Date______________________ Period__________ Name__________ KEY __________

8th Grade Science: First Semester Skill Review

Science In Our World (Ch. 1 text + additional notes from class)

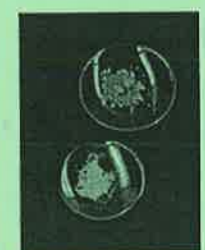
1. List five pieces of safety equipment and describe the location and use.
   1.) fire extinguisher – put out fires – by door
   2.) safety goggles + 3.) lab aprons – protect eyes + body – in cubbies/cabinets
   4.) sharps container – dispose of broken glass – back sink by window
   5.) eyewash – flush eyes – back sink by window
2. What steps should be taken when a chemical is spilled?
   - keep others away
   - tell teacher
   - follow teacher instructions
3. What steps should be taken when you spill chemicals on yourself, or if you get burned?
   - rinse with cold running water
   - notify teacher
4. Identify the name and function of each of the following pieces of laboratory equipment:

A.


B.


C.


D.


E.


A. spring scale – measure weight
B. graduate cylinder – measure volume
C. crucible – heat chemicals
D. wire gauze – heating over a bunsen burner
E. watch glass – holding chemicals / making observations

5. Ralph wanted to know how temperature affects pressure of a gas if volume is unchanged. He took a sample of nitrogen gas in a 100mL closed container and, using a pressure probe, measured the pressure in kPa at 0.0°C, 20.0°C (room temperature), 30.0°C, 40.0°C, 50.0°C, 60.0°C, 70.0°C, and 80.0°C. He used the same probe for each trial and the same container for the gas in each trial. His data is shown below:

Temperature (°C)	Pressure (kPa)
0.0	23.8
10.0	25.9
20.0	31.5
30.0	33.8
40.0	35.9
50.0	36.7
60.0	38.0
70.0	40.3
80.0	43.1

a. What is the independent variable in this experiment? Temperature

b. What is the dependent variable in this experiment? Pressure

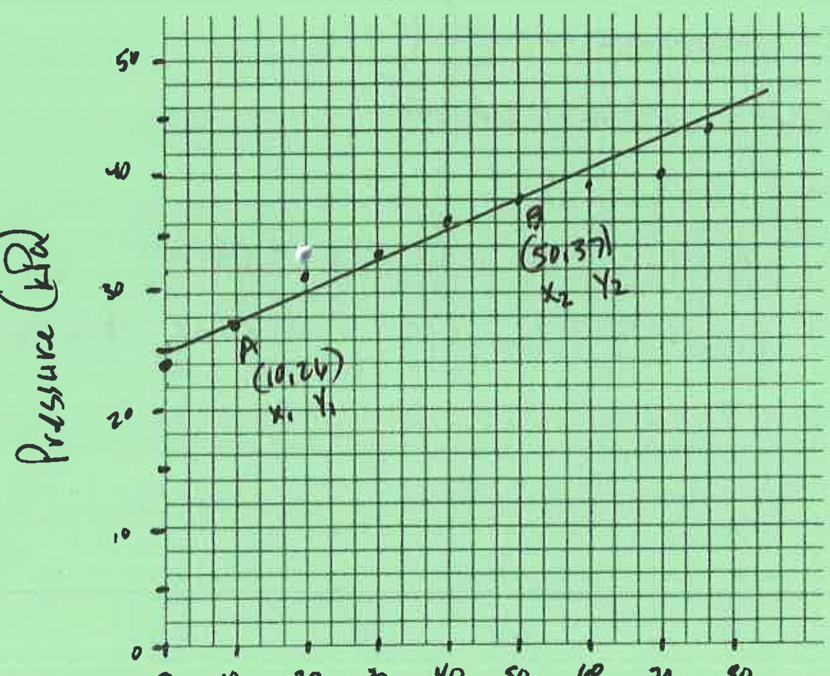
c. What would be a control in this experiment? the trial at room temperature

d. Write an appropriate hypothesis for this experiment (If….then)
If the temp. is increased, then the pressure will increase.

d. Name 3 constants.
- type of gas
- same probe
- same volume of container

e. Prepare a graph of this data in the space below. Provide a proper title (The Effect of IV on DV) and label the axes appropriately.

