

# **Grade 7: The Respiratory System and Lungs**

## **Lesson 1: The Lungs and Respiratory System**

## **Lesson 2: Breathing**

## **Lesson 3: Respiratory Problems**

### **Objectives:**

1. Students will describe the parts of the respiratory system.
2. Students will explain the function of the lungs, diaphragm, trachea, bronchia, and alveoli.
3. Students will explain the three stages of the breathing process and what occurs in each stage.
4. Students will explain two major risk factors for five respiratory problems.
5. Students will explain two ways to protect themselves against five respiratory problems.
6. Students will explain the connection of the respiratory system to four other body systems.

### **Materials:**

#### **Lesson 1:**

- Quiz (See Figure 1)
- Body Outline (See Figure 2)
- Respiratory anatomy charts
- Body organ model
- Materials to build lungs (examples: sponge, balloons, liter soda bottles, water bottles, straws, tubes, string, clay, etc.)

#### **Lesson 2:**

- few drops of red cabbage juice in a cup of water
- a funnel
- a hair dryer
- a straw
- a beaker
- water
- marker
- tub
- milk jug and lid
- plastic tub

#### **Lesson 3:**

- “Understanding Respiratory Problems” (**See Figure 3**)

### **Activity Summary:**

In this lesson students will explore the parts and functions of the respiratory system, the connection of the respiratory system with other body systems, the three stages of the breathing process and five respiratory problems. Students will expand their study to compare and contrast the human respiratory system with the respiratory systems of animals, plants, and the Earth's ecosystem.

## Background Information for the Teacher:

**Overview** Breathing is an amazing body activity and is a common factor in physical, mental, and emotional activity and health. Breathing is an essential part of what we think of as the **mind/body/spirit connection**. It is not an exaggeration to say that breath is the significant link that makes the mind/body/spirit connection real. We use breath to sustain and energize our life, to calm our emotions, and to settle our minds. Whenever a person's breathing changes-- becoming slower or faster (OR shorter or longer), the body, mind, and emotions respond accordingly.

Physiologically, breathing is an activity of the respiratory system and it is actively connected to many other body systems. Breathing and its benefits are not an isolated activity involving only the lungs.

- The respiratory system is connected to the heart and circulatory system through the cardio-pulmonary circulatory process that accomplishes the gas exchange required to keep oxygen and carbon dioxide in balance. Oxygen is carried in the blood, traveling everywhere throughout the body.
- The nervous system is involved with the breath and is affected by the breath as well. The autonomic nervous system engages the sympathetic and parasympathetic divisions to activate and calm breathing rhythms associated with the **stress response**.
- The respiratory activity of transporting oxygen around the body connects to the digestive system, supplying energy for digestion.
- Oxygen in the blood goes to the muscular system, providing energy to burn the food nutrients needed for muscle movement.

## Parts of the Respiratory System

The respiratory system consists of more than just the lungs. These are the major parts of the respiratory system:

- **Nasal cavity** – The passage for air entering and leaving the lungs.
- **Cilia** – The lining of the nasal cavity. These are tiny hair-like structures that trap the small particles of dust and foreign matter that don't belong in the lungs. This is a very important function that helps keep our lungs clean and clear, allowing us to breathe efficiently.
- **Mouth** – A passageway for air as well as food into the body.
- **Pharynx** – Located in the throat, this is the passageway for food into the esophagus.

