



Weather – Grades 3-5

Nebraska Science Standards

2.4.3.b Observe and describe simple daily changes in weather

5.4.3.c Recognize the difference between weather, climate, and seasons

Objective: The objective of this lesson is to learn the importance of understanding the weather and how to observe, measure, and record changes in weather.

Materials (provided by CSM):

Thermometer Activity:

- Glass thermometers (5)
- A pitcher to fill with water (5)
- Rubbing alcohol
- Clear, narrow-necked plastic bottle (11-ounce water bottles work well)
- Food coloring (3 sets)
- Clear plastic drinking straw
- Modeling clay

Wind Vane Activity

- Round plastic drinking cup with lid
- Paper plates
- Rulers
- Pebbles or sand
- Masking tape
- Two-sided tape and scissors
- Sharpened pencil
- Double-sided sticker dots
- Drinking straw (a straight one)
- Straight pin
- Card stock paper
- Black permanent marker

Materials (provided by the classroom):

- Water

Questions: What can we use to measure weather? Thermometer-measures the temperature of air Rain Gauge-measures rainfall Wind Vane-measure the winds direction Rain cloud demonstration:

Discussion: (Questions to ask the students)

- Why is it important for scientists to study weather?
 - So, we can predict weather events and help with safety and planning.
- What types of weather are there?
 - Sunny, cloudy, windy, rainy, and stormy
- What types of storms are there?
 - Blizzards, tornados, hurricanes/tsunamis, earthquakes, hail, etc.
- What can we use to measure weather?
 - Thermometer - measures the temperature of the air
 - Rain Gauge - measures rainfall
 - Wind Vane - measure the direction of the wind

Activity Description: A thermometer is an instrument that measures the temperature. Temperature is measured on a scale called Fahrenheit (by most people in the United States) and in Celsius or Centigrade (used by scientists and by people in many other countries). The point where water freezes is 32 degrees Fahrenheit (F for short) and 0 degrees Celsius (C). The point where water boils is 212 degrees F and 100 degrees C. If you want to know how to convert from F to C or from C to F.

$$^{\circ}\text{C} = (^{\circ}\text{F} - 32) \times 5 / 9$$

$$^{\circ}\text{F} = (^{\circ}\text{C} \times 9 / 5) + 32$$

ACTIVITY 1 – THERMOMETERS

You will need:

- Thermometers
- Empty water bottles
- Rubbing alcohol
- Clear, narrow-necked plastic bottle (11-ounce water bottles work well)
- Food coloring (3 sets)
- Clear plastic drinking straw
- Modeling clay

Setup 1:

- Hand out the thermometers to small groups of students
- Fill the water bottles full of water (cold water) and hand them out to the students

Procedure:

1. Have the students observe the current room temperature using the thermometer. Ask them what temperature the room is in Fahrenheit. Then ask what temperature the room is in Celsius.
2. Write on the board the temperature they say and represent the numbers as equaling each other ie. 68 degrees F = 20 degrees C.
3. Now, have the students place the thermometers in the water bottles to watch the thermometer drop. Ask the students what the temperature of the water is in Fahrenheit and then in Celsius.
4. Write these numbers on the board and show them as equaling.

Setup 2:

- Give each student a bottle filled with equal parts of tap water and rubbing alcohol, about 1/8 to a 1/4 of the bottle.
- Give each student a straw, food coloring, and a small amount of modeling clay
- Students may need to share the food coloring but emphasize only 2-3 drops.

Procedure:

1. Tell the students to add 2-3 drops of food coloring and to be careful as it will stain.
2. Instruct the students to put the straw in the bottle, but don't let the straw touch the bottom (DO NOT DRINK THE MIXTURE).
3. Have the students use the modeling clay to seal the neck of the bottle, so the straw stays in place.
4. Tell the students to hold their hands on the bottle and watch what happens to the mixture in the bottle.

EXPLANATION: Why does this happen? Just like in a thermometer, the mixture expanded when it was warmed. This made the mixture no longer fit in the bottom of the bottle. As the alcohol expanded, the colored mixture moved up through the straw. If the bottle were to get extremely hot, the mixture would have come up through the top of the straw.

