <ul style="list-style-type: none"><li>• An object’s motion may be described by tracing and measuring its position over time. The motion of objects may be straight, circular, curved, or back and forth.</li><li>• One kind of back and forth motion is vibration. Vibrations may create sound.</li><li>• Pushing or pulling can change the position and motion of objects. For the same object, the size of the change is related to the strength of the push or pull.</li></ul>	<p>In order to meet this standard, it is expected that students should be able to:</p> <ul style="list-style-type: none"><li>• make and communicate observations about moving objects. Examples should include balls, objects with wheels, windup toys, tops, rubber bands, and playground equipment.</li><li>• predict an object’s movement using its size, shape, and the force of the push or pull on it.</li><li>• conduct a simple experiment to determine an object’s movement.</li><li>• describe and classify the motion of an object as straight, circular, curved, or back and forth.</li><li>• understand that vibrations may create sound, such as humming, strumming a guitar, or plucking a rubber band.</li><li>• record observations of movement (length/distance) using standard (English/metric) and nonstandard units.</li><li>• compare the movement of objects using graphs, pictures, and/or numbers.</li></ul>

## Standard 1.2

Resources	Teacher Notes
<p><u>Harcourt Science</u>; Unit F, chapter 1; Unit E, Chapter 2</p> <p><i>THE SCIENCE BOOK OF MOTION</i> Neil Ardley <i>THE SCIENCE BOOK OF SOUND</i> Neil Ardley <i>FAST AND SLOW</i> Jack Challoner <i>FORCE, MOTION AND ENERGY</i> Robert Friedhoffer <i>PUSH AND PULL</i> Mike and Maria Gordan <i>AMUSEMENT PARK MACHINES</i> Christine Hahn <i>BATHTUBS, SLIDES, ROLLERCOASTERS: SIMPLE MACHINES THAT ARE REALLY INCLINED PLANES</i> Christopher Lampton <i>FORCES</i> Karen Bryant Mole <i>SOUNDS ALL AROUND</i> Wendy Pfeffer <i>FORCES AND MOTION</i> Simon de Pina <i>PUSH AND PULL</i> Lola M. Schafer <i>TELL ME HOW FAST IT GOES</i> Willis Shirley <i>SOUND</i> Darlene Stille <i>FORCE AND MOVEMENT</i> Barbara Taylor <i>SOUND</i> Angela Webb <i>HOW DO YOU LIFT A LION</i> Robert E. Wells</p> <p>AIMS: “Why Wheels?”, Magazine Volume 13 Issue 2 AIMS: “Sound is Vibration”, <u>Primarily Physics</u> AIMS: “Huff and Puff”, <u>Spring Into Math and Science</u> AIMS: “Feather Relays”, Magazine Volume 13 Issue 4</p> <p><b><i>Lets Be Motion Detectives</i></b> <b><i>Sail On</i></b> Investigations from the VA Department of Education Science Enhanced Scope and Sequence – Grade 1. <a href="http://www.doe.virginia.gov/VDOE/EnhancedSandS/science.shtml">http://www.doe.virginia.gov/VDOE/EnhancedSandS/science.shtml</a></p> <p>Correlations to VA Science SOL (AIMS and Children’s Literature) found on the LCPS intranet at: <a href="http://www.intranet.lcps">http://www.intranet.lcps</a></p> <p>Standards of Learning Literature Correlation searchable database “Connections” can be found at: <a href="http://www.fcps.k12.va.us/cpsapps/connections/">http://www.fcps.k12.va.us/cpsapps/connections/</a></p>	

**Matter**

This strand focuses on the description, physical properties, and basic structure of matter.

**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, others will not;
- b) some common solids will dissolve in water, others will not; and
- c) some substances will dissolve more readily in hot water than in cold water.

**Understanding the Standard**

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 states (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

<b>Overview</b>	<b>Essential Knowledge, Skills, and Processes</b>
<p>The concepts developed in this standard include the following:</p> <ul style="list-style-type: none"><li>• Different types of materials react differently when mixed with water.</li><li>• Some liquids will mix with water while others will not.</li><li>• Some solids will dissolve in water while others will not.</li><li>• The temperature of the water affects how easily a substance will dissolve in it.</li></ul>	<p>In order to meet this standard, it is expected that students should be able to:</p> <ul style="list-style-type: none"><li>• describe and apply the term “dissolve.”</li><li>• predict and describe how a variety of materials (vinegar, milk, baking soda, powdered drink mix, sugar, salt, sand, oil, soil, rocks) act when mixed with water.</li><li>• classify liquids and solids into those that will dissolve in water and those that will not. Use picture graphs, tables, and/or charts to record and display the information.</li><li>• infer that some substances will dissolve more easily in hot water than in cold water by conducting investigations using different temperatures of water.</li></ul>

