Kindergarten Science, Quarter 1, Unit 1.1

Weather

Overview

Number of instructional days: 5 (1 day = 20–30 minutes)

Content to be learned

- Observe local weather data.
- Record and summarize local weather data.
- Use a thermometer to extend the senses and gather data about temperature.
- Observe seasonal and weather changes throughout the school year.

Science processes to be integrated

- Observe, record, and summarize data.
- Use scientific tools to gather data.
- Observe changes over time.

Essential questions

- What are the different types of weather you have observed? Describe them.
- How does weather change with each season?
- How do scientific tools, such as a thermometer, help us describe the weather?

Written Curriculum

Grade-Span Expectations

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 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), students who attended preschool may have 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

Students in kindergarten develop knowledge of weather by observing, recording, and summarizing local weather data. They use scientific tools, such as thermometers, to gather data about the weather, and observe seasonal and weather changes throughout the school year. All concepts in this unit are new to students, and should be taught at the developmental level of instruction.

Throughout this unit, students should participate in a variety of whole group activities, and should be actively engaged in collecting, recording, discussing, and summarizing weather data.

When learning about weather, students should observe the weather on a daily basis, and learn to record that data in class graphs and charts. At the end of each week, month, and season, students need opportunities to summarize their data. Students should notice seasonal trends such as changes in temperature (cooler/warmer) and precipitation (rainfall, snowfall), and they should be asked to give simple explanations for patterns of change in the weather (i.e., it is colder in the winter, so the temperature is usually lower).

In this unit of study, students also learn that a thermometer is a tool that measures temperature more accurately than can be observed with our senses alone. For example, a child's skin will tell him/her if it is hot or cold outside, but a thermometer will give us more accurate information about the temperature outside. Students should learn that the higher the red liquid moves in the thermometer, the warmer the temperature is. A way to accomplish this is to give pairs or small groups of students the opportunity to place a thermometer, with the temperature scale covered or removed, into cups of warm and cold water in order to see the effect on the thermometer. Then, when using a thermometer to record the daily temperature, have the students measure and cut a red strip of paper to match the length of the red portion of the thermometer each day. These strips of paper can be used to create a class graph that shows the daily temperature. These graphs can be collected month after month, and students can periodically look at the graphs to determine patterns of change in daily temperature.

Future Learning

In first grade, students will continue to observe, record, and summarize local weather data. While kindergartners record weather as a whole class experience, first grade students can begin to record weather data individually. They will also observe and record seasonal and weather changes throughout the school year using scientific tools, such as thermometers, windsocks, and rain gauges, understanding that tools extend the senses and help us gather data about the weather. They will identify the sun as a source of heat energy, and describe that the sun warms land and water. Students will demonstrate when a shadow is created using sunny versus cloudy days, and will observe how clouds are related to forms of precipitation.

In second grade, students will continue to use scientific tools to extend senses and gather data about weather. They will observe and record seasonal and weather changes throughout the school year.

In grades 3–4, students will explain how the use of scientific tools helps to extend senses and gather data about weather. They will select appropriate scientific tools for a given task and describe the information that they will provide. Students will describe water as it changes into vapor in the air and reappears as a liquid when it cools, explaining how this cycle of water relates to weather and the formation of clouds. Students will observe, record, compare, and analyze weather data to describe weather changes or weather patterns.

Additional Findings

In the early years of school, children are most interested in learning about their surroundings and all the ways they can interact with these surroundings (*Benchmarks for Science Literacy*, p. 140). Students should be actively involved in exploring phenomena that interests them both in and out of class. These investigations should be fun and exciting, opening the door to even more things to explore. An important part of students' exploration is telling others what they see, what they think, and what it makes them wonder about. 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. Theory can wait. (*Benchmarks*, p. 10) In addition, teachers should keep in mind that investigating for kindergarteners means exploration, not experimentation.

