

Aim: SWBAT connect how the respiratory system works to help humans with sport.

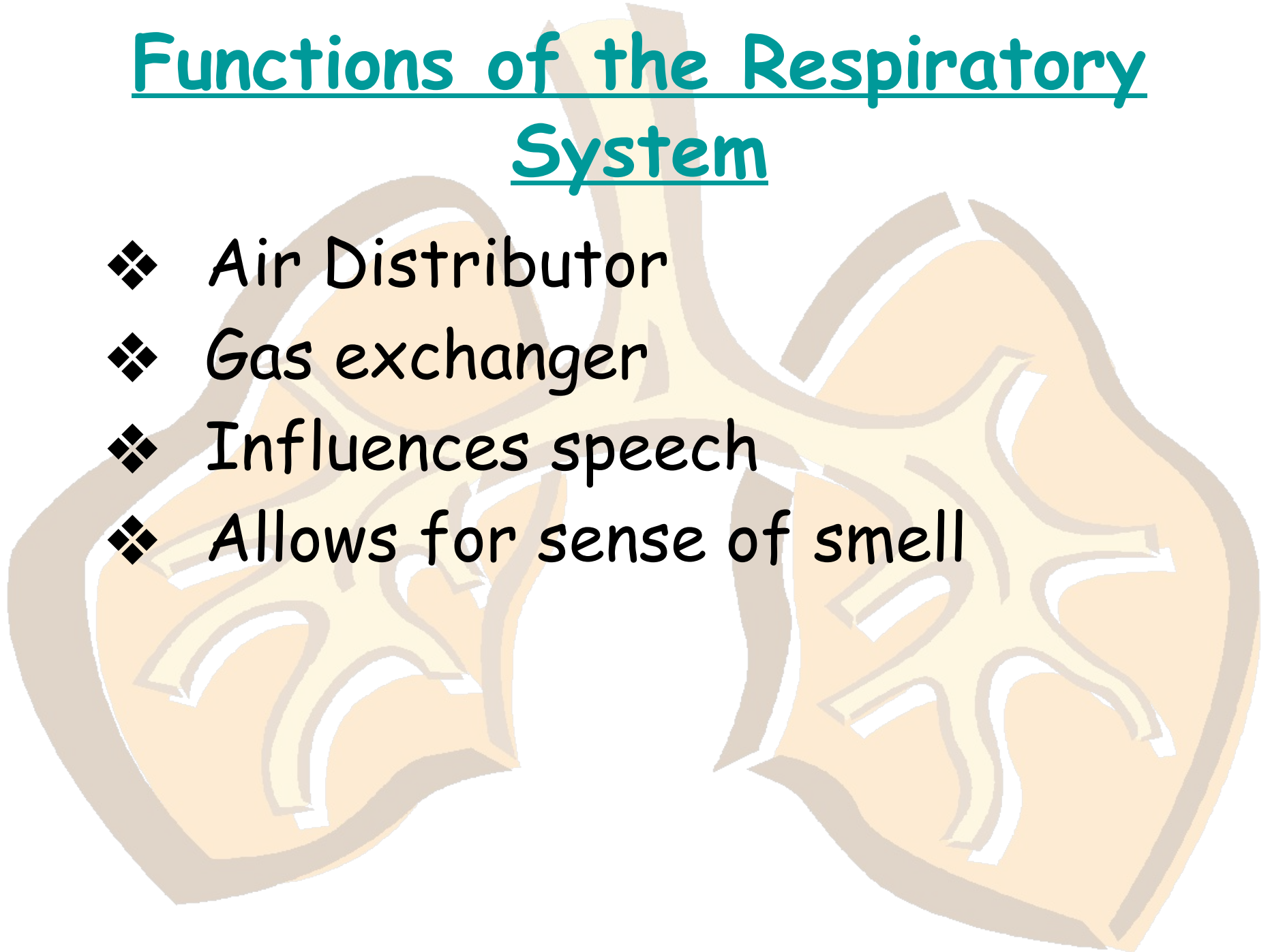
Do Now: How does the respiratory system affect our ability to do activities such as sport?

First 40 Mins

- Finish Lab write up
- Read article on Respiratory System
(Go to lightningmark.com)
- Make up work (No Make up work accepted after tuesday)

Functions of the Respiratory System

- ❖ Air Distributor
- ❖ Gas exchanger
- ❖ Influences speech
- ❖ Allows for sense of smell

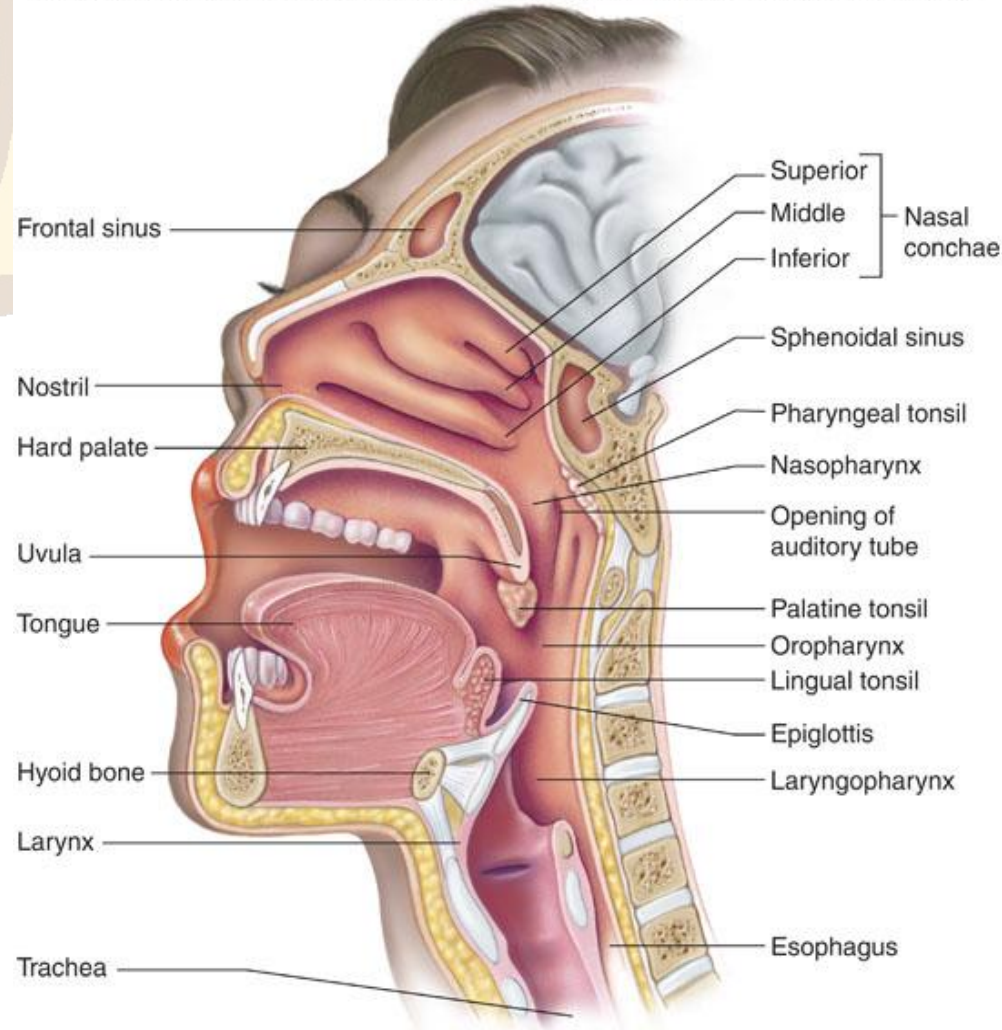


Divisions of the Respiratory System

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□ Upper respiratory tract (outside thorax)