### Standard 1.3

Resources	Teacher Notes
<p><u>Harcourt Science</u>; Unit E, chapter 1</p> <p><i>SPECTACULAR SCIENCE</i> Lee Bennett Hopkins <i>SNOW</i> Helen Frost <i>WHAT IS THE WORLD MADE OF? ALL ABOUT SOLIDS LIQUIDS AND GASES</i> Kathleen Zoehfeld <i>SOLIDS, LIQUIDS AND GASES</i> Ontario Science Center <i>SPLISH SPLASH</i> Joan Bransfield Graham</p> <p>AIMS: “Blue Wave”, <u>Spring Into Math and Science</u> AIMS: “Lucky Shamrocks”, <u>Spring Into Math and Science</u> AIMS: “Leaf the Dyeing to Us”, <u>Fall Into Math and Science</u></p> <p><b><i>Mix It Up: In Hot Water</i></b> <b><i>Mix It Up: In the Kitchen</i></b> <b><i>Mix It Up: In the Yard</i></b></p> <p>Investigations from the VA Department of Education Science Enhanced Scope and Sequence – Grade 1. <a href="http://www.doe.virginia.gov/VDOE/EnhancedSandS/science.shtml">http://www.doe.virginia.gov/VDOE/EnhancedSandS/science.shtml</a></p> <p>Correlations to VA Science SOL (AIMS and Children’s Literature) found on the LCPS intranet at: <a href="http://www.intranet.lcps">http://www.intranet.lcps</a></p> <p>Standards of Learning Literature Correlation searchable database “Connections” can be found at: <a href="http://www.fcps.k12.va.us/cpsapps/connections/">http://www.fcps.k12.va.us/cpsapps/connections/</a></p>	

**Life Processes**

This strand focuses on the life processes of plants and animals and the specific needs of each.

**Standard 1.4**

The student will investigate and understand that plants have life needs and functional parts and can be classified according to certain characteristics. Key concepts include

- a) needs (food, air, water, light, and a place to grow);
- b) parts (seeds, roots, stems, leaves, blossoms, fruits); and
- c) characteristics (edible/nonedible, flowering/nonflowering, evergreen/deciduous).

**Understanding the Standard**

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 nourishment, air, and a place 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), 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.

## Standard 1.4

Overview	Essential Knowledge, Skills, and Processes
<p>The concepts developed in this standard include the following:</p> <ul style="list-style-type: none"><li>Plants have basic needs, including food, air, water, light, and a place to grow.</li><li>Plants have different structures that serve different functions in growth, survival, and reproduction.</li><li>The functions of plant parts include roots holding plants in place and absorbing water, seeds making new plants, leaves making food for the plant, and stems holding the plants upright and transporting materials up and down the plant.</li><li>Plants can be categorized by their different characteristics, such as edible/nonedible, flowering/nonflowering, and evergreen/deciduous. <b>Students do not need to know the terms nonedible and deciduous. The focus should be on the concept, not the terminology.</b></li></ul>	<p>In order to meet this standard, it is expected that students should be able to:</p> <ul style="list-style-type: none"><li>conduct simple experiments/investigations related to plant needs by changing one variable (food, air, water, light, and place to grow) at a time. <b>Students do not need to know the term variable.</b></li><li>create and interpret a model/drawing of a plant, including seeds, roots, stems, leaves, blossoms and fruits.</li><li>identify the functions of the seed, root, stem, and leaf.</li><li>classify plants by the characteristics of edible/nonedible, flowering/nonflowering, and evergreen/deciduous using tables, charts, and picture graphs.</li></ul>

