SI A&P - Full Discipline Demo - Fetal Pig

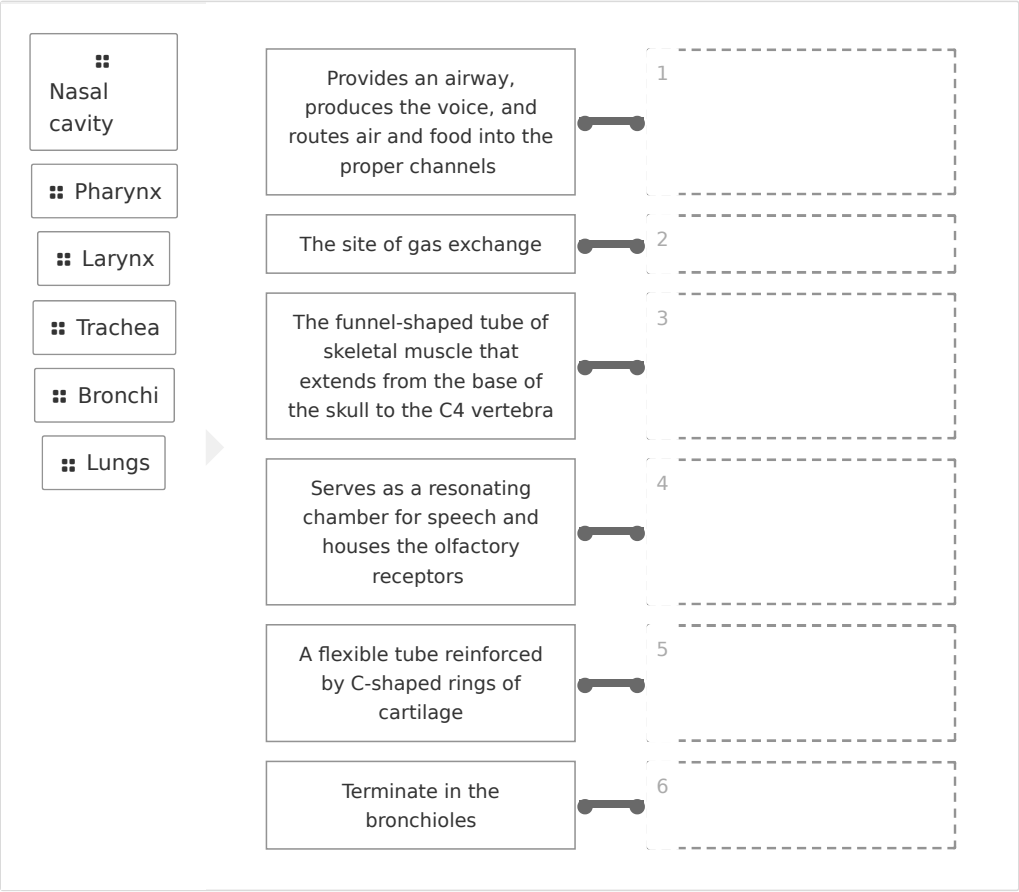
Anatomy of the Respiratory System

Final Report - Answer Guide

Institution	Science Interactive University
Session	SI A&P - Full Discipline Demo - Fetal Pig
Course	SI A&P - Full Discipline Demo - Fetal Pig
Instructor	Sales SI Demo

Test Your Knowledge

Match each term with the best description.



Correct answers:

1 Larynx 2 Lungs 3 Pharynx 4 Nasal cavity 5 Trachea

6 Bronchi

Order the steps of pulmonary ventilation, with the first step on the top and the last step on the bottom.

≡ Air moves from the area of higher pressure outside the body to the area of lower pressure inside the lungs.

1 **Correct answer:** The diaphragm contracts.

≡ The diaphragm relaxes.

2 **Correct answer:** Air moves from the area of higher pressure outside the body to the area of lower pressure inside the lungs.

≡ Oxygen moves into the pulmonary capillaries and carbon dioxide moves out of the pulmonary capillaries.

