

# THE RESPIRATORY SYSTEM

**Grade Level or Special Area:** Grade 4

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**Length of Unit:**

Six lessons (eight days of 45 minutes each)

## I. ABSTRACT

This unit will familiarize students with upper and lower organs of the respiratory system. Students will understand how the organs work together in the respiration process. How do we breathe? How is oxygen taken in and carbon dioxide gotten rid of? How do we make sounds? These questions will be answered by the students. Finally, the effects of pollution, smoking and other diseases of the lungs will be discussed.

## II. OVERVIEW

### A. Concept Objectives

1. Students will develop an understanding of how the respiratory system works. (Colorado Science Standard 1)
2. Students will recognize how to use science to make personal decisions and decisions affecting society. (Jefferson County Science Standard 2.3)

### B. Content from the *Core Knowledge Sequence*

1. Grade 4 Science: The Human Body (page 104)
  - a. The Respiratory System
    - i. Process of taking in oxygen and getting rid of carbon dioxide
    - ii. Nose, throat, voice box, trachea (windpipe)
    - iii. Lungs, bronchi, bronchial tubes, bronchioles, diaphragm, ribs, alveoli
    - iv. Smoking: damage to lung tissue, lung cancer

### C. Skill Objectives

1. Students will explain the importance of breathing and that breathing is an involuntary action.
2. Students will explain the function of the nose.
3. Students will locate and name the nose, throat (pharynx), trachea (windpipe) and voice box (larynx).
4. Students will explain how the voice box works and makes sound.
5. Students will locate and name the lungs, bronchi, diaphragm, and ribs.
6. Students will explain how the diaphragm works.
7. Students will locate and name the bronchial tubes (bronchioles), alveoli (air sacs), and capillaries.
8. Students will make a poster for disease/sickness prevention.
9. Students will know a variety of illnesses related to the lungs and ways to prevent them.
10. Students will locate and name the organs of the respiratory system.
11. Students will explain the respiratory process.
12. Students will verbalize reasons why people should not smoke.

## III. BACKGROUND KNOWLEDGE

### A. For Teachers

1. *The Respiratory System*, by Dr. Alvin Silverstein, Virginia Silverstein, and Robert Silverstein
2. *The Lungs and Respiratory System*, by Steve Parker

3. *The Lungs: Learning How We Breathe*, by Chris Hayhurst
- B. For Students
  1. Kindergarten – The Human Body – The Sense of Smell
  2. First Grade – The Human Body – Body Systems
  3. Third Grade – The Human Body \_ The Skeletal System
  4. Third Grade – The Human Body – The Nervous System
  5. Fourth Grade (if circulatory system was taught prior to this unit) – The Human Body – The Circulatory System

#### IV. RESOURCES

- A. *The Lungs and the Respiratory System*, by Steve Parker (Lesson Two)

#### V. LESSONS

##### Lesson One: The Nose (45 minutes)

- A. *Daily Objectives*
  1. Concept Objective(s)
    - a. Students will develop an understanding of how the respiratory system works.
  2. Lesson Content
    - a. Process of taking in oxygen and getting rid of carbon dioxide
    - b. Nose, throat (pharynx), voice box (larynx), trachea (windpipe)
  3. Skill Objective(s)
    - a. Students will explain the importance of breathing and that breathing is an involuntary action.
    - b. Students will explain the function of the nose.
- B. *Materials*
  1. One piece of paper and one pencil for each student
  2. A vacuum
  3. One dry paper towel
  4. One damp paper towel
  5. Elmer's glue
  6. Two small similar piles of dust, pepper, and fine sand
  7. Appendix A (one for the teacher)
- C. *Key Vocabulary*
  1. *Oxygen* is a gas found in the air that is necessary for life.
  2. *Carbon dioxide* is a gas that you exhale when breathing.
  3. The *respiratory system* is the body system that contains the organs involved in breathing.
  4. An *involuntary* action is an action that the body does without conscious thought, such as breathing or your heartbeat.
  5. *Inhale* means to draw into the lungs.
  6. *Exhale* means to breathe out.
  7. *Mucus* is a thick liquid secreted by the nose.
  8. The *nose* is the intake and the outlet for air in the respiratory system.
  9. *Respiration* is the process of taking in oxygen and getting rid of carbon dioxide.
- D. *Procedures/Activities*
  1. Prior to class write on the board, "What is more important, breathing in or breathing out? Explain your answer." The teacher informs the class that today we will be beginning a new science unit on The Respiratory System, but first I have a question for you to think about and answer.

2. Students take out a piece of paper and pencil and answer the question on the board, making sure to explain their answer.
3. Students put the paper aside for use later in the lesson. (We will have a discussion later.)
4. Have students take a deep breath while they feel what happens. Air enters the nose and goes down the throat to your lungs. The chest fills out as the lungs fill with air. When your lungs are full, you can't take in any more air. Hold your breath for a while, but soon you must breathe out. Feel what happens as you breathe out. The air leaves your lungs and goes out through your *nose*. Put the word *nose* on the board in sentence form. (We breathe in through our nose.)
5. Discuss what *mucus* is and how it keeps the air we breathe in moist and filters out dirt. Put it on the board in sentence form. (Mucus is the thick fluid in our nose that filters out dirt and keeps the air we breathe moist.)
6. Tell students you are going to demonstrate how mucus works in the nose. Using a vacuum hose, suction a small pile of dust, pepper, and fine sand through a dry paper towel. Then vacuum an equal amount of dust, pepper, and fine sand through a damp paper towel with a bit of Elmer's glue on it to simulate the damp sticky mucus in their nose. Compare the two towels and what was caught on each. Tell students that the mucus in their nose works the same way.
7. Explain *inhale* and *exhale*, *oxygen* and *carbon dioxide* and discuss that the air we breathe is made up of a mixture of gases. Put these vocabulary words on the board in sentence form. (We inhale oxygen and exhale carbon dioxide.)
8. Discuss with the class that we breathe without thinking about it. Discuss the meaning of *involuntary* and why breathing is an *involuntary* action. On the board, use the word in sentence form. (Breathing is an involuntary action.)
9. Ask the class where the respiratory system begins. (nose) Discuss how all the organs involved with breathing make up the *respiratory system* which takes in oxygen for the body to use and gets rid of carbon dioxide. Put *respiratory system* on the board in a sentence. (The respiratory system is the body system that contains all the organs involved in breathing.)
10. Discuss the process of breathing is called *respiration*. Put *respiration* on the board. (The process of taking in oxygen and getting rid of carbon dioxide is called respiration.)
11. On the board will be a model of the paragraph the students will write on their own. Read the paragraph together as a class.
12. Erase the paragraph on the board and have the students write their own using all the vocabulary words, leave a list of just the words on the board. Instruct them to use proper paragraph form and correct grammar and punctuation.
13. As a class, have some volunteers share their answers to the question on the board at the beginning of the lesson. This can be a short discussion/debate for the class. Of course, it was a trick question because both processes are equally important. You can share that with students after the debate.
14. The teacher will grade the paragraph using Appendix B.
15. Note to teacher: These items will need to be collected for use in Lesson Three: a plastic liter bottle for each student, modeling clay (enough for one cube for each student), rubber bands, large balloons, and small balloons.

