Activities

The Magic School Bus in the Arctic

Grades: PreK–K, 1–2, 3–5

Overview
Following a worksheet, kids do simple demonstrations to see how air and fat can slow the flow of body heat into ice water.

Field Trip Notes
When Arnold discovers that his cocoa is cold, he demands to know where the hot went. In response, Ms. Frizzle whisks the class to the Arctic. What's the freezing Arctic got to do with heat? While the kids try to find out, the bus's engine freezes and the bus floats away on an ice floe with Ralphie and Phoebe inside! As the bus moves away, so does the heat from everyone's bodies. How can Ms. Frizzle's kids insulate their bodies to keep the heat in? Can they rescue Ralphie and Phoebe before they all become the Ice Cube Kids?
The Inspiration of Insulation
Time: 30 minutes
Group Size: 2-4
The Magic School Bus kids are freezing! When they discover that heat flows from hotter to colder things, they find ways to block heat escape routes. Your kids explore how insulation works to keep in body heat.

What You Need
- Spatula or spoon
- Large bowl of ice water
- Copies of THE INSPIRATION OF INSULATION page
For each group:
- 4 sandwich-size zipper plastic bags
- 12-15 cotton balls
- water and ice
- 1 cup solid shortening

Ahead of time:
For each group, tightly seal some ice and water in one zipper bag. Put the shortening in a second bag.

Talk About It
Ask: How do layers of clothes, fur coats, and fat keep humans and animals warm when it’s cold outside? (Fat and trapped air in fur or clothing layers block the flow of body heat into the cold.)
**What To Do**

In two demonstrations, kids explore how air and fat can slow the flow of body heat into ice water.

2. Ask: How do polar bears keep warm in the Arctic? (Air spaces in their fur trap body-heated air.) How are the cotton balls like polar bear fur?
3. The "Walrus Mitt" seals a hand inside a layer of fat to imitate walrus blubber. Pass out materials. Help kids follow activity-page directions. Show how to zip the shortening and empty bags together to make the mitt.
4. Ask: How do walruses keep warm in icy cold water? (Blubber slows the movement of body heat.)

**Next Stop**

Challenge kids to insulate jars of warm water so that they keep the heat as long as possible. Dip a finger in each of the jars after an hour. Which stayed the warmest? Why?

Subjects:

*Animals, Human Body, Arctic Regions, Science, Heat, Insulation*
THE INSPIRATION OF INSULATION

TEST A "POLAR BEAR BLANKET"
1. To make a Polar Bear Blanket, zip up one bag, fill the empty bag with:
   - 1 bag of ice water
   - 2 zipper bags
   - 2 1/2-15 cotton balls
2. Work with a Partner. Hold your hands, palms up, out of the bag. Ask your partner to put the bag on your palms. Does your hand feel cold?
3. Remove the bag. Put the empty bag on your palms. Does your hand feel cold?

PREDICT: Put a check mark by the one you think will keep your hand warmer.

RESULT: Circle the one that kept your hand warmer. Write how you think the Polar Bear Blanket worked.

TEST A "WALRUS MITT"
1. Turn an empty bag inside out. The zipper stripes face each other. Zip the two bags together to make a Walrus Mitt.
2. Put one hand in the Walrus Mitt. Take the other hand out. Which is colder?

PREDICT: Put a check mark by the one you think will keep your hand warmer.

RESULT: Circle the one that kept your hand warmer. Write how you think the Walrus Mitt worked.