

Respiratory System:

Breathe in and out...



What is the RESPIRATORY SYSTEM?



- > The system of the body that deals with **BREATHING**.
- > It consists of the **NOSE, PHARYNX, TRACHEA, BRONCHIAL TUBES,** and **LUNGS**.

What is the FUNCTION of the Respiratory System?



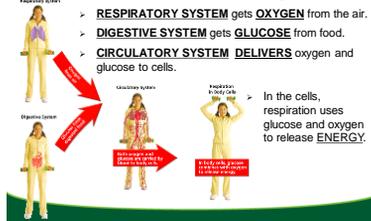
- > To **DELIVER OXYGEN** to the body.
- > To **REMOVE CARBON DIOXIDE** from the body.

Why does the body need oxygen?

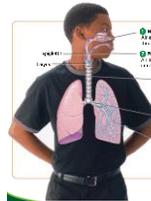
- > The body's **CELLS** use **OXYGEN** to release **ENERGY** to the body.
- > **CELLULAR RESPIRATION** is the **CHEMICAL REACTION** that uses **GLUCOSE & OXYGEN** to release **ENERGY**.
- > **CARBON DIOXIDE** is a **WASTE PRODUCT** of this chemical reaction.



Which systems work together?



What path does AIR follow?



- > **NOSE**
- > **PHARYNX**
- > **TRACHEA**
- > **BRONCHIAL TUBES**
- > **LUNGS (alveoli)**

What happens in each part?

NOSE – in the nasal cavity,

the air is:

- **Warmed**,
- **FILTERED**, and
- **moistened**.

(Mucus and nasal hairs keep out dust, pollen and other particles).

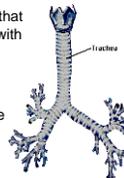
- > **PHARYNX** – air passes through the **THROAT** when breathing. The **EPIGLOTTIS** covers the trachea when you **SWALLOW** to prevent **FOOD** from entering the trachea when you eat/drink.



What happens in each part?

- > **TRACHEA** – is the **WINDPIPE** that leads to the lungs. It is a **TUBE** with **RINGS OF CARTILAGE**.

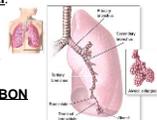
- > **BRONCHIAL TUBES** – are the short tubes that branch off the trachea **TO CARRY AIR TO** the **LUNGS**.



What happens in each part?

- > **LUNGS** – inside the lungs, the bronchi branch into **SMALLER TUBES**. At the end of the smallest tubes, are structures called **ALVEOLI**.

- > **ALVEOLI** – are **AIR SACS**, surrounded by **CAPILLARIES**. This where **BLOOD** picks up **OXYGEN** and gets rid of **CARBON DIOXIDE**.



The Respiratory System - Breathe in and out...

What happens in the ALVEOLI?

> **GAS EXCHANGE** - Blood from the body enters the lungs. In the alveoli, the blood **GETS RID OF CARBON DIOXIDE** and **PICKS UP OXYGEN** before returning to the heart to take oxygen to rest of the body.

Gas Exchange

The Respiratory System

How do we BREATHE?

The Respiratory System

How do we BREATHE?

> When you **BREATHE**, the actions of your **RIB MUSCLES** and **DIAPHRAGM**, expand or contract your **chest**, changing the **VOLUME** of your **lungs**. As a result, **AIR** rushes **in** or **out**.

The Respiratory System - Breathe in and out...

How do we BREATHE?

> **INHALATION** - the **DIAPHRAGM** (a large dome-shaped muscle at the base of the lungs) contracts and moves **DOWN**. The **RIB CAGE** moves **UP & OUT**.

> The volume of the lungs **INCREASES**, and air **FLOWS IN**.

The Respiratory System - Breathe in and out...

How do we BREATHE?

> **EXHALATION** - the **DIAPHRAGM** relaxes and moves **UP**. The **RIB CAGE** relaxes and returns to its **ORIGINAL POSITION**.

> The volume of the lungs **DECREASES**, and air is **PUSHED OUT**.

The Respiratory System

How are BREATHING & SPEAKING related?

> Air that you **BREATHE OUT** when you exhale also helps you **SPEAK**.

> Your **LARYNX** is your **VOICE BOX** which has 2 **VOCAL CHORDS** that move and produce sound when air passes through the opening between them.