- **Esophagus** – Food moves through the pharynx into the esophagus, which is the passageway for food into the stomach.
- **Epiglottis** – Acting as a trapdoor to the trachea, it keeps food from entering the trachea and blocking the airway.
- **Trachea** – Branching off from the esophagus, this is the passageway for air to the lungs, often called the windpipe.
- **Bronchia** – branches off from the trachea, with one branch going to each lung
- **Alveoli** – Attaches and branches off the bronchioles throughout the lungs. The oxygen/carbon dioxide exchange happens in these tiny air sacs. There are about 300 million alveoli in the lungs. This extraordinary number of alveoli provides a gas contact area of about 60 sq meters, or the area of a room 24 x 24 feet, roughly the size of a tennis court.
- **Lungs** – In these two large organs the oxygen/carbon dioxide exchange occurs. The left lung is slightly smaller than the right as the heart intrudes into the left lung area a bit. The left lung has two lobes, while the right one has three. The lungs are large, taking up most of the chest or thoracic cavity, and are soft, spongy, expandable, and light. Each one weighs about a pound (454 grams) and contains about 30,000 bronchioles in each lung. Bronchioles are only as thick as a single strand of the finest hair, each ending in a group of bubble-like air sacs called alveoli. There are about 350 million alveoli in each lung.
- **Pleura** – Airtight sacs surrounding each lung.
- **Diaphragm** – Because the lungs are not capable of any movement on their own, they are entirely dependent upon the surrounding musculature called the diaphragm. A large dome-shaped muscle below the lungs, the diaphragm is the **primary muscle** of respiration. When we are breathing properly this muscle is doing most of the work, not the muscles of our neck, shoulders, and chest.

The diaphragm separates the chest cavity from the abdominal cavity, making a kind of floor for the chest cavity. This muscle covers the entire bottom area inside the ribcage from the spine (and the ribs attaching to the spine) wrapping all the way around to the front of the ribcage to the bottom of the sternum (breastbone).

In the front we can feel the movement of the diaphragm. If we place our fingers on the bottom edge of the rib portion directly under the nipple and

angle the fingertips in towards the middle of the body, we will feel the diaphragm as it contracts into the abdominal organs.

The small muscles between each rib also contract, lifting and expanding the bony ribcage. These are the secondary muscles of respiration. When we take a deep breath it is easy to feel this thoracic expansion.

## **Taking a Breath and Letting It Go**

The breathing process occurs automatically. Our breath adjusts to our needs without us having to do anything consciously. At the same time, though, it is a body function over which we can exercise a lot of control--speeding it up or slowing it down instantaneously and at will. There is virtually no other body system, other than the skeletal muscles, about which we can make that same claim.

The respiratory and circulatory systems are a powerful team where two significant body organs--the heart and the lungs--work together. They ensure that the body is served with sufficient amounts of oxygen-rich blood as well as providing the return and removal of carbon dioxide waste products from our system.

### **The Three Stages of the Breath:**

- 1. Inhaling Oxygen (Air) INTO the Body:** The diaphragm expands into the abdominal cavity, where the intestines are located. Other muscles cause the ribs to move up and out, creating room in the chest (thoracic cavity). The lungs expand with the air that has entered through the nose and mouth. **Inhalation (or inspiration) is the active breathing phase.**
- 2. Gas Exchange in the Lungs:** Air enters the lungs through the bronchial tube that branches into bronchioles which branch into alveoli. The alveoli are surrounded by the capillaries of the pulmonary arteries and veins. Oxygen from the inflated lungs moves from the alveoli into the capillaries as carbon dioxide moves from the capillaries into the alveoli.
- 3. Exhaling Carbon Dioxide (Air) OUT of the Body:** The diaphragm muscle relaxes and returns to its dome-like position inside the ribcage. The ribcage muscles also relax. This pressure surrounding the lungs pushes air out of the body. Carbon dioxide is released from the body by traveling through the alveoli to the bronchiole to the bronchi, up the trachea and out through the nose and mouth. **Exhalation (or expiration) is the passive phase of breathing.**

## Care of our Respiratory System

We can consistently make choices and take actions that help keep our respiratory system strong:

1. **CHOOSE to surround yourself with healthy air.**
  - This means not to smoke **and** not hanging out with friends when they are smoking. **Choosing to stay smoke-free** is one of the best all-around health decisions we can EVER make.
  - Stay out of areas that have polluted air.
  - Choose not to sniff inhalants. They are so hazardous to lung health that in extreme cases they can suck all the oxygen out of the lungs, causing the inhalant to suffocate. This is known as **Sudden Sniffing Death**.
2. **Drinking lots of water, getting plenty of rest, and eating wisely and well** are three things that help us keep our immune system healthy and strong. When our immune system is run down, we are more susceptible to getting the colds and illnesses that surround us.
3. **Be active.** Get regular exercise for stronger, more efficient and powerful lungs that can take in more air. More air means more oxygen and a more efficient release of carbon dioxide.

