

Honour Chemistry Unit 2 Outline: Matter as Solutions and Gases

Chapters 17 & 18 (Part 1): Water as Aqueous Systems & Solutions (Part 1)

Classes	Topics	Suggested Reading	✓	Assignments	✓
1	Water Molecule Structure (Polarity, Hydrogen Bonding), Properties of Water (Surface Area, Surfactant, Specific Heat Capacity), Evaporation and Condensation, Density of Ice, Solvents and Solutes, Solution Process, Electrolytes and Nonelectrolytes, Strong and Weak Electrolytes, Hydration	17.1 Liquid Water and its Properties (pg. 475 – 478) 17.2 Water Vapor and Ice (pg. 479 – 481) 17.3 Aqueous Solutions (pg. 482 – 488)		pg. 478 #1 to 4 pg. 481 #5 and 6 pg. 488 #8 to 10, 11, 12	
2	Solution Formation. Solubility, Saturated, Unsaturated, and Supersaturated Solutions, Miscible and Immiscible, Factors Affecting Solubility of Solids and Gases, Solubility Table, Molarity or Molar Concentration $\left(C = \frac{n}{V}\right)$, Dilution ($C_1V_1 = C_2V_2$) and Dilution Technique, Pipet, Volumetric Flask, %by Volume, % by Mass	18.1 Properties of Solutions (Part 1) (pg. 501 – 505) Extra: Solubility Table 18.2 Concentrations of Solutions (pg. 509 – 515)		pg. 507 #3, 5, 6, 7 pg. 511 #8 to 11; pg. 513 #12, 13; pg. 514 #14, 15; pg. 515 #16 to 23	
3	Lab #2: Solution Preparation (October 29, Monday)	Lab #2 Procedure		Lab #2 Report (November 2, Tuesday)	
4	Chapters 17 and 18 Quiz (October 30, Tuesday)			pg. 496 – 497 #19, 20, 22, 23, 24, 29, 31 to 35, 38, 40, 41 pg. 528 #40 to 47, 49 to 54	

Chapter 10: States of Matter

Classes	Topics	Suggested Reading	✓	Assignments	✓
1	Kinetic Energy, Kinetic Theory, Phase Changes, Gas Pressure and units, Pressure versus Temperature, Evaporation, Vapour Pressures, Boiling Point, Relationship between Vapour Pressure and Boiling Point, Phase Diagrams, Sublimation	10.1 The Nature of Gases (pg. 267 – 272) 10.2 The Nature of Liquids (pg. 274 – 279) 10.4 Change of State (pg. 284 – 286)		pg. 271 #1, 2; pg. 272 #3 to 7 pg. 279 #8 to 13 pg. 286 #17 to 19 Chapter 10 Review: pg. 289 #20 to 42, 46, 47	

Chapters 12 and 18 (Part 2): The Behavior of Gases and Solutions (Part 2)

Classes	Topics	Suggested Reading	✓	Assignments	✓
1	Kinetic Molecular Theory, Compressibility, Variables of a Gas (V, P, T, n), Pressure (kPa, atm), Temperature (K), STP and SATP	12.1 The Properties of Gases (pg. 327 – 328) 12.2 Factors Affecting Gas Pressure (pg. 330 – 332) 7.2 Mole-Volume Relationship (pg. 184 – 185) Extra: SATP		pg. 328 #1 to 4 pg. 332 #5 to 9 pg. 184 #20, 21; pg. 185 #22, 23; pg. 186 #25, 26, 28; pg. 348 #31 to 33; pg. 349 #34 to 36; pg. 353 #40 and 41 and SATP Worksheet.	
2	Boyle's Law ($P & V$), Charles's Law ($T & V$), Gay-Lussac's Law ($P & T$), Combined Gas Law $\left(\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}\right)$	12.3 The Gas Laws (pg. 333 – 340)		pg. 335 #10, 11; pg. 337 #12, 13; pg. 338 #14; pg. 339 #15; pg. 340 #16 to 21	
3	Ideal Gas Law ($PV = nRT$), Ideal Gas Constant [$R = 8.31 \text{ (L} \cdot \text{kPa)/(K} \cdot \text{mol)}$], Ideal Gas Law and Kinetic Theory, Departure from Ideal Gas Law, Real Gases	12.4 Ideal Gases (pg. 341 – 346)		pg. 342 #22, 23; pg. 343 #24, 25; pg. 346 #26 to 30	
4	Avogadro's Hypothesis, Dalton's Law of Partial Pressure, Graham's Law of Effusion	12.5 Gas Molecules: Mixtures and Movements (pg. 347 – 353)		pg. 348 #31 to 33; pg. 349 # 34 to 36; pg. 351 #37, 38; pg. 351 #37, 38; pg. 353 #39 to 44 Chapter 12 Review: pg. 356 #45 to 68	
5	Lab #3: Ideal Gas Law (November 13, Tuesday)	Lab #3 Procedure		Lab #3 Report (November 19, Monday)	
6	Henry's Law of Solubility of Gas, Colligative Properties (Freezing Point Depression and Boiling Point Elevation), Molality (m) and Mole Fraction (χ); Molal Boiling Point Elevation Constant (K_b) and Molal Freezing Point Depression Constant (K_f); Van't Hoff Factor (i); Calculating Boiling Point Elevation and Freezing Point Depression ($\Delta T_b = iK_b \times m$ and $\Delta T_f = iK_f \times m$)	18.1 Properties of Solutions (Part 2) (pg. 506 – 508) 18.3 Colligative Properties of Solutions (pg. 517 – 519) 18.4 Calculations involving Colligative Properties (pg. 520 to 525)		pg. 507 #1, 2; pg. 508 #4 pg. 519 #24 to 27 pg. 521 # 28, 29; pg. 522 #30, 31; pg. 524 #32, 33; pg. 525 #34 to 39 Chapter 18 Review: pg. 528 #48, 55 to 60	
7	Unit 2 Test (covers Chapters 10.1, 10.2 to 10.4, 12, 17 and 18) (November 16, Friday)			pg. 291 #1 to 9 pg. 356–357 #69, 71, 73; pg. 359 #1, 2, 5 to 12 pg. 496–497 #47, 49, 51, 53, 56, 59; pg. 499 #2 to 7 pg. 529 #62 to 66, 68 to 77; pg. 531 #1 to 9, 14 to 17	