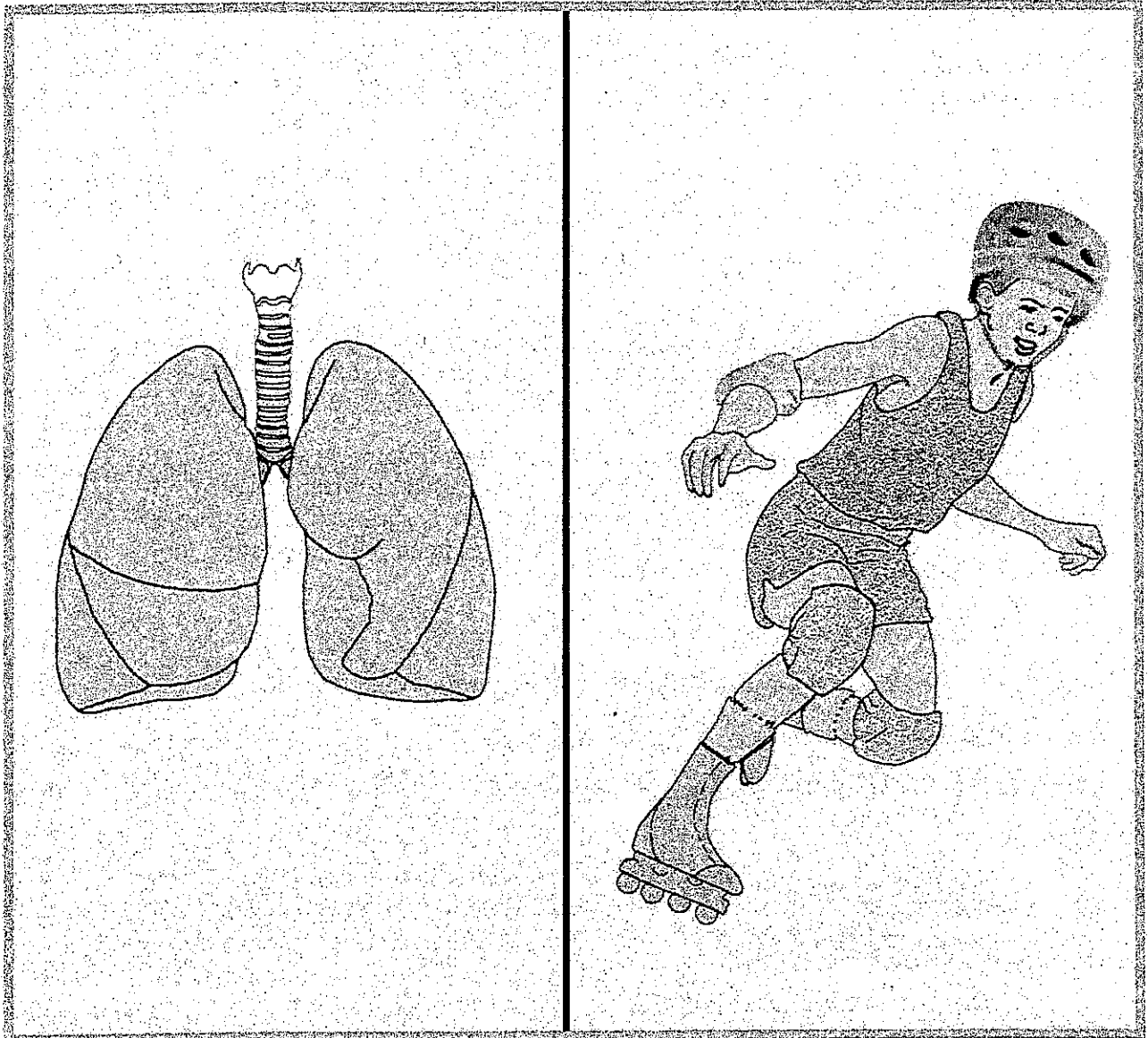


What is breathing and respiration?



KEY TERM

respiration: process of carrying oxygen to cells, getting rid of carbon dioxide, and releasing energy

LESSON

15

What is breathing and respiration?

