

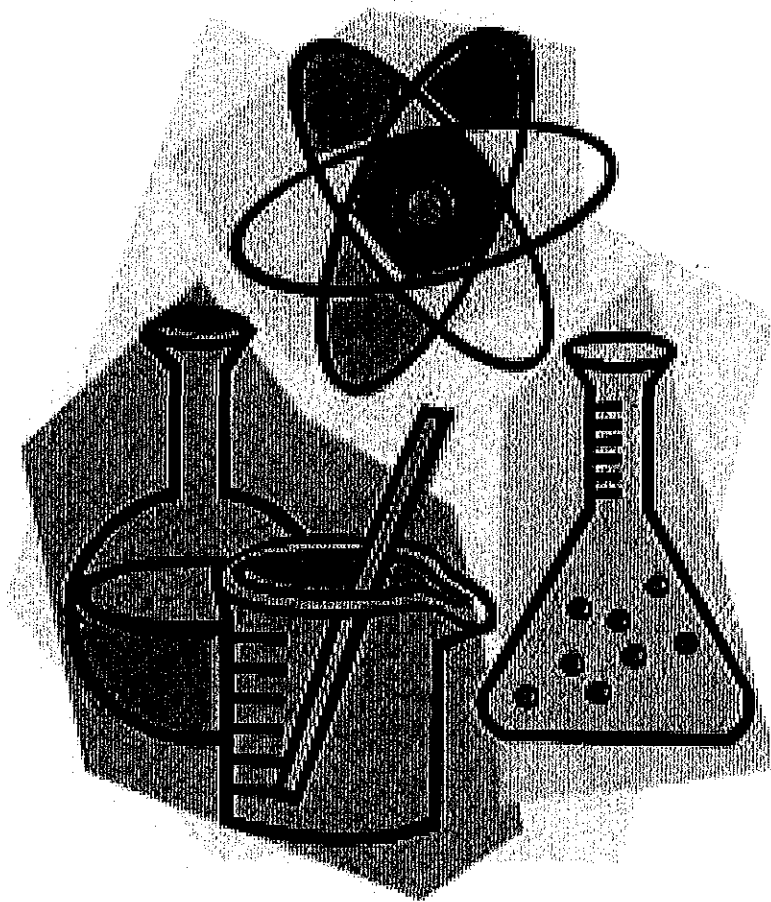
# SCIENCE 1206

# CHEMISTRY UNIT

## PART ONE

NAME: \_\_\_\_\_

TEACHER: \_\_\_\_\_



**NAME:** \_\_\_\_\_

**UNIT OUTLINE**

- ❖ CHEMISTRY TERMINOLOGY
  - GENERAL TERMS
  - PERIODIC TABLE
- ❖ BOHR DIAGRAMS
- ❖ ATOMS versus IONS
- ❖ NAMING COMPOUNDS
  - IONIC, MOLECULAR, ACIDS
- ❖ CHEMICAL REACTIONS
  - BALANCING CHEMICAL EQUATIONS
  - 5 TYPES of REACTIONS



**CHEMISTRY GENERAL TERMS**

**MATTER**

- ❖ **DEFINITION:**
  - \_\_\_\_\_
- ❖ **What is not matter?**
  - \_\_\_\_\_
- ❖ In chemistry, we often discuss \_\_\_\_\_, such as \_\_\_\_\_.

**MASS**

- ❖ The amount of \_\_\_\_\_, measured in \_\_\_\_\_.

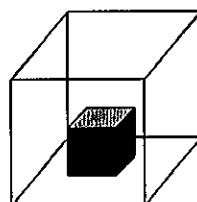
**3 STATES OF MATTER**

- ❖ **SOLID**
  - \_\_\_\_\_
- ❖ **LIQUID**
  - \_\_\_\_\_
- ❖ **GAS**
  - \_\_\_\_\_

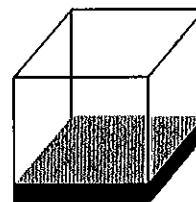


**States of Matter**

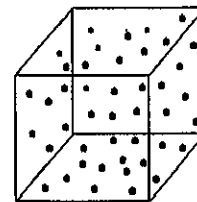
Glenn  
Research  
Center



**Solid**  
Holds Shape  
Fixed Volume



**Liquid**  
Shape of Container  
Free Surface  
Fixed Volume



**Gas**  
Shape of Container  
Volume of Container

**Chemistry Subscripts**

- ❖ (s) - \_\_\_\_\_
- ❖ (l) - \_\_\_\_\_
- ❖ (g) - \_\_\_\_\_
- ❖ (aq) - \_\_\_\_\_

**WHAT IS CHEMISTRY?**

- ❖ **DEFINITION:**
  - The study of \_\_\_\_\_.
- ❖ **Examples of chemical reactions:**
  - \_\_\_\_\_
  - \_\_\_\_\_
- ❖ **TWO TYPES OF CHEMISTRY**
  - **PURE CHEMISTRY**
    - \_\_\_\_\_ work that involves \_\_\_\_\_.
    - \_\_\_\_\_.
  - **APPLIED CHEMISTRY**
    - \_\_\_\_\_ work that involves \_\_\_\_\_.

## PHYSICAL PROPERTY

- ❖ A \_\_\_\_\_ of a substance that can be observed \_\_\_\_\_ a chemical reaction.
- ❖ **Examples of Physical Properties**

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

## PHYSICAL CHANGE

- ❖ A change in \_\_\_\_\_.

- ❖ **Examples of Physical Changes:**

- **Melting/fusion** – \_\_\_\_\_
- **Freezing** – \_\_\_\_\_
- **Evaporation** – \_\_\_\_\_
- **Condensation** – \_\_\_\_\_
- **Sublimation** – \_\_\_\_\_
- **Deposition** – \_\_\_\_\_

- ❖ Example:  $\text{H}_2\text{O}_{(s)} \rightarrow \text{H}_2\text{O}_{(l)}$

## CHEMICAL PROPERTY

- ❖ A \_\_\_\_\_ of a substance that can only be observed when a \_\_\_\_\_ is taking place.

- ❖ Example:

- Magnesium ribbon burning
- $2 \text{Mg}_{(s)} + \text{O}_2 \rightarrow 2 \text{MgO}_{(s)} + \text{light energy}$
- The chemical property is that \_\_\_\_\_.

## CHEMICAL CHANGE

- ❖ A change in which \_\_\_\_\_ is formed.

- ❖ Example: Iron Rusting

- \_\_\_\_\_

## INDICATORS OF A CHEMICAL CHANGE

- ❖ Basically, a chemical change has occurred if the change is \_\_\_\_\_.

- ❖ However, there are many good indicators of a chemical change:

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

## HOMEWORK!!!

- ❖ **Identify the following as a PHYSICAL PROPERTY or a CHEMICAL PROPERTY.**

- Burns in air when heated.
- Melts at 98 degrees Celsius.
- Reacts violently with water.
- Can be cut with a knife.
- Conducts electricity.

- ❖ **Identify the following as a PHYSICAL CHANGE or a CHEMICAL CHANGE.**

- Digesting a meal.
- Butter melting in a pan.
- Burning gasoline.
- Wood rotting.

