Specific Heat Capacity & Calorimetry

1. 375 kJ of heat is added to a 25.0 kg granite rock. How much does the temperature increase?

\[ 18.99^\circ C \]

2. A 0.040 kg block of copper at 95°C is placed in 0.105 kg of water at an unknown temperature. After equilibrium is reached, the final temperature is 24°C. What was the initial temperature of the water?

\[ 21.5^\circ C \]

3. A sample of metal with a specific heat capacity of 0.50 \( \frac{\text{kJ}}{\text{kg}^\circ C} \) is heated to 98°C and then placed in an 0.055 kg sample of water at 22°C. When equilibrium is reached, the final temperature is 35°C. What was the mass of the metal?

\[ 0.0948 \text{ kg} \]
4. An 0.280 kg sample of a metal with a specific heat capacity of $0.43 \text{ kJ/kg}^\circ\text{C}$ is heated to 97.5°C then placed in an 0.0452 kg sample of water at 31.2°C. What is the final temperature of the metal and the water?

$57^\circ\text{C}$

5. You want to do an experiment to measure the conversion of gravitational potential energy to kinetic energy to heat by dropping 2.0 kg of copper off the roof of LEHS, a height of 14 m. How much will the temperature of the copper increase?

(Hint: Remember that potential energy is measured in J but specific heat capacity problems usually use kJ.)

$0.356^\circ\text{C}$

6. Based on your answer to question #5 above, you decide to modify your experiment by dropping the 2.0 kg bag of copper from a height of 2.0 m to the floor multiple times. How many times would you need to drop the copper bag to get a temperature increase of 2°C?

(Hint: Remember that potential energy is measured in J but specific heat capacity problems usually use kJ.)

39 times