

Lesson: Breathing models

Teacher:	Kaylan Duthie
Unit Theme/Course:	Human Respiration – 7 th Grade Life Science
Date:	November 5 th , 8 th , 9 th
Timing:	3 days

Rationale/Goal:

- **Breathing is the mechanical process of moving air into and out of the lungs**
- **Models have strengths and limitations**
- **The respiratory system is made up of organs with special structures and functions**

Overview:

Students will begin by creating a class list of what they already think they know about breathing to explore preconceptions. They will then explore what happens when they inhale and exhale by first attempting to create their own model using a syringe and balloon. The students will then complete a reading about the process of breathing, and label diagrams of the respiratory system. Then they will recreate the syringe model. Last, they will observe a bell jar model of breathing and compare the strengths and weaknesses of both the syringe and bell jar models.

Learning Objectives [cognitive, academic, language, socio-cultural]	Assessment Criteria
Students will share any prior knowledge of the breathing process/respiratory system.	Students will complete individual class T-Charts representing what they know.
Students will create a model to represent how human lungs work	Students will create an accurate model based on 4 criteria and then draw and label the diagram, indicating what parts represent the lungs, diaphragm, pleural cavity, and ribs.
Students will describe how the breathing models are similar to and different from the actual phenomenon	Students will complete a T-chart with at least 3 strengths and 3 weaknesses listed for either the bell jar or syringe model.
Students will gain a preliminary understanding of the anatomy of the respiratory system.	Students will have accurately labeled diagrams of the respiratory system in their journals, along with new vocabulary words. Students will have completed the second journey handout describing structures and functions of the respiratory system.

Standard/EALR:

6-8 INQE Model	<i>Models</i> are used to represent objects, events, <i>systems</i> , and processes. <i>Models</i> can be used to test <i>hypotheses</i> and better understand <i>phenomena</i> , but they have limitations.	Create a <i>model</i> or <i>simulation</i> to represent the behavior of objects, events, <i>systems</i> , or processes. Use the <i>model</i> to explore the <i>relationship</i> between two <i>variables</i> and point out how the <i>model</i> or simulation is similar to or different from the actual phenomenon.
6-8 LS1C	<i>Multicellular organisms</i> have specialized cells that perform different <i>functions</i> . These cells join together to <i>form</i> tissues that give organs their structure and enable the organs to perform specialized <i>functions</i> within organ <i>systems</i> .	Relate the structure of a specialized cell (e.g., nerve and muscle cells) to the <i>function</i> that the cell performs. <i>Explain</i> the <i>relationship</i> between tissues that make up individual organs and the <i>functions</i> the organ performs (e.g., valves in the heart control blood flow, <i>air</i> sacs in the lungs maximize surface area for <i>transfer</i> of <i>gases</i>). <i>Describe</i> the components and <i>functions</i> of the digestive, circulatory, and respiratory <i>systems</i> in humans and how these systems interact.

Preparation Time:

30 minutes to gather materials, set up tubs, and make copies

Materials:

- 8 tubs with:
 - 60 cc syringes w/ tip removed
 - Balloon
 - Beaker for water
- Copies of body parts
- Bell Jar Model
- Second Journey Handouts
- Human Body Systems Books

Instructional Sequence:

Day 1:

1. Think-Pair-Share Discussion of what you know/think you know. → No right or wrong answers!
 - a. Have students individually write down what they know about breathing individually:
 - i. What do you know you know about how humans breathe?
 - ii. What do you think you know about how humans breathe?
 - b. Team up with lab group to share ideas
 - c. As a group create an Active Board chart that has class list of (i) & (ii) from above

Have students write responses on the board

- i.
 - ii. Return to this later in the unit
2. Syringe Model Discovery Activity
- a. Have students observe each other breathing
 - b. Give students syringe, balloon, and beaker of water

*What do you see when your partner breaths?
What changes?
Does anything move?*

- i.
- ii. Ask to make a model of how they think the lungs work.
- iii. Once they have their models, have each group explain their model to the class
- iv. Have the groups draw their model in their journal

Explain model to class

v.

