Summer Assignment Overview:

In chemistry, you will be learning the scientific names of elements and compounds, as well as completing many mathematical calculations of chemical quantities. Your summer assignment begins with learning some of these facts. You will be quizzed on the names and symbols of the elements and polyatomic ions in this packet throughout the year (given the chemical symbol provide the properly spelled name or given the name provide the proper chemical symbol). You must know the spelling and symbol. All elements are to be written as shown on this list with a capital letter as the first letter and lowercase letter as the second letter. You will also be quizzed on the metric prefixes, their meanings and the ability to convert between them.

Assignment:

1. Make flash cards (on index cards not cut strips of paper) of the metric system prefixes at the bottom of this page, as well as the elements and the polyatomic ions listed on the next page.

a. For the metric units and system, put the prefix on one side and the numerical meaning on the other.

b. For elements and ions, put the symbol on one side and the name on the other. Please put only one element or ion per card.

c. ***You will be given a homework grade for the flash cards.***

2. Complete the attached ***worksheet packet***, to be handed in the first day of school as a ***second homework grade.*** You have been given a periodic table in case there are elements in the worksheet that are not on your list to memorize.

Assume you have Chemistry the first day of school; do not wait to find out your schedule! Bring your cards, video notes and packet to school!

Make sure you watch the following videos and take notes on them:

YOU MUST REGISTER FOR HONORS CHEMISTRY on remind.com

https://www.remind.com/join/justtry

Unit 1:
Intro to chemistry: calculating via conversion units

Understanding converstion factors
https://youtu.be/HZ9weUkSdoY?list=PL3hPm0ZdYhywMyYMt9shG_-M_pI4akJk8

Video#1:https://youtu.be/7N0lRJLwpPI
Video#2: https://youtu.be/7N0lRJLwpPI?list=PL3hPm0ZdYhywMyYMt9shG_-M_pI4akJk8
Video#3 https://youtu.be/LdZ00OFAfaQ?list=PL3hPm0ZdYhywMyYMt9shG_-M_pI4akJk8

Metric conversion of volume

https://youtu.be/Ynp6rG45RZA?list=PL3hPm0ZdYhywMyYMt9shG_-M_pI4akJk8

Intro to Chemistry: 1.6: Calculating Using Significant Figures (1/2)
http://www.youtube.com/watch?v=MKz_JJDe21I
Intro to Chemistry: 1.6: Calculating Using Significant Figures (2/2)
http://www.youtube.com/watch?v=e-Hf9CWcJmo
Intro to Chemistry: 1.4: The Importance of Measurement (1/2)
http://www.youtube.com/watch?v=hQfxY8v96g8
Intro to Chemistry: 1.4: The Importance of Measurement (2/2)
http://www.youtube.com/watch?v=m2DtOFnBEMk
Intro to Chemistry: 1.5: Precision & Counting Significant Figures (1/2)
http://www.youtube.com/watch?v=GRgyi-86PaE
Intro to Chemistry: 1.5: Precision & Counting Significant Figures (2/2)
http://www.youtube.com/watch?v=fz7xJ2IFPng

AP Chem- Dimensional Analysis & the Factor-Label Method (1/4)
http://www.youtube.com/watch?v=2Wl0kOeUJ-Y
AP Chem- Dimensional Analysis & the Factor-Label Method (2/4)
http://www.youtube.com/watch?v=Pr99KAu349E
AP Chem- Dimensional Analysis & the Factor-Label Method (3/4)
http://www.youtube.com/watch?v=XQZJV7D2Ies
AP Chem- Dimensional Analysis & the Factor-Label Method (4/4)
http://www.youtube.com/watch?v=pSyzudiUK_U

Metric Unit Flashcards

Directions: Write the unit name and quantity on one side and the symbol on the other.

Example Flashcard:

Length, meter	m

Quantity	Unit	Symbol
Length	Meter	m
Mass	Gram	g
Volume	Liter	L
Temperature	Celsius	°C
Time	Seconds	s
Energy	Joule	J
Amount of a Substance	Mole	mol

Metric Prefixes

Prefix	Numerical Meaning
Kilo- (K___)	1000 (which is 10^3)
BASE UNIT	**The main metric unit (meter (m), liter (l) , gram (g), etc.)**
deci- (d___)	0.1 (which is 10^{-1} or a tenth)
centi- (c___)	0.01 (which is 10^{-2} or a hundredth)
milli- (m___)	0.001 (which is 10^{-3} or a thousandth)
micro (μ___)	0.000001 (which is 10^{-6} or a millionth)

Mega- (M___) 1000,000 (which is 10^6)

Element Flashcards

Directions: Write the element symbol on one side and the name on the other.

