

The Respiratory System

A respiratory system lab activity using Visible Body's Anatomy & Physiology

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PRE-LAB EXERCISES

Open the A&P app, and from the left-side menu select the Respiratory System Unit.

You are responsible for the identification of **all bold terms**.

A. Watch the video in Module 34.1 Respiratory System Overview and then answer the following questions.

1. The exchange of air between the lungs and the outside environment (atmosphere) is called

_____.

2. The exchange of gases between the lungs and the blood is called

_____.

3. The exchange of gases between the blood and the body tissues is called

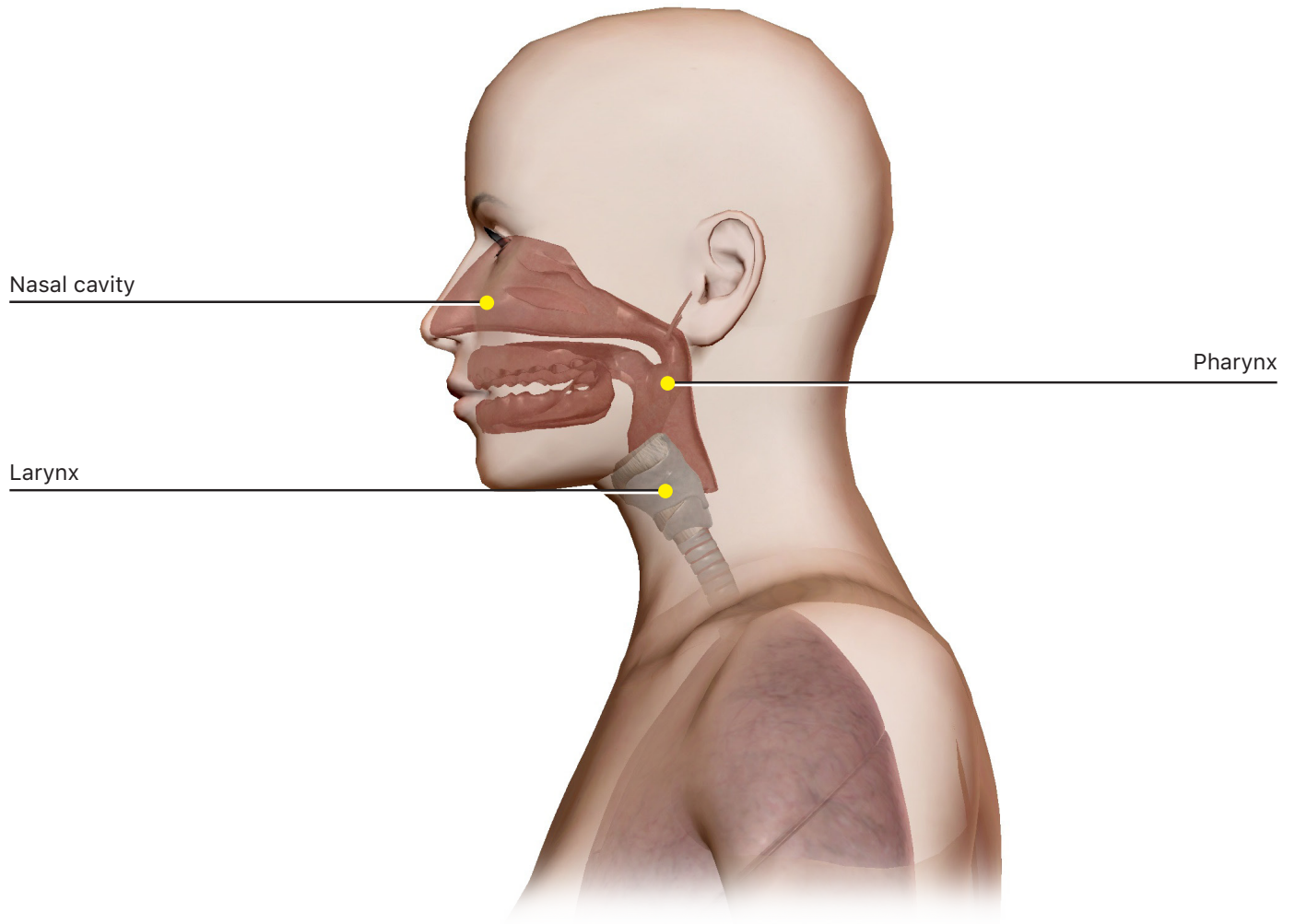
_____.

4. What is the name of the terminal air sacs in the lungs?

5. In the lungs, what type of gas diffuses into the bloodstream?

6. In the lungs, which gas diffuses from the blood into the alveoli?

B. Select Module 35.1 Upper Respiratory Structures.



1. Choose the items listed on the left-side menu: **Nasal Cavity, Pharynx, Larynx**, and note their relative locations.

a. What is the location of the larynx in relation to the pharynx?

