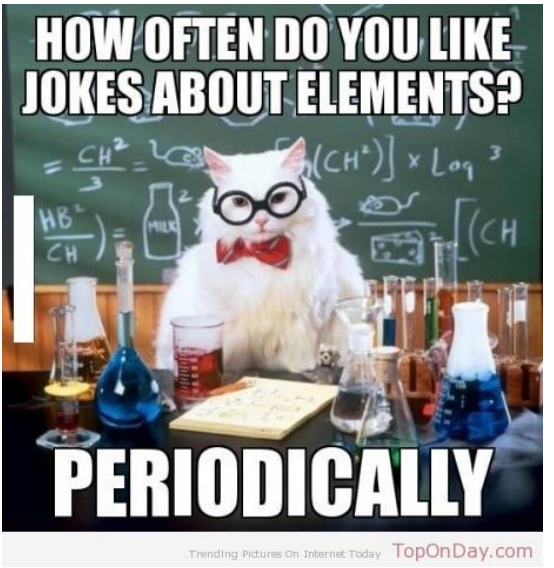
Intro to Chemistry (Scientific Method and Metrics)



Name_____

Test Date_____

Vocabulary to know

Terms	Definition
hypothesis	
control	
variable	
accuracy	
Precision	
Independent variable	
Dependent variable	
Qualitative	
Quantitative	
Observation	
Model	
Theory	
Law	

What is Chemistry?_____

_____

_____

Branches of Chemistry:

*	*
*	*
*	*

The Scientific Method is_____

List the steps:

1)
2)
3)
4)
5)
6)
7)

Hypothesis:

You write a hypothesis as an _____/_____ statement

Variable:

Independent Variable:
Ex:

Dependent Variable:
Ex:

Experiment Example

Hypothesis:

Independent Variable:

Dependent Variable:

Control:

Collecting Data

Quantitative:
Ex:

Qualitative:
Ex:

Observation:
Ex:

Inference:
Ex:

Model:
Ex:

Theory:

Ex:

Law:
Ex:

The International System (SI)

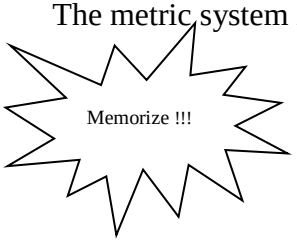
Why is it used?

Term	Unit Name	Symbol
Length		
	Kilogram	
		s
	Kelvin	
Amount		

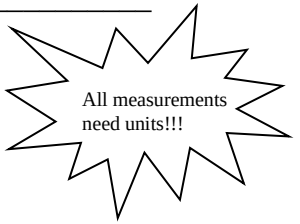
Derived Units
Definition:
Examples:

The Metric System:

The metric system is based on a factor of _____



Metric Prefixes



Prefix	Symbol	Exponent with no negative values
mega-	M	10^6 base = 1 mega
kilo-	k	1000 base = 1 kilo
hecto-	h	100 base = 1 hecto
deka-	D (dk)	10 base = 1 deka
Base	Meter, gram, second, liter	
deci-	d	1 base = 10 deci
centi-	c	1 base = 100 centi
milli-	m	1 base = 1000 milli
micro-	µ	1 base = 10^6 micro
nano-	n	1 base = 10^9 nano
pico-	p	1 base = 10^{12} pico

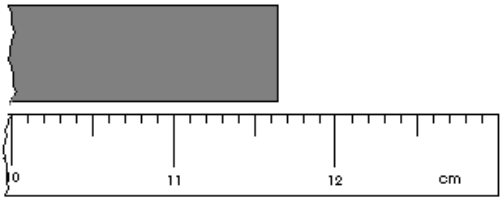
Measurement and Estimated Digits:

Measurement:

Estimated digits:

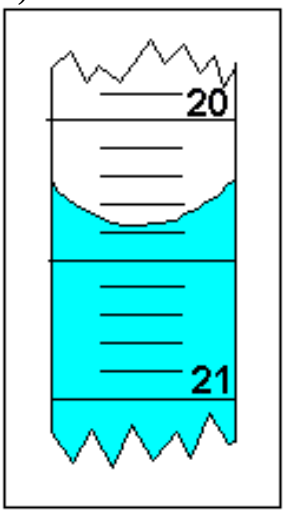
Example:

1) Measure this to the correct digits. Be sure to include units



Answer_____

2) Measure this to the correct digits. Assume these units are mL.



Answer_____

Accuracy versus Precision

Accuracy:

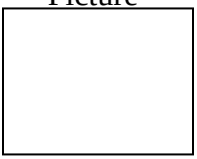
Definition

Picture

Precision:

Definition

Picture



Student	Trial 1	Trial 2	Trial 3	Average
A	1.78 g	2.25 g	10.5 g	4.71 g
B	4.75 g	4.74g	4.75g	4.75 g
C	7.73 g	7.72g	7.73 g	7.73 g

True Value: 4.73 g

Using the table above describe the accuracy and precision of each of the students.

_____

_____

_____

Scientific Notation

Why:

How:

Try It:

Write the following in scientific notation

5, 600, 000 m

0.000789 nL

3,700 sec

Write the following in standard notation

9.12 x 10-3 cg

5.6×10^{9} m

2.2×10^{2} sec

Graphing

Types of graphs:
1)
2)
3)

Most Commonly Used in Chemistry:

Parts of a graph that are SUPER important:

Direct Relationship
Definition:
Example:
Picture:

Inverse Relationship:
Definition:
Example:
Picture:

Dimensional Analysis:
What is it?

Try It:

1)

2)

3)

Volume and Density

Volume:
Definition:
Units of measurement:

Density:
Definition:
Units of Measurement:

The density of water is _____

Try It:

1) If a sample of aluminum has a volume of 5.0 cm^3 and a mass of 13.5 g. Find the density.
   Formula: _____
   Work:

Answer with units_____

2) Find the mass of a sample of copper with a volume of 6.2 cm^3.
Formula: _____
Work:

Answer with units_____

3) A student observes the reading of a graduated cylinder to be 7.3 mL. After dropping irregularly shaped solid object with a mass of 2.5 grams into the cylinder the volume rises to 12.9 mL. What is the density of the object?
Formula:_____
Work:

Answer with units_____

%Error Formula:

$$\frac{|Measured - Actual|}{Actual} \times 100$$

What is Jake's percent error, if he measured 6.8 mL during his experiment and the actual measurement was supposed to be 7.2 mL?