

## Section 14.2 The Combined Gas Law and Avogadro's Principle

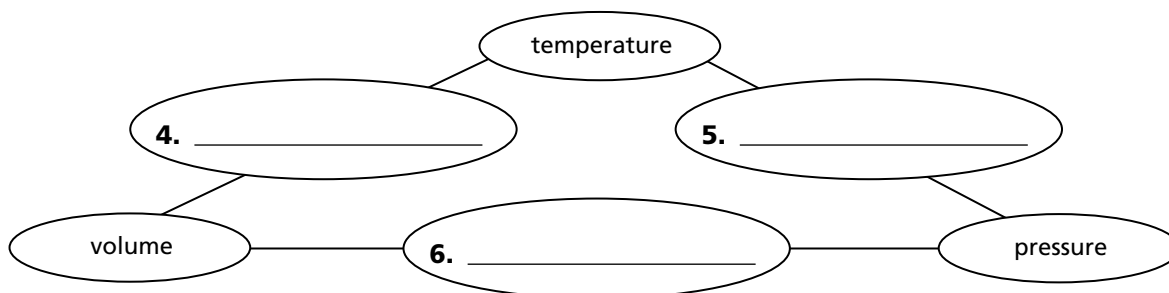
In your textbook, read about the combined gas law.

Fill in the following table. State what gas law is derived from the combined gas law when the variable listed in the first column stays constant and the variables in the second column change.

Derivations from the Combined Gas Law		
Stays constant	Change	Becomes this law
Volume	Temperature, pressure	1.
Temperature	Pressure, volume	2.
Pressure	Temperature, volume	3.

In your textbook, read about the relationships among temperature, pressure, and volume of a sample of gas.

Fill in the blanks between the variables in the following concept map to show whether the variables are directly or inversely proportional to each other. Write *direct* or *inverse* between the variables.



In your textbook, read about the combined gas law and Avogadro's principle.

Circle the letter of the choice that best completes the statement or answers the question.

- The variable that stays constant when using the combined gas law is  
 a. amount of gas.      b. pressure.      c. temperature.      d. volume.
- The equation for the combined gas law can be used instead of which of the following equations?  
 a. Boyle's law      b. Charles's law      c. Gay-Lussac's law      d. all of these
- Which of the following expresses Avogadro's principle?  
 a. Equal volumes of gases at the same temperature and pressure contain equal numbers of particles.  
 b. One mole of any gas will occupy a certain volume at STP.  
 c. STP stands for standard temperature and pressure.  
 d. The molar volume of a gas is the volume that one mole occupies at STP.

**Section 14.2** *continued*

Answer the following questions.

10. What is standard temperature and pressure (STP)?

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11. What is the molar volume of a gas equal to at STP?

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*In your textbook, read about how to solve problems using the combined gas law and Avogadro's principle.*

**Each problem below needs more information to determine the answer. List as many letters as are needed to solve the problem.**

- |                            |                                      |
|----------------------------|--------------------------------------|
| a. molar volume of the gas | d. pressure of the gas               |
| b. molar mass of the gas   | e. volume of the gas                 |
| c. temperature of the gas  | f. No further information is needed. |

\_\_\_\_\_ 12. What volume will 1.0 g N<sub>2</sub> gas occupy at STP?

\_\_\_\_\_ 13. What volume will 2.4 mol He occupy at STP?

\_\_\_\_\_ 14. A gas sample occupies 3.7 L at 4.0 atm and 25°C. What volume will the sample occupy at 27°C?

\_\_\_\_\_ 15. A sample of carbon dioxide is at 273 K and 244 kPa. What will its volume be at 400 kPa?

\_\_\_\_\_ 16. A sample of oxygen occupies 10.0 L at 4.00 atm pressure. At what temperature will the pressure equal 3.00 atm if the final volume is 8.00 L?

\_\_\_\_\_ 17. At what pressure will a sample of gas occupy 5.0 L at 25°C if it occupies 3.2 L at 1.3 atm pressure and 20°C?

\_\_\_\_\_ 18. How many grams of helium are in a 2-L balloon at STP?

\_\_\_\_\_ 19. One mole of hydrogen gas occupies 22.4 L. What volume will the sample occupy if the temperature is 290 K and the pressure is 2.0 atm?