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The Chemical Context of Life

- I. Matter
 - a. Element
 - b. Compound
 - c. Essential elements of life
 - i. Macronutrients—C, H, N, O, P, S
 - ii. Micronutrients—Ca, K, Na, Cl, Mg,
 - iii. Trace elements—B, Cr, Co, Cu, F, I, Fe, Mn, Mo, Se, Si, Sn, V, Zn
- II. Structure of Matter
 - a. Nucleus
 - i. Protons
 - ii. Neutrons
 - b. Electron cloud
 - i. How many energy levels are there and what is their use?
 - ii. Electrons get “excited” and jump up energy levels; doing so potential energy is converted to kinetic energy when they fall back to ground state
 - iii. What are valence electrons and describe their use
 - c. Charge in an atom
 - d. Atomic number
 - e. Atomic mass
 - f. Isotopes
 - i. Difference between stable and radioactive
 - ii. Uses for isotopes
- III. Bonding
 - a. What are they and why do they form?
 - b. Compare and contrast covalent, ionic, metallic, hydrogen bonds
 - c. What is a single, double and triple bond?
 - d. Compare/contrast structural formulas with molecular formulas
 - e. What is valence?
 - f. What is the difference between polar and nonpolar molecules? Give examples of each and explain why they are classified as such.
 - g. When do ionic bonds form and why?
 - h. Define salts
 - i. Why is molecular shape important in biology?
- IV. Chemical Reactions

- a. Why do chemical reactions occur?
- b. Write an equation describing a chemical reaction. Label products and reactants.
- c. When does a chemical reaction stop?