

# Kindergarten

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## Standard 1

### The Nature of Science and Technology

Students are actively engaged in beginning to explore how their world works. They explore, observe, ask questions, discuss observations, and seek answers.

#### Scientific Inquiry

K.1.1 Raise questions about the natural world.



Color Crazy p. 2

Grasshopper Gravity p. 4

What's Wild? p. 7

Classroom Carrying Capacity p. 9

Graphanimal p. 49

Wildlife Is Everywhere! p. 51

Habitacks p. 53

What's That, Habitat? p. 56

Beautiful Basics p. 58

Everybody Needs a Home p. 59

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Thicket Game p. 114

Playing Lightly on the Earth p.

Seeing Is Believing! p. 116

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Make a Coat! p. 243

Learning to Look, Looking to See  
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Animal Charades p. 280

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Ethi-Thinking p. 303

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Are You Me? p. 2

Aqua Words p. 29

Water Plant Art p. 31

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Water We Eating? p. 83

#### The Scientific Enterprise

K.1.2 Begin to demonstrate that everyone can do science.



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## Standard 2 Scientific Thinking

*Students use numbers, pictures, and words when observing and communicating to help them begin to answer their questions about the world.*

### *Computation and Estimation*

K.2.1 Use whole numbers, up to 10, in counting, identifying, sorting, and describing objects and experiences.



Grasshopper Gravity p. 4  
Graphanimal p. 49  
Environmental Barometer p.  
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And the Wolf Wore Shoes p.  
180 (E)

### *Communication*

K.2.2 Draw pictures and write words to describe objects and experiences.



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What's That, Habitat? p. 56

Everybody Needs a Home p. 59  
Seeing Is Believing! p. 116 (E)



Aqua Words p. 29  
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### **Standard 3** **The Physical Setting**

*Students investigate, describe, and discuss their natural surroundings. They begin to question why things move.*

#### *Matter and Energy*

K.3.1 Describe objects in terms of the materials they are made of, such as clay, cloth, paper, etc.



Make a Coat! p. 243

#### *Forces of Nature*

K.3.2 Investigate that things move in different ways, such as fast, slow, etc.



Grasshopper Gravity p. 4



Fashion a Fish p. 56

### **Standard 4** **The Living Environment**

*Students ask questions about a variety of living things and everyday events that can be answered through shared observations.*

#### *Diversity of Life*

K.4.1 Give examples of plants and animals.



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What's Wild? p. 7

Graph-animal p. 49

Wildlife Is Everywhere! p. 51

What's That, Habitat? p. 56

Everybody Needs a Home p. 59 (E)

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K.4.2 Observe plants and animals, describing how they are alike and how they are different in the way they look and in the things they do.



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Water Plant Art p. 31 (E)

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## Standard 5

### The Mathematical World

*Students use shapes to compare objects and they begin to recognize patterns.*

#### *Shapes and Symbolic Relationships*

K.5.1 Use shapes — such as circles, squares, rectangles, and triangles — to describe different objects.

## Standard 6

### Common Themes

*Students begin to understand how things are similar and how they are different. They look for ways to distinguish between different objects by observation.*

#### *Models and Scale*

K.6.1 Describe an object by saying how it is similar to or different from another object.



Make a Coat! p. 243

# Grade 1

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## Standard 1

### The Nature of Science and Technology

*Students are actively engaged in exploring how the world works. They explore, observe, count, collect, measure, compare, and ask questions. They discuss observations and use tools to seek answers and solve problems. They share their findings.*

#### Scientific Inquiry

1.1.1 Observe, describe, draw, and sort objects carefully to learn about them.



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Learning to Look, Looking to See  
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1.1.2 Investigate and make observations to seek answers to questions about the world, such as "In what ways do animals move?"



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Grasshopper Gravity p. 4

What's Wild? p. 7

Classroom Carrying Capacity p. 9

Graph-animal p. 49

Wildlife Is Everywhere! p. 51

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### *The Scientific Enterprise*

1.1.3 Recognize that and demonstrate how people can learn much about plants and animals by observing them closely over a period of time. Recognize also that care must be taken to know the needs of living things and how to provide for them.



