Unit 1 Review **Name:** KEY **Block:** _____
Chemistry

Part I: Scientific Method and Equipment

1. Know safety rules
2. Know laboratory glassware and instruments
3. What is the difference between a theory and a law?
T: explains a relationship, can be changed
L: defines " w/ a formula, can't be changed
4. What is the difference between an observation and an inference?
O: fact, 5 senses I: conclusion based on obs + prior knowledge
5. What is the difference between the independent and dependent variable in an experiment?
I.V. controlled by scientist, D.V. what scientist is measuring
6. What is the difference between a direct and an inverse relationship?
D: as both variables change the same way
I: as one var. ↑, the other ↓

A scientist knows wants to determine the percent of fish eggs that hatch is affected by the temperature of the water in an aquarium. She is attempting to identify which water temperature will cause the highest percentage of fish eggs to hatch. The scientist sets up 5 aquariums at the following temperatures: 10°C, 20°C, 30°C, 40°C, and 50°C. She adds 50 fish eggs to each aquarium and records the number of eggs that hatch in each aquarium.	Identify the: • Identify the ~~hypothesis~~ question • List 3 variables that should be Constants • Independent Variable temperature • Dependent Variable # hatched fish • Control group
A car magazine is trying to write an article that rates the top 5 most fuel efficient SUVs (the SUVs that can drive the most miles for each gallon of gasoline). They make sure each model of SUV has exactly 10 gallons of gasoline in its fuel tank and reset the odometer (instrument that measures the distance a vehicle has traveled) to zero. The SUVs are then driven until they run out of gasoline. The distance on the odometer is recorded.	Identify the: • List 3 variables that should be Constants • Independent Variable model of SUV • Dependent Variable distance travelled • Control group

Part II: Measurement and Significant Figures.

1. What is the difference between being accurate and being precise?
A: close to actual answer
P: each trial is consistent
2. What is the relationship between significant figures and precision?
more sig figs → more precise
3. Underline the number of significant figures in the following measurements and indicate what the measurement is (time, distance, length, etc...)
   a. 0.00<u>40500</u> m length
   b. <u>2071</u>000 kg mass
   c. <u>1</u>00 mL volume
   d. 0.00<u>1030</u> L volume
   e. <u>100.0</u> ms time
   f. <u>30</u>300 kPa pressure
4. Put the following numbers in scientific notation.
   a. 560000000 g 5.6×10^{8}
   b. 0.000000000003700 cm 3.7×10^{-12}
   c. 9847380000000000 g 9.84738×10^{15}
   d. 0.0048 mL 4.8×10^{-3}
   e. 40600 kPa 4.06×10^{4}
   f. 0.000000049300 mm 4.9300×10^{-8}
5. Round the following measurements to the requested number of significant figures and put the numbers in scientific notation.
   a. 34890 km → 2 s.f. 3.5×10^{4}
   b. 0.0087998 mm → 3 s.f. 8.80×10^{-3}
   c. 456666 ns → 4 s.f. 4.567×10^{5}
   d. 399 g → 2 s.f. 4.0×10^{2}
   e. 0.00762055 mL → 3 s.f. 7.62×10^{-3}
   f. 3290 cm → 2 s.f. 3.3×10^{3}
6. Calculate the following using the correct number of significant figures:
   a. 3.560 km + 2.04 km
   5.60 km
   b. 0.00349 s x 100. s
   0.349 s^2
   c. $\frac{(30.0\text{ cm} + 0.3\text{ cm})}{4.345\text{ s}} = \frac{30.3}{4.345}$
   6.97 cm/s
   d. 2.109 cm – 0.2 cm
   1.9 cm
   e. 4500 g ÷ 0.00324 K
   1,400,000 g/K
   f. (2.50 m/s x 3.4 s) + 2.788 m
   11.3 m

Part III: SI Units and Dimensional Analysis

For all calculations, round your answer to the proper number of significant figures!

7. Complete the following, **show work** on the calculations.

a. Name the SI unit of temperature and convert 36°C to that temperature (K = °C + 273.15)

Kelvin

309.15

b. Calculate the density of an object whose mass is 1.6g and volume is 0.234 mL.

6.8 g/mL

c. What is the % error in a measurement whose actual value is 15.00mL, yet you measured 14.65mL? Is this accurate (explain)?

2.33 %

d. The density of copper is 8.96 g/cm^3. A student measured the mass and volume which are on the data table below.

Measurement	Mass (g)	Volume (cm^3)	Density (g/cm^3)
1	25.45	2.85	8.93
2	27.89	3.12	8.94
3	26.44	2.97	8.90
4	21.55	2.41	8.94
average	-------	-------	8.93

a. Calculate the density for each measurement and indicate your answers in the table

b. Calculate the average density and indicate the answer in your table

c. Calculate the % error.

0.33%

d. Is the data precise and/or accurate for just the density?

yes yes

8. Perform the following conversions. SHOW ALL WORK!

1) 0.00662 kJ → J

6.62 J

2) 4.5 m → cm

450 cm

3) 350 cg → kg

0.0035 kg

4) 14 km → m

14,000 m

9. Perform the following conversions. SHOW WORK!

(1 kg = 2.2 lbs 1 ton = 2000 lbs 1 mile = 1.6 km 1 calorie = 4.18 J)

a. 0.0056 g → lbs

0.000012 lbs

b. 1230 m → mile

0.769 miles

c. 3.56 kJ → calorie

852 calories

d. 273.55 kg → tons

0.30091 tons

10. Perform the following conversions. (Show work!)

a. 5.398 g KCl = 0.0724 moles KCl (for KCl: 74.55 g = 1 mole)

b. If an automobile is able to travel 254 mi on 11.2 gal of gasoline, what is the gas mileage in km/L? (1.0 in = 2.54 cm) (1 mi = 5280 ft.) (1 ft = 12 in.) (1 US gallons = 3.7854118 liters)

9.64 km/L

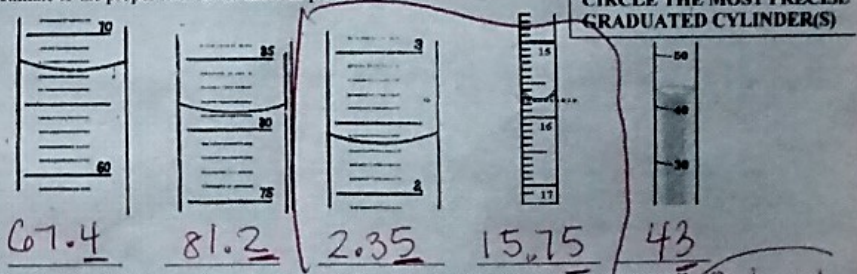
c. 8.719 g H_2O_2 = _____ moles H_2O_2 = _____ molecules H_2O_2 (2nd half is bonus)
(1 mole = 6.022 x 10^{23} molecules) (for H_2O_2: 34.01 g = 1 mole)

0.2564 moles 1.543×10^{23} molecules

Part IV: Measurement

11. Determine the measurements for the following graduated cylinders (in mL). Make sure to estimate to the proper number of decimal places!

CIRCLE THE MOST PRECISE GRADUATED CYLINDER(S)



67.4 81.2 2.35 15.75 43

12. A graduated cylinder has markings at every 1 mL. To what place should your measurements read? 0.1 mL

13. What is the uncertainty in a measurement?

the estimated digit