2. Select **Pharynx** from left-side menu. Select Hide Others.

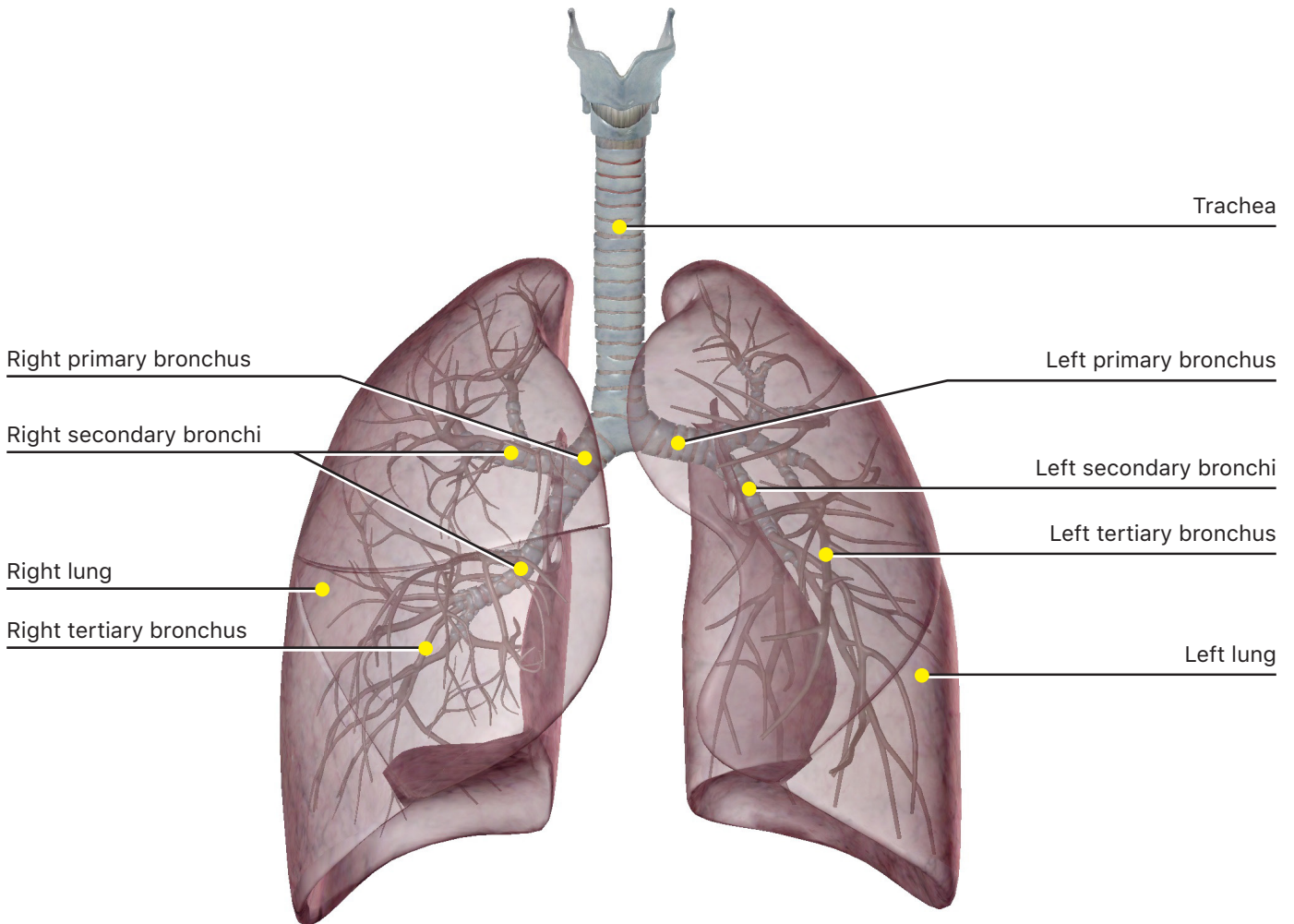
a. List the 3 parts of the pharynx from superior to inferior.

3. Select **Larynx** from the left-side menu. Select Hide Others. Locate the epiglottis. Click the textbook icon to get more information.

a. What is the **epiglottis** made of? What is the function of the epiglottis?

b. Locate the **thyroid cartilage**. What is it and the other laryngeal cartilage's function?

C. Select Module 36.1 Lower Respiratory Structures.



1. Select **Trachea** from the left-side menu. Note its location.

a. What is the main function of the **tracheal rings**?

b. What are the tracheal rings made of?

2. Select **Bronchi** from the left-side menu.

a. In terms of size and structure, what is the difference between **primary, secondary, and tertiary bronchi**?

b. Why are **alveoli** not seen in this view at the ends of the tertiary bronchi?

3. Select **Lungs** from the left-side menu.

a. What differences do you notice between the left and right lungs?

b. What are the lines on the surface of the lungs called?

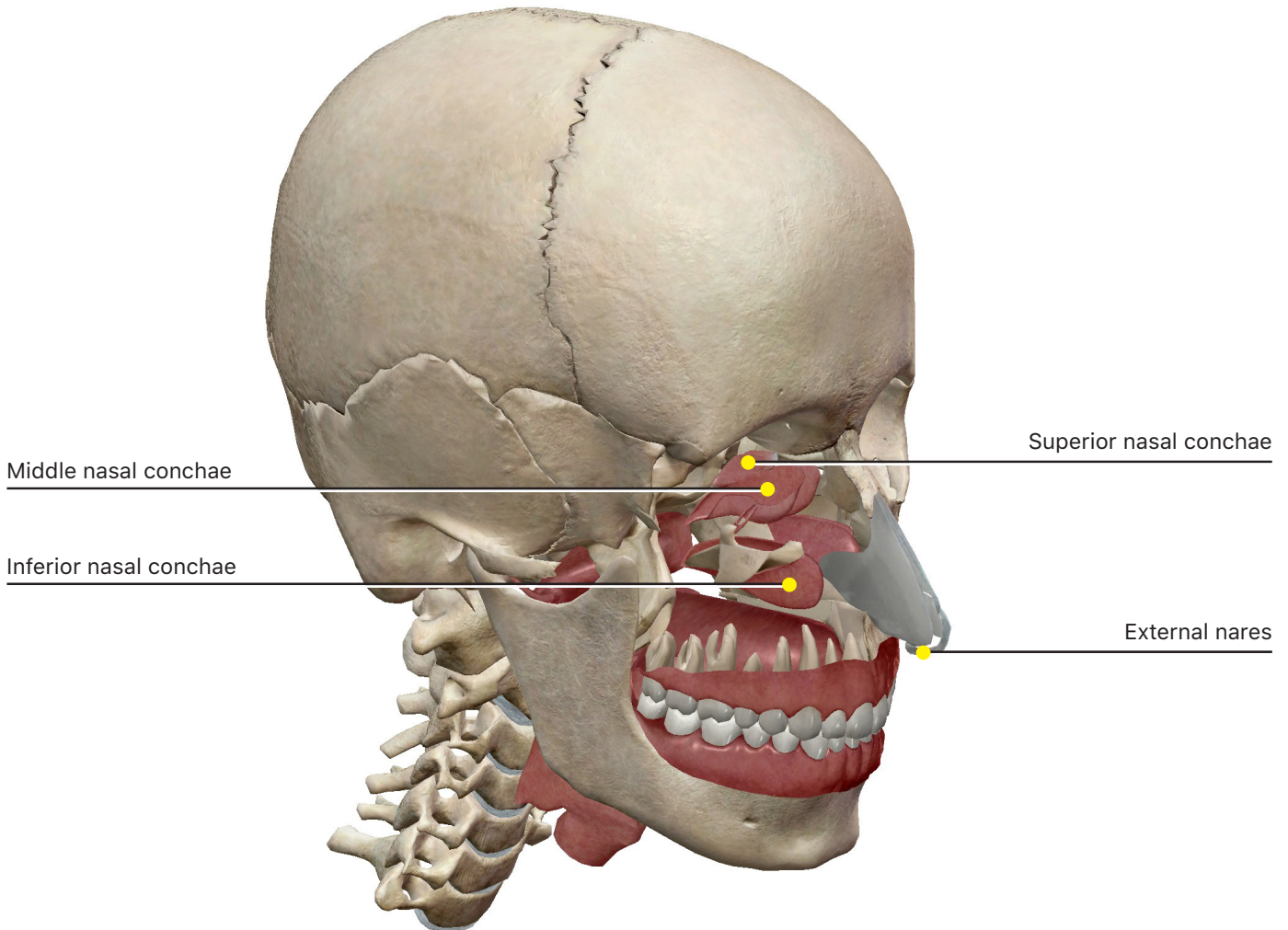
c. On the medial aspect of the lungs, what is the region where the bronchi enter the lung called?
What else enters the lung at this point?