3 **Correct answer:** Oxygen moves into the pulmonary capillaries and carbon dioxide moves out of the pulmonary capillaries.

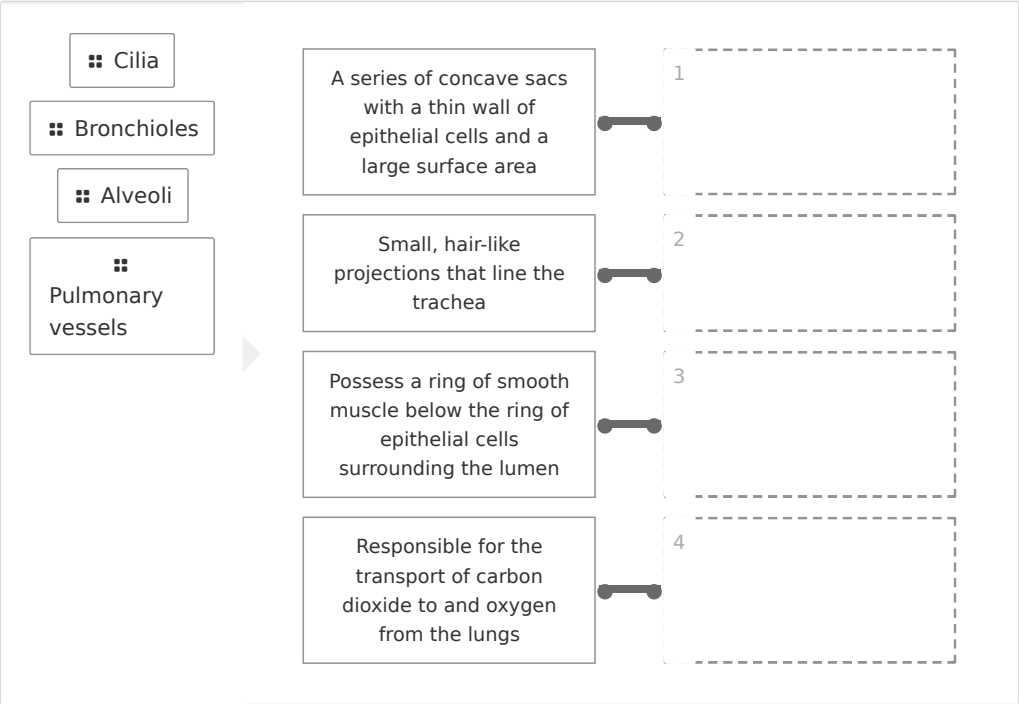
≡ Air moves from the area of higher pressure inside the lungs to the area of lower pressure outside of the body.

4 **Correct answer:** The diaphragm relaxes.

≡ The diaphragm contracts.

5 **Correct answer:** Air moves from the area of higher pressure inside the lungs to the area of lower pressure outside of the body.

Match the term with the best description.



Correct answers:

1 Alveoli 2 Cilia 3 Bronchioles 4 Pulmonary vessels

Exploration

The _____ is also known as the voice box.

- epiglottis
- pharynx
- larynx ✔
- trachea

_____ are a series of concave sacs with a thin wall and a large surface area that exchange gases.

- Bronchioles
- Alveoli ✔
- Cilia
- Cartilaginous rings

Pressure change in the thoracic cavity is caused by contraction and relaxation of the _____.

- diaphragm ✔
- lungs
- heart
- nose

Exercise 1

What is the most prevalent structure in the lung tissue? Explain the prevalence of this structure in terms of lung function.

The alveoli are the most prevalent structure in lung tissue. That is because they are the site of gas exchange, the primary function of the lungs.

What are the functions of the pseudostratified ciliated epithelium of the trachea?

The ciliated epithelium beats rhythmically upward toward the mouth so any foreign particles that stick to the mucus can be spit out or swallowed instead of going to the lungs.