## Standard 1.4

Resources	Teacher Notes
<p data-bbox="180 274 1047 310"><u>Harcourt Science</u>; Unit A, Chapters 1 &amp; 2</p> <p data-bbox="180 347 1047 418"><b>Plants (dormant, evergreen, deciduous, changes through the seasons) (1.4, 1.7)</b></p> <p data-bbox="180 420 1047 456"><i>PAPERWHITE</i> by Nancy Elizabeth Wallace</p> <p data-bbox="180 457 1047 493">AIMS: “Observing Bulbs”, <u>Primarily Plants</u></p> <p data-bbox="180 495 1047 531">AIMS: “Evergreen”, Magazine Volume 7 Issue 5</p> <p data-bbox="180 552 1047 587"><b>Plants (budding and growth) (1.4, 1.7)</b></p> <p data-bbox="180 589 1047 625"><i>SUNFLOWER HOUSE</i> Eve Bunting</p> <p data-bbox="180 626 1047 662"><i>THE VERY HUNGRY CATERPILLAR</i> Eric Carle</p> <p data-bbox="180 664 1047 699"><i>WILD WILD SUNFLOWER CHILD</i> Nancy White Carlstrom</p> <p data-bbox="180 701 1047 737"><i>THE BOY WHO DIDN'T BELIEVE IN SPRING</i> Lucille Clifton</p> <p data-bbox="180 738 1047 774"><i>UNDER THE GREEN WILLOW</i> Elizabeth Coatsworth</p> <p data-bbox="180 776 1047 812"><i>MISS RUMPHIUS</i> Barbara Cooney</p> <p data-bbox="180 813 1047 849"><i>THE TINY SEED</i> Eric Carle</p> <p data-bbox="180 850 1047 886"><i>GROWING VEGETABLE SOUP</i> Lois Ehlert</p> <p data-bbox="180 888 1047 924"><i>EATING THE ALPHABET</i> Lois Ehlert</p> <p data-bbox="180 925 1047 961"><i>PLANTING A RAINBOW</i> Lois Ehlert</p> <p data-bbox="180 963 1047 998"><i>FROM SEED TO PLANT</i> Gail Gibbons</p> <p data-bbox="180 1000 1047 1036"><i>MUSHROOM IN THE RAIN</i> Mirra Ginsburg</p> <p data-bbox="180 1037 1047 1073"><i>THE REASON FOR A FLOWER</i> Ruth Heller</p> <p data-bbox="180 1075 1047 1110"><i>TREE TRUNK TRAFFIC</i> Bianca Lavies</p> <p data-bbox="180 1112 1047 1148"><i>PUMPKIN CIRCLE: Story of a Garden</i> George Levenson</p> <p data-bbox="180 1149 1047 1185"><i>ALISON'S ZINNIA</i> Anita Lobel</p> <p data-bbox="180 1187 1047 1222"><i>THE ROSE IN MY GARDEN</i> Arnold Lobel</p> <p data-bbox="180 1224 1047 1260"><i>HOW DO APPLES GROW?</i> Betsy Maestro</p> <p data-bbox="180 1261 1047 1297"><i>THE FLOWER ALPHABET BOOK</i> Jerry Pallotta</p> <p data-bbox="180 1299 1047 1334"><i>THE LEGEND OF THE BLUEBONNET</i> Tomie de Paola</p> <p data-bbox="180 1336 1047 1372"><i>HOW PLANTS GROW</i> Angela Rouston</p> <p data-bbox="180 1373 1047 1409"><i>LIFE CYCLE OF A SUNFLOWER</i> Royston</p> <p data-bbox="180 1411 1047 1446"><i>TOPS AND BOTTOMS</i> Janet Stevens</p>	

*THE VICTORY GARDEN* Jerry Pallotta and Bob Thomson  
*THE GIFT OF THE TREE* Alvin Tresselt  
*JUNE 29, 1999* David Wiesner  
*WORKING COTTON* Sherley Anne Williams

AIMS: “It’s in the Bag”, Primarily Plants  
AIMS: “What Do Plants Need?”, Primarily Plants  
AIMS: “Inside a Seed”, Primarily Plants  
AIMS: “The Seed Within”, Primarily Plants  
AIMS: “Observe a Leaf”, Primarily Plants  
AIMS: “Stem Study”, Primarily Plants  
AIMS: “Root Study”, Primarily Plants  
AIMS: “Flowers”, Primarily Plants  
AIMS: “Don’t Leaf Out the Vegetables”, Primarily Plants

***Fun with Plants*** an Investigation from the VA Department of Education Science Enhanced Scope and Sequence – Grade 1.  
<http://www.doe.virginia.gov/VDOE/EnhancedSandS/science.shtml>

Correlations to VA Science SOL (AIMS and Children’s Literature) found on the LCPS intranet at:  
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<http://www.fcps.k12.va.us/cpsapps/connections/>

## **Life Processes**

### **Standard 1.5**

The student will investigate and understand that animals, including people, have life needs and specific physical characteristics and can be classified according to certain characteristics. Key concepts include

- a) life needs (air, food, water, and a suitable place to live);
- b) physical characteristics (body coverings, body shape, appendages, and methods of movement); and
- c) other characteristics (wild/tame, water homes/land homes).

### **Understanding the Standard**

This standard focuses on the idea that living things move, need food, breath, 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), 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.

