**Obstructed Airways Lab:**

**Lesson Plan**

*Adapted from the University of Texas Health Science Center at San Antonio
Last updated: 04/02/25*

**Resources**

* Straws
* Nose clip (optional)
* Stopwatch
* Pen or pencil
* Student worksheet with tables and discussion questions
* Visible Body

**Objectives**

1. Students will compare normal breathing to obstructed breathing.
2. Students will rate each experience using the Rating of Perceived Dyspnea Scale.
3. Students will relate their experience to different pathologies presented in Visible Body.

**Introduction**

15 minutes: Direct students to use the Search tool to locate the Respiratory Tract 3D lesson. Students should also view the Respiratory Overview animation, the Pulmonary Ventilation animation, and Respiratory Regulation lesson.

The role of the respiratory system is to ensure the proper supply of oxygenated blood to body tissues while also expelling carbon dioxide from the body. You may choose to review key concepts with your students. All the underlined items below can be found in Visible Body; use the Search tool to find the content you need.

Here are some important things to keep in mind:

* The trachea, or windpipe, is a cartilaginous and membranous tube that extends from the larynx to the lungs, where it divides into bronchi.
* The bronchi bring air into the lungs, where they branch into a network of smaller and smaller airways known as secondary and tertiary bronchi.
* From the secondary and tertiary bronchi, small branches called bronchioles emerge. The bronchioles continue to branch as terminal bronchioles and then respiratory bronchioles. The respiratory bronchioles make contact with the alveoli.
* Alveoli are tiny air sacs lined by a thin layer of epithelium. This thin layer allows for the exchange of gases with capillaries.
* During inhalation, the diaphragm, a dome shaped muscle, flattens to allow more space in the thoracic cavity for the lungs to expand.
* Another component involved in respiration is the intercostals. The intercostal muscles are responsible for expanding the chest cavity to allow for the movement of air into and out of the lungs.

Students should also watch the Asthma and COPD animations presented in Visible Body.

**Activity**

30 minutes: This activity consists of two parts. In the first part, the students will use either a nose clip or their hand to block their nose. Students will be breathing solely through their mouth for the duration of part 1. They will sit and breathe normally for one minute and then they will do the same while running in place. After 1-2 minutes of rest the students will repeat the previous two steps while breathing through a straw. After each step, the students will record their experience on the worksheet provided.

Direct the students to the Asthma and COPD animations in Visible Body.

The second part of the activity consists of answering reflection questions based on the activity and pathology animations.

**Discussion Questions**

1. Why was breathing through a straw more difficult?
2. How did your experience differ when you were breathing through a straw while sitting down versus when you were running in place?
3. How did your experience differ when you were running in place while breathing normally versus running in place while breathing through a straw?
4. What normal daily activities might an individual with either COPD or asthma struggle with?
5. What are some differences between COPD and asthma? What are some similarities between the two?
6. What are two ways in which the narrowing of airways might lead to muscle fatigue?
7. What muscles are involved in respiration?