Title: The Effect of Temperature on Pressure



$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{37-26}{50-10} = \frac{11}{40}$$

$= .275$

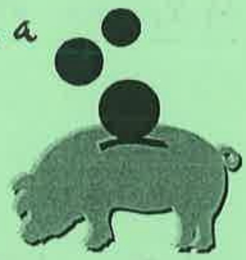
f. Draw a best fit line on the graph above.

g. Calculate the slope of the best-fit line on the graph in part e above. Show your work in the space to the side of your graph.

7. Make two observations and two inferences from those observations using the pictures shown here.

1.) shape of a pig with a line
2.) circles

1.) piggy bank
2.) coins going into bank



1.) cup
2.) shape above cup

1.) cup of coffee
2.) coffee is hot

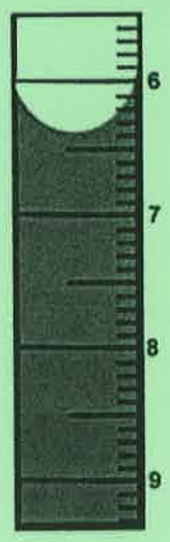
8. How many significant figures are in each of the following numbers?

a. 100 1 b. 0.0030 2 c. 2008 4

d. 0.250 3 e. 200.001 6 f. 76.50 4

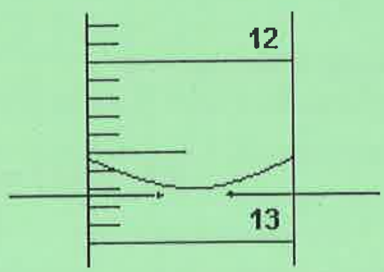
9. Read each of the following instruments to the proper number of significant figures. Don't forget units!

Assume Graduated Cylinders measure in mL



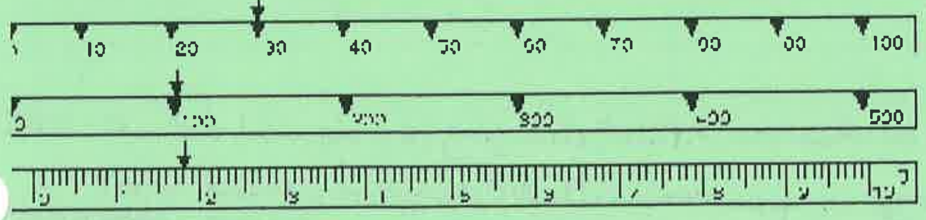
6.40mL

31.0 mL



Marked in mL

12.69mL



131.80 g

Complete the following conversions. Show all of your work and remember to write your units. Report answers in the proper number of significant figures.

10) 1.9 cm^3 = ?µL

$$1.9\ cm^3 \times \frac{1\ mL}{1\ cm^3} \times \frac{1000\ \mu L}{1\ mL} = 1.9 \times 10^3\ \mu L \text{ or } 1900\ \mu L$$

11) 1.00 x 10^{12} nm = ? Mm

$$1.00 \times 10^{12}\ nm \times \frac{1\ \mu m}{1000\ nm} \times \frac{1\ mm}{1000\ \mu m} \times \frac{1\ m}{1000\ mm} \times \frac{1\ km}{1000\ m} \times \frac{1\ Mm}{1000\ km} = 1.00 \times 10^{-3}\ Mm$$

or 10^3 or 10^3 or 10^3 or 10^3 or 10^3

or 0.00100 Mm

12) 0.00040 Gm = ?dm

$$0.00040\ Gm \times \frac{1000\ Mm}{1\ Gm} \times \frac{1000\ km}{1\ Mm} \times \frac{1000\ m}{1\ km} \times \frac{10\ dm}{1\ m} = 4.0 \times 10^6\ dm$$

13) 0.00005 Tm = ?km

$$0.00005\ Tm \times \frac{1000\ Gm}{1\ Tm} \times \frac{1000\ Mm}{1\ Gm} \times \frac{1000\ km}{1\ Mm} = 5 \times 10^4\ km$$

or 50000 km

Properties of Matter (Chapter 17 / Density Calculations)

