

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

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

## Specific Heat of Metals

Objective: To determine the amount of heat transferred between a piece of metal and a container of water. This information will be used to determine the specific heat of each metal sample.

Procedure:

1. Take one coffee cup and tear off the lip around the top. Poke a hole in the bottom of this cup.
2. Add 250 mL of room temperature water to a second coffee cup. Record the temperature of the water.
3. Invert this cup and place it inside a second coffee cup so as to create an enclosed container. The calorimeter has now been constructed.
4. Fill a beaker with 400 mL of water. Place on a hot plate and turn the dial to 10.
5. Place a metal object inside the beaker. Make sure it is completely submerged.
6. When the beaker has boiled for at least three minutes, it is now reasonable to assume the metal sample is the same temperature as the boiling water. Record this temperature as the initial temperature of metal.
7. Remove the top (inverted coffee cup) from the calorimeter.
8. As quickly as possible, carefully remove the metal block from the beaker and place inside the coffee cup calorimeter.
9. Place the thermometer in the hole in the top of the inverted coffee cup. After approximately one minute, record the temperature of the water as the final temperature of the system.
10. Empty out all containers and repeat the procedure for two other metal samples.

Data:Metal: Al

	Metal sample	Calorimeter water
Initial temp. (°C)	100.0	21.3
Final temp. (°C)	28.9	28.9
Temperature change (°C)		
Mass (g)	97.22	200.00
Specific heat (J/g°C)		

Metal: Pb

	Metal sample	Calorimeter water
Initial temp. (°C)	100.0	21.5
Final temp. (°C)	23.2	23.2
Temperature change (°C)		
Mass (g)	127.74	200.00

Specific heat (J/g°C)		

Metal:     Cu    

	Metal sample	Calorimeter water
Initial temp. (°C)	100.0	22.8
Final temp. (°C)	25.6	25.6
Temperature change (°C)		
Mass (g)	92.08	200.00
Specific heat (J/g°C)		

Metal:     Zn    

	Metal sample	Calorimeter water
Initial temp. (°C)	100.0	22.3
Final temp. (°C)	26.1	26.1
Temperature change (°C)		
Mass (g)	108.66	200.00
Specific heat (J/g°C)		

Analysis:

Find the specific heat for each metal.

Determine the percent error for each metal used.

Conclusion:

Describe ways in which heat is lost during this lab.