IN-LAB EXERCISES

Obtain a model of the human respiratory system or a specimen for dissection. Use the following modules to guide your exploration of the respiratory structures.

You are responsible for the identification of **all bold terms**.

A. Go to the Respiratory unit and select the Upper Respiratory System chapter.



1. Explore the nasal cavity in Modules 35.1 through 35.6.

a. Locate the external **nares**. You may need to look at the greater alar cartilage definition for more information.

b. Locate the **nasal conchae** (turbinates) on a human skull or model.

- i. Superior
- ii. Middle
- iii. Inferior

iv. What is the function of the nasal conchae?

c. Watch the video in **Module 35.7 Nasal Mucosa**.

i. Describe the function(s) of the nasal cavity as it pertains to the respiratory system.

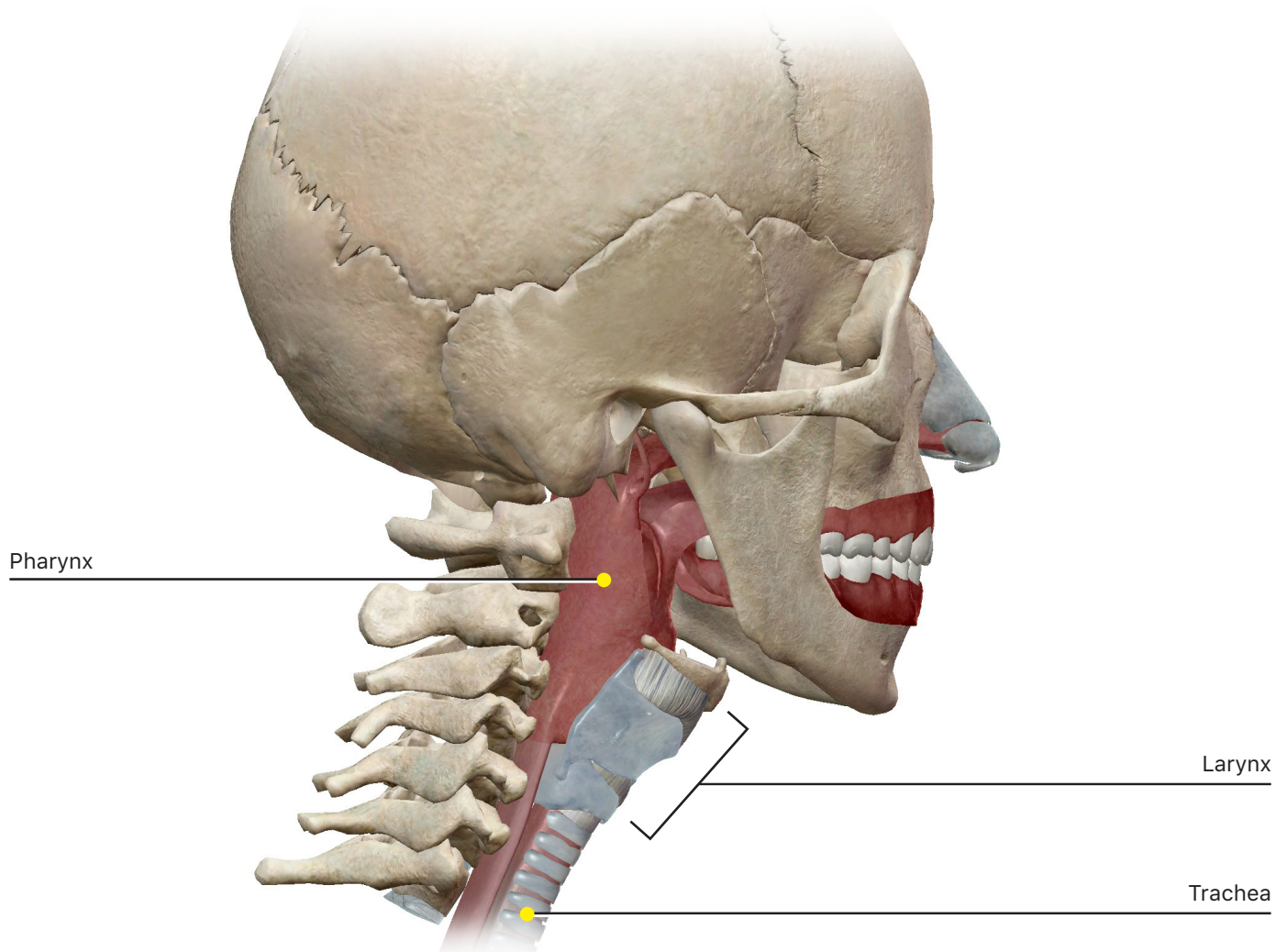
ii. The nasal and oral cavity are separated by a bony plate called the

_____.

iii. The nasal and oral cavities join posteriorly into one space called the

_____.

2. Explore the pharynx and larynx.



a. Select **Module 35.13**.

- i. Locate the three sections of the **pharynx**.
- ii. Locate the hyoid bone and the **larynx**.
- iii. What is the location of the larynx and trachea in relation to the esophagus?

b. Watch the videos in **Modules 35.14 and 35.17** and review **Modules 35.15 – 35.16**.

- i. Locate the **epiglottis**. What is the function of the epiglottis?

ii. What is the epiglottis made of?

iii. Locate the following **laryngeal cartilages**:

A. **Thyroid cartilage**

B. **Cricoid cartilage**

C. **Arytenoid cartilages**

D. **Corniculate cartilages**

E. What is the main function of the thyroid cartilage?

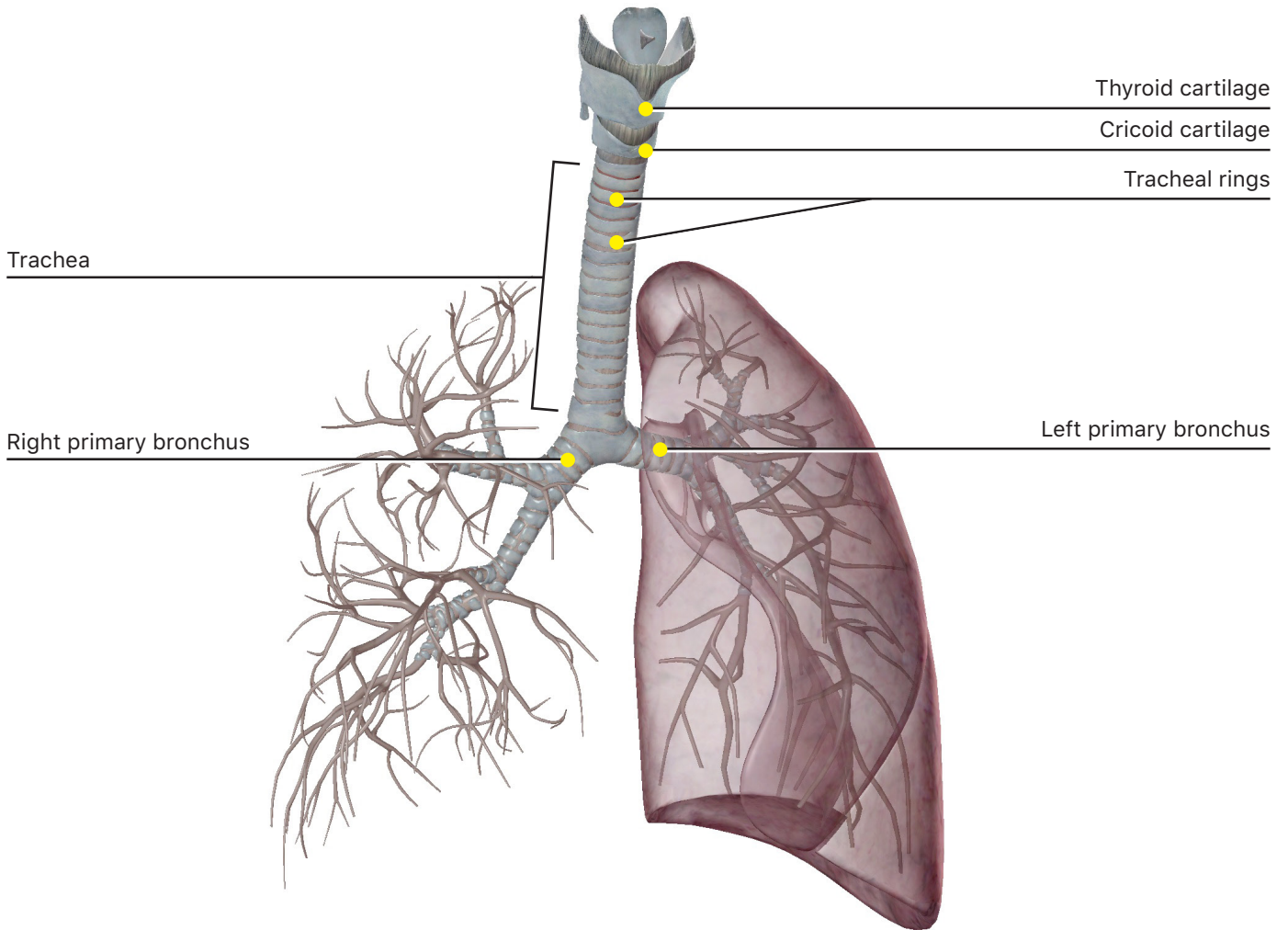
F. What makes the cricoid cartilage different from all of the other laryngeal cartilages?

G. If the vocal **ligament and cords** are longer and/or stretched, the pitch will be _____ (higher or lower?)

TIME TO PRACTICE!

GO TO THE QUIZZES MENU AND COMPLETE QUIZZES 35A AND 35B.

B. Now, select the Lower Respiratory System chapter.



1. **Trachea:** Watch the video in **Module 36.5** (formerly 36.4) and review **Modules 36.1-36.3**.

- a. What is the location of the **trachea** in relation to the esophagus?

- b. At what level does the trachea bifurcate into the **primary bronchi**?

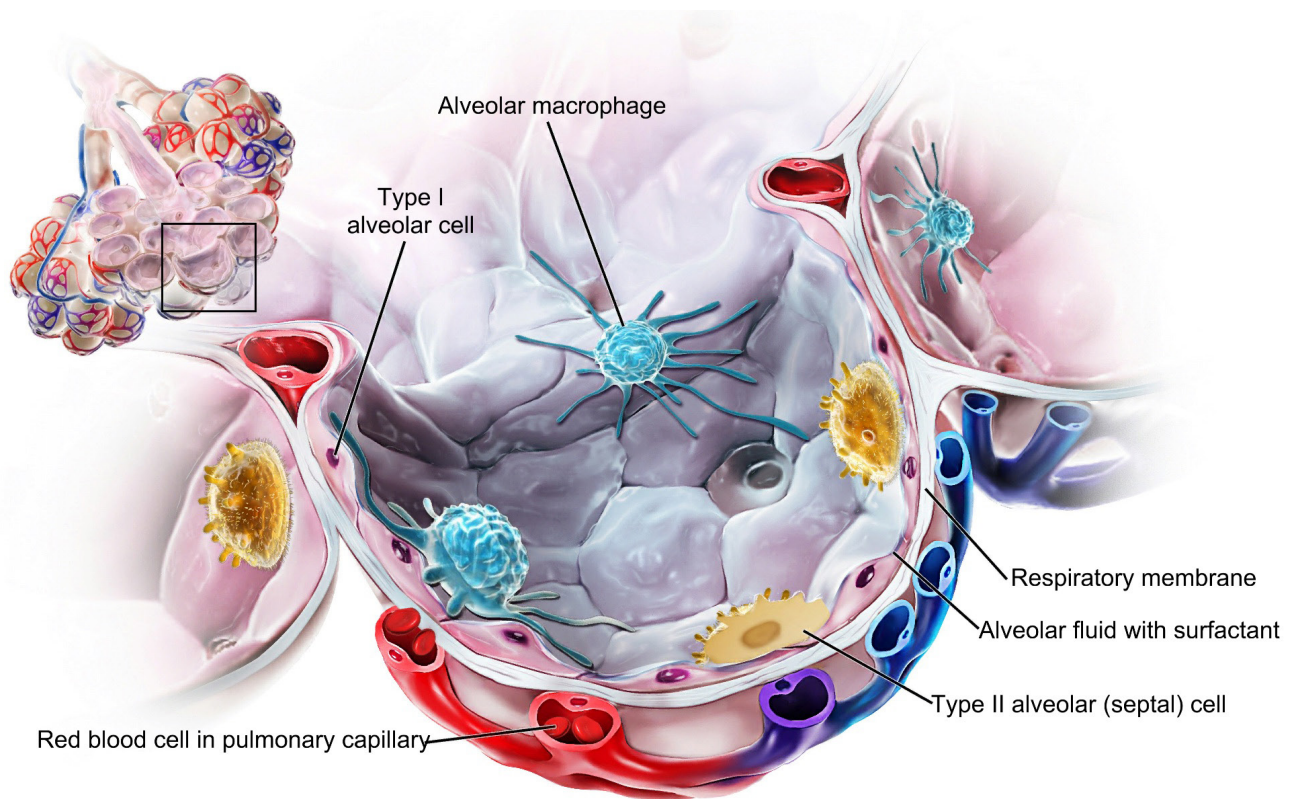
- c. What are the rings around the trachea made of, and what is their purpose?

- d. Why do you think the tracheal rings do not completely encircle the trachea?

2. **Bronchi:** Review **Module 36.11** (formerly 36.9).

