

Chapter Two Study Guide
Chemistry Part One // (2025/11/19)

- 1 When was the idea of an atom first proposed?
- 2 When was the modern atomic theory formulated? What are the main features of this theory? (5)
- 3 What is said to be the single most important document in the entire world? Nickname?
- 4 What is the atomic number? What is the atomic number?
- 5 What do you know if you know an atoms location on the periodic table's period or group?
- 6 How do electrons move in metal and nonmetal atoms?
- 7 What are the three elemental atomic particles? What are the properties of these three particles? Where is the location of these particles? What do we call the center of the atom? What particles are in the center of the atom? Why are atoms electrically neutral?
- 8 What is a valence electron? How do you identify the valence electron by the periodic table?
- 9 What elemental particle defines the chemical property of an atom?
- 10 What elemental particle defines how atoms form chemical bonds to make molecules?
- 11 What is a chemical bond? What characteristics define covalent, polar covalent, hydrogen, and ionic bonds? Give examples.
- 13 What do we know when illustrating a covalent bond when there is a solid line between two atoms? Two solid lines?
- 14 What is the octet rule? How many electrons fit into the first orbit? How many atoms fit in all other orbits?
- 15 Oxygen is a covalent molecule and water is a covalent compound? What is the distinction? (Note: this is often not practiced.)
- 16 Draw a water molecule to illustrate the molecule as a polar covalent? Why might you want to think of this molecule as a molecular magnet?
- 17 Draw NaCl molecule to illustrate electron movement forming an ionic bond? Which atom is the metal and which atom is the nonmetal?
- 18 How are ions formed? What is the difference between a cation and anion? Use NaCl as your example compound.
- 19 How is the structure of NaCl different when it is dry vs when it is in water? Use the term hydration sphere in your answer? How is the water compound orientated between the sodium and chloride?
- 20 How are hydrogen bonds different than ionic and covalent bonds? What do hydrogen bonds do? How are hydrogen bonds illustrated in a graphic form? Why does ice float? Why can some bugs walk on water?

- 21 What is an isomer?
- 22 What is a free radical? Are they dangerous? Why? What type of molecule neutralizes free radicals? Do we use free radicals to kill bacteria? Explain Why is anoxia dangerous?
- 23 What is an isotope?
- 24 What are electrolytes?
- 25 What is the difference between hydrophilic and hydrophobic? Give examples.
- 26 What is a mixture? What are the three types of mixtures? What characteristics define the different mixtures? What type of molecule forms a solution? What type of molecule form colloids? What may form a suspension?
- 27 What is pH? What do you measure to determine pH? What is an acid? What is a base? What is the benchmark for blood pH?
- 28 What is the pH scale range? Strongest acid? Strongest base?
- 29 What is the difference between an acid, base, and salt? What do you make when you add equal concentration of an acid and a base?
- 30 What is a buffer?
- 31 What is the most important reversible reaction in human physiology? Write and label the reactants and products. What enzyme is the catalyst?
- 32 What is the function of an enzyme? What is the enzymes nickname?
- 33 What is metabolism? What occurs in a catabolic reaction? What occurs in an anabolic reaction?
- 34 What occurs when a molecule is oxidized? Reduced? Illustrate an oxidation-reduction reaction using NaCl .

Chemistry: Part 2

- 35 What two atoms must be present for a molecule to be organic?
- 36 How many valence electrons are in a carbon atom? Significance?
- 37 What occurs during dehydration synthesis? What links the dimer?
- 38 What occurs in hydrolysis?
- 39 Are carbohydrates hydrophilic or hydrophobic?
- 40 What is the chemical formula for glucose, galactose, and fructose? These monosaccharides are what type of molecules?

- 41 What three type of polysaccharides are made with glucose? Function of each?
- 42 What are some of carbohydrates functions?
- 43 Are lipids hydrophobic or hydrophilic? Why?
- 44 What is the structure of a fatty acid? Why is it called an acid?
- 45 What is the structure of a triglyceride? Primary function?
- 46 What is the structure of a phospholipid? What is unique about its structure?
- 47 What type of structures may be formed with phospholipids?
- 48 What is the structure of cholesterol? Do plants make cholesterol? Do we metabolize cholesterol for energy? What functions do cholesterol provide?
- 49 What is the difference between HDL and LDL? Structure? Function?
- 50 What is the structure of proteins? Monomers? Why is it called an amino acid? How many different "R" groups?
- 51 What is protein's tertiary structure? How may you disrupt this structure? (3 ways) What is this called? Is this reversible?
- 52 What are protein's functions?
- 53 What is an enzyme? Type of molecule? What is the significance of a word ending in ose or ase? What do enzymes do? Are they consumed in the reaction? Are they fast acting?
- 54 What type of molecule are nucleotides? What are the three components of a nucleotide? What is the difference between DNA and RNA?
- 55 What is the significance of adenosine triphosphate? What is the precursor to ATP?
- 56 What is glycolysis? Location? Makes how many ATP? Need oxygen?
- 57 What is the Krebs cycle/electron transport chain? Location? Need oxygen?
- 58 What is a cofactor? Function?
- 59 What is a coenzyme? Function?