- ❖ Nose
- ❖ Nasal Cavity
- ❖ Sinuses
- ❖ Pharynx
- ❖ Larynx

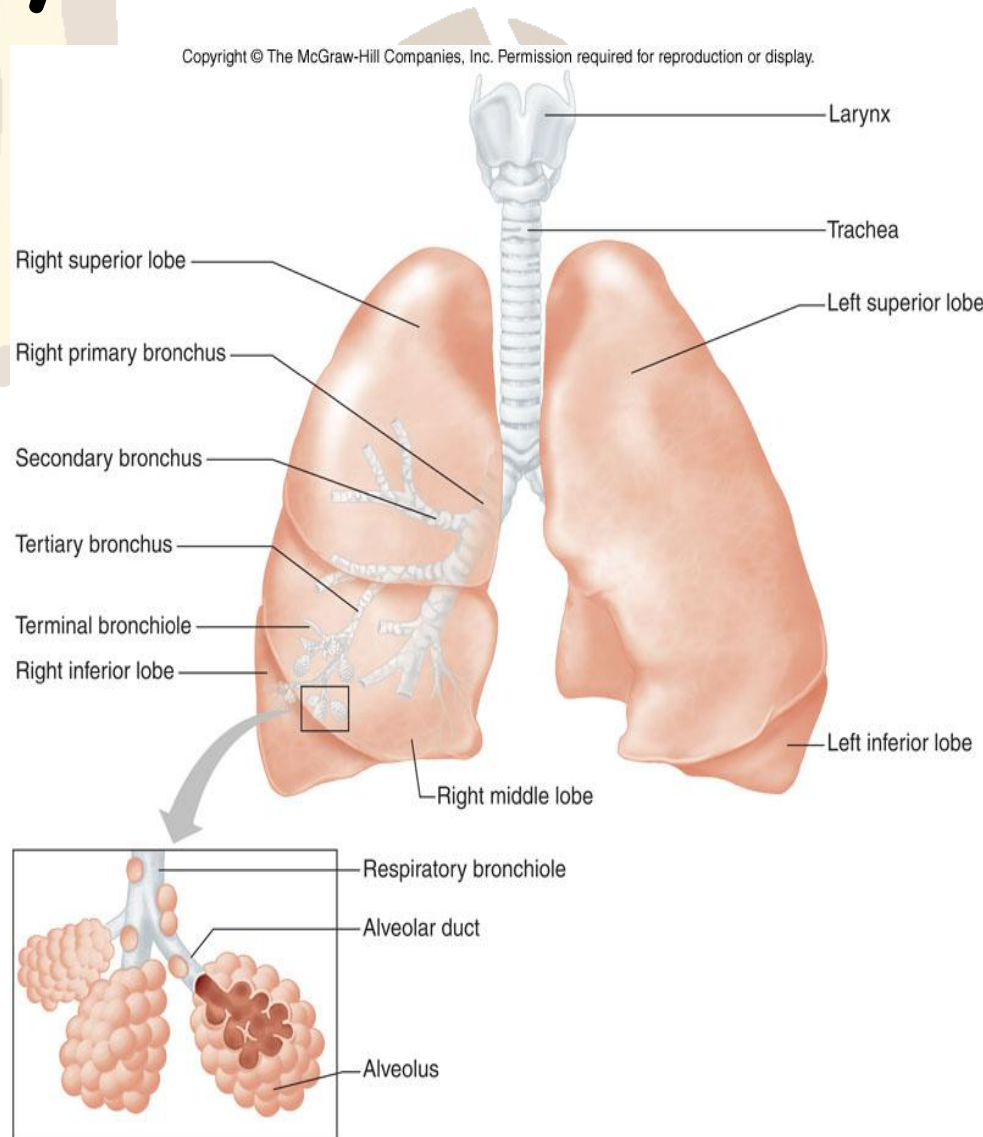


Divisions of the Respiratory System

□ Lower respiratory tract (within thorax)

- ❖ Trachea
- ❖ Bronchial Tree
- ❖ Lungs

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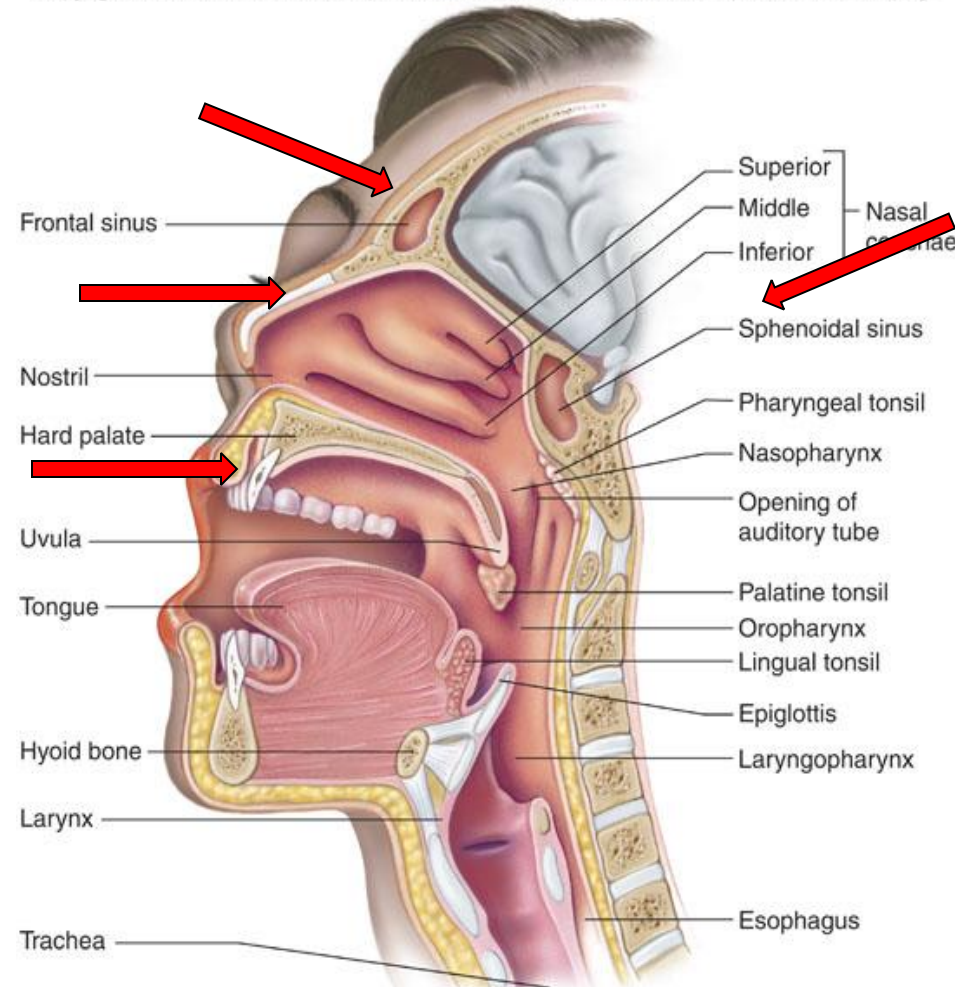


Structures of the Upper Respiratory Tract

☐ **Nose** - warms and moistens air

- ❖ **Palantine bone** separates nasal cavity from mouth.
- ❖ **Septum** - separates right and left nostrils
 - rich blood supply = nose bleeds.
- ❖ **Sinuses** - 4 air containing spaces - open or drain into nose - (lowers weight of skull).

