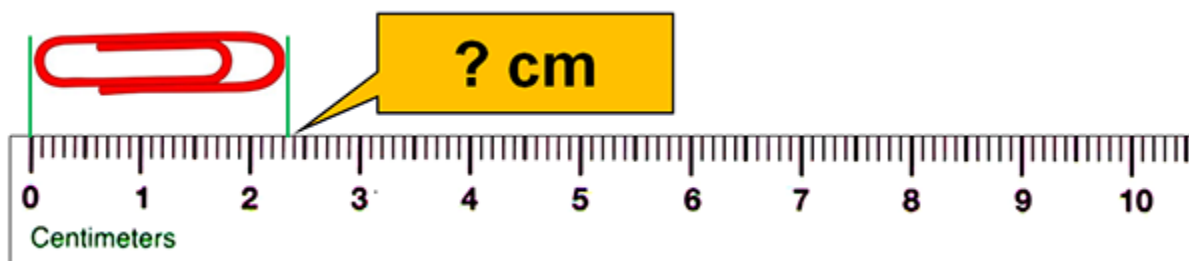


## Chapter 1 Review

1. Recognize parts of an experiment - independent and dependent variables, control, constants.
2. Know areas of chemistry - organic, biochemistry, analytical, inorganic, physical
3. Define and give an example of qualitative data
4. Define and give an example of quantitative data
5. Understand how to take a measurement (ruler, graduated cylinder - understand the meniscus).  
Estimate one digit past the given measurement markings.



6. Understand accuracy and precision. Is the following accurate, precise, neither or both
  - a. actual value = 2.33. Measured values: 2.3, 2.34, 2.33, 2.35
  - b. actual value = 11.43. Measured values: 16.3, 16.35, 16.30, 16.32
  - c. actual value = 7.89. Measured values: 3.2, 4.56, 1.23, 3.25

## Chapter 2 Review

1. If the density of aluminum is  $2.70 \text{ g/cm}^3$ , what is the mass of an aluminum sample with a volume of  $5.37 \text{ cm}^3$  ( $d = m/v$ )
2. A  $10.0 \text{ cm}^3$  sample of copper has a mass of 89.6 g. What is the density of copper? ( $d = m/v$ )
3. Convert 345.48 km to cm (  $100 \text{ cm} = 1 \text{ m}$  and  $1000 \text{ m} = 1 \text{ km}$ )

4. Convert 45 feet to inches (12 inches = 1 ft)
5. Express the following in scientific notation:
- a. 34,560,000,000 \_\_\_\_\_
  - b. 0.000002455 \_\_\_\_\_
  - c. 87,459,000 \_\_\_\_\_
6. Express the following in standard notation:
- a.  $5.67 \times 10^3$  \_\_\_\_\_
  - b.  $0.45 \times 10^{-6}$  \_\_\_\_\_

**How many significant figures are in the following?**

- |                  |                     |
|------------------|---------------------|
| 4. 19.30 _____   | 7. 69,000,000 _____ |
| 5. 1001 _____    | 8. 0.00007431 _____ |
| 6. 0.07130 _____ | 9. 1007953 _____    |

**Complete the following problems and put your answers in the correct number of significant figures**

- |                               |                           |
|-------------------------------|---------------------------|
| 10. $8.73 \times 2.6$ _____   | 14. $20.14 + 3.025$ _____ |
| 11. $5.85/2.77777$ _____      | 15. $27.1 + 32.786$ _____ |
| 12. $3.8888/3.2$ _____        |                           |
| 13. $55.77 \times 4.23$ _____ |                           |
16. What kind of graph do you use for the given set of data (bar graph, pie graph, line graph)
- a. Data: 43% milk chocolate, 22% dark chocolate, 35% white chocolate \_\_\_\_\_
  - b. Data: 87 people voted for Michigan, 43 people voted for Michigan State 27 people voted for Notre Dame and 2 people voted for Ohio State \_\_\_\_\_
  - c. Data: the freezing point data decreases as the percentage of solute increases \_\_\_\_\_

## Chapter 3 Review

1. Define the following:
  - a. Physical property
  - b. Chemical property
  - c. Physical change
  - d. Chemical change
2. Is the following a chemical or physical property?
  - a. acidity
  - b. boiling point
  - c. density
  - d. flammability
  - e. reacts with water
  - f. gray in color
3. Is the following a chemical or physical change?
  - a. rusting
  - b. chopping wood
  - c. burning wood
  - d. water boiling to produce steam
  - e. melting an ice cube
  - f. copper tarnishing
  - g. dissolving powdered lemonade mix in water
4. Are the following intensive properties or extensive properties?
  - a. volume
  - b. density
  - c. length
  - d. mass
  - e. color
  - f. melting point

5. For the states of matter Solid, Liquid or Gas - which ones have/do not have definite volume, definite shape, are/are not compressible and can/cannot flow?
  
6. What is a pure substance? Give two different examples.
  
7. What is the Law of Conservation of mass, and how does it relate to the mass of the reactants and products in an equation?
  
8. Describe separation techniques:  
 chromatography-  
 distillation-  
 filtration-  
 crystallization-
  
9. Classify each of the following as a substance or mixture. It is one or the other. If it is a substance, write “element” or “compound” in the substance column. If it is a mixture, write “heterogeneous” or “homogeneous” in the mixture column.