## MATTER FLOW CHART

### PURE SUBSTANCE

- ❖ Made up of only \_\_\_\_\_.
- ❖ Stays the same in response to a \_\_\_\_\_.
- ❖ **Example:**
  - \_\_\_\_\_
- ❖ **TWO TYPES:**
  - ELEMENT
  - COMPOUND

### ELEMENT

- ❖ A pure substance that \_\_\_\_\_ be broken down into a simpler substance by a \_\_\_\_\_.
- ❖ It is made up of \_\_\_\_\_.
- ❖ Element SYMBOLS are always written with the first letter \_\_\_\_\_ and the second letter \_\_\_\_\_.
- ❖ Element NAMES are always written in \_\_\_\_\_ letters.
- ❖ **Examples:** \_\_\_\_\_

### COMPOUND

- ❖ A pure substance that \_\_\_\_\_ be broken down into its elements with a \_\_\_\_\_.
- ❖ It is made up of \_\_\_\_\_ chemically joined together in fixed proportions.
- ❖ **Examples:** \_\_\_\_\_

### MIXTURE

- ❖ Contains \_\_\_\_\_
- ❖ **TWO TYPES:**
  - **HOMOGENEOUS MIXTURE**
    - AKA \_\_\_\_\_
    - Have only \_\_\_\_\_ throughout
    - Examples: \_\_\_\_\_
  - **HETEROGENEOUS MIXTURE**
    - Contains \_\_\_\_\_ throughout
    - Examples: \_\_\_\_\_

## **DIATOMIC MOLECULES**

❖ There are 7 elements that are diatomic, or found in pairs, in their natural state.

❖ These are: \_\_\_\_\_

❖ ALSO: \_\_\_\_\_

❖ Memory tool: \_\_\_\_\_

**REACTANTS:** \_\_\_\_\_

**PRODUCTS:** \_\_\_\_\_

**CHEMICAL REACTION:** \_\_\_\_\_

❖ Example:

## **HOMEWORK ...**

❖ Name the type of pure substance that is found on the periodic table.

❖ Give an example of each of the following:

➤ Pure substance

➤ Heterogeneous mixture

➤ Homogeneous mixture

## GROUP...

- ❖ GROUP 1 - \_\_\_\_\_  
➤ \_\_\_\_\_
- ❖ GROUP 2 - \_\_\_\_\_  
➤ \_\_\_\_\_
- ❖ GROUP 17 - \_\_\_\_\_  
➤ \_\_\_\_\_
- ❖ GROUP 18 - \_\_\_\_\_  
➤ INERT → \_\_\_\_\_

## REPRESENTATIVE ELEMENTS

- ❖ AKA \_\_\_\_\_
- ❖ Groups \_\_\_\_\_, or \_\_\_\_\_
- ❖ These elements illustrate the \_\_\_\_\_.

## TRANSITION ELEMENTS

- ❖ AKA \_\_\_\_\_
- ❖ Group \_\_\_\_\_, or the \_\_\_\_\_
- ❖ \_\_\_\_\_ elements that exhibit some \_\_\_\_\_ due to their \_\_\_\_\_.

## INNER TRANSITION ELEMENTS

- ❖ Removed from the main table as a matter of convenience in organizing table
- ❖ Two names:
  - 57-71 → \_\_\_\_\_
  - 89-103 → \_\_\_\_\_

## TYPES OF ELEMENTS

- ❖ There are three types of elements on the periodic table:
  - \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_
- ❖ The \_\_\_\_\_ on the periodic table divides the METALS and the NONMETALS.
- ❖ The ratio of metals to nonmetals is about \_\_\_\_\_.

## METALS

- ❖ Substances found on the \_\_\_\_\_ of the staircase on the periodic table.
- ❖ Physical properties include:
  - \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_





**ALDON CORPORATION**

# MATERIAL SAFETY DATA SHEET

1533 W. Henrietta Rd.  
Avon, New York 14414  
(716) 226-6177

MSDS No. CC 535  
Effective Date February 17, 1999

CC 535

## SECTION I NAME 24 HOUR EMERGENCY ASSISTANCE

Product	CUPRIC SULFATE, 5-HYDRATE	<p>CHEMTEC 800-424-9300 Day 716-226-6177</p> <p>NFPA HAZARD RATING LEAST SLIGHT MODERATE HIGH EXTREME 0 1 2 3 4</p> <p>HMIS * Health 2 Fire 0 Reactivity 0</p>
Chemical Synonyms	Copper (II) Sulfate, pentahydrate	
Formula	CuSO <sub>4</sub> ·5H <sub>2</sub> O	
Unit Size	up to 2.5 Kg.	
C.A.S. No.	7758-99-8	

## SECTION II INGREDIENTS OF MIXTURES

Principal Component(s)	%	TLV Units
Cupric Sulfate, pentahydrate	> 99 %	See Section V.

WARNING! HARMFUL IF SWALLOWED OR INHALED.

IRRITANT TO SKIN, EYES AND MUCOUS MEMBRANES.

## SECTION III PHYSICAL DATA

Melting Point (°F)	653°C (1207°F)	Specific Gravity (H <sub>2</sub> O = 1)	2.28
Boiling Point (°F)	N/A	Percent Volatile by Volume (%)	N/A
Vapor Pressure (mm Hg)	N/A	Evaporation Rate ( =1)	N/A
Vapor Density (Air=1)	N/A		
Solubility in Water	Appreciable (>10%).		
Appearance & Odor	Blue crystals or fine blue powder; no odor.		

## SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)	Non-flammable.	Flammable Limits in Air % by Volume	N/A	Lower	Upper
Extinguisher Media	Use any media suitable for extinguishing supporting fire.				

### SPECIAL FIREFIGHTING PROCEDURES

In fire conditions, firefighters should wear protective clothing and a NIOSH/MSHA-approved self-contained breathing apparatus. Cupric Sulfate will not burn, nor will it support combustion. Care should be used to keep material out of streams or other water bodies.

(1996 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.7, GUIDE PAGE NO. 171)

### UNUSUAL FIRE AND EXPLOSION HAZARDS

Fire or excessive heat may produce hazardous decomposition products as dust or fume.

## SECTION V HEALTH HAZARD DATA

Threshold Limited Value	(Air) As copper metal (dust): 1.0 mg/m <sup>3</sup> . Copper (fume) TLV 0.2 mg/m <sup>3</sup> . Oral, rat: LD50 = 300 mg/kg.
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Effects of Overexposure	TARGET ORGANS AFFECTED: Eyes, skin, blood, respiratory system, liver, kidneys. <b>INGESTION:</b> Copper salts impart a metallic taste in mouth. May cause gastrointestinal irritation and vomiting. <b>EYES:</b> Causes conjunctivitis, swelling of the eyelids, ulceration and burns of the cornea. <b>SKIN:</b> Causes irritation. May cause allergic skin reaction. <b>INHALATION:</b> Causes upper respiratory irritation and congestion of the nasal and mucous membranes.
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Emergency and First Aid Procedures	<b>INHALATION:</b> Remove to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention. <b>EYES:</b> Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get medical attention. <b>SKIN:</b> Flush with water, then wash with mild soap and water. <b>INGESTION:</b> If swallowed, if conscious, give one or two glasses of water to drink, induce vomiting and call physician. Never give anything by mouth to an unconscious person.
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## SECTION VI REACTIVITY DATA

