

# FRANKLIN-SIMPSON HIGH SCHOOL

**Course Name:** AP Chemistry

**Unit Name:** States of Matter

**Days:** 9

## **AP Chemistry Objectives:**

### **I. Structure of Matter (20%)**

#### **B. Chemical bonding**

##### **1. Binding forces**

- a. Types: ionic, covalent, metallic, hydrogen bonding, van der Waals (including London dispersion forces)
- b. Relationships to states, structure, and properties of matter
- c. Polarity of bonds, electronegativities

### **II. States of Matter (20%)**

#### **B. Liquids and solids**

1. Liquids and solids from the kinetic-molecular viewpoint
2. Phase diagrams of one-component systems
3. Changes of state, including critical points and triple points
4. Structure of solids; lattice energies

### **V. Laboratory (5–10%)**

The differences between college chemistry and the usual secondary school chemistry course are especially evident in the laboratory work.

The AP Chemistry Exam includes some questions based on experiences and skills students acquire in the laboratory:

- making observations of chemical reactions and substances
- recording data
- calculating and interpreting results based on the quantitative data obtained
- communicating effectively the results of experimental work

**Purpose of the Unit:**

This unit will briefly review intermolecular and intramolecular forces and then expand the understanding of these concepts to apply to pure substances and different types of solids. Students will also be able to rank substances based on strength of these forces with appropriate justification. Students will also understand the applications of a phase diagram and the changes associated with it when intermolecular forces change.

**Prerequisites:**

Students will need an understanding of:

- Intermolecular forces
- Intramolecular forces
- Types of solids
- Phase changes

**Daily Lesson Guide**

Day	Lesson Content and Objectives	Focus Questions	Critical Thinking (High Yield / Literacy /LTF/etc.)	Engagement	Assessment and/or Accommodations
1	Intermolecular Forces I.B.1	* What forces attract molecules to each other?	* Summarizing and note taking * I Do – We Do – You Do * Analysis/ Application * Learning with others	* ACT bell ringer * Take notes on modeled notes * Solve problems within notes solo and in small groups (formative)	* Evaluate student sample problems for understanding

2	<b>Types of Solids, Metallic Structure, &amp; Ionic Solids</b> <b>I.B.1</b> <b>II.B.1, 4</b>	<ul style="list-style-type: none"> <li>* What are the different classifications of solids?</li> <li>* What forces of attraction hold these solids together?</li> </ul>	<ul style="list-style-type: none"> <li>* Summarizing and note taking</li> <li>* I Do – We Do – You Do</li> <li>* Analysis/ Application</li> <li>* Learning with others</li> </ul>	<ul style="list-style-type: none"> <li>* ACT bell ringer</li> <li>* Take notes on modeled notes</li> <li>* Solve problems within notes solo and in small groups (formative)</li> </ul>	<ul style="list-style-type: none"> <li>* Evaluate student sample problems for understanding</li> </ul>
3	<b>Vapor Pressure, Phase Changes, &amp; Phase Diagrams</b> <b>I.B.1</b> <b>II.B.1, 2, 3</b>	<ul style="list-style-type: none"> <li>* How do different forces of attraction affect vapor pressure and phase changes of substances?</li> <li>* How is a phase diagram interpreted?</li> </ul>	<ul style="list-style-type: none"> <li>* Summarizing and note taking</li> <li>* I Do – We Do – You Do</li> <li>* Analysis/ Application</li> <li>* Learning with others</li> </ul>	<ul style="list-style-type: none"> <li>* ACT bell ringer</li> <li>* Take notes on modeled notes</li> <li>* Solve problems within notes solo and in small groups (formative)</li> </ul>	<ul style="list-style-type: none"> <li>* Evaluate student sample problems for understanding</li> </ul>
4-5	<b>Laboratory: AP required lab 03: Determination of Molar Mass by Vapor Density</b> <b>I.B.1</b> <b>II.B.1, 2, 3, 4</b> <b>V.</b>	<ul style="list-style-type: none"> <li>* How can I experimentally determine the molar mass of a gas by its vapor density?</li> </ul>	<ul style="list-style-type: none"> <li>* Learning with Others</li> <li>* Generating and testing Hypotheses</li> <li>* Authenticity</li> <li>* Novelty and Variety</li> <li>* Analysis/ Applications/ Synthesis</li> </ul>	<ul style="list-style-type: none"> <li>* ACT bell ringer</li> <li>* Work in small lab groups to solve a lab problem</li> <li>* Use data collected to calculate molar mass (summative)</li> </ul>	<ul style="list-style-type: none"> <li>* Evaluate lab reports</li> <li>* Students can check themselves by verifying their results among other lab groups</li> </ul>

6-7	<b>States of Matter FRQs and MC questions</b> <b>I.B.1</b> <b>II.B.1, 2, 3, 4</b> <b>V.</b>	<b>* How will I be tested over states of matter on the AP Chemistry Exam?</b> <b>* How does everything I just learned fit together with what I already know?</b>	<b>* Learning with others</b> <b>* Choice</b> <b>* Clickers</b>	<b>* ACT bell ringer</b> <b>* Work independently, then in small groups, then as whole class to solve and grade FRQ's with AP rubrics</b> <b>* Use clickers and Turning Point to answers MC Questions from retired AP exams (summative)</b>	<b>* Evaluate student responses and provide immediate feedback on FRQ's and MC's with rubrics and keys</b>
8-9	<b>Unit Exam</b> <b>I.B.1</b> <b>II.B.1, 2, 3, 4</b> <b>V.</b>	<b>* Can I use my knowledge to take an AP-like exam covering states of matter?</b>	<b>* Evaluation</b> <b>* Analysis</b> <b>* Application</b> <b>* Synthesis</b> <b>* Authenticity</b>	<b>* ACT bell ringer</b> <b>* Solve retired AP Chemistry MC and FR Questions</b> <b>* Graded by AP standards and rubrics (summative)</b>	<b>* Evaluate exam</b>