

# FRANKLIN-SIMPSON HIGH SCHOOL

Course Name: Pre – AP Chemistry Unit Name: **Bonding II**

Days: **8**

## Quality Core Objectives:

| Unit 12 Bonding II   |   |
|--|---|
| I.A.1. Scientific Inquiry                                    | d. Interpret results and draw conclusions, revising hypotheses as necessary and/or formulating additional questions or explanations                           |
|  | e. Write and speak effectively to present and explain scientific results, using appropriate terminology and graphics  |
|  | g. Routinely make predictions and estimations   |
| I.A.3. Science in Practice                                   | d. Explain why all scientific knowledge is subject to change as new evidence becomes available to the scientific community                                    |
|  | g. Compare the scientific definitions of fact, law, and theory, and give examples of each in chemistry  |
| II.B.2. The Nature of Gases                                  | d. Predict boiling point changes based on changes in atmospheric pressure   |
| IV.B.3. Intermolecular Forces and Types of Bonds             | a. Describe the characteristics of ionic and covalent bonding   |
|  | f. Compare the different types of intermolecular forces (e.g., van der Waals, dispersion)   |
|  | g. Explain and provide examples for dipole moments, bond polarity, and hydrogen bonding   |
|  | h. Describe the unique physical and chemical properties of water resulting from hydrogen bonding  |
|  | i. Explain the relationship between evaporation, vapor pressure, molecular kinetic energy, and boiling point for a single pure substance                      |
|  | j. Explain the relationship between intermolecular forces, boiling points, and vapor pressure when comparing differences in the properties of pure substances |
| k. Classify solids as ionic, molecular, metallic, or network |   |
| IV.B.4. Orbital Theory Applied to Bonding                    | f. Describe the relationship between molecular polarity and bond polarity   |

**Purpose of the Unit:** The purpose of this unit is to build on and expand the students' knowledge of covalent and ionic bonding attained in the unit Bonding I. Students will also explore intermolecular forces (van der Waals, London dispersion, Hydrogen, and dipole interactions.) Bond polarity and colligative properties will also be discussed. Students will also be able to classify solids based on their type (ionic, network, molecular, metallic, etc.)

**Prerequisites:** Students should be able to:

- demonstrate an understanding on intramolecular forces (ionic and covalent bonding)
- construct Lewis structures and predict molecular geometry
- understand the periodic trend of electronegativity

**Daily Lesson Guide**

| Day | Lesson Content and Objectives  | Focus Questions  | Critical Thinking (High Yield / Literacy /LTF/etc.)   | Engagement  | Assessment and/or Accommodations   |
|-----|--|--|---|---|--|
| 1   | <ul style="list-style-type: none"> <li>* Dipole moments</li> <li>* Molecular vs. bond polarity</li> </ul> IV.B.3.g,h<br>IV.B.4.f | <ul style="list-style-type: none"> <li>* What causes dipole moments?</li> <li>* What is the difference between molecular and bond polarity?</li> </ul> | <ul style="list-style-type: none"> <li>* Summarizing and Note taking</li> <li>* Non-linguistic representation</li> <li>* Similarities and differences</li> <li>* I Do-We Do-You Do</li> </ul> | <ul style="list-style-type: none"> <li>* ACT Bell Ringer</li> <li>* Pre-test</li> <li>* Take notes/ model sample problems</li> <li>* Practice writing dipole configurations and making predictions (formative)</li> </ul> | <ul style="list-style-type: none"> <li>* Evaluate practice problems</li> </ul> Enrichment: Less guidance in note taking, more independence in practice, discuss prior knowledge                |
| 2   | <ul style="list-style-type: none"> <li>* Hydrogen bonding, van der Waals, London dispersion forces</li> </ul> IV.B.3.f, g, h     | <ul style="list-style-type: none"> <li>* What causes attractions between molecules and formula units?</li> </ul>                                       | <ul style="list-style-type: none"> <li>* Summarizing and Note taking</li> <li>* Non-linguistic representation</li> <li>* Similarities and differences</li> <li>* I Do-We Do-You Do</li> </ul> | <ul style="list-style-type: none"> <li>* ACT Bell Ringer</li> <li>* Take notes/ model sample problems</li> <li>* Practice predicting intramolecular forces (formative)</li> </ul>   | <ul style="list-style-type: none"> <li>* Evaluate practice problems</li> </ul> Enrichment: Less guidance in note taking, more independence in practice, more challenging examples in formative |

