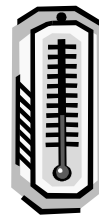


# WEATHER MEASURE



## BENCHMARKS AND TASKS

**SC.B.2.1.1** The student recognizes systems of matter and energy.

**SC.D.1.1.3** The student recognizes patterns in weather.

- The student graphs temperature and precipitation during the year to observe patterns that tend to be high, medium or low in certain months.
- The student measures the effects of energy from the sun upon air, land, and water by using a thermometer.

## KEY QUESTION

What makes the air around us warm or cool?

## BACKGROUND INFORMATION

Weather describes what is going on in the air that surrounds our earth. The sun warms the earth. The warm earth heats the air above it. The interaction between the sun's heat, air, and water creates an energy source. This energy source puts air into motion and contributes to the weather (temperature, wind, moisture in the air). This drives the water cycle.

The conditions of the atmosphere at a particular time and place are called **weather**. The weather is due to four atmospheric factors: winds, air pressure, heat energy, and moisture.

## MATERIALS

### Teacher

outdoor thermometer

hot plate

sauce pan

water

marker

chart paper

*Our Sun* (Benchmark Education Co.)

### Per group

2 thermometers

red crayon

*Temperature Testing* record sheet

bowl of ice water

bowl of hot water

paper towels

## TEACHING TIPS

1. If teacher has access to a microwave oven, this may be used in place of the hot plate and saucepan to heat water. You may also choose to bring hot water in a thermos. Be certain water is not too hot.
2. Caution students that thermometers are fragile and can break.
3. During the **ENGAGE** activity, tell students to place only the bulb (bottom portion) of the thermometer into the hot and cold water when measuring. They should hold onto the top so the thermometers do not fall into the water.
4. Students should double-check each thermometer reading with a partner and be sure to record the temperature accurately. Explain that scientists make very careful observations and record their data accurately in order to draw the right conclusions.
5. When outside, students may want to bring along a clipboard for recording.

## **ENGAGE**

1. Form student groups. Ask:  
*How would you describe today's weather?*  
*Is it hot, warm, cool or cold out today?*  
*What do we mean by "It" is hot?*  
*What is hot? (the air)*  
*What makes the air around us warm? cool? (Energy from the sun warms the land and water on our earth. The warm earth warms the air around it.)*  
*What will happen to a thermometer when the temperature rises?*  
If science journals are used, questions can be answered there.
2. **Temperature** is the word we use to describe how hot or cold something is. Show the students a thermometer. Ask:  
*What does a thermometer measure? (how much heat energy something has)*  
Thermometers are tools that measure temperature in degrees Fahrenheit or degrees Celsius. Distribute thermometers to groups. Talk about the numbers on the scale and point out the liquid in the bulb. Read the room's air temperature and record it on chart paper. Ask the students to make predictions as you ask:  
*What do you think will happen to the thermometer when an object is hot? cold?*
3. Write their predictions on the chart paper.

## **EXPLORE Part 1**

1. Have a student be responsible for distributing materials to each group. That student should get the *Temperature Testing* sheet, bowl of ice water, one empty bowl, a red crayon, and paper towels for the group.
2. Have students complete the top portion of the sheet by predicting the temperature of the water in each bowl.
3. While they are making their predictions, go to each table and pour hot water into the empty bowl.
4. Before checking the temperature, have students read both thermometers to see if they are showing about the same temperature.
5. Have students place one thermometer in the hot water bowl and one in the cold-water bowl. After a short interval, have students record the actual temperature of the water in each bowl. Tell students to use a red crayon to color each thermometer on the record sheet to match the real ones placed in hot/cold water.

## **EXPLAIN**

Discuss the results with students. (There will be variations in the reading of the thermometers. Discuss reasons for these variations with the students. Reasons might include when the thermometers were read, how much they were handled, and how accurately they were read.) At this time, students can record their observations in their science journals. (optional)

## **EXPLORE Part 2**

1. After comparing the predictions with the results of hot and cold temperatures, ask students to predict the temperatures in an outdoor, hot and sunny spot and in an outdoor, shady spot.
2. Have students write their predictions on the record sheet and go outside with thermometers, *Temperature Testing* sheets, and red crayons.

3. As a class, find a hot, sunny spot. Have each group read their thermometer, record the temperature, and then use the red crayon to color the thermometer to match the actual reading.
4. As a group, find a cool, shady place. Repeat the process used in the hot, sunny place.

### **EXPLAIN**

1. Discuss student observations:  
*What do you think causes the difference in temperatures?*  
(Direct sunlight on the earth's surface warms the surface. The warm surface warms the air. Shade from an object blocks the direct sunlight from warming the earth.)
2. Encourage each group to share their observations with the whole class.  
*Explain why there is such a difference in the two temperature readings.*  
*How would the results be different if we came outside on a cooler day? overcast day?*  
*Would the two temperatures be much different?*
3. Continue questioning to develop the concepts. The sun warms the earth; the warm earth heats the air above it.
4. If science journals are used, students may record some of these responses there.
5. Share *Our Sun*.

### **EXTEND/APPLY**

Discuss:

- What are some ways to find out about the weather?*  
*Why is it important to know the temperature?*  
*Why is it good to know the weather in advance?*  
*What information do we get from a weather forecast?*

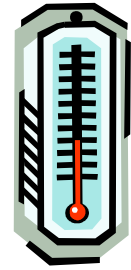
### **EXTENSIONS**

1. Encourage students to watch a weather forecast on TV and discuss the information with their parents. Have students draw a picture that illustrates the forecast.
2. Ask students to clip a weather forecast from the newspaper and share it with a family member or with the class. Discuss what information that forecast provides.
3. Explore weather lore:  
There's a pot of gold at the end of the rainbow.  
March comes in like a lion and goes out like a lamb.  
April showers bring May flowers.  
If the groundhog sees its shadow, there will be six more weeks of winter. If it doesn't see its shadow, spring is just around the corner.
4. Have students record in their journals how weather and temperature affect decisions we make.

### **ASSESSMENT**

Teacher assessment through observation should include the following criteria:

- Tasks have been completed by the student.
- Student demonstrates the ability to read a thermometer to the nearest number.
- Descriptions found in the *Temperature Testing* and student journal entries show growth and understanding.
- When looking in the journals, compare earlier and later entries for what they can tell you about the student's growth and understandings.



# TEMPERATURE TESTING

<p><b>BOWL OF HOT WATER</b></p> <p>Prediction: _____ degrees F</p> <p>Actual: _____ degrees F</p> <p>Fahrenheit 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0</p>	<p><b>BOWL OF COLD WATER</b></p> <p>Prediction: _____ degrees F</p> <p>Actual: _____ degrees F</p> <p>Fahrenheit 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0</p>
<p><b>SUNNY SPOT</b></p> <p>Prediction: _____ degrees F</p> <p>Actual: _____ degrees F</p> <p>Fahrenheit 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0</p>	<p><b>SHADY SPOT</b></p> <p>Prediction: _____ degrees F</p> <p>Actual: _____ degrees F</p> <p>Fahrenheit 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0</p>

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