Honors Chemistry 1

What you should know…

THIS IS NOT ACTUALLY AN ASSIGNEMNT*, but within the first week of school, you will be given your first test for honors chemistry that will cover prior chemistry knowledge you have learned in middle school, physics, and last year in biology. This test will be for a grade and all this material will not be covered in class. You will be responsible for reviewing all of this on your own. Use the practice worksheets as well as other resources on the internet (such as Kahn Academy) to help you as your review this information.*

HAVE A GREAT SUMMER AND I'M LOOKING FORWARD TO A GREAT YEAR NEXT YEAR!

Mrs. Jorgensen – cynthia.jorgensen@cscslions.org

Math Skills

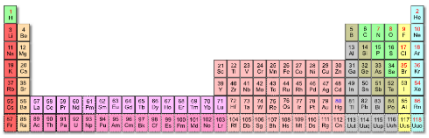
- Know how to use your calculator the right way
  - Most of you will have your TI-nspire calculators and that's great, but a scientific calculator will work great too. Consider getting a second calculator as a backup. Scientific calculators are about $15 at Target or Walmart.
    - YOU NEED TO HAVE A WORKING, CHARGED CALCULATOR **EVERY DAY**!!!
  - Be aware of how your calculator handles order of operations and when you need to include parentheses.
  - Know how to do scientific notation on your calculator.
    - For most of you, this is done with the "EE" button. You may experience a lot of calculator mistakes if you try to put in "$\times 10^{\text{a power}}$". I suggest getting out of that habit.
- Basic Algebra skill
  - Know how to manipulate an equation to solve for a variable
- Know how to round properly
- Know how to calculate a percent
- Fractions
  - Know how to add/subtract and multiple/divide fractions
  - Convert between a faction and decimal and percent
- Graphing skill
  - Know the difference between circle, bar, and line graphs and what each are used for
  - Be able to find the line of best fit, linear and nonlinear relationships, and slopes
  - Be prepared to interpret a graph and to use a set of data and graph in the appropriate type
- Scientific Notation
  - Scientific notation is used to represent really big or really small numbers
  - Be able to convert numbers from standard notation to scientific notation and vice versa without a calculator
  - Correctly calculate scientific notation problems with your calculator (DO NOT TYPE IN ×10 IN YOUR CALCULATOR, use EE or the equivalent)
  - See "Scientific Notation" for practice

The Metric System

- Know the difference between the English system and the Metric system of measurement
- Know the different units for the metric system and their abbreviations
- Know that the metric system is based on the power of 10 and how to convert between different measurements
- See "The Metric System" and "Metric Number Puzzle" for practice

The Periodic Table

- Know the basic organization of the periodic table
    - Where the metals, nonmetals, metalloids, line of separation are located
    - What the main families/groups of elements are: Transition metals, alkali metals, alkaline earth metals, halogens, noble gasses
    - Know that the lanthanide and actinide series have been removed to only allow for the periodic table to fit on a page better. It should look like this →



- Be able to find the name, symbol, atomic number, and atomic mass for each element
- See "The Periodic Table" for practice

The Atom

- The structure of the atom
    - Protons – positively charged, located in the nucleus, and has a mass of 1 amu
        - Protons are what make an element that element; atomic number = # protons
    - Neutrons – no charge, located in the nucleus, and has a mass of about 1 amu
        - # neutrons = Mass – atomic number
    - Electrons – negatively charged, located around the nucleus, has no mass (2,000 times less than a proton)
        - In a neutral atom, # electrons = # protons = atomic number
        - Located in energy levels around the nucleus – Bohr Model
        - See "Bohr Models" for more practice

Scientific Notation Practice

Convert the following numbers to Standard Scientific Notation.

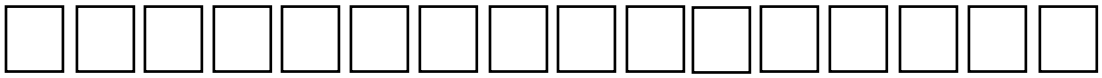
1) 0.0023 _____
2) 471000 _____
3) 0.0124 _____
4) 0.000000000004 _____
5) 1374000000 _____
6) 2515000 _____
7) 0.0000010032 _____
8) 201400000000000 _____

Convert the following from Standard Scientific Notation to numerical form.