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### *Technology and Science*

1.1.4 Use tools, such as rulers and magnifiers, to investigate the world and make observations.



Grasshopper Gravity p. 4  
Seeing Is Believing! p. 116

## **Standard 2 Scientific Thinking**

*Students begin to find answers to their questions about the world by using measurements, estimation, and observation as well as working with materials. They communicate with others through numbers, words, and drawings.*

### *Computation and Estimation*

1.2.1 Use whole numbers, up to 100, in counting, identifying, measuring, and describing objects and experiences.



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(E)



Plastic Jellyfish p. 128

1.2.2 Use sums and differences of single digit numbers in investigations and judge the reasonableness of the answers.



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Environmental Barometer p. 77



Plastic Jellyfish p. 128

1.2.3 Explain to other students how to go about solving numerical problems.

#### *Manipulation and Observation*

1.2.4 Measure the length of objects having straight edges in inches, centimeters, or non-standard units.

1.2.5 Demonstrate that magnifiers help people see things they could not see without them.



Grasshopper Gravity p. 4

#### *Communication Skills*

1.2.6 Describe and compare objects in terms of number, shape, texture, size, weight, color, and motion.



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Fashion a Fish p. 56

1.2.7 Write brief informational descriptions of a real object, person, place, or event using information from observations.

### **Standard 3**

#### **The Physical Setting**

*Students investigate, describe, and discuss their natural surroundings. They question why things move and change.*

*The Earth and the Processes That Shape It*

- 1.3.1 Recognize and explain that water can be a liquid or a solid and can go back and forth from one form to the other. Investigate by observing that if water is turned into ice and then the ice is allowed to melt, the amount of water is the same as it was before freezing.
- 1.3.2 Investigate by observing and then describing that water left in an open container disappears, but water in a closed container does not disappear.

### *Matter and Energy*

- 1.3.3 Investigate by observing and also measuring that the sun warms the land, air, and water.

### *Forces of Nature*

- 1.3.4 Investigate by observing and then describe how things move in many different ways, such as straight, zigzag, round-and-round, and back-and-forth.



Grasshopper Gravity p. 4



Fashion a Fish p. 56

- 1.3.5 Recognize that and demonstrate how things near Earth fall to the ground unless something holds them up.

## **Standard 4**

### **The Living Environment**

*Students ask questions about a variety of living things and everyday events that can be answered through observations. They become aware of plant and animal interaction. They consider things and processes that plants and animals need to stay alive.*

### *Diversity of Life*

- 1.4.1 Identify when stories give attributes to plants and animals, such as the ability to speak, that they really do not have.



First Impressions p. 178

And the Wolf Wore Shoes p. 180

Animal Charades p. 280

- 1.4.2 Observe and describe that there can be differences, such as size or markings, among the individuals within one kind of plant or animal group.





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*Interdependence of Life*

1.4.3 Observe and explain that animals eat plants or other animals for food.



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 What's Wild? p. 7  
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Water Plant Art p. 31  
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1.4.4 Explain that most living things need water, food, and air.



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 What's Wild? p. 7  
 Classroom Carrying Capacity p. 9  
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Aqua Words p. 29  
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**Standard 5**  
**The Mathematical World**

*Students apply mathematics in scientific contexts. They begin to use numbers for computing, estimating, naming, measuring, and communicating specific information. They make picture graphs and recognize patterns.*

## *Numbers*

- 1.5.1 Use numbers, up to 10, to place objects in order, such as first, second, and third, and to name them, such as bus numbers or phone numbers.
- 1.5.2 Make and use simple picture graphs to tell about observations.



Graphanaanimal p. 49



Plastic Jellyfish p. 128

## *Shapes and Symbolic Relationships*

- 1.5.3 Observe and describe similar patterns, such as shapes, designs, and events that may show up in nature, such as honeycombs, sunflowers, or shells. See similar patterns in the things people make, such as quilts, baskets, or pottery.

## **Standard 6 Common Themes**

*Students begin to understand how things are similar and how they are different. They look for what changes and what does not change and make comparisons.*

### *Models and Scale*

- 1.6.1 Observe and describe that models, such as toys, are like the real things in some ways but different in others.

### *Constancy and Change*

- 1.6.2 Observe that and describe how certain things change in some ways and stay the same in others, such as in their color, size, and weight.



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Thicket Game p. 114

Surprise Terrarium p. 120



Are You Me? p. 2  
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# Grade 2

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## Standard 1

### The Nature of Science and Technology

*Students are actively engaged in exploring how the world works. They explore, observe, count, collect, measure, compare, and ask questions. They discuss observations and use tools to seek answers and solve problems. They share their findings.*

#### Scientific Inquiry

2.1.1 Manipulate an object to gain additional information about it.

2.1.2 Use tools — such as thermometers, magnifiers, rulers, or balances — to gain more information about objects.



Grasshopper Gravity p. 4  
Seeing Is Believing! p. 116

2.1.3 Describe, both in writing and verbally, objects as accurately as possible and compare observations with those of other people.



