

## Chemistry—Fall Final Review

### Part I: Chemistry Content (30 points)

60 multiple choice questions on physical and chemical properties, significant figures, metric conversions, scientific measurement, atomic models, atomic structure, chemical nomenclature, chemical quantities, chemical reactions, and chemical equations

These will be similar to the multiple choice questions on chapter tests and quizzes

### Part II: Science Comprehension (20 points)

Several paragraphs about a chemical element and series of short answer questions about the element

### Part III: The Periodic Table (10 points)

A data table to complete with information about atomic number, atomic mass, and numbers of protons, electrons, and neutrons in selected elements

### Part IV: Graphing (20 points)

A data table with chemical information about elements or compounds and instructions for constructing a graph and performing calculations about the information

### Part V: Chemistry Problem Solving (20 Points)

Ten chemistry problems to solve involving metric conversions, atomic and molar mass, percent composition, moles, Avogadro's number, and Avogadro's number

### Terms to know

atom	accuracy	atomic number	alkali metals
proton	precision	atomic mass	alkaline earth metals
electron	percent error	mass number	transition metals
neutron	grams	formula mass	rare earth metals
nucleus	liters	molar mass	halogens
mass	meters	period	noble gases
weight	density	family	diatomic
gas	volume	ion	H <sub>2</sub>
liquid	temperature	ion charges	O <sub>2</sub>
solid	Celsius	ionic compound	N <sub>2</sub>
physical property	Kelvin	polyatomic ions	Cl <sub>2</sub>
chemical property	Democritus	acetic acid	Br <sub>2</sub>
physical change	Dalton	hydrochloric acid	I <sub>2</sub>
chemical change	Thomson	nitric acid	F <sub>2</sub>
significant figures	Rutherford	carbonic acid	percent composition
metric conversions	cathode ray tube	sulfuric acid	element names
precipitate	gold foil experiment	phosphoric acid	element symbols
		covalent compound	toxicity



### The Periodic Table

Element	Symbol	Atomic #	Atomic Mass	Mass #	Protons	Electrons	Neutrons
arsenic							
argon							
antimony							
aluminum							

### Chemistry Problem Solving

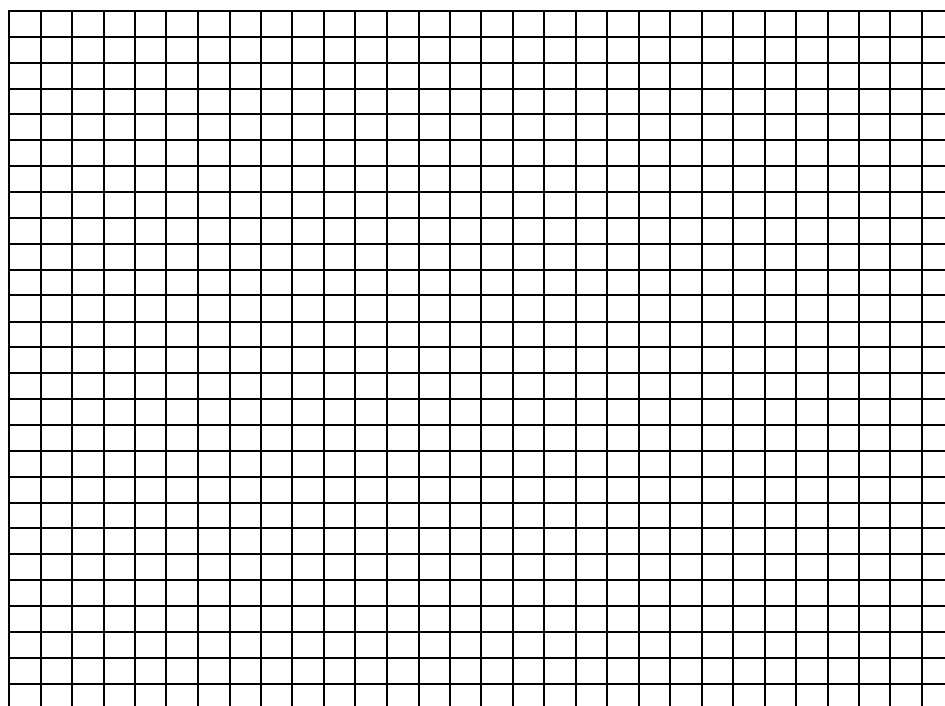
1. Convert 275 mg potassium to g.
2. Convert  $2.45 \times 10^3$  mg potassium chlorate to g.
3. Convert 125 g potassium nitrate to ng.
4. What is the formula mass of potassium chloride?
5. Calculate the percent potassium in potassium chloride.
6. What is the formula mass of KOH
7. Calculate the percent *potassium* in potassium hydroxide.
8. Determine the mass of a cube of potassium that measures 2.00 cm on each side. (The density of potassium is  $0.86 \text{ g/cm}^3$ ).