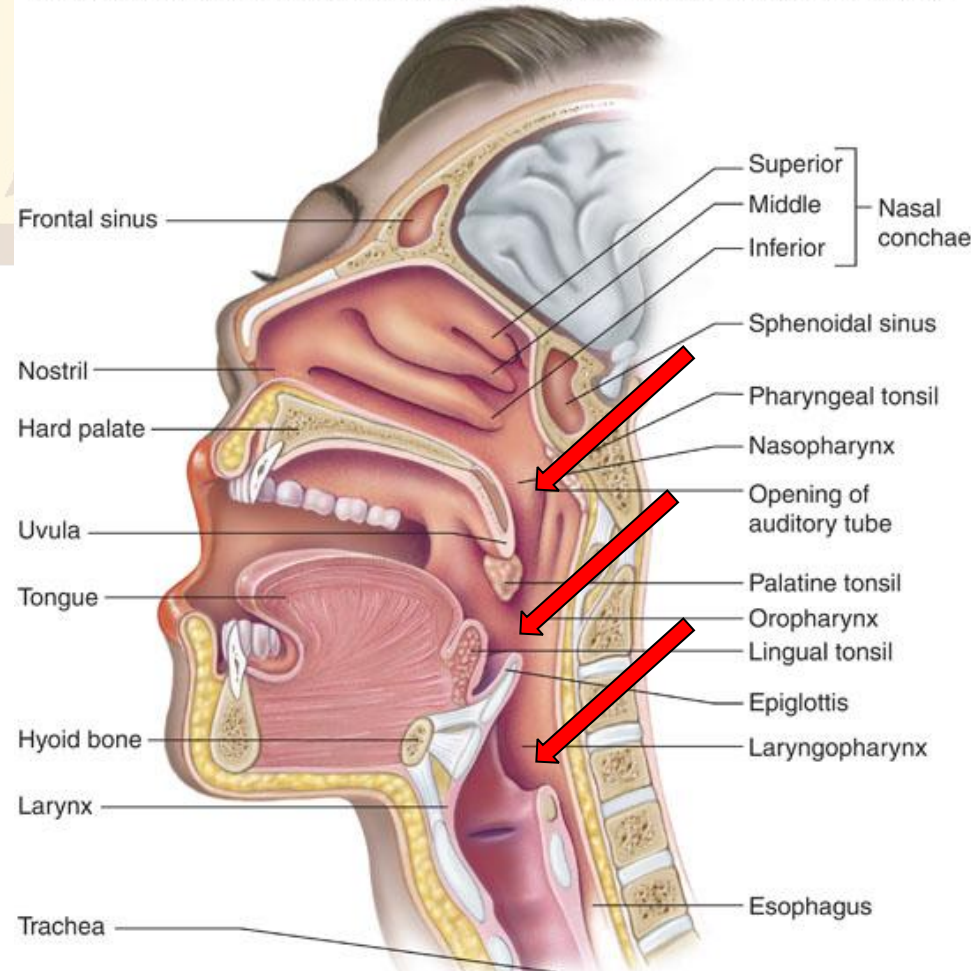
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Structures of the Upper Respiratory Tract

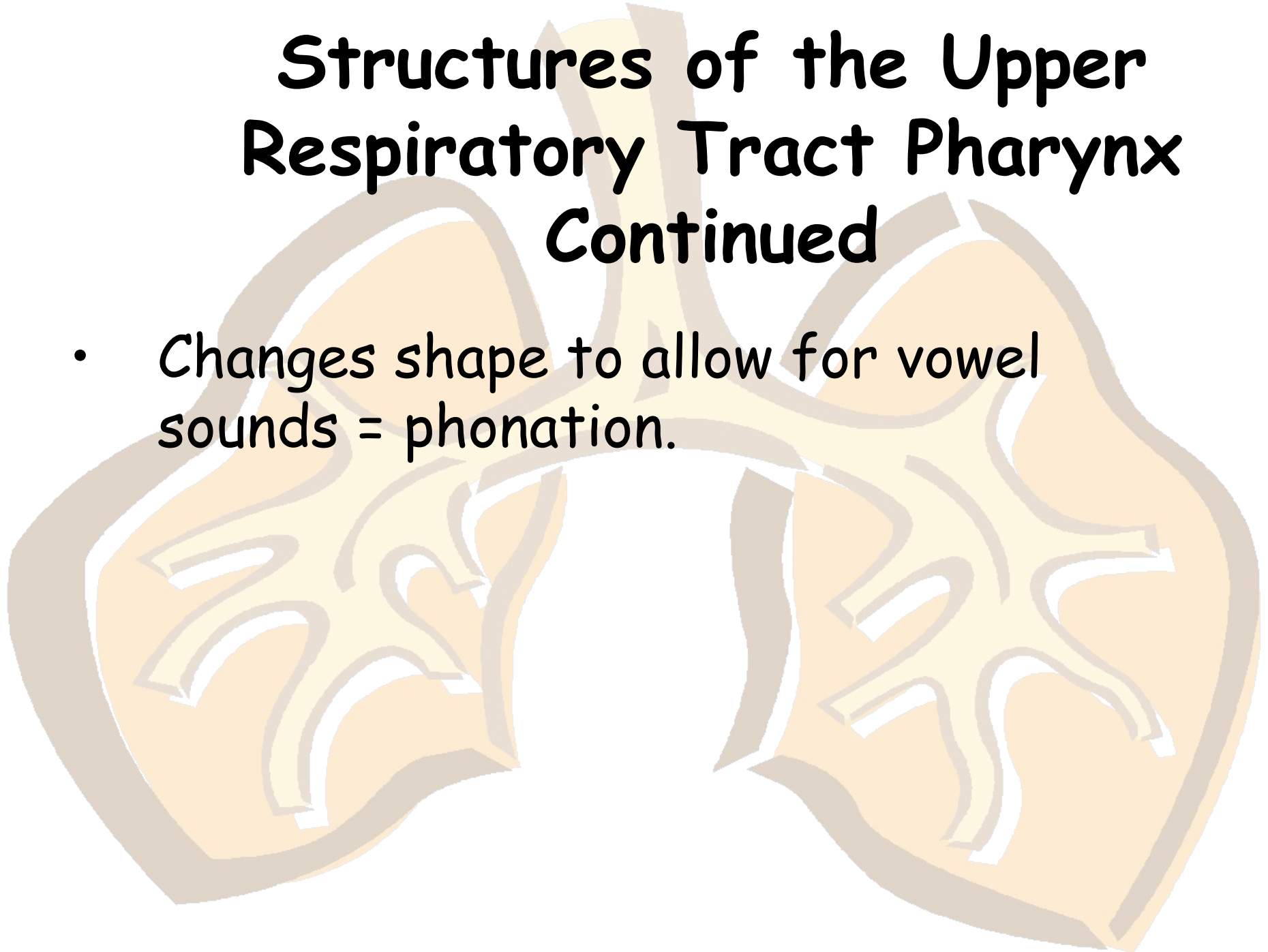
- **Pharynx** - (throat)
- Base of skull to esophagus
- **3 divisions**
 - **Nasopharynx** - behind nose to soft palate.
 - Adenoids swell and block.
 - **Oropharynx** - behind mouth, soft palate to hyoid bone.
 - tonsils
 - **Laryngopharynx** - hyoid bone to esophagus.

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Structures of the Upper Respiratory Tract Pharynx Continued

- Changes shape to allow for vowel sounds = phonation.

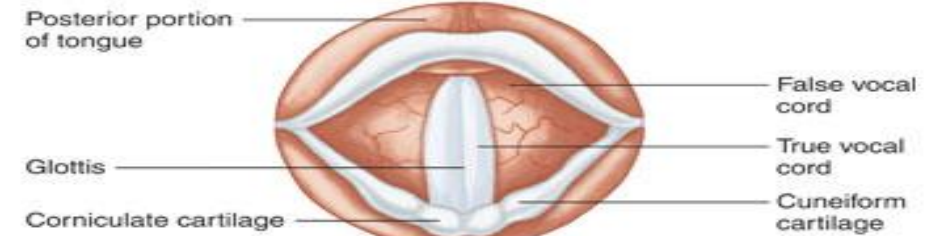


Structures of the Lower Respiratory Tract

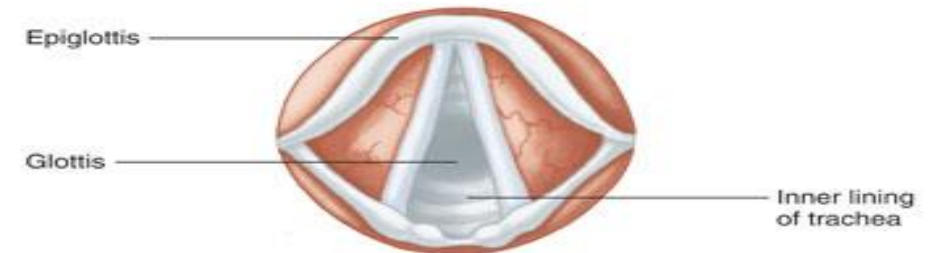
- **Larynx** - voice box

- Root of tongue to upper end of trachea.
- Made of cartilage
- 2 pairs of folds
 - Vestibular - false vocal cords
 - True vocal cords