You need energy to live. So do birds, trees, and bacteria. All living things need energy to carry out the life processes. And, there can be no life without the life processes.

How do plants and animals get energy? The same way your car gets its energy, by burning a fuel. Cars use gasoline as a fuel. Energy is released when oxygen from the air combines with the gasoline in the engine.

Animals get energy by linking the oxygen they breathe in with the food that they eat. This important life process is called **respiration** [res-puh-RAY-shun]. Respiration is the energy-producing process in living things. It is the release of energy by combining oxygen with digested food (glucose).

Here is what happens:

Digested Food + Oxygen → Energy and Waste Products

Respiration can also be shown in this way:

Glucose + Oxygen → Energy + Water + Carbon Dioxide
(fuel) (waste) (waste)

In humans and many other animals, breathing is done by means of the lungs. Breathing in is taking air into the lungs. Breathing out is forcing the air out of your lungs.

ABOUT BREATHING AND RESPIRATION

Breathing and respiration are related—but they are not the same. Breathing is necessary for respiration to take place. Breathing is the mechanical process of taking oxygen into the body and sending carbon dioxide out of the body.

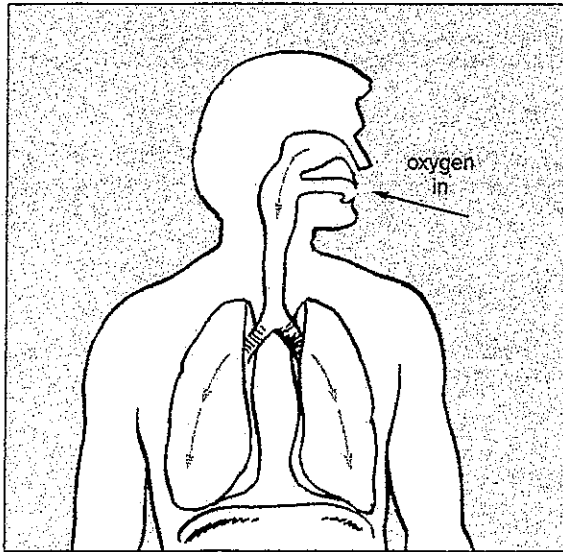


Figure A

Breathing in (inhaling) sends oxygen into the lungs.

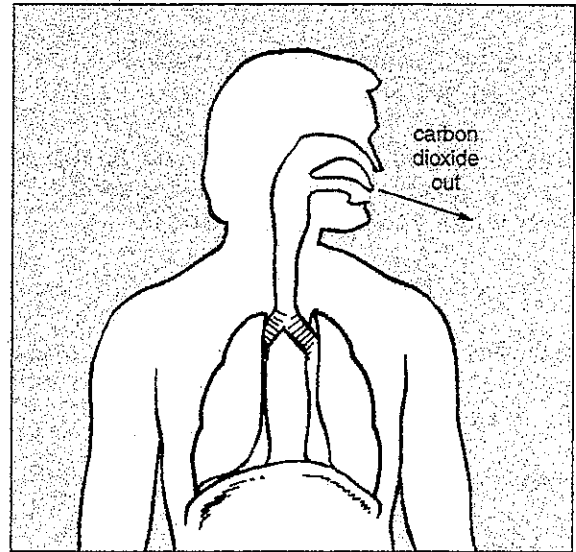


Figure B

Breathing out (exhaling) sends carbon dioxide waste out of the lungs.

