

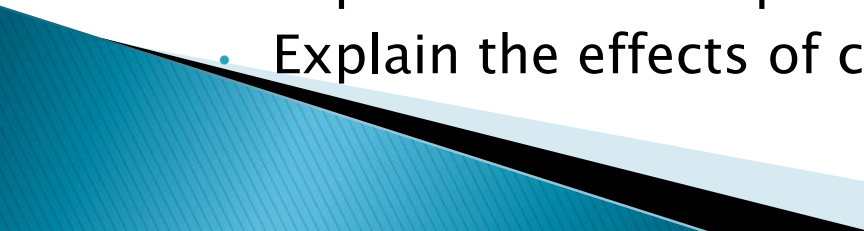
RESPIRATION

AND

BREATHING

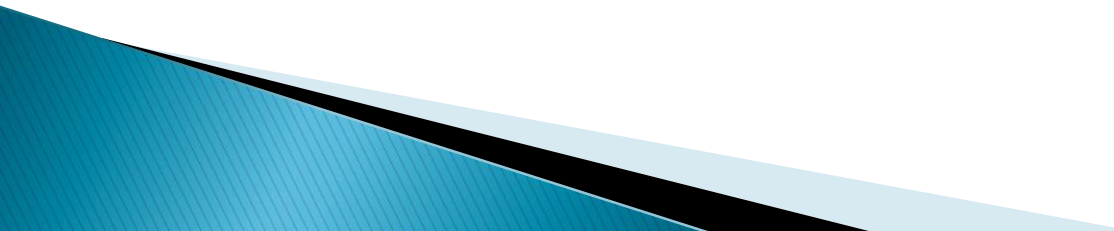


At the end of the lesson students should be able to:

- Explain the importance of breathing in humans
 - Relate the structures of the respiratory tract to their functions
 - Describe the breathing mechanism
 - Outline the factors affecting rate of breathing
 - Explain the concept of vital capacity
 - Distinguish between gaseous exchange and breathing
 - Identify characteristics common to gaseous exchanges surfaces
 - Differentiate between aerobic and anaerobic respiration
 - Explain the role of ADP and ATP in the transfer of energy
 - Explain the technique of mouth to mouth resuscitation
 - Explain the effects of cigarette smoking
- 


What is Respiration?

Why is Respiration in important?

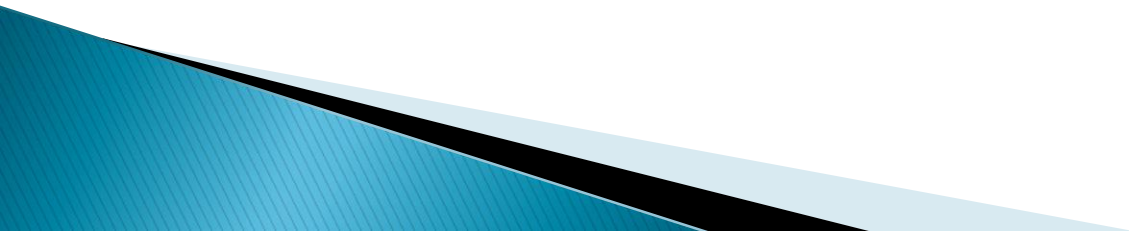


Respiration is the release
of energy from food and
occurs in all cells.

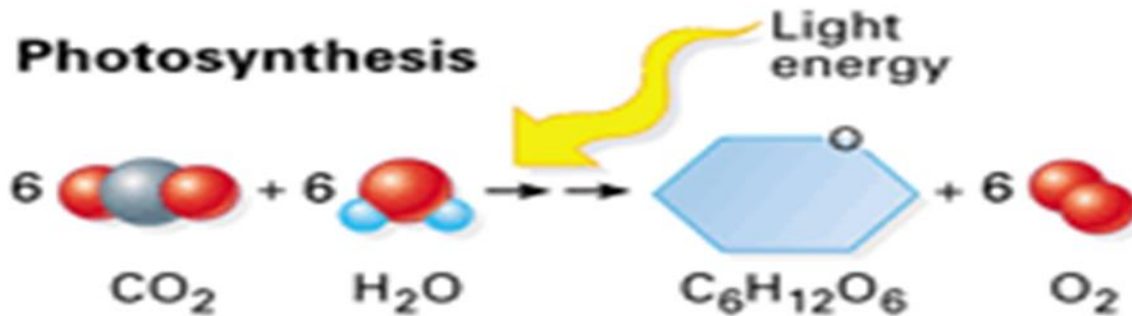
This must be done to
provide us with energy
This energy is used for
movement.



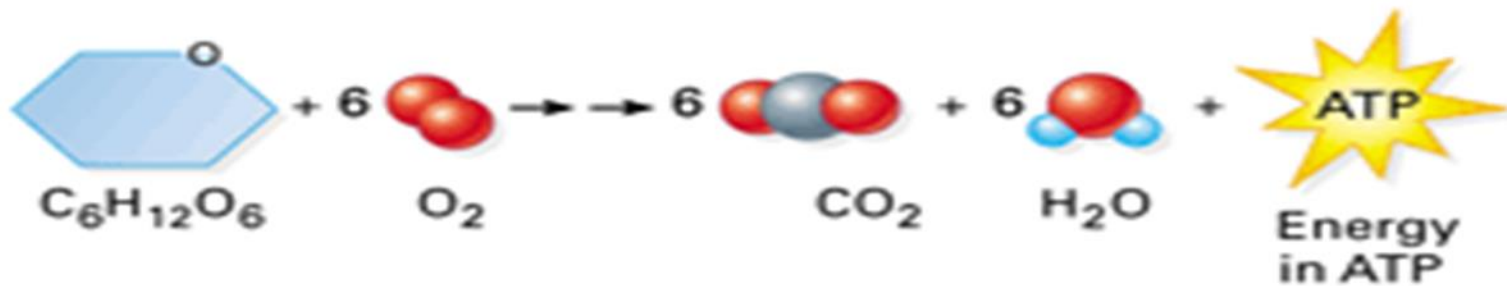
1. State two reasons why energy is important to humans.