Day 2

1. Peppi and Bollo reading, p. 77-78 → Excuse Me Please
 - a. Stop and talk about burping and how it is a part of different cultures
 - b. Stop at end of hiccup section and ask students for what their families do to help w/ hiccups

*Why do you burp?
What is a hiccup?*

- c.
2. Label and explain the drawings from Peppi and Bollo in Journal
 - a. Respiratory System Diagram
 - i. After students label, go over:
 1. Larynx – voice box
 2. Trachea
 3. Pleural cavity
 4. bronchiole
 - b. Breathing Process Diagram
 - i. Breathing IN:
 1. Diaphragm → thin muscle separating chest from abdomen. Contracts and moves down → increases size of chest cavity
 2. Ribs move up and out → increases size of chest cavity
 3. Air pressure reduced and air rushes in
 - ii. Breathing OUT:
 1. Diaphragm relaxes, moves up
 2. Ribs move down and in

3. Air pressure increases, air forced out
- c. Gas Exchange diagram
 - i. Go over Alveoli, and capillary
- d. Show students the alveoli model
3. Revisit the syringe model
 - a. Ask students to create a model of the lungs using the syringe again.
 - i. Have them make any modifications they want to be the best representation they can make
 - ii. Draw the model in the journal and label the parts
 - iii. Have each group show their model again, and explain if they changed anything, and what
 - iv.

*Did you make any changes?
What were they?
Why did you make them?*
 - b. Go over the “lung rules” on the activeboard and see who met them
 - i. A lung which inflates w/ air
 - ii. The lung is surrounded by water
 - iii. A muscle (diaphragm) below the lung)
 - iv. The diaphragm moves down when the lung inflates
 - c. Have students draw the final syringe model in their journals and label the following:
 - i. Lungs
 - ii. Diaphragm
 - iii. Pleural Cavity
 - iv. Ribs

Day 3

1. Do any wrap-up as needed for syringe model
2. Vocabulary in back of journal
 - a. Ask students what they think the vocabulary words are going to be

Have students define the words before giving the written definition

- b.
 - i. Trachea
 - ii. Diaphragm
 - iii. Alveoli
 - iv. Capillary
3. Show Bell Jar Model

*What do the different parts of this model represent?
What parts of the respiratory system do you see?
What parts of your body do they represent?
What is going to happen to the balloons when I pull down on the bottom? What human process does that represent?
What will I happen when I push up on the bottom? What process does that represent?
What parts of the model are accurate? What is it missing?*

- a.
- b. Have students create a Strengths/Weaknesses chart in their journal
 - i. Write down at least 3 strengths or weaknesses for either the syringe or bell jar models

*Why do we create models? Are they helpful? Are they ever not helpful?
What happens when the wind “gets knocked out of you”?*

- ii.
4. Read pg. 85-89 individually: The Second Journey Begins → Peppi and Bollo begin their journey through the respiratory system
 - a. Go over tips for how to read the story (activeboard)
 - b. Time to work in class.
 - c. Have copies of reading prepared for students to take home if needed

Assessment

- Grade Reading Worksheet
- Review T-Chart and Diagrams in Journal

Welcome to Science Class! Friday 11/5

Random Question: How many times a day do you breath?



1) Please get out your journal, a properly shaped pencil and sit in your Regular Flavored Seats.

2) New Grade Sheet

3) Stamp Entry # 20: Periodic X-Word

4) Entry #21: What do you know?

5) Begin Entry #22: Breathing Models

What do you know about lungs and breathing?

What do you **KNOW** you know?

What do you **THINK** you know?

Welcome to Science Class!

Monday 11/8

Random Question: What is someone called who studies the respiratory system?



1) Please get out your journal, a properly shaped pencil and sit in your Regular Flavored Seats.