Example Flashcard:

Gallium	Ga

Aluminum	Al
Argon	Ar
Barium	Ba
Beryllium	Be
Bismuth	Bi
Boron	B
Bromine	Br
Calcium	Ca
Carbon	C
Cesium	Cs
Chlorine	Cl
Chromium	Cr
Cobalt	Co
Copper	Cu
Fluorine	F
Gold	Au
Helium	He

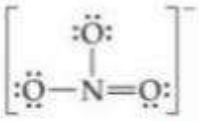
Gallium	Ga
Germanium	Ge
Hydrogen	H
Iodine	I
Iron	Fe
Lead	Pb
Lithium	Li
Magnesium	Mg
Manganese	Mn
Mercury	Hg
Neon	Ne
Nickel	Ni
Nitrogen	N
Oxygen	O
Phosphorous	P
Platinum	Pt
Potassium	K

Radon	Rn
Rubidium	Rb
Scandium	Sc
Silicon	Si
Silver	Ag
Sodium	Na
Strontium	Sr
Sulfur	S
Titanium	Ti
Tin	Sn
Uranium	U
Xenon	Xe
Zinc	Zn

Radium	Ra	Arsenic	As	Lanthanum	La
Antimony	Sb	Krypton	Kr	Actinium	Ac
Tungsten	W	Astatine	At		

Molecules: Deuterium H_2 Tritium H_3

Polyatomic Ion Flashcards



Polyatomic ions are groups of multiple atoms that have a charge (positive or negative). The symbols shown below tell you what elements are in the ion, how many atoms of each, and the charge. For example, contains a nitrogen atom, four hydrogen atoms, and the entire group has a charge of -1.

Memorization Hints: Polyatomic Ions

If you have two ions with similar names and the only difference is the number of oxygen atoms in your ion:

-ite means smaller number of O

-ate means larger number of O

Hypo- (smallest) and Per- (largest) are used if there are four ions with similar names and different numbers of oxygen.

Directions: Write the polyatomic ion symbol on one side and the name on the other.

Example Flashcard:

CN^-	cyanide

Positive Polyatomic Ions (Polyatomic Cations)

1+

Ammonium (NH_4^+)

Negative Polyatomic Ions (Polyatomic Anions)

1-

Acetate ($C_2H_3O_2^-$)
Chlorate (ClO_3^-)
Chlorite (ClO_2^-)
Cyanide (CN^-)
Dihydrogen phosphate ($H_2PO_4^-$)
Hydrogen Carbonate or bicarbonate (HCO_3^-)
Hydrogen Sulfite or bisulfite (HSO_3^-)
Hydroxide (OH^-)
Nitrate (NO_3^-)
Nitrite (NO_2^-)
Perchlorate (ClO_4^-)
Permanganate (MnO_4^-)
Thiocyanate (SCN^-)

Hypoiodite IO^-
Iodite IO_2^-
Iodate IO_3^-
Periodate IO_4^-

Hypochlorite ClO^-

2-

Carbonate (CO_3^{2-})
Chromate (CrO_4^{2-})
Dichromate ($Cr_2O_7^{2-}$)
Hydrogen Phosphate (HPO_4^{2-})
Oxalate ($C_2O_4^{2-}$)
Peroxide (O_2^{2-})
Sulfate (SO_4^{2-})
Sulfite (SO_3^{2-})

3-

Arsenate (AsO_4^{3-})
Phosphate (PO_4^{3-})
Phosphite PO_3^{3-}

Memorization Tips: Elements/Symbols

Silver	Ag	If a person who is expecting a present of a gold necklace receives a silver one. He might say, "**Ag**, I didn't want silver!"
Gold	Au	"Hey you, I want that gold necklace!" Said with "Hey you" sounding like **Au**.
Bromine	Br	That brother of mine - **Br**o of mine!
Calcium	Ca	"**Ca**ws give milk!" Pronounced with an accent to make cows sound like it's spelled with an A.
Chlorine	Cl	"You **Cl**ean with chlorine!"
Iron	Fe	"**Fe**, Fi, Fo, Fum, I'm an iron man!"
Helium	He	If you breathe in helium, you will laugh! **He**, He, He!
Mercury	Hg	Greek mythology - Hg stands for **H**elmet **g**uy!
Potassium	K	You will get **K**icked out of school for the double nasty! You can't do the first three letters and cannot say the next three!
Sodium	Na	"**Na**w, I don't want any sodium!"
Nickel	Ni	"**Ni**ck owes me a nickel!"
Oxygen	O	"**O**pen your mouth wide to take in oxygen!"
Lead	Pb	**P**encil **b**roke!
Silicon	Si	**Si**lly con!
Tin	Sn	A tin roof gets hot in the **Sn.**
Manganese	Mn	Take first three letters - **Man**
Magnesium	Mg	Take first three letters – **Mag**

Name: _____

Fill in the missing symbol/name of the element. The date of discovery and the origin of the name are included for your information only. You will only be responsible for the names and symbols.