E. *Assessment/Evaluation*

1. Pre-test Question: What is more important, breathing in or breathing out? Explain your answer.
2. Paragraph about the nose using today's vocabulary words will be graded using the rubric in Appendix B.

## **Lesson Two: Throat (45 minutes)**

### A. *Daily Objectives*

1. Concept Objective(s)
  - a. Students will develop an understanding of how the respiratory system works.
2. Lesson Content
  - a. Nose, throat, voice box, trachea (windpipe)
3. Skill Objective(s)
  - a. Students will locate and name the nose, throat (pharynx), trachea (windpipe) and voice box (larynx).
  - b. Students will explain how the voice box works and makes sound.

### B. *Materials*

1. Overhead of respiratory system - Appendix A (one for the teacher)
2. One large balloon for the teacher
3. *The Lungs and Respiratory System*, by Steve Parker
4. Copy of Appendix B (one for each student)
5. 3 ft. x 3 ft. square of white butcher paper (one for each student)
6. Pencils, erasers and markers (student has their own)
7. Copy of Appendix C (one for each student)
8. Copy of Appendix D (one for each student)
9. Rubber bands (one for each student)

### C. *Key Vocabulary*

1. The *pharynx* or *throat* is the tube in the front section of the neck.
2. The *larynx* or *voice box* is the part of the respiratory system that contains the vocal cords.
3. The *trachea* or *windpipe* is an air passage in the respiratory system.
4. The *esophagus* is the tube in your throat that carries food to your stomach.
5. The *epiglottis* is a flap of tissue that protects the opening of the voice box.
6. The *vocal cords* are two bands that stretch across the voice box and are responsible for making sounds.

### D. *Procedures/Activities*

1. Put the overhead of Appendix B on the overhead projector for the entire class to see.
2. Review with the class where the respiratory system starts—the nose. Point out and label the nose on the overhead of Appendix B.
3. Discuss the pathway air takes on the way to your lungs.
4. First, the air goes through the nose and down the throat. Point out and label the throat on the overhead of Appendix B.
5. The air then goes down the throat and past the voice box. Point out and label the voice box on the overhead of Appendix B. This is also where our vocal cords are located and where sounds come from.
6. The air then passes the voice box and goes down the trachea or windpipe. Point out and label the trachea on the overhead of Appendix B. This will be the stopping point for today. You will need this transparency for Lesson Three, which will be the following day.
7. Explain to the class that when they swallow, food passes behind the voice box and the trachea in a different pipe called the esophagus. During swallowing, muscle movements pull the larynx out of the way and a flap called the epiglottis moves over to cover the opening of the larynx. This prevents choking.
8. Talk about how we use our respiratory system for things other than breathing. Have the students press on their necks gently. Can they feel the hard lump in

their throat? This is your voice box or larynx. Two stretchy bands lie across your voice box. They are your vocal cords. Air flows over your vocal cords making them move. This moving back and forth makes sounds. Vocal cords are relaxed and far apart from each other when you make low sounds and they are stretched tight and closer together when you make high sounds. Your lips, tongue, teeth, and throat muscles shape the sounds into words. You breathe out as you speak. The harder you breathe out, the louder the sounds.

9. Take out the balloon and tell the class that you are going to do a demonstration of how the voice box makes noise, otherwise known as our voices, or talking, or singing.
10. Blow up the balloon and hold the opening closed with your fingers.
11. Holding each side of the neck of the balloon, stretch the sides of the balloon outward while letting a little air out at the same time. The balloon should make a squealing sound and this demonstrates how the voice box makes noise. Loosen the neck of the balloon to hear a low noise. Air from our lungs passes through the voice box and vibrates the vocal cords and on up through your throat, like the neck of the balloon.
12. Read pages 36 and 37 from *The Lungs and Respiratory System*, by Steve Parker aloud to the class.
13. Pass out copies of Appendix B to each student. Using the overhead of Appendix B, review the upper respiratory organs and have the students label the organs on their papers.
14. Pass out one 3' x 3' square of butcher paper to each student.
15. Instruct students to find a partner and quietly pick a spot on the floor to work.
16. Each student is to trace their partners from the side view of the head to their waist, no arms necessary.
17. Each student is to fill in with a pencil on their paper person these four organs: the nose, throat, voice box, and trachea. These should be in the proper place in the body, life-sized, and labeled.
18. Using Appendix C, the teacher will check each student's model, while the students are adding color to the four organs.
19. Once each student's paper has been checked, the student will roll up their diagram, put a rubber band around it and give to the teacher for use in the following day's lesson.
20. Pass out Appendix D to each student. The directions are printed on this worksheet, so the students will read the directions and work on this worksheet independently at their seat. When the students are finished, collect this worksheet, as it will be used as an assessment for today's lesson.

E. *Assessment/Evaluation*

1. Appendix C: This checklist will assess each student's knowledge of where the organs are located and what each organ is called.
2. Appendix D: This worksheet will assess students' understanding of how the voice box works and the correct steps in the process of making sound. This is how the paragraph should look like when finished:
  - a. Air goes through the nose and down the throat.
  - b. Air then goes past the voice box where the vocal cords are located.
  - c. While the air moves over the vocal cords, the vocal cords vibrate and make noise.
  - d. The harder you breathe out, the louder the sounds.
  - e. Your lips, tongue, teeth, and throat muscles shape the sounds into words.

### **Lesson Three: The Chest (45 minutes)**

#### **A. Daily Objectives**

1. Concept Objective(s)
  - a. Students will develop an understanding of how the respiratory system works.
2. Lesson Content
  - a. Lungs, bronchi, bronchial tubes, diaphragm, ribs, alveoli (air sacs)
3. Skill Objective(s)
  - a. Students will locate and name the lungs, bronchi, diaphragm, and ribs.
  - b. Students will explain how the diaphragm works.

#### **B. Materials**

1. Overhead of Appendix B from previous lesson
2. Student copies of Appendix B from previous lesson
3. Student copies of Appendix C from previous lesson
4. 3' x 3' square of white butcher paper from previous lesson
5. Pencils, erasers, and markers
6. Large balloon (one for each student)
7. Small balloon (one for each student)
8. Soda straw (one for each student)
9. Rubber bands (two for each student)
10. Plastic liter bottle (one for each student)
11. Scissors (one for each student)
12. Modeling clay (enough for each student to have one cube)
13. Appendix E, page 1 (one copy for each student)
14. Appendix E, page 2 (one copy for the teacher)

#### **C. Key Vocabulary**

1. The *lungs* are the paired organs in the chest that remove carbon dioxide from the blood and replace it with oxygen.
2. The *bronchi* are two large air tubes in the lungs.
3. The *diaphragm* is a large domed sheet of muscle that is underneath the lungs and involved in breathing.
4. The *ribs* are curving flat bones that protect the organs in the chest.

