FLASH CARDS

CLASS : Class 11th **SUBJECT : Zoology**

CHAPTER: Breathing and Exchange of Gases

Terminology	Description
Respiratory System	The organ system responsible for gaseous exchange. Comprises Nostrils, Nasal Cavity, Pharynx, Larynx, Trachea, Bronchi, Bronchioles, Alveoli, Lungs
Respiratory Organs in Other Animals	Cutaneous Respiration - Gas exchange through skin (e.g., earthworm). Gills - Aquatic respiratory organs (e.g., fish). Tracheal System - A network of air tubes in insects. Book Lungs - Respiratory organs in arachnids. Pulmonary Respiration - Gas exchange via lungs (e.g., mammals).
Steps Involved in Respiration	1. Pulmonary Ventilation: Breathing in and out. 2. Diffusion of Gases: Exchange between alveoli and blood. 3. Transport of Gases: Via blood to tissues. 4. Diffusion to Tissues: Exchange between blood and cells. 5. Cellular Respiration: Oxidation of nutrients to release energy.
Conducting Part	From the nostrils to the terminal bronchioles, no gas exchange. Transport, filtration, warming, and humidification of air.
Respiratory Part	Includes alveoli and alveolar ducts. Actual exchange of gases takes place here.
Mechanism of Breathing	Inspiration: Intake of air into lungs. Expiration: Expulsion of air from lungs. Intrapulmonary Pressure: Pressure within the lungs. Intrapleural Pressure: Pressure within the pleural cavity. Boyle's Law: Pressure is inversely proportional to volume.
Diaphragm & Intercostal Muscles	Diaphragm: A dome-shaped muscle separating the thorax and the abdomen. External Intercostal Muscles: Contract during inspiration. Internal Intercostal Muscles: Help in forced expiration.

	Muscle Contraction: Increases thoracic volume during inspiration.
Tidal Volume (TV)	Volume of air inspired or expired during a normal respiration. It is approx. 500 mL., i.e., a healthy man can inspire or expire approximately 6000 to 8000 mL of air per minute.
Inspiratory Reserve Volume (IRV)	An additional volume of air that a person can inspire by a forcible inspiration. This averages 2500 mL to 3000 mL.
Expiratory Reserve Volume (ERV)	Additional volume of air, a person can expire by a forcible expiration. This averages 1000 mL to 1100 mL.
Residual Volume (RV)	Volume of air remaining in the lungs even after a forcible expiration. This averages 1100 mL to 1200 mL.
Inspiratory Capacity (IC)	The total volume of air a person can inspire after a normal expiration. This includes tidal volume and inspiratory reserve volume (TV + IRV).
Expiratory Capacity (EC)	The total volume of air a person can expire after a normal inspiration. This includes tidal volume and expiratory reserve volume (TV + ERV).
Functional Residual Capacity (FRC)	Volume of air that will remain in the lungs after a normal expiration. This includes ERV + RV.
Vital Capacity (VC)	The maximum volume of air a person can breathe in after a forced expiration. This includes ERV, TV and IRV or the maximum volume of air a person can breathe out after a forced inspiration.
Total Lung Capacity	Total volume of air accommodated in the lungs at the end of a forced inspiration. This includes RV, ERV, TV and IRV or vital capacity + residual volume.
Exchange of Gases – Factors	Partial Pressure: Pressure exerted by an individual gas. Diffusion: Movement from high to low partial pressure. Factors Affecting Exchange: Pressure gradient, surface area, and thickness of membrane. Oxygen Gradient: Higher in alveoli than in the blood. Carbon Dioxide Gradient: Higher in the blood than in the alveoli.
Diffusing Membrane	Diffusing Membrane: Membrane between alveolar air and blood. Layers: Alveolar epithelium, basement membrane, capillary endothelium. Thickness: Very thin (~0.5 µm) for efficient diffusion.

Transport of Oxygen	About 97 per cent of O2 is transported by RBCs in the blood. The remaining 3 per cent of O2 is carried in a dissolved state through the plasma. Each haemoglobin molecule can carry a maximum of four molecules of O2.
Transport of Carbon Dioxide	CO2 is carried by haemoglobin as carbamino-haemoglobin (about 20-25 per cent). This binding is related to the partial pressure of CO2 . pO2 is a major factor which could affect this binding.
Factors for Oxyhaemoglobin	High pO2 , low pCO2 , lesser H+ concentration and lower temperature, the factors are all favourable for the formation of oxyhaemoglobin,
Oxygen Dissociation Curve	It's a sigmoid curve showing % saturation vs pO_2. Bohr Effect: Shift due to CO_2, pH, and temperature changes. Right Shift: Reduced affinity of Hb for O_2. Left Shift: Increased affinity of Hb for O_2.
Regulation of Respiration	Respiratory Rhythm Centre: Located in the medulla oblongata. Pneumotaxic Centre: Present in pons; regulates breathing rate. Chemoreceptors: Detect CO_2, O_2 and H^+ concentration. Neural Regulation: Controlled by CNS.
Asthma	Asthma is a difficulty in breathing, causing wheezing due to inflammation of the bronchi and bronchioles.
Emphysema	Emphysema is a chronic disorder in which alveolar walls are damaged, resulting in a decreased respiratory surface. One of the major causes of this is cigarette smoking.
Occupational Respiratory Disorders	Caused by long-term dust exposure. E.g. Silicosis



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