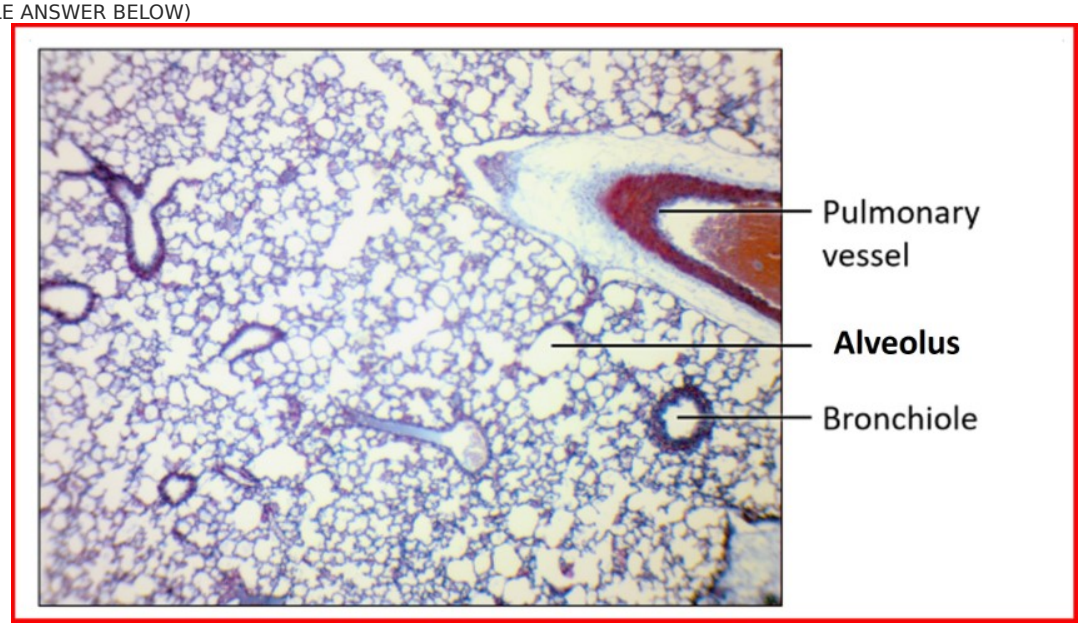
Describe the difference in appearance between the bronchioles and the alveoli. How does this difference in appearance correspond to their different functions?

The bronchioles possess smooth muscle and cuboidal epithelial cells. The alveoli are lined with squamous epithelial cells. This is because the bronchiole functions to transport air into and out of the lungs, and the smooth muscle aids in that function. The alveoli need the thinner epithelial cells to help facilitate gas exchange with the red blood cells.

What is the function of the smooth muscle in the trachea? Where is smooth muscle located in the wall of the trachea in relation to the ciliated epithelium and cartilage?

The smooth muscle allows the airway to expand or contract based on the need for more air to flow into the passageways. It is external to the ciliated epithelium and internal to the cartilage.

Photo 1: Simple Squamous, Lung - Low Power
(SAMPLE ANSWER BELOW)



Respiratory System Slide Magnification

(SAMPLE ANSWER BELOW)

Slide	Magnification	Comments
Simple Squamous, Lung - Low Power	60X	Student answers will vary.
Simple Squamous, Lung - High Power	600X	Student answers will vary.
Pseudostrat. Ciliated, Trachea - Low Power	60X	Student answers will vary.
Pseudostrat. Ciliated, Trachea - High Power	600X	Student answers will vary.

