**Unit 1: Learning Goals for Phases of Matter and Gases**

|  |
| --- |
| Guiding Question: How do factors such as temperature, pressure, volume, and number of moles, affect the behavior of particles in solids, liquids, and gases? |
| Content GoalsStudents will be able to:* Describe properties such as shape, volume, and particle movement of solids, liquids and gases
* Describe changes kinetic energy and potential energy as a substance undergoes a phase change
* Apply the Kinetic Theory of Gases to gas behavior
* Make temperature conversions between Celsius and Kelvin
* Make pressure conversions between atmospheres, millimeters mercury, and kilopascals
* Use Boyle’s Law, Charles’ Law, Gay-Lussac’s Law, and the combined gas law to determine changes in volume, pressure, and temperature
* Use the ideal gas law and the ideal gas constant (R) to make calculations involving pressure, temperature, volume, and **moles** of gas
* Use stoichiometry and the molar volume of a gas at STP to determine amounts of substances in a balanced equation
* Use Dalton’s law of partial pressures to determine the pressure of each gas in a gaseous mixture
* Interpret a phase diagram to predict states of matter and pressure / temperature conditions
 | Skills GoalsStudents will:* Conduct laboratory investigations in a safe and productive manner
* Use standard laboratory equipment to investigate the behavior of gases
* Present laboratory data in organized tables
* Present accurate calculations in organized format
* Analyze graphs to determine the effect of changes in variables
* Summarize results and analyze them in a conclusion
* Support analysis by properly citing a reliable source
* Evaluate the effect of error on experimental results and suggest realistic improvements
* Summarize the main idea and key supporting statements in a scientific text
* Evaluate the reliability of a published text
* Use research to support or reject statements from a published text
 |
| Big Ideas:Students will understand how changing the specific conditions of a solid, liquid, or gas will affect the behavior of the particles. This change in behavior will be described qualitatively and through calculations. |
| Assessment – How will mastery of content and skills be assessed?Work in the laboratory, student lab reports, and assessments will show if students:* Prepare well-organized data tables and present accurate calculations in an organized format
* Write a thorough conclusion that includes an analysis and an evaluation of the results
* Have mastered content goals
 |
| Key Vocabulary:* Kinetic energy
* Potential energy
* Temperature (˚C, K)
* Pressure (atm, mm Hg, kPa)
* Barometer
* Atmospheric pressure
* STP
* Melting
* Freezing
* Evaporation
* Condensation
* Sublimation
 | * Boiling Point
* Boyle’s Law
* Charles’ Law
* Gay-Lussac’s Law
* Combined Gas Law
* Dalton’s Law of Partial Pressures
* Ideal gas Law
* Molar Volume of a gas
* Partial pressure
* Diffusion
* Phase diagram
 |

 