Insulation Station

Constellation
An Exelon Company

❓ Question

How does the material a cup is made of affect the transfer or movement of heat?

✳ Hypothesis

Read the procedure and record your hypothesis in your science notebook using an "If... then... because..." format.

NOTE

When the procedure calls for:

ice water, use water <7°C or <45°F

room temperature water, use water between 20-22°C or 68-72°F

hot water, use water just under boiling (the teacher should handle the container for hot water)

🗐 Materials

- 4 Cups of different materials, but similar size
- 4 Digital thermometers
- 4 Rubber bands
- Plastic wrap
- Stopwatch or clock with second hand
- Ice water
- Room temperature water
- Hot water
- Beaker or graduated cylinder

✔ Procedure

1. Create the table below in your science notebook three times-once for the ice water, once for the room temperature water, and once for the hot water. Fill in the blanks in the chart for the material each cup is made of.

2. Using a rubber band, attach a thermometer to the outside of each cup.

3. Fill each cup with the same amount of ice water, using your beaker or graduated cylinder.

4. Cover each cup with plastic wrap.

5. In 30 second intervals, record the temperature of each cup for a total of three minutes.

6. Calculate the change in temperature (ΔT) for each type of cup.

7. Repeat steps 3-6 with room temperature water and hot water.

▦ Observations and Data

Material	0 sec	30 sec	60 sec	90 sec	120 sec	150 sec	180 sec	ΔT (^0C)
_____cup								
_____cup								
_____cup								
_____cup								

Use the data from the table to create a graph in your science notebook.

❄ Conclusion

1. Which material had the greatest change in temperature? Is it a good insulator?

2. Which cup would be the best for hot chocolate? Which would keep a drink cold the longest? Use data to support your answers.

3. What variables might have affected the results of your experiment?

Insulation Assessment

Circle the materials that will make the best insulators for a drink.
Remember, good insulators will trap the heat in, and keep the cold out.