Color Crazy p. 2  
Grasshopper Gravity p. 4  
Wildlife Is Everywhere p. 51 (E)

Seeing Is Believing! p. 116 (E)  
Surprise Terrarium p. 120  
First Impressions p. 178



Aqua Words p. 29

2.1.4 Make new observations when there is disagreement among initial observations.



Learning to Look, Looking to See p. 278



Are you Me? p. 2

#### The Scientific Enterprise

2.1.5 Demonstrate the ability to work with a team but still reach and communicate one's own conclusions about findings.



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(2.1.5 continued)

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Aqua Words p. 29  
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### *Technology and Science*

2.1.6 Use tools to investigate, observe, measure, design, and build things.



Grasshopper Gravity p. 4  
Seeing Is Believing! p. 116

2.1.7 Recognize and describe ways that some materials — such as recycled paper, cans, and plastic jugs — can be used over again.



Make a Coat! p. 243



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## **Standard 2 Scientific Thinking**

*Students begin to find answers to their questions about the world by using measurement, estimation, and observation as well as working with materials. They communicate with others through numbers, words, and drawings.*

### *Computation and Estimation*

2.2.1 Give estimates of numerical answers to problems before doing them formally.

2.2.2 Make quantitative estimates of familiar lengths, weights, and time intervals and check them by measurements.

2.2.3 Estimate and measure capacity using cups and pints.

### *Manipulation and Observation*

2.2.4 Assemble, describe, take apart, and/or reassemble constructions using such things as interlocking blocks and erector sets. Sometimes pictures or words may be used as a reference.

## Communication Skills

2.2.5 Draw pictures and write brief descriptions that correctly portray key features of an object.



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Wildlife Is Everywhere p. 51 (E)  
What's That, Habitat? p. 56

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Seeing Is Believing p. 116 (E)  
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## Standard 3 The Physical Setting

*Students investigate, describe, and discuss their natural surroundings. They wonder why things move and change.*

### *Earth and the Processes That Shape It*

2.3.1 Investigate by observing and then describe that some events in nature have a repeating pattern, such as seasons, day and night, and migrations.



Classroom Carrying Capacity p. 9

2.3.2 Investigate, compare, and describe weather changes from day to day but recognize, describe, and chart that the temperature and amounts of rain or snow tend to be high, medium, or low in the same months every year.

2.3.3 Investigate by observing and then describe chunks of rocks and their many sizes and shapes, from boulders to grains of sand and even smaller.

2.3.4 Investigate by observing and then describe how animals and plants sometimes cause changes in their surroundings.



Grasshopper Gravity p. 4 (E)  
Classroom Carrying Capacity p. 9  
Environmental Barometer p. 77

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### *Matter and Energy*

- 2.3.5 Investigate that things can be done to materials — such as freezing, mixing, cutting, heating, or wetting — to change some of their properties. Observe that not all materials respond in the same way.
- 2.3.6 Discuss how people use electricity or burn fuels, such as wood, oil, coal, or natural gas, to cook their food and warm their houses.

### *Forces of Nature*

- 2.3.7 Investigate and observe that the way to change how something is moving is to give it a push or a pull.
- 2.3.8 Demonstrate and observe that magnets can be used to make some things move without being touched.

## **Standard 4 The Living Environment**

*Students ask questions about a variety of living things and everyday events that can be answered through observations. They consider things and processes that plants and animals need to stay alive. Students begin to understand plant and animal interaction.*

### *Diversity of Life*

- 2.4.1 Observe and identify different external features of plants and animals and describe how these features help them live in different environments.



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Grasshopper Gravity p. 4

What's Wild? p. 7

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### *Interdependence of Life*

- 2.4.2 Observe that and describe how animals may use plants, or even other animals, for shelter and nesting.



HabitraCKs p. 53  
What's That, Habitat? p. 56

Beautiful Basics p. 58  
Everybody Needs a Home p. 59



Water Plant Art p. 31  
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2.4.3 Observe and explain that plants and animals both need to take in water, animals need to take in food, and plants need light.



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What's Wild? p. 7  
Classroom Carrying Capacity p. 9  
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Aqua Words p. 29  
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2.4.4 Recognize and explain that living things are found almost everywhere in the world and that there are somewhat different kinds in different places.



