

LESSON 43

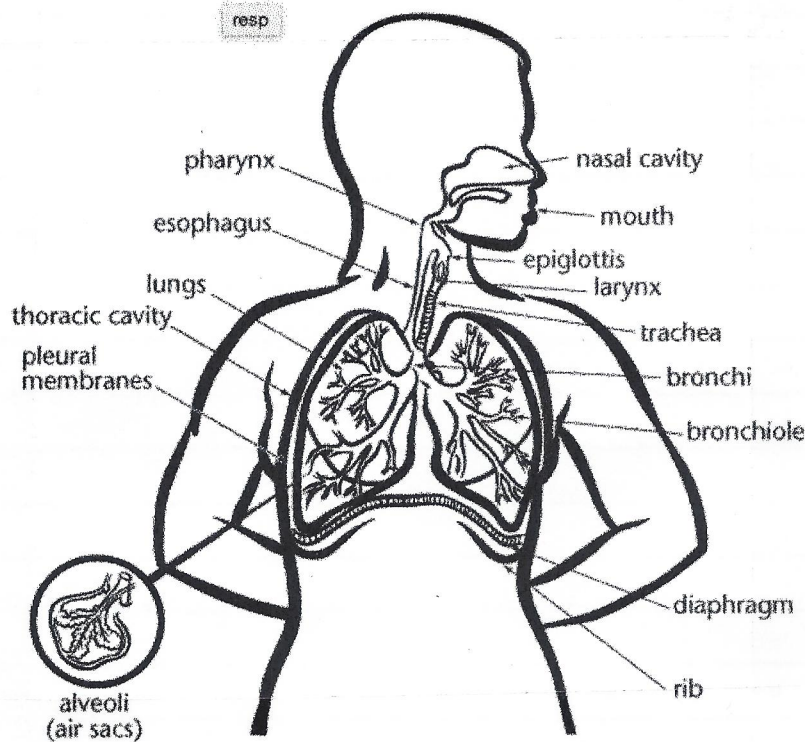
The Respiratory System

- Function:
- 1) external respiration is the exchange of O_2 and CO_2 between the air in blood, occurring in the lungs.
 - 2) internal respiration is the exchange of O_2 and CO_2 between the blood and the tissue fluid, occurring in the capillaries.

The Path of Air

- breathing begins when the diaphragm is contracted.
 - ↳ a circular band of muscle just below the rib cage and above the abdomen.
- air is brought into the mouth and nasal cavity.
- passes through the pharynx
- past the larynx (voice box) "adam's apple"
- larynx contains the vocal chords
- increased larynx size is one effect testosterone has on human development.
- air now enters the trachea.
- the trachea is surrounded by tough rings of cartilage.
 - ↳ branches into 2 bronchi (bronchus, singular)
 - ↳ lined with hair-like structures and coated in mucus.
- mucus traps air particles, preventing them from moving down into the lungs.
- the cilia beat upwards towards the trachea, moving the mucus to the back of the throat to be swallowed or spat out.

NOTE: inhaling smoke can kill the cilia lining the bronchi and prevents mucus from being removed.



Comprehension Questions

- 1) Describe the difference between internal & external respiration.
 internal - exchange of O_2 and CO_2 between air & blood in lungs.
 external - exchange of O_2 and CO_2 between blood & tissue fluid in capillaries.
- 2) How is the diaphragm important to breathing?
 breathing begins when diaphragm contracts

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The Path of Air... cont

→ the 2 bronchi each branch into smaller tubes called bronchioles.

* Bronchioles - highly branched ending in an alveoli (alveolus-sing)
↳ air sac covered in capillaries.

→ structure of alveoli is like a cluster of grapes.

→ gas exchange occurs here.

Structure: 1) → clustering shape increases the surface area for gas exchange.

2) → alveoli have thin walls (1 cell thick), this allows fast diffusion of O_2 and CO_2 .

3) → covered in capillaries, greater blood volume exposed to O_2 .

4) → inner wall is covered in surfactant.

↳ prevents alveoli walls from sticking together.

5) → inner walls are moist; diffusion of O_2 and CO_2 happen faster in the presence of H_2O .

6) → alveoli walls contain stretch receptors, prevents walls from bursting.

Exhalation

→ relaxing the diaphragm returns the lungs to resting volume.

→ the lungs are contained in a sealed unit called the thoracic cavity.

→ sealed around the lungs by the pleural membranes and underneath by the diaphragm.

Biology 12 – Respiratory System Written Response

Complete the Questions Below:

1. Complete the following table by outlining the structures of the alveoli that make it well suited to its function.

Structural Component	Functional Benefit

2. Describe how debris and particles in the air are removed from the lungs by mucus and cilia.

3. Draw a flow chart that describes the flow of air from the nose to the alveoli.

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Tidal Volume: the normal amount of air inhaled and exhaled while a person is resting.

- minimum amount of O_2 the body requires
- when O_2 requirements increase, tidal volume increases.

Vital Capacity: maximum volume of air a person can inhale and exhale.

average 3-5L

* depends on:

- 1) body mass

- 2) gender (10-20% lower in females)

- 3) fitness (20-30% greater in athletes)

- Tour de France can have a vital capacity of 7L.

Residual Volume: amount of air remaining in lungs after exhalation
average 1L