Stability	Unstable	Conditions to Avoid	Excessive temperature and heat.
	Stable		

Incompatibility (Materials to Avoid)	Incompatible with acetylene. Copper salts may react to form explosive acetylides. Copper sulfate can cause ignition upon contact with hydroxylamine due to the release of heat. Reducing agents react vigorously with copper salts.
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Hazardous Decomposition Products	Combustion may produce irritating copper fumes and toxic gaseous oxides (sulfur oxides).
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Hazardous Polymerization	Conditions to Avoid	Not applicable.
		X

## SECTION VII SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled	Ventilate the area. Sprinkle lime or soda ash on spill to form insoluble copper salt. Sweep up and place in a suitable container for disposal. Wash spill area with soap and water. Prevent material from entering sewers and waterways.
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Waste Disposal Method	Discharge, treatment, or disposal may be subject to Federal, State or Local laws. These disposal guidelines are intended for the disposal of catalog-size quantities only. Dispose of in an approved chemical landfill or contract with a waste disposal agency.
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## SECTION VIII SPECIAL PROTECTION INFORMATION

Respiration Protection (Specify Type)	None should be required in normal laboratory use. If dusty conditions prevail, work in a ventilation hood or wear a NIOSH/MSHA-approved dust mask.		
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Ventilation	Local Exhaust	Recommended.	Special	No.
	Mechanical (General)	Recommended.	Other	No.

Protective Gloves	Rubber.	Eye Protection	Chemical safety goggles.
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Other Protective Equipment	Safety glasses, smock, apron, vented hood, proper gloves, and eye wash station.
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## SECTION IX SPECIAL PRECAUTIONS

Precautions to be Taken in Handling & Storing	Store in a cool, dry place. Wash thoroughly after handling.
Other Precautions	Read label on container before using. Do not wear contact lenses when working with chemicals. Avoid contact with skin, eyes and clothing. Avoid breathing dust. Use with adequate ventilation. Remove and wash contaminated clothing.

For laboratory use only. Not for drug, food or household use. Keep out of reach of children.

Revision No. 6	Date 2/17/99	Approved Michael Raszeja	Chemical Safety Coordinator	MR
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The information contained herein is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. \*Hazardous Materials Industrial Standards. Printed on recycled paper.

D.O.T. RQ, Environmentally hazardous substance, solid, n.o.s., (Cupric sulfate), 9, UN 3077, PG III

Approved by U.S. Department of Labor "essentially similar" to form OSHA-20



Name: \_\_\_\_\_ Site: \_\_\_\_\_ Page: \_\_\_ of \_\_\_

1. Identify the nine sections of the material safety data sheet (MSDS).

Section I: \_\_\_\_\_

Section V: \_\_\_\_\_

Section II: \_\_\_\_\_

Section VI: \_\_\_\_\_

Section III: \_\_\_\_\_

Section VII: \_\_\_\_\_

Section IV: \_\_\_\_\_

Section VIII: \_\_\_\_\_

Section IX: \_\_\_\_\_

2. What is the name of the chemical described on the data sheet assigned to you?

3. State its chemical formula. \_\_\_\_\_

4. Complete the following table:

<b>Bolling point</b>	
<b>Melting point</b>	
<b>Appearance</b>	
<b>Solubility in water</b>	

5. Describe the fire and explosion hazards associated with this chemical.

6. What would happen to you if you were overexposed to the chemical?

Name: \_\_\_\_\_ Site: \_\_\_\_\_ Page: \_\_\_ of \_\_\_

7. How would you give first aid to a person who has come into contact with this chemical?

8. How would you deal with this chemical if you spilled it on the lab counter?

9. When you are using this chemical, how must you protect yourself?

10. How must this chemical be stored?

## BOHR DIAGRAMS FOR ATOMS

- Bohr diagrams, also called \_\_\_\_\_, are a means of drawing atoms in a 2-D manner.
- Keep in mind that atoms are actually 3-D, and there are more complex representations of atoms.
- Bohr models always include the \_\_\_\_\_ and the \_\_\_\_\_ of an atom.
- There are 3 types of **SUBATOMIC PARTICLES** found in the nucleus:

- **PROTONS** (\_\_\_\_)

\_\_\_\_\_  
\_\_\_\_\_

- **ELECTRONS** (\_\_\_\_)

\_\_\_\_\_  
\_\_\_\_\_

- **NEUTRONS** (\_\_\_\_)

\_\_\_\_\_  
\_\_\_\_\_

- **NUCLEUS**

- \_\_\_\_\_  
\_\_\_\_\_

- **ELECTRON ENERGY LEVELS**

- \_\_\_\_\_  
\_\_\_\_\_

- 3 Levels

- First Level (Closest to Nucleus) \_\_\_\_\_
- Second Level \_\_\_\_\_
- Third Level (Outermost) \_\_\_\_\_

- **VALENCE LEVEL**

- Definition: \_\_\_\_\_
- Electrons in this level are called: \_\_\_\_\_
- Atoms with FULL valence shells are STABLE, meaning they will not bond with other atoms in normal conditions.
- The atoms of Group \_\_\_\_\_, the \_\_\_\_\_, have full valence levels.
- Atoms that do not have full electron energy levels are unstable and must \_\_\_\_\_, \_\_\_\_\_, or \_\_\_\_\_ electrons to be stable.

**ATOMIC NUMBER**

- Located in the top of each element box on the periodic table
- ATOMIC NUMBER = \_\_\_\_\_

**ATOMIC MASS (Molar Mass)**

- Located in the bottom of each element box on the periodic table
- Round it off for calculating.
- ATOMIC MASS = \_\_\_\_\_

**EXAMPLE:**

- ***DRAW BOHR DIAGRAMS FOR:***

- Li - lithium atom

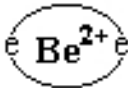
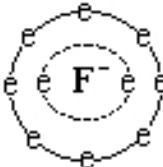
- Ne - neon atom

- S - sulfur atom

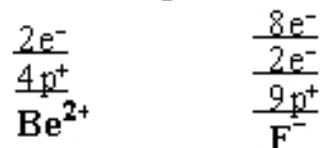
- **HOMEWORK:** Do WORKSHEET on following page.



Draw Bohr Energy Level Diagrams for the Ions (using circles or levels) that form as a result of the loss of electrons to give filled outer energy levels. Indicate the charge of the ion as a superscript next to the symbol for the element.

H						H	He
Li	 Be <sup>2+</sup>	<p><b>Does Not Form an Ion</b></p>	<p><b>Does Not Form an Ion</b></p>	N	O	 F <sup>-</sup>	Ne
Na	Mg	Al	<p><b>Does Not Form an Ion</b></p>	P	S	Cl	Ar

Here are the Energy Level Diagrams for Ions done without circles:



## TYPES OF CHEMICAL BONDS

- **CHEMICAL BONDS**

- DEFINITION: \_\_\_\_\_

- There are 2 TYPES OF Chemical Bonds:

- COVALENT
- IONIC

- **COVALENT BONDS**

- AKA: \_\_\_\_\_

- "co" - \_\_\_\_\_, "valent" - \_\_\_\_\_

- DEFINITION: \_\_\_\_\_  
\_\_\_\_\_

- BETWEEN: \_\_\_\_\_
- Solutions of covalently bonded substances are \_\_\_\_\_

- **IONIC BONDS**

- DEFINITION: \_\_\_\_\_  
\_\_\_\_\_

- BETWEEN: \_\_\_\_\_
- Solutions of ionic bonded substances are \_\_\_\_\_

- Compounds consist of atoms or ions of two or more elements bonded together.