Photo 2: Simple Squamous, Lung - High Power

(SAMPLE ANSWER BELOW)

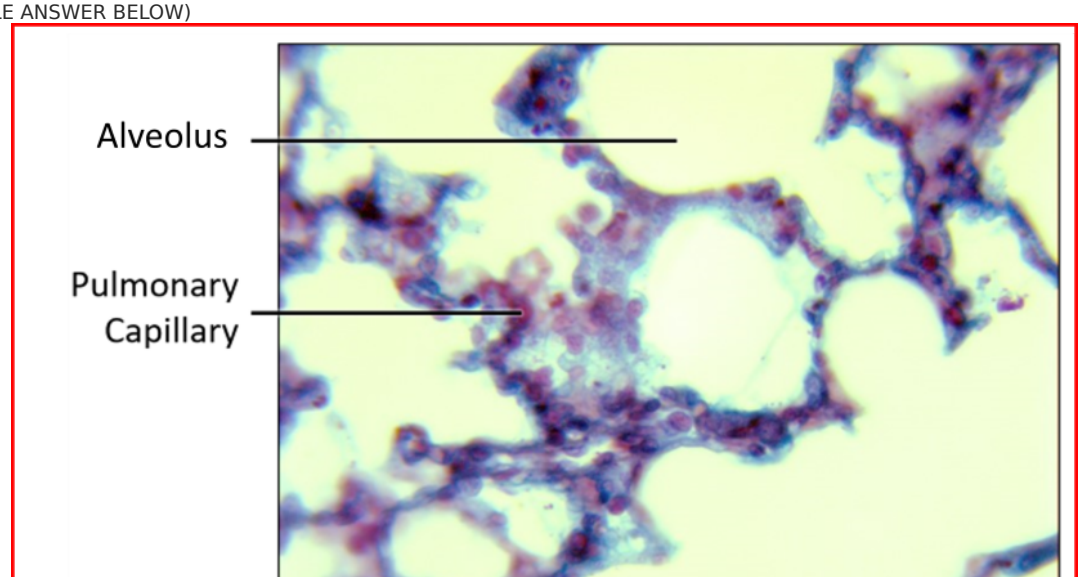


Photo 3: Pseudostrat. Ciliated, Trachea - Low Power

(SAMPLE ANSWER BELOW)

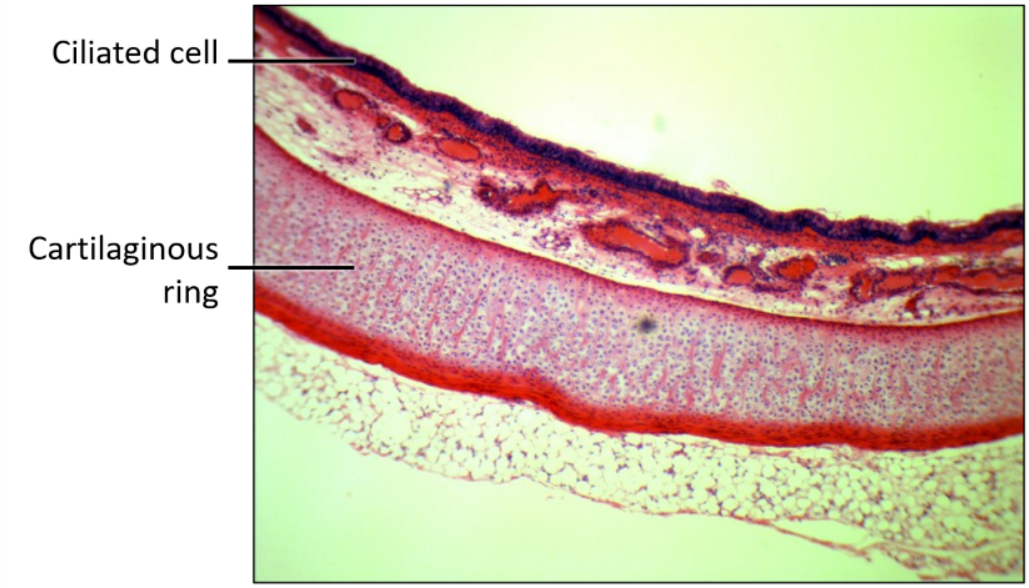
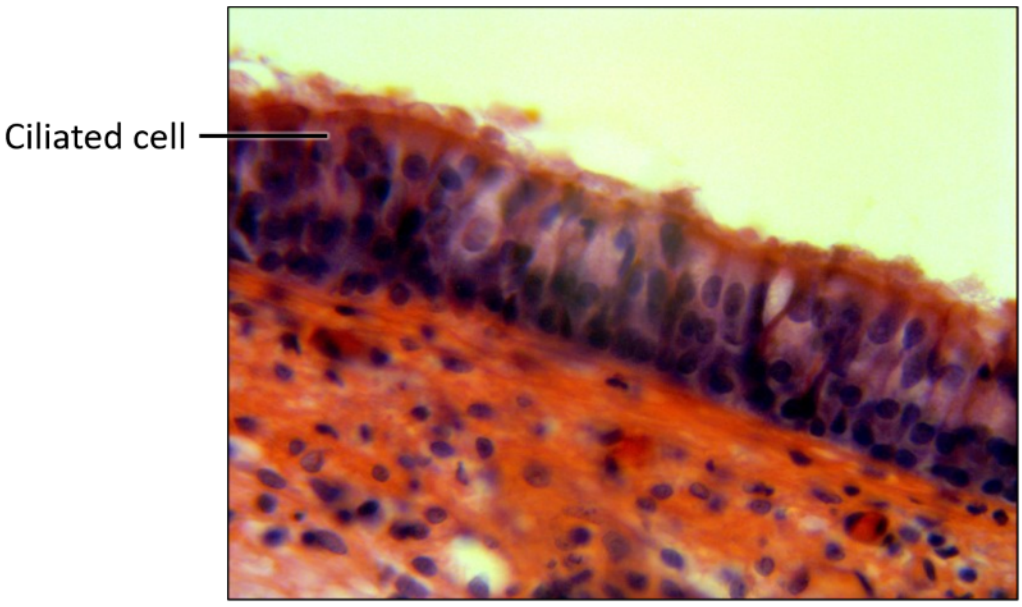


