

Chemistry 1 Learning Objects Wish List

Unit 1:

- Visuals of lab equipment—graduated cylinders, pipettes, burettes, test tubes and demonstrations of their use—measuring from the bottom of the meniscus, making drops, titrating by drops, observing colour changes
- Self-quiz on metric conversions (kilo, milli, deci, centi, micro, mega), conversion of numbers to scientific notation, selection of correct number of significant figures

Unit 2

- Visuals of atoms, molecules and compounds
- Identify elements on the periodic table by type—alkali metals, alkaline earth metals, transition metals, metalloids, non-metals, halogens, noble gases
- Identify properties of types of elements from their position on the periodic table
- Identify valence by position on the periodic table or vice versa
- Identify names of common elements from their atomic symbol and vice versa
- Make Lewis dot diagrams of valence electrons based on atomic number

Unit 3

- Naming ionic and covalent compounds
- Prediction of the type of bond that will be made between two atoms
- Prediction of ionic charge based on atomic number
- Using charge balance to write formulae of ionic compounds containing two elements or polyatomic ions

Unit 4

- Balancing chemical equations
- Illustration of combination, decomposition and single- and double-displacement reactions
- Illustration of oxidation/reduction reactions
- Illustration of hydroxide and hydronium ions in water, acids and bases; neutralization of acids by bases and vice versa

Unit 5

- Illustration of water as a polar molecule and of the hydrogen bonding between water molecules
- Illustration of water as a solvent of polar molecules
- Illustration of dissolution and recrystallization in a saturated solution
- Illustration of diffusion of small molecules, osmosis of water and the creation of osmotic pressure across a semi-permeable membrane
- Illustration of kidney dialysis

Unit 6

- Illustration of how addition of thermal energy (heat) increases particle movement (kinetic energy)
- Illustration of how high energy collisions between molecules or atoms can break or make chemical bonds
- Illustration of the concept of activation energy: particles must have enough kinetic energy to break chemical bonds in the reactants before a chemical reaction will take place
- Illustration of heat capacity, temperature change and change of state

Unit 7

- Animated illustrations of Boyle's, Charles's, Gay-Lussac's Gas Laws
- Illustration of the Kinetic Theory of Gases

Unit 8

- How do temperature, concentration of reactants, and the addition of catalysts affect reaction rate?
- Animations showing the reversibility of reactions and the state of equilibrium
- How do changes in concentration, temperature and pressure affect chemical equilibrium

Unit 9

- Loss or gain of a proton (hydrogen ion, H^+) between conjugate acid-base pairs: show how water can act like a base in the presence of an acid or like an acid in the presence of a base.
- Illustrate the complete or incomplete dissociation of strong or weak acids/bases respectively
- Illustrate what happens in acid/base neutralization
- Illustrate how a buffer solution (mixture of a weak acid and its salt) resists changes in pH when acid or base is added to it.