- a. How many primary bronchi are there?
- b. Describe the anatomical difference between the right and left primary bronchi that would cause accidentally inhaled objects like food particles to lodge more easily in the right bronchus.
- c. How many secondary bronchi are there in each lung? What accounts for these numbers?

3. **Bronchioles and Alveoli:** Review **Modules 36.13 and 36.14** (formerly 36.10 and 36.11).



- a. What is the difference between conducting and respiratory structures in the respiratory tract?

b. Number the following structures in order (1 - 8) of the path a molecule of oxygen would follow as it enters the lungs from the trachea.

____ Secondary bronchi

____ Primary bronchi

____ Terminal bronchiole

____ Tertiary bronchi

____ Alveolar duct

____ Respiratory bronchiole

____ Alveolus

____ Alveolar sac

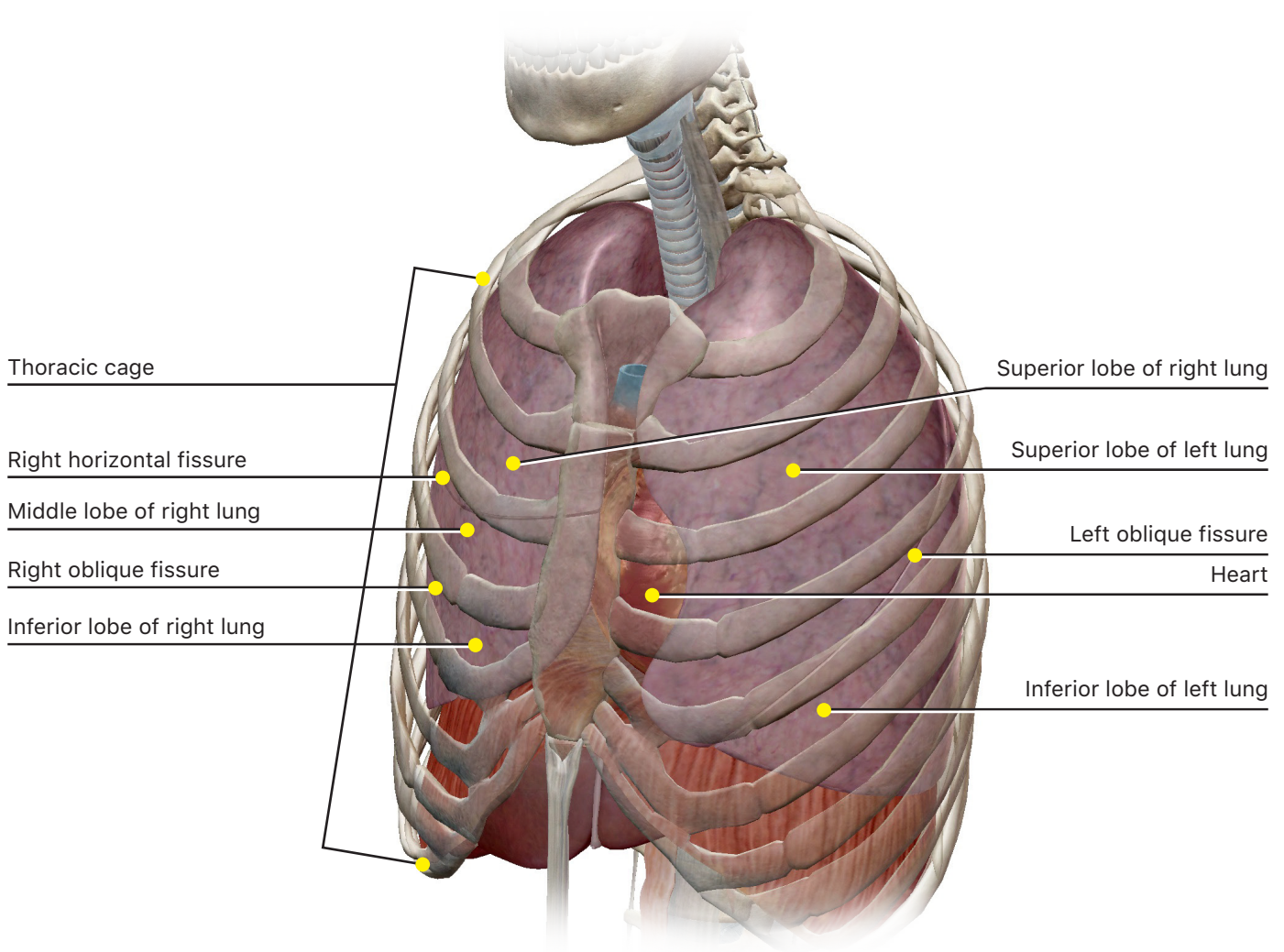
c. Why are there no cartilaginous rings around respiratory structures in the lungs?

d. What is the function of the smooth muscle in the walls of these tubes?

e. List the three types of cells found in the alveoli and describe their function(s).

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4. **Lungs:** Review **Module 36.6** (formerly 36.5).



- a. Select **Thoracic cage** from the left-side menu. List the structural components of the thoracic cage.
- b. Which structures form the upper opening of the thoracic cage?
- c. Hide the thoracic cage. Notice the differences between the two lungs. Note their relative position in regards to the heart. Select the **Left lung** from the left-side menu.
 - i. What is the name of the space on the medial aspect of the left lung that accommodates the heart?

- ii. What is the name of the line visible on the surface of the left lung? Which two lobes does it separate?
- d. Select **Right lung** from the left-side menu. Select Hide Others.
- i. What are the two fissures of the right lung and which lobes do they separate?
- e. What is the name of the double-layered membrane that surrounds the lungs? What is its primary function?

TIME TO PRACTICE!

GO TO THE QUIZZES MENU AND COMPLETE QUIZZES 36A AND 36B.

C. Go to the Respiration chapter. We will explore pulmonary ventilation.

1. Watch the **video in Module 37.1 Pulmonary Ventilation & Boyle's Law.**

a. What does Boyle's Law state and how does this apply to pulmonary ventilation?

b. Which muscles are involved in inspiration?

2. Go to **Module 37.3 Muscles of Inhalation.**

a. Locate the muscles of inspiration on an anatomical model of the torso.

b. Select the diaphragm muscle. Rotate the view so you are looking at the inferior surface of the diaphragm. Notice three large holes/openings in the diaphragm. What passes through these openings?

c. True or False: Relaxation of the diaphragm makes the lungs expand.

3. Go to **Module 37.4 Muscles of Expiration.**

a. Locate the muscles of inspiration on an anatomical model of the torso.

b. How do the abdominal muscles aid in respiration?

4. Watch the **videos in Modules 37.5, 37.7, & 37.8.**

a. Between which two spaces does external respiration take place? Internal respiration?

b. Describe the structure of the external respiratory membrane. (What barriers must gases cross between alveoli and capillaries?)

c. True or False:

i. The partial pressure of oxygen is lower in the alveoli than in the pulmonary capillaries.

ii. The partial pressure of CO_2 is higher in the tissue cells of the body than in the systemic capillaries.

iii. The partial pressure of oxygen is higher in the pulmonary artery than in the pulmonary vein.