There are many ways to acquaint children with earth-related phenomena that they will only come to understand later as being cyclical. For instance, students can start to keep daily records of temperature (hot, cold, pleasant) and precipitation (none, some, lots) and plot them by week, month, and years. It is enough for students to spot the pattern of ups and downs, without getting deeply into the nature of climate. Students should also recognize that some events in nature have a repeating pattern. The weather changes some from day to day, but things such as temperature and rain (or snow) tend to be high, low, or medium in the same months every year (*Benchmarks*, p. 67). Therefore, the focus of this unit of study should be on recognizing patterns in the weather, not an in-depth look on weather and climate.

According to the *Atlas of Science Literacy,* primary 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 (Volume 2, p. 21). As young students learn about weather, they should observe and record simple data, such as temperature.

Kindergarten Science, Quarter 1, Unit 1.2

Our Senses

Overview

Number of instructional days: 15 (1 day = 20–30 minutes)

Content to be learned

- Identify the five senses (sight, hearing, touch, taste, smell).
- Use senses to identify objects in the environment.

Essential questions

- What are your five senses and how do you use them to learn about the world around you?

Science processes to be integrated

- Conduct investigations.
- Use data to draw conclusions.
- Communicate understanding and ideas.

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,

Clarifying the Standards

Prior Learning

If students attended a preschool program, the early learning standards indicate that they have had previous experience using their senses to make observations.

Current Learning

Students in kindergarten will have varying levels of experience with the content in this unit. Kindergarteners learn to identify the five senses. This concept is only taught in kindergarten, and should be taught from the developmental level to the drill-and-practice level of instruction. At the developmental level of instruction, students use their senses to identify objects in the environment. Kindergarteners should be provided with multiple opportunities to use their senses to observe and describe a wide variety of objects in their environment. Activities should be engaging and can be both teacher-directed and center-based.

Future Learning

In grade 1, students will observe and identify the external features of humans, as well as observing and comparing their own physical features with those of parents and classmates.

In grade 2, students will observe, identify, and record the external features of humans and other animals, and they will identify the senses needed to meet survival needs for a given situation. Students will observe and compare their physical features with those of parents, classmates, and other organisms, and will identify that some behaviors are learned.

In grades 3–4, students will show connections between external and internal body structures (i.e., organs and systems) and how they help humans survive. They will compare and analyze external features and characteristics of humans and other animals. Students will identify similarities that are inherited from a biological parent and that some behaviors are learned and some behaviors are instinctive.

Additional Findings

Because children are most interested in learning about their surroundings and all the ways they can interact with these surroundings (*Benchmarks for Science Literacy,* p. 140), kindergarten students should be actively involved in exploring their environment in order to develop an understanding of the world around them. These investigations should be fun and exciting. An important part of students' exploration is telling others what they see, what they think, and what it makes them wonder about. Children should have lots of time to talk about what they observe and to compare their observation with those of others. Emphasis 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. Theory can wait (*Benchmarks*, p. 10).

Full inquiry involves asking a simple question, completing an investigation, answering the question, and presenting the results to others. In elementary grades, students begin to develop the physical and intellectual abilities of scientific inquiry. They can design investigations to try things to see what happens. Students at this age tend to focus on concrete results of tests and will entertain the idea of a "fair" test (a test in which only one variable at a time is changes). Children in K–4 have difficulty with experimentation as a process of testing ideas and the logic of using evidence to formulate explanations (*National Science Education Standards,* p. 122). Teachers of young children should be very purposeful in how they go about teaching students to conduct science inquiry. It requires extensive scaffolding, support, and time. Kindergarteners will need multiple opportunities to participate in concrete, hands-on investigations in order to explore and make sense of the world around them.

Children at this level think that each organ has it own independent function (i.e., ears are for hearing, the brain is for thinking). Only later will students be able to learn how organs work in coordinated ways to make systems (*Benchmarks*, p. 136). Therefore, primary students' learning during this unit of study should focus on the external features of humans, not on human body systems. This includes a focus on the five senses. Our senses are the tools that we use to learn about ourselves and the world around us.