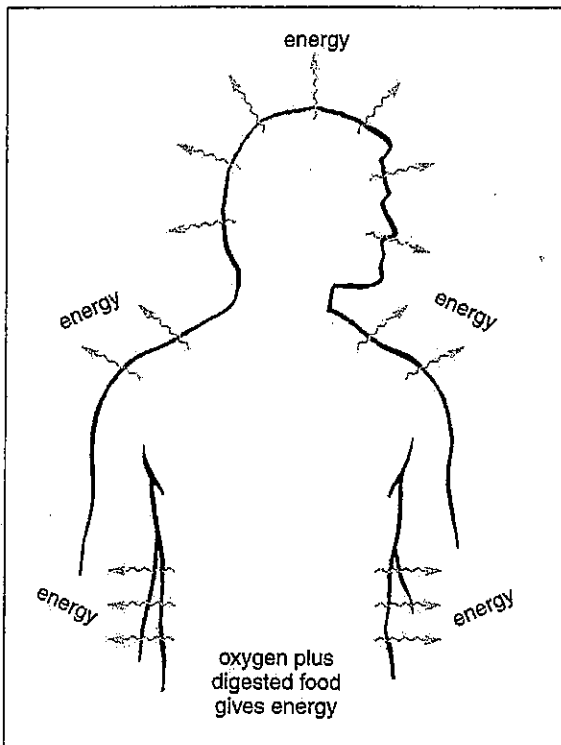


Figure C

Respiration takes place in every cell of the body. Respiration uses the oxygen that inhaling brings into the body.

Try to answer these questions about respiration.

1. What brings the oxygen to all parts of the body? _____
2. What does respiration make that living things need? _____
3. What waste materials does respiration give off? _____

Breathing and respiration are related. But they are not the same.

Respiration is a chemical process. It happens in every cell. In respiration, digested food links up with oxygen. This link-up produces the energy the cells need.

Breathing is a mechanical [muh-KAN-ih-cul] action. Breathing is the movement of gases into and out of the lungs.

Breathing is involuntary. You do it automatically without thinking. You breathe all the time. You breathe when you are awake. You breathe when you are asleep. You breathe even when you are unconscious!

How does breathing take place?

Many people believe that air in the lungs makes their chest move in and out when they breathe. This is not true. In fact, the opposite is true. It is your chest size that makes air move in and out of your lungs.

Your chest size changes when you breathe. It changes because of the actions of:

- your rib muscles, and
- your diaphragm [DY-uh-fram] muscle.

Figures D and E show what happens when you breathe. Study the diagrams carefully. Then answer the questions.

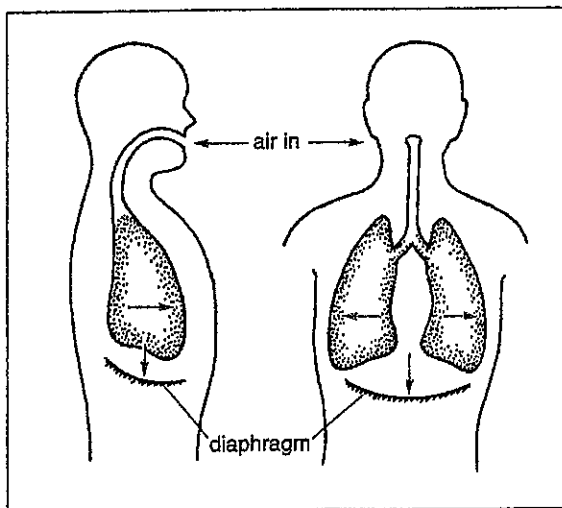


Figure D *Inhaling*

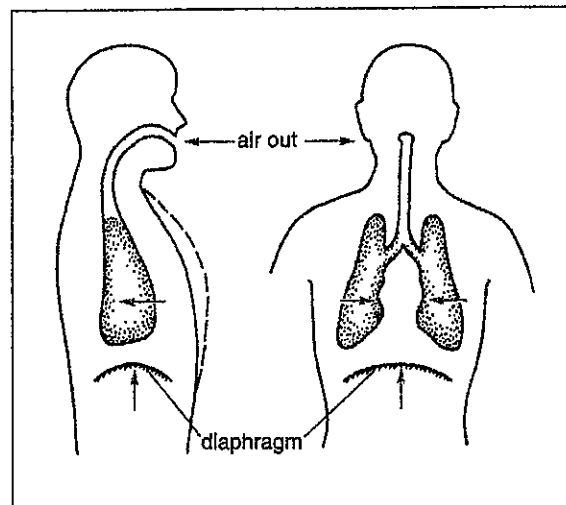


Figure E *Exhaling*

1. When you inhale (see Figure D),
 - a) the ribs move _____ .
inward, outward
 - b) the diaphragm moves _____ .
upward, downward
 - c) there is now _____ space in the chest area.
more, less
 - d) air rushes _____ to fill this space.
in, out