Respiration is the Opposite of Photosynthesis



Cellular Respiration



Aerobic Respiration

Every cell in every living organism needs energy. Cells get their energy from food. The energy that is released from food in the presence of oxygen is called Respiration (Aerobic Respiration).

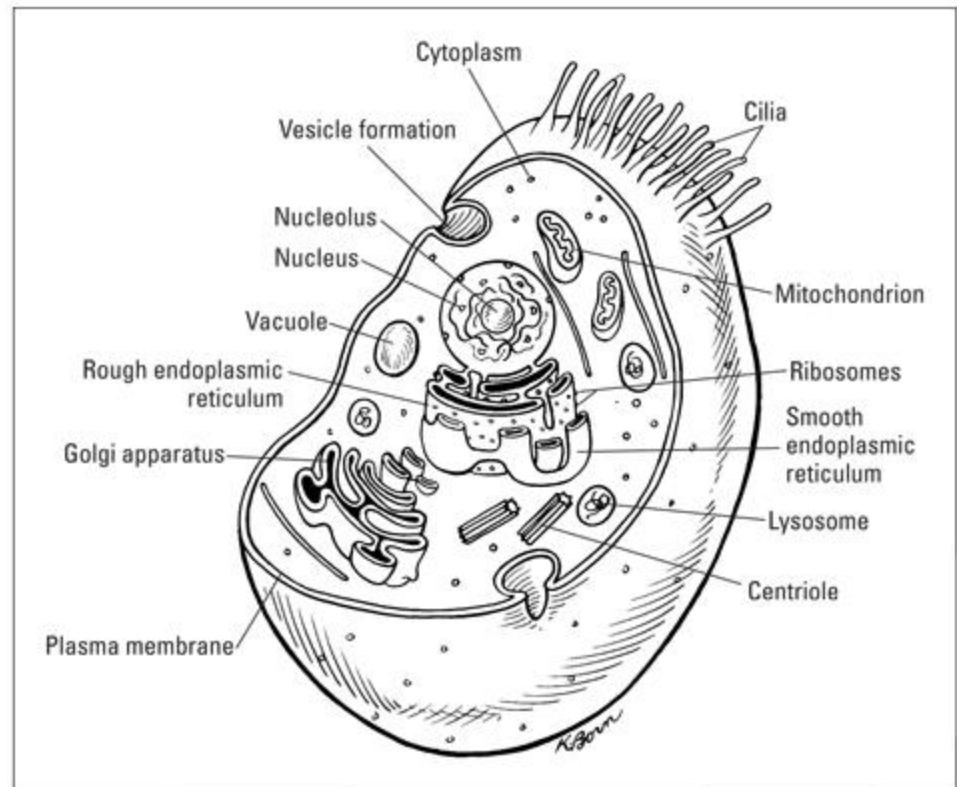


Glucose + Oxygen \longrightarrow Energy (ATP) + Carbon Dioxide + Water

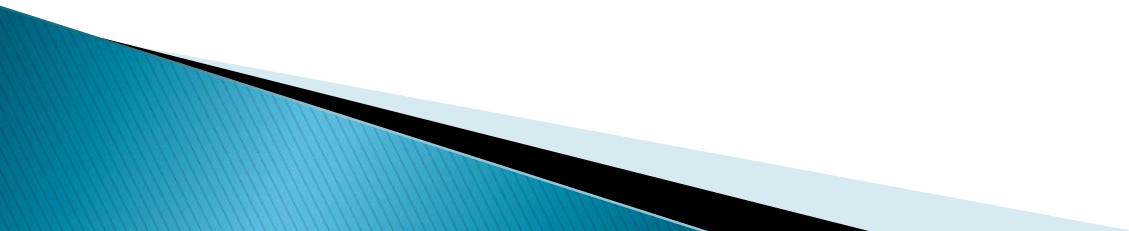
From
Our food

Can be used for
Cell activity eg
Muscle contraction

Respiration occurs in the mitochondria of cells.




Where do we get glucose from?