## Respiratory Problems

The common cold, pneumonia, allergies, asthma, and lung cancer are among the most common respiratory problems. The chart at the end of this lesson, ***Understanding Respiratory Problems***, summarizes key information about these respiratory illnesses.

### Vocabulary:

Autonomic nervous system  
Parasympathetic nervous system  
Sympathetic nervous system  
Lung  
Pleura  
Diaphragm  
Pulmonary artery  
Pulmonary vein  
Gas exchange  
Oxygen  
Carbon dioxide  
Tidal volume  
Nasal cavity  
Cilia  
Pharynx  
Epiglottis

Trachea  
Bronchi  
Alveoli  
Diaphragm

## **Lesson 1: The Lungs and Respiratory System**

### **Engage:**

Assess student knowledge by giving the Quiz (**See Figure 1**).

Answers to the quiz:

1. Two lungs.
2. Lungs conduct the oxygen-carbon dioxide exchange.
3. Left lung is slightly smaller than the right.
4. Ask: **“Why is that?”** (*The heart intrudes into the left lung area.*)
5. The left lung has two lobes.
6. The right lung has three lobes.
7. They are soft, spongy, expandable, and light.
8. Each lung weighs about one pound (454 grams).

After the quiz, share additional interesting information:

- There are about 30,000 bronchioles in each lung.
- Each bronchiole is thinner than the finest hair.
- There are more than 600 million alveoli (bubble-like air sacs) in the lungs.

### **Explore:**

1. Ask: **“Where does air go when it comes into our body through our nose or mouth?”**
2. Have students solve this question by working in groups. Give each student or group the body outline picture along with the pictures of the individual parts of the respiratory system. (**See Figure 2**) Have students research the definition and function of each part.
3. Have the students draw the respiratory parts inside the body outline and label the following parts:
  - Nose, nasal cavity and cilia, and mouth inhalation
  - Pharynx
  - Esophagus
  - Trachea
  - Bronchia and bronchioles
  - Alveoli
  - Pulmonary arteries – transmitting oxygen from alveoli into the blood
  - Capillaries around the alveoli
  - Pulmonary veins – taking carbon dioxide out of the blood

- Bronchioles, bronchia
- Trachea and esophagus
- Nose and mouth
- Exhalation

**Explain:**

1. Have students/groups report back their results to the class and evaluate each others' diagrams. Evaluations should be based on at least two criteria: **Accuracy** and **Thoroughness**. Students can determine other evaluation criteria and the rating scale to be applied to the criteria.
2. Ask: ***“What gives lungs their movement?” (Primarily the diaphragm and secondarily other surrounding muscles between the ribs. When we are breathing properly the diaphragm muscle is doing most of the work, rather than the muscles of our neck, shoulders, and chest.)***
3. Ask: ***“What is the diaphragm and where is it located?”***
  - Large dome-shaped muscle below the lungs.
  - Separates the chest cavity from the abdominal cavity.
  - Makes a kind of floor for the chest cavity.
  - Covers the entire bottom area inside the ribcage from the spine and the ribs attaching to the spine wrapping all the way around to the front of the ribcage to the bottom of the sternum (breastbone).

*(Note: In some anatomy diagrams, the diaphragm muscle looks like a mushroom cap when viewed “from” the abdominal cavity as if you were looking up at the bottom of it.)*

4. Explain: ***“We can feel the diaphragm when it is working.”*** Ask students to place their fingers on the bottom edge of the rib portion directly on either side of the sternum (breastbone) and slide the fingers an inch to two inches away from the midline of the body. Next, have them tuck their fingers slightly (and gently) into the body under the rib edge.
5. Now have students close or soft focus their eyes again in order to pay attention to their breathing. Tell them to inhale and exhale normally. They should feel their fingers being pushed out when the diaphragm presses into the abdominal cavity when they inhale. When they exhale the diaphragm presses back into bottom of the lungs to push air out. They will feel their fingers move back in towards the body.
6. Clarify the **three stages of the breathing cycle:**

**STAGE #1: Active Breathing Phase** – As oxygen (air) is inhaled into the body and muscles, the muscles expand to allow air into the body.

