

Name: \_\_\_\_\_

Date: \_\_\_\_\_

MCHS Honors Physics 2013-2014

## Temperature and Heat Energy 3

Remember:  $c_p = \frac{Q}{m\Delta T}$ , where  $c_p$ =specific heat,  $Q$  equals energy transferred as heat,  $m$ =mass, and  $\Delta T$ =change in temperature.

1. If the specific heat of water  $c_p = 4.186 \times 10 \frac{J}{kg \cdot ^\circ C}$ , how much energy ( $Q$ , in Joules) would be needed to raise the temperature of  $m = 0.25$  kg at total of  $\Delta T = 0.2^\circ C$ ?
2. A 0.59kg sample of brass at a temperature of  $98^\circ C$  is dropped into 2.80kg of water with a temperature of  $5^\circ C$ . The eventual equilibrium temperature of the water and brass is  $6.8^\circ C$ ...
  - a. How much heat energy ( $Q$ , in Joules) was transferred from the brass into the water once it reaches equilibrium?
  - b. What is the specific heat of brass ( $c_p$ , in  $\frac{J}{kg \cdot ^\circ C}$ )?
3. A newly minted copper coin is placed into 0.101 kg of water to cool. The water temperature increases by  $8.39^\circ C$  and the temperature of the coin decreases by  $68.0^\circ C$ . What is the mass of the coin?