

Devin Hicks
Best Lesson

Grade Level: Third

Title of Lesson: Transfer and Movement of Heat

Unit Title: Heat Energy

Performance Standard(s) Covered: S3P1. 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.

Essential Question: How does heat travel? Why do some materials conduct heat better than others?

Objective: Students will investigate the transfer of heat energy and how heat travels.

Key Words and Terms:

Heat
Heat energy transfer
Conductor
Insulator

Learning Activity

Abstract (limit 100 characters): To demonstrate how heat travels and what types of materials are insulators and conductors.

Materials Needed:

Part 1:

- Bowl (1)
- Water
- Three types of spoons: wooden, plastic, metal (one each)
- Something to produce hot water for lesson (i.e. coffee maker)

Part 2:

- Three types of cups: Styrofoam, plastic, paper (one set per group of 3-4 students)
- Thermometer (3 per group of 3-4 students)
- Water
- Something to produce hot water (i.e. coffee maker)

Safety Concerns: The water is very hot when first poured and should be done by an adult in the classroom. The students should not put their hands in the water.

Procedure: Prep: Gather materials and make sure you have access to very hot water in order to pour into the bowls for the lesson (Run the water through the coffee pot twice to produce the heat needed before the lesson.)

PART ONE

1. Review the term heat and the ways to produce heat from previous lessons (friction, sun, electricity, burning) by asking the students to name these.
2. Put materials (one bowl and one set of spoons) in front of the class for everyone to see
3. Ask students which spoon they think will hold the most heat if placed in very hot water.
4. Allow each group of students to write a hypothesis about which spoon is going to hold the most heat from the water in the bowl and why.
5. Get a teacher or student teacher to pour the hot water into the bowl and place the three spoons sticking out of the water.
6. Set aside, to allow spoons to heat up, and start part two of the lesson.

PART TWO

7. Pass out materials (one set of cups and thermometers) to each group of 3-4 students.
8. Have an adult pour the hot water into each cup and place the thermometer sticking out of the cups.
9. Have students measure the temperature of each cup over time (initially, after 5 min and after 10 min) and record it on the table (table 1 below)
10. During the waiting period in between times, have the students feel the spoons from the bowl in part one to see which spoon became the hottest.
11. After the ten minutes is up, ask the students if their hypotheses about the spoons were correct. Why or why not?
12. Define the terms conductor (materials that easily transmit heat energy) and insulator (materials that do not transmit heat energy). Ask the students which of the spoons were conductors and which were insulators and why some spoons held heat better than others.
13. Ask the students to determine which cup held the most heat and which lost the most heat over time. Why did that happen? Which is the best insulator?
14. Have students finish filling out the table and questions on their worksheet.
15. Recap by having the students explain how heat is transferred and what kinds of materials conduct or insulate heat the best. Have students define conductors and insulators in their own words.

Table 1

	Temperature Initially	After 5 minutes	After 10 minutes
Paper cup			
Plastic cup			
Styrofoam cup			

Tips and Modifications:

1. Part one could be done in small groups if there are enough materials. Part two is best done in small groups to allow each student time to practice reading the thermometer and measuring the temperature.
2. Be careful to not make the water too hot for the type of thermometer you have. I would only run the water through the coffee maker once for part two if I did this lesson again. Another teacher had a thermometer burst because of the water.
3. Try to find cups that are similar in size and contain the same amount of water or the results of part two could be thrown off.

References: Partner teacher, Mr. Haley