1. For each of the following descriptions, determine if it is a physical or chemical change.

Description	Physical or Chemical?
A match burning	C
Ice forming	P
A glass being broken	P
Sugar dissolving	P
Magnesium metal + hydrochloric acid react to form a clear liquid	C

2. Differentiate between a physical change and a physical property. Give an example of each.

physical property - can be observed without changing the chemical nature - color, density

physical change - change in appearance with NO change in chemical nature

example - change in state

3. Differentiate between a chemical change and a chemical property. Give an example of each.

chemical property - describes a substance's ability to be chemically altered

- example - flammability

chemical change - can be observed by altering the chemical nature of something

- example - burning

For calculations, show all work. Include the formula, units, <u>sig figs</u>!!

4. You want to find the density of a marble. Describe how you should find the necessary properties.

Volume - displacement method in a graduated cylinder
Mass - use triple beam balance

5. If a block of wood will float on water, what can you say about the density of the block of wood (density of water = 1 g/mL).

If the wood floats in water, we can say it has a density less than 1.0 g/mL (~~same as water~~)

6. Calculate (show your work) the density of a substance whose mass was found to be 36.00 g and volume was found to be 4.0 cm^3.

$$D = \frac{M}{V} = \frac{36.00g}{4.0cm^3} = 9.0g/cm^3$$

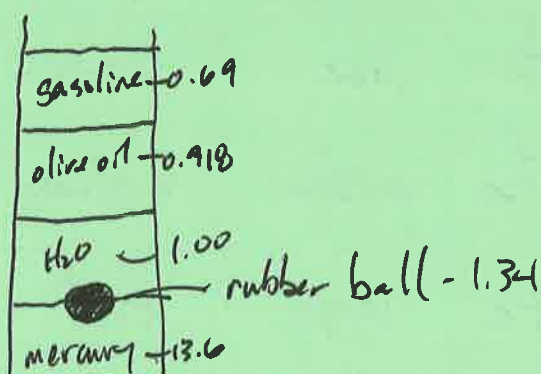
7. An object hose mass is 200.0 g has a density of 27.0 g/cm^3. What is its volume?

$$V = \frac{M}{D} = \frac{200.0g}{27.0g/cm^3} = 7.41cm^3$$

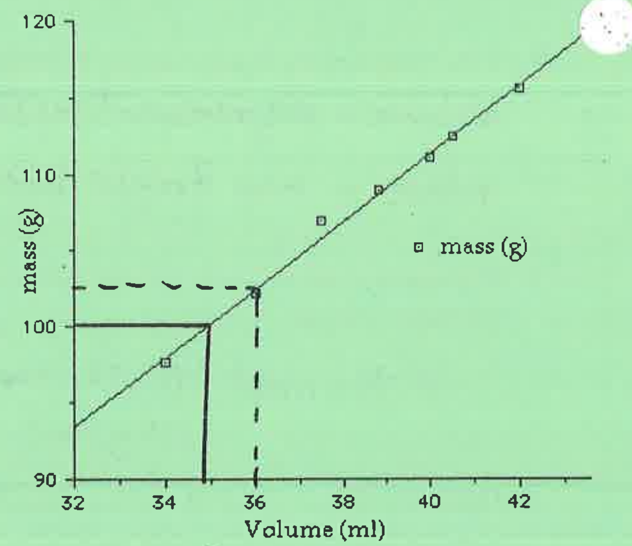
8. The density of aluminum is 2.7 g/mL. What is the mass of a piece of aluminum whose volume is 35mL?

$$M = DV = 2.7g/mL \cdot 35mL = 95g$$

9. The density in g/cm^3 of water = 1.00, olive oil = 0.918, mercury = 13.6, gasoline = 0.69 and a rubber ball = 1.34. All of these were carefully poured together without mixing. Draw and label a diagram of how they would look in a beaker. (The rubber ball is a solid, all the rest are liquids).