#### **D. Procedures/Activities**

1. Put the overhead of Appendix B from the previous lesson on to the overhead projector for the entire class to see.
2. Quickly review the four organs that we learned in the previous day's lesson. (These should still be labeled on the overhead from the previous lesson.)
3. Continuing with the pathway that air takes to get to the lungs, point to the trachea and with your finger trace down to where the trachea splits into two large tubes. These tubes are the bronchi. One tube goes to each lung.
4. Point out and label the bronchi on the overhead of Appendix B.
5. The air then splits and goes from each bronchi into the lungs. Point out and label the lungs on the overhead of Appendix B.
6. Underneath the lungs is a large sheet of muscle called the diaphragm. Point out and label the diaphragm on the overhead of Appendix A. The diaphragm aids our body in breathing.
7. Explain to the students that breathing is powered by muscles. Remind them that it is an involuntary action. The diaphragm is a large domed shaped muscle under the lungs. It separates the chest cavity from the abdomen. When you inhale, the diaphragm shortens and becomes flatter. This causes the lungs to get larger and

- air is sucked in. When you exhale, the diaphragm lengthens and resumes its dome shape. The lungs return to their smaller size and air is pushed out of them.
8. Let the students know that the lungs are protected by the ribs. The ribs are curved flat bones that form a cage around the organs in the chest.
  9. Tell the students that we will be making a model of how the diaphragm and the lungs work. An adult breathes in and out about 12-16 times a minute. A newborn breathes in and out about 40-50 times a minute. A ten-year old breathes in and out about 20 times a minute.
  10. Pass out these materials to each student: one large balloon, one small balloon, one soda straw, two rubber bands, one plastic liter bottle, one pair of scissors, and one cube of modeling clay.
  11. Tell the students and show them at the same time to cut off the bottom half of the plastic liter bottle.
  12. Then stretch the large balloon across the open bottom of the bottle.
  13. Fasten the balloon with a rubber band, making sure it is tightly stretched.
  14. Attach the small balloon to the soda straw with the other rubber band.
  15. Place the straw in the top bottle opening. Press clay around the straw and bottle opening which will keep air from coming in to the bottle.
  16. Pull down and push up on the bottom balloon and observe what is happening with the balloon inside the bottle.
  17. Pass out Appendix E, page 1, one for each student and give them time to answer the questions based on the lesson and demonstration.
  18. Collect these papers and grade them according to the answer sheet (Appendix E, page 2).
  19. Pass out Appendix B, one for each student, from the previous day's lesson. Using the overhead of Appendix B, students are to label the bronchi, lungs and diaphragm on their worksheet.
  20. Pass out the 3' x 3' butcher paper models from the previous day's lesson.
  21. Each student is to fill in with a pencil on his or her paper model, the bronchi, the lungs, and diaphragm. These should be in the proper place in the body, life-sized, and labeled.
  22. The teacher will then use Appendix C, one for each student from the previous day's lesson, to check off that each student has correctly followed the directions and placed the organs correctly. While the teacher is doing this, the students may add color to these organs.
  23. Students roll up the paper models, put a rubber band around it, and the teacher collects them for use in the following day's lesson.
  24. **Fun Fact:** A pair of adult lungs weighs about 2.2 pounds.
- E. *Assessment/Evaluation*
1. Appendix C: Using this checklist will assess students' knowledge of where the organs are located and what each organ is called.
  2. Appendix E, page 1: Having the students answer these questions will show their understanding of how the diaphragm works and whether or not they understood the demonstration. (The last question is a higher level thinking question that can be used for gifted students or to see which students were able to think critically.)

#### **Lesson Four: Inside the Lungs (45 minutes)**

##### *Daily Objectives*

1. Concept Objective(s)
  - a. Students will develop an understanding of how the respiratory system works.

2. Lesson Content
    - a. Lungs, bronchi, bronchial tubes (bronchioles), diaphragm, ribs, alveoli (air sacs)
  3. Skill Objective(s)
    - a. Students will locate and name the bronchial tubes (bronchioles), alveoli (air sacs), and capillaries.
- B. *Materials*
1. Transparency of Appendix B
  2. Student copies of Appendix B
  3. Transparency of Appendix F
  4. One piece of paper per student
  5. Students' life-size paper diagram of person
  6. Pencil, eraser, and markers for each student
  7. Appendix G (one for each student)
- C. *Key Vocabulary*
1. *Bronchial* tubes or *bronchioles* are all the small tubes that branch off from the bronchi once they enter the lungs.
  2. *Alveoli* are air sacs in the lungs where the exchange of gases takes place.
  3. *Capillaries* are thread-like blood vessels where oxygen is exchanged for carbon dioxide.
- D. *Procedures/Activities*
1. Put Appendix B on the overhead projector for the class to see.
  2. Review how air enters the nose and passes down the throat, past the voice box, through the trachea into the bronchi and enters the lungs.
  3. Discuss how once the bronchi enter the lungs they branch off into smaller and smaller tubes called bronchial tubes or bronchioles. Label on overhead and have students label their Appendix B sheets.
  4. Explain how the bronchioles resemble upside down trees that divide from a trunk into branches, twigs.
  5. Explain how the bronchioles get smaller and smaller until they are no larger than a hair.
  6. Each of these tiny bronchioles end in a group of bubble-shaped air sacs called alveoli. The alveoli look like a bunch of grapes.
  7. Point out that the alveoli are covered with a net of capillaries. Label capillaries on the overhead and have students label their copies.
  8. Refer to transparency of Appendix B. Label alveoli on transparency and have students label their sheets.
  9. Put up transparency of Appendix F.
  10. Explain this is a diagram of the alveoli at the end of the bronchiole. Point out blood flow and capillaries. Point out that the alveoli are hollow and that each sac is covered with a net of fine thread-like capillaries which carry red blood cells.
  11. On the transparency, move to figure of single alveolus. Point out flow of red blood cells in the capillaries.
  12. Explain that the walls of the capillaries and the alveoli are each only one cell thick. They are very thin so there is a thin barrier for the gasses to pass through. The red blood cells pass carbon dioxide to the air sacs and pick up oxygen from the air sacs.
  13. Explain that we inhale oxygen which is carried to the lungs into the air sacs and the red blood cells carry it to the body. The red blood cells drop off carbon dioxide to the air sacs, we breathe out, and the carbon dioxide is exhaled.

14. Tell the students that each lung has about 300 million air sacs. Flattened out they provide a huge surface for gas exchange to take place. If the alveoli were all flattened out, they would cover an area the size of a tennis court.
  15. Put the words alveoli, bronchioles (bronchial tubes), bronchi, capillaries, oxygen, carbon dioxide, and lungs on the board.
  16. Instruct students to write a paragraph explaining what happens to the air once it enters the lungs. They must use all the words on the board and use proper paragraph format, punctuation, and grammar.
  17. Once their paragraph is turned in, they may get their life-size diagrams and add bronchioles, alveoli, and capillaries to their diagrams. Remind them to have bronchial tubes branch into smaller and smaller units. Remind them to leave room to draw in air sacs at the end of several bronchioles. Don't forget capillaries in red and blue. Model adding air sacs on the board. Use pencils first, then add color.
  18. Grade paragraphs using Appendix G.
  19. Grade life-size diagrams using Appendix C checklist.
- E. *Assessment/Evaluation*
1. Life-size drawing will be assessed using Appendix C.
  2. Paragraphs will be assessed using Appendix G.

