

Review #2

Chemistry: <http://genest.weebly.com>
 Stop in for help every day at lunch and Tues, Weds, & Thurs after school



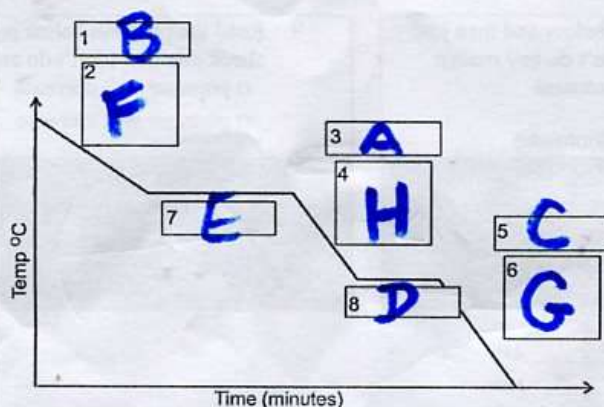
Name _____

Period _____

THE FOLLOWING NUMBERS WILL BE AVAILABLE
 ALL TESTS AND QUIZZES:

760 torr = 760 mmHg = 1.00 atm = 101.3 kPa = 101,300 pascals = 14.7 p.s.i.
 4.184 kilojoules = 4184 joules = 1000 calories = 1 Calorie

1. Look at the bottom. Copy those eight labels into the correct blanks on this cooling curve.



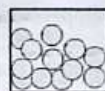
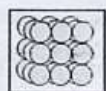
A. Liquid

B. Gas

C. Solid

D. Liquid → Solid

E. Gas → Liquid



F.

G.

H.

2. $Q = mc \Delta T$ Type Problems

For the formula $Q = m c \Delta T$ fill in the parentheses at right with the words such as "change of temperature", "heat", "specific heat", and "mass"

$$(\text{HEAT}) = (\text{MASS}) (\text{Spec HT}) (\text{change temp})$$

↑ ↑
DONT MIX UP THESE TWO

For the formula $Q = m c \Delta T$ fill in the parentheses at right with the units that go in $Q = m c \Delta T$, such as "grams", "joules", "°C", and $\frac{\text{joules}}{\text{g} \cdot \text{°C}}$

$$[\text{J}] = [\text{grams}] [\frac{\text{J}}{\text{g} \cdot \text{°C}}] [\text{°C}]$$

- In a container of gas, when temperature decreases pressure usually (decreases / increases).
- In a container of gas, when number of particles decreases pressure usually (decreases / increases).
- In a container of gas, when volume decreases pressure usually (decreases / increases).

6. Read the problem below and then just check one box (don't do any math):

- pressure will decrease
 pressure will increase

A krypton balloon contains 5,000,000 atoms of krypton at 77.111 kPa pressure. If more krypton atoms are added until there are 7,000,000 atoms in the balloon what will happen to the pressure?

7. Read the problem below and then just check one box (don't do any math):

- pressure will decrease
 pressure will increase

A sample of ethane gas has a volume of 125 mL at 725 torr. If the volume is changed to 100 mL, what will happen to the pressure?

8. Read the problem below and then just check one box (don't do any math):

- pressure will decrease
 pressure will increase

A copper container has a volume of 555 mL and is filled with air at 298K. The container is immersed in dry ice. How will the pressure change?

9. Read the problem below and then just check one box (don't do any math):

- pressure will decrease
 pressure will increase

When air in a steel cylinder is compressed from 10 L to 5 L, and temperature remains constant, what will happen to the gas pressure inside the cylinder?

10. Standard Pressure: 101.3 kPa

11. Standard Pressure: 1 atm

12. Standard Temperature 273 K

13. Standard Temperature 0 °C

14. Decide whether heating (we called it Q) is entering or leaving the object in bold.

- a) entering air At night, the blanket is too short so your feet are sticking out into the chilly **air** of your bedroom
b) entering cat A **cat** is curled up sleeping in a beam of sunlight
c) entering your hand You shake **your hand** with Principal Hernandez and his hand **feels** warm.

15. Which of these units are suitable for solving gas math problems?

- a. kelvins are (suitable / not suitable)
b. degrees celsius are (suitable / not suitable)

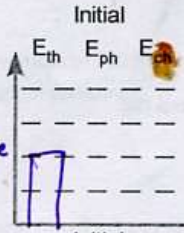
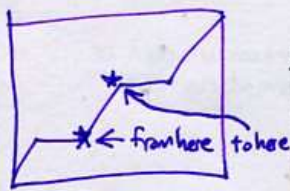
16. The temperature of a sample of aluminum increases from 24.5°C to 46.6°C as it absorbs 5650 calories of heat. What is the mass of the aluminum?

rearrange to

$$Q = mc\Delta T$$
$$m = \frac{Q}{c\Delta T}$$
$$m = \frac{(5650 \text{ cal})}{(0.21 \frac{\text{J}}{\text{g}^\circ\text{C}}) (22.1^\circ\text{C})}$$
$$1220 \text{ gram} = m$$

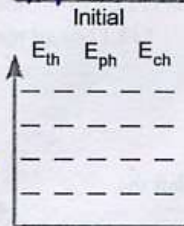
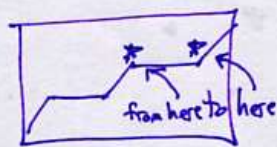
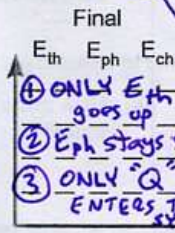
ADVICE TO YOU

17. A pan of water (25°C) is heated to boiling and some of the water is boiled away. Do separate energy bar charts for each stage of the process.



