**Lesson Plans for September 26th – October 3rd**

**AP Chemistry 2013-2014**

**Ms. Diane Paskowski**

***007 - Chemical Bond***

**Massachusetts Science Curriculum Frameworks**

4.1 Explain how atoms combine to form compounds through both ionic and covalent bonding. Predict chemical formulas based on the number of valence electrons.

4.2 Draw Lewis dot structures for simple molecules and ionic compounds.

4.3 Use electronegativity to explain the difference between polar and nonpolar covalent bonds.

4.4 Use valence-shell electron-pair repulsion theory (VSEPR) to predict the molecular geometry (linear, trigonal planar, and tetrahedral) of simple molecules.

**College Board AP Chemistry Curriculum Standards**

Big Idea 1: The chemical elements are fundamental building materials of matter, and all matter can be understood in terms of arrangements of atoms. These atoms retain their identity in chemical reactions.

* **Enduring understanding 1.A:** All matter is made of atoms. There are a limited number of types of atoms; these are the elements.
  + **Essential knowledge 1.A.1:** Molecules are composed of specific combinations of atoms; different molecules are composed of combinations of different elements and of combinations of the same elements in differing amounts and proportions.

Big Idea 2: Chemical and physical properties of materials can be explained by the structure and the arrangement of atoms, ions, or molecules and the forces between them.

* **Enduring understanding 2.C:** The strong electrostatic forces of attraction holding atoms together in a unit are called chemical bonds.
  + **Essential knowledge 2.C.1:** In covalent bonding, electrons are shared between the nuclei of two atoms to form a molecule or polyatomic ion. Electronegativity differences between the two atoms account for the distribution of the shared electrons and the polarity of the bond.
  + **Essential knowledge 2.C.2:** Ionic bonding results from the net attraction between oppositely charged ions, closely packed together in a crystal lattice.
  + **Essential knowledge 2.C.3:** Metallic bonding describes an array of positively charged metal cores surrounded by a sea of mobile valence electrons.
  + **Essential knowledge 2.C.4:** The localized electron bonding model describes and predicts molecular geometry using Lewis diagrams and the VSEPR model.
* **Enduring understanding 2.D:** The type of bonding in the solid state can be deduced from the properties of the solid state.
  + **Essential knowledge 2.D.1:** Ionic solids have high melting points, are brittle, and conduct electricity only when molten or in solution.
  + **Essential knowledge 2.D.2:** Metallic solids are good conductors of heat and electricity, have a wide range of melting points, and are shiny, malleable, ductile, and readily alloyed.
  + **Essential knowledge 2.D.3:** Covalent network solids generally have extremely high melting points, are hard, and are thermal insulators. Some conduct electricity.
  + **Essential knowledge 2.D.4:** Molecular solids with low molecular weight usually have low melting points and are not expected to conduct electricity as solids, in solution, or when molten.

**Lesson Plans**

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**Wednesday, September 25th**

**H day**

Period 3

Lecture/discussion/problems: PowerPoint presentation on Covalent and ionic bond, animations on the three types of bonds, energy considerations (Coulomb’s Law), compare and contrast ionic and covalent, patterns of electronegativity and effective nuclear charge.

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**Thursday, September 26th**

**A day**

Periods 2 and 3

Lecture/discussion/demonstration: Ionic - Predicting formulas of ionic compounds, lattice energy considerations, Lewis structures and crystal lattices – Coulomb’s Law again. Diagraming the formation of an ionic bond

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**Friday, September 27th**

**B day**

Periods 2 and 3

Lecture/discussion/ demonstration/lab activity: Covalent compounds, bonding models, properties. Using electron configuration to show covalent bonding. Simple Lewis Structures for covalent molecules. Predicting polarity introduction.

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**Monday, September 30th**

**C day**

Period 2

Lecture/Discussion: Metallic bonds and the properties of metals. Review bonding.

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**Tuesday, October 1st**

**D day**

Period 3

Lecture/Discussion: Compare and contrast ionic, covalent and metallic compounds, energy considerations, and properties.

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**Wednesday, October 2nd**

**E Day**

Periods 2

Assessment: Quiz on bonding basics

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**Thursday, October 3rd**

**F Day**

Period 2 and 3

Lab Activity: Ionic, covalent, metallic?

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