**Lesson Five: Diseases (two days, 45 minutes each day)**

- A. *Daily Objectives*
1. Concept Objective(s)
    - a. Students will recognize how to use science to make personal decisions and decisions affecting society.
  2. Lesson Content
    - a. Smoking: damage to lung tissue, lung cancer
  3. Skill Objective(s)
    - a. Students will make a poster for disease/sickness prevention.
    - b. Students will know a variety of illnesses related to the lungs and ways to prevent illness.
- B. *Materials*
1. Paper, pencils, and markers
  2. Appendix H (one for the teacher)
  3. Appendix I (one for each student)
  4. 8" x 10" white construction paper (one for each student)
- C. *Key Vocabulary*
1. The *common cold* is a viral infection of the respiratory passages.
  2. *Asthma* is an allergic respiratory disease marked by labored breathing.
  3. *Laryngitis* is an inflammation of the larynx, like when you have trouble speaking because your vocal cords are sore.
  4. *Bronchitis* is an inflammation of the bronchi, otherwise known as a chest cold.
  5. *Pneumonia* is an inflammatory disease of the lungs caused by viruses, bacteria, chemicals or irritation.
  6. *Emphysema* is a disease in which many tiny sacs inside the lungs become larger, which causes breathing to become more and more difficult.
  7. *Cancer* is caused by the body cells dividing out of control and producing growths called tumors. *Lung Cancer* is the most common cancer in our society. However, it can be prevented by not smoking.

D. *Procedures/Activities*

1. **DAY ONE:** The students are going to take Two-column notes or T-notes for this discussion/brainstorm activity. See Appendix H for an example of how those notes will/should look. Label the top of the left column, Sickness and label the top of the right column Facts. Demonstrate this on the board for the class to see and copy.
2. Brainstorm and discuss with the class some of the sicknesses or diseases that can affect the respiratory system.
3. Write down on the board, under the sickness column all of the ideas that the students come up with that are relevant to the respiratory system.
4. When a student comes up with a sickness, decide together what definition or fact you want to write under the second column of the Two-column notes. The definition or fact should be something to help the students remember what the illness is.
5. When the students are out of ideas, check Appendix H and add and discuss any sicknesses that were not mentioned by the students.
6. Now move the discussion to ways to prevent illness.
7. Tell the students that you have two examples of ways to prevent illnesses and why these examples are helpful. #1: We wash our hands before we eat so that we do not spread germs to our food and to each other. #2: We cough into our elbow so we do not spread germs on our hands and on to other people.
8. Tell the students that these are just two examples. There are many more examples.
9. For homework tonight: Each student needs to think about, check the internet, or ask their parents for three more examples of ways to prevent illness. (They may not use the two examples that you gave them in class.)
10. Let the students know that they need to do this homework assignment because they will be making posters the next day as advertisements for Disease Prevention.
11. Using Appendix I, go over the rubric for grading the poster with the class. Showing the students the rubric lets them know what is expected of them for this assignment, and then they can start to think about what their poster might look like. They will begin their posters on the following day. This finishes the lesson for today.
12. **DAY TWO:** Pass out one piece of construction paper to each student.
13. Pass out Appendix I, one for each student, and review this rubric again as a class. This is the grading scale that will be used to grade their poster.
14. Students have the entire class period to work on their poster. They will need a title, three ways to prevent illness and hand-drawn pictures or graphics to make this poster an advertisement for Disease Prevention. They will need to color the poster when finished drawing/writing.
15. Collect the posters and use Appendix I to grade each poster.

E. *Assessment/Evaluation*

1. Posters
2. Appendix I: This rubric will assess if students understand how to use science to make decisions and the problems that can occur in the respiratory system.

**Lesson Six: Unit Review, RAP, Final Exam (two days, 45 minutes each day)**

A. *Daily Objectives*

1. Concept Objective(s)
  - a. Students will develop an understanding of how the respiratory system works.
  - b. Students will recognize how to use science to make personal choices and decisions affecting society.
2. Lesson Content
  - a. The process of taking in oxygen and getting rid of carbon dioxide
  - b. Nose, throat (pharynx), voice box (larynx), trachea (windpipe)
  - c. Lungs, bronchi, bronchial tubes (bronchioles), diaphragm, ribs, alveoli (air sacs)
  - d. Smoking, damage to lung tissue, lung cancer
3. Skill Objective(s)
  - a. Students will locate and name the organs of the respiratory system.
  - b. Students will explain the respiratory process.
  - c. Students will verbalize reasons why people should not smoke.

B. *Materials*

1. Overhead of Appendix B
2. Student copies of Appendix B
3. Paper for each student
4. Pencil for each student
5. Copy of test for each student – Appendix J, pages 1-4
6. Copy of Appendix J, page 5 for teacher

C. *Key Vocabulary*

1. The *nose* is the intake and the outlet for air for the respiratory system.
2. The *throat (pharynx)* is the front section of the neck.
3. The *voice box (larynx)* is the part of the respiratory system that contains the vocal cords.
4. The *trachea (windpipe)* is an air passage in the respiratory system.
5. The *bronchi* are two large airways leading into the lungs.
6. The *bronchial tubes (bronchioles)* are increasingly smaller airways branching off into the lungs.
7. The *diaphragm* is a large domed sheet of muscle underneath the lungs that is involved in breathing.
8. The *ribs* are curving flat bones that protect the organs in the chest.
9. The *alveoli* are air sacs in the lungs where the exchange of gases takes place.
10. The *respiratory system* is the body system that contains the organs involved in breathing.
11. *Respiration* is the process of taking in oxygen and getting rid of carbon dioxide.
12. *Oxygen* is a gas found in the air that is necessary for life.
13. *Carbon dioxide* is a gas that you exhale when you breathe.
14. *Capillaries* are thread-like blood vessels where oxygen is exchanged for carbon dioxide.
15. *Inhale* means to draw into the lungs.
16. *Exhale* means to breathe out.
17. An *involuntary* action is an action that the body does without conscious thought.
18. The *lungs* are paired organs in the chest that remove carbon dioxide from the blood and replace it with oxygen.

D. *Procedures/Activities*

1. **DAY ONE:** Put Appendix B on the overhead.