ORGANS IN THE RESPIRATORY SYSTEM

STRUCTURE	FUNCTION
nose / nasal cavity	warms, moistens, & filters air as it is inhaled
pharynx (throat)	passageway for air, leads to trachea
larynx	the voice box, where vocal chords are located
trachea (windpipe)	keeps the windpipe "open" trachea is lined with fine hairs called cilia which filter air before it reaches the lungs
bronchi	two branches at the end of the trachea, each lead to a lung
bronchioles	a network of smaller branches leading from the bronchi into the lung tissue & ultimately to air sacs
alveoli	the functional respiratory units in the lung where gases are exchanged

The Breathing Process

The Breathing Process

The Breathing Process

How do we BREATHE?

The Breathing Process

How do we BREATHE?

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The Breathing Process

How do we BREATHE?

EXHALATION - the **DIAPHRAGM** relaxes and moves **UP**.

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The Breathing Process

Let's make a model of our LUNGS

- Cut the bottom of your bottle. Trim off any rough edges.
- Insert 1 balloon in the mouth of the bottle and stretch the neck over the opening.
- Cut off the mouth of the other balloon and stretch it over the bottom of the bottle.
- <https://www.youtube.com/watch?v=CBvZBaqAydE>

The Breathing Process

Let's make a model of our LUNGS

- Label the diagram of the model. Which parts represent your lungs, chest cavity, diaphragm, and trachea?
- Answer the "Analyze & Conclude" questions on your lab sheet.

The Breathing Process

What's in the AIR we BREATHE?

Gas	Inhaled Air (%)	Exhaled Air (%)
Nitrogen	78%	78%
Oxygen	21%	16%
Carbon dioxide	0.03%	4%
Other gases	0.97%	2%

The Breathing Process

What's in the AIR we BREATHE?

1. What does each wedge in the graphs represent?
2. Based on the data, which gas is USED BY THE BODY? Explain.
3. Compare the % of carbon dioxide in the inhaled air with the % in exhaled air. How can you account for the difference?
4. Explain why the % of nitrogen is the same in both inhaled air and exhaled air?

PATHWAY OF OXYGEN

- Body breathes in the air which is pulled through the nose or mouth and down through the trachea.
- The trachea is a pipe shaped by rings of cartilage.
- It divides into two tubes called bronchi.
- Bronchi carry air into each lung.

PATHWAY OF OXYGEN

- Inside the lung, the tubes divide into smaller and smaller tubes called bronchioles.
- At the end of each of these tubes are small air sacs called alveoli.
- Capillaries, which are small blood vessels with thin walls, are wrapped around these alveoli.
- Capillary walls are so thin and close to each other that the air easily diffuses through.

DISCUSSION QUESTIONS

- What types of things can affect breathing or damage lungs?
Smoking, second hand smoking, asthma, pollutants, chemicals, inhalants, allergens
- Think back to our atmosphere unit – Does altitude or elevation affect your breathing?
Yes, the higher you go up, the hard it is to breath because of reduced air pressure
- Respiration at High Elevations video clip – United Streaming: 7 min.48 sec.

DISCUSSION QUESTIONS

- What two gases are exchanged during breathing?
Oxygen and carbon dioxide
- What are the two functions of the respiratory system?
Provides oxygen to the body and eliminates carbon dioxide and excess water.
- Through what structures does air pass to get to the lungs?
Nose – Pharynx – Trachea – Bronchi

Smoking and Your Health

Smoking and your Health



Smoking and Your Health



Lung of a nonsmoker

Lung with emphysema

Lung with cancer

Smoking and Your Health

Using your textbook, the videos, and the hand-out as resources, work in groups to answer the following questions:

- 1) **DANGERS OF SMOKING:** What makes smoking dangerous? (Be specific!)
- 2) **ILLNESSES:** What happens to your body with smoking-related illnesses? Give examples.
- 3) **QUITTING:** What happens to your body after you quit smoking? Why is it difficult to quit? What's being done to help people quit or discourage people from starting to smoke?

RESPIRATORY SYSTEM DISORDERS

- **Bronchitis** - an inflammation of the bronchi caused by irritants, such as cigarette smoke, air pollution, or infections
- **Cystic fibrosis** - a genetic disorder that causes a thick buildup of mucus in the lungs and digestive system
- **Asthma** - a disorder in which there are periodic episodes of contractions of bronchial smooth muscle, which restricts air movement. Many cases of asthma result from allergic reactions
- **Lung cancer** - Lung cancer is the most common cause of cancer death in males and females in the United States, and almost all cases occur in smokers.