

# Weather and Seasons

## Teacher Background

### Scientific Background

This unit allows children to experiment and explore weather phenomena through hands-on investigation and observations of the world around. It involves a number of science processes. This unit emphasizes the scientific processes of observation and classification. In addition, the integration of the mathematics skill of telling time on a calendar is an ideal combination. The unit does not need to be done in a single consecutive series, and in fact is better done over a longer period of time. To maintain continuity in instruction over weeks or months, a permanent class bulletin board for weather ideas and weather graphs is necessary.

First, this unit emphasizes time and calendars. While many of the children will be comfortable with maintaining data on a calendar, this skill deserves reinforcement. Each of the lessons suggest making a weather prediction (based on child preconceptions or on weather reports) for the following day. While children will not appreciate the complexity of weather prediction, some of the ways that predictions are made will come out as they study weather events.

Children will use actual weather instruments and compare their data to that provided by the National Weather Service. If you have a computer on line in your classroom allow children to access weather URL's. With enough memory you can access real-time satellite photos of moving cloud patterns and impending storms for the children to watch. Your zip code can be entered into CNN.com, MSN.com, or a number of other URL's.

Children in first grade will not understand the reason for the seasons. It is not related to Earth's distance from the sun, but the angle through which the sun's rays enter the atmosphere. Because the Earth tilts on its axis, during the winter we receive very indirect rays that lose energy as they pass through the atmosphere. During the summer the northern hemisphere receives very direct rays, which retain more energy.

### Precipitation

In this unit, children look at rain, snow, hail, and freezing rain as types of precipitation. All precipitation begins as snow, small ice crystals which form around nuclei of dust in the clouds. While it is not true that « every snow crystal is different, » there are many varieties. Each has some component of a hexagon, reflecting the shape of the water molecule and the way several molecules bond together as they get cooler. Rain melts as it comes down. Freezing rain (sleet) freezes again after it has melted. Hail is bounced down, up, and down again inside a tall thunderhead (cumulonimbus) cloud, and gets another coating of ice each time it makes the round trip.

### Clouds

While many books for older students describe clouds as cumulus, stratus, cirrus, and numbus, it is just as useful to classify cloud cover and the altitude of clouds. Low clouds may have some of their ice crystals already melted. They often cover the entire sky, because they are heavy and the winds aloft cannot tear them apart. High clouds (like altostratus) are puffy. They have less moisture, and may look like strands or whisps as the winds aloft push them along. Thunder clouds (cumulonimbus) go from low to high. You can often see them spread apart on the top in an anvil shape.

### Heat and Temperature

Children of all ages have trouble separating heat from temperature. It is not too early to use careful language. One of the effects of heat can be to raise the temperature of a substance. But heat can

also change a substance (like melting ice or making water evaporate) without changing its temperature, and can cause other chemical reactions. When speaking with children it is helpful to say the following: When we put heat in, the temperature can change or When we put heat in, the ice can melt.