2. Go through the steps in the respiratory process with the class, going over the names of each organ and its definition. The teacher will have the class participate by asking them to name each organ, asking them for the definitions, and asking students the next step in the process.
  3. Put each vocabulary word from the list above on the board as you go through the process and have students follow along writing each vocabulary word and its definition in Two- column note form on their paper.
  4. For homework tonight, remind students that tomorrow will be the day of the test over the respiration system and they have this vocabulary list to study from as well as their body diagrams, their Appendix B sheets, their paragraph on gas exchange in the lung from Lesson Four, and their Two- column notes on diseases from Lesson Five.
  5. Explain that students will be working on their own anti-smoking rap songs for the rest of the period.
  6. Go over the guidelines with students:
    - a. effects of smoking
    - b. peer pressure
    - c. addiction
    - d. second-hand smoke
    - e. cancer
    - f. emphysema
  7. Students don't have to use all the guidelines, but they can.
  8. Students' songs will be judged by their classmates. All members of the group must participate in the presentation; they can take turns or do the song all together.
  9. Break students into groups of three or four.
  10. **DAY TWO:** Get ready for exam. Give students a few minutes to study.
  11. Pass out one copy of exam, Appendix J, to each student.
  12. Teacher grades exams using Appendix J, page 2.
- E. *Assessment/Evaluation*
1. Final exam will be graded using Appendix J, page 2.

## VI. CULMINATING ACTIVITY

- A. Give students a few minutes to go over their rap songs in their groups.
- B. Share rap songs with the class, one group at a time.
- C. Class will critique each group using positive reinforcement only. Students may only say what is good about another group's performance.
- D. Appendix J-The Final Exam

## VII. HANDOUTS/WORKSHEETS

- A. Appendix A: Rubric for Lesson One Paragraph (Lesson One)
- B. Appendix B, page 1: Overhead of Diagram of the Respiratory System (Lesson Two, Lesson Three)
- C. Appendix B, page 2: Answer Key for Diagram of the Respiratory System (Lesson Two, Lesson Three)
- D. Appendix C: Body Diagram Checklist (Lesson Two-Four)
- E. Appendix D: Student Worksheet-Putting Together a Paragraph (Lesson Two)
- F. Appendix E, page 1: Questions about the Model Lung (Lesson Three)
- G. Appendix E, page 2: Answer Key for Questions about the Model Lung (Lesson Three)
- H. Appendix F: Overhead of Alveoli Diagram (Lesson Four)

- I. Appendix G: Rubric to Grade Paragraph about Gas Exchange (Lesson Four)
- J. Appendix H: Example of Two-Column Notes (Lesson Five)
- K. Appendix I: Rubric to Grade Disease Prevention Poster (Lesson Five)
- L. Appendix J, pages 1-4: Final Exam (Lesson Six)
- M. Appendix J, page 5-6: Answer Key for Final Exam (Lesson Six)

### VIII. BIBLIOGRAPHY

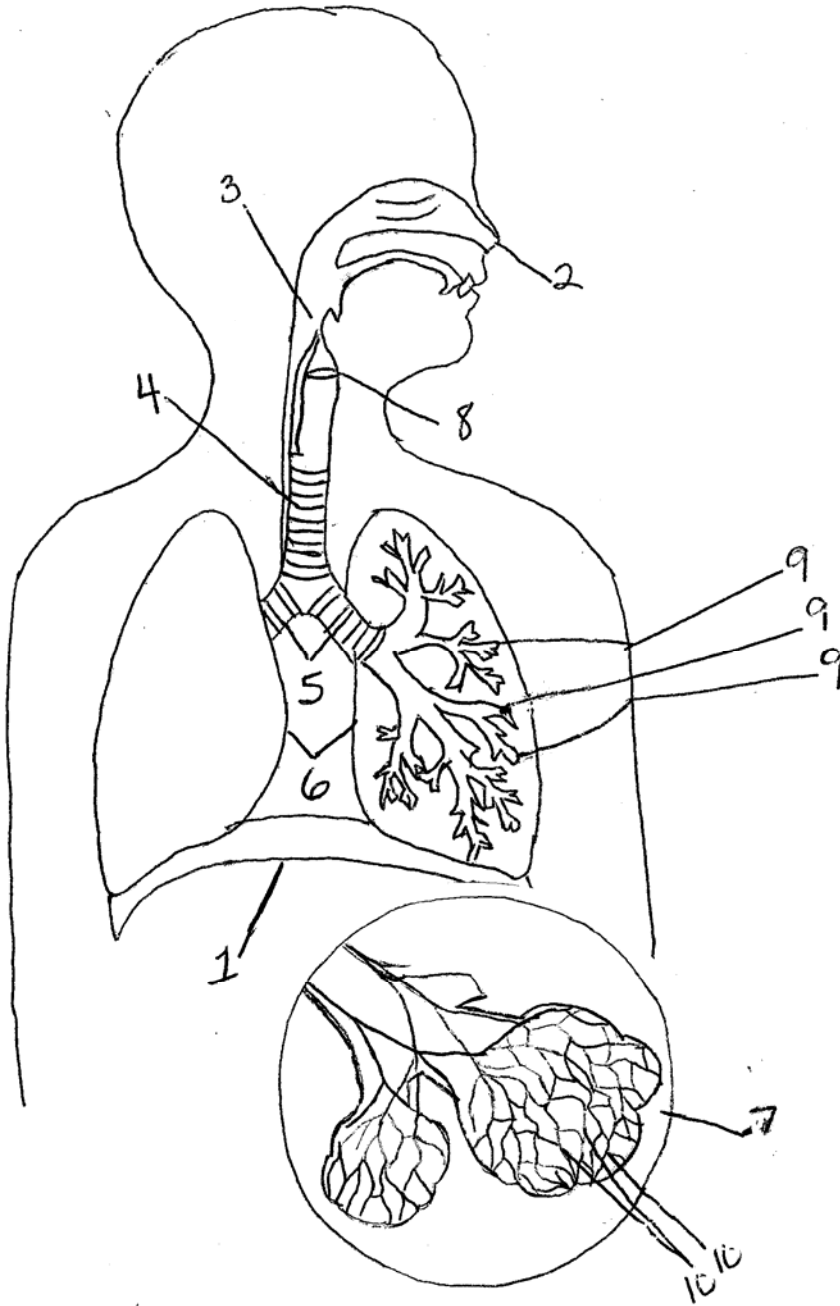
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**Appendix A**  
**Rubric for Lesson One Paragraph**

	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>Points</b>
<b>Vocabulary</b>	uses all eight words correctly	uses six-seven words correctly	uses four-five words correctly	uses less than four words correctly	
<b>Paragraph Format</b>	uses correct paragraph format for my classroom	uses correct paragraph format but leaves out introduction sentence or concluding sentence	uses correct paragraph format but leaves out both introduction and concluding sentences	does not follow proper paragraph format	
<b>Grammar</b>	uses complete sentences, correct grammar, correct punctuation	makes one-four grammatical errors	makes five-eight grammatical errors	makes more than eight grammatical errors	
<b>TOTAL POINTS</b>					

