Definitions and Concepts for CAIE Biology IGCSE

Topic 11: Gas Exchange in Humans

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*Definitions in **bold** are for supplement only*

Alveoli - Tiny, thin-walled air sacs in the lungs which serve as the gaseous exchange surface.

Breathing rate - The number of breaths taken per minute.

Bronchi - Divisions of the trachea that lead into the lungs.

Bronchioles - Many small divisions of the bronchi.

Cilia - **Hair-like structures found on ciliated cells that waft substances across the surface of the tissue in one direction.**

Ciliated cell - **A type of epithelial cell that lines the surface of the respiratory tract. Ciliated cells are covered in tiny hair-like structures known as cilia.**

Diaphragm - A large sheet of muscle that separates the thorax and the abdomen.

Exchange surface - A surface over which materials are exchanged from one region to another. An effective exchange surface has a large surface area, thin layers, a good blood supply and ventilation to maintain a steep diffusion gradient.

Expiration - **During expiration (exhalation) the diaphragm relaxes and reverts to a dome shape. The internal intercostal muscles contract, pulling down the ribcage. The volume of the thorax decreases and thoracic pressure rises above air pressure. Air moves out of the lungs.**

Expired air - The air that is breathed out. It has a higher concentration of carbon dioxide and water vapour than inspired air and a lower concentration of oxygen.

External intercostal muscles - **A set of muscles found between the ribs on the inside that are involved in forced exhalation.**

Gaseous exchange - The exchange of respiratory gases between an organism and its environment.

Goblet cells - **Specialised cells located in the epithelial lining of the trachea, bronchi, and some bronchioles that secrete mucus.**

Inspiration - During inspiration (inhalation) the diaphragm contracts and flattens and the external intercostal muscles contract, raising the ribcage. The volume of the thorax increases and thoracic pressure falls below air pressure. Air moves into the lungs.

Inspired air - The air that is breathed in. It has a higher concentration of oxygen than expired air and a lower concentration of carbon dioxide and water vapour.

Intercostal muscles - Groups of muscles situated between the ribs. **They control rib movement.**

Internal intercostal muscles - A set of muscles found between the ribs on the outside that are involved in forced and quiet inhalation.

Larynx - A hollow, tubular structure located at the top of the trachea involved in breathing, and the production of sound.

Limewater - A chemical used to test for the presence of carbon dioxide. It turns milky when carbon dioxide is present.

Lungs - A pair of air-filled organs located on either side of the chest. They contain the alveoli, the gaseous exchange surface.

Mucus - A slimy substance secreted by goblet cells. It forms a thin, sticky film over the internal lining of the respiratory tract, trapping pathogens and particles and preventing their entry into the alveoli.

Ribs - A set of bones that surround and protect the chest cavity.

Trachea - The primary airway which carries air from the nasal cavity down into the chest. **It is a tube supported by incomplete rings of cartilage which provide structural strength.**

Ventilation - The movement of fresh air into the lungs and stale air out of the lungs via inspiration and expiration.