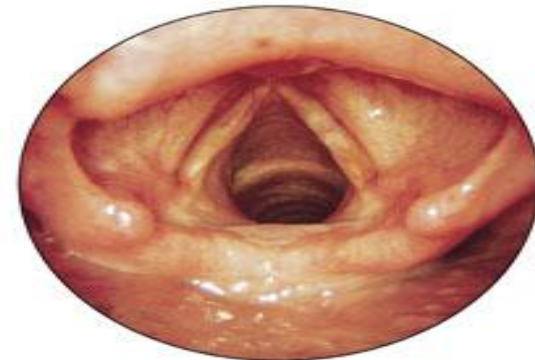
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(a)



(b)

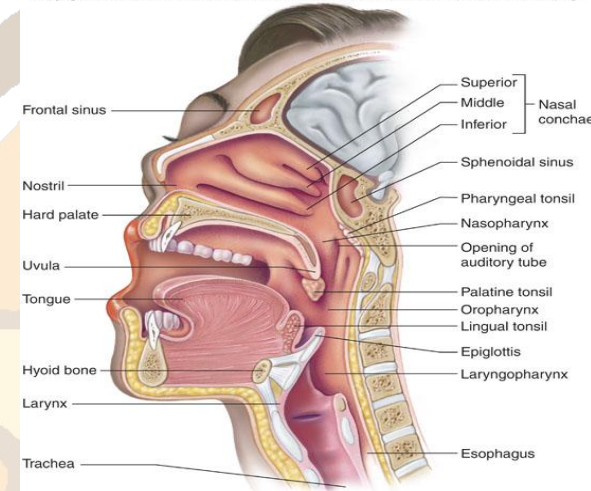


(c)

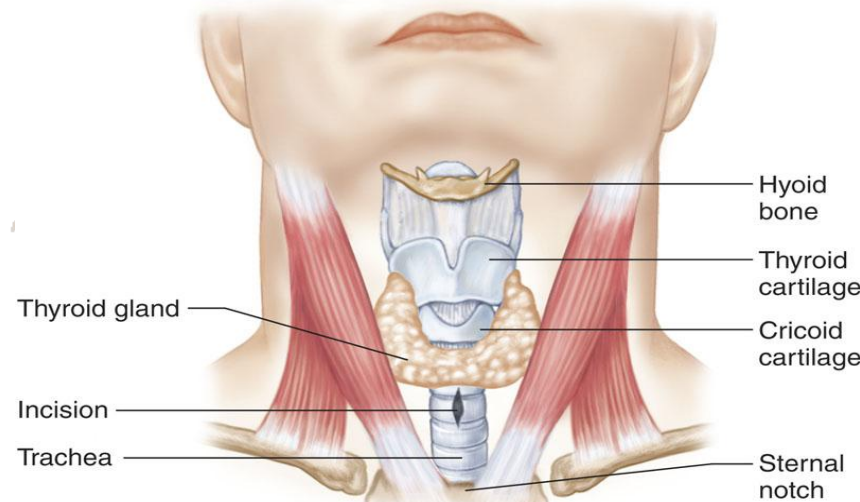
Structures of the Lower Respiratory Tract larynx cont...

- **Thyroid cartilage** - adam's apple - larger in males due to testosterone.
- **Epiglottis** - flap of skin (hatch) on trachea, moves when swallowing and speaking.
 - closes off trachea when swallowing food

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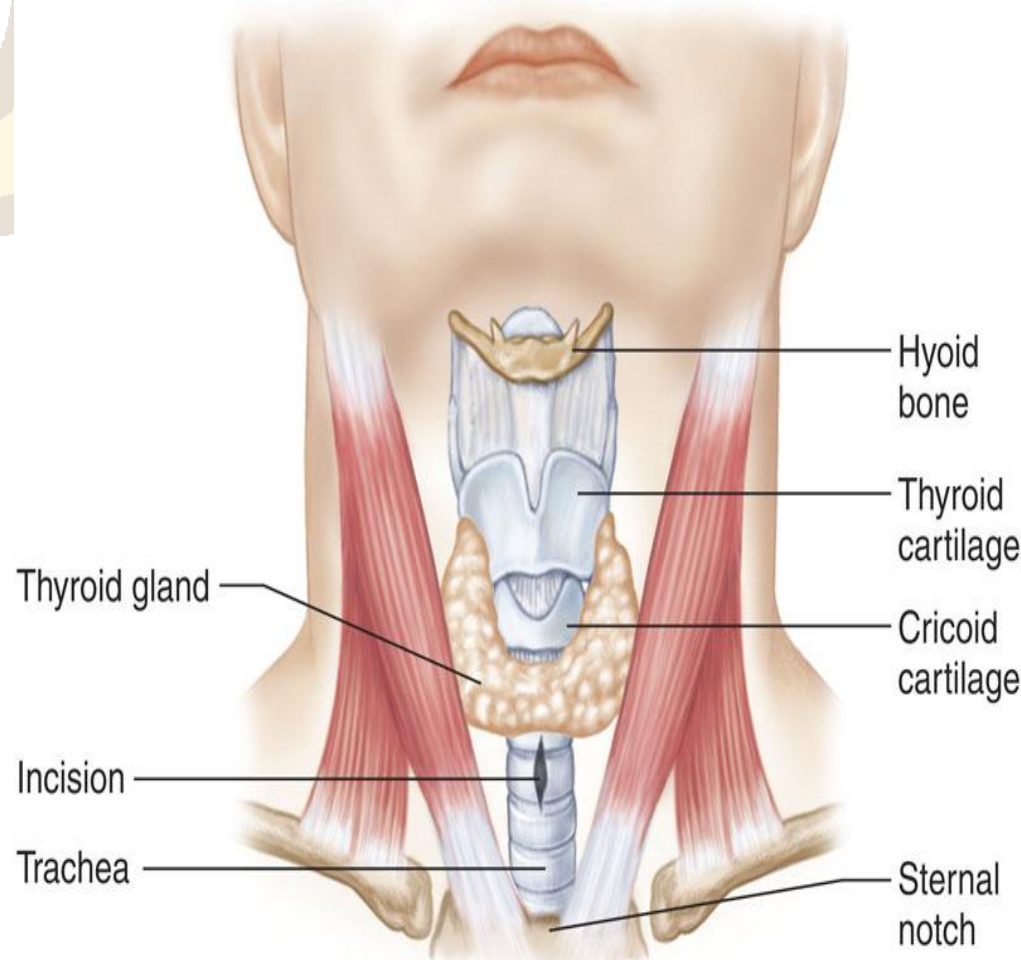
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Structures of the Lower Respiratory Tract

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- **Trachea (windpipe)**
 - Larynx to bronchi
 - Consists of smooth cartilage and C shaped rings of cartilage.
 - **Tracheostomy** - cutting of an opening in trachea to allow breathing.