2. When you exhale (Figure E),
 - a) the ribs move _____ .
inward, outward
 - b) the diaphragm moves _____ .
upward, downward
 - c) there is now _____ space in the chest area.
more, less
 - d) because of this pressure, air moves _____ the lungs.
in, out of

MORE ABOUT BREATHING

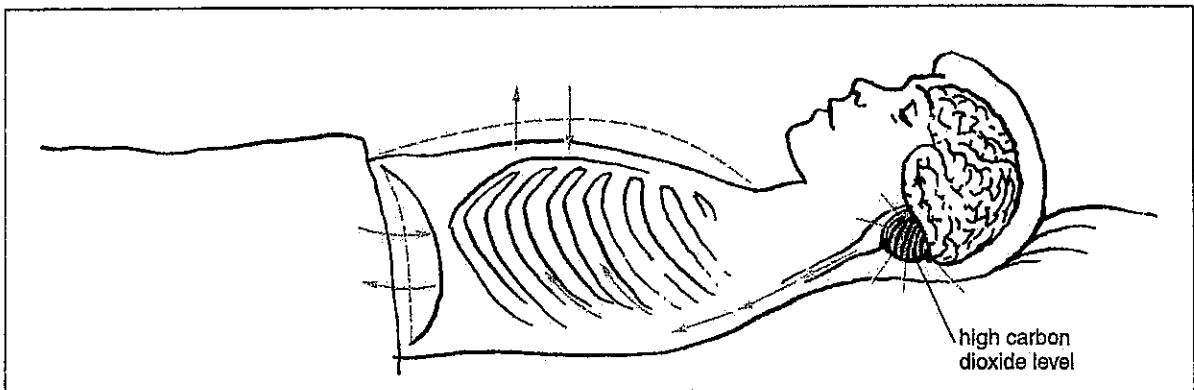


Figure F

Why do you breathe?

Breathing is automatic. When the level of carbon dioxide in your blood increases, a message goes to your brain. Then, your brain sends a message to your diaphragm and rib muscles to move. You take a breath without thinking!

INHALING OR EXHALING?

Each of the following goes either with inhaling or exhaling. Place a check (✓) in the box where you think it belongs.

		INHALING	EXHALING
1.	air moves out of the lungs		
2.	air moves into the lungs		
3.	ribs move out		
4.	ribs move in		
5.	chest space becomes smaller		
6.	chest space becomes larger		
7.	diaphragm moves down		
8.	diaphragm moves up		

WORD SCRAMBLE

Below are several scrambled words you have used in this Lesson. Unscramble the words and write your answers in the spaces provided.