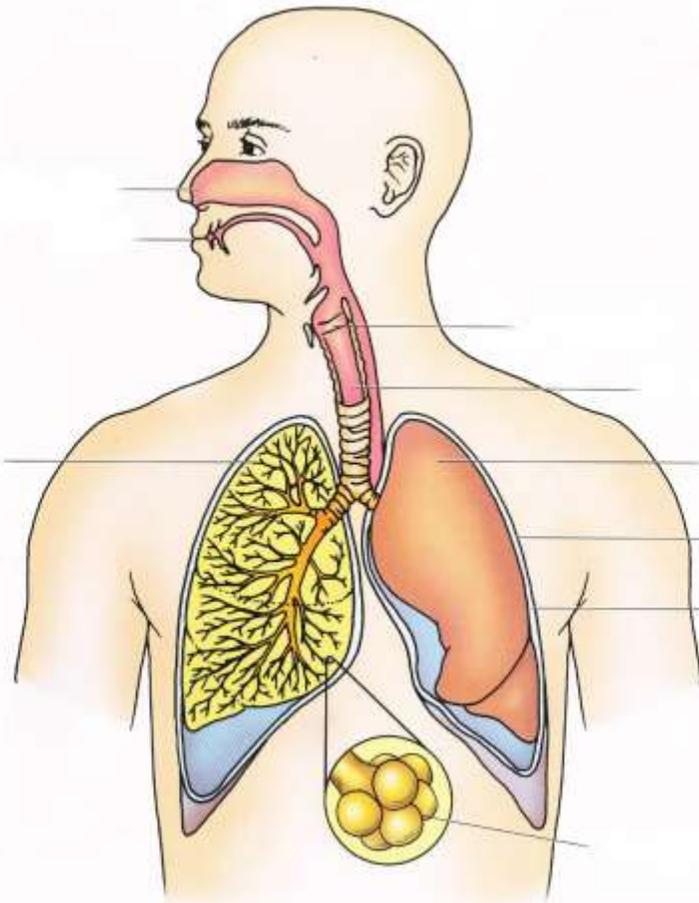
2) Entry #22: Breathing Models

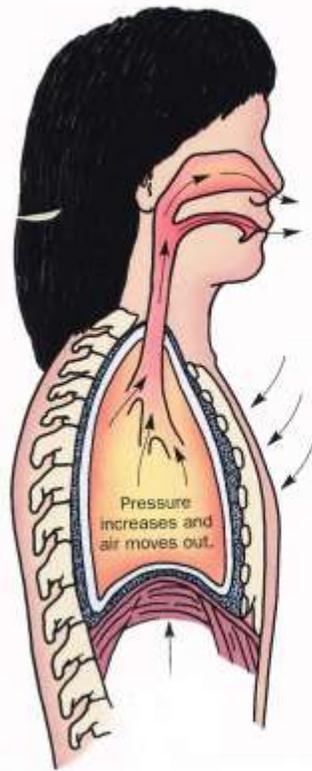
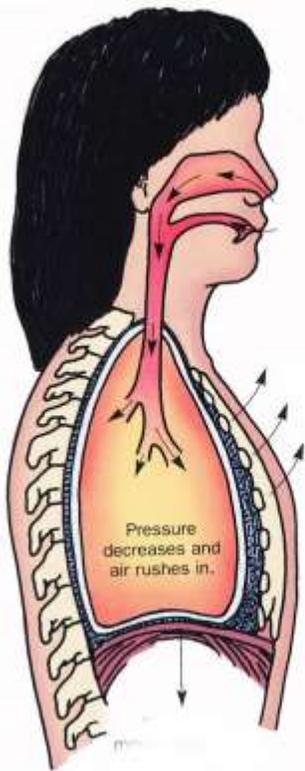
***Label Respiration Diagrams**