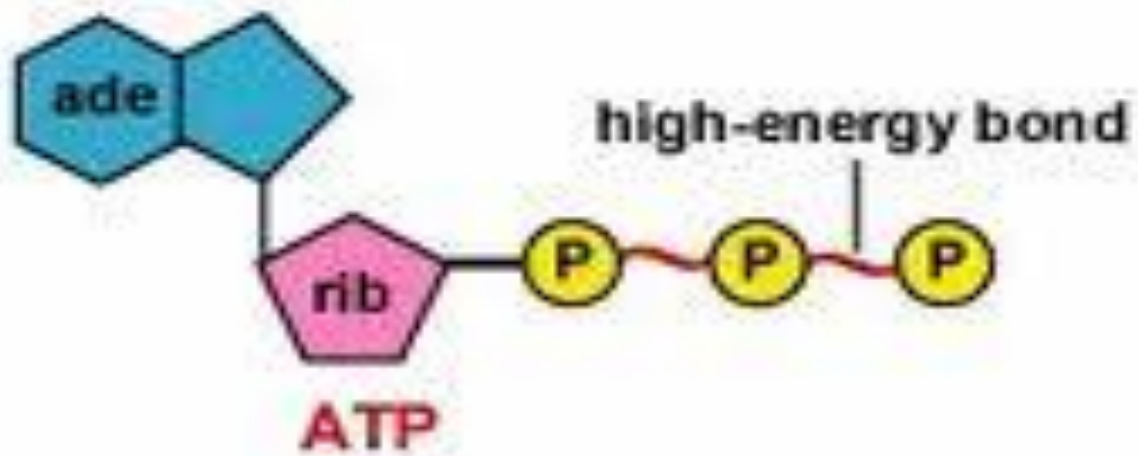


This respiration is very efficient it produces

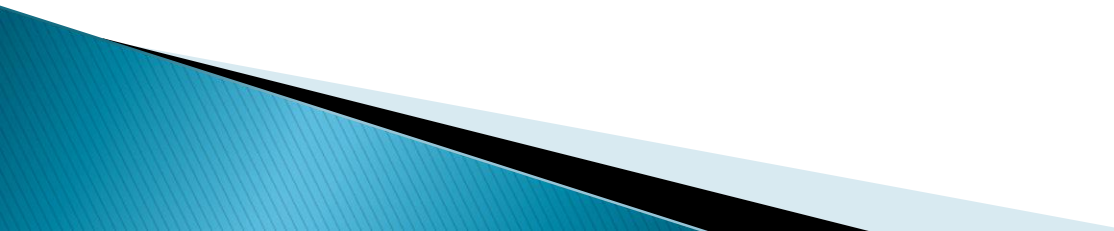
36 molecules of ATP.

ATP is the currency for storing energy.





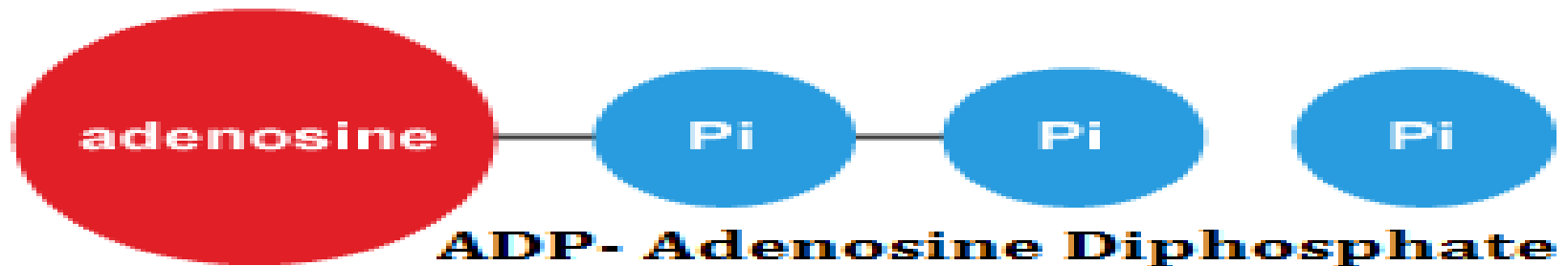
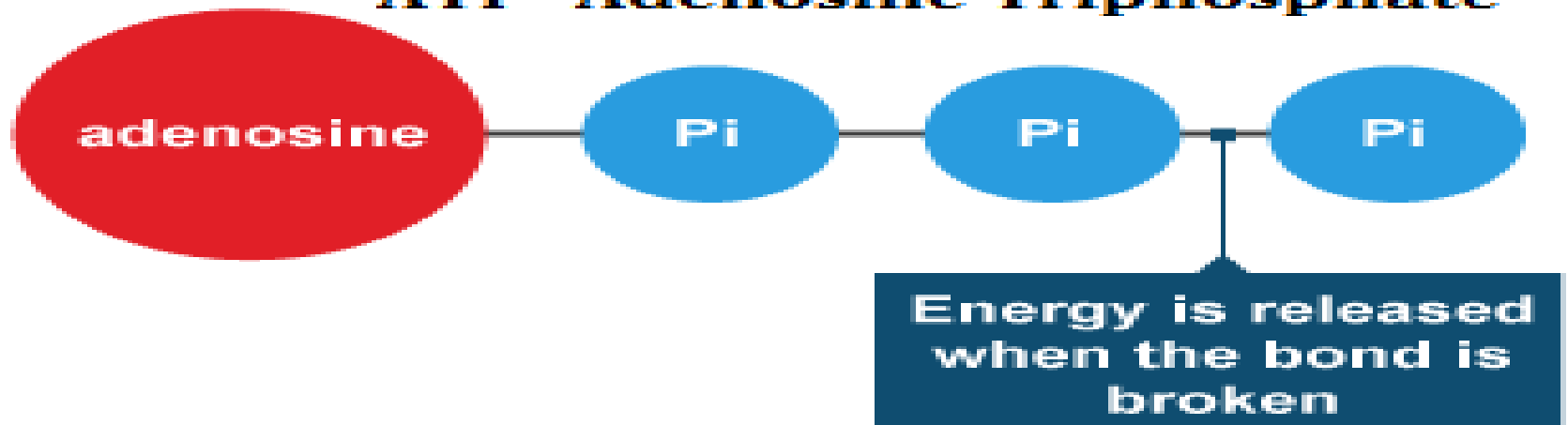
The energy is stored in the phosphate bond. If the bond is broken it becomes ADP or adenosine diphosphate. Thus releasing energy in the process.



