

Grade 2 Science, Quarter 1, Unit 1.1

Human Characteristics

Overview

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

Content to be learned

- Observe, identify, and record external features of humans.
- Identify external features that all humans have in common.
- Identify the senses used to meet survival needs in a given situation.
- Observe and compare physical features with those of parents and classmates.
- Identify that some behaviors are learned.

Essential questions

- What are some similarities and differences among humans?

Processes to be used

- Observe, identify, and record observations.
- Observe and compare characteristics of organisms.
- Observe and describe behaviors of organisms.
- Demonstrate safe practices during classroom and field investigations.
- Use scientific processes to make observations, organize and compare data, communicate findings, cite evidence, and build explanations.

- How can our senses help us survive?

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~~.

9b identifying that some behaviors are learned.

Clarifying the Standards

Prior Learning

Students in kindergarten and first grade named the five senses and used them to identify and describe objects in the environment. They also observed and compared their physical features with those of parents and classmates.

Current Learning

At the reinforcement level of instruction, second-graders continue observing and comparing their external features to those of their parents and classmates. They learn to record their observations in science journals, graphic organizers, and labeled drawings at the developmental level of instruction. Also at the developmental level, students describe how the senses help humans survive in their environment and recognize that some behaviors are learned.

Future Learning

In third grade, students will identify external and internal body structures and learn how those structures help humans survive. They will continue to identify learned behavior. In addition, students will identify body features that are inherited from a biological parent.

Additional Research Findings

Benchmarks for Science Literacy states that children at the primary level should develop ideas about how people and other animals live, grow, feed, move, and use their senses. Learning should focus mainly on external features. While students may be able to identify some major internal organs and have a basic understanding of their functions, internal organs should not be emphasized. Although children easily imagine animals acting as people, they have difficulty seeing people as animals. They do not need to be coerced into this idea, but they should explore the similarities and differences among people and animals. As students progressively find similarities and differences among human beings and between human beings and other animals, they see the value in having a classification system for living organisms (p. 128).

Primary students think that each organ has its own independent function (the eyes are for seeing; the brain is for thinking; the stomach is for digesting food, and so forth). Only later will students be able to learn how organs work in coordinated ways to make a system. Young children can understand that the human body has parts that help it seek, find, and take in food when hungry—eyes and noses for detecting food, legs to get to it, arms to carry it away, and a mouth to eat it. In addition, the senses warn us about danger, muscles help us to fight, hide, or get out of danger (*Benchmarks for Science Literacy*, p. 136).

Notes About Resources and Materials

The following resources can be found at most CPS Libraries and the Cranston Public Libraries.

Books

- Aiki. (1989). *My Five Senses*. New York: Harper Collins.
- Cole, J. (1999). *The Magic School Bus Explores the Senses*. New York: Scholastic.
- Fowler, A. (1991). *Hearing Things*. New York: Scholastic.
- Fowler, A. (1991). *Tasting Things*. New York: Scholastic.
- McMillan, B. (1994). *Sense Suspense: A Guessing Game for the Five Senses*. New York: Scholastic.
- Miller-Schroeder, P. (2000). *The Science of Senses*. New York: Weigl Publishers.
- Simon, S. (2003). *Eyes and Ears*. New York: Harper Collins.
- Treays, R. (2004). *Understanding your Senses*. Eveleth, MN: Usborne Books.

DVDs

- Discover Education. (1987). *The Fabulous Five: Our Senses*.
Available through the Discovery Education store:
<http://store.discoveryeducation.com/product/show/50635#video>

Grade 2 Science, Quarter 1, Unit 1.2
Objects in the Sky

Overview

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

Content to be learned

- Observe that the sun and moon appear to move slowly across the sky.
- Observe that the moon looks slightly different from day to day.
- Observe that there are more stars in the sky than can easily be counted.
- Observe that the stars are not scattered evenly and vary in brightness.

Processes to be used

- Record observations of objects in the natural world.
- Observe and describe changes in objects over time.
- Demonstrate safe practices during classroom and field investigations.
- Use scientific thinking processes such as observing, citing evidence, communicating, comparing, and organizing to conduct investigations and build explanations.

Essential questions

- How does the sun appear to change throughout the day?
- How does the moon appear to change over time?
- When you look at the sky, what do you notice about the stars?

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 ...

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

7c observing that the moon looks slightly different from day to day.

ESS3 - The origin and evolution of galaxies and the universe demonstrate fundamental principles of physical science across vast distances and time

No further targets for EK ESS3 at the K-4 Grade Span

The GSEs listed below are assessed at the local level only

ESS3 (K-2) –9 Students demonstrate understanding of processes and change over time within the system of the universe (Scale, Distances, Star Formation, Theories, Instrumentation) by...

9a observing that there are more stars in the sky than can easily be counted, but they are not scattered evenly and not all the same in brightness.

Clarifying the Standards

Prior Learning

Kindergarten and first-grade students observed that the sun can be seen only in the daytime while the moon can be seen sometimes at night and sometimes during the day. In first grade, students observed that the sun and moon appear to move slowly across the sky.

