

Keeping warm investigation



Details

What you need

- 3 heat resistant cups with lids
- 3 different materials to wrap around the cups, e.g. fleece, cotton wool, and bubble wrap
- Thermometer
- Measuring jug
- 6 elastic bands
- Timer
- Access to warm water
- Access to a cool area, e.g. a fridge

Introduction

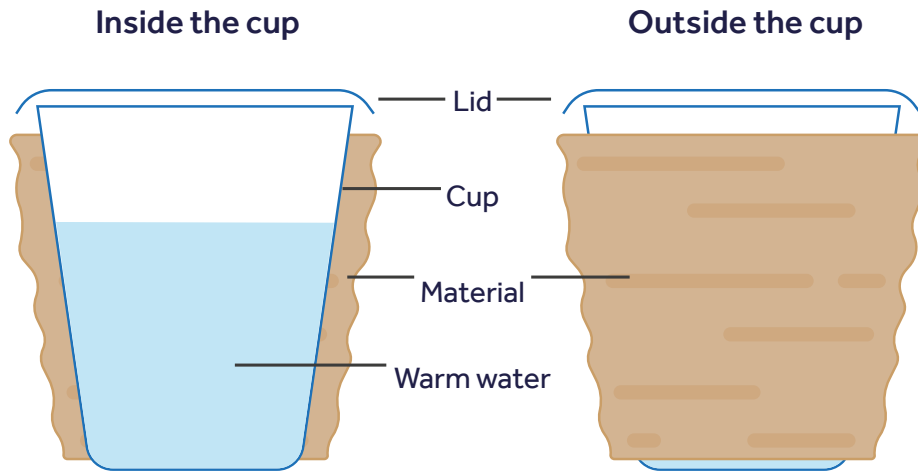
In this activity, you will investigate the insulating properties of three different materials. You will then need to use these findings to decide which material to recommend using for clothing on a polar expedition.

Activity steps

1. Half fill your three cups with warm water (no warmer than 43°C or 110°F).
2. Measure the temperatures and record these for each of the different materials on a separate piece of paper.
3. Quickly and carefully put the lids on your cups and wrap each one in a different material using the elastic bands to keep the material in place.
4. Place the cups in a cool environment, e.g. a fridge.
5. Leave them for 15 minutes, use the stopwatch to time this. Can you guess or predict which material will keep the water warmest?
6. Collect your containers and unwrap them carefully.
7. Measure the temperatures again and record these new temperatures for each of the different materials on your sheet of paper.
8. Work out the difference between the temperatures before and after the experiment.
9. The material that shows the lowest decrease is the one which is the best insulator. Was your prediction correct? Would you choose this material for your next polar expedition?

STUDENT SHEET

Set-up



Results table

	Starting Temperature	Finishing Temperature	Change in Temperature
Material 1			
Material 2			
Material 3			

Summary question

Which material would you recommend using for clothing in a polar expedition?

Explain why you decided to use this material?