5. Watch the **video in Module 37.10**.

a. The respiratory control center of the brain is located in the _____ and _____ of the brainstem.

b. Special receptors, called _____, monitor the levels of carbon dioxide and oxygen in the bloodstream.

c. If the CO_2 levels are too high, the brain would send signals to the respiratory muscles to _____ the breathing rate.

d. The _____ region of the brain allows us to take over conscious control of respiration.

TIME TO PRACTICE!

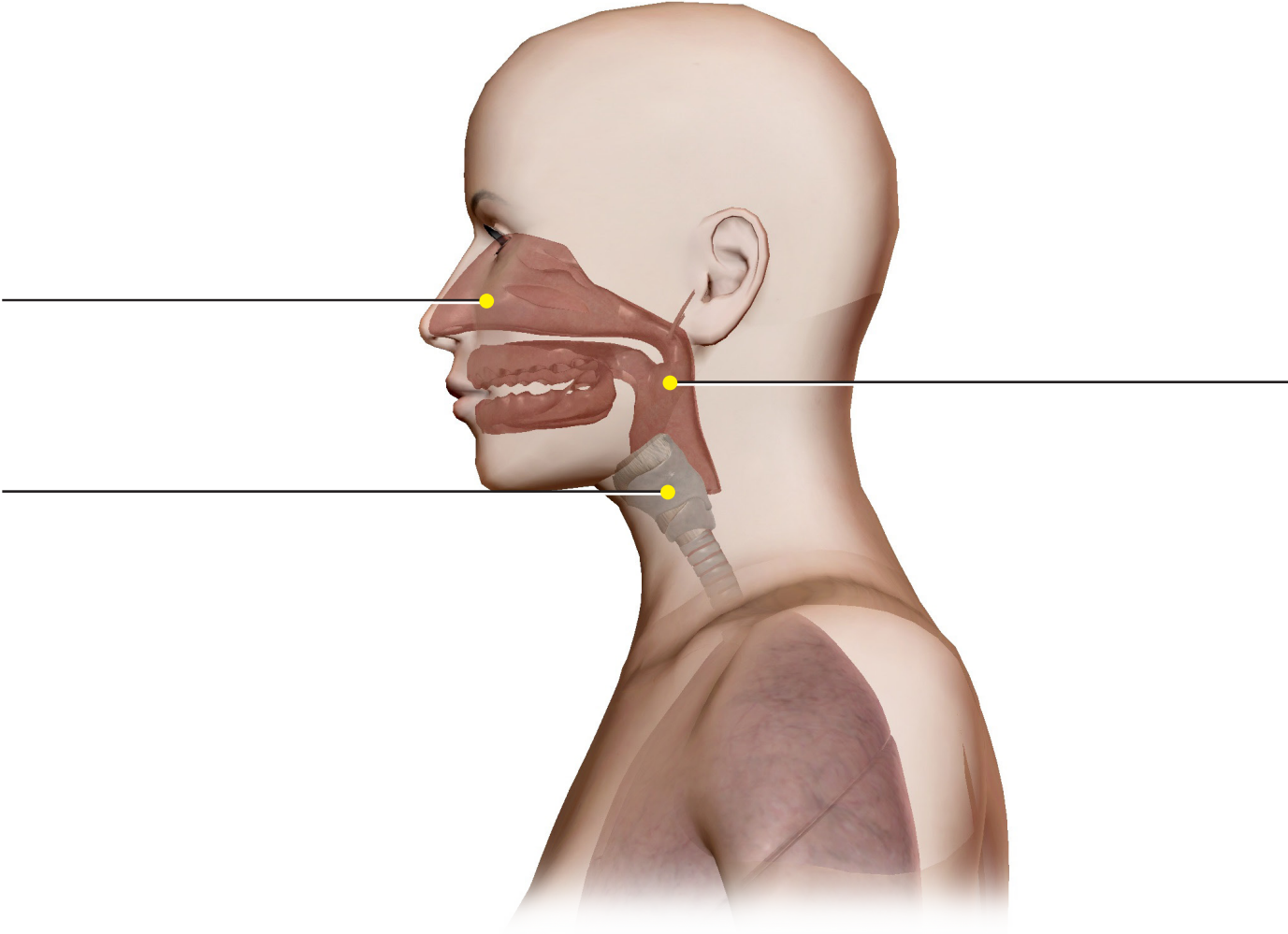
GO TO THE QUIZZES MENU AND COMPLETE QUIZZES 37A AND 37B.



