Student Exploration: Calorimetry Lab

Gizmo Warm-up

A calorimeter is an insulated container filled with a liquid, usually water. When a hot object is placed in the calorimeter, heat energy is transferred from the object to the water and the water heats up.

Calorimeters can be used to find a substance's **specific heat** capacity. You will use the Calorimetry Lab Gizmo™ to determine the specific heat capacities of various substances.



- On the SIMULATION pane, select Copper. Use the slider to set its Mass to 200 g. Set the Water mass to 200 g. Check that the Water temp is set to 30.0 °C and the copper's Temp is 90 °C. Select the GRAPH tab, and click Play (**).
 - A. What was the Final temperature of the copper and the water?

34.96°C

B. How much did the temperature of the copper change?

T = Tf -T = (34.96°C - 90°C) = -55.04°C

The temperature of the copper changed about 55°C.

C. How much did the temperature of the water change?

T = Tf -T = (34.96°C - 30°C) = 4.19°C

The temperature of the water changed about 5°C.

Specific heat capacity can be described as a substance's resistance to temperature changes. Which substance has a greater specific heat capacity, copper or water? Explain.

c_o = 4.184 J/g c_o = 0.385 J/g Water has a greater specific heat capacity.

Activity A:	Get the Gizmo ready:	National Park
Heat transfer	Click Reset (②).	= \

Question: What factors determine how heat energy transfers between objects?

- Predict: In the Gizmo warm-up, you saw how 200 g of 90 °C copper transfers heat to 200 g of 30.0 °C water.
 - A. How do you think increasing the water's mass would affect the final temperature?

Answers For Calorimetry Gizmo

W. Hemminger, Günther Höhne

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