

Class 10 Biology - Chapter 10 Notes

Gaseous Exchange | Respiratory system, breathing mechanism, disorders | Punjab Boards (PCTB)

Gaseous Exchange

- Gaseous exchange is the exchange of oxygen and carbon dioxide between an organism and its environment.
- In plants it occurs through stomata (leaves) and lenticels (stems/roots); in humans through the lungs.
- Cellular respiration uses the oxygen taken in: glucose + oxygen → carbon dioxide + water + energy (ATP).

Human Respiratory System

- Path of air: nostrils - nasal cavity - pharynx - larynx - trachea - bronchi - bronchioles - alveoli.
- Trachea is supported by C-shaped cartilage rings so it does not collapse; its lining has mucus and cilia that trap dust and germs.
- Alveoli: tiny balloon-like sacs (millions in each lung) wrapped in capillaries - thin walls, moist surface and rich blood supply make them ideal for diffusion.
- Diaphragm (dome-shaped muscle) and intercostal muscles power breathing.

Mechanism of Breathing

- Inhalation: diaphragm contracts and flattens, ribs move up/out, chest volume increases, pressure drops, air rushes in.
- Exhalation: diaphragm relaxes to dome shape, ribs move down/in, volume decreases, air is pushed out.
- Oxygen diffuses from alveoli into blood; carbon dioxide diffuses from blood into alveoli (both by diffusion down concentration gradients).

Respiratory Disorders

- Bronchitis: inflammation of bronchi (cough, mucus). Emphysema: alveoli walls break down, common in smokers - less surface for exchange.
- Pneumonia: bacterial/viral infection filling alveoli with fluid. Asthma: airways narrow, causing wheezing and breathlessness.
- Lung cancer is strongly linked with smoking; tobacco smoke also causes chronic bronchitis and damages cilia.

Exam Tips

- The labelled diagram of the respiratory system and alveolus is a guaranteed-mark question - practise it.
- Make a comparison table of inhalation vs exhalation for short questions.
- Learn disorders with cause + symptom in one line each.

Quick Revision Table

Part	Function
Trachea	Air passage; cartilage rings keep it open
Alveoli	Site of gaseous exchange by diffusion

Part	Function
Diaphragm	Main muscle of breathing
Epiglottis	Stops food entering the trachea
Bronchi	Carry air from trachea into each lung

Practice MCQs (answers at the end)

Q1. Gaseous exchange in humans occurs in the:

A. Trachea **B.** Bronchi **C.** Alveoli **D.** Larynx

Q2. During inhalation the diaphragm:

A. Relaxes **B.** Contracts and flattens **C.** Stops **D.** Moves up

Q3. The voice box is called:

A. Pharynx **B.** Larynx **C.** Trachea **D.** Glottis

Q4. Emphysema is caused mainly by:

A. Viruses **B.** Smoking **C.** Cold air **D.** Allergy

Q5. In leaves, gaseous exchange occurs through:

A. Lenticels **B.** Stomata **C.** Cuticle **D.** Xylem