

Heat Transfer: Counting Calories Activity – Your Calorimeter and You Lab Worksheet

Getting to Know Your Calorimeter

Now that you have built your calorimeter, you are ready to test how much heat you will lose.

1. Measure 100ml of room temperature water into a beaker. Record the temperature and volume in the table below. This will be the starting temperature for both your water and you calorimeter.
2. Measure 100ml of hot water in a beaker. Record the temperature and volume in the table below.
3. Pour the room temperature water into your calorimeter and wait a few minutes to allow them to equilibrate.
4. Quickly pour the warm water into the calorimeter and close the lid. Watch the thermometer as the temperature rises. Be sure to stir the water to uniformly mix it. Wait until the temperature stabilizes at a single temperature on the thermometer. Record this value in the table below.
5. Now, find the heat capacity for the calorimeter by solving the given equations for mC_p of the calorimeter

Data Table

	Volume	Mass	Initial Temperature	Final Temperature
Cold Water				
Calorimeter	N/A	N/A		
Hot Water				

Calculations

Equations

$$Q_{cal} + Q_c + Q_{hot} = 0$$

$$Q = mC_p\Delta T$$

Name: _____ Date: _____

Determining the Enthalpy of Solution of KCl

Now that we know how to predict how much heat our calorimeter absorbs, we can use it to figure out how much energy is consumed in the dissolution of KCl salt in water.

1. Fill your calorimeter with approximately 100ml of water. Let it sit for a few minutes to allow the water to equilibrate with the device.
2. Record the water temperature below. This will also be your starting temperature for your device.
3. Weigh out approximately 25g of salt.
4. Pour your salt into your calorimeter, stir the solution to ensure all the salt dissolves, and seal the top. Make sure all the salt has dissolved. This can be done by listening for it “scratching” at the bottom of the cup while stirring. Record the temperature at which it stops getting colder and you are fairly certain all the salt has dissolved.
5. Solve the following expressions for the heat of solution: $\Delta H_{solution} = Q_{sol}$.

Data

Volume H₂O: _____

Mass H₂O: _____

Mass KCl: _____

Initial Temperature: _____

Final Temperature: _____

Calculations

Equations

$$Q_{cal} + Q_c + Q_{hot} = 0$$

$$Q = mC_p\Delta T$$