Activity 2 – WIND VANE ACTIVITY**Discussion:**

- What is a weather vane?
 - A weather vane, or a wind vane, is an instrument for measuring wind direction. It is a simple instrument consisting of an arrow, or any figure, mounted on a rod. This rod moves in the direction of the wind when there is a breeze. The front part of the vane is more or less pointed, and the back end is wide so that even the slightest breeze will move the vane. The arrow turns until the wind is equally distributed on either side of the weather vane, making the front part indicate the exact direction of the wind. Wind vanes are placed in open and high places to catch the wind.

You will need:

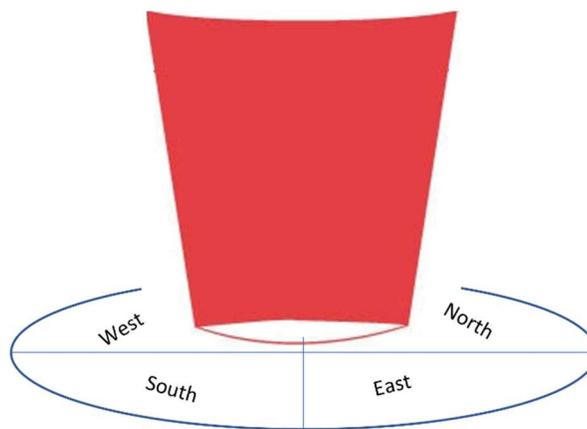
- Round plastic drinking cup with lid
- Paper plates
- Rulers
- Pebbles or sand
- Masking tape
- Two-sided tape and scissors
- Sharpened pencil
- Double-sided sticker dots
- Drinking straw (a straight one)
- Straight pin
- Card stock paper of triangles and squares (roughly 1 inch in size)
- Black permanent marker

Set up:

- Instructors will need to help the students with filling their cups with sand and making their tracings.
- Have an instructor cut pieces of the double-sided tape to secure the finished cup onto the plate.

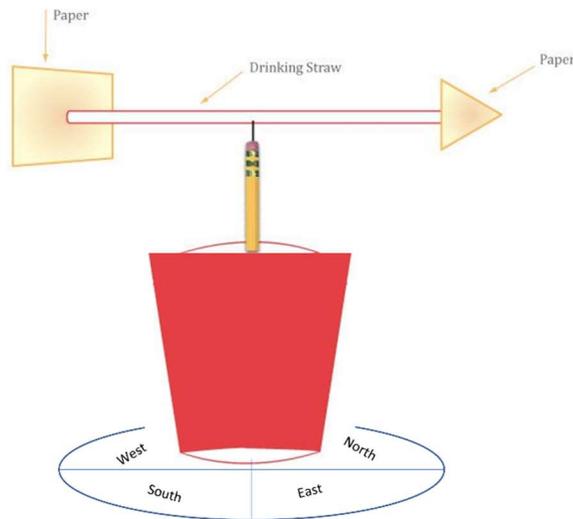
Procedure:

1. Start by putting the cup right side up onto a paper plate.
2. Trace around the cup, and then make another circle around the outer edge, at least 2 inches wider than the first one. Remove the cup.
3. Use a ruler to divide the circle in half along its diameter, and then divide each of those halves in half.
4. Have the students write the words for the four parts of the compass along the outer edge of each of the four sides, moving from the top, clockwise, “North, East, South, and West.”



5. Now, fill the container about $\frac{1}{4}$ of the way with pebbles or sand. Stick a small amount of modeling clay on the lip of the lid. Snap the container lid on and tape it to secure the lid.

6. Use the double-sided tape to secure the cup onto the paper plate.
7. Take the sharpened pencil and poke it through the center of the plastic cup lid so that the eraser is on top, and the point is held by the putty and sand.
8. Now, secure a triangle and a square to each end of the straw using the double-sided sticker dots.
9. Push the straight pin through the center of the straw and attach it to the top of the pencil eraser. If you flick the straw or blow on either end, it should move freely.



10. Take your wind vane outside to a place where the wind is not highly obstructed. Help the students find north, south, east, and west on a real compass, and line up the wind vane accordingly. Wait for the next breeze; the arrow will point to where it's coming from.
11. Students are then able to bring their weather vane home to determine wind direction anytime they want.