Grade 1 Science, Quarter 1, Unit 1.1

Weather

Overview

Number of instructional days: 6 (1 day = 45 minutes)

Content to be learned

- Observe local weather.
- Record and summarize local weather data.
- Describe weather changes or patterns based on data collected from daily weather observations.
- Use scientific tools to extend the senses and gather weather data.
- Observe and record weather changes throughout the year.

Processes to be used

- Observe, collect, and record data.
- Describe and summarize patterns found in data.
- Use scientific tools to measure data.
- Demonstrate safe practices during classroom and field investigations.
- Use scientific processes to conduct investigations, make observations, cite evidence, organize and compare data, communicate findings, and build explanations.

Essential questions

- Why do scientists use weather tools?
- Why is it important to gather data about the weather?
- How does weather change throughout the school year?

Written Curriculum

Grade Span Expectations

(Teacher note: Asterisk refers to content that should be taught all year long.)*

ESS1 - The earth and earth materials as we know them today have developed over long periods of time, through continual change processes.

ESS1 (K-4) POC –5

Based on data collected from daily weather observations, describe weather changes or weather patterns.

ESS1 (K-2) –5 Students demonstrate an understanding of processes and change over time within earth systems by …

***5a** observing, recording, and summarizing local weather data.

ESS 1 (K-4) NOS –3

Explain how the use of scientific tools helps to extend senses and gather data about weather. (i.e., weather/wind vane: direction; wind sock: wind intensity; anemometer: speed; thermometer: temperature; meter sticks/rulers: snow depth; rain gauges: rain amount in inches).

ESS 1(K-2)–3 Students demonstrate an understanding of how the use of scientific tools helps to extend senses and gather data by…

***3a** using scientific tools to extend senses and gather data about weather (e.g., weather/wind vane: direction; wind sock: wind intensity; ~~anemometer: speed~~; thermometer: temperature; ~~meter sticks/rulers: snow depth~~; rain gauges: rain amount in *(Teacher note: nonstandard units)* ~~inches~~).

ESS1 (K-4) INQ+SAE –4

Explain how wind, water, or ice shape and reshape the earth.

ESS1 (K-2) –4 Students demonstrate an understanding of processes and change over time within earth systems by …

***4a** observing and recording ~~seasonal and~~ weather changes throughout the school year.

Clarifying the Standards

Prior Learning

In kindergarten, students observed, recorded, and summarized local weather data. They began to use scientific tools, including windsocks and thermometers, to extend the senses and gather data about weather. As a whole group, they observed and documented weather changes throughout the school year.

Current Learning

Reinforcement Level (content taught in prior grade)
Students in first grade observe, record, and summarize local weather data. They use windsocks and thermometers to collect weather data. Students observe weather changes throughout the school year.

Developmental Level of Instruction (content new to the grade level)
First-graders learn to work independently to observe, record, and summarize local weather data. Additionally, they use weather/wind vanes and rain gauges (nonstandard units of measurement) to collect weather data throughout the school year.

Future Learning

In grade 2, students will use additional scientific tools, such as an anemometer to determine wind speed, meter sticks and rulers to judge snow depth, and rain gauges to measure rainfall amounts in inches. As they continue to observe and record weather changes throughout the year, students will be introduced to seasonal changes. Students will also learn for the first time about clouds, including how they relate to precipitation.

Additional Research Findings

According to *Benchmarks for Science Literacy* and *Making Sense of Secondary Science,* primary students easily develop a conceptual understanding of solids and liquids because they can be readily observed. But, because gases cannot be directly observed, students at the developmental level struggle to understand processes of evaporation and condensation. Therefore, teaching the water cycle to kindergarteners and first-grade students is not developmentally appropriate (*Benchmarks,* p. 67; *Making Sense*, pp. 101–102).

Students are required to observe changes over time and should understand that change is something that happens to many things (*Benchmarks*, p. 272).

Research shows that students need repeated practice making observations and recording data to become proficient in these skills. Suggested strategies include providing guidance and practice in compiling, reading, and summarizing data in graphs and charts (*Benchmarks,* p. 10).

Common challenges students encounter in this unit include learning to measure, measuring accurately, and understanding new vocabulary such as the term *rain gauge* (*Making Sense*, pp. 10–11).

