

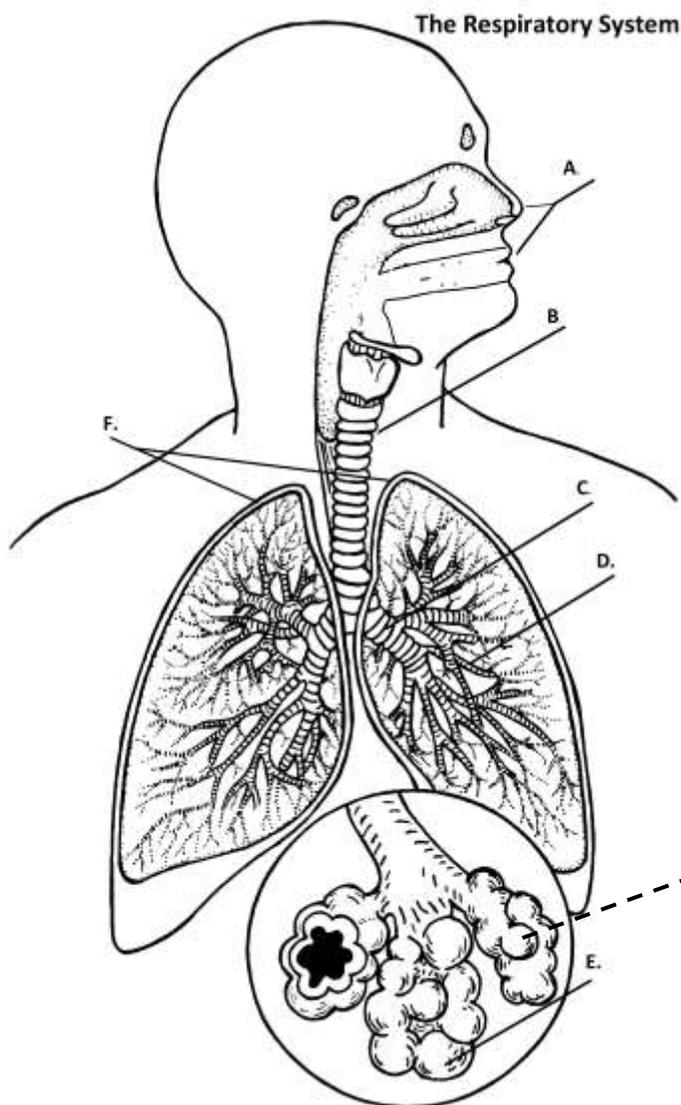
## Essential Question: How can my lifestyle affect the quality of my life?

### Activity 7 - How does your Respiratory System work?

**Purpose:** I can explain how the **parts (subsystems)** of my **respiratory system** work together to bring oxygen ( $O_2$ ) into my body and remove carbon dioxide ( $CO_2$ ) from my body

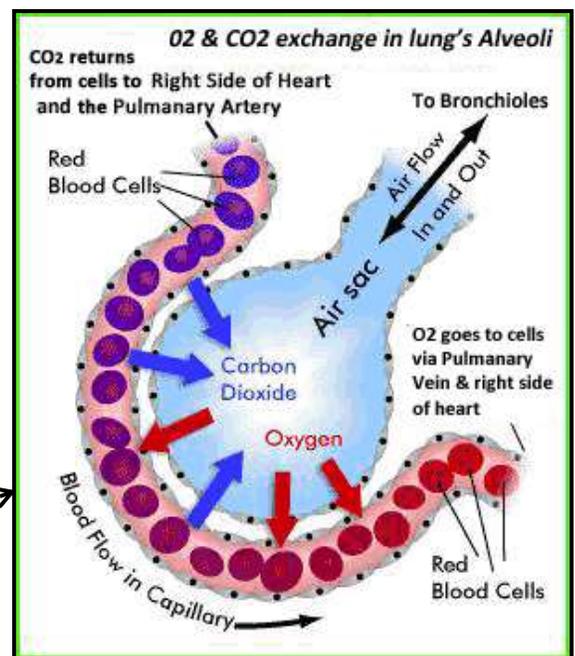
**Background:** How does the body get oxygen from the atmosphere into each of the body cells?

- Humans and other animals take in **oxygen** ( $O_2$ ) through the respiratory system, via the lung's alveoli, to the circulatory system.
- The red blood cells in the circulatory system deliver the oxygen to each cell in the body.
- The cells do their jobs, producing  $CO_2$  as a waste product. The  $CO_2$  is harmful and needs to be removed.
- Thus red blood cells pick up the  $CO_2$ , travel in the circulatory system to the **alveoli** where it passes into the lungs and breathed out.



#### Instructions:

- Watch [vclip 1](#) and [vclip 2](#) then label the Respiratory System diagram at left.
- Next check out this [infographic animation](#) of the respiratory system, then study the  $CO_2$  &  $O_2$  exchange diagram below.



On average, one individual breathes in 11,000 litres of air a day. If you exercise heavily during the day, this amount will increase even further!

**Student Review:** 1-Below Standard, 2-Approaching Standard, 3-Standard, 4-Above Standard  
Use the scale to evaluate completeness & correctness of the job. Put score, Initial & date in boxes.

Score

Initial/Date

**CO<sub>2</sub> and You.** Humans can only live if the blood in the circulatory system is within a certain **pH** range.

- The normal range of blood pH must be between 7.35 - 7.45. Serious problems occur if the blood **pH** goes above or below this range.
- A person's **pH** will decrease when excess **carbon dioxide** (CO<sub>2</sub>) mixes with your blood and **makes a weak acid** called carbonic acid.
- As carbonic acid builds up in the bloodstream, the **pH** of the blood gets lower (more acidic) & life-threatening problems occur, including loss of consciousness, increased heart rate, shortness of breath, & vomiting.

**Instructions:** In this activity you will work with the indicator Bromothymol Blue, also known as BTB. When a BTB solution contains carbon dioxide, BTB molecules change shape to reflect the color yellow. At normal ranges of pH (7.0) the BTB reflects green. Higher than normal, (8.0) or basic, solutions of BTB reflect blue.

- Your task is to find evidence that CO<sub>2</sub> exists in our exhaled breath.
- You will also measure who has the most and least amount of CO<sub>2</sub> in your teammate's breath.
- Follow the procedures given and record your data in the table below.

**Data Table 1. Using BTB to Test for Carbon Dioxide in Our Breath ( in seconds )**

		Cup A (Control)		Cup B		Cup C		Cup D		Cup E	
Time to turn BTB yellow (s)											
Start pH	End pH										

1. Tell two pieces of evidence from the exercise & explain how you know your breath contains CO<sub>2</sub>?

- a.  
b.

2. Use the data from the procedure to tell who in your lab exhaled the most CO<sub>2</sub> and the least CO<sub>2</sub>.

- a. Most CO<sub>2</sub> \_\_\_\_\_/\_\_\_\_\_ (Sec/pH)                      b. Least CO<sub>2</sub> \_\_\_\_\_/\_\_\_\_\_ (Sec/pH)

**Chris's Asthma Attack!!** Go to Proj->Human Body Systems->Chris's Asthma Attack

View this video, Then record all steps of an asthma attack & how it was treated.

**Student Review:** 1-Below Standard, 2-Approaching Standard, 3-Standard, 4-Above Standard  
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Score

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