# 14.4 GASES: MIXTURES AND MOVEMENTS

## Section Review

### Objectives

- Relate the total pressure of a mixture of gases to the partial pressures of the component gases
- Explain how the molar mass of a gas affects the rate at which the gas diffuses and effuses

### Vocabulary

- partial pressure
- Dalton's law of partial pressures
- diffusion
- effusion
- Graham's law of effusion

### Key Equations

- Dalton's law of partial pressures: $P_{total} = P_1 + P_2 + P_3 + \ldots$

- Graham's law of effusion: $\dfrac{\text{Rate}_A}{\text{Rate}_B} = \sqrt{\dfrac{\text{molar mass}_B}{\text{molar mass}_A}}$

### Part A  Completion

*Use this completion exercise to check your understanding of the concepts and terms that are introduced in this section. Each blank can be completed with a term, short phrase, or number.*

According to Dalton's law of partial pressures, at constant volume and temperature, the ___**1**___ pressure exerted by a mixture of gases is equal to the ___**2**___ of the partial pressures of the component gases.

Molecules tend to move to areas of ___**3**___ concentration until the concentration is ___**4**___. This process is called ___**5**___. During ___**6**___ a gas escapes through a tiny ___**7**___ in its container.

The rate of effusion of a gas is ___**8**___ proportional to the square root of the gas's ___**9**___. This relationship is described by ___**10**___ of effusion.

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

## Part B  True-False

*Classify each of these statements as always true, AT; sometimes true, ST; or never true, NT.*

_____ **11.** The fraction of the pressure exerted by a gas in a mixture does not change as the temperature, pressure, or volume changes.

_____ **12.** The rate of diffusion of a gas is not influenced by its molar mass.

_____ **13.** Two objects with the same mass move at the same velocity.

_____ **14.** Diffusion is the tendency of molecules to move towards areas of lower concentration until the concentration is uniform throughout.

## Part C  Matching

*Match each description in Column B to the correct term in Column A.*

| Column A | Column B |
|---|---|
| _____ **15.** partial pressure | **a.** the pressure exerted by each gas in a gaseous mixture |
| _____ **16.** effusion | **b.** the escape of a gas through a tiny hole in its container |
| _____ **17.** Graham's law of effusion | **c.** The rate of effusion of a gas is inversely proportional to the square root of its formula mass. |

## Part D  Questions and Problems

*Answer the following in the space provided.*

**18.** Explain, using kinetic theory, why molecules of low molar diffuse more rapidly than molecules with a higher molar mass.

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_____

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_____

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