



High School Science Virtual Learning

**College Chemistry**

**Calorimetry**

April 15, 2020



High School College Chemistry  
Lesson: April 15, 2020

**Objective/Learning Target:**  
Students will be able to do calorimetry calculations.



## Let's Get Started:

1. What are the units for heat capacity?
2. Which would have a higher specific heat capacity, aluminum or rubber?



## Let's Get Started: **Answer Key**

1. What are the units for heat capacity?  **$\text{J/g}\cdot^{\circ}\text{C}$  or  $\text{cal/g}\cdot^{\circ}\text{C}$**
2. Which would have a higher specific heat capacity, aluminum or rubber? **Aluminum. Rubber is much more difficult to heat up.**

## Lesson Activity:

### Directions:

1. Watch this [video](#).
2. What does the equation  $-q_m = q_w$  tell about the amount of heat associated with the metal and the amount of heat associated with the water?
3. What do the signs in the equation tell us?
4. Why must the metal and the water be opposite signs?

## Answers

2. The amount of heat lost by the metal is gained by the water.
3. The metal loses heat and the water gains heat.
4. Assuming that no heat escapes the water-metal mixture, any heat lost by one must be gained by the other. This stems from the Law of Conservation of Energy.



# Practice

*Complete the following questions using the information you learned during the lesson activity.*

## Questions:

1. If  $-q_m = q_w$ , does this mean that the temperature change of the water is the same as the temperature change of the metal?
2. If the coffee cup in the experiment described in the video absorbed some of the heat, how would this change the equation?
3. How would the equation change if you put cold metal in hot water?
4. In this case what is the system, and what is the surroundings?



Once you have completed the practice questions check with the **answer** key.

1. The temperature change would not be the same. Although the heat gained or lost is the same, the mass and substance affect how much the temperature change.
2.  $-q_m = q_w + q_{\text{cup}}$  The metal still loses heat, but now the water and the cup gain heat. The loss and gain still must be equal due to the Law of Conservation of Mass.



Once you have completed the practice questions check with the **answer** key.

3. The heat transfer is now in the opposite direction, so the signs would flip.  $q_m = -q_w$

4. The metal is the system. The surroundings is everything else in the universe, including the water.

## More Practice:

Follow the links below to do more practice.

1. This [worksheet](#) has some review from yesterday, and new types of problems for today.
2. This [simulation](#) can help you understand the setup for calorimetry experiments.



## Additional Practice:

Click on this [link](#) for additional practice. Do numbers one through 8 only.