Type of Matter	Substance (element/compound)	Mixture (heterogeneous/homogeneous)
1. Nitrogen		
2. Water		
3. Soil		
4. Sugar water		
5. Oxygen		
6. Table salt		
7. CO <sub>2</sub>		
8. Air		
9. Steel		
10. Sand and water		

## Chapter 4 Review

1. Complete the following table:

	Symbol	Location	Mass	Charge
Proton				
Neutron				
Electron				

2. Define anion & cation

3. What does the atomic number tell you?

4. What does the mass number tell you?

5. What is an isotope?

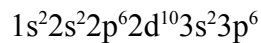
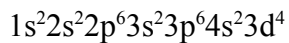
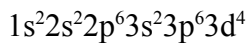
6. Complete the following table:

Chemical symbol	Protons	Electrons	Neutrons	Mass #
$^{14}_7\text{N}^{3-}$			7	
		10		24
	9	10	10	
$^{11}_5\text{B}$				11
$^{32}_{16}\text{S}^{2-}$				

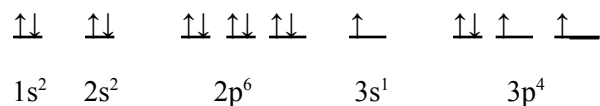
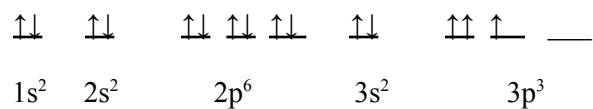
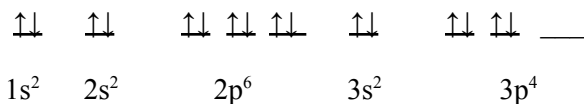
## Chapter 5 Review

- What are the maximum number of electrons in:
  - one orbital
  - d orbitals
  - p orbitals
  - s orbitals
  - 3rd energy level
- How many orbitals/sublevels are in:
  - 4th energy level
  - 3rd energy level
  - 2nd energy level
  - 1st energy level
- What is the highest energy level in potassium?
- What is the speed of light for any electromagnetic radiation?
- How does increased frequency of a wave affect energy? How does it affect wavelength?
- Answer the following:
  - What is the energy of radiation that has a frequency of  $7.6 \times 10^8$  Hz ( $h = 6.626 \times 10^{-34} \text{ J}\cdot\text{s}$ )?
  - What is the wavelength of radiation has a frequency of  $3.25 \times 10^{15} \text{ s}^{-1}$
- Use the electron configuration to identify the following elements:
  - $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^8$
  - $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^3$
  - $1s^2 2s^2 2p^1$
- Use the electron configuration to identify the element
  - $[\text{Xe}]6s^2 4f^{14} 5d^{10} 6p^1$  \_\_\_\_\_
  - $1s^2 2s^2 2p^6 3s^2 3p^4$  \_\_\_\_\_

9. Which electron configuration is written correctly?



10. Find the problem in the following orbital diagrams



11. What is the electron configuration for:

a.  $\text{O}^{2-}$

b.  $\text{Mg}^{2+}$

12. How many valence electrons are in a Selenium atom? \_\_\_\_\_

13. How many valence electrons are in a Chlorine atom? \_\_\_\_\_

## Chapter 6 Review

1. Identify each as a metal, nonmetal, or metalloid

a. Gold

### c. Silicon

b. Sulfur

d. Barium

2. Which element is in group 7 period 4?\_\_\_\_\_

3. Which period 3 element is in the following families?

a. Alkali metals\_\_\_\_\_

b. Halogens\_\_\_\_\_

c. Nobel gasses\_\_\_\_\_

d. Alkali earth metals

4. What is the trend in atomic size (radius) within groups and across periods?
5. Define electronegativity. Arrange F, Cl, S, O in order of increasing electronegativity?
6. Define ionization energy. Arrange Mg, Al, Si, P in order of increasing ionization energy?
7. What is special about noble gases?
8. Why do all atoms in the same group have the same chemical properties?
9. Compare the size of an anion to the neutral atom
10. Compare the size of a cation to the neutral atom
11. Which has the largest atomic radius?
  - a. N
  - b. O
  - c. P
  - d. S

## Chapter 7 Review

1. What are the properties of metals? nonmetals? Be able to identify metals and nonmetals on the periodic table.
2. How many electrons are transferred to form one formula unit of the compound  $\text{MgCl}_2$ ?
3. What ionic compound would you form with Ga and O? K and Cl?
4. How many electrons does Ca need to lose to obtain a noble gas configuration?
5. Describe the difference between a covalent and ionic bond. What type of elements form each bond?
6. What is resonance?

What is the charge of the ions from the following groups?

- |             |             |
|-------------|-------------|
| e. Group 1  | d. Group 15 |
| f. Group 2  | e. Group 17 |
| g. Group 13 | f. Group 16 |



7. What is the octet rule?

Complete the table:

Formula	Lewis Structure	Shape (write the name of the shape)	Polar or Nonpolar Molecule?
SI <sub>2</sub>			
N <sub>2</sub>			
CH <sub>4</sub>			

## Chapter 8 Review

Name	Formula
Carbon tetraoxide	
Nitrogen trisulfide	
	$\text{S}_3\text{O}_7$
	$\text{Na}_2\text{S}$
Hydrobromic acid	
Ammonium chloride	
	$\text{PbO}_2$
	$\text{HCN}$
Nitrous acid	
Calcium carbonate	
	$\text{CoBr}_2$
Cobalt (II) Nitrate	
	$\text{Hg}_2\text{S}$