Remember John Dalton???? Well, he's back.....

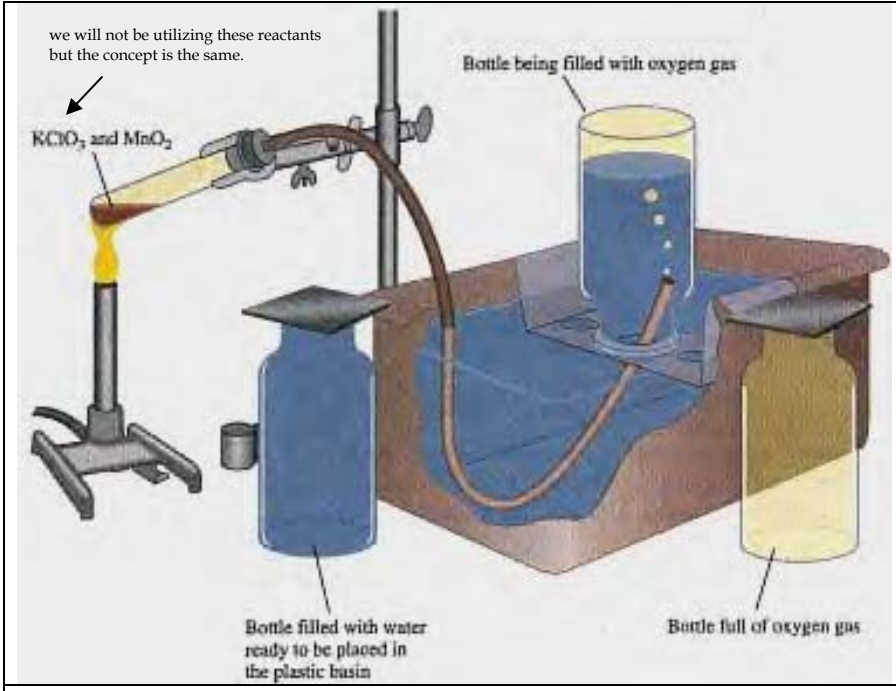
Dalton did his own experiments on gases and discovered that in a mixture of gases the total pressure is the sum of all the individual pressures of the components.

This is not astounding in view of kinetic theory (before Dalton's time). Imagine a box of 100 molecules, 50 of oxygen and 50 of hydrogen. Statistically, the number of collisions with the walls of the container should be divided between the oxygen and the hydrogen---so the pressure is also.

Dalton's Law of Partial Pressures can be written in a number of ways. Here is a simple one:

$$P_T = P_1 + P_2 + P_2 + ...$$

Because pressure results from collisions, and collisions come from atoms, partial pressures are related to the number of atoms (not their masses) or their volumes (Avogadro's Law).



One of the most convenient uses of Dalton's Law is in determining the pressure of a gas collected over water. Gases are often bubbled through water to collect them free of air. But because of the vapor pressure of water they end up mixed with water.

Water vapor pressure tables exist which list the vapor pressure of water at various temperatures. When a gas is collected over water the total pressure is the sum of the actual gas pressure and the water vapor pressure:

$$P_T = P_{water} + P_{gas}$$

Subtraction of the water vapor pressure thus yields the pressure of the gas itself.

Temperature, °C	Pressure, mmHg
17	14.5
18	15.5
19	16.5
20	17.5
21	18.7
22	19.8
23	21.1
24	22.4
25	23.8
26	25.2
27	26.7
28	28.3