

## Review Topics for Exam 1

**Text coverage** (with significant focus on items covered in class):

Section numbers correspond the 14<sup>th</sup> edition of the text

- Chapter 1: All sections
- Chapter 2: All sections
- Chapter 3: Sections 3.5-3.8
- Chapter 4: All sections
- Chapter 6: 6.3 and 6.4 (we may not get this far)

**Terms you should understand:**

amu	density	law	orbital
atom	double bond	Lewis structure	p orbital
atomic mass	electronegativity	mass number	polar covalent bond
atomic number	electronic configuration	metalloid	polyatomic ion
Avogadro's number	electrons	metals	protons
bond dipole	element	mixture	quantum
calorie	energy	molar mass	s orbital
chemical compound	heat	mole	single bond
chemical element	hypothesis	molecule	theory
chemical formulas	intermolecular force	neutrons	triple bond
core electrons	ionic bond	nonmetals	valence electrons
covalent bond	isotope	nonpolar covalent bond	valence shell
d orbital	joule	octet rule	

### Concepts

1. You should be able to explain the scientific method
2. You should be able to calculate percent composition of mixtures and to calculate amounts of each component of a mixture from a given percent.
3. You should be able to identify and differentiate chemical and physical properties and changes
4. You should understand how the Celsius and Kelvin temperature scales are related.
5. You should be able to relate density, mass and volume.
6. You should be able to use metric prefixes and dimensional analysis to perform conversions.
7. You should understand the Law of Conservation of Matter, Law of Definite Proportions and Law of Multiple Proportions.
8. You should understand Dalton's atomic theory and its shortcomings.
9. You should be able to explain what a mole is and be able to use the mole to relate a mass of a compound (or element) to the number of molecules.
10. You should be able to interpret the Periodic Table as a function of atomic number, families, rows, electron configuration and valence (outer shell) electrons. Know the common names of family such as halogens, alkali metals, noble gases etc.
11. You should have an understanding of the Bohr and quantum mechanical models of the atom.
12. You should know how to fill atomic orbitals based on an element's atomic number to determine the electron configuration.
13. You should understand ionic and covalent bonding and the differences between the two.
14. You should be able to convert between names and formulas following the rules for naming ionic and covalent compounds.
15. You should know the names, formulas and charges for the polyatomic ions in table 4.4 and be able to use polyatomic ions to build compounds.
16. You should know how to create a Lewis structure from a chemical formula and predict its shape using VSEPR.
17. From the shape of a molecule and an understanding of electronegativity, you should be able to predict whether a molecule will be polar.
18. You should be able to predict the types of intermolecular forces a compound can experience and discuss how intermolecular forces relate to properties like solubility and boiling point.