### **Wind**

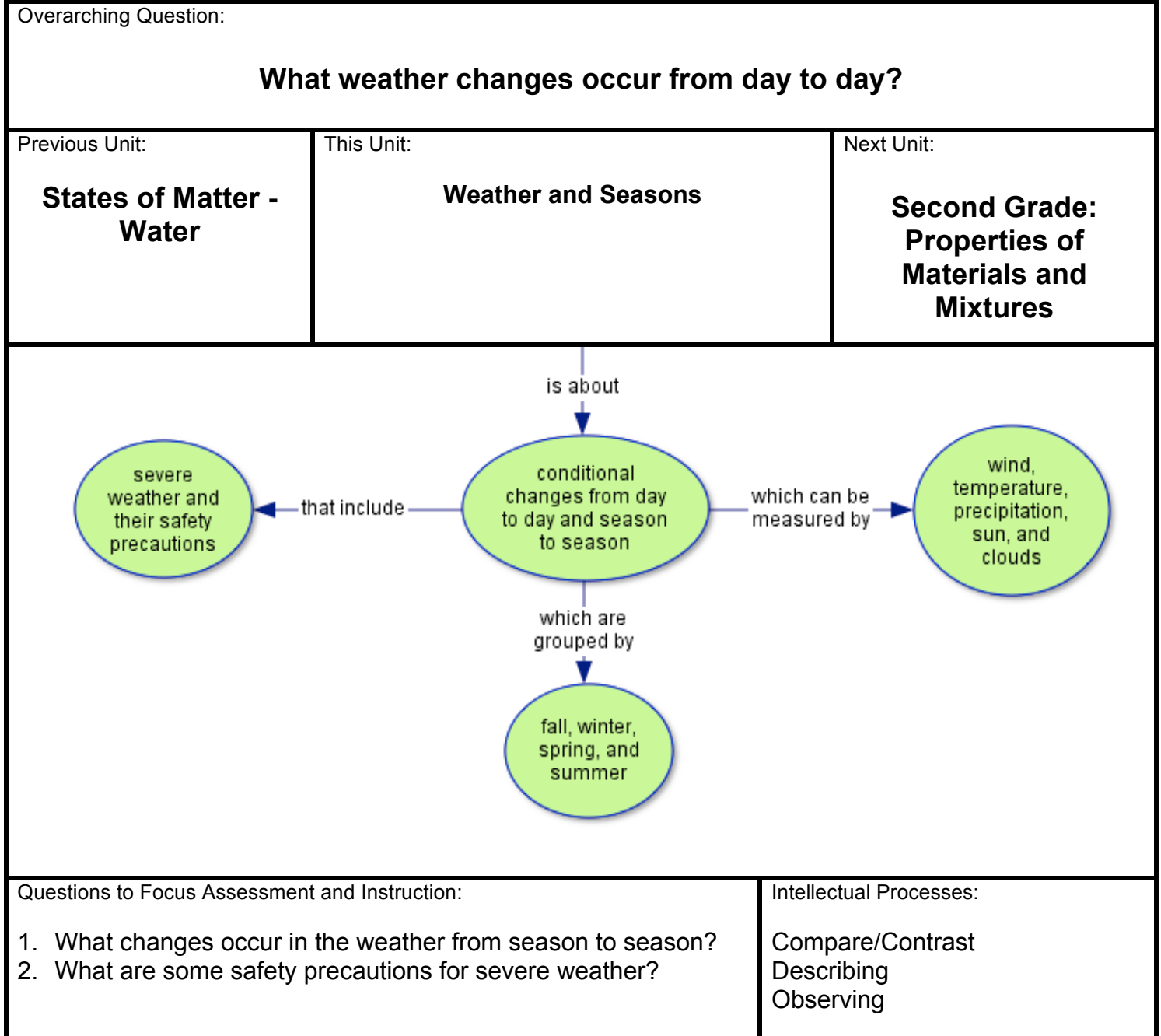
The ultimate cause of all wind on Earth is the sun, which heats some air and causes it to move. High pressure areas move toward lower pressure areas. Their movement is slightly twisted by the rotation of the Earth (the Coriolis effect).

### **Weather and Climate**

Weather is a snapshot in time that shows us the temperature, winds, and humidity at any one time. Climate is the long term condition in an area.

# Weather and Seasons

## Big Picture Graphic



### Unit Abstract

In this earth science unit children learn about weather conditions, seasonal changes in Michigan's weather, and safety during severe weather. Children recognize that weather changes from day to day and determine the factors that characterize weather, such as temperature, wind, precipitation, and clouds. They learn about the four seasons and the types of weather that are typical in each season. Children use simple tools to measure weather conditions such as temperature, wind, and rain. They observe and graph the daily weather and use this information to predict future weather

conditions. Children discuss and record information to predict future weather conditions and organize their observations and data on graphs and charts. They identify various types of severe weather and the safety precautions needed for each such as watch, warning, siren, and safety locations.