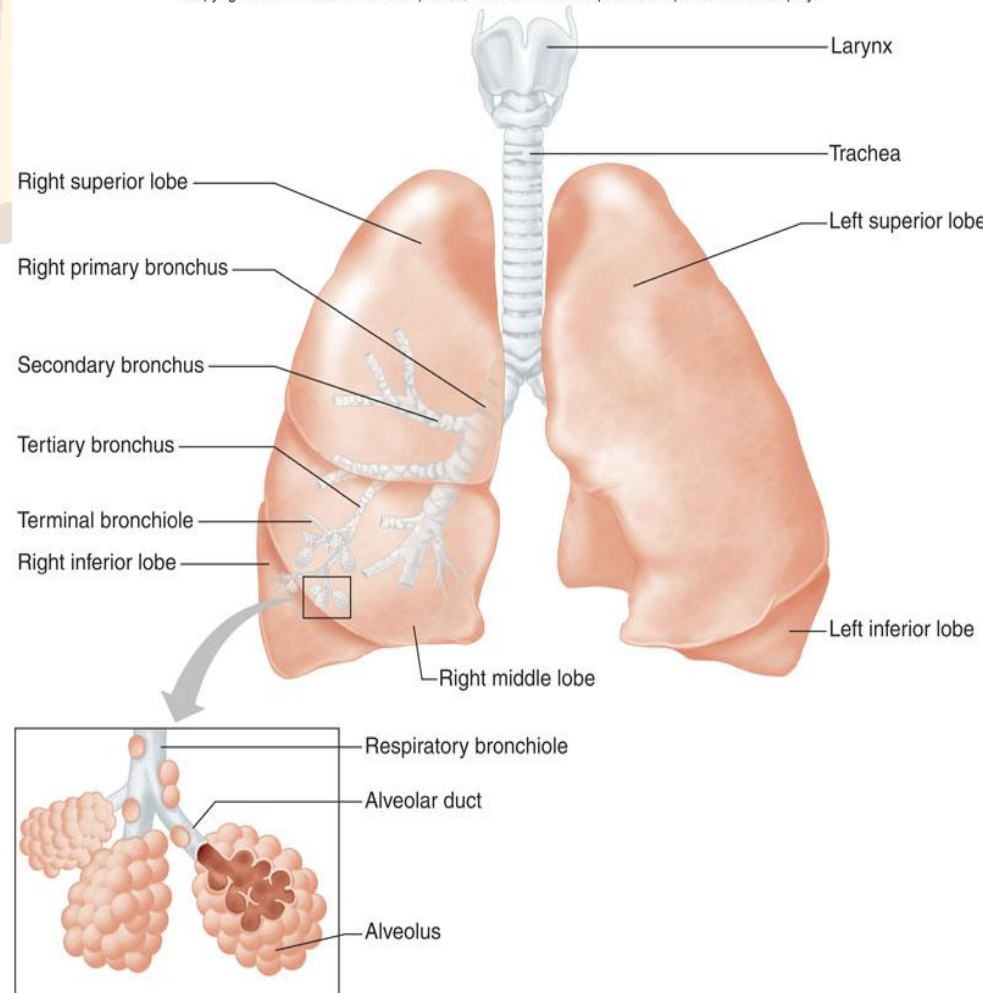


Structures of the Lower Respiratory Tract

Bronchi

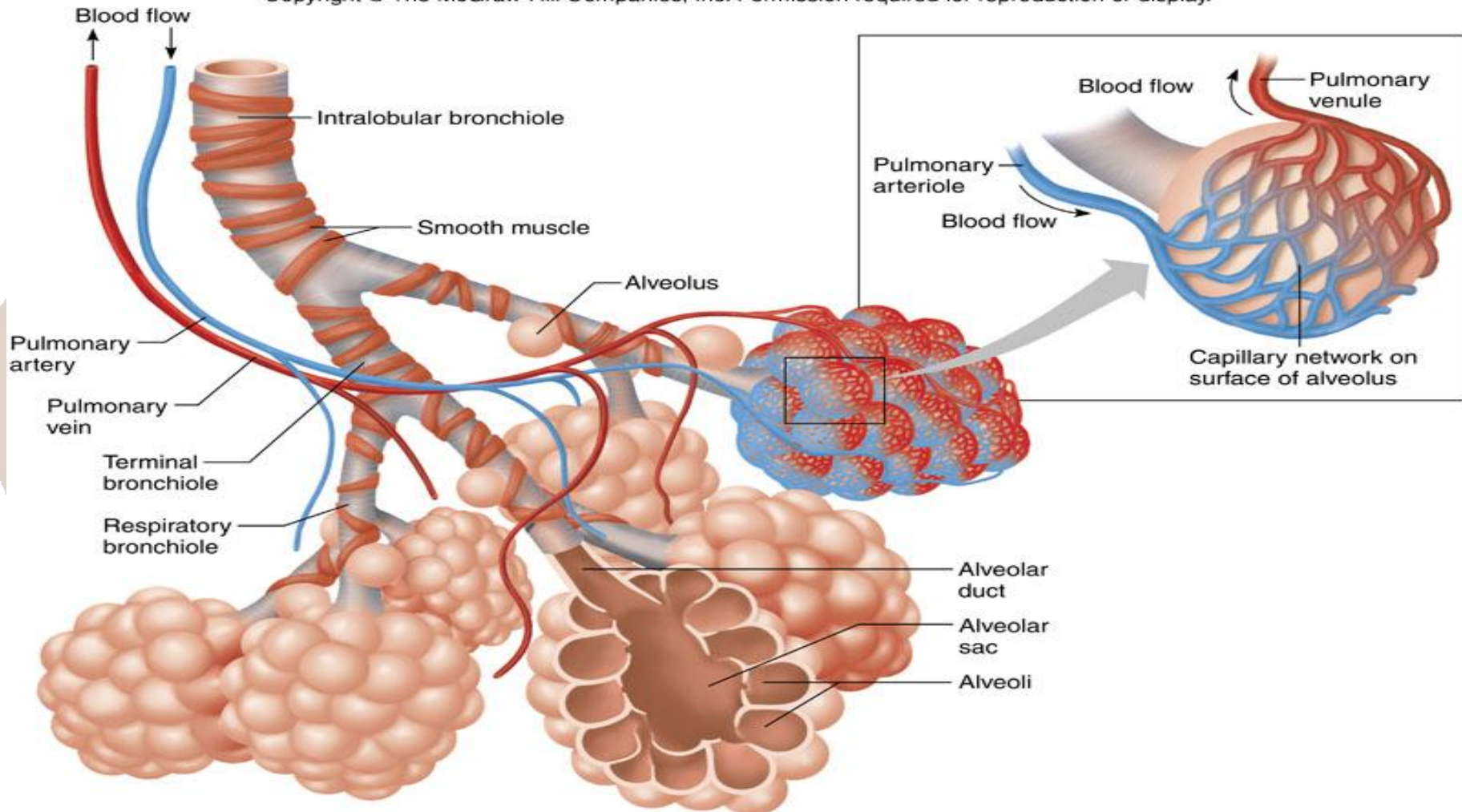
- Tubes that branch off trachea and enter into lungs
- Ciliated
- Branches: Primary bronchi—secondary bronchi—tertiary bronchi—bronchioles
- Bronchioles branch into microscopic alveolar ducts. Terminate into alveolar sacs
- Gas exchange with blood occurs in sacs.

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Structures of the Lower Respiratory Tract

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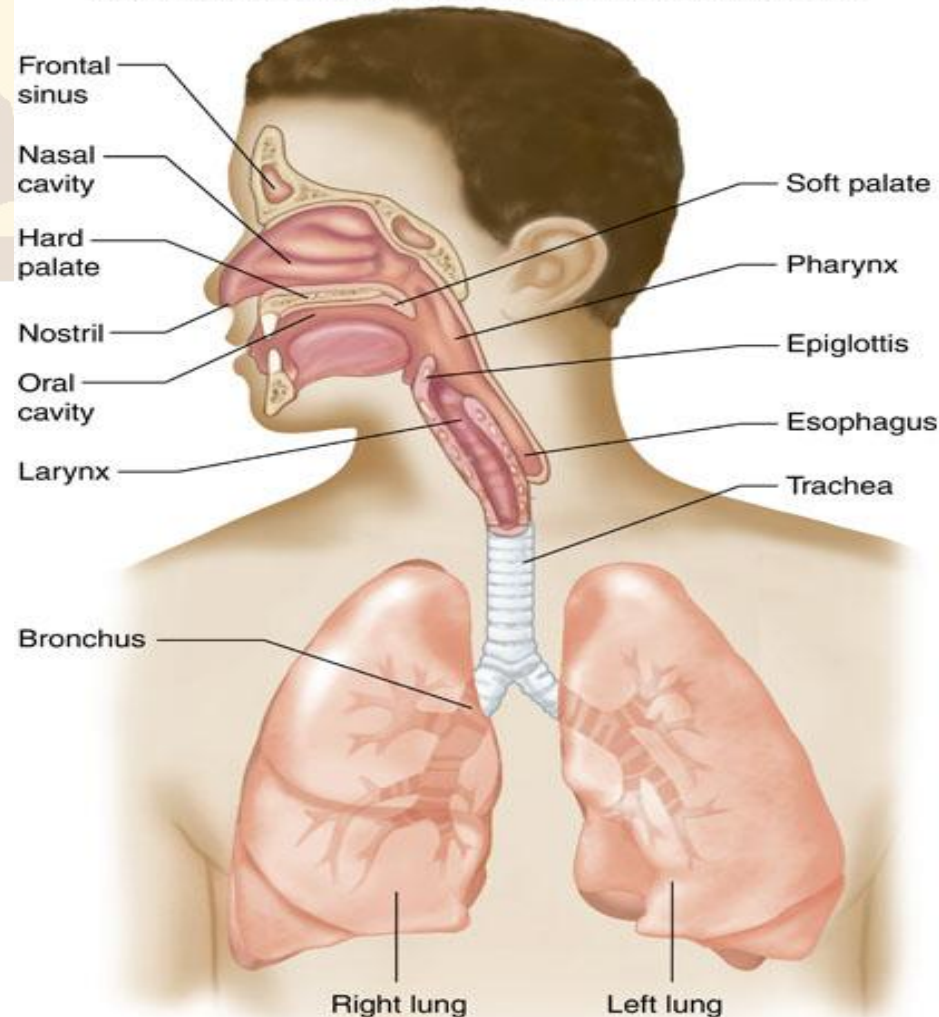