1. ALEHEX

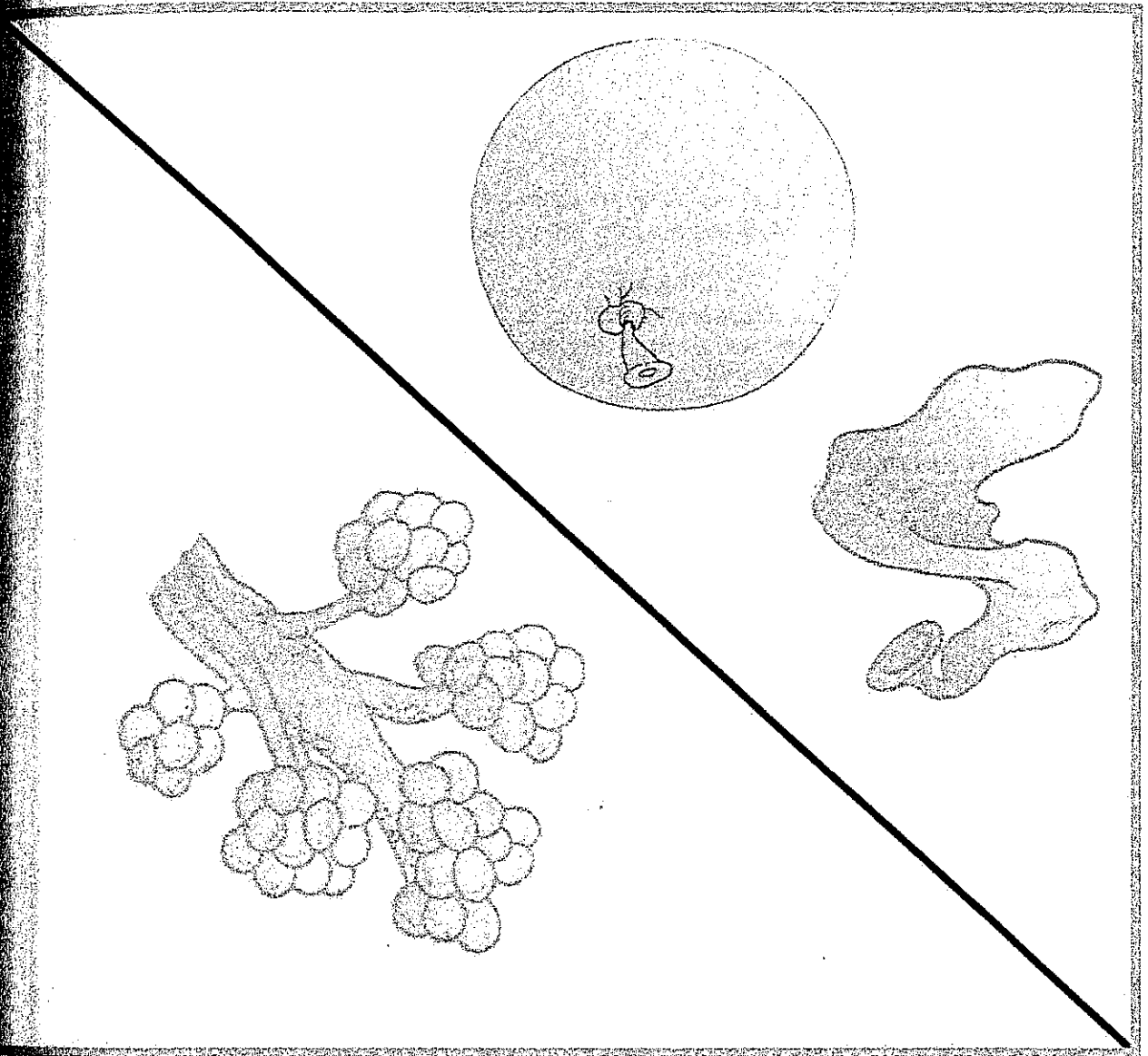
2. MUSELC

3. HINALE

4. GMPRHAID

5. SBRI

What is the respiratory system?



KEY TERMS

trachea: windpipe

bronchi: tubes leading to the lungs

alveoli: microscopic air sacs in the lungs

LESSON

16

What is the respiratory system?

Almost every living thing must take in oxygen in order to live. Breathing is the process of bringing air into the organism. Breathing also gets rid of used air.

As you have just learned, breathing is done by means of lungs. The lungs, along with several other organs make up the **respiratory** [RES-pur-uh-towr-ee] system. The job of the respiratory system is to take oxygen into the lungs and to get rid of carbon dioxide and water.

Let us trace the path that air takes when you inhale and exhale.

1. Air enters the body through the mouth or nose.
2. The air moves into your throat and then passes through the windpipe, or **trachea** [TRAY-kee-uh].
3. The trachea branches into two tubes called **bronchi** [BRAHN-kee]. Each bronchus extends into one of the lungs.
4. The lungs are the main organs of the respiratory system. In the lungs, the bronchi branch into smaller and smaller tubes. At the end of the smallest tubes are tiny air sacs. Each lung contains millions of air sacs. Each air sac is surrounded by capillaries.

While the air is in the air sacs, two important things happen:

- The blood picks up oxygen from the air sacs.
- At the same time, the air sacs pick up carbon dioxide waste from the blood.

When you exhale, you breathe out the carbon dioxide. Some waste water and heat also are exhaled.