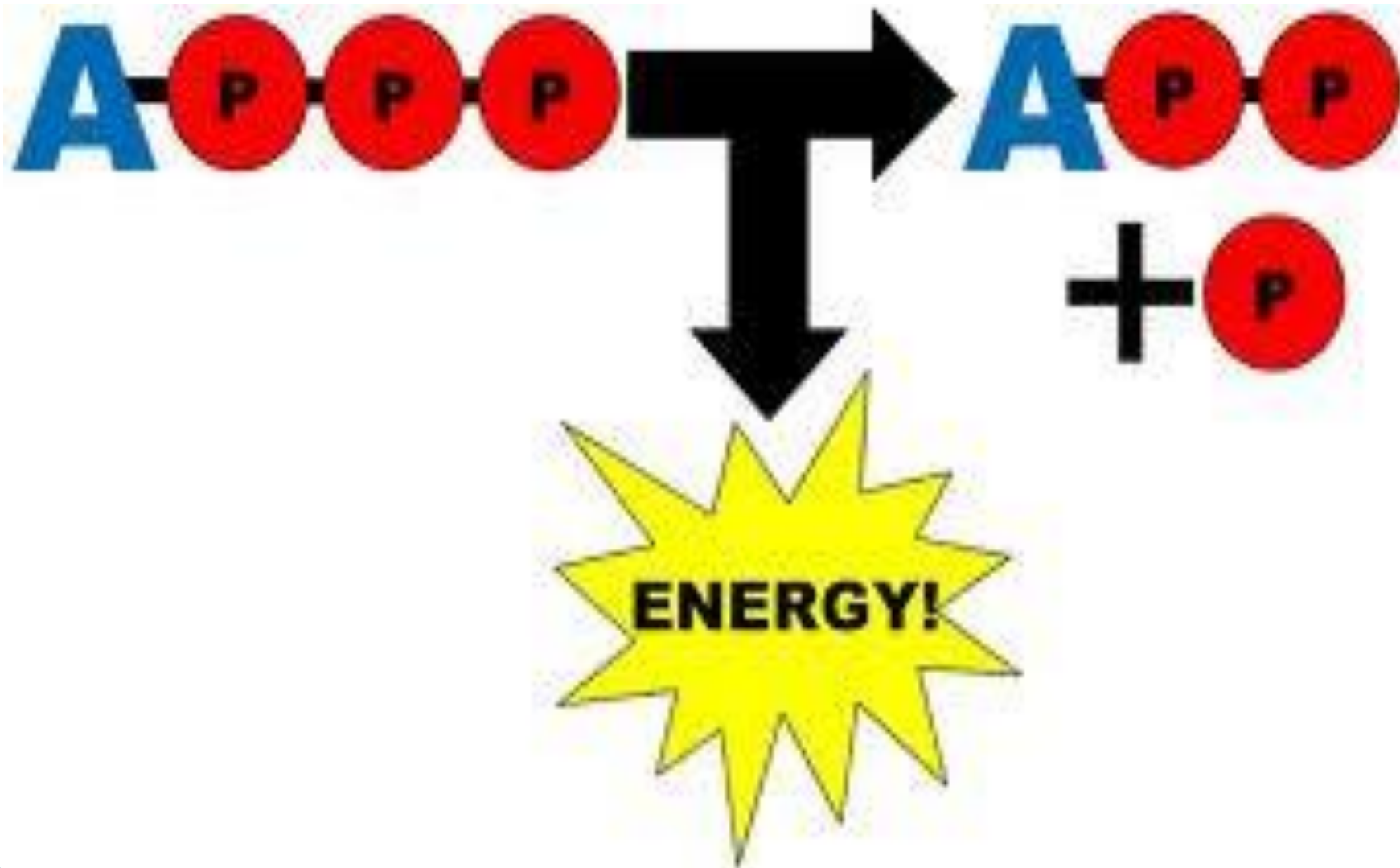
Respiration

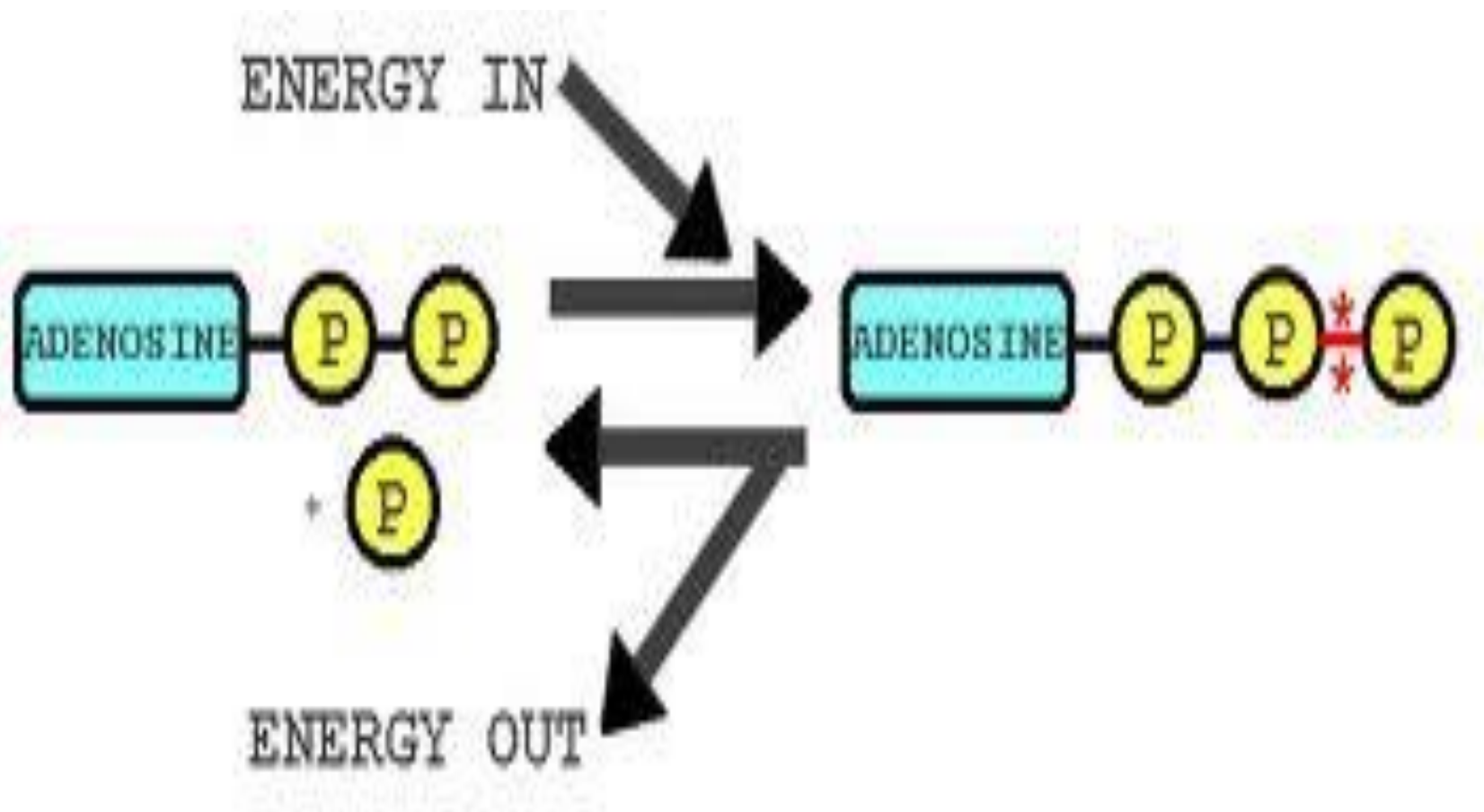
- ▶ When energy is released from glucose, it is stored in the energy molecule called ATP.
- ▶ Respiration takes place inside the mitochondria where ATP is made.

ATP- Adenosine Triphosphate

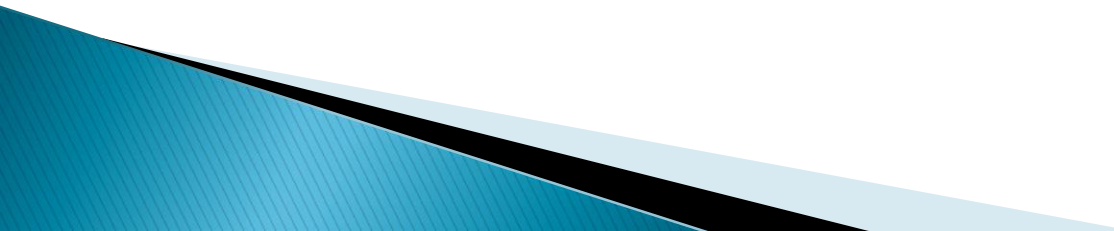


ADP- Adenosine Diphosphate





