

# Conduction Game

## Grade 5

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### **Benchmarks:**

PS-1: Define temperature as the measure of thermal energy and describe the way it is measured.

PS-2 Trace how thermal energy can be transferred from one object to another by conduction.

### **Objective:**

The students will review what they learned about conduction. The key concept to remember is that heat flows from the warmer source to a cooler source.

### **Materials:**

- 2 inch deep tray (I used a lasagna pan)
- A plastic measuring cup, a metal measuring cup, and a small glass bowl
- Three small transparent cups
- Dihydrogen monoxide (hot)
- Dihydrogen monoxide (solid, in cubes)
- Thermometers
- Game cards for each group (prepared before class)

### **Initial Demonstration:**

Fill the tray with hot water. Measure the temperature of the water. Explain that you are going to make three ice ‘boats’ with the plastic, glass, and metal cups respectively. Ask the students in which boat will the ice melt the fastest (correlating to which is the best conductor). Ask the students in which boat will the ice melt the slowest (correlating to which is the best insulator). At the same time, place the three boats, with their ice cube passengers, into the hot water. Observe. I let rows of students walk by to observe what happens. When the ice cube in the metal cup is totally melted or close to totally melted, remove the boats from the hot water and pour each into a transparent cup. This will allow for easier comparison of which ice cube melted the fastest. Anticipated results (although it really depends on the individual ‘boats’ used) is that the metal boat’s ice cube will melt the fastest since metal is the best conductor. The plastic boat’s ice cube will melt the slowest because it is the best insulator. The glass boat’s ice cube will melt somewhere in between depending on the thickness of the glass. Finally measure the temperature of the hot water bath and compare with the temperature at the beginning. The temperature should drop because heat flowed into the ice boats. Compare results to student’s predictions.

### **Procedure:**

1. Divide the class into groups or pairs. It is best if the groups get along with one another because they will be on a team competing against other groups.
2. Have teams choose a team name and write on the board.
3. Distribute game cards in small plastic sandwich bags.
4. Explain how the game is played. The teacher will describe a situation where heat is flowing (conduction) or heat is being prevented from flowing (not conduction).

5. The teacher then describes the items involved (items are on game cards). The groups will be awarded 1 point for identifying if it is conduction or not conduction. The groups will be awarded 1 point for getting the order of the cards correct. The groups will be awarded 1 point for getting the item connectors correct (arrows for when energy flows, dashes for when energy is prevented from flowing).
6. Give groups 1 minute to arrange the cards and then walk around and 'grade' them.
7. Move on to the next question.

### **Conduction Game Situations:**

#### Conduction

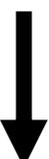
Fire → Hot Dog → Coat Hanger → Human  
Fire → Marshmallow → Coat Hanger → Human  
Fire → Frying Pan → Water → Hot Dog

#### Not Conduction

Human – Clothing - Cold Air  
Human – Clothing – House - Cold Air  
Human – Clothing – Blanket - Cold Air  
Warm Air – Refrigerator – Hot Dog  
Warm Air – Refrigerator – Water

### **Discussion:**

Heat flows from hot to cold always. So all items should start with the hottest thing and go to the cooler thing, regardless of being conduction or not conduction. Remember, heat is the flow of thermal energy. It should be mentioned that insulators let some heat pass, they are not perfect heat blockers, but they do impede the flow of heat. Another important concept to note is that in cold air, it is not the cold flowing inside, it heat flowing out.

<b>FIRE</b>	<b>Hot Dog</b>	<b>Hanger</b>	<b>Human</b>	<b>Marsh-mallow</b>
<b>Frying Pan</b>	<b>Water</b>	<b>Cold Air</b>	<b>Warm Air</b>	<b>Clothing</b>
<b>House Wall</b>	<b>Blanket</b>	<b>Refrigerator</b>		
				
				

**CONDUCTION**

**NOT CONDUCTION**