

Name: _____

30 Pts.

Chemistry Worksheet: Heat Calculations

1. How many kilojoules of energy are needed to raise the temperature of 2.0 liters of water from 35.0°C to 65.0°C?
2. 1.25×10^3 grams of a metal absorbs 7.50kJ of heat. If the temperature change of the metal is 15.0°C what is the specific heat of the metal?
3. 3.0×10^4 J of heat is absorbed by a sample of aluminum (C_p Al = 0.900 J/g°C) at 24.0°C. If the final temperature is 261°C what mass of Al metal was heated?
4. The specific heats of three different liquid substances are listed as:
Carbon tetrachloride: 0.856 J/g°C Benzene: 1.74 J/g°C Acetic Acid: 2.05 J/g°C
An experimenter found that 1.42 kJ of heat energy raised the temperature of 19.70g of an unknown liquid substance by 36.4°C. What is the heat capacity of this substance and what could this substances could this be?
5. Mercury has a density of 13.546 g/mL and a specific heat of 0.139 J/g°C. How much energy in Joules is released from 15.00 mL of Hg when it cools from the boiling point of Hg (357°C) to its freezing point (-39°C)?
scientific notation!
6. How many kJ is released from a 2.0 liter bottle of cola when it cools from 70°F (294K) to its freezing point? (Assume that the cola has the same properties as water)
7. What (minimum) mass of glass (C_p = 0.749 J/g°C) at -15.0°C is needed to absorb 3.50×10^4 Joules of heat energy if its final temperature cannot exceed 90.0°C?
8. What final temperature will 120.0 grams of benzene (C_p = 1.74 J/g°C) at 25.0°C have after it absorbed 5.0kJ of heat?
9. 50.0g of Osmium metal (C_p = 0.130 J/g°C) at 241 K is heated to its melting point of 3306 K. How much energy is needed for this? Osmium has the highest melting point of any element. *Final answer must be in scientific notation!*
10. 61.00 g of a substance absorbs 4.85 kJ of heat and undergoes a temperature change from -29.0°C to 52.0°C. What is the specific heat of the metal?
11. How many Joules is needed to raise the temperature of 3.0 Liters of water from 270 K to body temperature, 310K?
12. The density of gold is 19.3 g/mL What volume in mL of gold can absorb 16kJ of heat when undergoing a 25.0°C ΔT . It requires 0.128 J of heat to raise the temperature of 1g of Au 1°C.
13. Calculate the final temperature of a sample of platinum (C_p = 0.133 J/g°C) when a 30.00g sample at 60.0°C releases 2.00×10^2 J of heat energy.
14. Calculate the specific heat of a metal if 62.05 grams of it at 99.5°C is added to 160.0 ml of water at 24.5°C. The final temperature of the system is 26.8°C.
15. A lump of tin has a mass of 90.36g and a temperature of 93.5°C. It is then placed into a calorimeter with 115 ml of water at 20.5°C. After stirring, the final temperature of the water, metal, and calorimeter is 23.5°C. What is the specific heat of the tin metal?

**YOUR WORK MUST BE SHOWN ON A SEPARATE SHEET OF PAPER.
RECORD YOUR FINAL ANSWER ON THE ANSWER GRID
WITH APPROPRIATE UNITS AND SIG FIGS**

Calorimetry

Answers with units and sig figs



1. Must be in kilojoules	2.	3.
4. Cp= Substance:	5.	6. Must be in kilojoules
7.	8.	9. Must be in scientific notation (2 s.f.)
10.	11. Must be in scientific notation (2 s.f.)	12.
13.	14.	15.