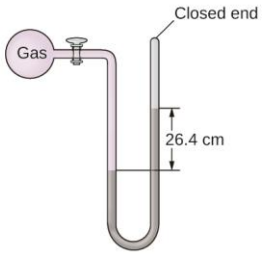
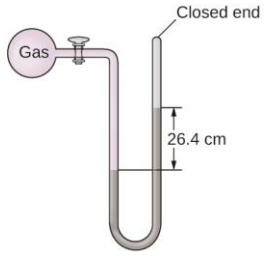
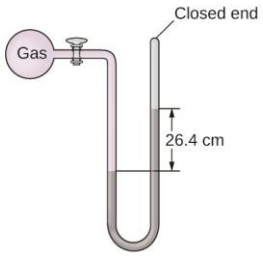
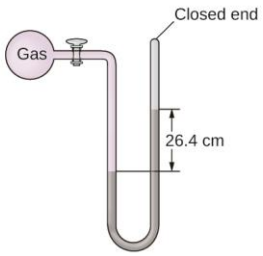
Faculty Submitting: James Grinias

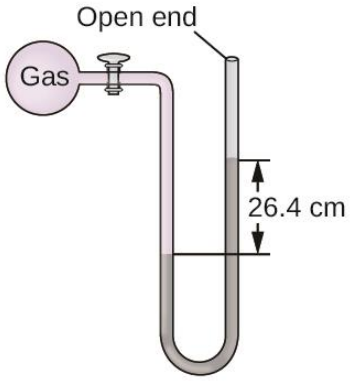
Specify here whether "Pre" or "End" of Unit and the Unit #: End Unit 8

LOs: *Describe the kinetic molecular theory of gases and how it predicts the macroscopic behavior of gases* *Qualitatively predict the behavior of gases based on the simple gas laws, and perform quantitative calculations using the Ideal Gas Law* *Perform calculations for mixtures of gases using Dalton's Law and the concept of a mole fraction*	
Unit 8_ Question 1	**Canvas Question Type:** Formula
	A typical barometric pressure in Denver, Colorado, is [x] mm Hg. What is this pressure in atmospheres?
	Answer: 0.0013158*x Let [x] vary from 605.0 to 625.0 by 0.1.
Read More	https://openstax.org/books/chemistry-2e/pages/9-1-gas-pressure#fs-idp189967312
Unit 8_ Question 2	**Canvas Question Type:** Formula
	A typical barometric pressure in Denver, Colorado, is [x] mm Hg. What is this pressure in bar?
	Answer: 0.001333*x Let [x] vary from 605.0 to 625.0 by 0.1.
Read More	https://openstax.org/books/chemistry-2e/pages/9-1-gas-pressure#fs-idp189967312
Unit 8_ Question 3	**Canvas Question Type:** Formula
	A typical barometric pressure in Denver, Colorado, is [x] mm Hg. What is this pressure in kPa?
	Answer: 0.1333*x

	Let [x] vary from 605.0 to 625.0 by 0.1.
Read More	https://openstax.org/books/chemistry-2e/pages/9-1-gas-pressure#fs-idp189967312
Unit 8_ Question 4	**Canvas Question Type:** Formula
	A typical barometric pressure in Denver, Colorado, is [x] mm Hg. What is this pressure in psi?
	Answer: 0.0193*x Let [x] vary from 605.0 to 625.0 by 0.1.
Read More	https://openstax.org/books/chemistry-2e/pages/9-1-gas-pressure#fs-idp189967312
Unit 8_ Question 5	**Canvas Question Type:** Formula
	A medical laboratory catalog describes the pressure in a cylinder of a gas as [x] MPa. What is this pressure in psi?
	Answer: 145.08*x Let [x] vary from 14.00 to 16.00 by 0.01.
Read More	https://openstax.org/books/chemistry-2e/pages/9-1-gas-pressure#fs-idp189967312
Unit 8_ Question 6	**Canvas Question Type:** Numeric
	