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Graphanimal p. 49  
Wildlife Is Everywhere! p. 51  
Environmental Barometer p. 77

What Bear Goes Where? p. 118  
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Animal Charades p. 280



Fashion a Fish p. 56  
Water We Eating? p. 83

2.4.5 Recognize and explain that materials in nature, such as grass, twigs, sticks, and leaves, can be recycled and used again, sometimes in different forms, such as in birds' nests.



Make a Coat! p. 243

### *Human Identity*

2.4.6 Observe and describe the different external features of people, such as their size, shape, and color of hair, skin, and eyes.

2.4.7 Recognize and discuss that people are more like one another than they are like other animals.

2.4.8 Give examples of different roles people have in families and communities.

## Standard 5 The Mathematical World

*Students apply mathematics in scientific contexts. They use numbers for computing, estimating, naming, measuring, and communicating specific information. They make picture and bar graphs. They recognize and describe shapes and patterns. They use evidence to explain how or why something happens.*

### Numbers

2.5.1 Recognize and explain that, in measuring, there is a need to use numbers between whole numbers, such as  $2\frac{1}{2}$  centimeters.

2.5.2 Recognize and explain that it is often useful to estimate quantities.



Environmental Barometer p. 77

### Shapes and Symbolic Relationships

2.5.3 Observe that and describe how changing one thing can cause changes in something else, such as exercise and its effect on heart rate.



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### Reasoning and Uncertainty

2.5.4 Begin to recognize and explain that people are more likely to believe ideas if good reasons are given for them.



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2.5.5 Explain that some events can be predicted with certainty, such as sunrise and sunset, and some cannot, such as storms. Understand that people aren't always sure what will happen since they do not know everything that might have an effect.



Classroom Carrying Capacity p. 9  
Environmental Barometer p. 77



2.5.6 Explain that sometimes a person can find out a lot (but not everything) about a group of things, such as insects, plants, or rocks, by studying just a few of them.



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Surprise Terrarium p. 120  
First Impressions p. 178

Learning to Look, Looking to See  
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## Standard 6 Common Themes

*Students begin to observe how objects are similar and how they are different. They begin to identify parts of an object and recognize how these parts interact with the whole. They look for what changes and what does not change and make comparisons.*

### *Systems*

2.6.1 Investigate that most objects are made of parts.



Grasshopper Gravity p. 4



Fashion a Fish p. 56

### *Models and Scale*

2.6.2 Observe and explain that models may not be the same size, may be missing some details, or may not be able to do all of the same things as the real things.

### *Constancy and Change*

2.6.3 Describe that things can change in different ways, such as in size, weight, color, age, and movement. Investigate that some small changes can be detected by taking measurements.



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Environmental Barometer p. 77  
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Are You Me? p. 2  
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# Grade 3

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## Standard 1 The Nature of Science and Technology

*Students, working collaboratively, carry out investigations. They question, observe, and make accurate measurements. Students increase their use of tools, record data in journals, and communicate results through chart, graph, written, and verbal forms.*

### *The Scientific View of the World*

- 3.1.1 Recognize and explain that when a scientific investigation is repeated, a similar result is expected.

#### *Scientific Inquiry*

- 3.1.2 Participate in different types of guided scientific investigations, such as observing objects and events and collecting specimens for analysis.



Grasshopper Gravity p. 4  
Wildlife Is Everywhere! p. 51  
Habittracks p. 53  
Environmental Barometer p. 77  
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Seeing Is Believing! p. 116  
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Sockeye Scents p. 61  
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Silt: A Dirty Word p. 176

- 3.1.3 Keep and report records of investigations and observations using tools, such as journals, charts, graphs, and computers.



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Environmental Barometer p. 77  
Habitrekking p. 79

Learning to Look, Looking to See  
p. 278



Water We Eating? p. 83  
Plastic Jellyfish p. 128

Silt: A Dirty Word p. 176

- 3.1.4 Discuss the results of investigations and consider the explanations of others.



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Graph-animal p. 49  
Wildlife Is Everywhere! p. 51  
HabitTracks p. 53  
Environmental Barometer p. 77

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### *The Scientific Enterprise*

3.1.5 Demonstrate the ability to work cooperatively while respecting the ideas of others and communicating one's own conclusions about findings.



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### *Technology and Science*

3.1.6 Give examples of how tools, such as automobiles, computers, and electric motors, have affected the way we live.

3.1.7 Recognize that and explain how an invention can be used in different ways, such as a radio being used to get information and for entertainment.

