Calorimetry Worksheet:

Name:

$q = mc\Delta T$ or $-q = q$ or $-mc\Delta T = mc\Delta T$

Specific Heat Capacities of Common Substances:	
Substance	**J/g ^{O}C**
Water (l)	4.184
Water (s)	2.03
Water (g)	2.0
Aluminum (s)	0.89
Iron (s)	0.45
Mercury (l)	0.14
Carbon (s)	0.71
Silver (s)	0.24
Gold (s)	0.13

4.184 Joules = 1 calorie

1. Determine the amount of heat energy in joules required to raise the temperature of 7.40g of water from 29.0^{O}C to 46.0 ^{O}C.

2. Calculate the joules of energy required to heat 454.3g of water from 5.4 ^{O}C to 98.6 ^{O}C.

3. What quantity of energy (in J and cal) is required to heat a piece of iron weighing 1.31 g from 25.0 ^{O}C to 46.0 ^{O}C?

4. A 5.63g sample of solid gold is heated from 21.0 ^{O}C to 32.0 ^{O}C. How much energy, (in J and cal) is required?

5. A 1.60g sample of a metal that has the appearance of gold requires 5.8J of energy to change its temperature from 23.0 ^{O}C to 41 ^{O}C. Is the metal pure gold?

6. A 2.80g sample of a pure metal requires 10.0J of energy to change its temperature 15.0 ^{O}C. What is this metal?

7. How much heat energy is required to raise the temperature of a 30.0g sample of aluminum from 15.0 ^{O}C to 35 ^{O}C?

8. What would be the temperature of a 24.2g sample of carbon if 575.6J of heat energy was applied?

9. A sample of water raised its temperature from 45.7 ^{O}C to 89.9 ^{O}C when 4.36kJ of heat energy was applied. What is the mass of the water sample?

10. A 450.0g sample of silver was cooled from 125.0 ^{O}C to 45.0 ^{O}C. How much heat energy did the sample lose?

11. A sample of iron having a mass of 93.3g is heated to 65.58^{O}C is placed in 75.0g of water raising the temperature from 16.95 ^{O}C to 22.24 ^{O}C. Find the specific heat capacity for this iron sample. The answer you find has had some lab errors due to human mistakes. Find your percent error for your work using

$$\% \ Error = \frac{Expected - Actual}{Expected \ Yield} x100 =$$

12. What is the resulting temperature when 35g of water at 75 ^{O}C is mixed with 15g of water at 15 ^{O}C?

Answers: 1. 526J 2. 177000J 3. 12J and 2.9cal 4. 8.1J and 1.9cal 5. 0.20J/g ^{O}C and the sample is not pure gold 6. 0.238J/g ^{O}C is silver 7. 530J 8. 34 ^{O}C temp diff 9. 23.6g H_2O 10. -8640J 11. 0.41J/g ^{O}C and 8.89% error 12. 57 ^{O}C