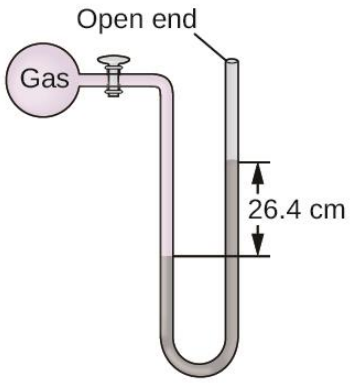
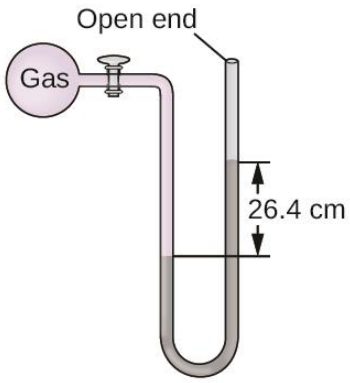
	ALT TEXT: The figure shows a closed-end manometer. The column mercury on the side open to the gas chamber is lower than the column of mercury on the closed-end. The difference between the two columns is 26.4 cm The pressure of a sample of gas is measured at sea level with a closed-end manometer. The liquid in the manometer is mercury. Assuming atmospheric pressure is 760.0 mm Hg, determine the pressure of the gas in torr.
	264 torr
Read More	https://openstax.org/books/chemistry-2e/pages/9-1-gas-pressure
Unit 8_ Question 7	**Canvas Question Type:** Numeric
	 ALT TEXT: The figure shows a closed-end manometer. The column mercury on the side open to the gas chamber is lower than the column of mercury on the closed-end. The difference between the two columns is 26.4 cm The pressure of a sample of gas is measured at sea level with a closed-end manometer. The liquid in the manometer is mercury. Assuming atmospheric pressure is 760.0 mm Hg, determine the pressure of the gas in atm.
	0.347 atm
Read More	https://openstax.org/books/chemistry-2e/pages/9-1-gas-pressure
Unit 8_ Question 8	**Canvas Question Type:** Numeric

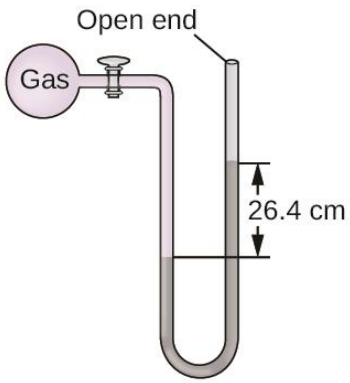
	 ALT TEXT: The figure shows a closed-end manometer. The column mercury on the side open to the gas chamber is lower than the column of mercury on the closed-end. The difference between the two columns is 26.4 cm The pressure of a sample of gas is measured at sea level with a closed-end manometer. The liquid in the manometer is mercury. Assuming atmospheric pressure is 760.0 mm Hg, determine the pressure of the gas in kPa.
	35.2 kPa
Read More	https://openstax.org/books/chemistry-2e/pages/9-1-gas-pressure
Unit 8_ Question 9	**Canvas Question Type:** Numeric
	 ALT TEXT: The figure shows a closed-end manometer. The column mercury on the side open to the gas chamber is lower than the column of mercury on the closed-end. The difference between the two columns is 26.4 cm The pressure of a sample of gas is measured at sea level with a closed-end manometer. The liquid in the manometer is mercury. Assuming atmospheric pressure is 760.0 mm Hg, determine the pressure of the gas in bar.
	0.352 bar

Read More	https://openstax.org/books/chemistry-2e/pages/9-1-gas-pressure
Unit 8_ Question 10	**Canvas Question Type:** Numeric
	 ALT TEXT: The figure shows an open-end manometer. The column mercury on the side open to the gas chamber is lower than the column of mercury on the side open to the atmosphere. The difference between the two columns is 26.4 cm The pressure of a sample of gas is measured at sea level with a open-end manometer. The liquid in the manometer is mercury. Assuming atmospheric pressure is 760.0 mm Hg, determine the pressure of the gas in torr.
	1024 torr
Read More	https://openstax.org/books/chemistry-2e/pages/9-1-gas-pressure
Unit 8_ Question 11	**Canvas Question Type:** Numeric

Commented [KMA1]: Make Question 10-13 into a group?