9) 1.37×10^{7} _____
10) 2.01×10^{-4} _____
11) 7.90×10^{-13} _____
12) 4.320×10^{6} _____
13) 3.002×10^{-7} _____
14) 4.98×10^{1} _____

Write down what you would put into your calculator to solve the following problems. **DO NOT SOLVE!**

15) $4.35\times10^{-7} + 1.002\times10^{-8}$



16) $7.002\times10^{5} + 1.3\times10^{3}$

17) $\dfrac{2.9\times10^{6}}{7.0\times10^{2} \bullet 1.2\times10^{-3}}$

Solve the following problems dealing with scientific notation. Put all your answers in <u>scientific notation</u> (with the ×10 not E in your written answer).

18) $9.3\times10^{-13} \div 3.1\times10^{4} =$

19) $1.002\times10^{2} - 7.10\times10^{3} =$

20) $8.00\times10^{7} \bullet 1.11\times10^{-5} =$

21) $4.21\times10^{12} \div 1.00\times10^{-4} =$

22) $3.0\times10^{32} - 4.51\times10^{29} =$

23) $\dfrac{5.36\times10^{-1} - 7.40\times10^{-2}}{3.5\times10^{-3}} =$

24) $\dfrac{9.2\times10^{4}}{2.9 + 8.3\times10^{4}} =$

25) $6578.4 + 3.8\times10^{-1} \bullet 0.087 - 3.21\times10^{12} =$

The Metric System

1. Why is a good idea to have a standard for units?

2. What are the two most widely used standard systems of units and where are they used?

3. What was set up in 1960 for scientific measurement? What is it called?

4. Complete the table for some of the fundamental SI units.

Physical Quantity	**Name of Unit**	**Abbreviation**
Mass		
Length		
Time		
Temperature		

5. The metric system is based on the power of tens which uses scientific notation when converting the fundamental units to more convenient sizes by using prefixes. Fill in the following table based on the metric system prefixes.

Prefix	**Symbol**	**Meaning**	**Scientific Notation**
Giga	G	1,000,000,000	10^9
	M		
		1,000	
Hecto	h		10^2
Deca	dK or da	10	
Base Unit	*No prefix*		10^0
Deci			
	c		
		0.001	
			10^{-6}
Nano			

