Rubens' Chemistry

at Golden Valley High School

First Quarter

MODULE I Classroom Routine & The Scientific Method

1. **Introductions, Classroom Procedures, Grading**
   A discussion of Rubens' General Chemistry. Homework and grading policies, parental communication procedures, SCIDUDE.com website, required materials, the weekly agenda. California Content Standards. Classroom Conduct.

2. **The Science of Chemistry**
   Specialties in field of chemistry. Current opportunities and the future of chemistry.

3. ***QUIZ 1: Chemistry Classroom Policies, Rules, Procedures, Chem Careers***

MODULE II Measurement and Units of the S.I. System

1. **The Metric system** ***I&E 1a, 1b***
   Base units of measure and the S.I. system. Prefixes used in the metric system.

2. **Length, Volume, Mass, Density and Specific Gravity** ***I&E 1a, 1e***
   Measuring length. Identifying glassware. Determining the volume of liquids and solids. Determining mass using the balance. Calculating density and specific gravity. Interpolation.

3. ***LAB 1: Measurement***

4. ***QUIZ 2: Metrics and Measurement***

MODULE III Calculations and the Mathematics of Chemistry

1. **Significant Figures and Rounding** ***I&E 1a, 1b, 1d, 1e***
   The limitations of measurements. Reporting numbers. Rounding.

2. **Scientific Notation—the power of 10** ***I&E 1b,1d, 1e***
   Adding, subtracting, multiplying and dividing very large or very small numbers using scientific notation.

3. **Dimensional Analysis** ***I&E 1a, 1d, 1e***
   Conversion factors. Solving complex problems with a single calculation.

4. ***QUIZ 3: Mathematics of Chemistry***

MODULE IV The Nucleus

1. **Early Discoveries Of Atomic Structure** ***I&E 1d, 1k, 1g*** ***Chem 1e, 1h, 1i***
   Early Concepts of Matter. How Dalton, Thompson, Rutherford, Bohr, Millikan, and others contributed to our modern understanding of the atom.

2. **The Proton** ***Chem 1a, 1e***
   How the Proton determines an element's identity. The AMU. Nuclear charge. Introduction to the Periodic Table of the Elements.

3. ***QUIZ 4: Early Atomic Discoveries & The Proton's Role***

4. **The Neutron** ***Chem 1a, 1e, 11a, 11c***
   Uncharged nucleons and their effect on the stability of the atom. Identifying Isotopes. The Strong Nuclear Force. Stable vs. Radioisotopes. The increasing ratio of Neutrons to Protons.

5. ***QUIZ 5: The Role of the Neutron & Identifying Atomic Isotopes***

6. **Radioactive Decay** ***Chem 11a, 11b, 11c, 11d, 11e, 11f, 11g***
   Transmutation. The Weak Nuclear Force. Alpha, Beta and Gamma Decay. Electron capture. Radioactive Decay Series.

7. ***QUIZ 6: Radioactive Decay***

8. **Harnessing The Nucleus & Elemental Particles** ***Chem 11b, 11e***
   Fission & Fusion. The development of nuclear weapons. Trinity and Beyond. Hiroshima and Nagasaki. Nuclear Power Plants. TMI and Chernobyl. Nuclear Medicine. Particle accelerators. Quarks and other "sub-subatomic" particles. Fears about nuclear power: The China Syndrome

9. ***QUIZ 7: Harnessing and Exploring The Nucleus***
10. ***ASSIGNMENT A: Nuclear Power In America***

MODULE V Electrons, Orbitals and Electron Configuration

1. **The Bohr Model of the Atom** ***Chem 1c, 1e, 1i***
   Mass and size of the electron. Electron Shells and Energy levels.

2. **Orbitals—the true behavior of electrons.** ***Chem 1e, 1g, 1i, 1j***
   Understanding how electrons "stack up" around the nucleus. The Quantum Mechanical Model. Atomic Line Spectra.

3. ***LAB 2: Making and Using a SPECTROSCOPE***

4. ***LAB 3: The Science of Fireworks—Exciting the elements***

5. ***Quiz 8: Orbits, Orbitals, and the Quantum Mechanical Model***

6. **Electron Configuration** ***I&E 1f, 1g, 1k Chem 1a, 1c, 1e, 1i***
The "stacking order" of electrons around the nucleus. Writing electron configurations. The Aufbau Principle, Pauli Exclusion and Hund's rules.

7. Quiz 9: Electron Configuration

8. **Valence** ***I&E 1f, 1g Chem 1d, 1e, 1g, 1g***
The relationship between electron configuration and reactivity of elements. How strongly the nucleus holds on to its electrons. Electronegativity. Identifying valence electrons.

9. **The Lewis Dot Diagram** ***Chem 1d, 1g, 2e, 2f***
Expressing Electron Configuration with the Lewis Dot Diagram.

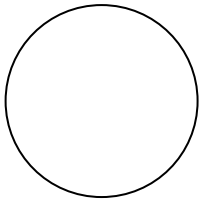
10. Quiz 10: Valence Electrons & The Lewis Dot Diagram

Safety Module

No student may participate in any lab activity until all safety modules below have been completed

SAFETY MODULE A: Lab Safety Rules
All chemistry students are required to be completely familiar with all lab safety rules and abide by these rules at all times or risk termination of lab privileges. Students MUST report all violations witnessed in class. Module A is completed upon student's signature and parent's signature on rule sheet. This document MUST be in student's possession at all times during any lab activity.

SAFETY MODULE B: Lab Follies
Student must satisfactorily demonstrate the ability to identify safety violations found in text of lab incident reports.
Teacher's initials/stamp required.



SAFETY MODULE C: Lab Safety Written Test
Student must complete the lab safety test with a score of 100% or completion of Lab Safety Test Essay(s) for missed questions.
Teacher's initials/stamp required.