

Students will create a review booklet for what we have covered in chemistry. This is will be comprised of “cheat sheet” for each unit. Each unit must be at least 1 page (but no more than 2 pages per unit) and no larger than 8x11”. Pages may be typed but NOT CUT & PASTE!! This is for your benefit to help you prepare for your upcoming SOL!!! Pages must be legible.

10 pts per section (10 x 9 = 90) & 10 pts for neatness and overall appearance (90 + 10 = **100pts!!!**)

Each section must contain the following minimum:

Part 1: The Atom: Democritus. Scientists-Dalton (include model of the atom), Thomson (include model of the atom & experiment), Rutherford (include model of the atom & experiment), Millikan (include experiment), Bohr (include model of the atom), Planck, Heisenberg, & de Broglie. How to Find: Atomic #, Atomic Mass, Mass #, #p⁺, #e⁻, #n, Isotopes, Ions- Cation & Anion, Hund's Rule, Aufbau, Pauli Exclusion Principle, Electron configuration for Copper, Orbital Diagram for Chromium and both for Bromine, Electron Configuration for N⁻³. Composition, shielding, and penetrating power of alpha, beta, and gamma.

Part 2: Periodic Table: Importance of Mendeleev and Mosely. Draw 2 periodic tables. On the first label metals/non-metals/ metalloids, each group #, Alkali metals, Alkaline Earth Metals, Transition Metals, Halogen, Nobel Gases/Inert Gases, Oxidation # above each group, Periods, Blocks-s,p,d,f. On the 2nd table draw the overall increasing trend for electronegativity, ionization energy, shielding effect, and atomic radius. Define/Describe each trend as well as cation size & anion size vs. neutral atom

Part 3: Bonding & Naming: Ionic- naming rules and example, formula rules and example, and properties. Covalent- naming rules and example, formula rules and example, and properties; VSEPR- shapes, bond polarity, molecular polarity, electronegativity difference chart, and describe all Intermolecular Forces. List Polyatomic Ions with formulas for Ammonium, Acetate, Hydroxide, Chlorate, Nitrate, Sulfate, Phosphate, & Carbonate. Name & formula for ammonia and methane.

Part 4: Chemical Reactions & Stoichiometry: Indicators of chemical reaction, ways to increase reaction rate, types of reactions (include neutralization & redox), & show how to balance 2 problems one must be a combustion reaction. What does (aq) and (s) indicate in a reaction and how is it determined? Discuss/explain a reaction at equilibrium and Le Chatelier's principle. Show how to solve 3 stoichiometry problems must include a mole → mole; gram → gram; and liter → molecules problem.

Part 5: Acid, Bases & Solutions: Homogeneous versus Heterogeneous. Ways to increase solubility rate and parts of a solution-solute & solvent. Seven separation techniques. Explain the following unsaturated, saturated, super saturated, concentrated, dilute, miscible, Immiscible, like dissolves like, pH scale, neutralization, naming acid rules, acids, bases including ammonia, colligative properties, and electrolytes. Explain how to set up and perform a titration including what is your final goal.

Part 6: States of Matter & Gases: States of Matter- solids, liquids, gases, phase changes, Draw a heating curve, Draw a phase diagram, Label the states and phase changes include directionality. Be sure to label axis's!!! Describe the following relationships include graphs for each: Boyle's Law, Lussac's Law, & Charles Law. Explain each effusion, diffusion, & Graham's Law. Relationship between atm → mmHg → kPa. Explain Kinetic Molecular Theory, gas pressure, absolute Zero & elastic collisions.

Part 7: Thermochemistry: Heat vs. Temperature and include units for each. Endothermic vs. Exothermic include: a physical and chemical example of each, a thermochemical equation for each, and draw a reaction pathway diagram (potential energy diagram) for each and label the products, reactants, ΔH , activated complex, and activation energy. Explain enthalpy and entropy. Show how to solve thermochemical reaction stoichiometry problem. Show how to use Heat of Fusion/Vaporization.

Part 8: Math: Metric prefixes (kilo \rightarrow milli) and SI Units of measurement. ALL FORMULAS!!! Percent error, percent yield, density, inversely proportional, directly proportional, independent variable on a graph, dependent variable on a graph, average atomic mass, half-life, empirical formula/rules, molecular formula, percent composition, ideal gas law, Dalton's partial pressure, Boyle's Law, Lussac's Law, Charles Law, Combined Gas Law, $Q=mc\Delta T$, Molarity, Dilution, pH, pOH, Molar Mass, Significant Figure Rules \pm \times/\div Avagadro's #, Standard Temperature, Standard Pressure, and $^{\circ}\text{C} \rightarrow$ Kelvin.

Part 9: Laboratory: Accuracy vs Precision. Function of lab equipment: beaker, Erlenmeyer flask, test tube, graduated cylinder, test tube rack, test tube holder, ring stand, wire gauze, clay triangle, crucible with lid, evaporating dish, watch glass, wash bottle, volumetric flask, buret, & dropping pipette. Measuring with correct number of significant figures. What are the following used for: safety shower, fume hood, eye wash, and fire blanket. Steps of the scientific method, independent variable, and dependent variable.

Matter Flowchart and any other information you may need to succeed!!!

Flashback Quizzes – At the end of every week. You may use your SOL booklet.

#1: The Atom – April 23 & 24

#2: The Periodic Table – April 30 & May 1

#3: Bonding & Naming – May 7 & 8

#4: Reactions, Balancing & Naming– May 14 & 15

#5: Atoms, Ions, e^{-} Configuration & Naming – May 21 & 22