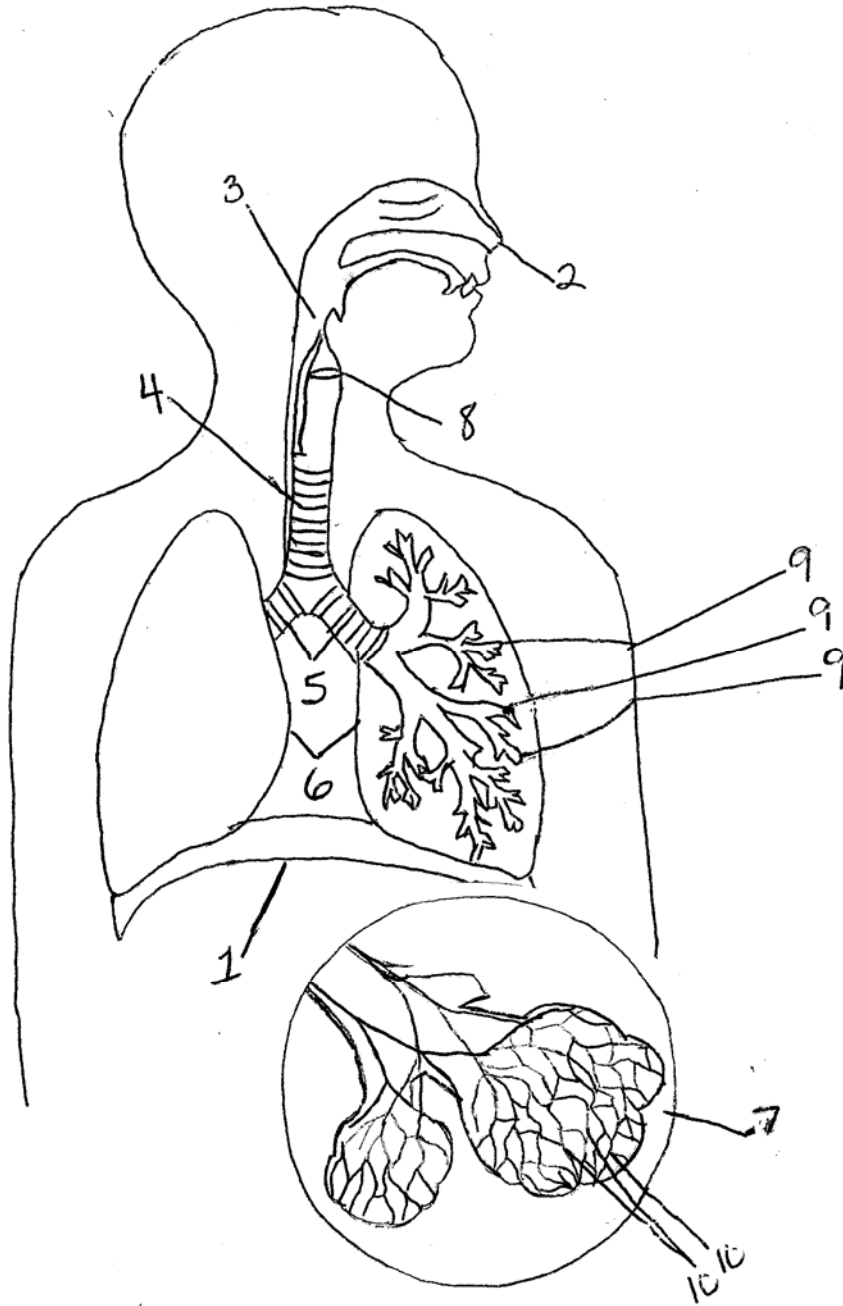
Appendix B, page 1  
**Parts of the Respiratory System**

Answers



1.	_____
2.	_____
3.	_____
4.	_____
5.	_____
6.	_____
7.	_____
8.	_____
9.	_____
10.	_____

# Parts of the Respiratory System Answer Key



## Answers

1. diaphragm
2. nose
3. pharynx
4. trachea
5. bronchi
6. lungs
7. alveoli
8. larynx
9. bronchioles
10. capillaries



## Appendix C

### Checklist for Body Diagrams

1. Nose labeled properly	Y	N
2. Nose in the correct place	Y	N
3. Pharynx (throat) labeled properly	Y	N
4. Pharynx in correct place	Y	N
5. Larynx (voice box) labeled properly	Y	N
6. Larynx in correct place	Y	N
7. Diaphragm labeled properly	Y	N
8. Diaphragm in correct place	Y	N
9. Bronchi labeled properly	Y	N
10. Bronchi in correct place	Y	N
11. Bronchioles labeled properly	Y	N
12. Bronchioles in correct place	Y	N
13. Lungs labeled properly	Y	N
14. Lungs in correct place	Y	N
15. Alveoli labeled properly	Y	N
16. Alveoli in correct place	Y	N
17. Capillaries labeled properly	Y	N
18. Capillaries in correct place	Y	N
19. Diagram has hair	Y	N
20. Diagram has eyes	Y	N
21. Diagram has ears	Y	N
22. Diagram has a mouth	Y	N
23. Diagram is colored neatly	Y	N
24. Diagram is labeled neatly	Y	N
25. Labeling is spelled correctly	Y	N

## Appendix D

**DIRECTIONS:** Cut out the sentences below and put them in correct order on a new sheet of paper.

The harder you breathe out, the louder the sounds.

Air then goes past the voice box where the vocal cords are located.

Your lips, tongue, teeth, and throat muscles shape the sounds into words.

Air goes through the nose and down the throat.

While the air moves over the vocal cords, the vocal cords vibrate and make noise.