3.1.8 Describe how discarded products contribute to the problem of waste disposal and that recycling can help solve this problem.



Plastic Jellyfish p. 128

## **Standard 2 Scientific Thinking**

*Students use a variety of skills and techniques when attempting to answer questions and solve problems. They describe their observations accurately and clearly, using numbers, words, and sketches, and are able to communicate their thinking to others.*

### *Computation and Estimation*

3.2.1 Add and subtract whole numbers mentally, on paper, and with a calculator.



Environmental Barometer p. 77



Plastic Jellyfish p. 128

### *Manipulation and Observation*

3.2.2 Measure and mix dry and liquid materials in prescribed amounts, following reasonable safety precautions.

3.2.3 Keep a notebook that describes observations and is understandable weeks or months later.



Learning to Look, Looking to See p. 278



Plastic Jellyfish p. 128 (E)

3.2.4 Appropriately use simple tools, such as clamps, rulers, scissors, hand lenses, and other technology, such as calculators and computers, to help solve problems.



Grasshopper Gravity p. 4  
Habitrekking p. 79

Seeing Is Believing p. 116

3.2.5 Construct something used for performing a task out of paper, cardboard, wood, plastic, metal, or existing objects.

### *Communication Skills*

3.2.6 Make sketches and write descriptions to aid in explaining procedures or ideas.



Wildlife Is Everywhere p. 51 (E)



Water Plant Art p. 31

Fashion a Fish p. 56

### *Critical Response Skills*

3.2.7 Ask “How do you know?” in appropriate situations and attempt reasonable answers when others ask the same question.



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What’s Wild? p. 7

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## **Standard 3 The Physical Setting**

*Students observe changes of Earth and the sky. They continue to explore the concepts of energy and motion.*

### *The Universe*

3.3.1 Observe and describe the apparent motion of the sun and moon over a time span of one day.

3.3.2 Observe and describe that there are more stars in the sky than anyone can easily count, but they are not scattered evenly.

3.3.3 Observe and describe that the sun can be seen only in the daytime.

3.3.4 Observe and describe that the moon looks a little different every day, but looks the same again about every four weeks.

### *Earth and the Processes That Shape It*

3.3.5 Give examples of how change, such as weather patterns, is a continual process occurring on Earth.

3.3.6 Describe ways human beings protect themselves from adverse weather conditions.



Everybody Needs a Home p. 59

Make a Coat p. 243

3.3.7 Identify and explain some effects human activities have on weather.

### *Matter and Energy*

3.3.8 Investigate and describe how moving air and water can be used to run machines like windmills and waterwheels.



Aqua Words p. 29

### *Forces of Nature*

3.3.9 Demonstrate that things that make sound do so by vibrating, such as vocal cords and musical instruments.

## **Standard 4 The Living Environment**

*Students learn about an increasing variety of organisms. They use appropriate tools and identify similarities and differences among them. Students explore how organisms satisfy their needs in typical environments.*

### *Diversity of Life*

3.4.1 Demonstrate that a great variety of living things can be sorted into groups in many ways using various features, such as how they look, where they live, and how they act, to decide which things belong to which group.



Color Crazy p. 2

What's Wild? p. 7

Graph-animal p. 49

Wildlife Is Everywhere! p. 51

Environmental Barometer p. 77

Thicket Game p. 114

Seeing Is Believing! p. 116

What Bear Goes Where? p. 118

First Impressions p. 178

And the Wolf Wore Shoes p. 180

Animal Charades p. 280



Fashion a Fish p. 56

3.4.2 Explain that features used for grouping depend on the purpose of the grouping.



Color Crazy p. 2  
What's Wild? p. 7  
Graph-animal p. 49  
Wildlife Is Everywhere! p. 51

Environmental Barometer p. 77  
And the Wolf Wore Shoes p. 180  
Animal Charades p. 280

3.4.3 Observe that and describe how offspring are very much, but not exactly, like their parents and like one another.



Are You Me? p.2  
Fashion a Fish p. 56

*Interdependence of Life and Evolution*

3.4.4 Describe that almost all kinds of animals' food can be traced back to plants.



Grasshopper Gravity p. 4  
Habitrekking p. 79



Water Plant Art p. 31  
Marsh Munchers p. 34

3.4.5 Give examples of some kinds of organisms that have completely disappeared and explain how these organisms were similar to some organisms living today.



Ethi-Thinking p. 303

*Human Identity*

3.4.6 Explain that people need water, food, air, waste removal, and a particular range of temperatures, just as other animals do.