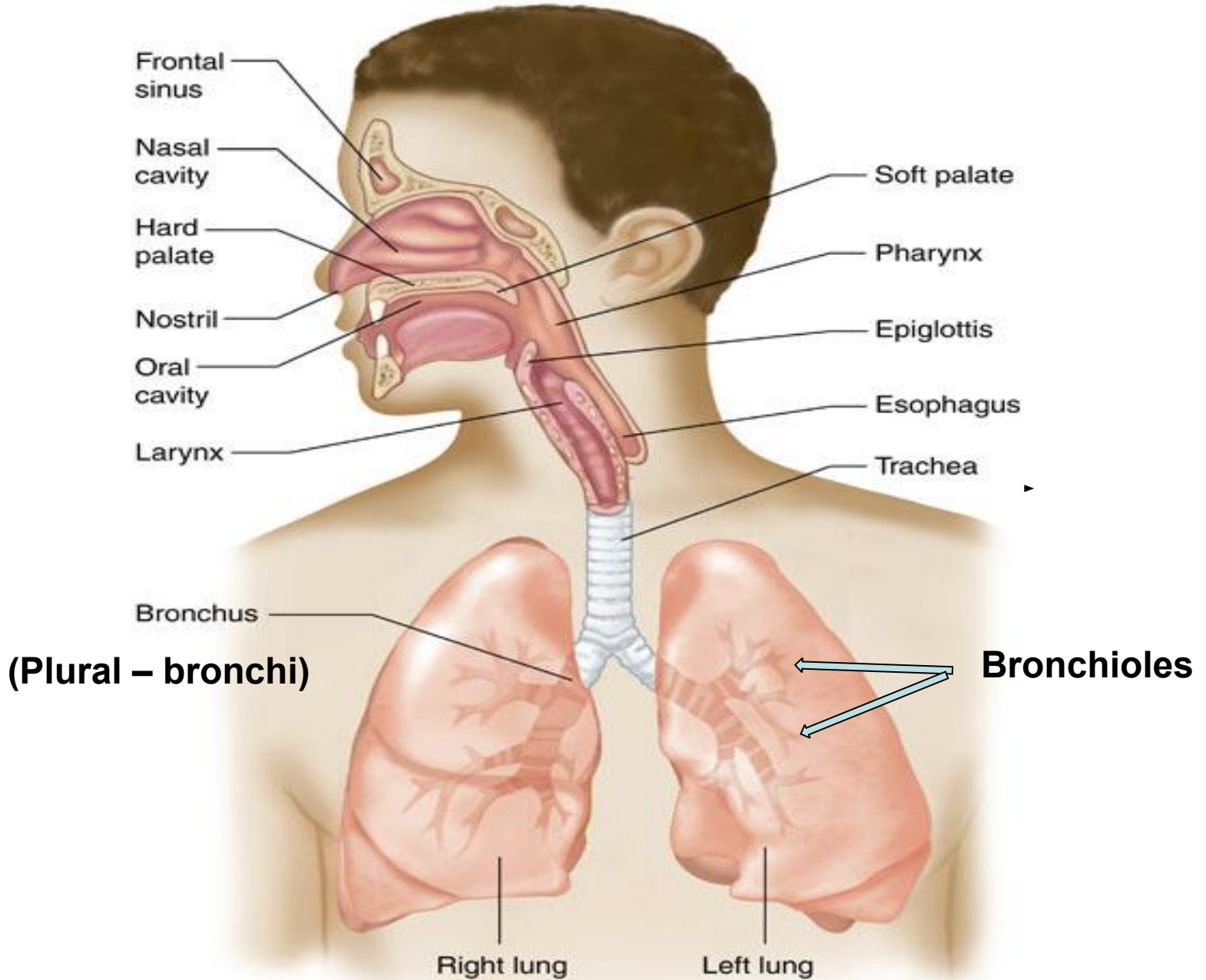
Structures of the Lower Respiratory Tract

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- **Lungs**

- Extend from diaphragm to clavicles
- Divided into lobes by fissures.
- Visceral pleura adheres to the lungs.





Activity

Pick a disease to research and present

- Asthma
- COPD
- Bronchitis
- Emphysema
- Lung Cancer
- Cystic Fibrosis
- Pneumonia
- Allergies

Questions

- 1) What is the disease?
- 2) What causes the disease?
- 3) What part of the respiratory system does it specifically affect?
- 4) Does it affect any other body systems?
- 5) Can it be cured? Managed?
- 6) How can it affect you as an athlete?
- 7) Create a presentation.

Aim: SWBAT connect how the respiratory system works to help humans with sport.

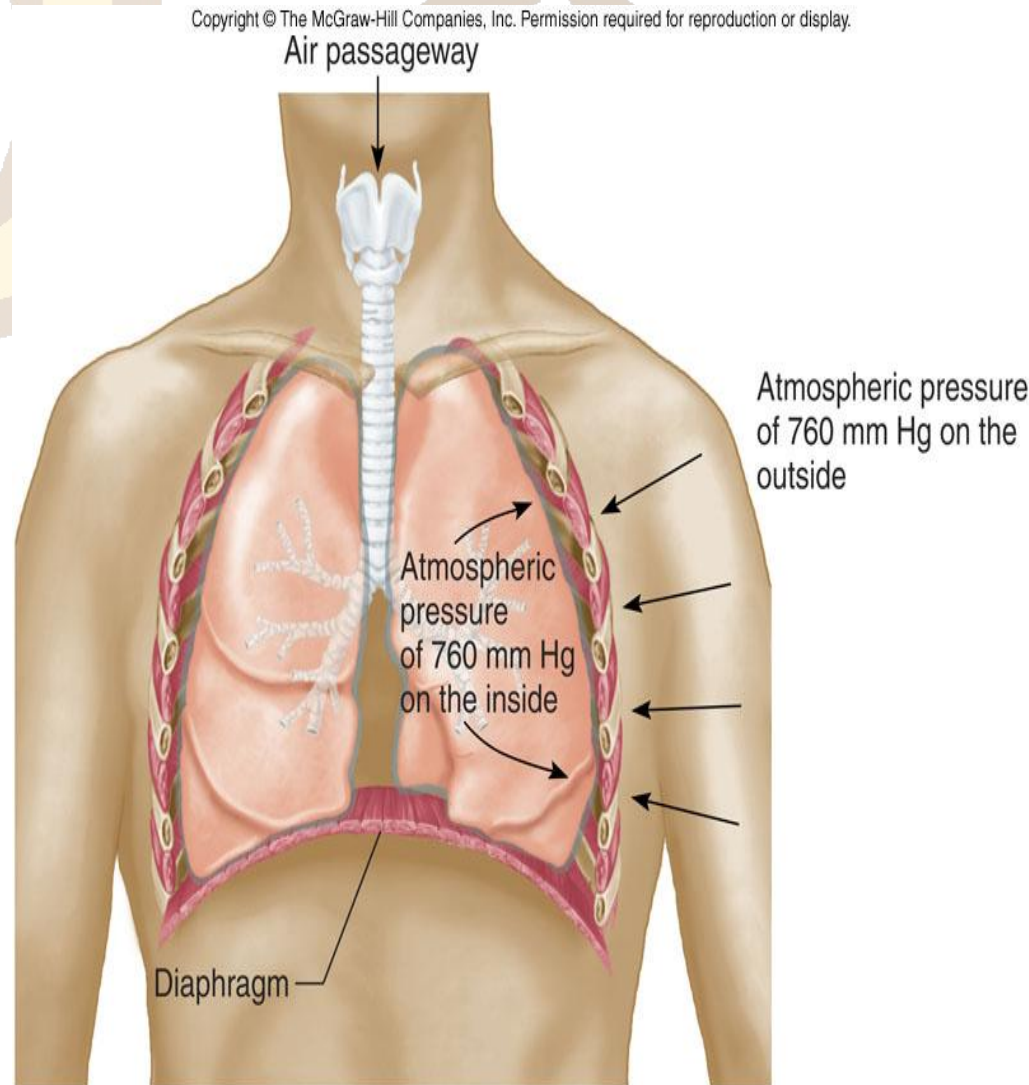
Do Now: Describe the process that a blood cell goes through from birth to death.

