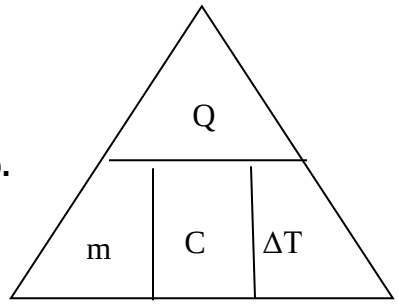
Calculating Specific Heat
Extra Practice Worksheet



Q = mc∆T, where **Q = heat energy**, **m = mass**, and **∆T = change in temp.** Remember, **∆T = (T_{final} – $T_{initial}$). <u>Show all work</u> and proper units.**

1. A 15.75-g piece of iron absorbs 1086.75 joules of heat energy, and its temperature changes from 25°C to 175°C. Calculate the specific heat capacity of iron.

2. How many joules of heat are needed to raise the temperature of 10.0 g of aluminum from 22°C to 55°C, if the specific heat of aluminum is 0.90 J/g°C?

3. Calculate the specific heat capacity of a piece of wood if 1500.0 g of the wood absorbs 67,500 joules of heat, and its temperature changes from 32°C to 57°C.

4. 100.0 g of 4.0°C water is heated until its temperature is 37°C. Calculate the amount of heat energy needed to cause this rise in temperature.

5. 25.0 g of mercury is heated from 25°C to 155°C, and absorbs 455 joules of heat in the process. Calculate the specific heat capacity of mercury.

6. What is the specific heat capacity of silver metal if 55.00 g of the metal absorbs 47.3J of heat and the temperature rises 15.0°C?

7. What mass of water will change its temperature by 3 ^{0}C when 525 J of heat is added to it?

8. A 0.3 g piece of copper is heated and fashioned into a bracelet. The amount of energy transferred by heat to the copper is 66,300 J. If the specific heat of copper is 390 J/g ^{0}C, what is the change of the copper's temperature?

Answers

$Q = mc\Delta T$, where **Q = heat energy**, **m = mass**, and **ΔT = change in temp.**
Remember, **$\Delta T = (T_{final} - T_{initial})$.** **Show all work and proper units.**

1. A 15.75-g piece of iron absorbs 1086.75 joules of heat energy, and its temperature changes from 25°C to 175°C. Calculate the specific heat capacity of iron.

$$C = \frac{Q}{m(T_f - T_i)} = \frac{1086.75}{15.75(175-25)} = 0.46 \text{ J/g°C}$$

2. How many joules of heat are needed to raise the temperature of 10.0 g of aluminum from 22°C to 55°C, if the specific heat of aluminum is 0.90 J/g°C?

$$Q = mC(T_f - T_i) = 10.0\text{g}\ (0.90\text{J/g°C})(55-22) = 297 \text{ J}$$

3. Calculate the specific heat capacity of a piece of wood if 1500.0 g of the wood absorbs 67,500 joules of heat, and its temperature changes from 32°C to 57°C.

$$C = \frac{Q}{m(T_f - T_i)} = \frac{67500 \text{ J}}{(1500 \text{ g})(57-32)} = 1.8 \text{ J/g°C}$$

4. 100.0 g of 4.0°C water is heated until its temperature is 37°C. Calculate the amount of heat energy needed to cause this rise in temperature.

$$Q = mC(T_f - T_i) = 100\text{g}(4.184\text{J/g°C})(37 - 4) = 14000 \text{ J}$$

5. 25.0 g of mercury is heated from 25°C to 155°C, and absorbs 455 joules of heat in the process. Calculate the specific heat capacity of mercury.

$$C = \frac{Q}{m(T_f - T_i)} = \frac{455 \text{ J}}{(25\text{g})(155-25)} = 0.14 \text{ J/g°C}$$

6. What is the specific heat capacity of silver metal if 55.00 g of the metal absorbs 47.3J of heat and the temperature rises 15.0°C?

$$C = \frac{Q}{m(T_f - T_i)} = \frac{47.3\ J}{(55.00g)(15)} = 0.0573\ J/g°C$$

7. What mass of water will change its temperature by 3 ^{0}C when 525 J of heat is added to it?

$$m = \frac{Q}{C(T_f - T_i)} = \frac{525\ J}{(4.184J/g°C)(3)} = 40\ g$$

8. A 0.3 g piece of copper is heated and fashioned into a bracelet. The amount of energy transferred by heat to the copper is 66,300 J. If the specific heat of copper is 390 J/g ^{0}C, what is the change of the copper's temperature?

$$\Delta T = \frac{Q}{mC} = \frac{66{,}300\ J}{0.3g(390J/g°C)} = 600°C$$