Symbol	Name	Date	Origin of Name
	aluminum	1825	Latin, alumen = astringent taste
Ar		1894	Greek, argos = neutral or inactive
	barium	1808	Greek, baryos = heavy
Bi		~1450	German, wismut = white mass
	boron	1808	Arabic, bawraq
Br		1826	Greek, bromos = stench
C		B.C.	Latin, carbo = coal
Cs		1860	Latin, caesius = blue
	chlorine	1808	Greek, chloros = green gas
Cr		1797	Greek, chroma = color
	cobalt	1735	Greek, cobolos = goblin
Cu		B.C.	Latin, cuprum
	fluorine	1886	Latin, fluere = to flow
Ga		1875	Latin name, Gaul, of France
	germanium	1886	country, Germany
Au		B.C.	Latin, aurum
He		1895	Greek, helios = the sun
H		1766	Greek, hydro genes = water former
I		1811	Greek, iodos = violet color
Fe		B.C.	Latin, ferrum
	lead	B.C.	Latin, plumbum
	magnesium	1803	Latin, magnesia = a place in Asia Minor
Mn		1774	Latin, magnes = magnet
Hg		B.C.	Latin, hydragyrum = god and planet
	neon	1898	Greek, neo = new
	nickel	1750	German, goblin
	nitrogen	1772	Latin, nitro = native soda and gen = born
O		1771	Greek, oxys = sharp and gen = born
P		1669	Greek, phosphoros = light bringer

	platinum	1735	Spanish, plata = silver
K		1807	Latin, kalium
	radon	1900	originates from radium
Rb		1860	Latin, rubidius = red
	scandium	1879	Scandanavian peninsula by its discoverer
	silicon	1823	Latin, silex = flint
Ag		B.C.	Latin, argentum
	sodium	1807	Latin, natrium
Sr		1808	town of Strontian, Scotland
	sulfur	B.C.	Latin, sulphur
	tin	B.C.	Latin, stannum
Ti		1791	Greek mythology, first sons of earth
U		1789	planet Uranus
Xe		1808	Greek, xenos = strange
	zinc	B.C.	German, zink = like tin

Write your answers in the blanks below

1. Mg is _____
2. Magnesium is _____
3. Aluminum is _____
4. Silicon is _____
5. Fe is _____
6. H is _____
7. Cu is _____
8. N is _____
9. C is _____
10. Helium is _____
11. Oxygen is _____
12. Copper is _____
13. Calcium is _____
14. Iron is _____
15. Potassium is _____
16. Hydrogen is _____
17. Carbon is _____
18. Nitrogen is _____
19. O is _____
20. F is _____
21. Fluorine is _____
22. Na is _____
23. Sodium is _____

Name: _____

Spell the name of the following ions correctly:

1. NO_2^{1-} _____
2. CO_3^{2-} _____
3. ClO_3^{1-} _____
4. OH^{1-} _____
5. PO_4^{3-} _____
6. NH_4^{1+} _____
7. SO_4^{2-} _____
8. CN^{1-} _____
9. CH_3COO^{1-} _____
10. O_2^{2-} _____
11. NO_3^{1-} _____
12. IO_3^{1-} _____
13. MnO_4^{1-} _____
14. ClO_2^{1-} _____
15. O_2^{2-} _____

Write the symbol and charge of the following ions.