### Graphing

- Graph the following data on mass and volume of various solids
- Write the correct formula for the liquids on the line provided
- Graph mass vs volume
- Determine the density from the slope (remember units)

Volume (cm <sup>3</sup> )	Mass of Solid (g)				
	Antimony _____	Aluminum _____	Arsenic _____	Selenium _____	Silver _____
5	33.00 g	13.00 g	29.00 g	24.00 g	52.00
10	66.00 g	28.00 g	58.00 g	49.00 g	106.00
15	100.00 g	41.00 g	84.00 g	75.00 g	160.00
20	135.00 g	53.00 g	115.00 g	95.00 g	212.00
25	170.00 g	68.00 g	145.00 g	120.00 g	253.00
Density	_____	_____	_____	_____	_____



## Mercury Health Hazards

<http://www.nih.gov/od/ors/ds/nomercury/health.htm>

1. Identify 3 physical properties
2. Identify 2 chemical properties
3. Name 4 mercury compounds
4. Name 2 sources of mercury toxicity
5. Describe 2 symptoms of mercury toxicity
6. Identify 2 ways to prevent mercury toxicity

### **Toxicology: How Mercury Harms Humans**

Elemental (metallic) mercury and its compounds are toxic and exposure to excessive levels can permanently damage or fatally injure the brain and kidneys. Elemental mercury can also be absorbed through the skin and cause allergic reactions. Ingestion of inorganic mercury compounds can cause severe renal and gastrointestinal toxicity. Organic compounds of mercury such as methyl mercury are considered the most toxic forms of the element. Exposures to very small amounts of these compounds can result in devastating neurological damage and death. For fetuses, infants and children, the primary health effects of mercury are on neurological development. Even low levels of mercury exposure such as result from mother's consumption methyl mercury in dietary sources can adversely affect the brain and nervous system. Impacts on memory, attention, language, and other skills have been found in children exposed to moderate levels in the womb.

### **How Do People Get Exposed To Mercury?**

Air borne mercury is highly toxic when inhaled. How does it get in the air? Metallic mercury slowly evaporates when exposed to the air. The air in a room can reach contamination levels just from the mercury in a broken thermometer

Mercury may be released into the air when coal, oil, or wood are burned as fuel or when mercury-containing wastes are incinerated. The resulting mercury concentrations in outdoor air are usually low and of little direct concern. However, mercury in the air can fall to the ground with rain and snow, landing on soil or in bodies of water, causing contamination. Lakes and rivers are also contaminated when there is a direct discharge of mercury-laden industrial or municipal waste into the water.

When mercury enters bodies of water, biological processes transform it to methyl mercury, a highly toxic and bioaccumulative form. Fish can absorb methyl mercury from their food and directly from water as it passes over their gills.

The cycle of mercury in nature is complex.

1. Methyl mercury in the water and sediment is taken up by tiny animals and plants known as plankton.
2. Minnows and juvenile fish eat large quantities of plankton over time.
3. Larger predatory fish consume many smaller fish, accumulating methyl mercury in their tissues. The older and larger the fish, the greater the potential for high mercury levels in their bodies.
4. Fish are caught and eaten by humans and animals, causing methyl mercury to accumulate in human tissues.

Most people are exposed to mercury by eating fish containing mercury. Since mercury is tightly bound to proteins in all fish tissue, including muscle, there is no method of cooking or cleaning them that will reduce the amount of mercury in a meal.

From the mid-1950s to the 1970s, several mass poisonings took place in Japan and in Canada involving methyl mercury from consumption of fish from contaminated waters. Although instances of poisoning from fish consumption in the U.S. have not been reported, the possibility of such poisoning has been a subject of concern. In the U.S., the number of states that have issued health advisories limiting consumption of fish has risen steadily from 27 states in 1993 to 41 states in 1999. A total of 2,073 advisories were issued.

<http://www.epa.gov/waterscience/fish/>

Currently, concern is focused on the health impacts of chronic exposures to low levels of mercury from dietary sources. Preliminary estimates of mercury levels in hair and blood samples from the 1999 National Health and Nutrition Examination Survey suggest that approximately 10% of women have mercury levels within one tenth of potentially hazardous levels indicating a narrow margin of safety for some women.

<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5008a2.htm>. The National Research Council (NRC) issued a report estimating that as many as 60,000 newborns a year in the U.S. are now at risk for adverse neurodevelopmental effects from dietary mercury <http://www.nap.edu/books/0309071402/html>. These studies strongly support efforts to reduce methyl mercury exposure.

