Show calculation setups and answers for all problems below.

1. You have a sample of 2.0 L of oxygen gas at 3.0 atm pressure. If you reduce the pressure to 0.50 atm, what is the volume of the gas?

2. A sample of argon gas occupies 2.50 L at 25.0 °C. If the gas is heated at constant pressure, what will the volume be at 99.9 °C?

3. A 252 mL sample of nitrogen gas is at 715 torr and 25.0 °C. What volume would the sample occupy at 760. torr and 0 °C?

4. How many moles of methane (CH₄) are present in a 10.0 L sample at STP?

5. How many liters would 14.0 grams of chlorine gas occupy at 300.0 K and 1.51 atm?
6. A sample of O$_2$ gas is collected at 30.0 °C and 755 torr. If the volume was 125 mL, how much did the oxygen weigh?

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7. Determine the percent composition (w/w) of a solution consisting of 75 g of NaOH in 325 g of NaOH solution.

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8. Calculate the mass/volume percent (w/v) of 39 g of sucrose in 355 mL of a carbonated drink.

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9. A mouthwash contains 22.5% alcohol by volume. If the bottle of mouthwash contains 355 mL, what is the volume (in mL) of the alcohol?

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10. How many mL of a 2.00 M NaCl solution are needed to provide 67.3 g NaCl?

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