Current Learning

At the reinforcement level of instruction, students in second grade observe that the moon looks slightly different from day to day. They also observe that the sun and moon appear to move slowly across the sky. Students will need opportunities to observe the sun's position in the sky at various times of the day (e.g., morning, lunch time, afternoon).

At the developmental level of instruction, second-graders observe that there are more stars in the sky than they are able to count, that stars are not scattered evenly, and that stars vary in brightness. Students will need opportunities to observe and draw the night sky. They should record visible stars, noticing differences in brightness and how stars are scattered unevenly. They should also describe changes in the moon's appearance.

Future Learning

In grade 3, students will learn that stars are similar to the sun and moon in that they also appear to move slowly across the sky. Students will also observe that the appearance of the moon changes from day to day, and that this pattern repeats approximately every four weeks. Students will recognize that the day/night cycle is a result of the earth rotating on its axis every 24 hours and that the sun is the center of our solar system.

Additional Research Findings

During the primary years, learning about objects in the sky should be entirely observational and qualitative. Because young children are not ready to understand the size and scale of objects in the sky, the priority is to get them noticing and describing what the sky looks like to them at different times. They should, for example, observe how the moon appears to change its shape, but it's too soon for students to name all the moon's phases and much too soon to attempt to explain those phases. By the end of second grade, students should understand that there are more stars in the sky than can be counted, but they are not scattered evenly, and are not the same in brightness or color. The sun can be seen only in the daytime, but the moon can be seen sometimes at night and sometimes during the day. The sun, moon, and stars all appear to move slowly across the sky, and the moon looks a little different every day, but looks the same again about every four weeks. (*Benchmarks for Science Literacy*, p. 62).

Because young children are concrete learners, it is not appropriate to use instructional time learning about the solar system. When presented with models, which have a level of abstraction, misconceptions often result. For example, students at this level often mistakenly believe that the sun is a planet and not a star (*Making Sense of Secondary Science*, p. 174). Therefore, learning during this unit should focus on what students can directly observe about the sun, moon, and stars.

Notes About Resources and Materials

Resources can be found at most CPS Libraries and the Cranston Public Libraries.

Books

- Aldrin, B. (2005). *Reaching for the Moon*. New York: Harper Collins.
- Branley, F.M. (1987). *The Moon Seems to Change*. New York: Harper Collins.
- Branley, F.M. (2000). *What the Moon is Like*. New York: Harper Collins.
- Gibbons, Gail. (1992). *Stargazers*. New York: Holiday House.
- Graham, I. (1999). *The Best Book of the Moon*. Boston: Houghton Mifflin.
- Graham, I. (2003). *You Wouldn't Want to Be on Apollo 13!* New York: Scholastic.
- Knudsen, S. (2003). *Neil Armstrong*. Minneapolis, MN: Lerner Publishing Group.
- Love, A. (2004). *The Kids Book of the Night Sky*. Tonawanda, NY: Kids Can Press.
- McDermott, G. (1986). *Anansi the Spider: A Tale from the Ashanti*. New York: Macmillan.
- McNulty, F. (2005). *If You Decide to Go to the Moon*. New York: Scholastic.
- Moore, P. (1995). *The Sun and Moon*. Glens Falls, NY: Red Fox Books.
- Rau, D.M. (2003). *Moon*. Mankato, MN: Capstone.

- Rau, D.M. (2006). *Spots of Light: A Book About Stars*. Mankato, MN: Capstone.
- Sanfield, S. (1996). *Just Rewards, or Who is that Man in the Moon and What's He Doing Up There Anyway?* New York: Orchard Books.
- Sipiera, D.M. (1997). *Project Apollo*. New York: Scholastic.
- Sly, A. (2001). *Footprints on the Moon*. Watertown, MA: Charlesbridge Publishing.

DVDs

- McDermott, G. *Anansi*. Norwalk, CT: Rabbit Ears Entertainment.
- National Geographic Society. (1982). *Reflecting on the Moon*. Washington D.C.
- National Geographic Society. (1995). *Sun, Earth, Moon*. Washington D.C.

Grade 2 Science, Quarter 1, Unit 1.3
Weather

Overview

Number of instructional days: 10 (1 day = 45 minutes)

Content to be learned

- Use scientific tools to gather weather data and extend the senses.
- Explain how scientific tools help to gather data and extend the senses.
- Observe and record seasonal and weather changes throughout the school year.
- Use data to describe weather changes or weather patterns.
- Observe how clouds are related to forms of precipitation.

Processes to be used

- Use scientific tools to gather data.
- Make and record observations.
- Collect and analyze data.
- Describe patterns found in data.
- Demonstrate safe practices during classroom and field investigations.
- Use scientific processes to make observations, collect, organize, and analyze data, communicate findings, cite evidence, and build explanations.

Essential questions

- How are weather tools used to help us learn more about our world?
- How are clouds related to forms of precipitation?
- How can data help us make predictions about the weather?

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.

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.

