

# Ice Cube Challenge

## Grade 5

Sarah Fortner, Penny Sanecki

### References:

- Warm Polar Animals- Sarah Fortner and Penny Sanecki (OSU GK-12 website)

### Benchmarks & Objectives:

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.

### Materials:

- Ice Cubes (one per student, a few spares for controls)
- 1 plastic baggy per ice cube
- Hot water (or a warm room)
- Materials of the students choice to wrap their ice cubes
- Scale or balance to determine starting mass of ice cube and the melted mass of ice cube

### Initial Demonstration:

Students are already familiar with conduction and insulation from our previous activity, making warm polar animals. Preface the exercise by refreshing the students memories about which materials best insulated the warm blood of their baggy animals in the ice bath?

### Procedure:

1. Ask the kids: What materials would be the best to keep an ice cube from melting in a warm room or in a hot water bath? (The kids should be asked to think about this the day (or week) before they start the activity, because they will be allowed to bring in materials they think would assist them to insulate their ice cubes)
2. Let the students know that their ice cubes will be place in a baggy and they can wrap any materials of their choice around another bag.
3. When the students begin their challenge, give them each one ice cube and one baggy.
4. Have the students weigh their unmelted ice cubes in their baggies.
5. Limit the amount of time they are allowed to wrap their ice cube to 3 minutes.
6. The students will leave their 'wrapped' ice cubes in the hot water bath or room for a set period of time (depends on the size of the ice cube and whether you use a hot water bath or warm room)
7. Students should make hypotheses about which ice cubes will melt the least. (You may consider wrapping your ice cube in nothing for a control, and perhaps testing a conductor, like tinfoil for the students to compare their ice cubes too.)
8. Students should remove their ice cubes and weigh the melted water and baggy.
9. Students should determine the mass of their remaining ice cubes by subtracting the weight of the melt water and baggy from the initial weight of the unmelted ice cube in the baggy.
10. The ice cube that has melted the least (by % mass) is the winner.

**Discussion:**

Heat flows from hot to cold. Some materials are better conductors of heat than others. Students should examine which materials were the worst conductors of heat (aka the best insulators). Some thought questions may be asked, such as why did the insulating material (use winning ice cube wrapper as the example) keep the ice cube from melting the longest? What materials conduct the most heat? The least?

Students will be asked to write a paragraph response to these questions in their science journals.