Commented [KMA2R1]: Made 10 & 11 and 12 & 13 into groups

	 ALT TEXT: The figure shows an open-end manometer. The column mercury on the side open to the gas chamber is lower than the column of mercury on the side open to the atmosphere. The difference between the two columns is 26.4 cm The pressure of a sample of gas is measured at sea level with a open-end manometer. The liquid in the manometer is mercury. Assuming atmospheric pressure is 760.0 mm Hg, determine the pressure of the gas in atm
	1.347 atm
Read More	https://openstax.org/books/chemistry-2e/pages/9-1-gas-pressure
Unit 8_ Question 12	**Canvas Question Type:** Numeric
	

	ALT TEXT: The figure shows an open-end manometer. The column mercury on the side open to the gas chamber is lower than the column of mercury on the side open to the atmosphere. The difference between the two columns is 26.4 cm The pressure of a sample of gas is measured at sea level with a open-end manometer. The liquid in the manometer is mercury. Assuming atmospheric pressure is 760.0 mm Hg, determine the pressure of the gas in kPa
	136.5 kPa
Read More	https://openstax.org/books/chemistry-2e/pages/9-1-gas-pressure
Unit 8_ Question 13	**Canvas Question Type:** Numeric
	 ALT TEXT: The figure shows an open-end manometer. The column mercury on the side open to the gas chamber is lower than the column of mercury on the side open to the atmosphere. The difference between the two columns is 26.4 cm The pressure of a sample of gas is measured at sea level with a open-end manometer. The liquid in the manometer is mercury. Assuming atmospheric pressure is 760.0 mm Hg, determine the pressure of the gas in bar
	1.365 bar
Read More	https://openstax.org/books/chemistry-2e/pages/9-1-gas-pressure

Unit 8_ Question 14	**Canvas Question Type:** Formula
	A spray can is used until it is empty except for the propellant gas, which has a pressure of [a] torr at [b] °C. If the can is thrown into a fire (T = [c] °C), what will be the pressure in the hot can (in torr)?
	Answer: (a*(c+273))/(b+273) Let [a] range from 1340 – 1370 torr (vary by 1), let [b] range from 20.0 – 25.0 (vary by 0.1), let [c] range from 460 – 480 (vary by 1).
Read More	https://openstax.org/books/chemistry-2e/pages/9-2-relating-pressure-volume-amount-and-temperature-the-ideal-gas-law#CNX_Chem_09_02_Amontons2
Unit 8_ Question 15	**Canvas Question Type:** Formula
	A balloon inflated with [a] breaths of air has a volume of [b] L. At the same temperature and pressure, what is the volume of the balloon if [5] more same-sized breaths are added to the balloon?
	Answer: b+((c*b)/a) Let [a] range from 2 – 7 (vary by 1), let [b] range from 1.5 to 2.5 (vary by 0.1), let [c] range from 2 – 7 (vary by 1).
Read More	https://openstax.org/books/chemistry-2e/pages/9-2-relating-pressure-volume-amount-and-temperature-the-ideal-gas-law
Unit 8_ Question 16	**Canvas Question Type:** Formula
	How many grams of CO_2 are present if a [a] L vessel of gas is at [b] torr and [c] °C?
	Answer: (a*(b/760)*44)/(.0821*(c+273)) Let [a] range from 0.080 to 0.120 (vary by 0.001), let [b] range from 290 – 320 (vary by 1), and let [c] range from 20 – 30 (vary by 1).
Read More	https://openstax.org/books/chemistry-2e/pages/9-2-relating-pressure-volume-amount-and-temperature-the-ideal-gas-law

Video	Youtube: https://youtu.be/iCFUvo_iJEs Gdrive: https://drive.google.com/file/d/1a_13PEXR0NubdOgSrR5B1dF4SmBG2uxY/view?usp=sharing
Unit 8_ Question 17	**Canvas Question Type:** Formula
	How many grams of C_2H_4 are present if a [a] L vessel of gas is at [b] kPa and [c] K?
	Answer: (a*(b/101.325)*28)/(.0821*c) Let [a] range from 8.00 to 9.00 (vary by 0.01), let [b] range from 360 – 390 (vary by 1), and let [c] range from 20 – 30 (vary by 1).
Read More	https://openstax.org/books/chemistry-2e/pages/9-2-relating-pressure-volume-amount-and-temperature-the-ideal-gas-law
Unit 8_ Question 18	**Canvas Question Type:** Formula
	How many grams of Ar are present if a [a] mL vessel of gas is at [b] mm Hg and [c] °C?
	Answer: ((a/1000)*(b/760)*39.95)/(.0821*(c+273)) Let [a] range from 200 to 240 (vary by 1), let [b] range from 0.20 – 0.50 (vary by 0.01), and let [c] range from -60.0 - -50.0 (vary by 0.1)
Read More	https://openstax.org/books/chemistry-2e/pages/9-2-relating-pressure-volume-amount-and-temperature-the-ideal-gas-law
Unit 8_ Question 19	**Canvas Question Type:** Formula
	While resting, the average 70-kg human consumes [a] L of pure O_2 per hour at 25 °C and 100 kPa. How many moles of O_2 are consumed by a 70 kg person while resting for 1.0 h?
	Answer: a*100/101.325/(0.08206*298.15) Let [a] range from 13.50 – 14.50 (vary by 0.01).
Read More	https://openstax.org/books/chemistry-2e/pages/9-2-relating-pressure-volume-amount-and-temperature-the-ideal-gas-law