Notes About Resources and Materials

General Resources

Houghton Mifflin Science Discovery Works, Unit B

- Teacher Resource Book, Overview Activity Support, pp. B35–B45

Related to ESS1 (K-2)–5, 5a

Houghton Mifflin Science Discovery Works, Unit B

- Teaching Guide, Lesson 1 (including poster book), pp. B16–B23
- Teaching Guide, pp. B97–B98
- Teacher Resource Book, pp. B17, B48, B49
- Teacher Resource Book, alternate activity 1, p. B30

Related to ESS 1(K-2)–3, 3a

Houghton Mifflin Science Discovery Works, Unit B

- Teaching Guide, Lesson 4 (including poster book), pp. B40–B47
- Teaching Guide, pp. B95–B96
- Teacher Resource Book, alternate activity 4, p. B31

Related to ESS1 (K-2) –4, 4a

Houghton Mifflin Science Discovery Works, Unit B

- Teaching Guide, Lesson 6 (including poster book), pp. B58–B65
- Teaching Guide, pp. B97–B98
- Teacher Resource Book, p. B117

Books

- Breen, M. & Friestad, K. (2008). *The Kids' Book of Weather Forecasting*. Carmel, NY: Ideals Books.
- Chen, K.K. & Haggerty, T. (illustrators). (2006). *Weather.* Eveleth, MN: Usbourne Beginners.
- DeWitt, L. (2002). *What Will The Weather Be?* New York: Harper Collins.
- Eckart, E. (2004). *Watching the Weather.* New York: Scholastic.
- Eckart, E. (2004). *Watching the Seasons*. New York: Scholastic.
- Gibbons, G. (1993). *Weather Forecasting*. Fullerton, CA: Aladdin Books.
- Gibbons, G. (1992). *Weather Words and What They Mean*. New York: Holiday House Books.
- Miles, E. (2005). *Sunshine (Watching the Weather).* Chicago: Heinemann-Raintree.
- Owen, A. & Ashwell, M. (2000). *Watching The Weather (What is Weather)*. Chicago: Heinemann-Raintree.
- Rabe, T. (2004). *Oh Say, Can You Say What's The Weather Today?* New York: Random House.

Helpful Websites

- www.Internet4Classrooms.com
- www.TeacherVision.fen.com

Grade 1 Science, Quarter 1, Unit 1.2

Objects in the Sky

Overview

Number of instructional days: 8 (1 day = 45 minutes)

Content to be learned

- Observe that the sun can be seen only in the daytime.
- Observe that the moon can be seen sometimes at night and sometimes during the day.
- Observe that the sun and moon appear to move slowly across the sky.
- Demonstrate when a shadow will be created on sunny versus cloudy days.

Processes to be used

- Observe and describe changes in objects over time.
- Record observations of objects.
- Demonstrate safe practices during classroom and field investigations.
- Use scientific processes to make observations, organize and compare data, communicate findings, and build explanations.

Essential questions

- How does the sun appear to change over time?
- How are shadows made?
- How does the moon appear to change over time?
- When can the sun and the moon be observed in the sky?

Written Curriculum

Grade Span Expectations

ESS2 - The earth is part of a solar system, made up of distinct parts that have temporal and spatial interrelationships.

No further targets for EK ESS2 at the K-4 Grade Span

ESS2 (K-2) –7 Students demonstrate an understanding of temporal or positional relationships between or among the Earth, sun, and moon by …

7a observing that the sun can only be seen in the daytime, but the moon can be seen sometimes at night and sometimes during the day.

7b observing that the sun and moon appear to move slowly across the sky.

PS 2 - Energy is necessary for change to occur in matter. Energy can be stored, transferred, and transformed, but cannot be destroyed.

PS2 (K-4) SAE – 5

Use observations of light in relation to other objects/substances to describe the properties of light (can be reflected, refracted, or absorbed).

PS2 (K-2)-5 Students demonstrate an understanding of energy by…

5a demonstrating when a shadow will be created using sunny versus cloudy days.

Clarifying the Standards

Prior Learning

In kindergarten, students observed that the sun can be seen only during the day, while the moon can be seen at night and sometimes during the day.

Current Learning

Reinforcement Level (content taught in prior grade)
In first grade, students observe that the sun can only be seen in the daytime, but the moon can be seen sometimes during the day and sometimes at night.

Developmental Level of Instruction (content new to grade level)
Students in first grade observe that the sun and moon appear to move slowly across the sky. In addition, students demonstrate when a shadow will be created using sunny versus cloudy days.