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## MOLECULAR COMPOUNDS

- Form when \_\_\_\_\_ share electrons in \_\_\_\_\_.

- **2 TYPES:**

- BINARY Molecular Compounds
- TRIVIAL NAME Molecular Compounds

## BINARY Molecular Compounds

- Also called SIMPLE molecular compounds.
- Binary Molecular Compounds use IUPAC prefixes:
  - We will write these prefixes in the following table.

1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

- **GIVEN MOLECULAR FORMULA, WRITE NAME**

- RULES:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

EXAMPLE:

- $N_2O_4$  \_\_\_\_\_
- $P_2O_5$  \_\_\_\_\_
- $CCl_4$  \_\_\_\_\_

- **GIVEN MOLECULAR NAME, WRITE FORMULA**

- RULES:

\_\_\_\_\_

\_\_\_\_\_

EXAMPLE

- carbon monoxide \_\_\_\_\_
- triphosphorus pentabromide \_\_\_\_\_
- sulfur hexafluoride \_\_\_\_\_

- **TRIVIAL NAME Molecular Compounds**

- Also called COMMON NAME molecular compounds
- There are SOME molecular compounds that still go by their common names.
- These common names must be memorized:

FORMULA	TRIVIAL / COMMON NAME
$O_3$	
$H_2O$	
$H_2O_2$	
$NH_3$	
$CH_4$	
$CH_3OH$	
$C_2H_5OH$	
$C_6H_{12}O_6$	
$C_{12}H_{22}O_{11}$	

- **HOMEWORK:** Complete the 2 sheets on the following pages.



## Practice Problems

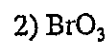
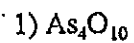
Write the correct formula for:

- 1) chlorine monoxide
- 2) oxygen difluoride
  
- 4) dinitrogen monoxide
- 5) nitrogen trifluoride
- 6) sulfur tetrachloride
  
- 8) carbon dioxide
- 9) diphosphorous pentoxide
- 10) phosphorous trichloride
- 11) sulfur dioxide
- 12) bromine pentafluoride
- 13) disulfur dichloride
  
- 15) tetraarsenic decoxide
- 16) silicon tetrachloride
- 17) krypton difluoride
- 18) chlorine monoxide
- 19) silicon dioxide
  
- 21) dinitrogen pentasulfide

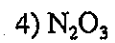
# NAMING MOLECULAR COMPOUNDS

## Practice Problems

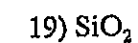
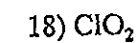
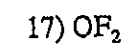
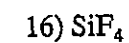
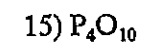
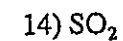
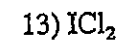
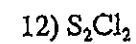
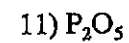
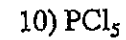
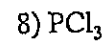
Write the correct name for:



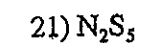
3)



7)



20)



Name: \_\_\_\_\_ Site: \_\_\_\_\_

1. Write the formulas for the following compounds in the space provided.

a) carbon dioxide		k) nitrogen monoxide	
b) silicon dioxide		l) tetraphosphorus decoxide	
c) water		m) silicon carbide	
d) carbon disulfide		n) methanol	
e) ammonia		o) diphosphorus pentabromide	
f) carbon tetrachloride		p) arsenic tribromide	
g) methane		q) carbon monoxide	
h) ozone		r) sulfur dioxide	
i) fluorine		s) neon	
j) diphosphorus trioxide		t) dinitrogen tetroxide	

2. Write the names for the following compounds, in the space provided.

a) $\text{CBr}_4$		k) $\text{N}_2\text{O}$	
b) $\text{I}_2$		l) $\text{C}_2\text{H}_5\text{OH}$	
c) $\text{PF}_3$		m) $\text{O}_3$	
d) $\text{N}_2\text{O}_4$		n) Ar	
e) CO		o) $\text{P}_4$	
f) $\text{NH}_3$		p) $\text{ClO}_2$	
g) $\text{H}_2\text{O}_2$		q) $\text{SiCl}_2$	
h) $\text{SCl}_6$		r) $\text{BH}_3$	
i) $\text{SO}_3$		s) $\text{C}_2\text{S}_4$	
j) $\text{P}_4\text{O}_6$		t) $\text{OF}_2$	

## IONS

### ● RECALL:

- As mentioned earlier, atoms other than the NOBLE GASES are unstable, and need to **GAIN, LOSE, or SHARE** ELECTRONS to become more stable.
- If they **SHARE** electrons, this forms a **COVALENT BOND** to another atom.
- If they **LOSE or GAIN** electrons, atoms become **IONS** and form **IONIC BONDS** with other atoms.

### ● OCTET RULE

- \_\_\_\_\_

### ● WHAT IS AN ION?

- Ions are \_\_\_\_\_ that have lost or gained electrons to achieve the valence configuration of a noble gas.

#### ○ TWO TYPES:

##### - CATIONS

- \_\_\_\_\_ ions that are formed from a \_\_\_\_\_ of electrons.
- It has more \_\_\_\_\_ than \_\_\_\_\_ and therefore has a net \_\_\_\_\_ charge.
- \_\_\_\_\_ form cations.
- MEMORY TOOL: \_\_\_\_\_
- EXAMPLE - lithium ion

##### - ANIONS

- \_\_\_\_\_ ions that are formed from a \_\_\_\_\_ of electrons.
- It has more \_\_\_\_\_ than \_\_\_\_\_ and therefore has a net \_\_\_\_\_ charge.
- change the ending of the name of anions to \_\_\_\_\_
- \_\_\_\_\_ form anions.
- MEMORY TOOL: \_\_\_\_\_
- EXAMPLE - fluoride ion



Another casualty in the War of the Atoms.

## BOHR DIAGRAMS FOR IONS

### ● METALS

- ATOMS of METALS will LOSE electrons to become CATIONS.
- ATOMS with 1, 2, or 3 VALENCE electrons will LOSE these electrons to form 1+, 2+, or 3+ ions respectively.
  
- **GROUP 1 ATOMS** - \_\_\_\_\_
  - \_\_\_\_\_ valence electrons(s)
  - \_\_\_\_\_ ion
  
- **GROUP 2 ATOMS** - \_\_\_\_\_
  - \_\_\_\_\_ valence electrons(s)
  - \_\_\_\_\_ ion
  
- **GROUP 3 ATOMS**
  - \_\_\_\_\_ valence electrons(s)
  - \_\_\_\_\_ ion

### ● NONMETALS

- ATOMS of NONMETALS will GAIN electrons to become ANIONS.
- ATOMS With 5, 6, or 7 VALENCE electrons will GAIN more electrons to form 3-, 2-, or 1- ions respectively.
  
