

Specific Heat

DIRECTIONS: Use $q = mc\Delta T$ to solve the following problems. Show all work and units.

- A 15.75 g piece of iron absorbs 1086 J of heat energy, and its temperature changes from 25°C to 175°C. Calculate the specific heat capacity of iron.
- How many joules of heat are needed to raise the temperature of 10.0 g of aluminum from 22°C to 115°C, if the specific heat of aluminum is $0.903 \text{ J/g}^\circ\text{C}$?
- To what temperature will a 50.0 g piece of glass absorb 5275 joules of heat and its specific heat capacity is $0.70 \text{ J/g}^\circ\text{C}$? The initial temperature of the glass is 20°C.
- Calculate the heat capacity of a piece of metal if 1000.0 g of the metal absorbs 4.75×10^3 joules of heat, and its temperature changes from 22°C to 175°C.
- 1000 mL of 4.0°C water is heated until its temperature is 17°C. If the specific heat of water is $4.18 \text{ J/g}^\circ\text{C}$, calculate the amount of heat energy needed to cause this rise in temperature.
- 25.0 g of mercury is heated from 25°C to 105°C, and absorbs 855 joules of heat in the process. Calculate the specific heat capacity of mercury.
- What is the specific heat capacity of silver metal if 95.00 g of the metal absorbs 47.3 calories of heat and the temperature rises 10.0°C ?
- If a sample of aluminum is initially at 25°C, what is its final temperature if 10.0 g of aluminum absorbs 1.0 kilojoules of heat, and the specific heat of aluminum is $0.90 \text{ J/g}^\circ\text{C}$?
- How much energy must be absorbed by 20.0 g of lead to increase its temperature from 30.0°C to 60.0°C ? (c_p of Pb = $0.128 \text{ J/g}^\circ\text{C}$)
- When 15.0 g of zinc drops in temperature from 275.0°C to 250.0°C , how much heat energy is released? (c_p of Zn = $0.388 \text{ J/g}^\circ\text{C}$)
- How much energy is required to heat 120.0 g of water from 15°C to 20.0°C ? (c_p of H_2O = $4.184 \text{ J/g}^\circ\text{C}$)
- How much heat (in J) is given out when 55.0 g of lead cools from 200.0°C to 10.0°C ? (c_p of Pb = $0.129 \text{ J/g}^\circ\text{C}$)
- If 5.00 mL of 75 joules of heat is given to a piece of gold weighing 10.00 g from 100°C to 27.0°C , what is the specific heat of the gold?
- A certain mass of water is heated with 85,000 Joules, raising its temperature from 20.0°C to 20.0°C . Find the mass of the water in grams. (c_p of H_2O = $4.184 \text{ J/g}^\circ\text{C}$)
- How many joules of heat are required to change 50.0 grams of ice at -10.0°C to steam at 120.0°C ? (c_p of H_2O = $4.184 \text{ J/g}^\circ\text{C}$)
- Calculate the number of joules given off when 12.0 grams of steam cools from 150.0°C to ice at -60.0°C . (c_p of H_2O = $4.184 \text{ J/g}^\circ\text{C}$)
- The specific heat of ethanol is $2.46 \text{ J/g}^\circ\text{C}$. Find the heat required to raise the temperature of 50.0 g of ethanol from 15°C to 35°C .
- When a 120 g sample of aluminum absorbs 9012 J of energy, its temperature increases from 25°C to 155°C . Find the specific heat of aluminum.

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