Classroom Carrying Capacity p. 9  
Wildlife Is Everywhere p. 51  
Habtracks p. 53  
What's That, Habitat? p. 56  
Beautiful Basics p. 58

Everybody Needs a Home p. 59  
Habitrekking p. 79  
Too Close for Comfort p. 300  
Ethi-Thinking p. 303



- 3.4.7 Explain that eating a variety of healthful foods and getting enough exercise and rest help people stay healthy.
- 3.4.8 Explain that some things people take into their bodies from the environment can hurt them and give examples of such things.
- 3.4.9 Explain that some diseases are caused by germs and some are not. Note that diseases caused by germs may be spread to other people. Also understand that washing hands with soap and water reduces the number of germs that can get into the body or that can be passed on to other people.

## **Standard 5**

### **The Mathematical World**

*Students apply mathematics in scientific contexts. Students make more precise and varied measurements when gathering data. Based upon collected data, they pose questions and solve problems. Students use numbers to record data and construct graphs and tables to communicate their findings.*

#### *Numbers*

- 3.5.1 Select and use appropriate measuring units, such as centimeters (cm) and meters (m), grams (g) and kilograms (kg), and degrees Celsius ( $^{\circ}\text{C}$ ).
- 3.5.2 Observe that and describe how some measurements are likely to be slightly different, even if what is being measured stays the same.

#### *Shapes and Symbolic Relationships*

- 3.5.3 Construct tables and graphs to show how values of one quantity are related to values of another.



- 3.5.4 Illustrate that if 0 and 1 are located on a line, any other number can be depicted as a position on the line.

#### *Reasoning and Uncertainty*

- 3.5.5 Explain that one way to make sense of something is to think of how it relates to something more familiar.



## Standard 6 Common Themes

*Students work with an increasing variety of systems and begin to modify parts in systems and models and notice the changes that result. They question why change occurs.*

### *Systems*

- 3.6.1 Investigate how and describe that when parts are put together, they can do things that they could not do by themselves.
- 3.6.2 Investigate how and describe that something may not work if some of its parts are missing.

### *Models and Scale*

- 3.6.3 Explain how a model of something is different from the real thing but can be used to learn something about the real thing.

### *Constancy and Change*

- 3.6.4 Take, record, and display counts and simple measurements of things over time, such as plant or student growth.



Environmental Barometer p. 77

- 3.6.5 Observe that and describe how some changes are very slow and some are very fast and that some of these changes may be hard to see and/or record.



Color Crazy p. 2

Classroom Carrying Capacity p. 9

Environmental Barometer p. 77

Thicket Game p. 114

Seeing Is Believing! p. 116

What Bear Goes Where? p. 118

Surprise Terrarium p. 120

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Are You Me? p. 2

Fashion a Fish p. 56

Sockeye Scents p. 61

Silt: A Dirty Word p. 176

# Grade 4

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## Standard 1 The Nature of Science and Technology

*Students, working collaboratively, carry out investigations. They observe and make accurate measurements, increase their use of tools and instruments, record data in journals, and communicate results through chart, graph, written, and verbal forms.*

### *The Scientific View of the World*

- 4.1.1 Observe and describe that scientific investigations generally work the same way in different places.



Wildlife Is Everywhere! p. 51  
Environmental Barometer p. 77

Learning to Look, Looking to See  
p. 278

### *Scientific Inquiry*

- 4.1.2 Recognize and describe that results of scientific investigations are seldom exactly the same. If differences occur, such as a large variation in the measurement of plant growth, propose reasons for why these differences exist, using recorded information about investigations.



Environmental Barometer p. 77  
Learning to Look, Looking to See p. 278

### *The Scientific Enterprise*

- 4.1.3 Explain that clear communication is an essential part of doing science since it enables scientists to inform others about their work, to expose their ideas to evaluation by other scientists, and to allow scientists to stay informed about scientific discoveries around the world.



Environmental Barometer p. 77  
Habitrekking p. 79

First Impressions p. 178

- 4.1.4 Describe how people all over the world have taken part in scientific investigation for many centuries.



