NAME: **HONORS CHEMISTRY**

SECTION: Heat Calculations

Level 1

Substance	Specific Heat (J /g ^{o}C)
Water(ℓ)	4.18
Gold(s)	.129
Copper(s)	.385
Mercury(ℓ)	.14
Silver	0.2165

1. A piece of copper alloy with a mass of 85.0 g is heated from 30.^{o}C to 45^{o}C. In the process, it absorbs 500 J of heat. What is the specific heat of this copper alloy?

2. The temperature of a 74 g sample of material increases from 15^{o}C to 45^{o}C when it absorbs 2.0 kJ of heat. What is the specific heat of this material?

3. How much heat is needed to raise the temperature of 5.00 g of gold by 25.0^{o}C?

4. What mass of liquid water at room temperature (25^{o}C) can be raised to its boiling point with the addition of 24 kJ of heat energy?

5. How much heat will be given off by 55.0 g of water as it cools from 87.1^{o}C to 25.1^{o}C?

6. Calculate the temperature change for mercury if 160 g of the metal absorb 1500 J of heat energy.

7. Heat in the amount of 420 J is added to a 35 g sample of water at a temperature of 10. ^{o}C. What will be the final temperature of the water?

Level 2

Hint: Assume that all the heat lost by the warm object is absorbed by the cooler object.

8. If a piece of gold with a mass of 45.5 g and a temperature of 80.5^{o}C is dropped into 192 g of water at 15.0^{o}C, what is the final temperature of the system?

9. A piece of unknown metal with a mass of 14.9 g is heated to 100.0^{o}C and dropped into 75.0 g of water at 20.0^{o}C. The final temperature of the system is 28.5^{o}C. What is the specific heat of the metal?

10. A piece of unknown metal with a mass of 17.19 g is heated to 100.00^{o}C and dropped into 25.00 g of water at 24.50^{o}C. The final temperature of the system is 30.05^{o}C. What is the specific heat of the metal?

11. A piece of silver with a mass of 14.16 g and a temperature of 133.5^{o}C is dropped into 250.0 g of water at 17.20^{o}C, what will be the final temperature of the system?

Answers to selected problems

1. 0.4 J/g ^{o}C
2. 0.90 J/g ^{o}C
3. 16.0 J
4. 77g
5. 14.0 kJ
6. 67^{o}C
7. 13^{o}C
8. 15.5^{o}C
9. 2.50 J/g oC