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

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| 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 Goals  Students 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 Goals  Students 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 | |

 