|   |   |  |   |  |  |
|---|---|--|---|--|--|
| 3 | <p>* Colligative properties of pure substances vs. solutions<br/>II.B.2.d<br/>IV.B.3.i, j</p> | <p>* How does the addition of a solute to a pure substance alter the boiling/ melting point, vapor pressure, and molecular KE?</p> | <p>* Summarizing and Note taking<br/>* Generating and testing hypothesis<br/>* Similarities and differences<br/>* I Do-We Do-You Do</p> | <p>* ACT Bell Ringer<br/>* Take notes/ sample problems<br/>* Practice predicting changes in colligative properties (formative)<br/>* Article about salting roads</p> | <p>* Evaluate practice problems and comprehension of article<br/>Enrichment: Less guidance in note taking, more independence in practice, more challenging examples in formative</p> |
| 4 | <p>* Classifying types of solids<br/>IV.B.3.k</p>   | <p>* What are the differences between the different types of solids?</p>   | <p>* Summarizing and Note taking<br/>* Non-linguistic representation<br/>* Similarities and differences<br/>* I Do-We Do-You Do</p>     | <p>* ACT Bell Ringer<br/>* Take notes/ model sample problems<br/>* Practice problems identifying the solid types (formative)</p>                                     | <p>* Evaluate practice problems<br/>Enrichment: Less guidance in note taking, more independence in practice, more challenging examples in formative</p>                              |
| 5 | <p>* Laboratory: IMF lab<br/>I.A.1.d, e, g<br/>I.A.3.d, g<br/>IV.B.3.f, g, h</p>              | <p>* What type of IMF's are in everyday objects around us?</p>   | <p>*Generating and testing hypotheses<br/>* Learning with others<br/>* Novelty and Variety</p>  | <p>* ACT Bell Ringer<br/>* Conduct laboratory according to set procedures (formative)</p>  | <p>* Evaluate lab report<br/>Enrichment: Student development of lab procedures with less guidance</p>  |
| 6 | <p>* Laboratory: Vapor pressure lab<br/>I.A.1.d, e, g<br/>I.A.3.d, g<br/>IV.B.3.i, j</p>      | <p>* How do IMF's and vapor pressure affect evaporation time?</p>  | <p>*Generating and testing hypotheses<br/>* Learning with others<br/>* Novelty and Variety</p>  | <p>* ACT Bell Ringer<br/>* Conduct laboratory according to set procedures (summative)</p>  | <p>* Evaluate lab report<br/>Enrichment: Student development of lab procedures with less guidance</p>  |

|   |   |   |  |  |  |
|---|---|---|--|--|--|
| 7 | <ul style="list-style-type: none"> <li>* Review</li> <li>I.A.1.d, e, g</li> <li>I.A.3.d, g</li> <li>IV.B.3.a, f, g, h, I, j, k</li> <li>IV.B.4.f</li> </ul> | <ul style="list-style-type: none"> <li>* What can I do to be better prepared for the exam?</li> </ul> | <ul style="list-style-type: none"> <li>* Use clickers to test students' knowledge and clarify and misconceptions before the exam with immediate feedback.</li> </ul> | <ul style="list-style-type: none"> <li>* ACT Bell Ringer</li> <li>* Use clickers to review with exam like questions (summative)</li> </ul> | <ul style="list-style-type: none"> <li>* Students participate in review</li> <li>Enrichment: Less time to solve problems and limited use of aides</li> </ul>                                   |
| 8 | <ul style="list-style-type: none"> <li>* Exam</li> <li>I.A.1.d, e, g</li> <li>I.A.3.d, g</li> <li>IV.B.3.a, f, g, h, I, j, k</li> <li>IV.B.4.f</li> </ul>   | <ul style="list-style-type: none"> <li>* Can I demonstrate my knowledge on the exam?</li> </ul>       | <ul style="list-style-type: none"> <li>* Evaluation</li> <li>* Analysis</li> <li>* Application</li> <li>* Synthesis</li> </ul>                                       | <ul style="list-style-type: none"> <li>* ACT Bell Ringer</li> <li>* Take exam (summative)</li> </ul>                                       | <ul style="list-style-type: none"> <li>* Evaluate exam</li> <li>Enrichment: No use of supports with exemption of periodic table, periodic table only has element symbols, not names</li> </ul> |