2. Explain briefly in your own words how energy is stored and released using ATP.

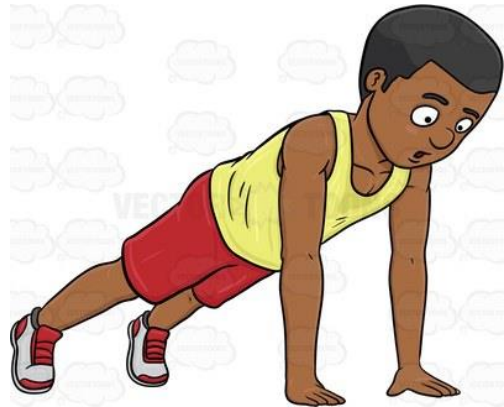


Recap-

- ▶ Fill in the blank spaces with the correct words.

Glucose + _____ $\xrightarrow{\quad}$ _____ + water + energy

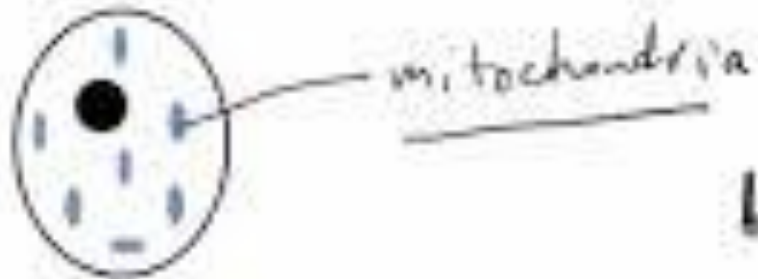
There are two types
of Respiration
Aerobic and
Anaerobic.