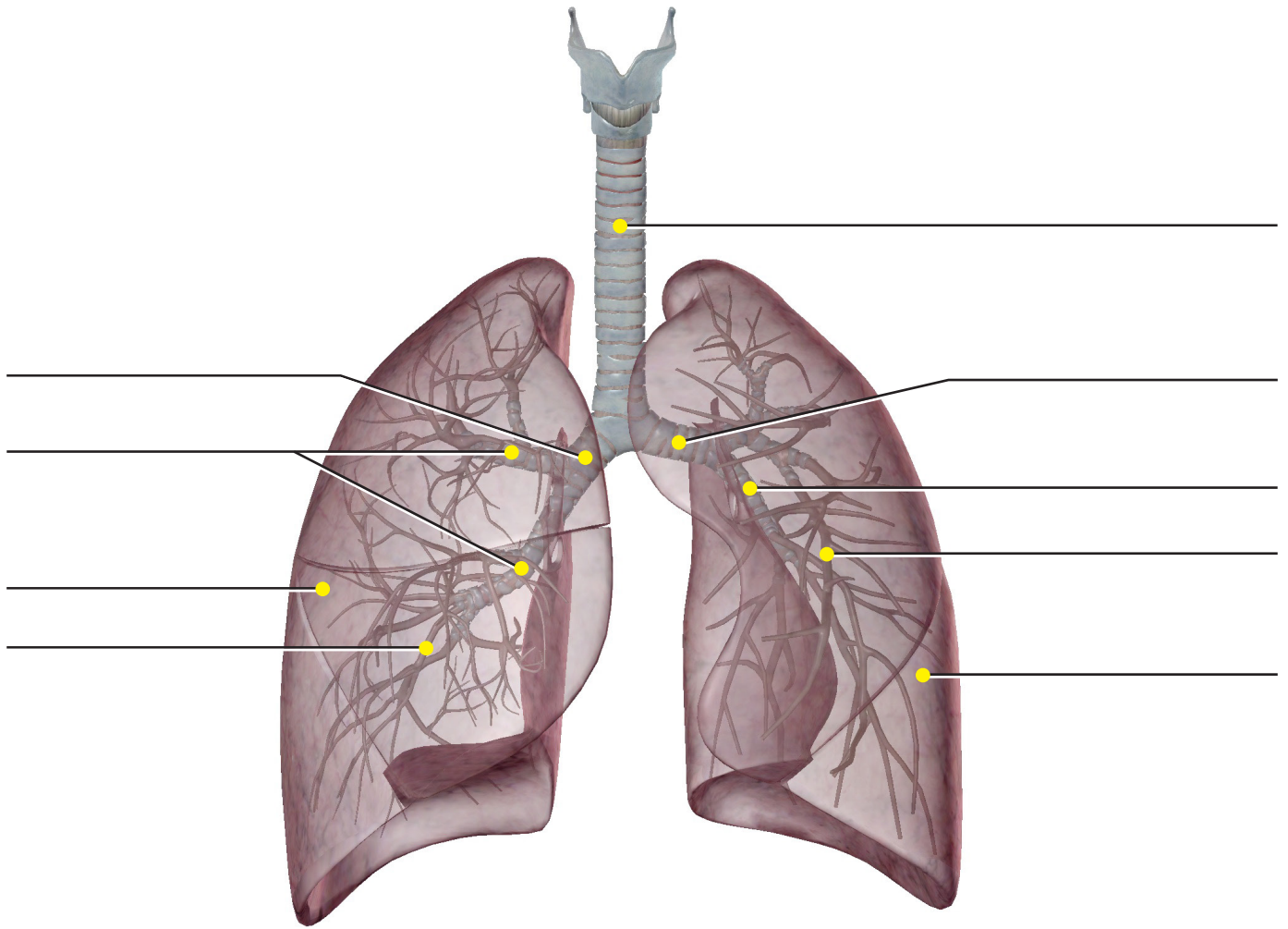
Student Practice

Label all the structures on the following images.

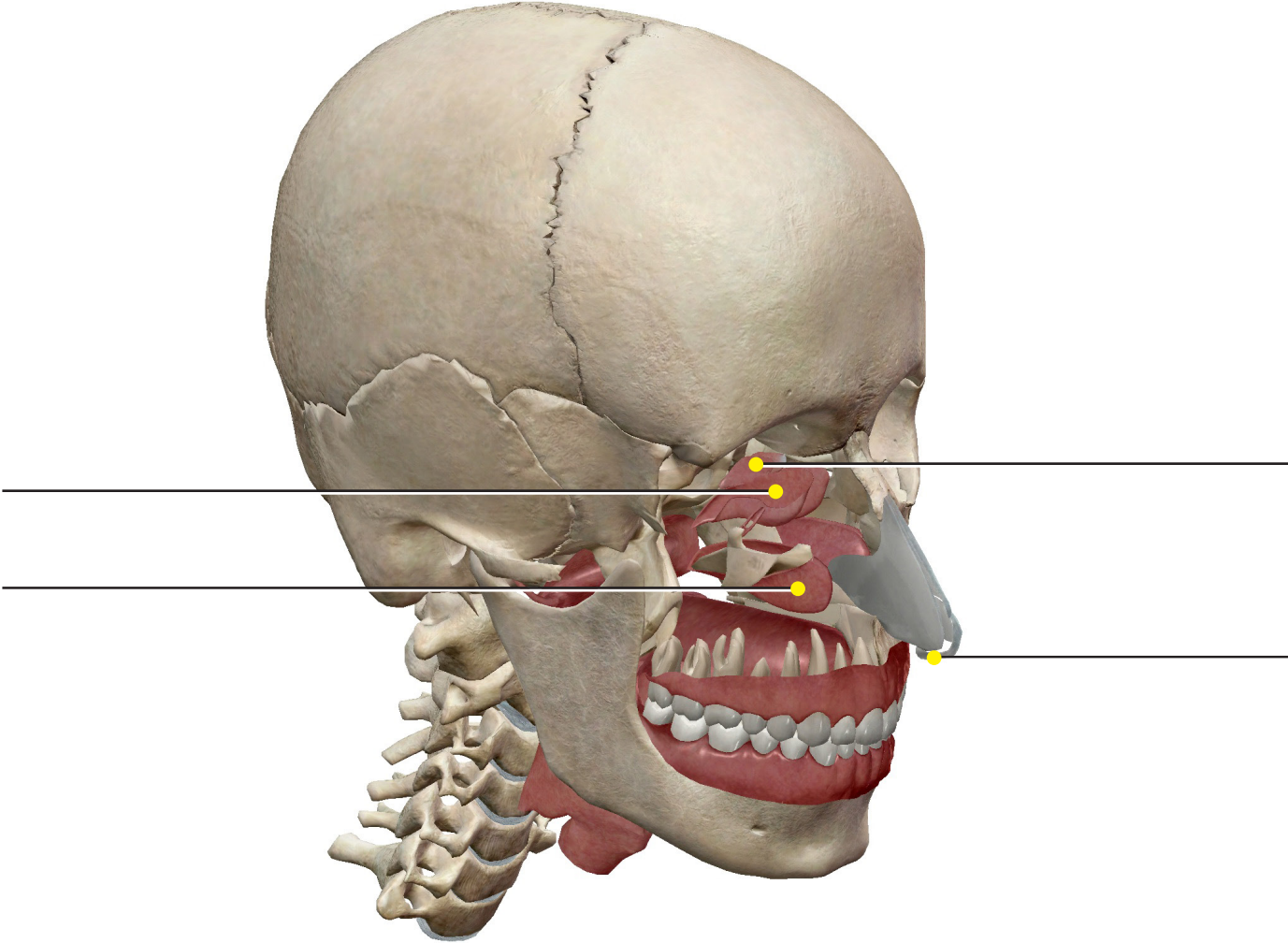
Module 35.1 Upper Respiratory Structures