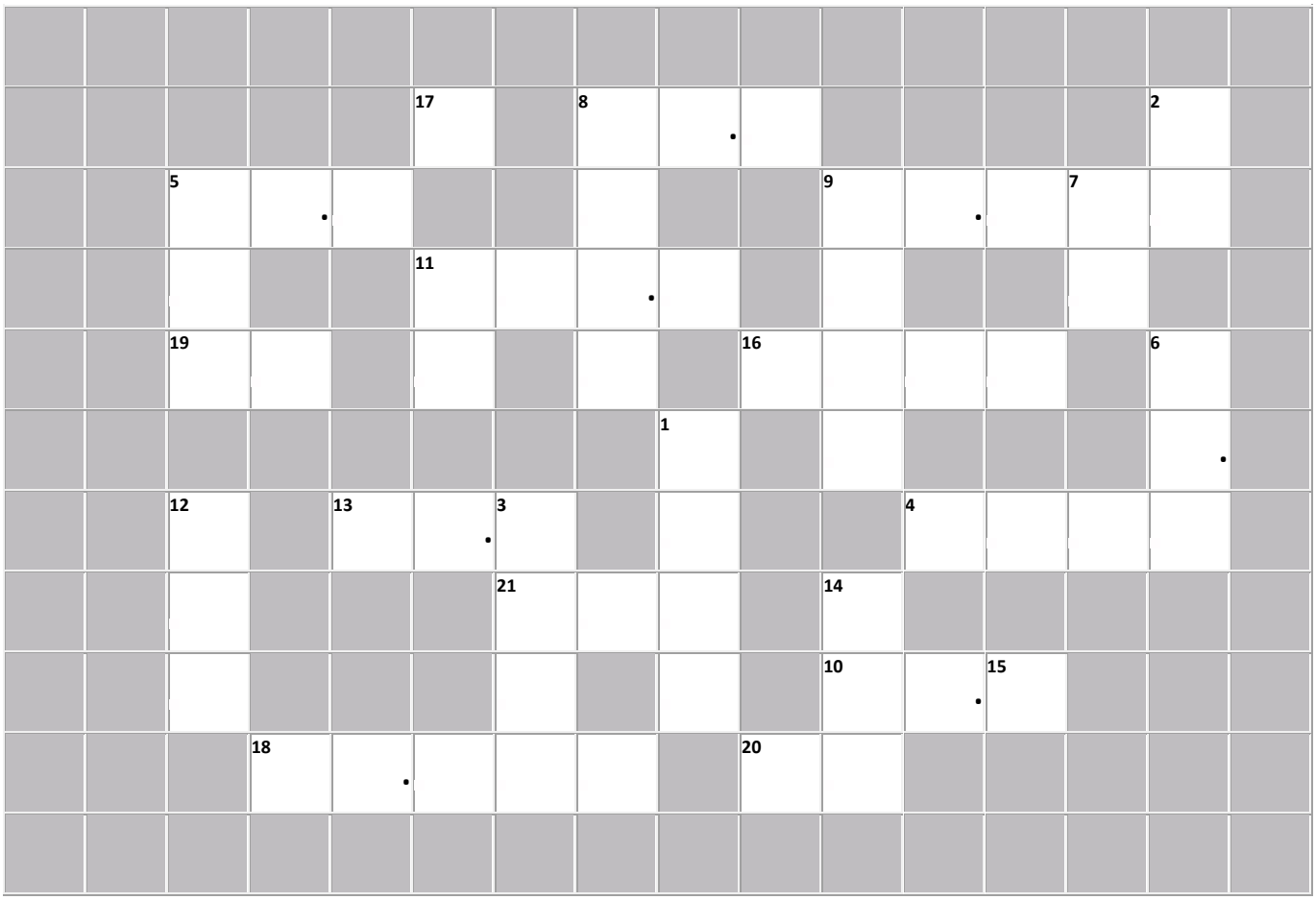
6. Try converting the following measurements based upon the metric system.

   783 dekagrams = _____ megagrams 0.736 centiliters = _____ nanoliters

   14 kilometers = _____ meters 109 grams = _____ kilograms

   250 meters = _____ kilometers 5.6 gigaliters = _____ liters

Metric Number Puzzle



Down

1. 7.4 km = _____ m
2. 6.9 cg = _____ mg
3. 8.7 kl = _____ L
4. 8000 g = _____ kg
5. 10.5 cm = _____ mm
6. 5300 ml = _____ L
7. 12000 mg = _____ g
8. 12100 mg = _____ g
9. 2.2 kl = _____ L
10. 4 cg = _____ mg
11. 11000 L = _____ kl
12. 6 L = _____ cl
13. 30 ml = _____ cl
14. 5.4 L = _____ cl
15. 5000 g = _____ kg

Across

1. 70 mm = _____ cm
2. 60 ml = _____ cl
4. 8.043 kg = _____ g
5. 1600 L = _____ kl
8. 1100 ml = _____ L
9. 2419 mg = _____ g
10. 4500 mm = _____ m
11. 1060 cl = _____ L
13. 38 mm = _____ cm
16. 1 kg = _____ g
17. 20 mm = _____ cm
18. 3505 L = _____ kl
19. 5.6 cg = _____ mg
20. 3 cl = _____ ml
21. 7 m = _____ cm

The Periodic Table

Use colored pencils to color in the periodic table.

