

Science Infinity Chemistry Syllabus

The following syllabus is based on the book *Chemistry: The Central Science* by Brown and Lemay. If you are interested in more comprehensive lessons, I suggest that you acquire a copy of the book. The syllabus below will have labels that indicate which chapter/section of the book each topic can be found in, so that, if your child wants to explore more about the topic, they know where to go.

These topics will be similar to those in Chemistry 2, but taught at a more elementary level.

Homework:

There will be some reading homework every time the class meets. This is only to help reinforce what has been learned during class, and to clear up any doubts during class. Additionally, students will be required to solve some of the review questions at the end of each chapter. This work should be legible, and in a notebook or loose-leaf notebook paper. Any questions about the homework will also be addressed.

Quizzes/Tests:

There will be occasional tests and quizzes. Tests will be announced ahead of time, but there might be a few pop quizzes, so that the teachers can understand what needs to be retaught. These quizzes will take no longer than 10 minutes, so don't stress over this. The tests will take up a good chunk of class time, and will be graded and handed back either during the class itself, or the next class.

| Chapter | Topic |
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| 4 | Types of Chemical Reactions (review) Synthesis, Single Replacement, Double Replacement, Decomposition, and Combustion. |
| 3 | Stoichiometry Molar Mass, Mole to Mole conversions, Gram to Mole conversions, Gram to Gram Conversions, Percent Composition, Empirical and Molecular Formulas, Limiting and Excess Reagents. |
| 13 | Keq – Introduction to Equilibrium Chemistry Definition of Equilibrium, Qualitative Meaning of the Equilibrium Constant, Quantitative Definition of the Equilibrium Constant, Equilibrium Calculations with and without Approximations. |
| 13 | Le Chateliers Principle – Equilibrium Chemistry Lesson 2 Definition of Le Chatelier's Principle, Qualitative Examples of Le Chatelier's, Factors that affect Equilibrium Position, Le Chatelier's Calculations. |
| 14/15 | Acid Base Equilibrium – Equilibrium Chemistry Lesson 4 Acid and Base Definitions, Common Strong Acids and Bases, Understanding the pH Scale, Calculating the pH of Strong and Weak Acid Solutions, Bases, Polyprotic Acids. |

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| 6/17 | <p>Thermochemistry and Thermodynamics</p> <p>Qualitative Discussion of Entropy, Enthalpy, Work, and Gibbs Free Energy, Discussion of Reaction Spontaneity, Thermodynamic Calculations to Determine Spontaneity.</p> |
| 7/20/21 | <p>Periodicity</p> <p>Periodic Properties: Group 1A, Hydrogen, Group 2A, Group 3A Elements, Group 4A Elements, Group 5A Elements, Group 6A Elements, Group 7A Elements, Group 8A Elements, Transition Metals (D Block).</p> <p>Quantum Model: Electron Configuration, Quantum Numbers, Orbital Energies, Pauli Exclusion Principle, Aufbau Principle, Heisenberg's Uncertainty Principle.</p> <p>Periodic Trends: Ionization Energy, Electron Affinity, Atomic Radius.</p> |
| 5 | <p>Gas Laws</p> <p>Pressure, Volume, Temperature Definitions, Boyle's Law, Charles' Law, Dalton's Law, Ideal Gas Law, Kinetic Molecular Theory, Effusion and Diffusion.</p> |
| 12 | <p>Kinetics</p> <p>Qualitative Discussion of Kinetics, Rate Constants, Rate Laws, Kinetics Calculations, Steady-State Approximation, Catalysts, Reaction Mechanisms</p> |