Process of Breathing

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INTRODUCTION
Breathing refers to the physical process of moving air through the airway into the lungs in order to bring oxygen into the body and for carbon dioxide to be removed from the body. This creates bulk flow of gases bringing oxygen to the alveolar capillary membrane where gas exchange takes place. Without the process of breathing, gas flow into the lungs would occur by diffusion, and would be inadequate to meet the body's oxygen requirements and the needs of the body to excrete carbon dioxide. This is what occurs in respiratory arrest, when a patient stops breathing.

GAS COMPOSITION IN THE LUNGS
Unlike the composition of gas in the airway, the gas composition in the lungs does not change very much during inspiration and expiration (Figure 5.1, overleaf). This is due to the buffering effect of the functional residual capacity (FRC), which is the lung volume remaining at the end of expiration when we are breathing normally. The main components of the gas in the lungs are shown in Table 5.1, overleaf. These include oxygen, carbon dioxide, nitrogen and also water vapour.

The oxygen partial pressure gradient between the lungs (100 mmHg) and the deoxygenated blood being brought by the pulmonary artery (40 mmHg) allows oxygen to diffuse into the blood (Figure 5.2, p. 31). The oxygen tension in the lungs will remain at this level of 100 mmHg (minimal variation between inspiration and expiration), provided there is regular breathing with normal tidal volumes and that air with 21% oxygen is being inhaled. This constancy in oxygen tension in the lungs in a normal patient is maintained by the buffering effects of the FRC. If the FRC is reduced, the buffering capacity is reduced and the oxygen levels in the lungs will show more variation with breathing.

When breathing oxygen-enriched air, depending on the inspired concentration of oxygen, the oxygen concentration in the lungs increases and the nitrogen