In order to observe changes in the appearance of the moon, sun, and shadows, students will need to make observations both at school and at home. Observations should occur over a period of time, so teachers will need to provide support and materials for at-home observations, as well as time, support, and materials for observations done at school. Teachers will also need to set aside time for students to study their qualitative data to look for patterns of change in the appearance of the sun, moon, and shadows over time.

Future Learning

In grade 2, students will continue to observe that the sun and the moon appear to move slowly across the sky. In addition, they will observe that the moon looks slightly different from day to day. They will also note that the number of stars in the sky cannot be easily counted, that stars are scattered unevenly, and that they display varying degrees of brightness.

Additional Research Findings

According to *Benchmarks for Science Literacy*, primary-age children are far from ready to understand the composition of the solar system and its scale of space and time. Learning about objects in the sky should be entirely observational and qualitative at this level. Students should observe and describe how objects in the sky look at different times, but it is too soon to teach them about the names of the moon's phases and much too soon to explain them (p. 62)

It may be helpful to strengthen students' understanding of these concepts by discussing their observations and recorded data. Children should have lots of time to talk about what they observe and to compare their observations with those of others. A premium should be placed on careful expression, a necessity in science, but students at this level should not be expected to come up with scientifically accurate explanations for their observations. (*Making Sense of Secondary Science*, p. 9; *Benchmarks for Science Literacy*, p. 9).

Younger students should be encouraged to talk about and draw what they see and think in order to develop observation and description skills and explanations based on their observations. (*National Science Education Standards*, p.134).

Even for older students, explanations of the day-night cycle, the phases of the moon, and the seasons are very challenging. To understand these phenomena, students should first master the idea of a spherical earth, itself a challenging task. Similarily, students must understand the concept of "light reflection" and how the moon gets its light from the sun before they can understand the phases of the moon. Finally, students may not be able to understand explanations of any of these phenomena before they reasonably understand the relative size, motion, and distance of the sun, moon and the earth. (*Atlas of Science Literacy*, *Volume 1*, p. 44).

Notes About Resources and Materials

General Resource Materials for All GSEs

Houghton Mifflin Science: Discovery Works, Unit B

- Teacher Resource Book, Overview Activity Support, pp. B35–B45

Books

- Anton, W. (1998). *Light and Shadow*. Marlborough, MA: Newbridge Discovery Links.
- Branley, F.M. (1987). *The Moon Seems to Change*. New York: Harper Collins.
- Branley, F.M. (1986). *What Makes Day and Night*. New York: Harper Collins.
- Canizares, S. (1998). *Sun*. New York: Scholastic.
- Eckart, E. (2004). *Watching the Moon*. New York: Scholastic.
- Eckart, E. (2004). *Watching the Sun.* New York: Scholastic.

- Fowler, A. (1994). *When You Look Up at the Moon*. New York: Scholastic.
- Hanson, M.P. (2007). *Sleepy Sun*. Charleston, SC: Booksurge Publishing.
- Seymour, S. (2003). *The Moon* (Revised ed.). New York: Simon & Schuster.
- Simon, S. (1989). *The Sun*. New York: Harper Collins.

Helpful Websites

- www.BeaconLearningCenter.com/WebLessons/AsTheEarthTurns/turn02.htm
- www.Internet4Classrooms.com
- www.Scholastic.com

Grade 1 Science, Quarter 1, Unit 1.3

Human Characteristics

Overview

Number of instructional days: 8 (1 day = 45 minutes)

Content to be learned

- Observe, identify, and record external features of humans.
- Identify the functions of the physical structures (sensory organs) of humans.
- Identify the senses needed for survival in various situations.
- Observe and compare physical features of parents and classmates.

Processes to be used

- Observe, identify, and record data.
- Identify the function of each of the senses.
- Observe and compare physical features of organisms.
- Use scientific processes to make observations, make comparisons, and communicate findings.

Essential questions

- How do your senses help you to survive?
- How are you alike and different from others?

Written Curriculum

Grade Span Expectations

LS 4 - Humans are similar to other species in many ways, and yet are unique among Earth's life forms.

LS4 (K-4) FAF -8

Identify what the physical structures of humans do (e.g., sense organs – eyes, ears, skin, etc.) or compare physical structures of humans to similar structures of animals.