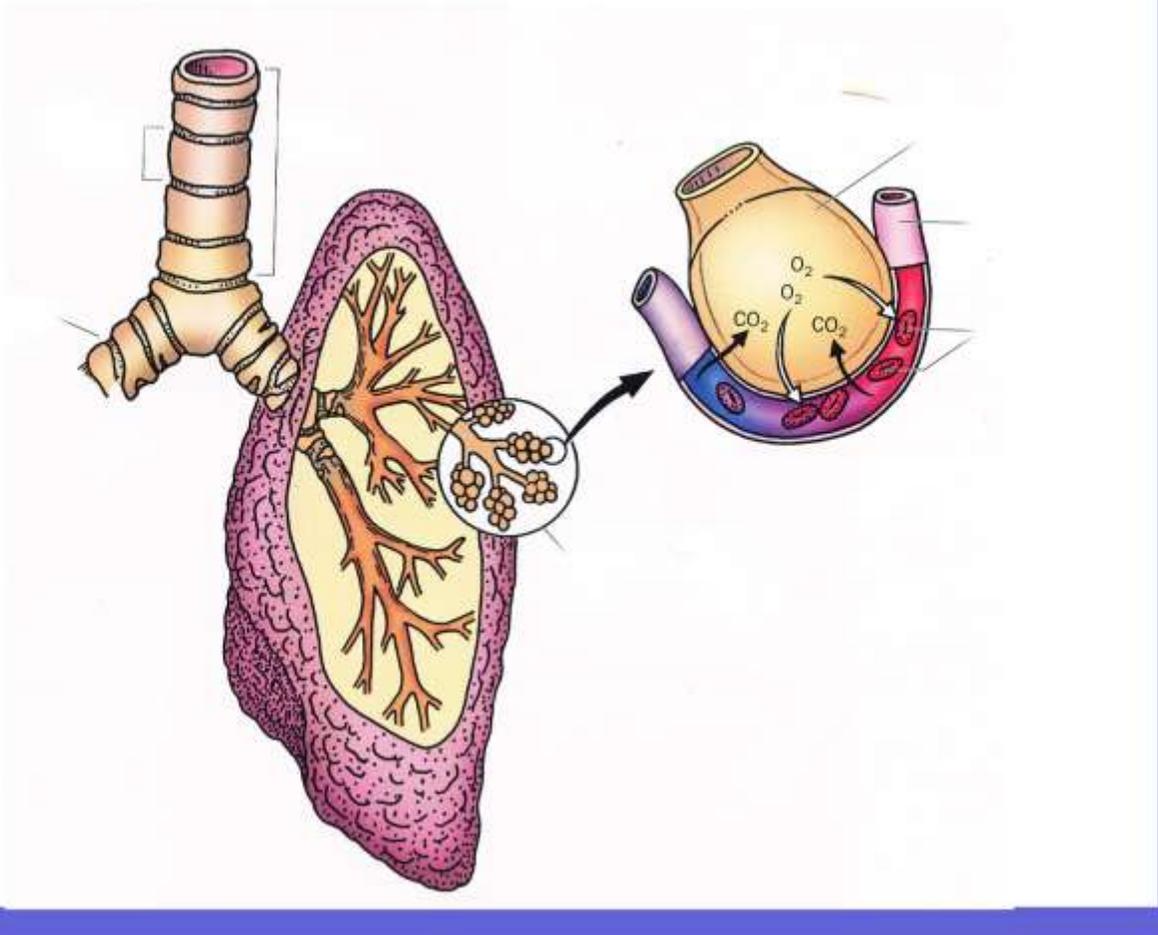
***Syringe Models**

3) Read "Excuse Me Please" p. 77-78

4) Bell jar model if time







Does Your Model Have the Following?

1) A Lung Which Inflates with Air

2) The Lung is Surrounded by Water

3) A Muscle (diaphragm) Below the Lung

4) The Lung Inflates When the Diaphragm Moves Down

Term	Definition
Trachea	The windpipe or tube leading to the two bronchi (covered by the epiglottis during eating)
Diaphragm	The sheet-like muscle below the lungs which goes down when we inhale and up when we exhale
Alveoli	Thin-walled air sacs at the end of the bronchioles, for the diffusion of oxygen and carbon dioxide
Capillary	The body's smallest vessels with thin walls for the exchange of oxygen and carbon dioxide

Hints for reading The Second Journey Begins

- 1) Put your pencil down
- 2) Read **one** section of the story
- 3) Complete the entries on the handout for that section
- 4) Put your pencil down
- 5) Move on to the next section of the story