Aerobic Respiration

Glucose + Oxygen \longrightarrow Carbon Dioxide + Water + Energy

$C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O + \text{Energy}$



Occasionally however
the body requires
more energy, however
the ability to produce
energy is limited to
how much oxygen can
get to the muscles



So what does the body do if it respire anaerobically -

AN - means without

Thus anaerobic respiration is respiration that occurs without the use of oxygen.

It is not very efficient – it only produces 2 molecules of ATP. Compared to thirty six in aerobic respiration



There are two types of respiration

- Anaerobic

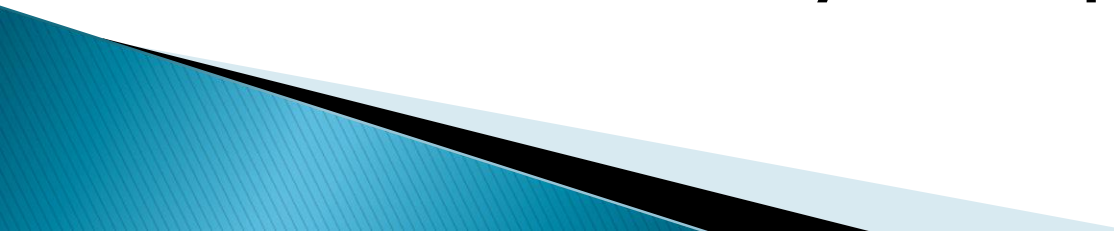
- Does not use oxygen
- Food is not broken down completely
- Little energy is released (4 ATPs)
- Alcohol or lactic acid are wastes (Fermentation)
- Occurs in cytoplasm

- Aerobic

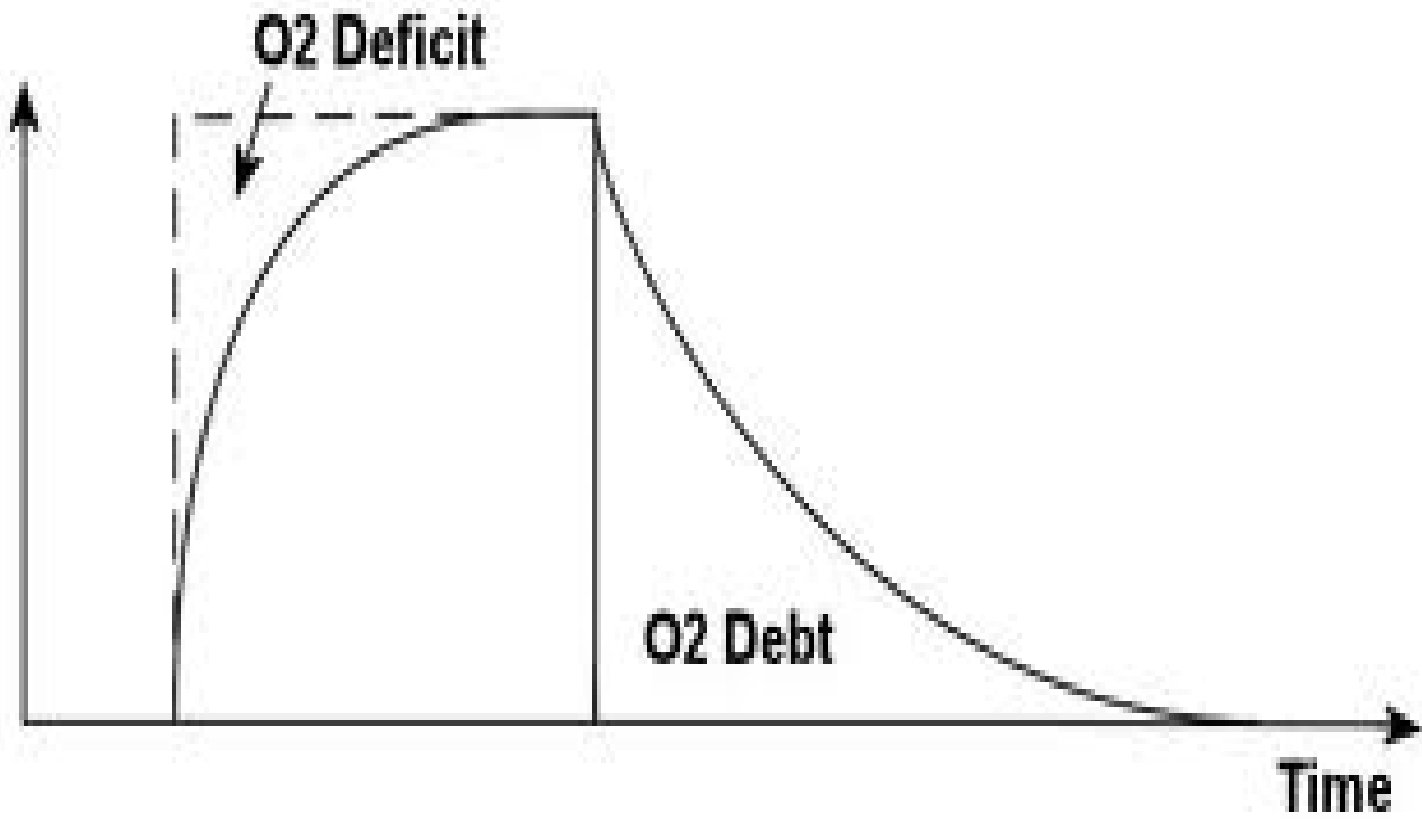
- Uses oxygen
- Food is broken down completely
- A lot of energy is released (38 ATPs)
- Carbon dioxide and water are wastes
- Occurs in mitochondria

If this type of respiration occurs long enough an oxygen debt occurs.

