Honors Chemistry – Summer Assignment

1. Memorize the 50 common elements (Name and symbol).
2. Memorize the 17 common polyatomic ions (Name, formula, and charge).
3. Metric System Review WS
4. Temperature Conversions Review WS
5. Scientific Notation Review WS

The best way to learn the elements and ions is to make flash cards. You will have a quiz over the elements the second day of class and a quiz over the polyatomic ions the second week of class. The review worksheets will be due on August 7, 2015. The review topics will be on the first test.

50 Common Elements

1. Helium …… He
2. Lithium ……. Li
3. Hydrogen …… H
4. Sodium (Natrium)…… Na
5. Boron ……. B
6. Carbon ……. C
7. Silicon …… Si
8. Calcium (Lime) ……. Ca
9. Beryllium …… Be
10. Fluorine …… F
11. Neon …… Ne
12. Sulfur (Brimstone)… S
13. Phosphorus …… P
14. Nitrogen …… N
15. Aluminum …… Al
16. Potassium (Kalium) … K
17. Chlorine ……. Cl
18. Argon …… Ar
19. Magnesium …… Mg
20. Iron (Ferrum) …… Fe
21. Bromine …… Br
22. Oxygen …… O
23. Manganese …… Mn
24. Copper (Cuprum)…… Cu
25. Cobalt …… Co
26. Nickel …… Ni
27. Chromium …… Cr
28. Lead (Plumbum)…… Pb
29. Zinc …… Zn
30. Krypton …… Kr
31. Rubidium …… Rb
32. Silver (Argentum)… Ag
33. Iodine …… I
34. Platinum …… Pt
35. Cadmium …… Cd
36. Tin (Stannum) …… Sn
37. Cesium …… Cs
38. Barium …… Ba
39. Francium …… Fr
40. Antimony (Stibium) Sb
41. Bismuth …… Bi
42. Arsenic …… As
43. Strontium …… Sr
44. Tungsten (Wolfram) W
45. Radon …… Rn
46. Xenon …… Xe
47. Gold (Aurum) …… Au
48. Radium …… Ra
49. Uranium …… U
50. Mercury (Hydrargyrum) … Hg

Polyatomic Ions

Polyatomic Ion Charge = +1

ammonium - NH_4^+

Polyatomic Ion Charge = -1

acetate - $C_2H_3O_2^-$
bicarbonate (or hydrogen carbonate) - HCO_3^-
bisulfate (or hydrogen sulfate) - HSO_4^-
chlorate - ClO_3^-
cyanide - CN^-
hydroxide - OH^-
nitrate - NO_3^-
nitrite - NO_2^-

permanganate - MnO_4^-

Polyatomic Ion Charge = -2

carbonate - CO_3^{2-}
chromate - CrO_4^{2-}
dichromate - $Cr_2O_7^{2-}$
sulfate - SO_4^{2-}
sulfite - SO_3^{2-}
oxalate – $C_2O_4^{2-}$

Polyatomic Ion Charge = -3

phosphate - PO_4^{3-}

Metric system

Conversion tables and symbols.

Size:	1000	=	100	=	10	=	**1**	=	.1	=	.01	=	.001
Prefix:	kilo	-	hecto	-	deka	–	**gram-**		deci	-	centi	-	milli
Symbol	(kg)		(hg)		(dag)		**(g)**		(dg)		(cg)		(mg)
							(m)						
							(L)						

Method:

1) Put an **X on the unit given** in the problem.
2) Draw an **arrow to the needed unit.**
3) Count the number of places and the direction you went.
4) Move the decimal the same number of places and the same direction.

Example: How many meters are in 247**.** centimeters?
Given: 247 cm = _____ m

k h da Base d c m
<– <– X 2 places to the left, remember meter is a base unit
247 cm = **2.47** m

Practice: Convert the following:

1. 1 cm=_____m
2. 1 cm=_____mm
3. 1 cm=_____km
4. 5.2 km=_____m
5. 100 ml=_____L
6. 100 m=_____cm
7. 300 ml=_____L
8. 80 kg=_____g
9. 12 mm=_____m
10. 35 cm=_____mm
11. 0.15 L=_____ml
12. 35.7 mg=_____g
13. 56 ml=_____L
14. 0.006 km=_____mm
15. 3501 cm=_____km
16. 1500 µm=_____mm
17. 1.6 mm=_____dm
18. 2.0 mm=_____cm
19. 1.7 cm=_____mm
20. 100 cm=_____ km

Temperature Conversions Worksheet

Use the following formula: 5F = 9C + 160

Convert the following Fahrenheit temperatures to Celsius:

1. 2200ºF (ceramic kiln)
2. 650ºF (Brick pizza oven)
3. 98.6ºF (normal body temperature)
4. 451ºF (book paper burns)
5. -18ºF (Freon refrigerant in ice rink)
6. 134ºF (record high in Death Valley)

Convert the following Celsius temperatures to Fahrenheit:

7. -27ºC (January in Yellowknife, NT)
8. -196ºC (boiling point of Nitrogen)
9. 961.78ºC (melting point of silver)
10. 15ºC (suntanning in Montreal)
11. 200ºC (antifreeze boils)
12. -273ºC (absolute zero)

Use the following formula: K = C + 273

Convert to Kelvins or Celsius:

13. 250 K
14. 25ºC
15. -15ºC
16. 375 K
17. 200ºC
18. 278 K

Converting from "Normal" to Scientific Notation

Place the decimal point after the first non-zero digit, and count the number of places the decimal point has moved. If the decimal place has moved to the *left* then multiply by a positive power of 10; to the right will result in a negative power of 10.

> *Example:* To write 3040 in scientific notation we must move the decimal point 3 places to the left, so it becomes 3.04×10^{3}.
>
> *Example:* To write 0.00012 in scientific notation we must move the decimal point 4 places to the right: 1.2×10^{-4}.

Converting from Scientific Notation to "Normal"

If the power of 10 is positive, then move the decimal point to the right; if it is negative, then move it to the left.

> *Example:* Convert 4.01×10^{2}. We move the decimal point two places to the right making 401.
>
> *Example:* Convert 5.7×10^{-3}. We move the decimal point three places to the left making 0.0057.

Working with Scientific Notation:

Addition and Subtraction

When adding or subtracting numbers in scientific notation, their powers of 10 must be equal. If the powers are *not* equal, then you must first convert the numbers so that they all have the same power of 10.

> *Example:* $(6.7 \times 10^{9}) + (4.2 \times 10^{9}) = (6.7 + 4.2) \times 10^{9} = 10.9 \times 10^{9} = 1.09 \times 10^{10}$. (Note that the last step is necessary in order to put the answer in scientific notation.)
>
> *Example:* $(4 \times 10^{8}) - (3 \times 10^{6}) = (4 \times 10^{8}) - (0.03 \times 10^{8}) = (4 - 0.03) \times 10^{8} = 3.97 \times 10^{8}$.

Multiplication and Division

It is very easy to multiply or divide just by rearranging so that the powers of 10 are multiplied together. (Multiply – add the exponents, Divide – subtract the exponents)

> *Example:* $(6 \times 10^{2}) \times (4 \times 10^{-5}) = (6 \times 4) \times (10^{2} \times 10^{-5}) = 24 \times 10^{2-5} = 24 \times 10^{-3} = 2.4 \times 10^{-2}$. (Note that the last step is necessary in order to put the answer in scientific notation.)

I. *Convert to scientific notation:*

1. 900 _____
2. 2,800 _____
3. 15,392 _____
4. 854,000 _____
5. 0.072 _____
6. 0.134 _____
7. 0.000656 _____
8. 0.0000009 _____
9. 12,867,000 _____
10. 0.000200042 _____

II. *Convert to decimal numbers:*

11. 6.10×10^{2} _____
12. 3.8×10^{4} _____
13. 7.72×10^{-1} _____
14. 8.18×10^{7} _____
15. 9.4006×10^{-3} _____
16. 4×10^{13} _____
17. 7.24×10^{6} _____
18. 1.006×10^{-9} _____
19. 2.608×10^{-2} _____
20. 6.02×10^{23} _____

III. *Perform the following multiplications and division, expressing your answer in scientific notation:*

21. $5 \times 10^{2} * 3 \times 10^{4} =$ _____
22. $3.3 \times 10^{-1} * 2.01 \times 10^{7} =$ _____
23. $8.92 \times 10^{9} \div 7.75 \times 10^{4} =$ _____
24. $6.24 \times 10^{-5} \div 4.091 \times 10^{3} =$ _____
25. $9.11 \times 10^{-31} * 6.02 \times 10^{23} =$ _____
26. $4.87 \times 10^{3} \div 1.092 \times 10^{-7} =$ _____

IV. *Perform the following additions and subtractions, expressing your answer in scientific notation:*

27. $9 \times 10^{3} + 4 \times 10^{3} =$ _____
28. $2.4 \times 10^{-2} - 7.8 \times 10^{-3} =$ _____
29. $6.61 \times 10^{6} + 8.0 \times 10^{4} =$ _____
30. $3.03 \times 10^{8} - 1.8 \times 10^{9} =$ _____
31. $4.1145 \times 10^{2} + 8.275 \times 10^{-2} =$ _____
32. $3.49 \times 10^{-1} + 7.0 \times 10^{3} =$ _____