What Is The temperature?

Summary

A learning activity where students will observe temperature changes, use a thermometer to measure temperature, and create a graph based on the temperature readings they have gathered.

Time Frame

2 class periods of 45 minutes each

Group Size

Pairs

Life Skills

Communication

Materials

Student Materials;copy of practice thermometer (created by teacher prior to the class);thermometer;temperature recording sheet (created by teacher prior to the class);graph paper;Teacher Materials;demonstration thermometer;clear straw (You must be able to see through it);glass bottle with a narrow neck, such as a soda bottle;clay;food coloring;2 deep pans;hot water;cold water

Background for Teachers

Temperature is the measure of heat energy. Most people choose to use a thermometer to measure temperature. The most common thermometer consists of a column of red alcohol or mercury that expands when it is heated. As the alcohol expands, it moves up the column resulting in a higher temperature reading.
There are different scales that a thermometer may be based on. We are most familiar with the Farenheit scale. Scientists, however, use the Celsius scale. On the Farenheit scale, water freezes at 32 degrees and boils at 212 degrees. On the Celsius scale it freezes at 0 degrees and boils at 100 degrees.

Intended Learning Outcomes

Make observations and measurements. Collect and record data. Understand science concepts. Construct graphs.

Instructional Procedures

Ask the students to tell you what they know about thermometers. What are they used for? How do they work? How does one read a thermometer? Discuss with the students ways in which we measure temperature. Pass each student a thermometer and have the students make observations. Show the students that the top of the liquid indicates the temperature. Talk with them about degrees and show them how to read the thermometer. Ask questions such as: What is the highest temperature reading on the thermometer or What is the lowest temperature reading on the thermometer? Demonstrate to the students how a thermometer works with the following demonstration.

1. Pour cold water into a bottle. Add a few drops of food coloring.
2. Put a straw into the water about halfway.
3. Mold the clay around the top of the bottle making a tight seal. The straw should be held firmly

in place by the molded clay and the seal around the straw and bottle top should be air tight.
4. Put the bottle into a deep pan.
5. Pour hot tap water into the pan.
6. Watch the water in the straw go up.

Discuss with the students how this is like a thermometer. Also explain to them how this occurred. [The cold water in the bottle was warmed by the water in the pan. As it warmed, it expanded. Because it expanded, it required more room so it moved up the straw.] Next, have the students practice reading a thermometer. Pass each student a reproducible page with a thermometer that they can assemble and use to practice. With these practice thermometers, have the students show you a variety of temperatures. Ask, 'What would your thermometer look like if you measured something that is 45 degrees.' Continue with this until you can see that the students are understanding. When the students are ready, you can practice with real thermometers. As a class decide on three different locations to go and take the temperature. You may want to take the temperature in your own classroom first. Have each student read their thermometer. Come to a class consensus of what the temperature actually is. Proceed out into the hall or even outside to the playground to take two more temperature measurements. On another day, give each student a thermometer and a temperature recording sheet. In the morning, have each student take and record the temperature at a specific location on the playground. Have them return to this spot at least three times during the day to do the same thing again. By afternoon they should have at least three or four different temperatures recorded on their paper. Later in the day, discuss with the students the results of their temperature readings. Did the temperatures change during the day? Their temperatures may have gone up or down depending on the day that you conducted this activity. Instruct the students to make a graph which shows how their temperatures changed during the day.

Extensions

You may want to have the students keep a week long list of different temperatures they see in the home and at school. They may include things like the weather report, the baking temperature on a recipe, or the thermostat in their homes.

Assessment Plan

Collect the graphs that the students created using their temperature readings. Check to see that their temperature readings are reasonable and that their graphs are accurate.
Set up a lab that includes various sources of heat (or lack of heat) such as hot water, ice water, and/or a heat lamp. Ask the students to measure and record the temperature in each situation. Check their measurements for accuracy.

Bibliography

Tunnell, Michael O. Chinook! (Tambourine, 1993)

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