ABOUT THE RESPIRATORY TRACT

The path that air follows when we breathe is called the respiratory tract. It is shown in Figure A. Study it. Then answer these questions or complete the sentences.

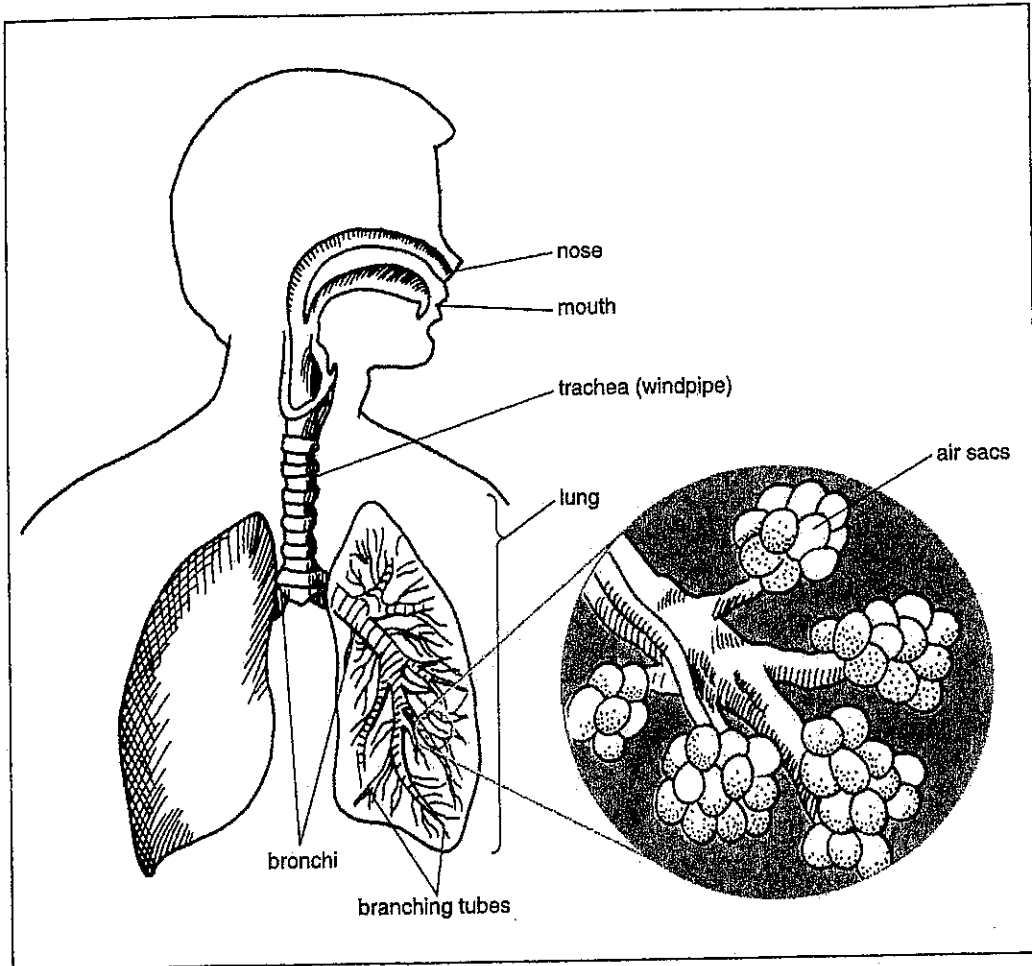


Figure A Notice the enlarged segment of the lung. Each small branch ends at an air sac.

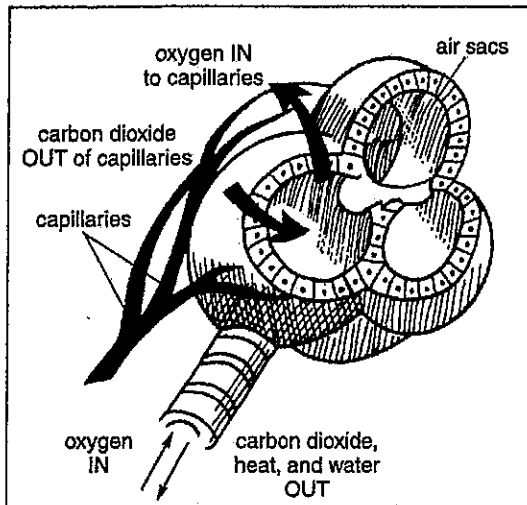
1. The respiratory tract starts with the _____ and the _____.
2. The respiratory tract ends with millions of tiny _____.
3. How many lungs does a person have? _____
4. The parts of the respiratory tract are listed below. But they are not in order. Rewrite them in the order in which air goes through the body.