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 ...

5b observe how clouds are related to forms of precipitation (e.g., rain, sleet, snow).

Clarifying the Standards

Prior Learning

Kindergarteners and first-graders observed and recorded daily (not seasonal) weather changes using nonstandard units of measure. In kindergarten, students learned to use windsocks and thermometers to gather weather data. In first grade, students expanded their knowledge of weather-data collection tools to include weather/wind vanes and a rain gauge.

Current Learning

This unit gives students the opportunity to use tools to collect weather data. This will continue throughout the school year so that students can use the data to look for patterns of change in the weather.

Building on their experience using nonstandard units of measure when gathering weather data in kindergarten and first grade, second-graders learn to measure weather data using standard units at a developmental level of instruction. Students also observe how clouds are related to various forms of precipitation at a developmental level of instruction. Grade 2 students observe and record seasonal and daily weather changes at the reinforcement level and move toward the drill-and-practice level of instruction as the school year progresses. Students demonstrate the use of windsocks, thermometers, weather/wind vanes, and rain gauges at a drill-and-practice level of instruction. They are introduced to anemometers and meter sticks/rulers as tools to gather weather data. These tools and their related concepts are taught at a developmental level of instruction.

Future Learning

In grade 3, students will explain how tools are used to extend the senses and gather weather data. Third-graders will compare data to describe weather changes or patterns. They will also be introduced to the concept of the water cycle as it relates to cloud formation and precipitation. Students will describe water as it changes to vapor in the air and reappears as a liquid when cooled.

Additional Research Findings

According to *Benchmarks for Science Literacy*, it is important to introduce young students to the cyclical nature of earth-related phenomena, a concept that they will explore further in later grades and courses. One suggested activity is to have students keep daily records of temperature (*hot, cold, pleasant*) and precipitation (*none, some, a lot*), tracking these data over the course of weeks, months, and the school year. It is enough for students to spot the pattern of ups and downs without getting into the nature of climate. They should become familiar with the freezing of water and melting of ice (with no change in weight), the disappearance of wetness into the air, and the appearance of water on cold surfaces. Evaporation and condensation will mean nothing different from disappearance and appearance, perhaps for several years, until students begin to understand that the evaporated water is still present in the form of invisibly small molecules (pg. 67).

The Atlas of Science Literacy indicates that students in the K–2 grade span should develop a foundational understanding of basic weather concepts, including the role played by water (*Weather and Climate, K-2*), while *Making Sense of Secondary Science* indicates that students at this level often infer that wind speed determines air temperature (p. 111).

By the end of grade 2, students should recognize that, while weather changes from day to day, certain factors—such as temperature and rainfall—display patterns over time that help us predict the weather. A suggested strategy to help students understand weather patterns is to build and use weather tools. (*Note: Teachers should practice building and using these weather tools before conducting activities with students.*)

According to research, second-grade students easily comprehend the concepts of solids and liquids because these forms of matter can be observed. Because gases are not observable, students can only infer the presence of a gas by observing its interactions with an object, such as wind moving paper.

Misconceptions often occur when the processes involved in the water cycle, such as evaporation and condensation, are taught too early. Primary students struggle developmentally with the concepts of gases and changing states of matter. As a result, students often mistakenly assume that liquids disappear or cease to exist when they evaporate or that condensation is a reappearance of the liquid that previously disappeared.

Notes About Resources and Materials

Materials

- Meter sticks/rulers
- Rain gauges
- Thermometers

Weather tools that can be built in class

- Anemometers
- Windsocks
- Wind vanes

Websites

- www.WeatherWizKids.com
- www.TheWeatherChannelKids.com

***You might also invite a local TV weatherman to come into the classroom as a guest speaker.*

Trade books that may be used in class

- Gibbons, G. (1993). *Weather Forecasting*. Fullerton, CA: Aladdin Books.
- *Watch Out!* (Scott Foresman Reading Street Leveled Reader 2.4.5). New York: Pearson Education.

Books

These resources can be found at most CPS Libraries and the Cranston Public Libraries.

- Base, G. (2001). *The Water Hole*. New York: Abrams Books.
- Berger, M. (1993). *How's the Weather? A Look at Weather and How it Changes*. Nashville, TN: Ideals Publications. (**Note:** This book is already in the Unit C science kit.)
- DePaola, T. (1975). *The Cloud Book*. New York: Holiday House Books.
- DeWitt, L. (1991). *What Will the Weather Be?* New York: Harper Collins.
- Gibbons, G. (1990). *Weather Words and What They Mean*. New York: Holiday House Books.
- Godwin, S. (2005). *The Drop Goes Plop: A First Look at the Water Cycle*. London: Hachette Children's Books.
- Rau, D.M. (2006). *Fluffy, Flat, and Wet*. Mankato, M.N.: Capstone.
- Sherman, J. (2004). *Shapes in the Sky: A Book about Clouds*. Mankato, MN: Capstone.
- Sherman, J. (2004). *Splish, Splash! A Book about Rain*. Mankato, MN: Capstone.