1. The following elements are metalloids: B, Si, Ge, As, Sb, Te, and Po. Color them and be sure to color the key.
2. The elements in *periods (rows)* 2 through 7 that are to the left of the zigzagged line of separation are metals. Chose a color to outline (don't color!) the metals (don't forget the key).
3. The elements in *periods* 1 through 6 that are to the right of the zigzagged line of separation are nonmetals. Chose a color to outline (don't color!) the nonmetals (don't forget the key). Don't forget hydrogen…it's a little out of place.
4. Label the line of separation. This is the staircase line that starts between Boron and Aluminum and goes down the middle of the metalloids, finishing between Polonium and Astaine.
5. The alkali metals are in *group (column)* 1. They have only one electron in their outer shell. They are VERY reactive and have a low melting point. Color the alkali metals (don't forget the key).
6. Alkaline earth metals are located in *group* 2. They have 2 electrons in their outer energy level. Color the alkaline earth metals (don't forget the key).
7. The noble gases are found in *group* 18. Their outer energy level is filled, and they are very non-reactive, colorless gases. Color the noble gases (don't forget the key).
8. Halogens have seven electrons in their outer shell. They are located in *group* 17 on the periodic table. Halogens react with metals to form salts. Color the halogens (don't forget the key).
9. The transition elements are found in groups 3 through 12 and periods 4 through 7. These elements have either one or two electrons in the outer energy level. They are often used to form alloys because they are hard and have high melting points. Color the transition metals (don't forget the key).
10. Below the main part of the table are two rows of elements. These elements are part of the transition metal section. The top row is called the Lanthanide Series and the bottom section is called the Actinide Series. Label each series and color these rows using the same color you use for the transition metals.

Answer these five questions based upon your periodic table.

1. What is a metalloid? (*Hint: notice where they are located on the Periodic Table*)

2. List 5 metals.

3. List 5 nonmetals.

4. What does the line of separation separate?

5. Where do the names Lanthanide and Actinide come from? (*hint: take a look at your periodic table and take note of the names of elements*)

The Periodic Table of the Elements

	G 1	G 2	G 3	G 4	G 5	G 6	G 7	G 8	G 9	G 10	G 11	G 12	G 13	G 14	G 15	G 16	G 17	G 18
P 1	1 **H** Hydrogen 1.00794																	2 **He** Helium 4.003
P 2	3 **Li** Lithium 6.941	4 **Be** Beryllium 9.012182											5 **B** Boron 10.811	6 **C** Carbon 12.0107	7 **N** Nitrogen 14.00674	8 **O** Oxygen 15.9994	9 **F** Fluorine 18.9984032	10 **Ne** Neon 20.1797
P 3	11 **Na** Sodium 22.989770	12 **Mg** Magnesium 24.3050											13 **Al** Aluminum 26.981538	14 **Si** Silicon 28.0855	15 **P** Phosphorus 30.973761	16 **S** Sulfur 32.066	17 **Cl** Chlorine 35.4527	18 **Ar** Argon 39.948
P 4	19 **K** Potassium 39.0983	20 **Ca** Calcium 40.078	21 **Sc** Scandium 44.955910	22 **Ti** Titanium 47.867	23 **V** Vanadium 50.9415	24 **Cr** Chromium 51.9961	25 **Mn** Manganese 54.938049	26 **Fe** Iron 55.845	27 **Co** Cobalt 58.933200	28 **Ni** Nickel 58.6934	29 **Cu** Copper 63.546	30 **Zn** Zinc 65.39	31 **Ga** Gallium 69.723	32 **Ge** Germanium 72.61	33 **As** Arsenic 74.92160	34 **Se** Selenium 78.96	35 **Br** Bromine 79.904	36 **Kr** Krypton 83.80
P 5	37 **Rb** Rubidium 85.4678	38 **Sr** Strontium 87.62	39 **Y** Yttrium 88.90585	40 **Zr** Zirconium 91.224	41 **Nb** Niobium 92.90638	42 **Mo** Molybdenum 95.94	43 **Tc** Technetium (98)	44 **Ru** Ruthenium 101.07	45 **Rh** Rhodium 102.90550	46 **Pd** Palladium 106.42	47 **Ag** Silver 107.8682	48 **Cd** Cadmium 112.411	49 **In** Indium 114.818	50 **Sn** Tin 118.710	51 **Sb** Antimony 121.760	52 **Te** Tellurium 127.60	53 **I** Iodine 126.90447	54 **Xe** Xenon 131.29
P 6	55 **Cs** Cesium 132.90545	56 **Ba** Barium 137.327	71 **Lu** Lutetium 174.967	72 **Hf** Hafnium 178.49	73 **Ta** Tantalum 180.9479	74 **W** Tungsten 183.84	75 **Re** Rhenium 186.207	76 **Os** Osmium 190.23	77 **Ir** Iridium 192.217	78 **Pt** Platinum 195.078	79 **Au** Gold 196.96655	80 **Hg** Mercury 200.59	81 **Tl** Thallium 204.3833	82 **Pb** Lead 207.2	83 **Bi** Bismuth 208.98038	84 **Po** Polonium (209)	85 **At** Astatine (210)	86 **Rn** Radon (222)
P 7	87 **Fr** Francium (223)	88 **Ra** Radium (226)	103 **Lr** Lawrencium (262)	104 **Rf** Rutherfordium (261)	105 **Db** Dubnium (262)	106 **Sg** Seaborgium (263)	107 **Bh** Bohrium (262)	108 **Hs** Hassium (265)	109 **Mt** Meitnerium (266)	110 (269)	111 (272)	112 (277)	113	114				