Sufficient room is created in the chest as the diaphragm expands the abdominal cavity and other muscles cause the ribs to move up and out. The lungs expand and fill with air that has entered through the nose and mouth.

**STAGE #2: Gas Is Exchanged in the Lungs** - Air enters the lungs through the bronchial tube, then branches into smaller bronchioles which branch into alveoli, bubble-like air sacs which are surrounded by the capillaries of the pulmonary arteries and veins. Oxygen from the inflated lungs moves from the alveoli into the capillaries, and carbon dioxide moves from the capillaries into the alveoli.

**STAGE #3: Passive Breathing Phase** - Carbon dioxide (air) is exhaled out of the body. During this process:

- Muscles relax
- Lung space is compressed
- Diaphragm muscle relaxes and returns to its dome-like position inside the ribcage, pushing up on the bottom of the lungs.
- Ribcage muscles also relax.
- Pressure surrounding the lungs pushes air out of the body.
- Carbon dioxide is released and travels through the alveoli to the bronchioles, then to the bronchi, up through the trachea and out of the body through the nose and mouth.

**Extend:**

Using their drawings from the Explore activity, have students assign numbers to each part to indicate the correct order of the breathing sequence, from inhalation to exhalation through the lungs.

**Evaluate:**

Have students work together in threes, creating their own diagram or three-dimensional model illustrating the lungs (including bronchia, bronchioles, and alveoli) and gas exchange. The model can be an active or passive demonstration.

Possible materials can be sponges, balloons, liter soda or water bottles, straws and tubes of varying diameters, string, clay, etc.

## **Lesson 2: Breathing**

**Engage:**

1. Ask: “**How many breaths do we take in a minute?**” Have students suggest answers, then try to figure out how many breaths they take in one minute. Ask students to concentrate on their breathing, closing or soft focusing the eyes so that attention can be more focused on their breathing.



2. Have students notice when they inhale and when they exhale air through the nose. Give them a minute or two to let them fall into the rhythm of paying attention. Ask the students to breathe as they normally do--they don't need to change anything about *how* they breathe, just notice *when* they inhale and when they exhale.
3. When you feel they are ready, ask the students to count the times they inhale. Tell the students you will time them for 60 seconds. (They should *notice* when they exhale, but only *count* the number of inhales.) Have students record and save their results, then report results to the class.

*(Note: This may be repeated once or twice if it is useful to help students get a more "accurate" count.)*

4. Have students address the following questions based on their results:
  - How many breaths do you take in an hour? A day? A year?
  - Approximately how many breaths have you taken since you were born?

### Explore:

Ask: **"What do we breathe in? Do we breathe in the same air we breathe out?"** To illustrate, perform the following experiment:

1. Put a few drops of red cabbage juice in a cup of water. (The color should be purple.)
2. Blow air into a funnel from a hair dryer or other source into the cup.
3. Since the same air we breathe in is going in, the color should remain purple.)
4. Now blow into the water with a straw. (The color will turn red)
5. Finally, **exercise** briefly and blow into the water with a straw (the color is red quicker)

### Explain:

1. Ask: **"When we inhale, how much of our breath is oxygen and how much is carbon dioxide? When we exhale?"**

	Oxygen	Carbon Dioxide
Inhaled Air	21%	.04 %
Exhaled Air	16%	3.5%

2. Have students find the solutions to these questions using math:
  - How much of the  $\frac{1}{2}$  liter or **inhaled** air is oxygen? Carbon dioxide?
  - How much of the  $\frac{1}{2}$  liter of **exhaled** air is oxygen? Carbon dioxide?