### **Grade Level Content Expectations**

Children will:

- compare daily changes in weather related to temperature (e.g., cold, hot, warm, cool); cloud cover (e.g., cloudy, partly cloudy, foggy); precipitation (e.g., rain, snow, hail, freezing rain); wind (e.g., breezy, windy, calm) (E.ES.01.21).
- describe and compare weather related to the four seasons in terms of temperature, cloud cover, precipitation, and wind (E.ES.01.22).
- describe severe weather characteristics (E.ES.01.23).
- describe precautions that should be taken for human safety during severe weather conditions (thunder and lightning, tornadoes, strong winds, heavy precipitation) (E.ES.01.24).
- identify the sun as the most important source of heat, which warms the land, air, and water of the earth (E.ES.01.11).
- identify the tools that might be used to measure temperature, precipitation, cloud cover, and wind (E.ES.01.31).
- observe and collect data of weather conditions over a period of time (E.ES.01.32).
- demonstrate scientific concepts through various illustrations, performances, models, exhibits, and activities (S.RS.01.11).

### **Key Concepts**

measure

precipitation

season

severe weather

temperature

thermometer

**Duration:** 6 – 7 weeks

### **Supplemental Materials**

SCoPE Lesson 1 – Weather Stories

SCoPE Lesson 2 – What’s The Temperature?

SCoPE Lesson 3 – Reading Outdoor Temperatures

SCoPE Lesson 4 – Clouds! Clouds! Clouds!  
SCoPE Lesson 5 – What Makes the Wind Blow?  
SCoPE Lesson 6 – What’s That Falling From The Sky?  
SCoPE Lesson 7 – It’s Raining! It’s Pouring!  
SCoPE Lesson 8 – Let It Snow!  
SCoPE Lesson 9 – Seasonal Weather  
SCoPE Lesson 10 – Seasonal Safety  
SCoPE Lesson 11 – My Weather Book

### **Recommended (not required) Instructional Resources**

#### Student Resource

Branley, Franklyn. *Flash, Crash, Rumble, and Roll*. New York: HarperCollins, 1985.

DeWitt, Lynda. *What Will the Weather Be?* New York: HarperCollins, 1991.

Dorros, Arthur. *Feel the Wind*. New York: Crowell, 1989.

Gibbons, Gail. *Weather Forecasting*. Salem, OR: Four Winds Press, 1987.

---. *Weather Words and What They Mean*. New York: Holiday House, 1990.

Kalman, Bobbie, and Kathryn Smithyman. *Changing Seasons*. New York: Crabtree Publishing, 2005.

MacAulay, Kelley, and Bobbie Kalman. *Changing Weather: Storms*. New York: Crabtree Publishing, 2006.

Stolz, Mary. *Storm in the Night*. New York: Harper and Row, 1988.

#### Teacher Resource

Braus, Judy. *NatureScope: Wild About Weather*. New York: Macmillan-McGraw Hill, 1989.

Elsom, Derek. *Weather Explained*. New York: Henry Holt and Company, 1997.

*A First Look: Weather*. Rainbow Educational Media. 2000. Discovery Education. 6 July 2009 <<http://streaming.discoveryeducation.com/>>.

*Monster Storms (Primarily JASON)*. National Geographic. 17 December 2008 <<http://www.jason.org>>.

Sacks, Janet. *Weather and Art Activities*. New York: Crabtree Publishing, 2002.

*Weather: Changes and Measurement.* 100% Educational Videos. 1999. Discovery Education. 6 July 2009 <<http://streaming.discoveryeducation.com/>>.

### **Sample Performance Assessments**

1. Observe and record the weather for a given month. Describe and interpret in writing the types of weather conditions (E.ES.01.21, E.ES.01.11, E.ES.01.32).
2. Construct a model that represents each of the four seasons. Describe in writing the weather that is associated with each (E.ES.01.22, E.ES.01.11, S.RS.01.11).
3. Create a weather broadcast, using the appropriate tools, that describes a severe weather condition and explain what safety precautions to take (E.ES.01.23, E.ES.01.31, E.ES.01.24, S.RS.01.11).

### **Connections**

#### English Language Arts

When learning about seasons and weather conditions children can explore fiction and non-fiction books to further their knowledge.

When creating a weather broadcast about severe weather children use elements of the speaker's and writer's craft.

#### Mathematics

When learning about seasons and weather conditions children use tables and graphs to make predictions based on data.

When learning about seasons and weather conditions children expand their use of measurement tools.

#### Social Studies

Children can describe the weather of places they study and its effects on culture.