Teacher's Guide for "Breathe In Breathe Out"

CT State Standards	National Science Standards
C.16 Describe the Structure of the human digestive, respiratory and circulatory systems, and explain how they function to bring oxygen and nutrients to the cells and expel waste materials	**Structure and Function in Living Systems** **The human organism has systems for digestion, respiration, reproduction, circulation, excretion, movement, control, and coordination, for protection from disease. These systems interact with one another.**

I. Vocabulary covered in "Breathe in Breathe Out"

1. Cilia – small hair-like structures that clean the air and sweep mucus into the throat
2. Pharynx –the throat
3. Larynx –the voice box which contains the vocal chords
4. Trachea – the windpipe, where air passes through to enter the lungs
5. Bronchi – large tubes which lead from the trachea in each respective lung
6. Lungs – organs responsible for exchanging oxygen and carbon dioxide
7. Alveoli – tiny air sacs at the end of the lungs which exchange oxygen for carbon dioxide via capillaries
8. Mitochondria – cellular organelles that use oxygen to break down sugar into energy and create Carbon dioxide as a waste product
9. Diaphragm – large dome shaped muscle under the ribs which aids in breathing
10. Inhale – to take in air, diaphragm contracts
11. Exhale – to release air, diaphragm relaxes

II. Understanding the Respiratory System Concepts within the Song

A. The path of air (verses 1 and 2)

Verse 1 and 2 divide up the path that air takes from the nose and mouth down into the lungs. The song discusses:

a. Air moving in through your nose
b, Cilia sweeping mucus down the throat (Pharynx)
c. Air travels into the larynx, which contains the vocal chords – they vibrate to create the speaking voice
d. Air then moves down the trachea into the left and right bronchi
e. From the bronchi it then travels into the smaller passages called bronchioles

f. The final stop is the alveoli (tiny sacs which exchange oxygen and carbon dioxide)

B. The Role of Blood and Mitochondria in Respiration (verse 3)

1. This concept can be tricky for students to visualize. Red blood cells picking up oxygen from the alveoli and exchanging it for carbon dioxide. Then the oxygen gets taken into the body's cells.
2. In the body's cells, the mitochondria serve as the power plants as learned in "The Cell Song." These mitochondria need the oxygen from the lungs so that they can break down sugar into energy and create the carbon dioxide waste product.

C. The Role of the Diaphragm in Breathing (verse 4)
1. The diaphragm is the large dome shaped muscle responsible for breathing in and out
2. When you inhale the diaphragm contracts and when you exhale it relaxes allowing you to breathe in and out comfortably.

Student Worksheet for "Breathe In Breathe Out"

Part I. Match the following vocabulary words with the proper definition.

1. _____Alveoli	A. Large dome shaped organ which aids in breathing
2. _____Bronchi	B. Organ where gas exchange occurs
3. _____ Diaphragm	C. Voicebox, contains the vocal chords
4. _____Cilia	D. Tiny sacs that exchange oxygen and carbon dioxide
5. _____ Larynx	E. The throat
6. _____Trachea	F. Tiny hair-like structures that help clean the air
7. _____ Pharynx	G. Large tubes which lead from the trachea to the lungs
8. _____ Lungs	H. The windpipe, brings air into the lungs

Part II. Answer the following short answer questions to the best of your ability.

1. How are the mitochondria related to the process of respiration?
   _____
   _____
   _____
   _____
2. What is the diaphragm and how does it work when you inhale and exhale?
   _____
   _____
   _____
   _____
   _____
3. Use the following terms to draw AND LABEL the path of air.

   Nose Trachea Alveoli Bronchi Pharynx

   Larynx Lungs Bronchioles Lungs