Photo 4: Pseudostrat. Ciliated, Trachea - High Power

(SAMPLE ANSWER BELOW)



Exercise 2

What is the structure and function of the epiglottis as described on the Virtual Model display?

The epiglottis is a mobile cartilaginous lamina located in the upper larynx that functions to direct food into the esophagus at the moment of swallowing and prevent food from entering the lower airways.

Which of the labeled structures in this exercise function for gas exchange? Describe the process of gas exchange including the associated microscopic structures examined in Exercise 1 in your answer.

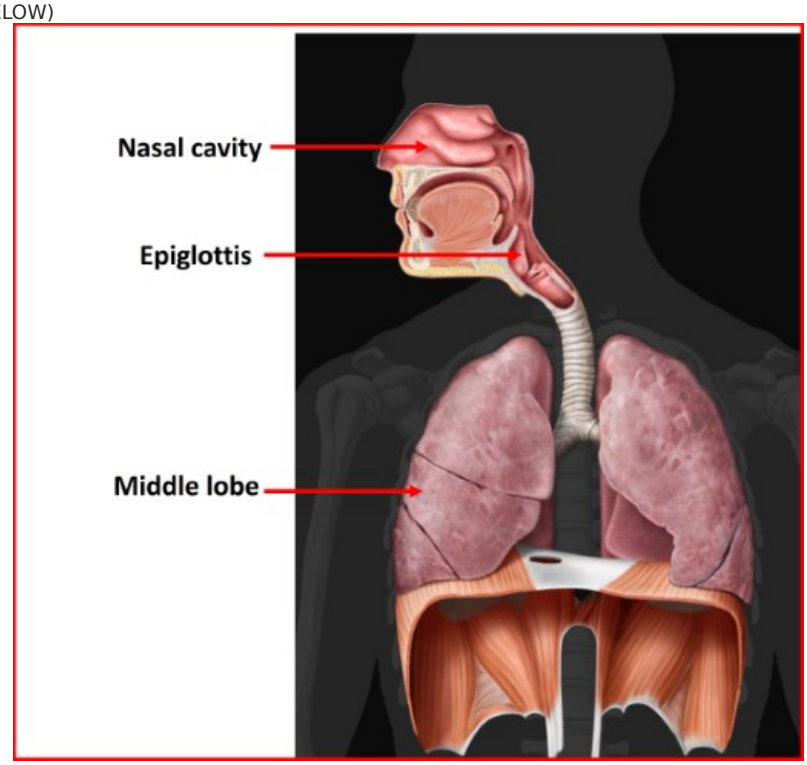
Gas exchange occurs in the lungs, including the middle lobe that was labeled in this exercise. Microscopic air-filled sacs called alveoli and the associated pulmonary capillaries permit the

