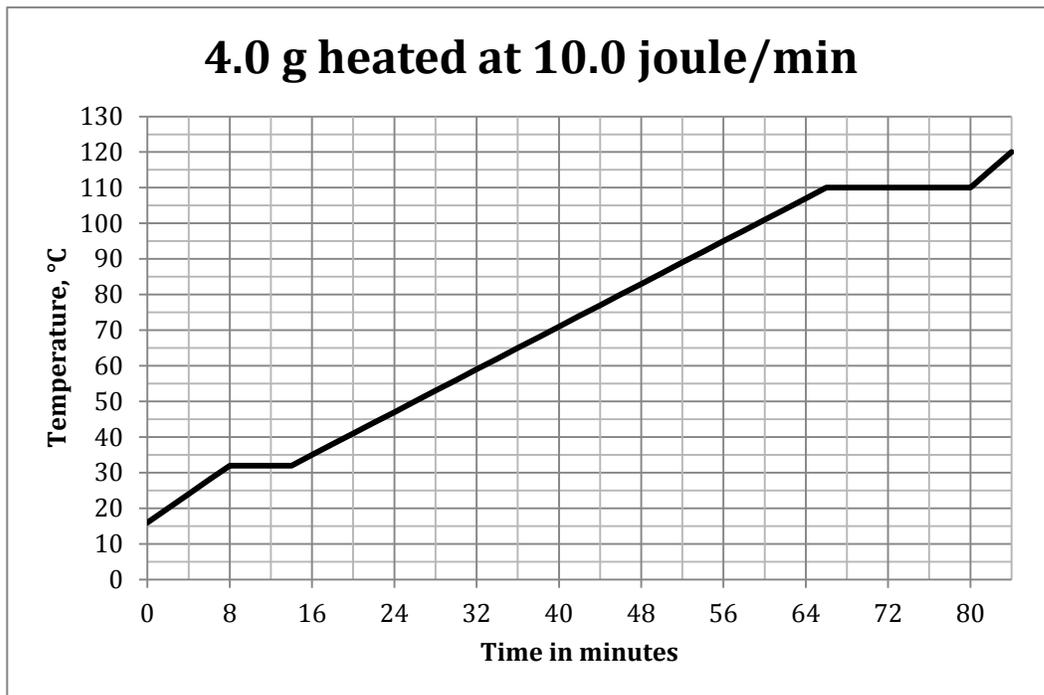


Name _____ "The Family Joules"



Base your answers to questions 1 to 7 on the graph above, which shows the temperature changes as a pure substance is heated over time. (all questions are worth 4 points)

- _____ 1. The melting point of this substance is closest to A) 16°C
B) 32°C C) 72°C D) 110°C
- _____ 2. The boiling point of this substance is closest to A) 16°C
B) 32°C C) 72°C D) 110°C
- _____ 3. The freezing point of this substance is closest to A) 16°C
B) 32°C C) 72°C D) 110°C
- _____ 4. How long does it take to boil the entire substance, once the melting point has been reached? A) 6 minutes. B) 80 minutes C) 12 minutes D) 14 minutes
- _____ 5. How much heat is required to **melt** 4.0 grams of this substance, at its melting point? A) 24 joule B) 60. joules C) 140 joules D) 40.0 joules
- _____ 6 As the substance is heated between the 68 minute mark and the 76 minute mark, the average kinetic energy of the substance A) increases
B) decreases C) remains the same
- _____ 7. If 8.0 grams had been heated instead of 4.0 grams, the melting temperature would have been A) two times greater B) one half as much

- C) 8 times greater D) exactly the same
- _____ 8. A substance that has a definite formula, and cannot be broken down into anything simpler by chemical means A) a compound B) an element
C) a heterogeneous mixture D) a homogeneous mixture
- _____ 9. Brass is an alloy, best described as is A) a compound B) an element
C) a heterogeneous mixture D) a homogeneous mixture
- _____ 10. A mixture of sand, salt, and water is best described as is A) a compound
B) an element C) a homogeneous mixture D) a heterogeneous mixture
- _____ 11. Glucose is best described as is A) a compound B) an element
C) a homogeneous mixture D) a heterogeneous mixture
- _____ 12. A chemical property of glucose is that it
A) dissolves in water B) is solid at room temperature
C) burns to produce a large amount of energy D) is denser than water
- _____ 13. An example of an exothermic, physical change is
A) burning B) melting C) evaporation D) condensation
- _____ 14. A student obtains a volume of 0.04569 liters, but must express it to 3 significant figures. It should be written as A) 0.046 liters B) 0.0456 liters
C) 0.0457 liters D) 0.456 liters
- _____ 15. The dissolving of LiBr in water is illustrated on Table I. (2nd from the bottom of the table). Based on the information in the table, when LiBr(s) is dissolved in water, we would expect the temperature to
A) increase, because the change is exothermic
B) increase, because the change is endothermic
C) decrease, because the change is exothermic
D) decrease, because the change is endothermic
- _____ 16. Your mass in kilograms is closest to A) 20 kg B) 60 kg
C) 180 kg D) 65,000 kg
- _____ 17. Your height is closest to 170 A) meters B) centimeters C) millimeters
D) kilometers

Short answers. Include units!

- _____ 17. How much heat is needed to boil 30.00 grams of water at its boiling point?
- _____ 18. What is the mass of the quantity of ice that can be melted at 0° by applying 6.68×10^3 joules of heat?

_____19. How much heat is needed to raise the temperature of 10.0 grams of water from 24.0°C to 74.0°C?

_____20. How many liters are there in 1237 milliliters?

LONGER ITEMS: Show work, and include units!

I. There is a table of densities of elements on Table S. Use the information on this table to answer the following questions:

A. What is the mass of 80.0 cm³ of Tin? (element number 50_

B. Which has a larger volume, 10. grams of Pb (element 82) or 10. grams of Ni (element 28)? You must justify your answer to get ANY credit!

II. An exothermic reaction occurs in water, and gives off 4180 joules. The water has a mass of 50.00 grams, and is at an initial temperature of 15.0°C

A. Write the equation you will use to find the temperature change of the water.

B. Substitute the correct values into the equation, and find the temperature change.

C. What is the **final** temperature of the water?

EXTRA CREDIT. A 50.0 grams sample of water, initially at 40.0°C is heated at 1000. joules per minute.

A. How long must the water be heated before it begins to boil?

- B. A second 50.0 grams sample of water initially at 40.0°C is heated for 20.0 minutes, at 1000J/minute
Find the mass of water that boils in this experiment.