

Doggo Cheat Sheet - Respiratory System

Air Pathway into Lung

	Feature	Function
Nostrils	Hairs	Filter out large dust particles
Nasal cavity	Mucus-secreting cells	Traps dust particles and bacteria
	Ciliated epithelial cells	Moistens the incoming air
	Blood capillaries	Sweep mucus towards the pharynx
		Warm the incoming air
Pharynx and Larynx		Direct air to the trachea
		Swallow dust and dirt
Trachea and Bronchi	Cartilages	Structural support
	Ciliated epithelial cells and mucus-secreting cells	Trap foreign particles and move them up toward the pharynx for removal
Bronchioles	Ciliated epithelial cells and mucus-secreting cells	Trap foreign particles and move them up toward the pharynx for removal
Air sacs	Large in number	Provide a large surface area for gas exchange
	Water film covering the inner surface	Allows oxygen to dissolve in it and diffuse across the walls of air sacs
	One-cell-thick walls that lies the walls of blood capillaries	Provide a short distance for diffusion of gases
	Surrounded by a dense network of blood capillaries	Maintain a steep concentration gradient

Mechanism for Ventilation

	Inhalation	Exhalation
Intercostal muscles	Contract	Relax
Rib cage	Moves upwards and outwards	Moves downwards and inwards
Diaphragm muscles	Contract	Relax
Diaphragm	Becomes flattened	Returns to dome shape
Volume of the thoracic cavity and the lungs	Increases	Decreases
Air pressure in the lungs	Decreases → lower than atmospheric pressure	Increases → higher than atmospheric pressure
Movement of air	Into the lungs	Out of the lungs

Red Blood Cells

Feature	Adaptation
Biconcave disc shape	Increases the surface area
	Shortens the distance
Packed with haemoglobin	Serve as oxygen carrier
No nucleus in mature cells	Hold more haemoglobin

Doggy the Scientist

Home >>>



Respiratory System

Overview >>>



Doggo Tutorial



Doggo Quiz



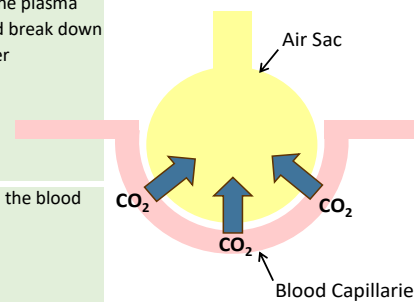
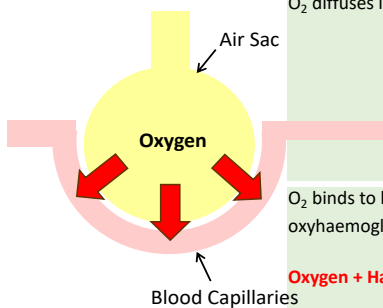
Uptake/Release @ Air Sacs

Uptake Oxygen	Release Carbon Dioxide
O ₂ concentration in the air sacs is high	CO ₂ concentration in body tissues is low
O ₂ diffuses into the red blood cells	Hydrogencarbonate ions in the plasma enter the red blood cells, and break down into carbon dioxide and water
	$\text{HCO}_3^- + \text{H}^+ \rightarrow \text{H}_2\text{O} + \text{CO}_2$
O ₂ binds to haemoglobin to form oxyhaemoglobin	Carbon dioxide diffuses from the blood into the air sacs
Oxygen + Haemoglobin → Oxyhaemoglobin	

HCO₃⁻ in plasma is carried to the lung

Uptake/Release @ Body Tissue

Uptake Carbon Dioxide	Release Oxygen
CO ₂ concentration in body tissues is high	The oxygen concentration in body tissues is low.
CO ₂ diffuses into the blood and enters the red blood cells and reacts with water in the red blood cells to form hydrogencarbonate ions	Oxyhaemoglobin in red blood cells breaks down into oxygen and haemoglobin.
$\text{H}_2\text{O} + \text{CO}_2 \rightarrow \text{HCO}_3^- + \text{H}^+$	Oxyhaemoglobin → Oxygen + Haemoglobin
Hydrogencarbonate ions diffuse from red blood cells to plasma	Oxygen diffuses into the body cells



Oxyhaemoglobin is transported in red blood cells to body