LS4 (K-2)-8 Students demonstrate an understanding of human body systems by …

8b observing, identifying, and recording external features of humans ~~and other animals~~.

8c identifying the senses needed to meet survival needs for a given situation.

LS4 (K-4) POC -9

Distinguish between characteristics of humans that are inherited from parents (i.e., hair color, height, skin color, eye color) and others that are learned (e.g., riding a bike, singing a song, playing a game, reading)

LS4 (K-2) –9 Students demonstrate an understanding of human heredity by …

9a observing and comparing their physical features with those of parents, classmates ~~and other organisms.~~

Clarifying the Standards

Prior Learning

In kindergarten, students used their five senses to identify and describe objects and organisms in their environment. They observed and identified human external features and compared their own physical features with those of their classmates.

Current Learning

Reinforcement Level (content taught in prior grade)
First-graders build on prior experiences in kindergarten as they continue to observe and identify external features of humans. They also compare their own features to those of their classmates.

Developmental Level of Instruction (content new to grade level)
Students in first grade begin recording their observations of the external features of humans and comparing their own features to those of their parents. They identify the function of their external features, as well as identifying the senses needed to meet survival needs for a given situation.

Future Learning

In the third quarter, first-grade students will observe, identify, and record external features of animals. Observing, identifying, and recording external features of humans and animals will continue in grade 2. Students will also identify and describe how the senses are essential to the survival of animals and humans. Second-graders observe and compare their physical features with those of parents and classmates and then compare their features with the external features of other organisms. In addition, they will be introduced to the concept of learned behavior.

Additional Research Findings

At the primary level, children learn about themselves and other animals as they develop ideas about how humans and animals live, grow, feed, move, and use their senses. While students may be able to identify and have a simple view of the functions of some major internal organs, this knowledge should not be emphasized. The focus should remain on external features of organisms (*Benchmarks for Science Literacy*, p. 128). Children at this level think each organ has its own independent function (e.g., the eyes are for seeing; the brain is for thinking; the stomach is for digesting food). Only later will students learn how organs work in coordinated ways to form systems. Because young students have difficulty understanding the complexity of internal organs and systems, it is best to limit discussion of these topics to only what is necessary in response to questions (*Benchmarks*, p. 136).

Young children should understand that different senses give different information and that humans use their senses to learn about themselves and their physical surroundings (*Benchmarks*, p. 140).

At the primary level, students learn best when given specific examples that illustrate real-world concepts. When learning how the senses might aid in survival, students might relate to the example of feeling a door for heat to see if there is a fire or looking before crossing a street. Using real-world examples to explore the various functions performed by the five senses should be reinforced throughout the school year.

Notes About Resources and Materials

General Resource Material for All GSEs

Houghton Mifflin Science: Discovery Works, Unit B

- Teaching Guide, pp. B97–B98
- Teacher Resource Book, Overview Activity Support, pp. B35–B45

Books

Related to LS4 (K-2)-8, 8b, and 8c

- Adoff, A. (2000). *Touch the Poem.* New York: Blue Sky Press.
- Aliki. (1991). *My Five Senses*. New York: Harper Collins.
- Cole, J. (1994). *You Can't Smell a Flower with Your Ear*. New York: Grosset & Dunlap/Penguin USA.
- Hill Nettleton, P. (2006). *Look, Listen, Taste, Touch, and Smell: Learning About Your Five Senses*. Mankato, MN: Picture Window Books/Capstone.

- Keller, H. (2006). *Nosy Rosie*. New York: Greenwillow Books/Harper Collins.
- Kroll, V. (1993). *Naomi Knows It's Springtime*. Honesdale, PA: Boyds Mills Press.
- Raschka, C. (2006). *Five For a Little One*. New York: Atheneum Books/Simon and Schuster.

Related to LS4 (K-2)–9, 9a

- Hinshaw Patent, D. (1989). *Grandfather's Nose: Why We Look Alike or Different*. London: Franklin Watts.
- May, J. (1970). *Do You Have Your Father's Nose?* The Story of Human Heredity. Mankato, MN: Creative Company.
- Pomerantz, C. (1969). *Why You Look Like You Whereas I Tend To Look Like Me*. Frenchs Forest, Australia: Addison Wesley/Pearson Education.

Helpful Websites

- www.Education.com
- www.PBSkids.org/zoom/activities
- www.TeachtheChildrenWell.com