1. phosphate _____
2. sulfate _____
3. cyanide _____
4. hydroxide _____
5. carbonate _____
6. nitrate _____
7. acetate _____
8. chlorate _____
9. perchlorate _____
10. hypochlorite_____
11. iodate _____
12. nitrite _____
13. sulfite _____
14. peroxide _____
15. permanganate _____

Name: _____

Metric Prefix Conversion Worksheet

Fill in the blanks with the appropriate number:

1. 1 liter = _____ deciliters
2. 1 gram = _____ milligrams
3. 1000 millimeters = _____ meters
4. 1 kilogram = _____ grams
5. 10^9 centimeters = _____ meter
6. 1 liter = _____ microliters

Complete the conversions using dimensional analysis method. Watch this YouTube video as reference. http://www.youtube.com/watch?v=aZ3J60GYo6U. **Show your work! IF you solve these problems without using dimensional analysis, you are not doing the exercise correctly. The point is not the answer, but the process.**

7. How many liters are there in 145,000,000 nanoliters?

8. How many grams are there in 123 kg?

9. How many centimeters are there in 921 mm?

10. What is the mass in kilograms of something that has a mass of 1926532 dg?

11. An atom has a diameter of approximately 1 x 10^{11} m. How many nanometers is this?

12. A 3.45 microgram sample of Uranium has a mass of how many grams?

13. What volume in kiloliters will a sample of Bay water occupy if it has a volume of 125 ml?

14. A sample of a chemical has a volume of 145 ml. How many liters is this?

15. A piece of metal has a mass of 27.9 grams.
a. How many kg is this?

b. dg?

c. cg?

d. mg?

e. µg?

16. Watch the following YouTube video on significant figures. This topic is extremely important in your study of Chemistry.
Unit Conversion & Significant Figures: Crash Course Chemistry #2 http://www.youtube.com/watch?v=hQpQ0hxVNTg

1 • Observations, Models, & Experiments

SCIENTIFIC NOTATION & UNIT ANALYSIS

Change the following to Scientific Notation (maintain the number of significant figures):

1. 5.280 = _____
2. 2,000 = _____
3. 15 = _____
4. 6,589,000 = _____
5. 70,400,000,000 = _____
6. .00263 = _____
7. .00589 = _____
8. .006 = _____
9. .400 = _____
10. .08060 = _____
11. 2,560 = _____
12. .0009 = _____
13. 8,900,000 = _____
14. .0920 = _____
15. 6,300 = _____
16. .90 = _____
17. 250 = _____
18. .006087 = _____
19. 500,000 = _____
20. .0000000105 = _____

Make the following Metric System conversions using "unit analysis" (you may use scientific notation):

1. 100 mg _____ = _____ g
2. 20 cm _____ = _____ m
3. 50 L _____ = _____ kL
4. 22 g _____ = _____ cg
5. 825 cm _____ = _____ km
6. 2,350 kg _____ = _____ g
7. 19 mL _____ = _____ cL
8. 52 km _____ = _____ m
9. 36 m _____ = _____ cm
10. 18 cm _____ = _____ mm
11. 6 g _____ = _____ mg
12. 4,259 mg _____ = _____ g

1 • Matter and Measurements

SIGNIFICANT FIGURES & ROUNDING

A. Indicate the number of significant figures then round each to the number of significant figures indicated.

For example:

1.234 has _____4___ significant figures and, rounded to 2 significant figures, is ___1.2____

1. 0.6034 has _____ significant figures and, rounded to 2 significant figures, is _____
2. 12,700 has _____ significant figures and, rounded to 2 significant figures, is _____
3. 12,700.00 has _____ significant figures and, rounded to 1 significant figures, is _____
4. 0.000983 has _____ significant figures and, rounded to 2 significant figures, is _____
5. 123342.9 has _____ significant figures and, rounded to 5 significant figures, is _____
6. 6.023×10^{23} has _____ significant figures and, rounded to 2 significant figures, is _____
7. .005600 has _____ significant figures and, rounded to 1 significant figures, is _____
8. 10000.5006 has _____ significant figures and, rounded to 5 significant figures, is _____
9. 2.0×10^{-3} has _____ significant figures and, rounded to 1 significant figures, is _____
10. 3.456110 has _____ significant figures and, rounded to 3 significant figures, is _____

B. Given calculations with the calculator answer, write the answers with the appropriate number of significant figures.

Example:

6.00 x 3.00 = 18 The answer should be _____18.0_____

1. 23 + 46 = 69 The answer should be _____
2. 23.0 + 46.0 = 69 The answer should be _____
3. 253 + 345.8 = 598.8 The answer should be _____
4. 56 – 35 = 21 The answer should be _____
5. 56.00 – 35.0 = 21 The answer should be _____
6. 46 x 12 = 552 The answer should be _____
7. 3.24 x 5.63 = 18.2412 The answer should be _____

8 (2.355 + 2.645) x 10.00 = 50 The answer should be _____

9 654 ÷ 32 = 20.4375 The answer should be _____

10. .024 x .063 = 1.512×10^{-03} The answer should be _____