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Curriculum Design
Atomic Theory

Sequencing Rationale

The atomic theory unit is organized according to the concept-related sequencing pattern where a logical order is followed in material presentation. Other sequencing patterns could be used for higher levels of chemistry, but at the introductory level, the concept-related pattern works well.

The first subunit, *Discovery and Theories*, provides a starting point for students as they start learning about the atom. In 9th grade chemistry, the atom is briefly introduced by stating that all matter is made from atoms. In 10th grade chemistry, the details about atomic structure are revealed. Before jumping into breaking down atoms, it makes sense to provide students the opportunity to explore the history of atomic theory development. This subunit allows students to see how theories have changed over time, but more importantly how each new theory tends to build on or improve the theories that preceded it. This history rich subunit should give students an appreciation of the accomplishments of past scientists. Students often ask, "How do we know what an atom looks like if we can't see it?" This subunit provides an excellent opportunity for them to see how theory developed and has changed and will continue to change.

The second subunit, the Periodic Table, is closely connected to the first subunit. As students learn about the scientists, they learn who discovered the three subatomic particles and how they were discovered. Students then learn how this information can be deciphered from the periodic table. In 9th grade chemistry, students again get a brief introduction to the periodic table when they learn about the major categories of elements (metals, nonmetals and metalloids) and periods and groups In 10th grade chemistry, they are responsible for determining the number of

protons, neutrons, and electrons for an atom. Students begin drawing and building models of atoms. Students learn how protons and electrons interact to give an atom its neutral charge. Soon students learn how the loss or gain of electrons causes the formation of ions. Students can then distinguish between an ionic compound and a covalent compound. This second subunit ends with students able to write chemical formulas from names of compounds and to also write balanced, chemical equations in order to obey the Law of Conservation of Matter.

To conclude the Atomic theory unit, students will learn about nuclear chemistry. This is learned last since students must understand atomic structure before they learn about the nuclear processes of fission and fusion. With fission learned, students can proceed onto more complicated matters such as radioactive decay and radioactive particles. This final subunit allows students to get a better understanding of nuclear energy. Nuclear energy for both destructive and constructive purposes plays an ever-increasing role in the world. Students need to understand the importance of responsible nuclear energy use.