- Compare the oxygen decrease to the carbon dioxide increase. (A pie or bar chart can be used to illustrate.)
  - How many liters of air do you breathe in daily? (Each student can calculate this amount based on the Engage activity that determined the number of their breaths per minute/per day.)
3. **SOLUTION:** Around a pint (1/2 liter) of air is inhaled or exhaled with each breath. This is called **tidal volume**.
4. Ask: “**How does breathing connect to other body systems? What body systems does the respiratory process connect to and how?**”

**Extend:**

1. Ask: “**What is tidal volume?**” (The amount of air moved into or out of the lungs during relaxed, normal breathing.)
2. Conduct a **Tidal Volume Experiment**. Items needed:
  - Water
  - Clean milk jug with cap
  - Marker
  - large clear tub
  - plastic tubing
  - beaker.
3. Directions:
  - 1) Fill beaker with 100 ml of water. Pour the water into the milk jug and mark the water line. Repeat until jug is full. Replace the cap on the jug.
  - 2) Fill the tub **half** full of water.
  - 3) Holding the top of the jug carefully, flip it upside down into the tub. This means the top of the jug will be on the bottom of the tub.
  - 4) **CAREFULLY** remove the cap from the jug. The jug should still be full of water.
  - 5) Have one person hold the jug while another person puts the plastic tube into the top of the jug.
  - 6) Have one person take a deep breath and breathe into the tube. (However much water leaves the jug is the amount of air that person’s lungs can hold.)
  - 7) Compare a deep breath to a normal breath. Have one person exercise vigorously for two minutes, then breathe into the tube. Compare the different breaths.

**Evaluate:** Check for understanding by asking students to:

1. Explain Tidal Volume.
2. Explain the influence of exercise on tidal volume.

3. Explain how **inhaled** air is different from **exhaled** air. Be specific. Explain why this is important.

### **Lesson 3: The Respiratory System and Respiratory Problems**

#### **Engage:**

1. Ask: “**How does breathing connect to other body systems? What body systems does the respiratory process connect to and how?**”
2. Have students, working in small groups, quickly brainstorm answers. Allow students no more than five minutes to come up with answers once the groups are formed.
3. Answers:
  - **Circulatory System:** The respiratory system is connected to the heart and circulatory system through the cardio-pulmonary circulatory process. Gas exchange occurs to keep oxygen and carbon dioxide in balance. Oxygen is carried in the blood and travels throughout the body, while carbon dioxide in the blood is returned to the lungs for removal from the body.
  - **Nervous System:** Involved with the breath and affected by the breath as well, the autonomic nervous system engages the sympathetic and parasympathetic divisions to activate and calm breathing rhythms in the stress response.
  - **Digestive System:** The respiratory activity of transporting oxygen throughout the body connects to the digestive system, providing energy for digestion.
  - **Muscular System:** Oxygen in the blood goes to the muscular system, providing energy to burn food nutrients needed for muscle movement.

#### **Explore:**

1. Arrange students into groups and have them conduct research into the following respiratory disorders:
  - Colds
  - Pneumonia
  - Allergies
  - Asthma
  - Lung cancer
2. Details they'll need to include in their reports are:
  - Description of the condition
  - Cause and risk factors
  - Communicable considerations
  - How to protect against getting it

**Explain:**

Have each group present their research about their topic. Distribute the chart, “Understanding Respiratory Problems” (**See Figure 3**) to the students. Have them read the chart, making notes of questions for class discussion and clarification.

**Extend:**

Have students interview someone they know who has a respiratory condition, asking:

- What it is the condition like?
- When did you get it?
- Is it preventable?
- Can anything be done to alleviate the symptoms?
- How do you deal with it?
- Does it prevent you from doing things that other people do?

**Evaluate:**

Evaluate students based on their research about their respiratory problems, using the following questions:

- Did they answer all the required questions thoroughly?
- How well did they present the information?

Ask students to review the chart and provide the following information:

1. What are **three** things you can do to protect yourself against exposure to or minimize your risk of getting these respiratory problems?
2. Create a new chart comparing and contrasting the risk factors for these respiratory problems. What conclusions can you draw about the risk factors for respiratory problems?

**Optional Enrichment Activity:**

Have students work in groups to research the following respiratory system topics, assigning the students to groups and having them organize and dividing up the tasks for their research and report:

1. Compare and contrast the human respiratory system with the respiratory systems of another organism (choose one):
  - Birds
  - Reptiles
  - Insects
  - Fish
2. Why do we consider life possible only on planets where there is oxygen?
3. What are those planets and what is their atmospheric make-up?