	57 **La** Lanthanum 138.9055	58 **Ce** Cerium 140.116	59 **Pr** Praseodymium 140.90765	60 **Nd** Neodymium 144.24	61 **Pm** Promethium (145)	62 **Sm** Samarium 150.36	63 **Eu** Europium 151.964	64 **Gd** Gadolinium 157.25	65 **Tb** Terbium 158.92534	66 **Dy** Dysprosium 162.50	67 **Ho** Holmium 164.93032	68 **Er** Erbium 167.26	69 **Tm** Thulium 168.93421	70 **Yb** Ytterbium 173.04
	89 **Ac** Actinium (227)	90 **Th** Thorium 232.0381	91 **Pa** Protactinium 231.03588	92 **U** Uranium 238.0289	93 **Np** Neptunium (237)	94 **Pu** Plutonium (244)	95 **Am** Americium (243)	96 **Cm** Curium (247)	97 **Bk** Berkelium (247)	98 **Cf** Californium (251)	99 **Es** Einsteinium (252)	100 **Fm** Fermium (257)	101 **Md** Mendelevium (258)	102 **No** Nobelium (259)

- ☐ Metal
- ☐ Nonmetal
- ☐ Metalloids
- ☐ Transition Metals
- ☐ Alkali Metals
- ☐ Alkaline Earth Metals
- ☐ Halogens
- ☐ Nobel Gases

Bohr Models

Draw Bohr Models for the following elements.

1. Hydrogen
2. Fluorine
3. Phosphorus
4. Argon
5. Lithium
6. Selenium
7. Titanium
8. Arsenic
9. Silver
10. Mercury

Answers

Name: Key
Block: ____ Date: _____

Scientific Notation Practice

Convert the following numbers to Standard Scientific Notation.

1) 0.0023 — 2.3×10^{-3}
2) 471000 — 4.71×10^{5}
3) 0.0124 — 1.24×10^{-2}
4) 0.000000000004 — 4×10^{-12}
5) 1374000000 — 1.374×10^{9}
6) 2515000 — 2.515×10^{6}
7) 0.0000010032 — 1.0032×10^{-6}
8) 201400000000000 — 2.014×10^{14}

Convert the following from Standard Scientific Notation to numerical form.

9) 1.37×10^{7} — 13700000
10) 2.01×10^{-4} — 0.000201
11) 7.90×10^{-13} — 0.00000000000790
12) 4.320×10^{6} — 4320000
13) 3.002×10^{-7} — 0.0000003002
14) 4.98×10^{1} — 49.8

Write down what you would put into your calculator to solve the following problems. **DO NOT SOLVE!**

15) $4.35\times10^{-7} + 1.002\times10^{-8}$

4 . 3 5 EE − 7 + 1 . 0 0 2 EE − 8 Enter/=

16) $7.002\times10^{5} + 1.3\times10^{3}$

7.002 EE 5 + 1.3 EE 3 Enter/=

17) $\dfrac{2.9\times10^{6}}{7.0\times10^{2} \bullet 1.2\times10^{-3}}$

2.9 EE 6 ÷ (7.0 EE 2 × 1.2 EE − 3) Enter/=

Solve the following problems dealing with scientific notation. Put all your answers in scientific notation (with the ×10 not E in your written answer).

