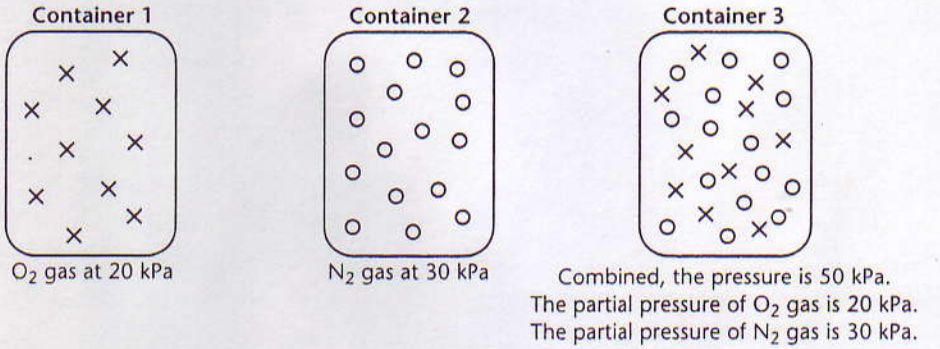
Name _____ Date _____ Class _____

SECTION 15-2 **ENRICH**

Partial Pressures

John Dalton (1766–1844) was a British teacher and scientist who studied chemistry and physics. Some of his experiments concerned the behavior of gases. The data that Dalton gathered from these tests led him to develop the law of partial pressures. This law concerns the pressure exerted by a mixture of gases.

Dalton's law of partial pressures states that the total pressure of a mixture of gases is equal to the sum of the partial pressures of the gases in the mixture. The diagram below explains how this works. The three closed containers are the same size and temperature. In Container 1, the oxygen gas has a pressure of 20 kPa. In Container 2, the nitrogen gas has a pressure of 30 kPa. When those two amounts of oxygen and nitrogen are put into Container 3, the total pressure is the sum of the partial pressures of the components, or 50 kPa. Also, the amounts and partial pressures of each gas component are proportional. In the example below, 40 percent of the gas in Container 3 is oxygen, so the partial pressure of oxygen is 40 percent of the total, or 20 kPa.



Answer the following questions on a separate sheet of paper.

1. At sea level, the partial pressures of the gases in air are 77.10 kPa for nitrogen, 21.23 kPa for oxygen, and 3.01 kPa for all other gases. What is the total pressure of air at sea level?
2. Suppose a balloon contains a mixture of helium, nitrogen, and oxygen gases. The pressure exerted by the mixture is 101.2 kPa. The partial pressure of helium is 80.1 kPa and the partial pressure of nitrogen is 16.2 kPa. What is the partial pressure of oxygen in the balloon?
3. Suppose the partial pressure of one gas in a mixture decreases by 5 kPa. How does this change affect the total pressure of the mixture?
4. Suppose the temperature inside a sealed container increases. How do you expect this change to affect the partial pressure of each gas in a mixture of gases inside the container? How does it affect the total pressure?