Kindergarten Science, Quarter 1, Unit 1.1

Weather

(Year-Round Topic)

Overview

Number of instructional days: 7 (1 day = 30 minutes)

Content to be learned

- Observe and record local weather data.
- Summarize local weather data.
- Use data collected to describe weather changes.
- Use scientific tools to extend the senses and gather weather data.
- Observe weather changes throughout the school year.

Processes to be used

- Observe and record data.
- Summarize data.
- Observe and describe changes found in data.
- Use scientific tools to gather data.
- Demonstrate safe practices during classroom and field investigations.
- Use scientific processes to conduct investigations, make observations, organize and compare data, and communicate findings.

Essential questions

- How can we use tools to learn about the weather?
- How does weather change over time?

Written Curriculum

Grade Span Expectations

ESS 1 - 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).

ESS1 (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 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

According to the Rhode Island Early Learning Standards (http://www.ride.ri.gov/els/science.asp), preschoolers had opportunities to collect, describe, and record information using their senses, scientific tools, discussions, drawings, and charts. Preschoolers also investigated changes in materials and cause–effect relationships, such as changes in temperature, based on everyday experiences.

Current Learning

For many kindergarten children, formal schooling experiences are limited. Therefore, concrete interactions with hands-on materials are essential for developing student understanding. Most, if not all, concepts should be taught at the developmental level of instruction.

In this unit, students begin to develop an understanding of changes in weather over time. They observe and record local weather on a daily basis, continuing throughout the school year. Each month, students observe, describe, and summarize changes in recorded weather data (i.e., weather graph). Specifically, they make comparisons and communicate their findings with regard to weather changes over time (i.e., 1 month, 2 months, entire year). Students are also taught safe practices for conducting investigations using scientific tools (thermometers and windsocks). These tools extend the students' senses and enable them to gather weather data.

Kindergartners build upon their general preschool learning (i.e., collect, describe, record information) by gathering data, making comparisons, and summarizing weather data collected over time.

Future Learning

Students will continue to observe, record, and summarize local weather data in first grade. While kindergartners record weather as a whole class experience, first grade students will record weather data in their individual weather journals/notebooks. They will record weather changes throughout the school year using the same scientific tools used in kindergarten, with the addition of a wind vane to determine wind direction and a rain gauge to measure rain. Both tools should measure in nonstandard units.

Additional Research Findings

Making Sense of Secondary Science points out that students have a "tendency to relate wind speed to temperature" (p. 111). To address this misconception, it may be helpful to encourage students to observe the windsock outside the classroom on cold days with little wind, as well as on warm, windy days. Ask, "What do you notice?" Guide them through the concrete experience of observing and noting that wind speed is not related to temperature. Additionally, many students mistakenly believe air exists only when they can feel it (p. 104). One suggestion to address this particular misconception would be to take the students outside when the windsock is not moving (i.e., no wind) to discuss the presence of air. PLEASE NOTE: Since the definition of wind is not addressed in the GSEs, students should have an understanding that wind is actually the movement of air… and that air is present at all times, regardless of the presence of wind. Students can also overcome these misconceptions by using scientific tools to collect data and record findings in real-world situations. Be mindful that this content should be revisited throughout the school year.

According to *Benchmarks for Science Literacy,* there are many ways to introduce young students to the cyclical nature of earthly phenomena. For instance, students may keep daily records of temperature (*hot*, *cold*, *pleasant*) and precipitation (*none*, *some*, *a lot*), tracking data trends on a weekly and monthly basis throughout the school year. At the primary level, it is sufficient for students to spot general patterns of change in temperature or precipitation (4B–The Earth; K–2).

According to research in the *Atlas of Science Literacy*, kindergarten students should understand that "change is something that happens to many things" and that weather changes are caused by heat energy from the sun as it warms land, air, and water. As students learn about weather, they should observe and record simple data, such as temperatures (p. 21).

Notes About Resources and Materials

Materials

- Thermometers without Fahrenheit or Celsius scales
- Windsock

Books

- Borden, L. (1992). *Caps, Hats, Socks and Mittens: A Book About the Four Seasons*. New York: Scholastic Paperbacks.
- Cousins, L. (2006). *Maisy's Wonderful Weather Book*. London: Walker Books, Ltd.

Helpful Websites

- www.ScienceNetLinks.com

  See the following lessons in the Grades K-2 Lesson Index:

  Weather 1—Weather Patterns
  http://www.sciencenetlinks.com/lessons.php?BenchmarkID=4&DocID=493

  Look at Those Leaves!

  http://www.sciencenetlinks.com/lessons.php?BenchmarkID=12&DocID=215

- http://Internet4Classrooms.com

  See the following lesson in the Kindergarten Earth and Space Standards Index:

  Dress A Bear For the Weather

  http://www.fossweb.com/modulesK-2/AirandWeather/activities/whatstheweather.html

- www.KinderPlans.com

Kindergarten Science, Quarter 1, Unit 1.2

Human Characteristics

Overview

Number of instructional days: 15 (1 day = 30 minutes)

Content to be learned

- Identify the five senses.
- Use the five senses to identify and describe objects.
- Observe and identify external features of humans.
- Observe and compare physical features among classmates.

