

Calorimetry Practice

1. To a calorimeter (whose heat capacity is $195 \text{ J/}^\circ\text{C}$) containing 125 grams of water at 22.6°C is added 48.3 grams of aluminum (heat capacity of $0.900 \text{ J/g}^\circ\text{C}$) at 99.6°C . What is the final temperature?
2. You start with 100 grams of cold water (12°C) in a calorimeter whose heat capacity is $58 \text{ cal/}^\circ\text{C}$. To it you add some hot water (80°C). The final temperature is 29°C . What mass of hot water did you add?
3. A calorimeter contained 75.0 g of water at 16.95°C . A 75.2 g sample of iron at 63.15°C was added giving the mixture a final temperature of 19.68°C . Calculate the heat capacity of the calorimeter. The specific heat of iron is $0.450 \text{ J/g}^\circ\text{C}$.
4. 200 mL's of water at 25°C is in a calorimeter whose heat capacity is $107.5 \text{ J/}^\circ\text{C}$. To this we add 75.4 grams of Copper (specific heat = $0.385 \text{ J/g}^\circ\text{C}$) that is at 99.73°C . What is the final temperature of the system?
5. Suppose you have a coffee cup calorimeter whose heat capacity is $50 \text{ J/}^\circ\text{C}$ that holds 250 mL's of water at 22°C . To this you drop in a 75 gram chunk of aluminum that has a specific heat of $0.89 \text{ J/g}^\circ\text{C}$. If the metal was at 85°C what was the final temperature of the mixture?
6. Suppose you have a coffee cup calorimeter whose heat capacity is $75 \text{ J/}^\circ\text{C}$ that holds 250 mL's of water at 22°C . To this you drop in a 201 gram chunk of aluminum that has a specific heat of $0.89 \text{ J/g}^\circ\text{C}$. If the metal was at 99°C what was the final temperature of the mixture?
7. Suppose you have a coffee cup calorimeter whose heat capacity is $75 \text{ J/}^\circ\text{C}$ that holds 250 mL's of water at 25°C . To this you drop in a 445 gram chunk of aluminum that has a specific heat of $0.89 \text{ J/g}^\circ\text{C}$. If the metal was at 96°C what was the final temperature of the mixture?
8. Suppose you have a coffee cup calorimeter that is holding 200.0 grams of water at 10.0°C . To this you add 200.0 grams of water at 70.0°C . The final temperature of the water after mixing is 35.0°C . What is the heat capacity of the calorimeter? Use calories as the unit of heat and include a unit in your answer.
9. A 5.00 gram sample of nitric acid is dissolved in 1.00 lit of water in a calorimeter whose heat capacity is $5.16 \text{ kJ/}^\circ\text{C}$. The temperature increase is 0.511 K . Calculate the molar heat of solution of nitric acid in water.
10. A calorimeter whose heat capacity is $60 \text{ J/}^\circ\text{C}$ was used to find the heat flow for the dissociation of 24 grams of NaCl in 176 grams of water. The observed temperature change was -1.6 K and the specific heat of the NaCl solution is $3.64 \text{ J/g}^\circ\text{C}$. What was the heat flow?