**Obstructed Airways Lab: Lesson Plan**

*Adapted from the University of Texas Health Science Center at San Antonio*

**Resources**

* Straws
* Nose clip (optional)
* Stopwatch
* Pen or pencil
* Student worksheet with tables and discussion questions
* Physiology & Pathology by 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 the Physiology & Pathology app by Visible Body.

**Introduction**

15 minutes: Direct students to the Respiratory unit to view the Respiratory Overview, Respiratory Tract, and Pulmonary Ventilation 3D views in the Physiology & Pathology app by Visible Body.

The role of the respiratory system is to ensure the proper supply of oxygenated blood to the body's tissues while also expelling carbon dioxide from the body. You may choose to review key concepts with your students.

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 and form a network of airways in the lungs. The bronchi branch within the lungs into 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 the Physiology & Pathology app by Visible Body.

**Activity**

30 minutes: This activity consists of two parts. In the first part, students will sit and breathe normally for one minute. Then, the students will run in place for one minute while breathing normally. After a 1-2 minutes of rest the students will repeat the previous two steps while blocking their nasal airway using either a nasal clip or their hand. After each step, the students will record their experience on the worksheet provided.

Direct the students to the Asthma and COPD animations in the Respiratory unit of Visible Body’s Physiology & Pathology app.

The second part of the activity consists of answering reflection questions.

**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 emphysema? 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?