## Standard 1.5

Overview	Essential Knowledge, Skills, and Processes
<p>The concepts developed in this standard include the following:</p> <ul style="list-style-type: none"> <li>• Animals, including people, have basic life needs including air, food, water and a suitable place to live.</li> <li>• Body coverings include hair, fur, feathers, scales, and shells.</li> <li>• Appendages are parts with specific functions that extend from the main body, such as arms, legs, wings, fins, and tails. <b>Students do not need to know the term appendage. The focus should be on the concept, not the terminology.</b></li> <li>• Methods of movement may include walking, crawling, flying, and swimming.</li> <li>• Simple ways to classify animals are whether they are wild or tame, and whether they live on land or in water.</li> </ul>	<p>In order to meet this standard, it is expected that students should be able to:</p> <ul style="list-style-type: none"> <li>• make and communicate observations of live animals, including people, about their needs, physical characteristics, and where they live.</li> <li>• describe the life needs of animals including air, food, water, and a suitable place to live.</li> <li>• 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 tame, and water homes or land homes.</li> <li>• distinguish between wild (raccoon, hawk, squirrel, shark) and tame (dog, cat, sheep) animals and recognize examples of each.</li> <li>• 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, fur and legs that allow dogs to live and move on land.</li> <li>• classify animals by where they live (their homes).</li> </ul>

**Standard 1.5**

<b>Resources</b>	<b>Teacher Notes</b>
<p><u>Harcourt Science</u>; Unit A, chapter 3, Unit B, chapters 1 &amp; 2</p> <p><b>Animals (coverings, preparing for winter) (1.5b, 1.7b)</b> AUTUMN STORY Jill Barklem <i>IN THE WOODS: WHO'S BEEN HERE?</i> Lindsay Barrett George <i>THE CINNAMON HEN'S AUTUMN DAY</i> Sandra Dutton <i>DO NOT DISTURB</i> Margery Facklam <i>ANIMALS AND WHERE THEY LIVE</i> John Feltwell <i>POSSUM'S HARVEST MOON</i> Anne Hunter <i>THE BEARS' AUTUMN</i> Keizaburo Tejima <i>A COLOR OF HIS OWN</i> Leo Lionni <i>FREDERICK</i> Leo Lionni <i>THE STRANGER</i> Chris Van Allsburg</p> <p>AIMS: “Under Cover”, <u>Critters</u></p> <p><b>Animals (life needs, body coverings, habitats related to seasons, hibernation, migration) (1.5, 1.7 b)</b> ANIMALS IN WINTER Ron Fisher <i>ANIMALS IN WINTER</i> Henrietta Bancroft and Richard G. Van Gelder <i>IN THE SNOW: WHO'S BEEN HERE?</i> Lindsey Barrett George <i>WHAT DO ANIMALS DO IN WINTER</i> Melvin and Gilda Berger <i>STOPPING BY WOODS ON A SNOWY EVENING</i> Robert Frost/Susan Jeffers GEOFFREY GROUNDHOG PREDICTS THE WEATHER Bruce Koscielniak BACKYARD BIRDS OF WINTER Carol Lerner KEEP LOOKING Millicent Selsam HOW TO BE A NATURE DETECTIVE Millicent Selsam</p>	

*OWL MOON* Jane Yolen

*MOUSEKIN'S FROSTY FRIEND* Edna Miller

*MOUSEKIN'S WOODLAND SLEEPERS* Edna Miller

*WHOSE TRACKS ARE THESE?* Jim Nail

AIMS: “Hide and Seek”, Critters

AIMS: “Under Cover”, Critters

*Amazing Animals* an Investigation from the VA Department of Education Science Enhanced Scope and Sequence – Grade 1.

<http://www.doe.virginia.gov/VDOE/EnhancedSandS/science.shtml>

Correlations to VA Science SOL (AIMS and Children’s Literature) found on the LCPS intranet at:

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**Interrelationships in Earth/Space Systems**

This strand focuses on student understanding of how Earth systems are connected, and how the Earth interacts with other members of the solar system.

**Standard 1.6**

The student will investigate and understand the basic relationships between the sun and the Earth. Key concepts include

- a) the sun is the source of heat and light that warms the land, air, and water; and
- b) night and day are caused by the rotation of the Earth.

**Understanding the Standard**

This standard focuses on some of the important relationships between the sun and the Earth. Day and night occurs because Earth turns or rotates on its axis. Earth turns on its axis once a day. Students need to understand the concepts of rotation and axis, but they do not need to know the terms. This standard builds upon science standard K.7 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.