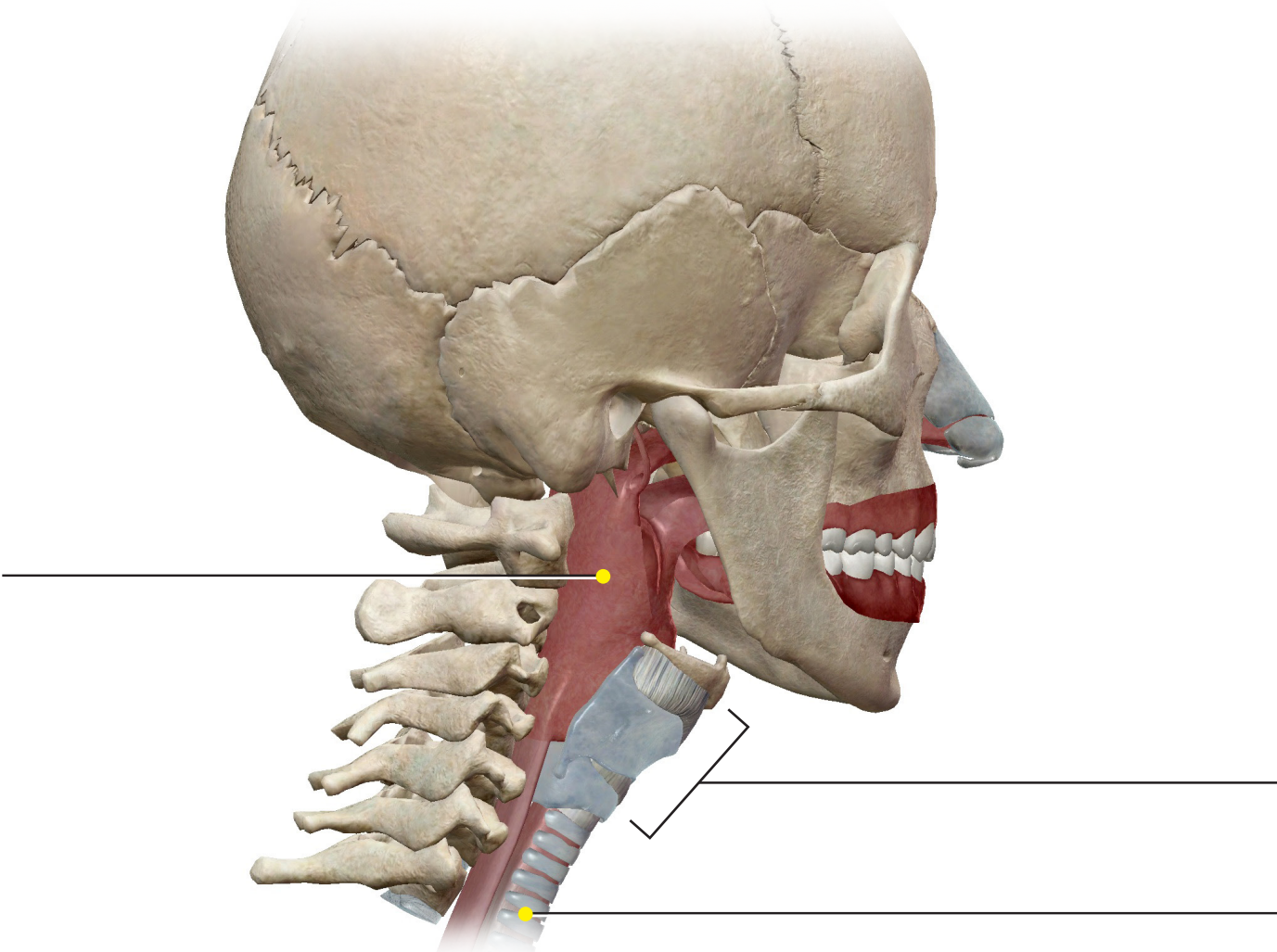
Module 36.1 Lower Respiratory Structures



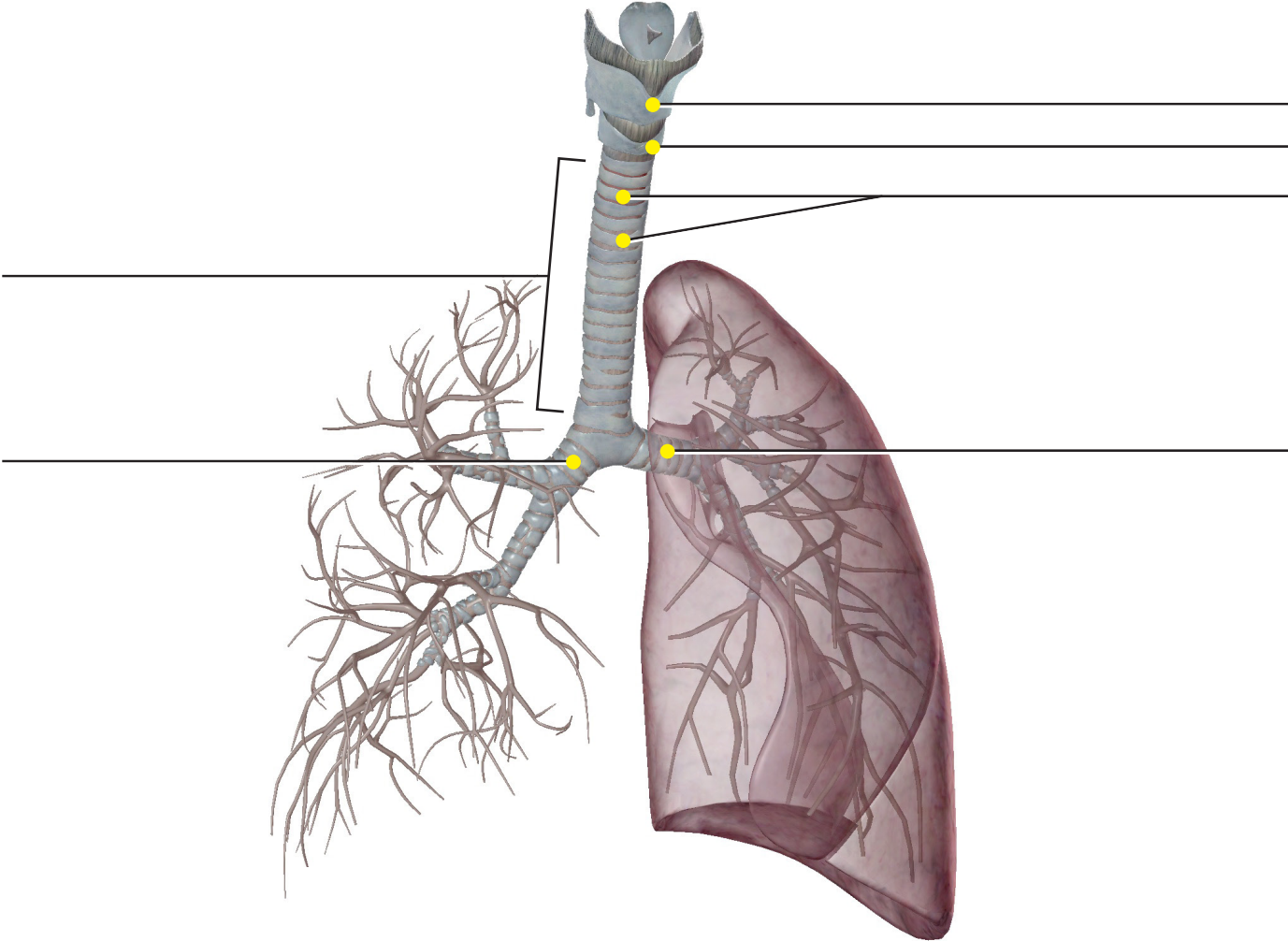
Module 35.2 Nasal Cavity



Module 35.13 Pharynx



Module 36.11 The Bronchial Tree



Module 36.6 Lungs in Anatomical Context (formerly 36.5)