18) $9.3\times10^{-13} \div 3.1\times10^{4} =$ 3×10^{-17}
19) $1.002\times10^{2} - 7.10\times10^{3} =$ −6999.8 -6.9998×10^{3}
20) $8.00\times10^{7} \bullet 1.11\times10^{-5} =$ 888 8.88×10^{2}
21) $4.21\times10^{12} \div 1.00\times10^{-4} =$ 4.21×10^{16}
22) $3.0\times10^{32} - 4.51\times10^{29} =$ 2.99549×10^{32}
23) $\dfrac{5.36\times10^{-1} - 7.40\times10^{-2}}{3.5\times10^{-3}} =$ 132 1.32×10^{2}
24) $\dfrac{9.2\times10^{4}}{2.9 + 8.3\times10^{4}} =$ 1.1094×10^{0} (rounded)
25) $6578.4 + 3.8\times10^{-1} \bullet 0.087 - 3.21\times10^{12} =$ -3.21×10^{12} (rounded)

Name: Key
Block: ____ Date: _____

The Metric System

1. Why is a good idea to have a standard for units?
   So there is a common way to measure and compare things with other people.
2. What are the two most widely used standard systems of units and where are they used?
   English system - United States
   Metric system - the rest of the world
3. What was set up in 1960 for scientific measurement? What is it called?
   International System (le Systeme Internationale)
   SI units
4. Complete the table for some of the fundamental SI units.

Physical Quantity	Name of Unit	Abbreviation
Mass	Kilograms	kg
Length	meter	m
Time	seconds	s
Temperature	Kelvin	K

5. The metric system is based on the power of tens which uses scientific notation when converting the fundamental units to more convenient sizes by using prefixes. Fill in the following table based on the metric system prefixes.

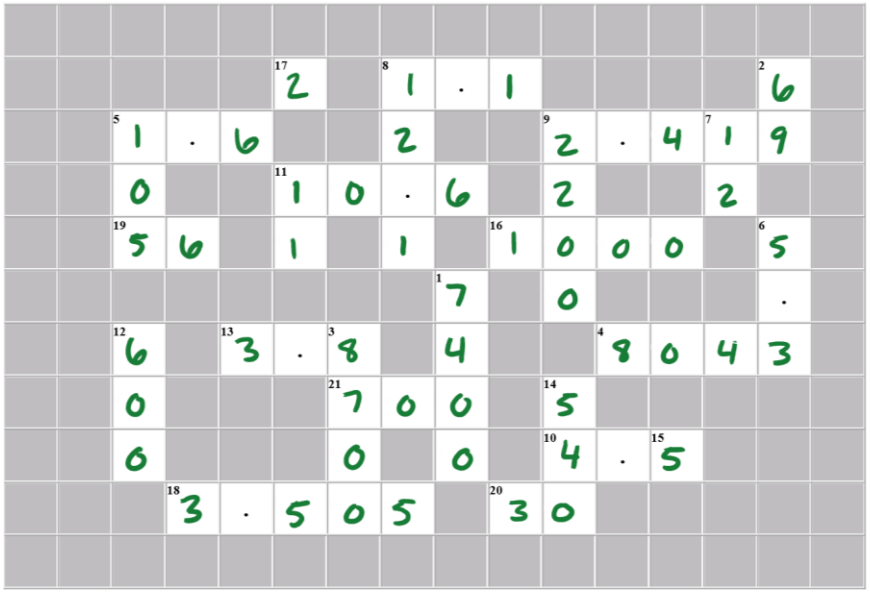
Prefix	Symbol	Meaning	Scientific Notation
Giga	G	1,000,000,000	10^{9}
Mega	M	1,000,000	10^{6}
Kilo	k	1,000	10^{3}
Hecto	h	100	10^{2}
Deca	dK or da	10	10^{1}
Base Unit	*No prefix*	1	10^{0}
Deci	d	0.1	10^{-1}
Centi	c	0.01	10^{-2}
Milli	m	0.001	10^{-3}
Micro	μ	0.000001	10^{-6}
Nano	n	0.000000001	10^{-9}