10. Use the graph of mass vs volume for glass, shown here, to answer the following questions.



a. Use the graph to find the mass of a piece of glass that has a volume of 36 mL. Include units

mass ≈ 103g

b. Use the graph to find the volume of a piece of glass that has a mass of 100 g.

vol ≈ 34.8 mL

8. Read each description below and select from the word bank the term that best fits.

a. a characteristic that can be observed without forming a new substance physical property

b. anything that has volume and mass matter

c. two or more elements chemically combined compound

d. the amount of space something takes up volume

e. the amount of matter in something mass

f. the ratio of mass to volume density

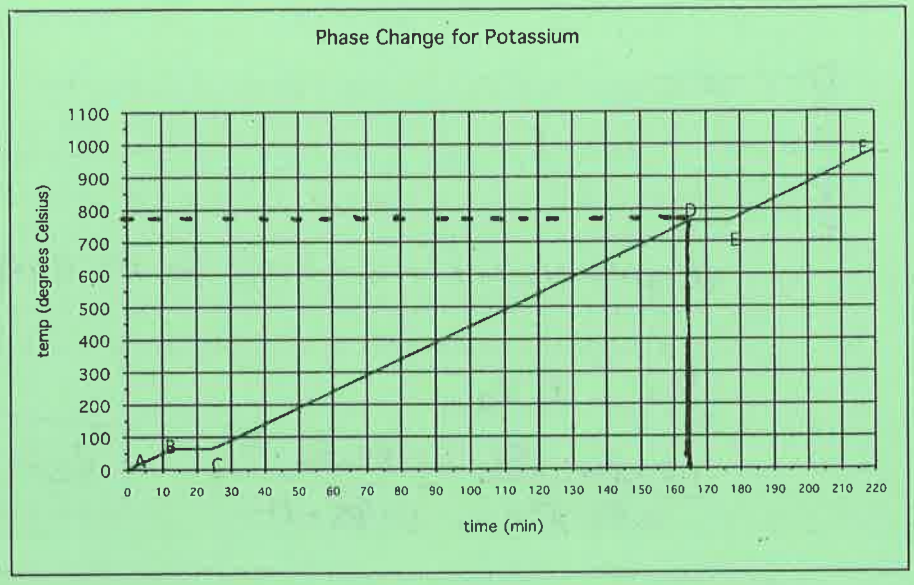
Word Bank:, *physical property, matter, element, volume, mass, density,* ~~*volume*~~ compound

States of Matter (Chapter 18)

1. Be able to compare phases of matter in terms of particle motion, distance between particles, speed of particles, volume and shape.

Phase	Shape	Volume	Distance between particles	Speed of particles	Freedom of motion of particles
solid	definite	definite	close	slow	vibrate in fixed position
liquid	not definite	definite	medium	medium	can flow past each other
gas	not definite	not definite	large	fast	random

2. Use the graph shown here to answer the following questions.



a. Use two letters to indicate what part of the graph represents the boiling point of potassium?

D, E

b. What temperature is the boiling point of potassium? (Be sure to include units) 760°C

c. What phase(s) of matter is/are present between E and F?

gas

d. What phase is potassium at 0°C? solid

e. What phase is potassium at room temperature (30°C) solid

f. How long did it take for potassium to boil? (Include units) 165 min

g. What is happening to the temperature in section B-C. stays the same

h. Heat is being added at D-E, what effect does this heat have on the potassium?
The heat is being used to change the state, NOT raise the temp.

i. Compare speed and freedom of motion of potassium between points A-B and between points E-F.

	A-B	E-F
freedom of motion	fixed position (solid)	random (gas)
Speed	slow	fast

3. What are the 3 variables that need to be considered when working with Gay Lussac's, Charles' and Boyle's Laws?

pressure, volume + temperature

4. Complete the following:

I = increases D = decreases R= remains the same

__D__ a. According to Boyle's Law, the pressure of a gas as volume increases.
__I__ b. According to Charles' Law, the temperature of a gas as volume increases.
__I__ c. The temperature of a gas as pressure increases, while volume remains constant.
__I__ d. The speed of particles in a sample of gas as temperature increases.
__I__ e. The distance between particles as volume increases and temperature remains the same.