This is an accumulation of lactic acid in the body. The result of which is that lactic acid has to be removed by oxygen , which continues to be breathed in long after the activity has passed.



Oxygen Consumption



O2 Deficit

O2 Debt

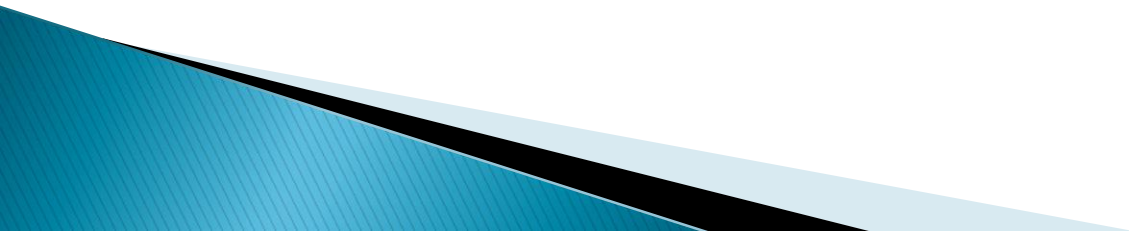
Time

We must remember that diffusion of oxygen into the blood stream is passive , as a result oxygen may not get to the cells that need it quickly enough in strenuous or vigorous exercise.


The Respiratory System




Where do we get oxygen from?
Why do we need oxygen?




The primary function of the respiratory system is the supply of oxygen to the blood so this in turn delivers oxygen to all parts of the body.



The respiratory system does this while breathing is taking place. During the process of breathing we inhale oxygen and exhale carbon dioxide. This exchange of gases takes place at the alveoli.



Meanwhile, the waste-rich blood from the veins releases its carbon dioxide into the alveoli. The carbon dioxide follows the same path out of the lungs when you exhale.

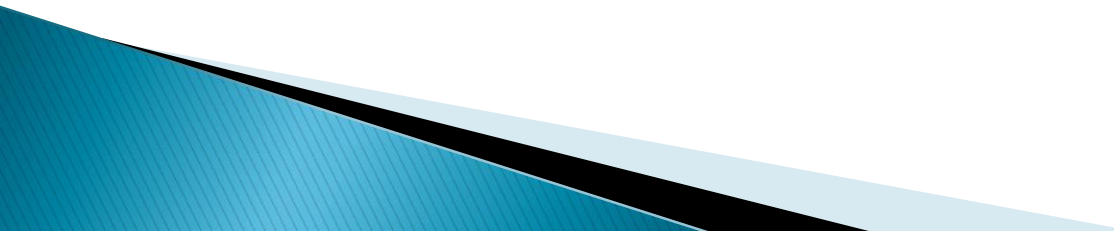


Respiration takes place with the aid of the mouth, nose, trachea, lungs, diaphragm and intercostal muscles .

Oxygen enters the respiratory system through the mouth and the nose. The oxygen then passes through the larynx and the trachea. In the chest cavity, the trachea splits into two bronchi. Each bronchus then divides again forming the bronchial tubes.

The bronchial tubes lead directly into the lungs where they divide into many

Breathing

- ▶ Breathing is the muscular movements of the respiratory tract, which keep the respiratory surface supplied with oxygen.
 - ▶ In other words, breathing is the intake of oxygen and the release of carbon dioxide.
- 

Why is breathing important?

- ▶ State two reasons why breathing is important to humans.