6. Try converting the following measurements based upon the metric system.

783 dekagrams = 7.830 megagrams
14 kilometers = 14,000 meters
250 meters = 0.250 kilometers
0.736 centiliters = 0.0000000736 nanoliters
109 grams = 0.109 kilograms
5.6 gigaliters = 5600000000 liters

Name: Key
Per: _____ Date: _____

Metric Number Puzzle



Down

1. 7.4 km = _____ m
2. 6.9 cg = _____ mg
3. 8.7 kl = _____ L
4. 8000 g = _____ kg
5. 10.5 cm = _____ mm
6. 5300 ml = _____ L
7. 12000 mg = _____ g
8. 12100 mg = _____ g
9. 2.2 kl = _____ L
10. 4 cg = _____ mg
11. 11000 L = _____ kl
12. 6 L = _____ cl
13. 30 ml = _____ cl
14. 5.4 L = _____ cl
15. 5000 g = _____ kg

Across

1. 70 mm = _____ cm
2. 60 ml = _____ cl
4. 8.043 kg = _____ g
5. 1600 L = _____ kl
8. 1100 ml = _____ L
9. 2419 mg = _____ g
10. 4500 mm = _____ m
11. 1060 cl = _____ L
13. 38 mm = _____ cm
16. 1 kg = _____ g
17. 20 mm = _____ cm
18. 3505 L = _____ kl
19. 5.6 cg = _____ mg
20. 3 cl = _____ ml
21. 7 m = _____ cm

The Periodic Table

Use colored pencils to color in the periodic table.

1. The following elements are metalloids: B, Si, Ge, As, Sb, Te, and Po. Color them and be sure to color the key.
2. The elements in *periods (rows)* 2 through 7 that are to the left of the zigzagged line of separation are metals. Chose a color to outline (don't color!) the metals (don't forget the key).
3. The elements in *periods* 1 through 6 that are to the right of the zigzagged line of separation are nonmetals. Chose a color to outline (don't color!) the nonmetals (don't forget the key). Don't forget hydrogen...it's a little out of place.
4. Label the line of separation. This is the staircase line that starts between Boron and Aluminum and goes down the middle of the metalloids, finishing between Polonium and Astaine.
5. The alkali metals are in *group (column)* 1. They have only one electron in their outer shell. They are VERY reactive and have a low melting point. Color the alkali metals (don't forget the key).
6. Alkaline earth metals are located in *group* 2. They have 2 electrons in their outer energy level. Color the alkaline earth metals (don't forget the key).
7. The noble gases are found in *group* 18. Their outer energy level is filled, and they are very non-reactive, colorless gases. Color the noble gases (don't forget the key).
8. Halogens have seven electrons in their outer shell. They are located in *group* 17 on the periodic table. Halogens react with metals to form salts. Color the halogens (don't forget the key).
9. The transition elements are found in groups 3 through 12 and periods 4 through 7. These elements have either one or two electrons in the outer energy level. They are often used to form alloys because they are hard and have high melting points. Color the transition metals (don't forget the key).
10. Below the main part of the table are two rows of elements. These elements are part of the transition metal section. The top row is called the Lanthanide Series and the bottom section is called the Actinide Series. Label each series and color these rows using the same color you use for the transition metals.

Answer these five questions based upon your periodic table.

1. What is a metalloid? (*Hint: notice where they are located on the Periodic Table*)
   An element that has properties of both metals and nonmetals
2. List 5 metals.
   Answers will vary - elements from left side of periodic table
3. List 5 nonmetals.
   Answers will vary - elements from right side of periodic table
4. What does the line of separation separate?
   The metals from the nonmetals
5. Where do the names Lanthanide and Actinide come from? (*hint: take a look at your periodic table and take note of the names of elements*)
   They are the first elements of the bottom two rows of the periodic table that have been removed to help the table fit on paper better.