## Standard 1.6

<b>Overview</b>	<b>Essential Knowledge, Skills, and Processes</b>
<p>The concepts developed in this standard include the following:</p> <ul style="list-style-type: none"><li>• The sun is the source of light on Earth.</li><li>• The sun provides heat, which warms the land, air, and water on Earth.</li><li>• The rotation of Earth means that Earth turns once a day. The part of Earth facing the sun has daytime and the part not facing the sun has nighttime.</li><li>• Rotation of the Earth causes day and night.</li></ul>	<p>In order to meet this standard, it is expected that students should be able to:</p> <ul style="list-style-type: none"><li>• infer that sunlight striking an object makes the object warmer.</li><li>• conduct simple experiments to show how sunlight changes the temperature of land, air, and water.</li><li>• demonstrate and describe the concept of rotation.</li><li>• comprehend that day and night are caused by Earth's rotation.</li><li>• compare and contrast day and night by characteristic changes in temperature and light.</li><li>• model the rotation of Earth and its physical relationship to the sun.</li><li>• 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 the late afternoon (West).</li></ul>

**Standard 1.6**

<b>Resources</b>	<b>Teacher Notes</b>
<p>Harcourt Science; Unit D, chapter 2</p> <p><b>Sun and Earth (1.6 a, b)</b> <i>THE SUNSHINE MAKES THE SEASONS</i> Franlyn Branley <i>THE REASON FOR THE SEASONS</i> Gail Gibbons <i>SEASONS</i> Gail Gibbons <i>TEMPERATURE AND YOU</i> Betsy and Giulio Maestro <i>WHEN SUMMER ENDS</i> Susi Gregg Fowler <i>MY FAVORITE TIME OF YEAR</i> Susan Pearson <i>SEASONS</i> Illa Podendorf</p> <p><b>Sun and Earth (temp, light, precip) (1.6 a, b)</b> <i>THE SUNSHINE MAKES THE SEASONS</i> Franlyn Branley <i>THE REASON FOR THE SEASONS</i> Gail Gibbons <i>SEASONS</i> Gail Gibbons <i>TEMPERATURE AND YOU</i> Betsy and Giulio Maestro <i>WINTER ACROSS AMERICA</i> Seymour Simon <i>SNOW</i> Nancy Elizabeth Wallace <i>THE BIGGEST SNOWSTORM EVER</i> Diane Paterson <i>SEASONS</i> Podendorf <i>A BOOK OF SEASONS</i> Provensen <i>WINTER, DISCOVERING THE SEASONS</i> Louis Santrey <i>SNOW</i> Steve Sanfield <i>SNOW</i> Roy McKie and P.D. Eastman <i>WINTER MAGIC</i> Eveline Hasler <i>WINTER</i> by Ron Hirschi <i>DEAR REBECCA, WINTER IS HERE</i> Jean Craighead George <i>WHEN IT STARTS TO SNOW</i> Phillis Gershator</p> <p><b>Sun and Earth (temp, light, precip) (1.6, 1.7)</b> <i>SPRING</i> Ron Hirschi <i>SUMMER</i> Ron Hirshi</p>	

*THE SUNSHINE MAKES THE SEASONS* Franlyn Branley  
*THE REASON FOR THE SEASONS* Gail Gibbons  
*SEASONS* Gail Gibbons

*Light and Dark* an Investigation from the VA Department of Education Science Enhanced Scope and Sequence – Grade 1.  
<http://www.doe.virginia.gov/VDOE/EnhancedSandS/science.shtml>

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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 over time.

**Standard 1.7**

The student will investigate and understand the relationship of seasonal change and weather to the activities and life processes of plants and animals. Key concepts include how temperature, light, and precipitation bring about changes in

- a) plants (growth, budding, falling leaves, and wilting);
- b) animals (behaviors, hibernation, migration, body covering, and habitat); and
- c) people (dress, recreation, and work).

**Understanding the Standard**

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.8 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