Processes to be used

- Make observations using the five senses.
- Identify, describe, and compare objects and organisms.
- Demonstrate safe practices during classroom and field investigations.
- Use scientific processes to conduct investigations, make observations, communicate findings, organize and compare data, and build explanations.

Essential questions

- How do your five senses help you learn about the world around you?
- How are your physical features the same as or different from those of your classmates?

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 …

8a identifying the five senses and using senses to identify objects in the environment,

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

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

According to the Rhode Island Early Learning Standards (http://www.ride.ri.gov/els/science.asp), preschoolers learned to collect, describe, and record information through discussion, drawings, and charts. They used their senses to make observations, to gather and record information, and to make predictions. As they enter kindergarten, students should be able to ask and pursue questions based upon discoveries and simple investigations.

Current Learning

For many kindergarten children, formal schooling experiences are limited. Therefore, concrete interactions with hands-on materials are essential for developing student understanding. Most, if not all, concepts should be taught at the developmental level of instruction.

In this unit, students begin to understand the external features of the human body. They observe and identify their external features (e.g., arms, legs, hands, feet), and begin to explore the purpose of these features. In addition, students build upon their general preschool learning (i.e., collect, describe, record information) in order to gain an understanding of the function of their body parts and how they relate to their senses. Students identify body parts associated with the five senses (i.e., eyes, nose, ears, tongue, hands), and describe how the senses are used to observe and describe objects in their environment.

Kindergarteners determine similarities and differences as they compare their own physical features to those of their classmates.

Future Learning

In first grade, students will continue to observe, identify, and describe objects using their senses. They will record information about external features and will use these data to compare their own physical features with those of their classmates and parents. Students will also identify ways in which the senses help a specific organism meet its needs for a given situation.

Additional Research Findings

According to *Benchmarks for Science Literacy*, kindergarteners "should be finding out about themselves and other animals, developing ideas about how people and other animals live, grow, feed, move, and use their senses. They should concentrate mainly on external features. They may be able to identify some major internal organs and have simple views of their functions, but those should not be emphasized" (6A–Human Identity; K–2, p. 128).

According to *Making Sense of Secondary Science*, children under the age of 10 do not yet understand the internal organ systems or how those systems function cooperatively to maintain life. At the kindergarten level, young students are egocentric in their thinking about body parts. "A shift in children's thinking occurs between the ages of 7 and 9, from a holistic human-centered view to a view which recognizes different functional parts working together" (p. 26). Although the GSEs do not specifically state addressing the "function" of external body parts, it is important for students to have a basic understanding that the external body parts each have a particular purpose. This should be included as part of the overall learning experience.

The Atlas of Science Literacy states: "People use their senses to find out about their surroundings and themselves. Different senses give different information. The human body has parts that help it seek, find, and take in food when it feels hunger—eyes and a nose for detecting food, legs to get to it, arms to carry it away, and a mouth to eat it" (p. 41).

Notes About Resources and Materials

Materials

- Handheld mirrors
- Cotton balls
- Opaque containers
- Scented extracts
- Touch-and-feel kit
- Sound boxes (2 of each: bells, 1-inch cubes, coins, pompom balls, erasers)
- Audio recordings of various sounds
- Picture cards related to the five senses

Books

- Cole, J. (1994). *You Can't Smell a Flower with Your Ear*. New York: Grosset & Dunlap/Penguin USA.
- Fletcher Walker Elementary School (Westwood, CA) students. (2003). *Picture Perfect?* New York: Scholastic, Inc.
- Jayne, L. (2007). *How Do You Know? A Book About the Five Senses.* Mustang, OK: Tate Publishing & Enterprises. (Includes e-live audio download.)
- Williamson, S.A. (1998). *Fun with My Five Senses: Activities to Build Learning Readiness* (2nd ed.). Charlotte, VT: Williamson Publishing.

Helpful Websites

- www.ScienceNetLinks.com

  See the following lessons in the Grades K–2 Lesson Index:

  My Senses Tell Me

  http://www.sciencenetlinks.com/lessons.php?BenchmarkID=6&DocID=392

  My Body Helps Me Get Food

  http://www.sciencenetlinks.com/lessons.php?BenchmarkID=6&DocID=383

- http://Internet4Classrooms.com

  See the following lessons in the Kindergarten Life Science Standards Index:

  Five Senses

  http://www.sedl.org/scimath/pasopartners/senses/welcome.html

  The Senses

  http://faculty.washington.edu/chudler/chsense.html