- **GROUP 15 ATOMS**
  - \_\_\_\_\_ valence electrons(s)
  - \_\_\_\_\_ ion
  
- **GROUP 16 ATOMS**
  - \_\_\_\_\_ valence electrons(s)
  - \_\_\_\_\_ ion
  
- **GROUP 17 ATOMS** - \_\_\_\_\_
  - \_\_\_\_\_ valence electrons(s)
  - \_\_\_\_\_ ion
  
- **GROUP 18 ATOMS** - \_\_\_\_\_
  - FULL outer valence levels

- **TO DRAW:**

- Draw a Bohr diagram for:

- A sodium atom AND a sodium ion

- A chlorine atom AND a chloride ion

- **HOMEWORK:** Do the following 2 worksheets for homework.

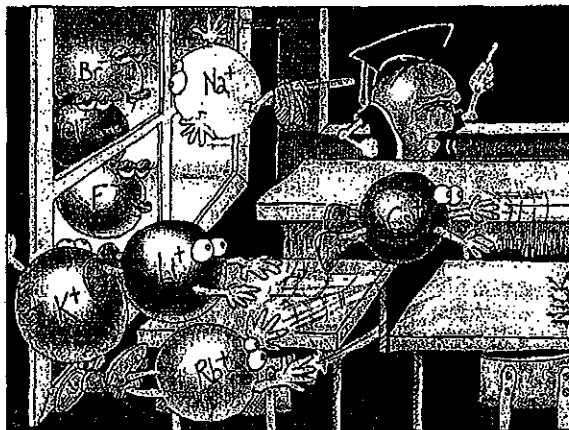
## SIMPLE IONS

Complete the following table. Note that the name of a *nonmetallic* ion ends in *ide* while the name for a *metallic* ion uses the full name of the metal.

Ion Name	Ion Symbol	Number of Protons	Number of Electrons	Number of Electrons Lost or Gained	Same Electrons as What Noble Gas?
e.g., fluoride	F <sup>-</sup>	9	10	gained one	neon
1.		53	54		
2.		16		gained two	
3. potassium				lost one	
4.	Ca <sup>2+</sup>				
5.		35	36		
6.	Sr <sup>2+</sup>				
7.	H <sup>+</sup>				(none)
8.		8		gained two	
9.		12		lost two	
10. aluminum			10		
11.		34	36		
12.	H <sup>-</sup>				
13. lithium				lost one	
14.	Rb <sup>+</sup>				
15.		17	18		

## IONIC COMPOUNDS

- Form when at least \_\_\_\_\_ transfer electrons in an \_\_\_\_\_.
- Metals will become CATIONS and \_\_\_\_\_ electrons and nonmetals will become ANIONS and \_\_\_\_\_ electrons.
- These ions, with opposite charges, attract, and form ionic bonds.



*"Perhaps one of you gentlemen would mind telling me just what it is outside the window that you find so attractive..?"*

- Unlike covalent bonds, these bonds are not "ACTUAL BONDS," but forces of attraction between oppositely charged ions.
- They stay together in a \_\_\_\_\_.
- EXAMPLE - NaCl

- **3 TYPES:**
  - BINARY Ionic Compounds
    - SIMPLE Ionic Compounds
    - MULTIVALENT Ionic Compounds
  - POLYATOMIC Ionic Compounds
  - HYDRATED Ionic Compounds



**BINARY IONIC COMPOUNDS**

- "Binary" - \_\_\_\_\_

**SIMPLE Ionic Compounds**

- Simple ionic compounds are composed of a metal ion (+) and a nonmetal ion (-).

- **GIVEN FORMULA, WRITE NAME**

- RULES:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- **EXAMPLE:**

- $MgBr_2$  \_\_\_\_\_
- $KCl$  \_\_\_\_\_
- $Na_2S$  \_\_\_\_\_
- $Mg_3P_2$  \_\_\_\_\_
- $Ba_3N_2$  \_\_\_\_\_

- *What's Wrong with the Following Names for BaS?*

- barium sulfur \_\_\_\_\_
- Barium Sulfide \_\_\_\_\_
- barium sulfuride \_\_\_\_\_

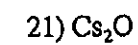
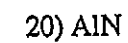
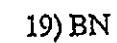
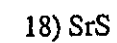
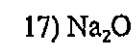
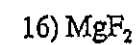
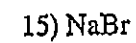
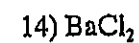
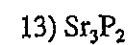
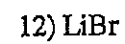
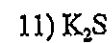
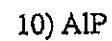
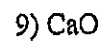
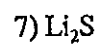
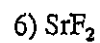
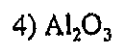
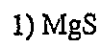
- **HOMEWORK:** Do the sheet on the following page.

Give the correct chemical formula and name for the compounds possible between the following ions.

ion/ name	$\text{Cl}^-$	$\text{N}^{3-}$	$\text{O}^{2-}$	$\text{S}^{2-}$	$\text{P}^{3-}$
$\text{Na}^+$					
$\text{Mg}^{2+}$					
$\text{Al}^{3+}$					
$\text{Ca}^{2+}$					
$\text{K}^+$					
$\text{Zn}^{2+}$					
$\text{Li}^+$					
$\text{Ba}^{2+}$					
$\text{Ga}^{3+}$					

## Practice Problems

Write the correct name for:



● **GIVEN NAME, WRITE FORMULA**

○ **RULES:**

- \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- **EXAMPLE:**

■ sodium bromide \_\_\_\_\_

■ barium iodide \_\_\_\_\_

■ magnesium oxide \_\_\_\_\_

■ aluminum oxide \_\_\_\_\_

● **HOMEWORK:** Do the next 2 sheets on the following pages.

## Practice Problems

Write the correct formula for:

- 1) magnesium oxide
- 2) lithium bromide
- 3) calcium nitride
- 4) aluminum sulfide
- 5) potassium iodide
- 6) strontium chloride
- 7) sodium sulfide
- 8) radium bromide
- 9) magnesium sulfide
- 10) aluminum nitride
- 11) cesium sulfide
- 12) potassium chloride
- 13) strontium phosphide
- 14) barium iodide
- 15) sodium fluoride
- 16) calcium bromide
- 17) beryllium oxide
- 18) strontium sulfide
- 19) boron fluoride
- 20) aluminum phosphide
- 21) rubidium oxide

Name: \_\_\_\_\_

Site: \_\_\_\_\_

Date: \_\_\_\_\_

	Name	Formula	Name	Formula
Molecular Compounds	1.	$P_4O_6$	11. iodine trifluoride	
	2.	$S_2F_{10}$	12. chlorine dioxide	
	3.	$N_2O_4$	13. methane	
	4.	$ICl_5$	14. boron trifluoride	
	5.	$SF_6$	15. diboron hexahydride	
	6.	$CH_3OH$	16. phosphorous trihydride	
	7.	$S_4N_2$	17. ethanol	
	8.	$H_2O_2$	18. carbon disulfide	
	9.	$N_2O_3$	19. sulfur trioxide	
	10.	$NH_3$	20. diarsenic trioxide	
Binary Ionic Compounds – Simple Ions	21.	$CaCl_2$	31. potassium iodide	
	22.	$MgO$	32. aluminum chloride	
	23.	$NaBr$	33. lithium nitride	
	24.	$Al_2O_3$	34. barium chloride	
	25.	$CaO$	35. magnesium hydride	
	26.	$ZnO$	36. magnesium chloride	
	27.	$Ag_2S$	37. sodium sulfide	
	28.	$CaF_2$	38. zinc sulfide	
	29.	$CaH_2$	39. potassium chloride	
	30.	$K_2S$	40. silver bromide	

**MULTIVALENT Ionic Compounds**

- Ions of some \_\_\_\_\_ can have more than one possible charge.
- Such elements are called MULTIVALENT species.
- For example what are the 2 possible charges for copper - Cu?
  - \_\_\_\_\_
  - \_\_\_\_\_
- WE use ROMAN NUMERALS to indicate the type of charge on these multivalent ions.
  - 1+ → \_\_\_\_\_
  - 2+ → \_\_\_\_\_
  - 3+ → \_\_\_\_\_
  - 4+ → \_\_\_\_\_
  - 5+ → \_\_\_\_\_
  - 6+ → \_\_\_\_\_
  - ONLY USE THESE ROMAN NUMERALS WITH MULTIVALENT IONS!!!!