passive exchange of carbon dioxide and oxygen as the two gases move along partial pressure gradients from areas of high partial pressure to areas of low partial pressure.

What is the structure and function of the nasal cavity as described in the Exploration section of this lab?

The nasal cavity is composed of bone and hyaline cartilage that provide structure. The cavity is lined with a mucus membrane that warms, humidifies, and filters inhaled air before it enters the lungs. The nasal cavity also serves as a resonating chamber for speech and houses olfactory receptors for smell.

Photo 5: Respiratory System Virtual Model
(SAMPLE ANSWER BELOW)



Exercise 3

Describe the physical characteristics of the trachea. How do these characteristics relate to this structure's function?

The cartilaginous rings of the trachea provide the trachea with a rigid structure, keeping the airway open for breathing.

Describe the pathway of oxygen through the respiratory system of the pig.

Oxygen enters the mouth or nasal pathway, goes through the pharynx, larynx, trachea, bronchi, bronchioles, alveoli, and diffuses into blood of capillaries, to pulmonary veins, to the heart, pumped out the aorta to arteries, arterioles, and capillaries where it then diffuses into the cells of the body.

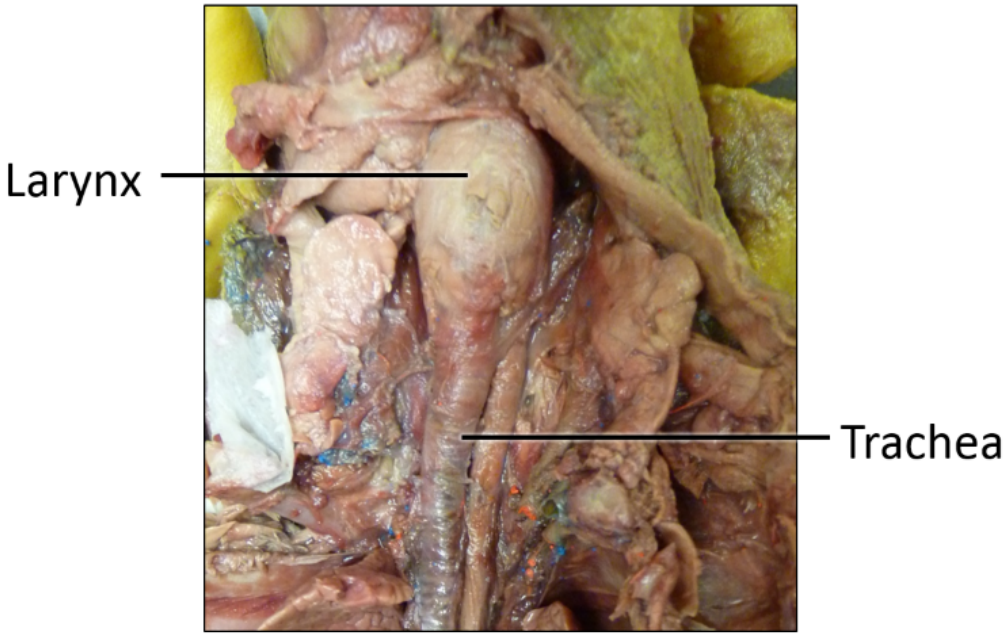
Describe the differences between the pig lungs and human lungs.

Differences between the human lungs and the pig lungs include the size, the number of lobes in each lung, and slight differences in the placement of the lungs because of locomotion and posture.