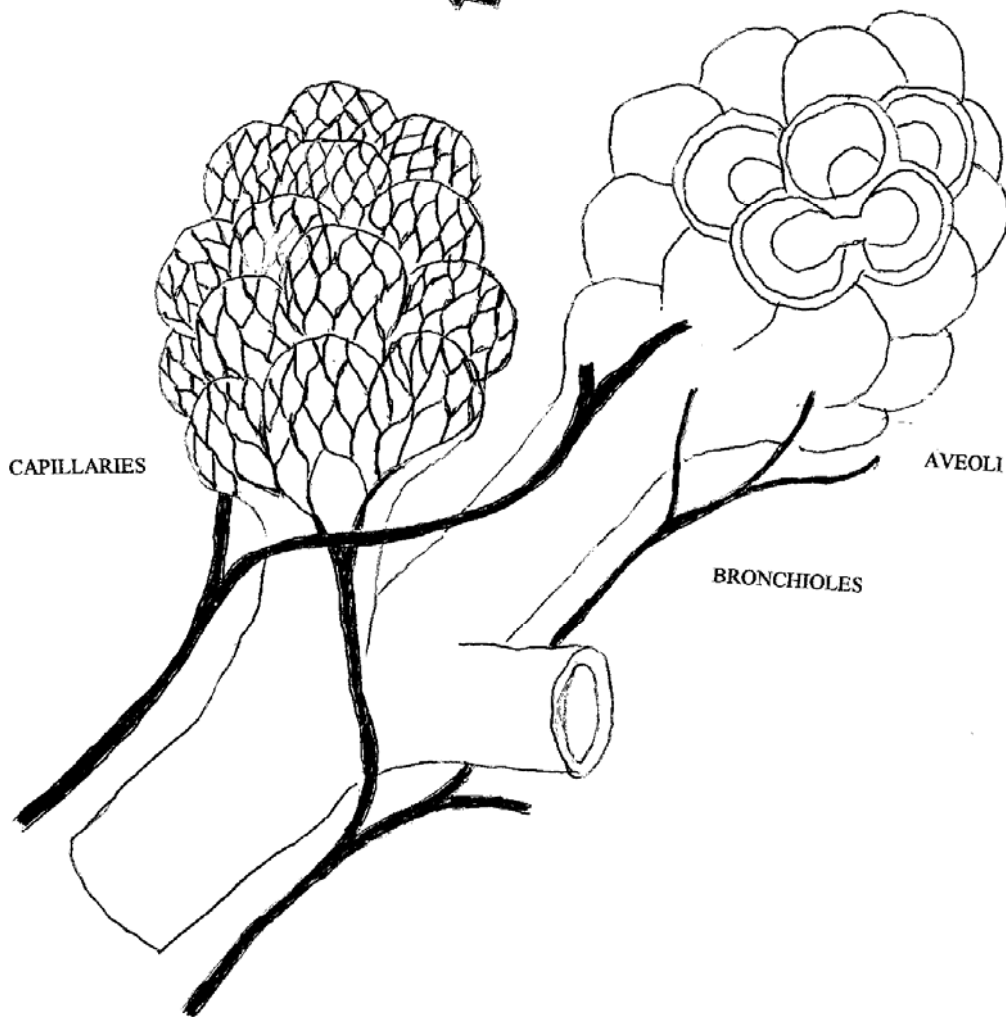
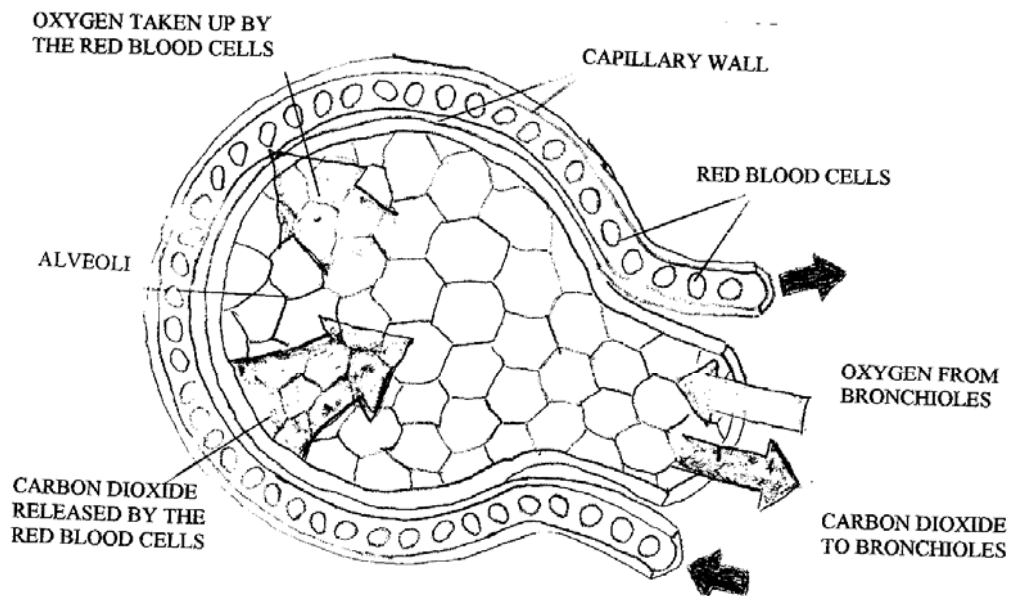
**Answer these questions after making a model lung. Be sure to remember to answer your questions in complete sentences, using part of the question in your answer.**

1. Which part of the respiratory system acts like the bottom balloon?
2. Which part of the respiratory system acts like the balloon inside the bottle?
3. When you push up on the bottom balloon, is this like inhaling or exhaling? Explain your answer.
4. **BONUS:** At rest, you breathe about 15 times a minute. When you exercise, do you breathe faster or slower? Why?

**Answers to the questions on Appendix E:**

1. The bottom balloon acts like the diaphragm, which contracts or tightens.
2. The balloon inside the bottle acts like the lungs. The lungs fill up with air and push air out.
3. When you push up on the bottom balloon, it is like exhaling. The diaphragm relaxes and becomes dome-shaped and this helps to push air out of the lungs.
4. When you exercise, you breathe faster. This is because more oxygen is being released into your blood, muscles, and cells causing you to breathe faster.

# Appendix F



Appendix G

**Rubric to Grade Paragraph about Gas Exchange**

	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>Points</b>
<b>Process</b>	all process steps are in the correct order	one step in the process is out of order or left out	two steps in the process are out of order or left out	more than two steps in the process are out of order or left out	
<b>Vocabulary</b>	uses all seven words correctly	uses five-six words correctly	uses three-five words correctly	uses less than three words correctly	
<b>Paragraph Format</b>	uses correct paragraph format for my classroom	uses correct paragraph format but leaves out introduction sentence or concluding sentence	uses correct paragraph format but leaves out both introduction and concluding sentences	does not follow proper paragraph format	
<b>Grammar</b>	uses complete sentences, correct grammar, correct punctuation	makes one-four grammatical errors	makes five-eight grammatical errors	makes more than eight grammatical errors	
<b>TOTAL POINTS</b>					

**Appendix H**  
**Two-column Notes or T-notes Example for Lesson Five**

SICKNESS	FACTS
Common Cold	an inflammation of the nasal passages (in the nose)
Asthma	a respiratory disease marked by labored breathing, chest constriction and coughing
Laryngitis (sore throat)	an inflammation of the larynx or vocal chords, hurts to talk, sore throat
Bronchitis (chest cold)	an inflammation of the bronchi, chest cold, soreness, heaviness in the chest
Pneumonia	a disease caused by an infection in which both lungs are swollen and irritated
Emphysema	a disease in which many tiny sacks inside the lungs become larger which causes breathing to become more difficult
Lung cancer	a disease caused by body cells dividing out of control and producing growths called tumors. This is the most common cancer and can be prevented by not smoking