● **GIVEN NAME, WRITE FORMULA**

○ RULES:

- \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- EXAMPLE:

■ copper (II) oxide \_\_\_\_\_

■ lead (IV) sulfide \_\_\_\_\_

■ tin sulfide \_\_\_\_\_

- **HOMEWORK:** Do the sheet on the following page.

### Practice Problems

Write the correct formula for:

- 1) iron(II) chloride
- 2) copper(I) sulfide
- 3) titanium(IV) iodide
- 4) manganese(II) fluoride
- 5) copper(I) bromide
- 6) nickel(II) oxide
- 7) chromium(III) oxide
- 8) copper(I) iodide
- 9) manganese(II) nitride
- 10) cobalt(III) phosphide
- 11) iron(III) chloride
- 12) copper(II) sulfide
- 13) nickel(II) bromide
- 14) titanium(IV) iodide
- 15) copper(II) fluoride
- 16) nickel(IV) oxide
- 17) manganese(III) chloride
- 18) chromium(II) nitride
- 19) vanadium(IV) oxide
- 20) cobalt(II) phosphide



- **GIVEN FORMULA, WRITE NAME**

- RULES:

- \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- EXAMPLE:

- $PbI_2$  \_\_\_\_\_

- $Fe_2O_3$  \_\_\_\_\_

- $CuCl$  \_\_\_\_\_

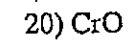
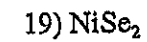
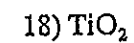
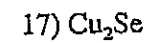
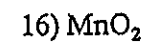
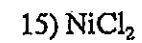
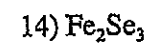
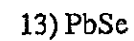
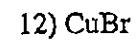
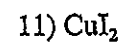
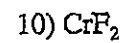
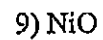
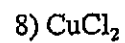
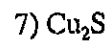
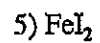
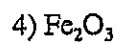
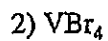
- $MnO_2$  \_\_\_\_\_

- **HOMEWORK:** Do the next 2 sheets on the following pages.

### Practice Problems

Answer using the Stock system.

Write the correct name for:



Name: \_\_\_\_\_ Site: \_\_\_\_\_ Date: \_\_\_\_\_

	Chemical Formula	Name of compound
e.g.	$\text{Cu}_2\text{S}$	copper (I) sulfide
1		uranium (IV) oxide
2		lead (IV) sulfide
3	$\text{SnO}_2$	
4		manganese (IV) oxide
5	$\text{Sb}_2\text{S}_3$	
6		iron (III) oxide
7	$\text{HgS}$	
8	$\text{PdS}_2$	
9		copper (II) sulfide
10	$\text{FeS}$	
11		lead (IV) oxide
12	$\text{HgO}$	
13	$\text{V}_2\text{O}_5$	
14		tin (II) fluoride
15		chromium (III) oxide
16	$\text{TiO}_2$	
17	$\text{AuF}_3$	
18		uranium (VI) bromide
19	$\text{NiBr}_2$	
20		cobalt chloride

## POLYATOMIC Ionic Compounds

- DEFINITION:
  - \_\_\_\_\_  
\_\_\_\_\_
  
- On the back of your periodic table, there is a POLYATOMIC ION TABLE.
  - You do not have to memorize them, but from use, you will become very familiar with them.
  - Example:
    - nitrate \_\_\_\_\_
    - nitrite \_\_\_\_\_
    - cyanide \_\_\_\_\_
    - hydroxide \_\_\_\_\_
    - bicarbonate \_\_\_\_\_
    - chlorate \_\_\_\_\_
    - carbonate \_\_\_\_\_
    - sulfate \_\_\_\_\_
    - phosphate \_\_\_\_\_
    - ammonium \_\_\_\_\_
    - acetate \_\_\_\_\_
  
- Endings of polyatomic ions are easily recognizable as they are often \_\_\_\_\_ or \_\_\_\_\_.
  - These endings are good clues that an ionic compound contains polyatomic ions.
  
- GIVEN NAME, WRITE FORMULA
  - EXAMPLE:
    - lithium sulfate \_\_\_\_\_
  
    - ammonium carbonate \_\_\_\_\_
  
    - hydrogen dichromate \_\_\_\_\_
  
    - sodium acetate \_\_\_\_\_

Directions: Place the symbol for each ion in the space provided, then write the correct chemical formula for the ionic compound. Be sure to balance the charges.

Remember complex ions end in -ite, and -ate, except for hydroxide and ammonium.

Ex: potassium	<u>  K<sup>+</sup>  </u>	sulfate	<u>  SO<sub>4</sub><sup>2-</sup>  </u>	<u>  K<sub>2</sub>SO<sub>4</sub>  </u>
1. aluminum	_____	chloride	_____	_____
2. calcium	_____	sulfite	_____	_____
3. sodium	_____	phosphate	_____	_____
4. copper(II)	_____	nitrate	_____	_____
5. chromium(II)	_____	nitride	_____	_____
6. silver	_____	chromate	_____	_____
7. nickel(III)	_____	iodide	_____	_____
8. barium	_____	nitride	_____	_____
9. sodium	_____	carbonate	_____	_____
10. zinc	_____	acetate	_____	_____
11. Magnesium	_____	hydroxide	_____	_____
12. iron(III)	_____	nitrite	_____	_____
13. mercury(I)	_____	oxide	_____	_____
14. copper(II)	_____	chlorate	_____	_____
15. potassium	_____	tetraborate	_____	_____
16. aluminum	_____	bicarbonate	_____	_____
17. lead(II)	_____	bisulfate	_____	_____
18. beryllium	_____	iodide	_____	_____
19. mercury(II)	_____	nitride	_____	_____
20. ammonium	_____	oxide	_____	_____
21. iron(II)	_____	bromide	_____	_____
22. strontium	_____	sulfite	_____	_____
23. nickel(II)	_____	hydroxide	_____	_____
24. copper(II)	_____	hydrogen sulfate	_____	_____
25. mercury(I)	_____	chlorate	_____	_____
26. aluminum	_____	carbonate	_____	_____
27. potassium	_____	nitrate	_____	_____
28. calcium	_____	phosphate	_____	_____

Name \_\_\_\_\_

Site \_\_\_\_\_

Provide the name of the compound or chemical formula.