4. The rainforests are sometimes called the Earth's lungs. Is this an accurate description? Why? What role do they play in planetary respiration?
5. What role does global warming play with the planet's oxygen/carbon dioxide gas exchange? How is this similar to or different from conditions in the body and conditions that affect the respiratory system?

Have groups present their reports by creating a poster board that includes their topic, a visual representation of the topic, and their conclusion.

#### **Additional Web Resources:**

- Saskatchewan Lung Association - <http://www.sk.lung.ca/content.cfm>
- Lung Association - <http://www.lungusa.org/site/>  
Search: Your Lungs
- KidsHealth - [www.kidshealth.org](http://www.kidshealth.org)  
Search: Lungs and Respiratory System, Asthma and titles of other respiratory conditions
- The Science Connection - <http://vilenski.org/science/humanbody>  
Search: Respiratory System

#### **Missouri Standards:**

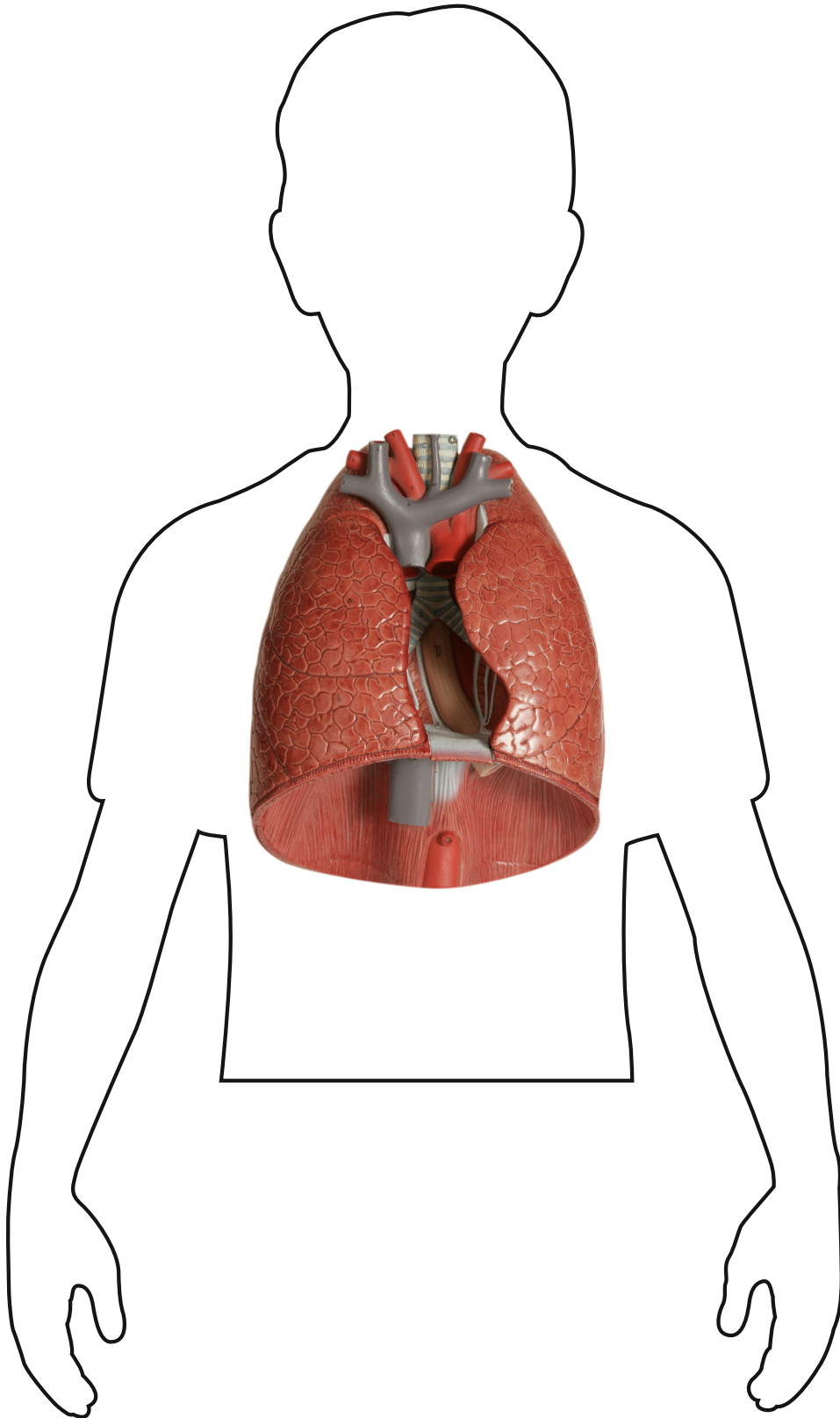
##### Health and Physical Education Frameworks

