Name: Date: Period:

Practice: Q = mCpΔT

*Table of Specific Heat values:*

|  |  |
| --- | --- |
| **Substance** | **Cp (J/g ºC)** |
| Hydrogen Gas | 14.267 |
| Helium Gas | 5.300 |
| Water | 4.184 |
| Vegetable Oil | 2.000 |
| Air | 1.020 |
| Sodium | 1.23 |
| Glass | 0.840 |
| Potassium | 0.75 |
| Nickel | 0.440 |
| Mercury | 0.140 |
| Silver | 0.233 |
| Gold | 0.126 |
| Copper | 0.386 |

1. A student must use 70g of hot water in a lab procedure. Calculate the amount of heat required (in J), to raise the temperature of the water from 46.0 ºC to 99.0 ºC.
2. A student heats 24g of an unknown metal from 40.0 ºC to 75.0 ºC. If the total heat required was 117.6 J, what was the identity of the unknown metal?
3. A 2950g sample of Sulfur is exposed to a total of -745,000 J of energy. If the specific heat of sulfur is 0.73 J/ g ·ºC, calculate the temperature change experienced by the sample.
4. Granite countertops have a specific heat of 0.790 J/ g ·ºC. If a piece of granite is exposed to -3081 J of energy and the temperature falls from 73 ºC to 21 ºC, what was the mass (in grams) of the granite?
5. Coastal areas have milder climates than inland areas due to the specific heat of water. If a 5000g mass of water rises in temperature 37 ºC, calculate the total heat absorbed by the water.
6. A scientist is deciding whether to use sodium or potassium in his next invention. The process he is studying releases 10,000 J heat.
   1. If the mass of metal required is 400g, calculate the temperature change experienced for each metal (sodium and potassium) in the process.
   2. If the scientist’s primary goal is to minimize the temperature change, which metal should he use? Explain your answer.
7. The semiconductor industry uses many different metals in designing computers. Some of the most popular metals are silver, gold, and copper.
   1. A specific engineering process releases 4,390 J of energy. If the temperature change experienced by each metal was 100 ºC, calculate the mass (in grams) used for each metal.
   2. The current market prices for copper, silver, and gold are shown below:

|  |  |
| --- | --- |
| **Metal** | **Price (per gram)** |
| Copper | $0.007 |
| Silver | $0.63 |
| Gold | $41.96 |

If you were an engineer, which metal would you use for the process? Defend your answer.