How does the texture of the lung recorded in Panel 1 relate to the organ's function?

The spongy texture of the lung is due to the numerous air filled sacs called alveoli. The high surface area of the alveoli that contributes to this texture enables more efficient gas exchange in the lungs.

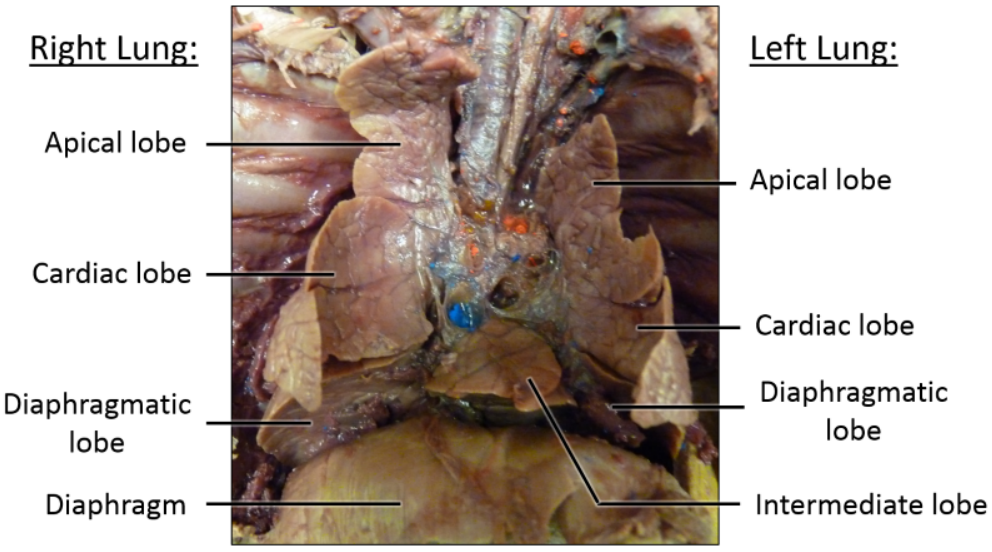
Photo 6: Larynx and Trachea
(SAMPLE ANSWER BELOW)



Data Table 2: Respiratory Dissection Comments
(SAMPLE ANSWER BELOW)

Structures	Comments
Larynx and Trachea	Students should only comment if they are unable to identify a structure.
Lobes of the Lungs and Diaphragm	Students should only comment if they are unable to identify a structure.

Photo 7: Lobes of the Lungs and the Diaphragm
(SAMPLE ANSWER BELOW)



Panel 1: Lung Texture Description
(SAMPLE ANSWER BELOW)

The lung has a spongy texture.

Competency Review

The walls of the _____ are lined with squamous epithelial cells.

- terminal bronchioles
- respiratory bronchioles ✔
- bronchi
- pulmonary vessels

The _____ respiratory tract includes the nasal cavity, pharynx, and larynx.

- upper ✔
- lower
- ventral
- dorsal

Muscles used for inspiration include the _____.

- sternocleidomastoids
- external intercostal muscles
- diaphragm
- All of the above ✔

