

Making Thermometers Lesson Plan

Grade Level: 3rd

Title of Lesson: Making Thermometers

Unit Title: Heat Energy

Performance Standard(s) Covered:

Science.3 Physical 1. Students will investigate how heat is produced and the effects of heating and cooling, and will understand a change in temperature indicates a change in heat.

- a. Categorize ways to produce heat energy from such as burning, rubbing (friction), and mixing with another.
- b. Investigate the transfer of heat energy from the sun to various materials.
- c. Use thermometers to measure the changes in temperatures of water sample (hot, warm, cold) over time.

Essential Question: How is heat energy produced and transferred? How do we measure temperature?

Objective: Students will learn how a thermometer works and is used.

Key Words: Thermometer, Heat, Heat energy, Fahrenheit, Celsius

Learning Activity:

Abstract:

Students will make their own thermometers.

Materials Needed:

- Clear, plastic bottles (20)
- Tap-water
- Rubbing alcohol
- Clear plastic drinking straw (1 per student)
- Modeling clay
- Red food coloring
- Clear plastic drinking straws (1 per student)

Procedure:

1. Briefly review the following background information with the class about how heat is produced and how it affects temperature. Use a PowerPoint or prezi with pictures and examples of where thermometers are used.
2. Students will be working individually.
3. Give each student an empty bottle, a straw, and piece of modeling clay.
4. Have small groups of 4 come to the sink located in the classroom and fill the bottle a fourth of the way full with a 50/50 mix of alcohol and water.

5. After all students have filled their bottles, go around to each student and put drops of red food coloring in their bottles. As you are going around explain to the students that the red stuff that is found in thermometers raises when it is hot because there is more energy. Then explain that when it is cold the red stuff found in thermometers goes down because there is less heat energy.
6. Once you have put the red food coloring in the bottles, tell the students to insert the straw into the bottles.
7. Next, show students how to mold clay around the top of the bottle to hold the straw in place. There should be no space at the top. It should be tightly sealed. The straw should be in the water but not touching the bottom of the bottle.
8. Finally once the thermometer is made have students rub their hands together to create friction and put them on the sides of the bottle. This should cause the mixture to rise.
9. Have students write in a journal what would happen if the thermometer is placed in the sun and what would happen if it is placed in a cool area.

Safety Concerns:

- Do not allow students to take home the thermometers because the alcohol and food coloring mix could spill.
- Remind students to not drink the content in their thermometer.

Notes & Tips

- Tip: 16.9 fl. oz. water bottles were the perfect size ratio for the straws. However any size bottle will work well because the straw isn't touching the bottom of the bottle.
- Tip: Do the experiment along with the students so you can guide them through it without actually doing one of theirs for them.
- Tip: Remind students to be careful and not squeeze the bottle because the water will come out through the top.

Reference:

http://www.focus.uga.edu/thirdgrade/documents/BLesson_Gr3_Physical_MakingThermometers.pdf