

CONCEPT: STANDARD TEMPERATURE AND PRESSURE

- **Standard Temperature and Pressure (STP)** is a commonly used term in calculations involving gases.
 - At STP, the temperature is measured as _____ °C or _____ K and the pressure is _____.

EXAMPLE: A sample of oxygen gas has a measured volume of 325 mL at STP. How many grams are present?

STP and Volume

- **Standard Molar Volume** represents the volume of one mole of an ideal gas at STP.

Standard Molar Volume	
$V = \frac{nRT}{P} = \frac{(1 \text{ mole}) \left(0.08206 \frac{\text{L} \cdot \text{atm}}{\text{mol} \cdot \text{K}} \right) (\text{_____ K})}{(\text{_____ atm})} =$	<div style="border: 1px solid black; width: 100px; height: 30px;"></div>

- This relationship between moles and volume gives us the conversion factor of:

EXAMPLE: How many moles of chlorine gas occupy a volume of 15.7 L at STP?

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PRACTICE: A sample of dichloromethane gas (CH_2Cl_2) occupies 32.6 L at 310 K and 5.30 atm. Determine its volume at STP?

PRACTICE: Which gas sample has the greatest volume at STP?

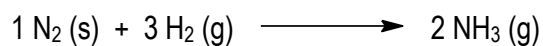
a) 10.0 g He

b) 10.0 g Ne

c) 10.0 g N_2

d) All have the same volume

PRACTICE: Nitrogen and hydrogen combine to form ammonia via the following reaction:



What mass of nitrogen is required to completely react with 800.0 mL H_2 at STP?