bronchi mouth and nose air sacs trachea branching tubes

_____, _____, _____, _____,

5. Each bronchus extends into a _____.

WHAT HAPPENS IN THE LUNGS?



The lungs have millions of air sacs. Air sacs are also called alveoli [al-VEE-uh-ly]. Alveoli are very tiny. You need a microscope to see them.

Figure B

- Air that enters the air sacs is rich in _____ .
oxygen, carbon dioxide
- Air that leaves the air sacs is rich in the gas _____ .
oxygen, carbon dioxide
- Air sacs are surrounded by _____ .
- The capillaries around the air sacs take in _____ and give off _____ .
oxygen, carbon dioxide
- List the three waste materials the lungs excrete.
_____ , _____ , _____

MATCHING

Match each term in Column A with its description in Column B. Write the correct letter in the space provided.

Column A	Column B
_____ 1. exhaling	a) where gases are exchanged
_____ 2. inhaling	b) windpipe
_____ 3. air sacs	c) breathing in
_____ 4. trachea	d) surround the air sacs
_____ 5. capillaries	e) breathing out

FILL IN THE BLANK

Complete each statement using a term or terms from the list below. Write your answers in the spaces provided. Some words may be used more than once.

alveoli
inhaling
mouth

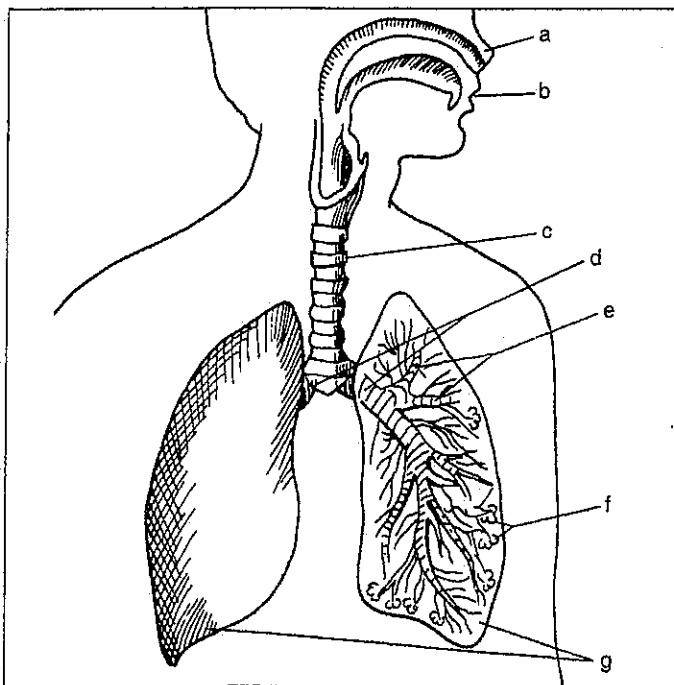
windpipe
bronchi
exhale

nose
capillaries
smaller and smaller

1. Breathing in is called _____.
2. We inhale through the _____ or _____.
3. The trachea is the scientific name for the _____.
4. The trachea divides into two tubes called _____.
5. In the lungs, the tubes branch into _____ tubes.
6. The lungs have millions of tiny air sacs called _____.
7. Air sacs have many _____.
8. We get rid of carbon dioxide waste when we _____.

LABEL THE DIAGRAM

Identify the parts of the respiratory system. Write the correct letter on the lines provided.



1. bronchi _____
2. nose _____
3. branching tubes _____
4. mouth _____
5. air sacs _____
6. trachea _____
7. lung _____

Figure C

