Name _____ Date _____ Period _____

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# 6.4 Heat Capacity and Calorimetry

AP Chemistry

Show work with units and sig figs.

| $q = mc\Delta T$ $q = nC\Delta T$ $q_{system} = -q_{surroundings}$ | Specific heat, J/(g·°C): water 4.18 \| Al 0.897 \| Fe 0.449 \| Cu 0.385 |
|---|---|

**1.** How much heat, in kJ, is needed to warm 125 g of water from 18.5°C to 72.0°C?

**2.** An 85.0 g sample of aluminum at 24.0°C absorbs 2,150 J of heat. What is its final temperature? (c = 0.897 J/(g·°C))

**3.** A 32.5 g piece of an unknown metal absorbs 694 J while warming from 21.0°C to 76.5°C. Calculate its specific heat and use the table to identify the metal.

**4.** A 150.0 g piece of iron at 98.0°C is dropped into 100.0 g of water at 21.0°C in an insulated coffee-cup calorimeter. Calculate the final temperature of the iron and water. Assume no energy is lost to the cup.


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**5.** The molar heat capacity of liquid water is 75.3 J/(mol·°C). How much heat is released when 2.50 mol of water cools from 60.0°C to 25.0°C?

**6.** A student dissolves a salt in 75.0 g of water in a coffee-cup calorimeter. The temperature rises from 20.5°C to 32.9°C. Assume that only the water changes temperature.

(a) Calculate q for the water.
(b) Calculate q for the dissolving process.
(c) Is dissolving endothermic or exothermic?


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