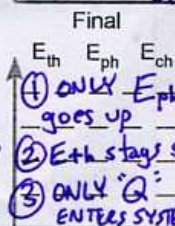
Energy Flow

WATER GOING FROM 25°C LIQUID TO 100°C LIQUID



Energy Flow

WATER GOING FROM 100°C LIQUID TO 100°C GAS



THIS IS A TOUGH ONE. IF YOU ARE TRYING TO JUST FIGURE OUT BASIC 'LOL'S' GO RE-DO THE WASHING MACHINE OR CLOTHESLINE OR HANGER SHEETS

Fill in blank with whichever is more appropriate, 'specific heat' or 'heat'

18. heat Q stands for this in the formula $Q = m C \Delta T$.

19. specific heat C stands for this in the formula $Q = m C \Delta T$

20. specific heat This is a constant number for a given substance.

21. heat This is sometimes measured in joules

22. specific heat This is sometimes measured in $\frac{J}{g \cdot ^\circ C}$

23. heat This is sometimes measured in calories

this increases pressure so put big # on top

24. A sample of ethane gas has a volume of 125 mL at 725 torr. If the volume is changed to 100 mL what will be the new pressure?

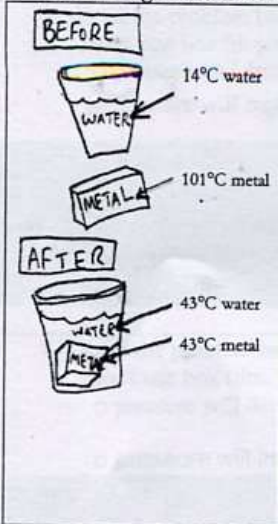
$$725 \text{ torr} \times \left(\frac{125 \text{ mL}}{100 \text{ mL}} \right) =$$

25. A krypton balloon contains 5,000,000 atoms of krypton at 77.111 kPa pressure. If more krypton atoms are added until there are 7,000,000 atoms in the balloon what will be the new pressure (in kPa)?

$$77.111 \text{ kPa} \times \left(\frac{7,000,000 \text{ atoms}}{5,000,000 \text{ atoms}} \right) = 107.9 \approx 100 \text{ kPa}$$

Show work for full credit.

26. If 15 grams of metal were dropped into 11 grams of water calculate the following



a) Find ΔT for the water.

$$\Delta T_w = 43 - 14 = 29^\circ\text{C}$$

b) How many joules of heat entered the water?

$$Q = m c \Delta T$$

$$Q = (11\text{g}) \left(4.18 \frac{\text{J}}{\text{g}^\circ\text{C}}\right) (29^\circ\text{C})$$

$$Q = 1300\text{ J}$$

c) How many joules of heat left the metal?

$$Q = 1300\text{ J}$$

d) Calculate the specific heat of the metal

$$Q = m (c_p) \Delta T$$

$$c_p = \frac{Q}{m \Delta T}$$

$$c_p = \frac{1300\text{ J}}{(15\text{g})(58^\circ\text{C})}$$

$$c_p = 1.5 \frac{\text{J}}{\text{g}^\circ\text{C}}$$

27. Write each number in standard decimal style, without an exponent

$$5.28 \times 10^{-4} \quad ,000528$$

$$2.000 \times 10^5 \quad 200000$$

28. Write each number in scientific notation

$$0.0003434 \quad 3.434 \times 10^{-4}$$

$$440000000 \quad 4.4 \times 10^8$$

23. write the answer to the correct number of significant figures

$$(8.5 \times 10^6)(8.9 \times 10^3) = 7.6 \times 10^9$$

24. write the answer to the correct number of significant figures

$$\frac{4.3 \times 10^{-4}}{2.5 \times 10^{-5}} = 170$$

29. Convert 45,000 joules into Calories (spelled with a capital).

$$45000 \text{ J} \times \left(\frac{1 \text{ Cal}}{4184 \text{ J}} \right) = 11 \text{ Calories}$$

30. A gas occupies a volume of 750 mL at 0°C. The conditions are changed to 500 mL at 2.0 atm and 25°C. What was the original pressure?

$$2.0 \text{ atm} \times \left(\frac{750 \text{ mL}}{500 \text{ mL}} \right) \left(\frac{298 \text{ K}}{273 \text{ K}} \right) =$$

31. A gas occupies a volume of 2.5 L at 600 mm Hg and 22°C. What is the new temperature if conditions are changed to 760 mm Hg and 1.8 L?

$$295 \text{ K} \times \left(\frac{760 \text{ mmHg}}{600 \text{ mmHg}} \right) \left(\frac{2.5 \text{ L}}{1.8 \text{ L}} \right) = 518.98 \approx 520 \text{ K}$$

32. Fluorine gas at 300K occupies a volume of 500 mL. To what temperature should it be lowered to bring the volume to 300 mL? It gets colder, so put your big # on the bottom

$$300 \text{ K} \times \left(\frac{300 \text{ mL}}{500 \text{ mL}} \right) = 180 \text{ K}$$

33. A sample of carbon dioxide occupies a volume of 3.50 liters at 125 kPa pressure. What pressure would the gas exert if the volume was decreased to 2.00 liters?

$$125 \text{ kPa} \times \left(\frac{3.50 \text{ L}}{2.00 \text{ L}} \right) = 219 \text{ kPa}$$

← lonely #
↑ these are in a relationship
Pressure should go up so put big number on top!

For each item below indicate whether it applies to HEAT or TEMPERATURE

34. TEMP Can be measured by inserting a thermometer

35. HEAT Can be measured by holding water nearby and then multiplying $\text{mass}_{\text{water}} \times C_{p\text{water}} \times \Delta T_{\text{water}}$

37. TEMP. one common unit for measuring this is degrees celsius

38. TEMP. one common unit for measuring this is kelvins

39. HEAT one common unit for measuring this is joules