<b>Overview</b>	<b>Essential Knowledge, Skills, and Processes</b>
<p>The concepts developed in this standard include the following:</p> <ul style="list-style-type: none"><li>• Seasonal changes bring about changes in plants, animals, and people.</li><li>• With seasonal changes come changes in weather, including temperature, light, and precipitation.</li><li>• Precipitation includes rain, snow, and ice.</li><li>• Changes in plants include budding, growth, wilting, and losing leaves.</li><li>• Some animals hibernate and some animals migrate as a result of seasonal changes, resulting in changes in habitat.</li><li>• The body coverings of some animals change with the seasons. This includes thickness of fur and coloration.</li><li>• Changes in people include their dress, recreation, and work.</li></ul>	<p>In order to meet this standard, it is expected that students should be able to:</p> <ul style="list-style-type: none"><li>• identify types of precipitation as rain, snow, and ice and the temperature conditions that result in each one.</li><li>• relate a temperature and precipitation chart to the corresponding season (daily or weekly).</li><li>• measure and chart changes in plants, including budding, growth, wilting, and losing leaves. Recognize in what season budding and wilting will most likely occur.</li><li>• predict how an outdoor plant would change through the seasons.</li><li>• compare and contrast the four seasons of spring, summer, fall (autumn) and winter in terms of temperature, light, and precipitation.</li><li>• compare and contrast the activities of some common animals (e. g., squirrels, chipmunks, butterflies, bees, ants, bats, and frogs) during summer and winter by describing changes in their behaviors and body covering.</li></ul>

**Standard 1.7 (continued)**

<b>Overview</b>	<b>Essential Knowledge, Skills, and Processes</b>
	<ul style="list-style-type: none"><li>• compare and contrast how some common plants (e. g., oak trees, pine trees, and lawn grass) appear during summer and winter.</li><li>• comprehend the concepts of hibernation, migration, and habitat, and describe how these relate to seasonal changes. (It may be useful to recognize common Virginia animals that hibernate and migrate, but specific names of animals is not the focus of student learning here.)</li><li>• infer from people’s dress, recreational activities, and work activities what the season is.</li></ul>

**Standard 1.7**

<b>Resources</b>	<b>Teacher Notes</b>
<p>Harcourt Science; Unit B, chapter 1; Unit A, chapter 3</p> <p><b>Plants (growth, falling leaves) (1.7 a)</b> <i>PUMPKIN CIRCLE:STORY OF A GARDEN</i> George Levenson <i>THE TINY SEED</i> Eric Carle <i>WHY DO LEAVES CHANGE COLORS?</i> Betsy Maestro <i>A BOOK OF SEASONS</i> Alice and Martin Provensen <i>APPLES AND PUMPKINS</i> Annie Rockwell AIMS: “Observe a Tree”, <u>The Budding Botanist</u> AIMS: “Leaf Safari”, <u>Primarily Plants</u> AIMS: “Apples A-Peel to Me”, <u>Fall Into Math and Science</u></p> <p><b>Animals (coverings, preparing for winter) (1.5b, 1.7 b)</b> <i>RACCOONS AND RIPE CORN</i> Jim Arnosky <i>AUTUMN STORY</i> Jill Barklem <i>IN THE WOODS: WHO'S BEEN HERE?</i> Lindsay Barrett George <i>THE CINNAMON HEN'S AUTUMN DAY</i> Sandra Dutton <i>DO NOT DISTURB</i> Margery Facklam <i>ANIMALS AND WHERE THEY LIVE</i> John Feltwell <i>POSSUM'S HARVEST MOON</i> Anne Hunter <i>THE BEARS' AUTUMN</i> Keizaburo Tejima <i>A COLOR OF HIS OWN</i> Leo Lionni <i>FREDERICK</i> Leo Lionni <i>THE STRANGER</i> Chris Van Allsburg AIMS: “Under Cover”, <u>Critters</u></p> <p><b>People in the Fall (dress, recreation) (1.7 c)</b> <i>WHAT WILL THE WEATHER BE LIKE TODAY?</i> Paul Rogers <i>HENRY AND MUDGE UNDER THE YELLOW MOON</i> Cynthia Rylant AIMS: “Weather Wear”, <u>Fall Into Math and Science</u></p>	

