Krug Chemistry – Deep Run Daily Planning Guide

Date of Lesson: Q3 Day 17 – Vapor Pressure and Stoichiometry

Topic /Big Questions: (Question Stems & Question Creation Chart)

- **How does heat energy affect the movement of molecules?**
- **How are pressure, temperature, and volume related for ideal gases?**
- **How does vapor pressure of a gas affect the boiling point of a liquid?**

State SOL	Unpacking the Standards (Video explanation shown at 3:18)
CH. 6	CH.6 The student will investigate and understand that the phases of matter are explained by the Kinetic Molecular Theory. Key ideas include a) pressure and temperature define the phase of a substance; b) properties of ideal gases are described by gas laws; and c) intermolecular forces affect physical properties

Visible Learning (For the three items with asterisks*, think from a student perspective. Use simple language)

***What am I learning today?** A liquid boils when the vapor pressure of its gas equals the air pressure surrounding it. And chemists use stoichiometry mixed with gas laws because both equations deal with MOLES.

***Why is it important?** The movement of atoms and the relationship of energy and the phases is outlined in the Kinetic Molecular Theory. The gas laws describe the relationships of pressure, volume, temperature and number of particles of a gas.

***How will I know I've learned it?** Will understand how the boiling point changes at different elevations. I will calculate the volume of gas produced after a chemical reaction. I will calculate the mass of a product based on the volume of a reactant.

Differentiation strategies:

Boiling CER:

- **If Possible: Teacher will demonstrate liquid boiling at room temperature in a bell jar apparatus. See Boiling Water in a Bell Jar by Flinn Scientific: https://www.flinnsci.ca/api/library/Download/ff4266282060457db366b25edef02d3c**
- **If not possible: Teacher will show a YouTube Video. https://www.youtube.com/watch?v=0x32Sw5ulVM – Flinn Scientific (2:43 min) or https://www.youtube.com/watch?v=739990nm0QY – Plainfield (9:25 min)**

Unit 9 Vapor Pressure Worksheet

Unit 9 Stoichiometry and Gas Law Worksheet

Accommodations and/or modifications are being met for students with IEP's/504's.

frequent checks for understanding; materials available on Schoology; small group activities

Daily Plan/Sequence of Instruction:

Boiling CER

Teacher will ask students, "What makes water boil?" Without giving away the answer, teacher will either demonstrate or show a YouTube video that reveals pressure matters when it comes to boiling. (Most students think that only temperature matters.)

Teacher ask students to draw **BEFORE, DURING**, and **AFTER** particle diagrams on their white board and in their lab notebooks. Then teacher will lead a Claim, Evidence, Reasoning discussion as to how the students think boiling happened. Teacher will eventually explain how the liquid molecules must evaporate into gas molecules. These gas molecules that came from the liquid are called VAPORS. These vapors create pressure as they bump into each other and into the air molecules above the liquid. When the vapor's pressure equals the air pressure, the liquid begins to boil, regardless of the temperature.

Vapor Pressure Worksheet

Teacher will distribute the Vapor Pressure worksheet and allow students to work alone or with partners. Teacher will circulate around the room and offer assistance as needed.

Stoichiometry and Gas Laws Worksheet

Teacher will demonstrate how to use the ideal gas law to convert given volume of a gas into moles of gas. Once moles of gas are known, this information can be used in any stoichiometric equation. Or in the reverse direction… one can begin with stoichiometry to calculate moles of gas and then plug that value into the ideal gas equation to solve for pressure, volume, or temperature of the gas.

Assessments (List all formative/summative assessments used to check for understanding during this lesson. Summative assessments may occur during a different class period.):

Vapor Pressure Worksheet – (summative)

Stoichiometry and Gas Laws Worksheet - (summative)

After assessing today's lesson are you and your students comfortable moving forward with your next objective?

Yes – students understand direct and indirect relationships between pressure, temperature, volume and moles.

No, remediation required to proceed – tutoring available during One Lunch

Teacher Reflection:

State SOL	Unpacking the Standards (Video explanation shown at 3:18)
CH.6	CH.6 The student will investigate and understand that the phases of matter are explained by the Kinetic Molecular Theory. Key ideas include d) pressure and temperature define the phase of a substance; e) properties of ideal gases are described by gas laws; and f) intermolecular forces affect physical properties.