- I. Functions and Interrelationships of Systems
  - A. Body Systems (Grades 5-8)  
What All Students Should Know:
    1. Human body systems do not exist in isolation. Their optimal functioning depends upon their interdependence. When system failure occurs in one, it ultimately causes problems for other body systems.  
What All Students Should Be Able To Do:
    - a. Apply knowledge of system interrelationships to predict health problems that could occur as a result of dysfunction.
- I. Functions and Interrelationships of Systems (Grades K-4)
  - A. Body System  
What All Students Should Know:
    7. The Respiratory System, which includes the air passageways and lungs, takes in oxygen from the air, delivers it to the blood through capillaries, and removes carbon dioxide from the blood.

**Figure 1** (Picture of upper body and lungs)

- 1. How many lungs do you have?**
- 2. What do lungs do?**
- 3. Are both lungs the same size?**
- 4. If not, which is bigger and why?**
- 5. How many lobes does the left lung have?**
- 6. How many lobes does the right lung have?**
- 7. Describe how the lungs “feel.”**
- 8. How much does one lung weigh?**

**Figure 1**



## Figure 2

Have students solve this question by working individually or in groups. Give each student or group the body outline picture along with the pictures of the individual parts of the respiratory system.



**Figure 2**

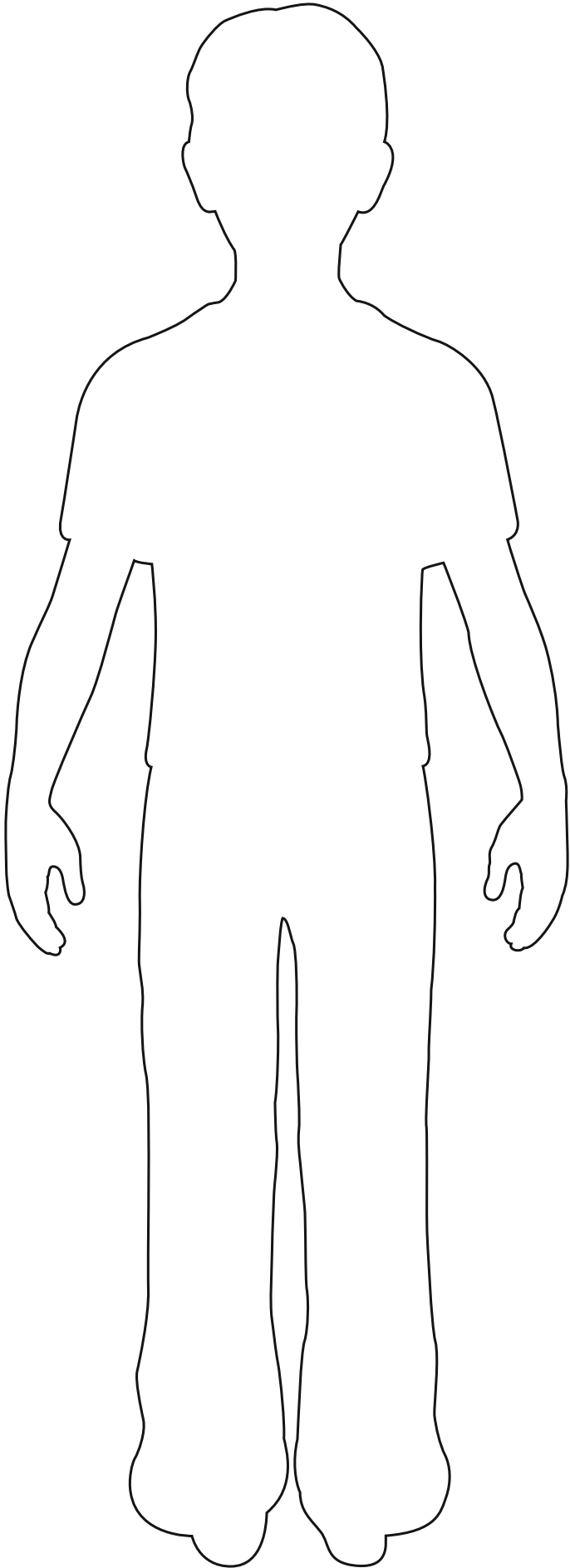


Figure 3

## Understanding Respiratory Problems

	Description	Causes & Risk Factors (Hereditary, Behavioral, Environmental, Other)	Communicable ?	How to Protect Against Acquiring
<b>Colds</b>	Sneezing, runny nose, cough, fever, sore throat, headache. Most common respiratory problem.	Environmental – Being around people with colds Behavioral – Hygiene, health practices Other –Viral infection of the mucous membranes of the upper respiratory tract. There are more than 200 cold causing viruses. Compromised immune system Contact with contaminated surface (including hands) that has infected viral particles on it.	Very	Keep immune system strong, Choose to remain smoke-free for strong lungs. Practice good hygiene, especially hand washing, Don't share germs.