First Impressions p. 178

## *Technology and Science*

- 4.1.5 Demonstrate how measuring instruments, such as microscopes, telescopes, and cameras, can be used to gather accurate information for making scientific comparisons of objects and events. Note that measuring instruments, such as rulers, can also be used for designing and constructing things that will work properly.
- 4.1.6 Explain that even a good design may fail even though steps are taken ahead of time to reduce the likelihood of failure.
- 4.1.7 Discuss and give examples of how technology, such as computers and medicines, has improved the lives of many people, although the benefits are not equally available to all.
- 4.1.8 Recognize and explain that any invention may lead to other inventions.
- 4.1.9 Explain how some products and materials are easier to recycle than others.



Make a Coat! p. 243



Plastic Jellyfish p. 128

## **Standard 2 Scientific Thinking**

*Students use a variety of skills and techniques when attempting to answer questions and solve problems. They describe their observations accurately and clearly, using numbers, words, and sketches, and are able to communicate their thinking to others. They compare, explain, and justify both information and numerical functions.*

### *Computation and Estimation*

- 4.2.1 Judge whether measurements and computations of quantities, such as length, area, volume, weight, or time, are reasonable.
- 4.2.2 State the purpose, orally or in writing, of each step in a computation.

### *Manipulation and Observation*

- 4.2.3 Make simple and safe electrical connections with various plugs, sockets, and terminals.

### *Communication Skills*

- 4.2.4 Use numerical data to describe and compare objects and events.



Graphanimal p. 49

Environmental Barometer p. 77



Plastic Jellyfish p. 128

4.2.5 Write descriptions of investigations, using observations and other evidence as support for explanations.



Classroom Carrying Capacity p. 9  
Wildlife Is Everywhere p. 51 (E)

Habitrekking p. 79  
First Impressions p. 178

*Critical Response Skills*

4.2.6 Support statements with facts found in print and electronic media, identify the sources used, and expect others to do the same.



Grasshopper Gravity p. 4  
Wildlife Is Everywhere p. 51 (E)

First Impressions p. 178



Sockeye Scents p. 61 (E)  
Water We Eating? p. 83

Plastic Jellyfish p. 128 (E)  
Silt: A Dirty Word p. 176 (E)

4.2.7 Identify better reasons for believing something than “Everybody knows that ...” or “I just know,” and discount such reasons when given by others.



Wildlife Is Everywhere! p. 51  
Environmental Barometer p. 77  
Seeing Is Believing! p. 116  
Surprise Terrarium p. 120  
First Impressions p. 178

Learning to Look, Looking to See p. 278  
Ethi-Thinking p. 303  
Playing Lightly on the Earth p. 432



Fashion a Fish p. 56  
Sockeye Scents p. 61

Silt: A Dirty Word p. 176

**Standard 3  
The Physical Setting**

*Students continue to investigate changes of Earth and the sky and begin to understand the composition and size of the universe. They explore, describe, and classify materials, motion, and energy.*

*The Universe*

- 4.3.1 Observe and report that the moon can be seen sometimes at night and sometimes during the day.

### *Earth and the Processes That Shape It*

- 4.3.2 Begin to investigate and explain that air is a substance that surrounds us and takes up space, and whose movements we feel as wind.
- 4.3.3 Identify salt as the major difference between fresh and ocean waters.
- 4.3.4 Describe some of the effects of oceans on climate.
- 4.3.5 Describe how waves, wind, water, and glacial ice shape and reshape Earth's land surface by the erosion of rock and soil in some areas and depositing them in other areas.



Silt: *A Dirty Word* p. 176

- 4.3.6 Recognize and describe that rock is composed of different combinations of minerals.
- 4.3.7 Explain that smaller rocks come from the breakage and weathering of bedrock and larger rocks and that soil is made partly from weathered rock, partly from plant remains, and also contains many living organisms.
- 4.3.8 Explain that the rotation of Earth on its axis every 24 hours produces the night-and-day cycle.
- 4.3.9 Draw or correctly select drawings of shadows and their direction and length at different times of day.

### *Matter and Energy*

- 4.3.10 Demonstrate that the mass of a whole object is always the same as the sum of the masses of its parts.
- 4.3.11 Investigate, observe, and explain that things that give off light often also give off heat.
- 4.3.12 Investigate, observe, and explain that heat is produced when one object rubs against another, such as one's hands rubbing together.
- 4.3.13 Observe and describe the things that give off heat, such as people, animals, and the sun.
- 4.3.14 Explain that energy in fossil fuels comes from plants that grew long ago.

### *Forces of Nature*

- 4.3.15 Demonstrate that without touching them, a magnet pulls all things made of iron and either pushes or pulls other magnets.

4.3.16 Investigate and describe that without touching them, material that has been electrically charged pulls all other materials and may either push or pull other charged material.