Commented [KMA3]: Double check this answer seems small

Commented [KMA4]: This seems like a very small pressure mmHg; swapped out for 200 to 500

Unit 8_ Question 20	**Canvas Question Type:** Formula
	What is the molar mass of a gas if [a] g of the gas occupies a volume of [b] mL at a temperature [c] °C and a pressure of [d] torr?
	Answer: (a*.0821*(c+273))/((d/760)*(b/1000)) Let [a] = 0.275 – 0.295 (vary by 0.001), let [b] = 120 – 140 (vary by 1), let [c] = 120 – 140 (vary by 1), let [d] = 765 – 785 (vary by 1)
Read More	https://openstax.org/books/chemistry-2e/pages/9-3-stoichiometry-of-gaseous-substances-mixtures-and-reactions
Video	Youtube: https://youtu.be/SqkOQYPOVQk Gdrive: https://drive.google.com/file/d/12VV-i0SlWRA1lrZL2ai9gk26KCu9HfSk/view?usp=sharing
Unit 8_ Question 21	**Canvas Question Type:** Formula
	A sample of gas isolated from unrefined petroleum contains 90.0% CH_4, 8.9% C_2H_6, and 1.1% C_3H_8 at a total pressure of [a] kPa. What is the pressure (in kPa) of CH_4 in the sample?
	Answer: 0.9*[a] Let [a] = 270.0 – 370.0 (vary by 0.1).
Read More	https://openstax.org/books/chemistry-2e/pages/9-3-stoichiometry-of-gaseous-substances-mixtures-and-reactions
Unit 8_ Question 22	**Canvas Question Type:** Formula
	What volume (in L) of oxygen at [a] °C and a pressure of [b] kPa is produced by the decomposition of [c] g of BaO_2 to BaO and O_2?
	Answer: (.0821*(a+273)*(c/338.66))/(b/101.325) Let [a] = 140 – 160 (vary by 1), let [b] = 120.0 – 130.0 (vary by 0.1), let [c] = 125.0 – 135.0 (vary by 0.1).
Read More	https://openstax.org/books/chemistry-2e/pages/9-3-stoichiometry-of-gaseous-substances-mixtures-and-reactions

Commented [KMA5]: Can we assume that students will know that this is percent of total mols instead of percent mass??

Unit 8_ Question 23	**Canvas Question Type:** Formula
	A balloon filled with helium gas takes [a] hours to deflate to [b]% of its original volume. How long will it take for an identical balloon filled with the same volume of hydrogen gas (instead of helium) to decrease its volume by [b]%?
	Answer: [a]/1.4142 Let [a] = 1.0 – 9.9 (vary by 1), let [b] = 20 – 80 (vary by 10)
Read More	https://openstax.org/books/chemistry-2e/pages/9-4-effusion-and-diffusion-of-gases
Unit 8_ Question 24	**Canvas Question Type:** Formula
	A gas of unknown identity diffuses at a rate of [a] mL/s in a diffusion apparatus in which carbon dioxide diffuses at the rate of [b] mL/s. Calculate the molecular mass of the unknown gas.
	Answer: 44*(b/a)^2 Let [a] = 80.0 – 90.0 (vary by 0.1), let [b] = 101 – 109 (vary by 1)
Read More	https://openstax.org/books/chemistry-2e/pages/9-4-effusion-and-diffusion-of-gases