**Plants (dormant, evergreen, deciduous, changes through the seasons) (1.4, 1.7)**

*PAPERWHITE* by Nancy Elizabeth Wallace

AIMS: “Observing Bulbs”, Primarily Plants

AIMS: “Evergreen”, Magazine Volume 7 Issue 5

**Animals (life needs, body coverings, habitats related to seasons, hibernation, migration) (1.5, 1.7 b)**

*ANIMALS IN WINTER* Ron Fisher

*ANIMALS IN WINTER* Henrietta Bancroft and Richard G. Van Gelder

*IN THE SNOW: WHO’S BEEN HERE?* Lindsey Barrett George

*WHAT DO ANIMALS DO IN WINTER* Melvin and Gilda Berger

*STOPPING BY WOODS ON A SNOWY EVENING* Robert Frost/Susan Jeffers

*GEOFFREY GROUNDHOG PREDICTS THE WEATHER*  
Bruce Koscielniak

*BACKYARD BIRDS OF WINTER* Carol Lerner

*KEEP LOOKING* Millicent Selsam

*How to be a Nature Detective* Millicent Selsam

*OWL MOON* Jane Yolen

*MOUSEKIN’S FROSTY FRIEND* Edna Miller

*MOUSEKIN’S WOODLAND SLEEPERS* Edna Miller

*WHOSE TRACKS ARE THESE?* Jim Nail

AIMS: “Hide and Seek”, Critters

AIMS: “Under Cover”, Critters

**People in Winter (1.7 c)**

*WINTER FUN* Rita Schlachter

AIMS: “Weather Wear”, Fall Into Math and Science

AIMS: “Mighty Mittens”, Glide Into Winter with Math and Science

**Sun and Earth (temp, light, precip) (1.6, 1.7)**

*SPRING* Ron Hirschi

*SUMMER* Ron Hirschi

*THE SUNSHINE MAKES THE SEASONS* Franlyn Branley

*THE REASON FOR THE SEASONS* Gail Gibbons

*SEASONS* Gail Gibbons

**Plants (budding and growth) (1.4, 1.7)**

*SUNFLOWER HOUSE* Eve Bunting

*THE VERY HUNGRY CATERPILLAR* Eric Carle

*WILD WILD SUNFLOWER CHILD* Nancy White Carlstrom

*THE BOY WHO DIDN'T BELIEVE IN SPRING* Lucille Clifton

*UNDER THE GREEN WILLOW* Elizabeth Coatsworth

*MISS RUMPHIUS* Barbara Cooney

*THE TINY SEED* Eric Carle

*GROWING VEGETABLE SOUP* Lois Ehlert

*EATING THE ALPHABET* Lois Ehlert

*PLANTING A RAINBOW* Lois Ehlert

*FROM SEED TO PLANT* Gail Gibbons

*MUSHROOM IN THE RAIN* Mirra Ginsburg

*THE REASON FOR A FLOWER* Ruth Heller

*TREE TRUNK TRAFFIC* Bianca Lavies

*PUMPKIN CIRCLE: Story of a Garden* George Levenson

*ALISON'S ZINNIA* Anita Lobel

*THE ROSE IN MY GARDEN* Arnold Lobel

*HOW DO APPLES GROW?* Betsy Maestro

*THE FLOWER ALPHABET BOOK* Jerry Pallotta

*THE LEGEND OF THE BLUEBONNET* Tomie de Paola

*HOW PLANTS GROW* Angela Rouston

*LIFE CYCLE OF A SUNFLOWER* Royston

*TOPS AND BOTTOMS* Janet Stevens

*THE VICTORY GARDEN* Jerry Pallotta and Bob Thomson

*THE GIFT OF THE TREE* Alvin Tresselt

*JUNE 29, 1999* David Wiesner

*WORKING COTTON* Sherley Anne Williams

AIMS: “It’s in the Bag”, Primarily Plants

AIMS: “What Do Plants Need?”, Primarily Plants

AIMS: “Inside a Seed”, Primarily Plants

AIMS: “The Seed Within”, Primarily Plants

AIMS: “Observe a Leaf”, Primarily Plants

AIMS: “Stem Study”, Primarily Plants

AIMS: “Root Study”, Primarily Plants

AIMS: “Flowers”, Primarily Plants

AIMS: “Don’t Leaf Out the Vegetables”, Primarily Plants

**Animals (behaviors in spring) (1.7)**

*BEAR WANTS MORE* Karma Wilson

*The Four Seasons* an Investigation from the VA Department of Education Science Enhanced Scope and Sequence – Grade 1.

<http://www.doe.virginia.gov/VDOE/EnhancedSandS/science.shtml>

Correlations to VA Science SOL (AIMS and Children’s Literature) found on the LCPS intranet at:

<http://www.intranet.lcps>

Standards of Learning Literature Correlation searchable database “Connections” can be found at:

<http://www.fcps.k12.va.us/cpsapps/connections/>

**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.

**Standard 1.8**

The student will investigate and understand that natural resources are limited. Key concepts include

- a) identification of natural resources (plants and animals, water, air, land, minerals, forests, and soil);
- b) factors that affect air and water quality; and
- c) recycling, reusing, and reducing consumption of natural resources.