★ answers are in sig figs for #'s 5-9 ★

5. I have added 15 L of air to a balloon at sea level (1.0 atm). If I take the balloon with me to Denver, where the air pressure is 0.85 atm, what will the new volume of the balloon be?

$P_1V_1 = P_2V_2$

$\frac{1.0\,atm \cdot 15L}{0.85\,atm} = \frac{0.85\,atm \cdot V_2}{0.85\,atm}$

$V_2 = 18L$

6. The total volume of a soda can is 415 mL. Of this 415 mL, there is 60.0 mL of headspace for the CO_2 gas put in to carbonate the beverage. If a volume of 100.0 mL of gas at standard pressure (1.0 atm) is added to the can, what is the pressure in the can when it has been sealed?

This is extra info that you don't need!!

$P_1V_1 = P_2V_2$

$\frac{(1.0\,atm)(100.0\,mL)}{60.0\,mL} = \frac{P_2(60.0\,mL)}{60.0\,mL}$

$P_2 = 1.7\,atm$

7. If 257 mL of oxygen in a flexible container goes from 17°C to 42°C from being out in the sun. The pressure in the tube is constant. What is the volume of the container after it has been heated?

$T_1 = 17+273 = 290K$

$T_2 = 42+273 = 315K$

$\frac{T_1}{V_1} = \frac{T_2}{V_2}$ $\frac{290K}{257mL} = \frac{315K}{V_2}$

$\frac{(257mL)(315K)}{290K} = \frac{(290K)V_2}{290K}$

$V_2 = 279mL$

8. How hot will a 2.3 L balloon have to get to expand to a volume of 400.0 L? Assume that the initial temperature of the balloon is 25°C.

$T_1 = 25+273 = 298K$

$\frac{T_1}{V_1} = \frac{T_2}{V_2}$ $\frac{298K}{2.3L} = \frac{T_2}{400.0L}$

$\frac{(298K)(400.0L)}{2.3L} = \frac{T_2(2.3L)}{2.3L}$

$T_2 = 52{,}000K$

9. If the initial pressure on a gas in a closed, rigid scuba tank is 15.08 psi, and the temperature is 20°C, what is the new temperature when the tank is dropped to the bottom of the Marianas Trench in the ocean where the pressure is 15, 750 psi?

$T_1 = 20+273 = 293K$

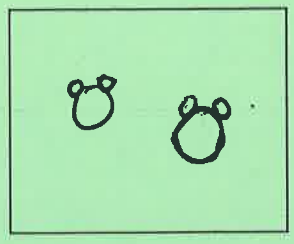
$\frac{P_1}{T_1} = \frac{P_2}{T_2}$ $\frac{293K}{15.08\,psi} = \frac{T_2}{15{,}750\,psi}$

$\frac{(293K)(15{,}750\,psi)}{15.08\,psi} = \frac{T_2(15.08\,psi)}{15.08\,psi}$

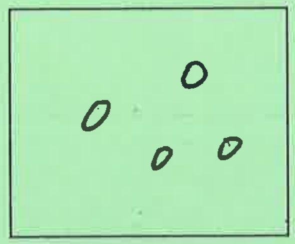
$T_2 = 306{,}000K$

Chapter 19: Elements, Compounds, Mixtures

1. Draw a picture representing a compound, element, and 2 types of mixtures:



A. Compound



B. Element

C. Mixture of atoms

D. Mixture of atoms and compounds

2. Look at each property listed below. If it is an intensive (I) or extensive property (E).

E size	E shape	I color	E weight
I melting point	E mass	I hardness	I reacts w/ acid
I density	E volume	I flammability	

3. Sodium and chlorine can be extremely dangerous in their elemental form. How is it possible that we can eat them in a compound?

4. Matching

D iron	A. homogeneous mixture
A Air	B. heterogeneous mixture
D Aluminum Foil	C. compound
A Salt Water	D. element
C Salt	
C Water, H_2O	
B Veggie soup	
A Paint	