

Semester II

THE FOLLOWING SCHEDULE IS SUBJECT TO CHANGE AT THE TEACHER'S DISCRETION

MODULE I Chemical Reactions: A Hands-on Review

- 1. The Single-Replacement Reaction** *Chem 2a*
Activity Series of metals. Electronegativity and the molecular tug-of-war. Writing single-replacement reactions.
- 2. The Double-Replacement Reaction** *Chem 2a*
When molecules “trade partners.” Writing double-replacement reactions. Common examples of double-replacement reactions.
- 3. *LAB 1: Single and Double Replacement Reactions***
- 4. *QUIZ 1: Single & Double Replacement Reactions***
- 5. The Combustion Reaction** *Chem 2a*
The importance of oxygen in reactions. Naming and combusting Hydrocarbons.
- 6. The Acid-Base Reaction** *Chem 2a*
Acids and bases—special ionic substances. The Neutralization reaction.
- 7. *LAB 2: Combustion and Acid Base Reactions***
- 8. *QUIZ 2: Combustion & Acid-Base Reactions***
- 9. Writing and Balancing Chemical Reactions** *Chem 2a, 3a*
Conservation of Mass. The Steps To A Balanced Reaction.
- 10. *QUIZ 3: Writing and Balancing Chemical Reactions***

MODULE II Quantifying and Measuring Atoms & Molecules

- 1. The Mole—How Tiny Atoms Can Be Counted** *Chem 2a, 3b, 3c, 3d*
Avogadro's Number. Atomic Mass and The Mole. Moles of a gas and STP—the relationship between volume, mass and moles.
- 2. Percent Composition, Empirical & Molecular Formulas** *Chem 3a, 3d*
Calculating percent composition of a substance. Using percent composition to determine the empirical and molecular formulas of a substance.

- QUIZ 4: Molar Masses, Percent Composition & Formulas.**
- Solutions** *Chem 6a, 6b, 6c, 6d, 6e, 6f*
Calculating MOLARITY. Dilutions. Solving problems relating to concentrations and dilutions. Colligative Properties. Vapor Pressure. Molality.
- QUIZ 5: Solutions and Their Concentrations**

MODULE III Stoichiometry

- Predicting Yields In Reactions** *Chem 3f, 3e*
Conservation of Mass. Using Molecular Formulas and Molar Masses to predict quantities of products in a reaction. Finding unknown quantities.
- LAB 3: Predicting Yield In Chemical Reactions**
- QUIZ 6: Yield**
- Percent Yield** *Chem 3f*
The reality of chemical reaction yields. Calculating percent yield in chemical reactions from balanced reactions, molar masses and measured results.
- LAB 4: Calculating Percent Yield**
- QUIZ 7: Chemical Reactions & Percent Yield**
- Limiting Reagents In Chemical Reactions** *Chem 3a, 3e*
Using balanced reactions to predict which reagent will be exhausted and which reagent will remain. How much remains?
- LAB 5: Limiting Reagents**
- QUIZ 8: Limiting Reagents**

MODULE IV Kinetic Molecular Theory & Phase

- Solid, Liquid or Gas** *Chem 4a, 4b, 4g*
The behavior of molecules in various states. KMT and molecular motion. Phase change. Heating Curves. Phase Diagrams and the Triple Point. Sublimation.
- LAB 6: The Heating Curve of Water**
- QUIZ 9: KMT and Phase Change**

- 4. Temperature** *Chem 4d, 4e, 4f, 4g*
Units of temperature—Fahrenheit, Celsius and Kelvin Temperature Scales.
Converting temperatures. Absolute zero. The Global Warming Controversy.
- 5. LAB 7: Temperature and Equilibrium**
- 6. QUIZ 10: Temperature**

MODULE V The Behavior Of Gasses

- 1. Boyle's Law** *Chem 4c*
The relationship between PRESSURE and VOLUME of a gas. Units of pressure.
- 2. LAB 8: The Relationship Between Pressure & Volume Of A Gas**
- 3. QUIZ 11: Boyle's Law**
- 4. Charles' Law** *Chem 4c*
The relationship between TEMPERATURE and VOLUME of a gas.
- 5. LAB 9: The Relationship Between Temperature & Volume Of A Gas**
- 6. QUIZ 12: Charles' Law**
- 7. Gay-Lussac's Law** *Chem 4c*
The relationship between TEMPERATURE and PRESSURE of a gas.
- 8. LAB 10: The Relationship Between Temperature & Pressure Of A Gas**
- 9. QUIZ 13: Gay-Lussac's Law**
- 10. The Combined Gas Law** *Chem 4c*
Calculations simultaneously relating Temperature, Pressure and Volume.
- 11. The Ideal Gas Law** *Chem 4h*
Solving complex calculations that quantize molar masses with the gas laws to produce objective predictions.
- 12. Other Important Gas Laws** *Chem 4i*
Avogadro's Hypothesis. Dalton's Law of Partial Pressure. Diffusion and Effusion.
Graham's Law.
- 13. QUIZ 14: The Behavior Of Gasses**