## Standard 4 The Living Environment

*Students learn about an increasing variety of organisms – familiar, exotic, fossil, and microscopic. They use appropriate tools in identifying similarities and differences among them. They explore how organisms satisfy their needs in their environments.*

### *Diversity of Life*

4.4.1 Investigate, such as by using microscopes, to see that living things are made mostly of cells.

### *Interdependence of Life and Evolution*

4.4.2 Investigate, observe, and describe that insects and various other organisms depend on dead plant and animal material for food.



Grasshopper Gravity p. 4



Water Plant Art p. 31  
Marsh Munchers p. 34

4.4.3 Observe and describe that organisms interact with one another in various ways, such as providing food, pollination, and seed dispersal.



Grasshopper Gravity p. 4 (E)  
Classroom Carrying Capacity p. 9

First Impressions p. 178  
Too Close for Comfort p.  
300  
Ethi-Thinking p. 303



Water Plant Art p. 31  
Marsh Munchers p. 34

Water We Eating? p. 83

4.4.4 Observe and describe that some source of energy is needed for all organisms to stay alive and grow.



Classroom Carrying Capacity p. 9  
Habitracks p. 53

What's That, Habitat? p. 56  
Beautiful Basics p. 58

## Habitrekking p. 79

- 4.4.5 Observe and explain that most plants produce far more seeds than those that actually grow into new plants.
- 4.4.6 Explain how in all environments, organisms are growing, dying, and decaying, and new organisms are being produced by the old ones.

## Water Plant Art p. 31

## Marsh Munchers p. 34

### *Human Identity*

- 4.4.7 Describe that human beings have made tools and machines, such as x-rays, microscopes, and computers, to sense and do things that they could not otherwise sense or do at all, or as quickly, or as well.
- 4.4.8 Know and explain that artifacts and preserved remains provide some evidence of the physical characteristics and possible behavior of human beings who lived a very long time ago.
- 4.4.9 Explain that food provides energy and materials for growth and repair of body parts. Recognize that vitamins and minerals, present in small amounts in foods, are essential to keep everything working well. Further understand that as people grow up, the amounts and kinds of food and exercise needed by the body may change.
- 4.4.10 Explain that if germs are able to get inside the body, they may keep it from working properly. Understand that for defense against germs, the human body has tears, saliva, skin, some blood cells, and stomach secretions. Also note that a healthy body can fight most germs that invade it. Recognize, however, that there are some germs that interfere with the body's defenses.
- 4.4.11 Explain that there are some diseases that human beings can only catch once. Explain that there are many diseases that can be prevented by vaccinations, so that people do not catch them even once.

## **Standard 5**

### **The Mathematical World**

*Students apply mathematics in scientific contexts. Their geometric descriptions of objects are comprehensive. They realize that graphing demonstrates specific connections between data. They identify questions that can be answered by data distribution.*

### *Numbers*

- 4.5.1 Explain that the meaning of numerals in many-digit numbers depends on their positions.

4.5.2 Explain that in some situations, “0” means none of something, but in others it may be just the label of some point on a scale.

### *Shapes and Symbolic Relationships*

4.5.3 Illustrate how length can be thought of as unit lengths joined together, area as a collection of unit squares, and volume as a set of unit cubes.

4.5.4 Demonstrate how graphical displays of numbers may make it possible to spot patterns that are not otherwise obvious, such as comparative size and trends.



Graphanimal p. 49

Environmental Barometer p. 77



Plastic Jellyfish p. 128

### *Reasoning and Uncertainty*

4.5.5 Explain how reasoning can be distorted by strong feelings.



First Impressions p. 178

Ethi-Thinking p. 303

Playing Lightly on the Earth p. 432

## **Standard 6 Common Themes**

*Students work with an increasing variety of systems and begin to modify parts in systems and models and notice the changes that result. They question why change occurs.*

### *Systems*

4.6.1 Demonstrate that in an object consisting of many parts, the parts usually influence or interact with one another.



Grasshopper Gravity p. 4

4.6.2 Show that something may not work as well, or at all, if a part of it is missing, broken, worn out, mismatched, or incorrectly connected.



## *Models and Scale*

- 4.6.3 Recognize that and describe how changes made to a model can help predict how the real thing can be altered.

## *Constancy and Change*

- 4.6.4 Observe and describe that some features of things may stay the same even when other features change.



Color Crazy p. 2

Thicket Game p. 114

Seeing Is Believing! p. 116

What Bear Goes Where? p. 118

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