Appendix I

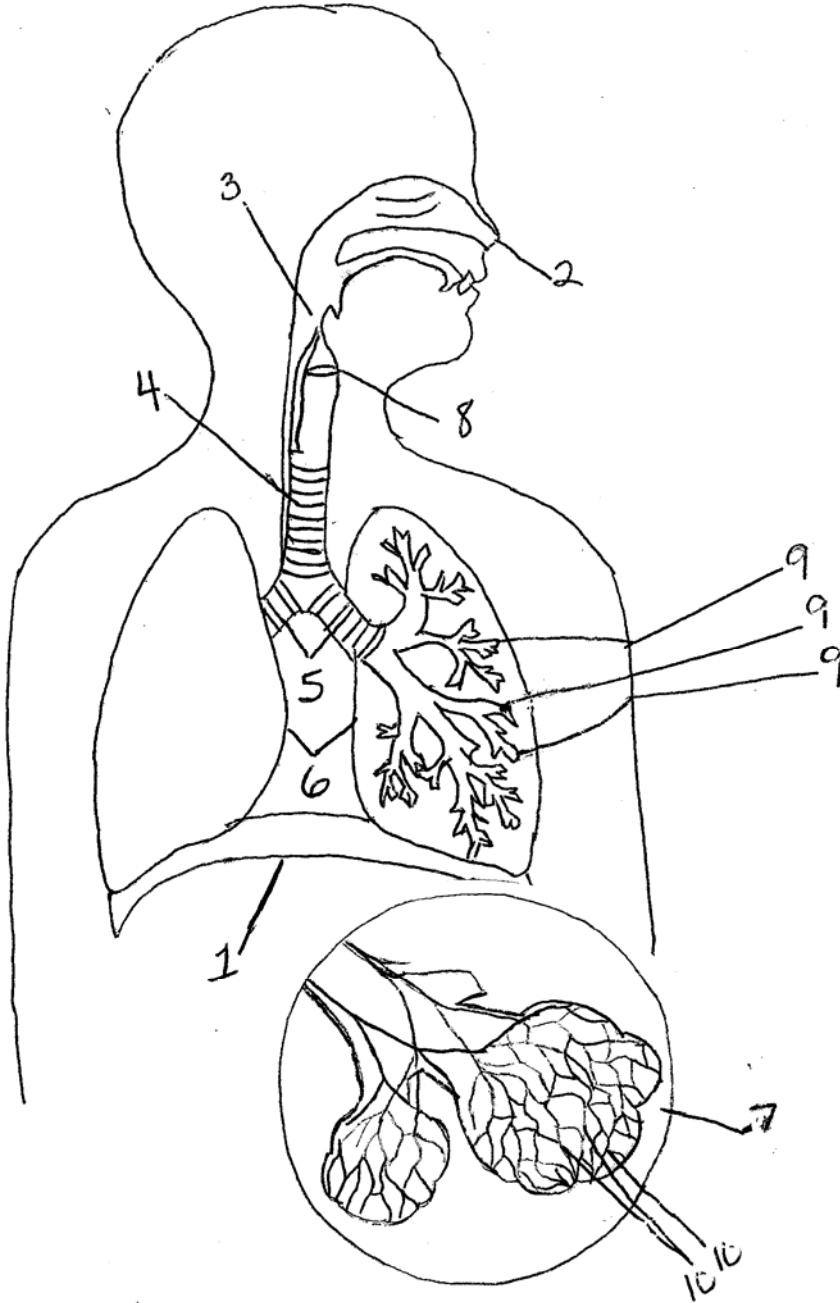
**Rubric for Disease Prevention Poster**

	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>Points</b>
<b>Title included</b>	Title is appropriate and included	Title is not as appealing as others and included	Title is not appropriate but is included	Title is missing	
<b>Three reasons to prevent illness</b>	Three reasons clearly presented for ways to prevent illness	Two reasons presented for ways to prevent illness	One reason presented for ways to prevent illness	Zero reasons presented for ways to prevent illness	
<b>Neatness</b>	Poster is very neat	Poster is neat, but not finished coloring	Poster shows little effort in neatness and coloring	Poster is hard to read and is not neat	
<b>Creative and Colorful</b>	Poster is very creative and maximum effort is demonstrated	Poster is somewhat creative and an average amount of effort was put into making it	Poster is not very creative, and does not have a lot of color to it		
<b>TOTAL POINTS</b>					

# UNIT TEST - RESPIRATORY SYSTEM

## PART A: THE RESPIRATORY SYSTEM

DIRECTIONS: Label each organ numbered in the box.



1.	_____
2.	_____
3.	_____
4.	_____
5.	_____
6.	_____
7.	_____
8.	_____
9.	_____
10.	_____

## Appendix J, page 2

### PART B: MATCHING

DIRECTIONS: Match the definitions with the correct word on the right.

- |    |  |                   |
|----|--|-------------------|
| 1. | This gas is what you exhale.                                 | A. pharynx        |
| 2. | This is another name for your throat.                        | B. diaphragm      |
| 3. | This is a domed shaped sheet of muscle underneath the lungs. | C. mucus          |
| 4. | This thick fluid in our nose filters out dirt and dust.      | D. breathing      |
| 5. | This is an example of an involuntary action.                 | E. carbon dioxide |
| 6. | The gas that you inhale.                                     | F. oxygen         |

### PART C: MULTIPLE CHOICE

DIRECTIONS: Circle the correct answer to each question.

- What are the bubble-shaped sacs in the lungs where gas exchange takes place called?
  - capillaries
  - bronchial tubes
  - alveoli
  - oxygen sacs
  - lungs
- Where does the respiratory system begin?
  - throat
  - capillaries
  - lungs
  - nose
  - in the air
- What is the organ that is responsible for making sounds called?
  - pharynx
  - throat
  - sound box
  - trachea
  - larynx

### Appendix J, page 3

4. What is the name of the disease that causes the body cells to divide out of control and produce growths?
  - a. asthma
  - b. cancer
  - c. bronchitis
  - d. asthma
  - e. emphysema
  
5. What are the increasingly smaller airways branching off into the lungs called?
  - a. air sacs
  - b. capillaries
  - c. bronchi
  - d. threadioles
  - e. bronchial tubes

#### **PART D: FILL IN THE BLANK**

DIRECTIONS: Read each sentence and fill in the correct word or words.

1. We breathe in \_\_\_\_\_, which is a gas in the air necessary for life.
  
2. The process of taking in oxygen and getting rid of carbon dioxide is called\_\_\_\_\_.
  
3. The windpipe or \_\_\_\_\_ is a passageway to the lungs.
  
4. The body system that contains all the organs that are involved in the process of breathing is\_\_\_\_\_.
  
5. The windpipe divides into two tubes called\_\_\_\_\_ as it enters the lungs.
  
6. \_\_\_\_\_ are the thread-like blood vessels where oxygen is exchanged for carbon dioxide.

**Appendix J, page 4**

**PART E. BONUS QUESTIONS**

**DIRECTIONS:** Answer each question completely.

How does the diaphragm work?

How do our vocal cords make high and low sounds?

## UNIT TEST – RESPIRATORY SYSTEM ANSWER KEY

### PART A: THE RESPIRATORY SYSTEM

1. diaphragm
2. nose
3. pharynx
4. trachea
5. bronchi
6. lungs
7. alveoli
8. larynx
9. bronchioles
10. capillaries

### PART B: MATCHING

1. F
2. A
3. B
4. C
5. D
6. E

### PART C: MULTIPLE CHOICE

1. C
2. D
3. E
4. B
5. E

### PART D: FILL IN THE BLANK

1. oxygen
2. respiration
3. trachea
4. respiratory system
5. bronchi
6. Capillaries

### PART E: BONUS QUESTIONS

1. When you inhale the diaphragm gets flat and shortens. The lungs get larger and air is sucked in. When you exhale the diaphragm lengthens and resumes its dome shape. The lungs return to their smaller size and air is pushed out.
2. To make high sounds the vocal cords are stretched tight and are close together. To make low sounds the vocal cords are loose and farther apart.