The Respiratory System

Respiration is breathing in and out.

Inhaling is taking fresh air into the lungs.

Exhaling is pushing stale air out of the lungs.

The Respiratory System consists of the **nose**, **pharynx** (throat), **trachea** (windpipe), **bronchi** (air tubes), **bronchioles** (smaller air tubes in the lungs), **alveoli** (tiny air sacs in the lungs), and the **lungs**.

Breathing In

When you breathe in you take in gases, the most important gas being **oxygen**. As air passes through your **nose**, blood vessels in your nose warm the air. Also, **mucus** and hairs, called **cilia**, clean the air that you breathe by trapping dust, smoke and other things (However, they cannot catch everything in the air). The **mucus** also helps to moisten the air so it travels easier on its journey to our lungs. After the air has been warmed, cleaned and moistened, it then moves down your **pharynx** (throat). From your **pharynx** the air enters a long tube called the **trachea** (wind pipe). Your trachea also contains mucus to help filter out things that your nose missed.

- Occasionally large particles from the air do enter the air passages, but are normally shot out by a cough or a sneeze.

- When we swallow, food and fluids are prevented from entering the windpipe by a small flap called the **epiglottis**.

Your trachea branches into two tubes called **bronchi** , one going to each lung. The **bronchi** then branch into a network of tiny **bronchioles** (thin as hairs), which eventually lead to millions of microscopic air sacs called **alveoli**. The **alveoli** have thin walls so oxygen can easily pass from the lungs into the blood. The **alveoli** are surrounded by **capillaries** which allow oxygen to easily pass into the bloodstream and carbon dioxide to be passed into the lungs.

Breathing Out

When your cells use oxygen they give off waste called **carbon dioxide**. **Carbon dioxide** is carried in you blood to the capillaries in your lungs. The carbon dioxide then passes into the **alveoli**, mixes with air and is **exhaled** out of your body.

- Only a tiny part of the air we breath is used by the body (only about 20% of air is oxygen), and only about 20% of this actually makes it into your blood. The remaining oxygen, along with other gasses and carbon dioxide, is breathed out.

How do we breathe?

Your **diaphragm** is a sheet of muscle located below your lungs, stretching across the bottom of you chest. When the diaphragm and rib muscles contract (tighten), the diaphragm moves away from the lungs, the space in the chest is enlarged, and air rushes into the lungs. When the diaphragm relaxes, it moves towards the lungs, the lungs are compressed, and the air is forced out of your lungs.

- The average person inhales and exhales 15 times a minute, approximately 20,000 times a day.

How do we talk?

At the top of your **trachea** is an area called the **larynx** (voice box). Two bands of elastic cartilage are stretched across the **larynx** with a small slit between them. These bands are the vocal cords and they can be stretched by muscles. Air from the lungs passes through the slit and makes the stretched cords vibrate, which produces sound. The cords can be stretched more or less tightly to make the sounds higher or lower pitch. To turn the sounds into speech we use our jaw, lips, tongue, palate, and teeth.

Bill Nye The Science Guy - Respiration

Name: _____

Breathing is part of respiration. That's how we get oxygen from the air so we can run or bike or any other movement.

Oxygen is important because we combine it with chemicals in the food that we eat for the energy we need to move.

You breathe all day and all night your whole life.

When you breathe you take air inside your lungs. Your lungs are inside your chest and your chest is air tight.

In your upper body there is a very strong muscle called the diaphragm.

When you breathe your diaphragm goes down and your lungs fill up.

When we breathe our bodies get oxygen from the air. Oxygen is the same chemical that makes candles burn and iron rust.

Our bodies combine the oxygen with our food to get the energy that we need to live.

Your lungs are full of tiny passageways like are found in a sponge. The small passageways allow you to take in a lot of oxygen with every breath - like a sponge soaking up water.

When you are asleep you breathe about 20 litres of air every 4 minute(s).

When you are walking around you breath the same amount of air every 1 minute(s).

Bill Nye The Science Guy - Respiration

Your lungs have as much surface area as a __tennis court__.
(surface area is how spread out something is)

Surface area is what allows sponges to soak up water. Sponges are full of tiny passages that have a lot of area. Surface area is where the water sticks.

Your lungs are full of tiny passages too.
They are little sacs called __alveoli__.

Every time you breathe, you breathe in air and your lungs are like little sponges soaking up the air.

You have __2__ lungs, but they are not exactly the same.

Your __right__ lung is __bigger__ than your __left__ lung.

Your __right__ lung is divided into __3__ parts, while your __left__ lung is divided into __2__ parts.

Why the difference? Because you have a __heart__!

Your __left__ lung is smaller so your __heart__ can fit in your chest.

Your __muscles__ can't do any work without your lungs.

Interesting Information

The accumulation of carbon dioxide (waste product of respiration and circulation) in your legs actually burns, feeling like an acid in your legs. That's why you feel pain when you are trying to work out at a level higher than what your lungs can supply.

Bill Nye The Science Guy - Respiration

We get the oxygen we need from the air we breathe and this is called respiration.

There is another type of respiration that happens in our cells, which is called cellular respiration. Our cells combine the chemicals in the food that we eat with oxygen to store energy in another simple chemical called ATP (Adenosine Triphosphate).

Once your body has oxygen, it can make ATP from almost any food.

Your body uses ATP as a sort of chemical battery. It stores energy then lets it go when your body needs a boost.

Heat and water are bi-products of respiration, so if you are sweating you are respiring.

We have slime inside our nose and lungs called mucus.

Mucus traps dust particles and smoke and keeps them from getting into our lungs.

Food + Oxygen = Energy

When you breathe in your diaphragm pulls down and air rushes into your lungs.

When you relax your diaphragm, air is pushed out of your lungs.

The average person over a lifetime will breathe in about 20 kg. of dust, so don't make it worse by smoking!!!!!!