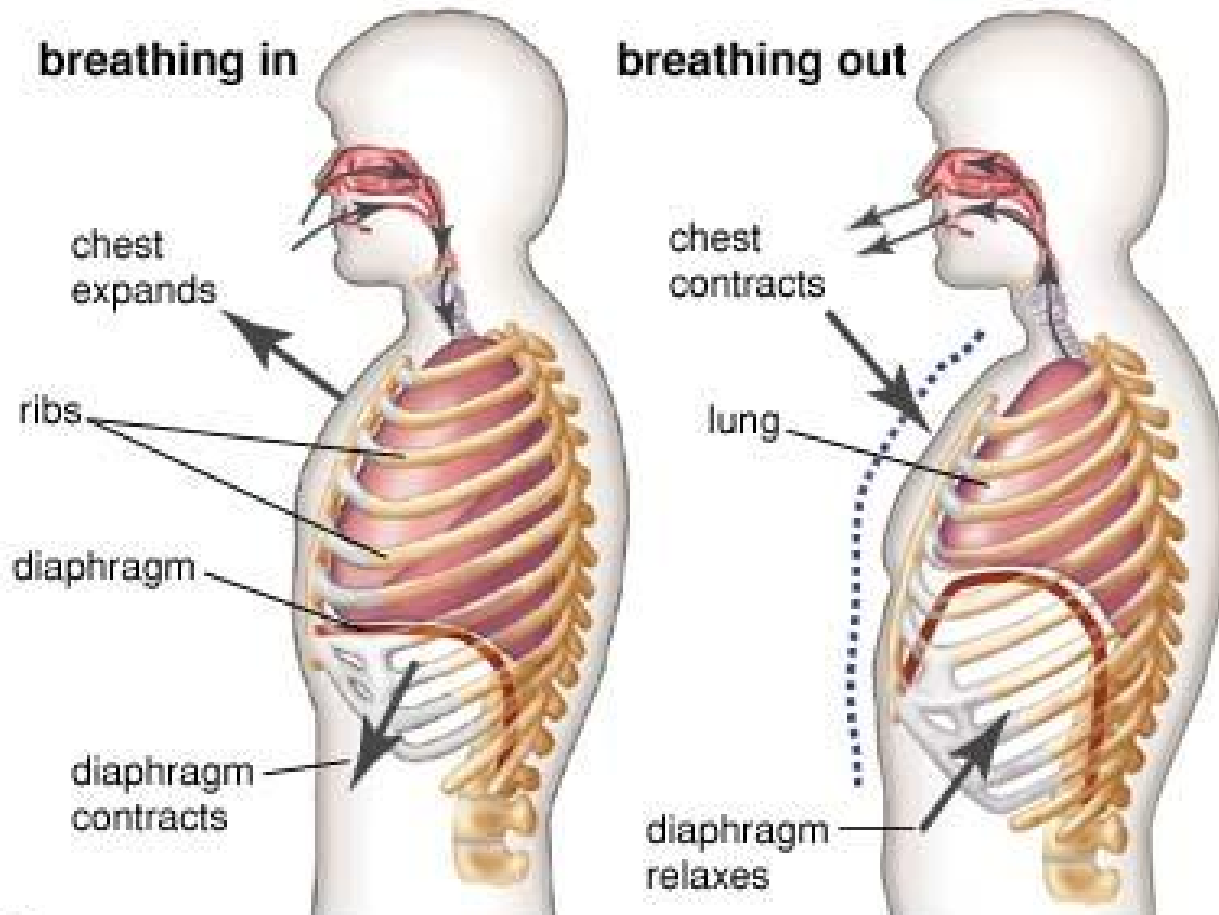
Respiratory Physiology

- **Pulmonary Ventilation = breathing**

- **Mechanism**

- Movement of gases through a pressure gradient - hi to low.
- When atmospheric pressure (760 mmHg) is greater than lung pressure ---- air flows in = **inspiration**.
- When lung pressure is greater than atmospheric pressure ---- air flows out = **expiration**.