<b>Pneumonia</b>	Inflammation of the lungs in which lung spaces filled with fluid. Fever, chest pain, breathing difficulty	Environmental – Exposure to toxic gases Behavioral- Smoking. Compromise of the immune system re: poor nutrition, rest, exercise, and stress management. Other- Bacterial or viral infection. Chronic, debilitating illness.	No	Keep immune system strong, Choose to remain smoke-free for strong lungs. Protect lungs from toxic exposure.
<b>Allergies</b>	Watery discharge from eyes and nose, sneezing, breathing difficulty Extreme sensitivity to substances	Hereditary – Allergic tendencies can be genetic. Environmental –Pollen, dust, mites, food, animal dander, insect bites or stings. May seasonal. Behavioral- Smoking. Compromised immune system can increase susceptibility to an allergic reaction.	No	Keep immune system strong, Choose to remain smoke-free for strong lungs. Avoid substances that trigger allergic reaction.
<b>Asthma</b>	Inflammation of the air passages, and spasm of involuntary bronchial tubes. Airflow restricted from tube constriction.	Hereditary – Susceptibility to asthma may be genetic. Environmental – Pollen, animal dander, foods, mold, dust mites, and irritants such as second-hand cigarette smoke, pollution, and fumes. Weather changes and cold air, and strenuous physical activity. Behavioral – Smoking, stress and	No	Keep immune system strong, Choose to remain smoke-free for strong lungs. Avoid substances that trigger asthmatic attack.

	Shortness of breath, wheezing, chest tightness	strong emotional upset can contribute to asthma. Other- Respiratory system infections such as colds, flu		Develop good stress management strategies.
	<b>Description</b>	<b>Causes &amp; Risk Factors (Hereditary, Behavioral, Environmental, Other)</b>	<b>Communicable ?</b>	<b>How to protect against getting this</b>
<b>Lung Cancer</b>	Uncontrolled, abnormal cell growth in the lung. Lung cancer is the most common cause of cancer-related deaths for both men and women.	Environmental – Exposure to second-hand smoke Behavioral – Cigarette smoking	No	Choose to remain smoke-free for strong lungs. Reduce/eliminate exposure to second hand-smoke

**Behavioral:** Illnesses/diseases that are created or exacerbated by behavior or lifestyle choices, such as diet, activity level, substance use (tobacco, alcohol, drugs), stress management choices.

**Environmental:** Illnesses/diseases that are created or exacerbated by exposure to specific substances in the environment or environmental hazards such as air pollution, toxic wastes, secondhand smoke.