The Periodic Table of the Elements

Legend: Metal; Nonmetal; Metalloids; Transition Metals; Alkali Metals; Alkaline Earth Metals; Halogens; Nobel Gases

Line of Separation

	G 1	G 2	G 3	G 4	G 5	G 6	G 7	G 8	G 9	G 10	G 11	G 12	G 13	G 14	G 15	G 16	G 17	G 18
P 1	1 H Hydrogen 1.00794																	2 He Helium 4.003
P 2	3 Li Lithium 6.941	4 Be Beryllium 9.012182											5 B Boron 10.811	6 C Carbon 12.0107	7 N Nitrogen 14.00674	8 O Oxygen 15.9994	9 F Fluorine 18.9984032	10 Ne Neon 20.1797
P 3	11 Na Sodium 22.989770	12 Mg Magnesium 24.3050											13 Al Aluminum 26.981538	14 Si Silicon 28.0855	15 P Phosphorus 30.973761	16 S Sulfur 32.066	17 Cl Chlorine 35.4527	18 Ar Argon 39.948
P 4	19 K Potassium 39.0983	20 Ca Calcium 40.078	21 Sc Scandium 44.955910	22 Ti Titanium 47.867	23 V Vanadium 50.9415	24 Cr Chromium 51.9961	25 Mn Manganese 54.938049	26 Fe Iron 55.845	27 Co Cobalt 58.933200	28 Ni Nickel 58.6934	29 Cu Copper 63.546	30 Zn Zinc 65.39	31 Ga Gallium 69.723	32 Ge Germanium 72.61	33 As Arsenic 74.92160	34 Se Selenium 78.96	35 Br Bromine 79.904	36 Kr Krypton 83.80
P 5	37 Rb Rubidium 85.4678	38 Sr Strontium 87.62	39 Y Yttrium 88.90585	40 Zr Zirconium 91.224	41 Nb Niobium 92.90638	42 Mo Molybdenum 95.94	43 Tc Technetium (98)	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.90550	46 Pd Palladium 106.42	47 Ag Silver 107.8682	48 Cd Cadmium 112.411	49 In Indium 114.818	50 Sn Tin 118.710	51 Sb Antimony 121.760	52 Te Tellurium 127.60	53 I Iodine 126.90447	54 Xe Xenon 131.29
P 6	55 Cs Cesium 132.90545	56 Ba Barium 137.327	71 Lu Lutetium 174.967	72 Hf Hafnium 178.49	73 Ta Tantalum 180.9479	74 W Tungsten 183.84	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.217	78 Pt Platinum 195.078	79 Au Gold 196.96655	80 Hg Mercury 200.59	81 Tl Thallium 204.3833	82 Pb Lead 207.2	83 Bi Bismuth 208.98038	84 Po Polonium (209)	85 At Astatine (210)	86 Rn Radon (222)
P 7	87 Fr Francium (223)	88 Ra Radium (226)	103 Lr Lawrencium (262)	104 Rf Rutherfordium (261)	105 Db Dubnium (262)	106 Sg Seaborgium (263)	107 Bh Bohrium (262)	108 Hs Hassium (265)	109 Mt Meitnerium (266)	110 (269)	111 (272)	112 (277)	113	114				

Lanthanide Series	57 La Lanthanum 138.9055	58 Ce Cerium 140.116	59 Pr Praseodymium 140.90765	60 Nd Neodymium 144.24	61 Pm Promethium (145)	62 Sm Samarium 150.36	63 Eu Europium 151.964	64 Gd Gadolinium 157.25	65 Tb Terbium 158.92534	66 Dy Dysprosium 162.50	67 Ho Holmium 164.93032	68 Er Erbium 167.26	69 Tm Thulium 168.93421	70 Yb Ytterbium 173.04
Actinide Series	89 Ac Actinium (227)	90 Th Thorium 232.0381	91 Pa Protactinium 231.03588	92 U Uranium 238.0289	93 Np Neptunium (237)	94 Pu Plutonium (244)	95 Am Americium (243)	96 Cm Curium (247)	97 Bk Berkelium (247)	98 Cf Californium (251)	99 Es Einsteinium (252)	100 Fm Fermium (257)	101 Md Mendelevium (258)	102 No Nobelium (259)

Name: Key

Block: Date:

Bohr Models

Draw Bohr Models for the following elements.

1. Hydrogen
2. Fluorine
3. Phosphorus
4. Argon
5. Lithium
6. Selenium
7. Titanium
8. Arsenic
9. Silver
10. Mercury