CONCEPT: HENRY'S LAW CALCULATIONS

- The _____ (solubility) of a dissolved gas can be determined from its *Henry's Law Constant* and *partial pressure*.
  - □ **Henry's Law Constant (___):** solubility of a gas at a fixed temperature in a particular solvent in _____ (M).

Henry's Law Formula

S_{Gas} = _____ • _____

- □ S_{Gas} = solubility of the gas in _____ (M).
- □ _____ = Henry's Law Constant in _____.
- □ _____ = Partial pressure of the gas in _____.

EXAMPLE: Calculate the solubility of carbon dioxide gas, CO_2, when its Henry's Law Constant is 8.20×10^2 M/atm at 3.29 atm?

Henry's Law (2 Point Form)

- The two point form of Henry's Law Formula illustrates how changes in _____ can affect gas solubility.
  - □ Used when dealing with _____ pressure(s) and _____ solubilities for a given gas.
  - □ With this formula, the units for solubility can be in _____ or other units that are in _____ per _____.

Henry's Law Formula (Two Point Form)

_____ = _____

- □ _____ = Initial Solubility of the gas
- □ _____ = Final Solubility of the gas
- □ _____ = Initial Partial Pressure of the gas
- □ _____ = Final Partial Pressure of the gas

EXAMPLE: At a pressure of 2.88 atm the solubility of dichloromethane, CH_2Cl_2, is 0.384 mg/L. If the solubility decreases to 0.225 mg/L, what is the new pressure?

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PRACTICE: Henry's Law Constant for nitrogen in water is 1.67×10^{-4} M • atm^{-1}. If a closed canister contains 0.103 M nitrogen, what would be its pressure in atm?

a) 617 atm b) 1.72×10^{-5} atm c) 1.62×10^{-3} atm d) 778 atm

PRACTICE: At 0ºC and 1.00 atm, as much as 0.84 g of O_2 can dissolve in 1.0 L of water. At 0ºC and 4.00 atm, how many grams of O_2 dissolve in 1.0 L of water?

a) 0.105 g b) 3.36 g c) 6.72 g d) 4.68 g

PRACTICE: The atmospheric pressure in a lab is calculated as 1.3 atm. If oxygen gas contributes 62% of this atmospheric pressure, determine its mass (in g) dissolved at room temperature in 25 L of water. The Henry's Law Constant for oxygen in water at this temperature is 5.3×10^{-5} M/atm.

a) 1.4×10^{-3} g b) 6.9×10^{-5} g c) 0.055 g d) 0.034 g