Chemical Formula	Name of compound	Chemical Formula	Name of compound
1. $\text{Li}_2\text{CO}_3$		16.	potassium hydroxide
2. $\text{K}_2\text{SO}_4$		17.	lithium phosphate
3. $\text{Al}(\text{OH})_3$		18.	iron (III) hydroxide
4. $\text{Fe}(\text{ClO})_3$		19.	sodium bicarbonate
5. $\text{H}_2\text{SO}_4$		20.	calcium chlorate
6. $\text{Ca}(\text{HCO}_3)_2$		21.	hydrogen borate
7. $\text{Pb}_3(\text{PO}_4)_2$		22.	
8. $\text{Zn}(\text{CH}_3\text{COO})_2$		23.	ammonium nitrate
9. $\text{Cu}(\text{NO}_3)_2$		24.	sodium hypochlorite
10. $\text{Cu}(\text{NO}_2)_2$		25.	potassium nitrate
11. $\text{K}_2\text{S}_2\text{O}_3$		26.	
12. $\text{CaCO}_3$		27.	
13. $\text{Na}_2\text{Cr}_2\text{O}_7$		28.	calcium cyanide
14. $\text{NaCN}$		29.	chromium (III) nitrite
15. $\text{KH}_2\text{PO}_4$		30.	iron (II) chlorite

## Nomenclature of Ionic Compounds

### 1. Simple Ions

#### Names

- write the name of the positive ion
- write the name of the negative ion followed by *-ide*

eg. NaCl sodium chloride  
Mg<sub>3</sub>N<sub>2</sub> magnesium nitride

#### Formulas

- determine the charge on each ion
- cross over the charges to write the formula

eg. calcium phosphide  
Ca<sup>2+</sup> P<sup>3-</sup>  
Ca<sub>3</sub>P<sub>2</sub>

### 2. Polyatomic Ions

#### Names

- write the name of the positive ion
- write the name of the negative ion

eg. CaSO<sub>4</sub> calcium sulfate  
Al(OH)<sub>3</sub> aluminum hydroxide

#### Formulas

- determine the charge on each ion
- cross over the charges to write the formula

eg. magnesium nitrate  
Mg<sup>2+</sup> NO<sub>3</sub><sup>-</sup>  
Mg(NO<sub>3</sub>)<sub>2</sub>

### 3. MultiValent Metals

- use Roman Numerals to indicate the ion charge (Stock System)

OR

- use the suffix **-ic** to indicate the smaller ion charge or **-ous** for the larger ion charge.

#### Names

eg. CoCl<sub>2</sub> - cobalt(II) chloride  
- cobaltous chloride  
CoCl<sub>3</sub> - cobalt(III) chloride  
- cobaltic chloride

#### Formulas

eg. nickel(II) nitride  
Ni<sup>2+</sup> N<sup>3-</sup> (cross over)  
Ni<sub>3</sub>N<sub>2</sub>

**NOTE:** After crossing over the charges to get the formula, make sure you are using the simplest ratio between the ions.  
eg. magnesium oxide - Mg<sub>2</sub>O<sub>2</sub> becomes MgO

**DON'T USE PREFIXES FOR IONIC COMPOUNDS.**

### HYDRATED Ionic Compounds

- Hydrated ionic compounds that have \_\_\_\_\_ attached to their crystal lattice structure.
- Solutions become hydrated when they are crystallized from a water solution.
- They are often recognizable by eye because they are often \_\_\_\_\_ and \_\_\_\_\_.
- Examples: \_\_\_\_\_
- Bluestone  $\rightarrow$   $\text{CuSO}_4 \cdot 5 \text{H}_2\text{O}$

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- We indicate the presence of water with the word \_\_\_\_\_ and we indicate the number of water molecules with our GREEK PREFIXES

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- ANHYDROUS:

- GIVEN NAME, WRITE FORMULA

○

EXAMPLE:

- barium chloride dihydrate

---

- potassium hydroxide hexahydrate

---

- sodium carbonate octahydrate

---

- cobalt (II) chloride decahydrate

---

- GIVEN NAME, WRITE FORMULA

○

EXAMPLE:

-  $\text{CaSO}_4 \cdot 2 \text{H}_2\text{O}$

---

-  $\text{Na}_3\text{PO}_4 \cdot 4 \text{H}_2\text{O}$

---

-  $\text{HCN} \cdot 3 \text{H}_2\text{O}$

---

- HOMEWORK: Do the sheet on the following page.



Name \_\_\_\_\_

Site \_\_\_\_\_

Provide the name or formula for each of the following:

Name:	Formula
1. copper (II) sulfate pentahydrate	
2.	$\text{MgSO}_4 \cdot 7 \text{H}_2\text{O}$
3. potassium carbonate octahydrate	
4.	$\text{MgCl}_2 \cdot 6 \text{H}_2\text{O}$
5. barium chloride dehydrate	
6.	$\text{Cd}(\text{NO}_3)_2 \cdot 4 \text{H}_2\text{O}$
7. lithium bromide trihydrate	
8.	$\text{Na}_2\text{S}_2\text{O}_3 \cdot 5 \text{H}_2\text{O}$
9. cobalt (II) chloride hexahydrate	
10.	$\text{AlCl}_3 \cdot 6 \text{H}_2\text{O}$
11. zinc sulfate nonahydrate	
12.	$\text{CaCl}_2 \cdot 2 \text{H}_2\text{O}$
13. barium hydroxide monohydrate	
14.	$\text{Na}_2\text{SO}_4 \cdot 10 \text{H}_2\text{O}$
15. magnesium silicate pentahydrate	

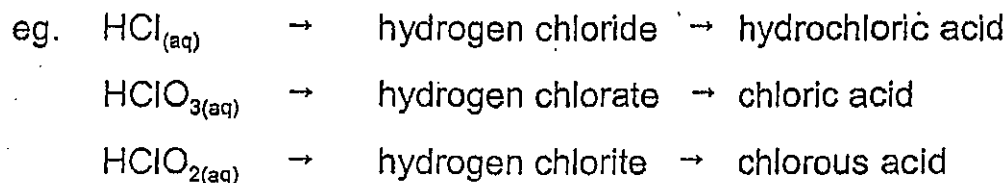
## Acid Nomenclature

- acids are hydrogen compounds which have been dissolved in water.
- the subscript (aq) is used to indicate aqueous (dissolved in water).
- the following rules are used for acid names and formulas:

<u>Ionic name</u>	→	<u>Acid name</u>
hydrogen ___ide	→	hydro___ic acid
hydrogen ___ate	→	_____ic acid
hydrogen ___ite	→	_____ous acid

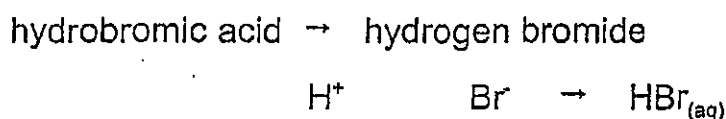
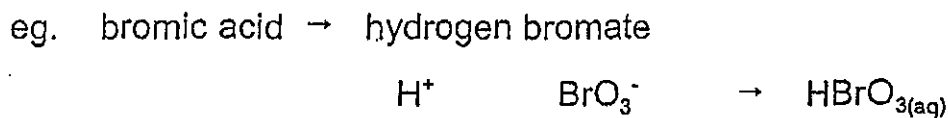
### Writing Names

- write the ionic name for the hydrogen compound.
- use the appropriate rule to write the acid name.