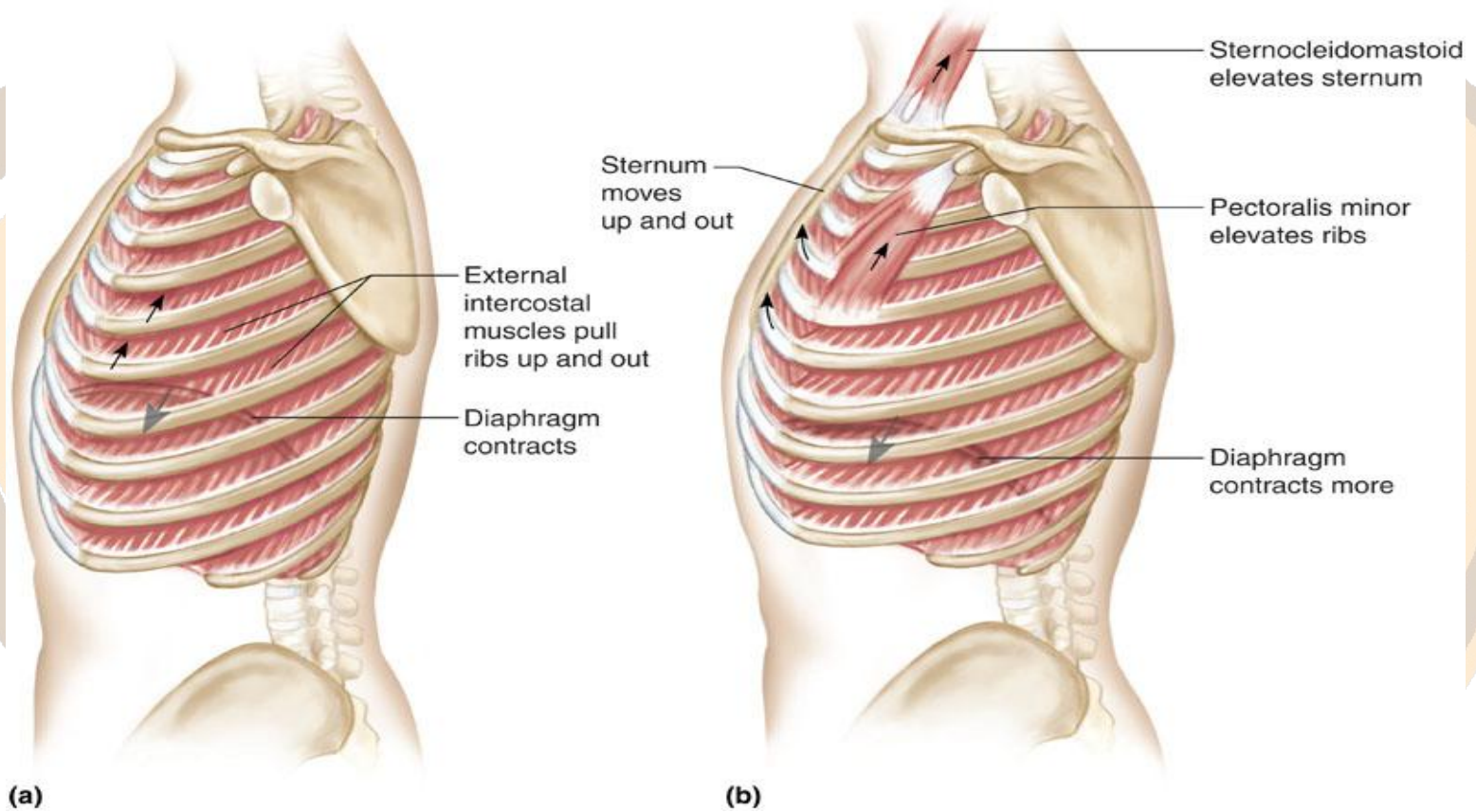


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Inspiration

-contraction of diaphragm and intercostal muscles

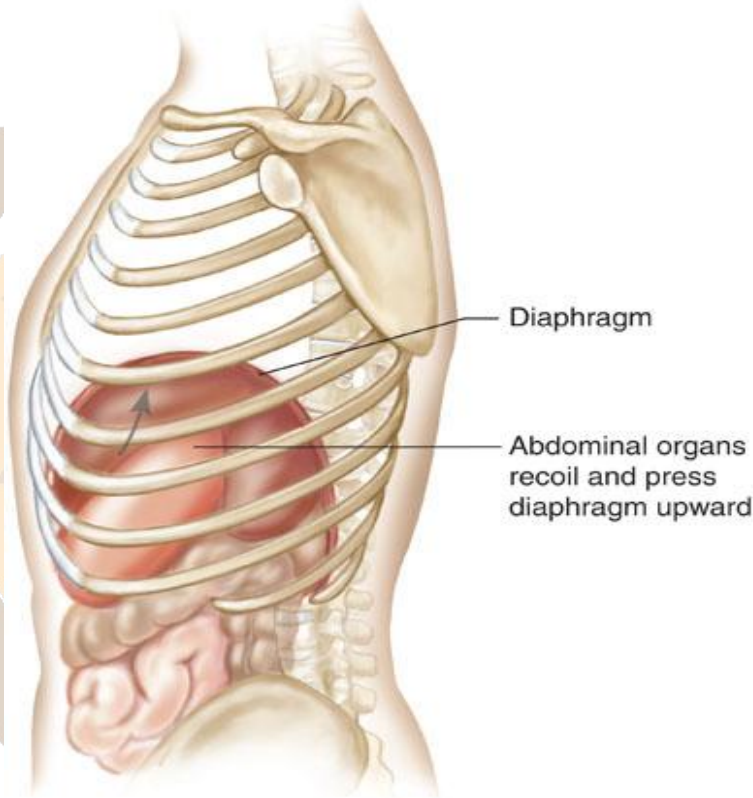
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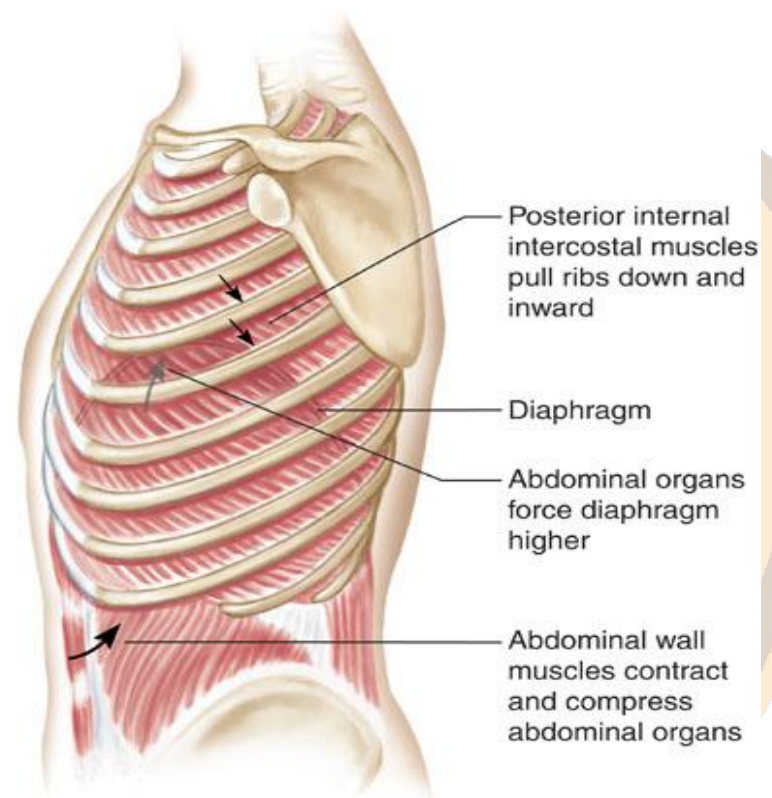
Expiration

- relaxation of diaphragm and intercostal muscles

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(a)



(b)

Volumes of Air Exchange

- ***Tidal volume*** - amount of air exhaled normally after a typical inspiration. Normal - about 500 ml
- ***Expiratory Reserve volume*** - additional amount of air forcibly expired after tidal expiration (1000 - 1200 ml).
- ***Inspiratory Reserve volume*** - (deep breath) amount of air that can be forcibly inhaled over and above normal.
- ***Residual volume*** - amount of air that stays trapped in the alveoli (about 1.2 liters).

Volumes of Air Exchange



- ***Vital capacity*** - the largest volume of air an individual can move in and out of the lungs.
- **Depends on many factors**
 - size of thoracic cavity
 - posture
 - volume of blood in lungs, which could be affected by congestive heart failure, emphysema and other diseases.

Volumes of Air Exchange

- **Eupnea** - normal quiet breathing, 12-17 breaths per minute.
- **Hyperventilation** - increase in respiratory ventilation in excess of the need for oxygen.
 - Caused by response to fear, stress, anxiety, anger, a phobia or exertion.
- **Hypoventilation** - decrease in respiratory ventilation.
- **Apnea** - temporary cessation of breathing at the end of normal expiration.

Heimlich Maneuver

- Lifesaving technique that is used to open a windpipe that is suddenly obstructed.
- Air already in lungs used to expel object.



Heimlich Maneuver

- **Technique - Conscious victim**
 - Ask the victim if he/she can talk
 - Stand behind victim and wrap your arms around their waist.
 - Make a fist with one hand and grasp it with the other hand.
 - Place thumb side of fist below xiphoid process and above navel.
 - Thrust your fist in and upward - about 4 times.
- **DO NOT** press on ribs or sternum



Heimlich Maneuver

- **Technique - Unconscious victim**
 - Catch victim if they begin to fall - place on floor face up.
 - Straddle hips
 - Place one hand on top of other on the victim's abdomen - above navel and below xiphoid process.
 - Forceful upward thrusts with heel of hand - several times if necessary.

Self Check Quiz

Take out sheet of paper.

Label 1-7

Review Questions

1 Which of the following is not a function of the respiratory system?

- A. influence speech
- B. Distribution of oxygen to cells
- C. Filtration of air
- D. Warming of air

2

The place where oxygen goes from the lungs to the capillaries

Alveoli

3

- The flap or opening to the trachea is the
 - a. Larynx
 - b. Pharynx
 - c. Epiglottis
 - d. Vocal cords

4

- The structure that separates the right and left nasal cavities is the _____

Septum

5

What is inspiration in relation to the respiratory system?

6

Which of the following activities is the best analogy of respiration?

- A. Exchanging gifts**
- B. Giving a gift**
- C. Receiving a gift**
- D. Sitting in a chair**

A

7

Air is forced into the lungs by the contraction of the...

A. Alveoli

B. Bronchioles

C. Diaphragm

D. Heart

C