**(Opportunity for a Meaningful Watershed Experience)**

**Understanding the Standard**

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.10 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

Overview	Essential Knowledge, Skills, and Processes
<p>The concepts developed in this standard include the following:</p> <ul style="list-style-type: none"> <li>• Natural resources provide us with the things we need in order to live, including food, clothing, water, air, shelter, land, and energy.</li> <li>• Many natural resources are limited and cannot be renewed. Other resources are limited and cannot be renewed, but may last a very long time.</li> <li>• What we put into the air, especially the products of the fuels we burn, affects the quality of the air. Animal, including human, and factory wastes can affect the quality of water. Some pollution washes from yards, streets, and farms.</li> <li>• Recycling recovers used materials. Many materials can be recycled and used again, sometimes in different forms.</li> <li>• Resources will last longer if we recycle them, reuse them, or reduce consumption of them.</li> <li>• The creation of parks can help preserve land. Parks have many uses including recreation.</li> </ul>	<p>In order to meet this standard, it is expected that students should be able to:</p> <ul style="list-style-type: none"> <li>• identify natural resources such as plants and animals, water, air, land, minerals, forests, and soil.</li> <li>• recognize that many natural resources are limited.</li> <li>• compare and contrast ways of conserving resources. This includes recycling, reusing, and reducing consumption of natural resources.</li> <li>• classify factors that affect air and water quality. <b>(Opportunity for a Meaningful Watershed Experience)</b></li> <li>• describe ways students and schools can help improve water and air quality in our communities.</li> <li>• 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.) <b>(Opportunity for a Meaningful Watershed Experience)</b></li> <li>• predict what would happen if natural resources were used up, and explain ways to prevent this from happening.</li> <li>• discuss the value of parks to wildlife and to people.</li> </ul>

**Standard 1.8**

<b>Resources</b>	<b>Teacher Notes</b>
<p><b>Natural Resources (1.8)</b> OUR EARTH Anne Rockwell THE GREAT TRASH BASH Loreen Leedy RECYCLE EVERY DAY! Nancy Elizabeth Wallace</p> <p>AIMS: “Just a Little Drip”, Magazine Volume 9 Issue 9 AIMS: “Let’s Recycle”, Magazine Volume 5 Issue 4 AIMS: “Drip, Drop, Flip Flop”, <u>Water Precious Water</u> AIMS: “A New Look at the Old Bag”, <u>Cycles of Knowing and Growing</u></p> <p><i>What are Natural Resources?</i> <i>Let the Sun Shine In!</i> <i>Reduce, Reuse, Recycle</i> <i>The Is-It-Litter? Box</i> <i>Henry Heron: A Litter Story</i></p> <p>Investigations from the VA Department of Education Science Enhanced Scope and Sequence – Grade 1. <a href="http://www.doe.virginia.gov/VDOE/EnhancedSandS/science.shtml">http://www.doe.virginia.gov/VDOE/EnhancedSandS/science.shtml</a></p> <p>Correlations to VA Science SOL (AIMS and Children’s Literature) found on the LCPS intranet at: <a href="http://www.intranet.lcps">http://www.intranet.lcps</a></p> <p>Standards of Learning Literature Correlation searchable database “Connections” can be found at: <a href="http://www.fcps.k12.va.us/cpsapps/connections/">http://www.fcps.k12.va.us/cpsapps/connections/</a></p>	

# 1<sup>st</sup> grade Science - Focal Points

## Scientific Investigation – 1.1

- Make predictions
- Make observations using senses
- Inferences and conclusions
- Conduct simple experiments
- Classify/group objects
- Measurement (standard/nonstandard)
- Measurement (length, mass, volume)
- Graph data

## Force, Motion & Energy – 1.2

- Push and pull
- Types of motion
- Vibration and sound
- Observing the motions of different objects

## Matter – 1.3

- Some solids dissolve in water, and others do not
- Some liquids separate when mixed with water, and others do not
- Difference of hot and cold water

## Plants – 1.4

- Parts: blossom, stem, leaf, seed, fruit
- Functions of root, stem, leaf, seed
- Plant needs: light, soil, water, food
- Characteristics:
  - edible vs. non-edible
  - flowering vs. non flowering
  - evergreen vs. deciduous

## Animals – 1.5

- Animal needs:
  - air, food, water, place to live
- Physical characteristics:
  - body coverings, appendages, body shape, methods of movement
- Water homes vs. land homes
- Wild vs. tame

## Earth and Sun – 1.6

- Night and day
- Rotation
- Sun is source of heat and light
- Energy

## Seasonal Change – 1.7

- Seasons
- Precipitation forms
- Temperature changes
- Light changes
- Animals (behaviors, migration, hibernation, body covering, habitat)
- Plants (growth, budding, falling leaves, wilting)
- People (dress, work, recreation)

## Natural Resources – 1.8

- Identify natural resources
- Air and water quality
- Reduce/ reuse/ recycle
- Conservation