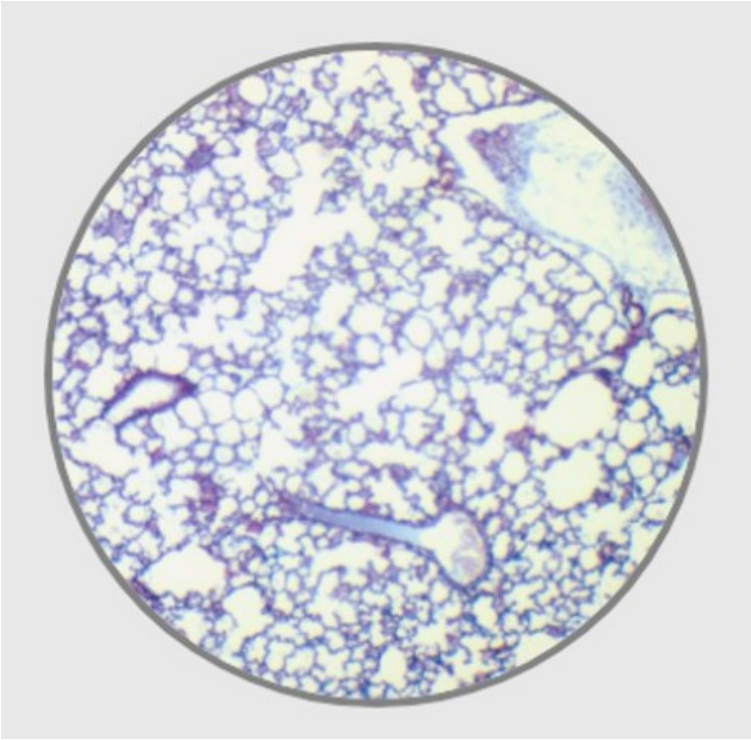
The larynx contains the vocal cords.

- True ✔
- False

The inside of the trachea is lined by small, hair-like projections called _____.

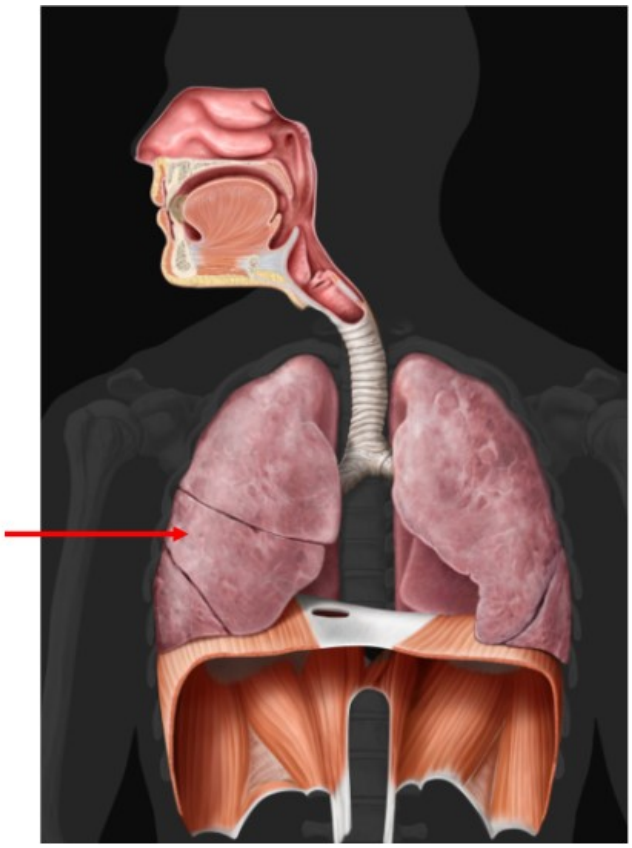
- cartilage
- alveoli
- cilia ✔
- surfactant

The slide image below is an example of _____ tissue.



- trachea
- nasal cavity
- pharynx
- lung ✔

The _____ is depicted by the red arrow in the image of the Virtual Model below.



- nasal cavity
- epiglottis
- middle lobe of lung ✔
- diaphragm

The _____ of the trachea function to move foreign particles toward the mouth.

- cartilaginous rings
- ciliated cells ✔
- alveoli
- pulmonary vessels

Extension Questions

Cystic fibrosis is a condition that leads to thick mucus in the respiratory tract and in the alveoli. Based on your knowledge of the respiratory system, how would you expect this condition to impact an individual? (SAMPLE ANSWER BELOW)

The thick mucus could block the airways. Persistent coughing in an attempt to clear the airways may cause inflammation and damage to the airways and lead to infection of the airways. Bacteria that are present in the mucus may build to unmanageable proportions and may eventually cause pneumonia. In addition, the alveoli may not be able to allow for the efficient exchange of gases from the airway to the blood. Cystic fibrosis may eventually lead to respiratory failure of the lungs and require a lung transplant.