

Heat Transfer: Counting Calories Activity – Wait, What Just Happened? Worksheet – Answers



Part I: How Did You Do That?

1. What do you think caused the water temperature to drop so much?

Any ideas are fine, encourage creative thinking. Actual cause is that the endothermic reaction to dissolve salt draws energy away from the water on the outside of the cup, causing a temperature drop and phase change.

2. Why didn't the water in the beaker freeze while the water outside the beaker did?

Encourage many ideas. The water inside the beaker did not freeze because the salt lowers the freezing point. Reference elementary chemistry books concerning freezing point depression.

3. Can you think of a good way to measure the amount of energy absorbed in this reaction? List your ideas below.

Especially encourage all creative ideas. Ideally, one would want a *calorimeter*, an adiabatic device that measures the change in temperature of a substance to determine how much heat was exchanged.

Part III: Background Questions

Based on personal experience and intuition, answer the following questions:

1. What type of cup do you think would be the best for retaining heat? Why?

A nice coffee cup, especially foam ones or ceramic mugs. A thermos would also be good. The insulating properties would help keep the heat inside.

2. What materials do you think would improve any cups' insulating properties?

Cloth, foam or certain plastics might improve a cup's insulating properties

3. Which do you think is a better insulator: aluminum foil or cloth?

Cloth

4. Where might a calorimeter lose heat?

Air, calorimeter walls, etc. Encourage multiple ideas.