### Writing Formulas

- use the appropriate rule to write the ionic name
- use the charge on the ions to get the formula



Name: \_\_\_\_\_ Site: \_\_\_\_\_

## Rules for naming acids:

Rule #1            hydrogen \_\_\_\_\_ ide    becomes    hydro \_\_\_\_\_ ic acid

Acid formula	ionic name would be	acid name
ex: $\text{HCl}_{(aq)}$	hydrogen <i>chloride</i>	<i>hydrochloric acid</i>
1.	hydrogen bromide	
2. $\text{HCN}_{(aq)}$		
3.		hydrofluoric acid

Rule #2            hydrogen \_\_\_\_\_ ate            becomes    \_\_\_\_\_ ic acid

Acid formula	ionic name would be	acid name
ex: $\text{HClO}_{3(aq)}$	hydrogen <i>chlorate</i>	<i>chloric acid</i>
1.	hydrogen borate	
2. $\text{HNO}_{3(aq)}$		
3.		permanganic acid

Rule #3            hydrogen \_\_\_\_\_ ite            becomes    \_\_\_\_\_ ous acid

Acid formula	ionic name would be	acid name
ex: $\text{HNO}_{2(aq)}$	hydrogen <i>nitrite</i>	<i>nitrous acid</i>
1.	hydrogen chlorite	
2. $\text{HClO}_{(aq)}$		
3.		sulfurous acid

NOTE: when naming acids with the root words "sulf" and "phosph", extra syllables are added to make them sound better. Add "ur" to "sulf" and add "or" to "phosph".

therefore  $\text{H}_2\text{SO}_{4(aq)}$  is sulfuric acid NOT sulfic acid

and  $\text{H}_3\text{PO}_{4(aq)}$  is phosphoric acid NOT phosphic acid

Name: \_\_\_\_\_

Site: \_\_\_\_\_

Complete the following table.

	Formula	Name of Acid
1.	$\text{H}_3\text{BO}_3(\text{aq})$	
2.		Hydrochloric acid
3.	$\text{CH}_3\text{COOH}(\text{aq})$	
4.	$\text{H}_2\text{SO}_4(\text{aq})$	
5.	$\text{H}_2\text{SO}_3(\text{aq})$	
6.		Oxalic acid
7.		Phosphoric acid
8.		Stearic acid
9.	$\text{H}_2\text{CO}_3(\text{aq})$	
10.		Nitric acid
11.	$\text{HClO}_4(\text{aq})$	
12.		Hypochlorous acid
13.	$\text{H}_2\text{S}(\text{aq})$	
14.		Hydrofluoric acid
15.	$\text{HCN}(\text{aq})$	
16.		Nitrous acid
17.		Benzoic acid
18.	$\text{H}_2\text{SiO}_3(\text{aq})$	
19.		Thiosulfuric acid
20.		Chromic acid

**Table: Properties of acids, bases and salts:**

	<b>Acid</b>	<b>Base</b>	<b>Salt</b>
<b>Definition</b>	- hydrogen compound which dissolves in water to produce hydrogen ions ( $H^+_{(aq)}$ ) - neutralizes bases	- ionic compound which dissolves in water to produce hydroxide ions ( $OH^-_{(aq)}$ ) - neutralizes acids	ionic compounds which dissolve in water. - formed by the reaction of an acid and a base.
<b>Litmus</b>	Blue $\Rightarrow$ Red	Red $\Rightarrow$ Blue	no effect
<b>electrical conductivity</b>	yes	yes	yes
<b>taste</b>	sour (lemons!)	bitter (soap)	N/A
<b>pH</b>	below 7	above 7	7 (neutral)
<b>other</b>	reacts with metals to produce hydrogen gas	feel slippery	
<b>example</b>	$HCl_{(aq)}$ hydrochloric acid	$NaOH_{(aq)}$ sodium hydroxide	$NaCl_{(aq)}$ sodium chloride

Name: \_\_\_\_\_

Site: \_\_\_\_\_

Page 1 of 2

Complete the following table. This is a mixture of molecular and ionic!

Name	Formula	Name	Formula
1.	NaBr	11. calcium iodide	
2.	SrCl <sub>2</sub>	12. silver sulfide	
3.	Zn(BrO <sub>3</sub> ) <sub>2</sub>	13. beryllium hydride	
4.	Fe(NO <sub>3</sub> ) <sub>3</sub>	14. aluminum sulfate	
5.	RbHCO <sub>3</sub>	15. ammonium carbonate	
6.	NaOCl	16. barium phosphide	
7.	Sn <sub>4</sub>	17. calcium hydrogen sulfite	
8.	HgCl	18. sodium nitrite	
9.	HgCl <sub>2</sub>	19. manganese(IV) sulfide	
10.	Cu <sub>2</sub> O	20. tin(II) perchlorate	
21.	Ca <sub>3</sub> N <sub>2</sub>	31. nickel(II) chromate	
22.	P <sub>4</sub> O <sub>6</sub>	32. potassium cyanide	
23.	LiH <sub>2</sub> PO <sub>4</sub>	33. chromium(III) sulfite	
24.	Pb(IO <sub>3</sub> ) <sub>2</sub>	34. zinc acetate	
25.	CoCO <sub>3</sub>	35. cadmium oxalate	
26.	AgSCN	36. calcium sulfide	
27.	S <sub>2</sub> F <sub>10</sub>	37. sodium hydrogen sulfate	
28.	HBr	38. cadmium cyanide	
29.	HF	39. copper(II) nitrate tetrahydrate	
30.	Ni <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> ·8H <sub>2</sub> O	40. lead(II) dichromate	
41.	KOH	51. bromine	
42.	N <sub>2</sub> O <sub>5</sub>	52. calcium carbonate	

Name: \_\_\_\_\_

Site: \_\_\_\_\_

Page 2 of 2

43.	$\text{Na}_2\text{SO}_3 \cdot 7\text{H}_2\text{O}$	53. aluminum nitrate	
44.	$\text{S}_4\text{N}_4$	54. beryllium iodate	
45.	$\text{HNO}_3$	55. cadmium oxide	
46.	$\text{HgNO}_2$	56. sodium oxalate	
47.	$\text{K}_2\text{Cr}_2\text{O}_7$	57. iron(II) bromide	
48.	$\text{Na}_2\text{CrO}_4$	58. cesium hydroxide	
49.	$\text{KMnO}_4$	59. ammonia	
50.	$\text{CrPO}_4$	60. mercury(II) acetate	
61.	$\text{NaOH}$	68. lithium chloride monohydrate	
62.	$\text{Mg}(\text{HCO}_3)_2$	69. iodine trifluoride	
63.	$\text{SF}_6$	70. hydrogen hypochlorite	
64.	$\text{HClO}_4(\text{aq})$	71. hydrogen phosphate	
65.	$\text{NaH}$	72. hydrogen fluoride	
66.	$\text{BaCO}_3$	73. tin(II) hydroxide	
67.	$\text{Mg}(\text{BrO}_3)_2$	74. chlorine dioxide	