Nasal Cavity

Oral Cavity

Tongue

Trachea

Pleura

Right Lung

Diaphragm

Medicallook.com

Pharynx

Epiglottis

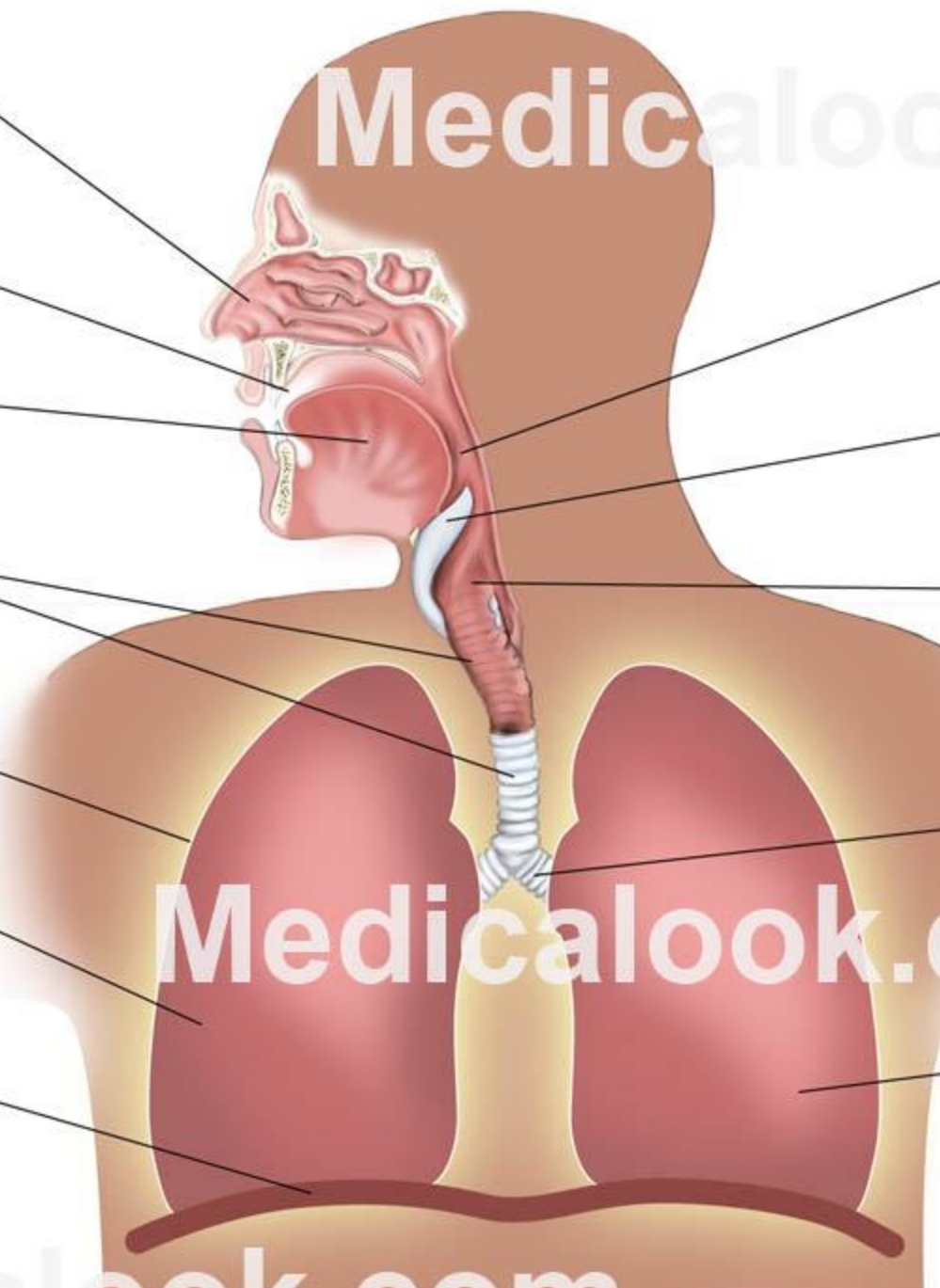
Larynx

Bronchus

Medicallook.com

Left Lung

Medicallook.com



Pharynx
(throat)

Larynx
(voice box)

Trachea
(windpipe)

Right lung

Bronchus

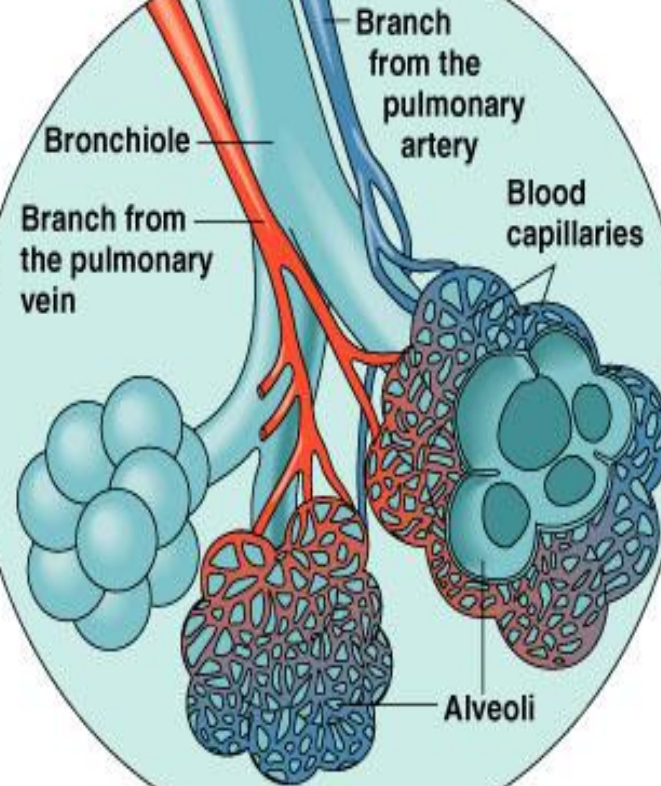
Bronchiole

Pleura

Diaphragm
(breathing
muscle)

Left lung

Heart



Breathing System

Part	Purpose
Nose/ Mouth	makes air warm, moist and filtered before reaching the lungs
Cilia	Thin, hair-like projections found in the trachea or bronchi which filters bacteria, dust, etc
Trachea	Air passes through the windpipe or trachea
Epiglottis	Piece of cartilage at the top of the trachea preventing food from entering the wind pipe
Larynx	Contains the vocal cords which produce sounds
Bronchi	2 braches extending from the trachea branching into smaller tubes called bronchioles
Alveoli	Tiny air like sacs where gaseous exchange takes place

Breathing is mechanical:

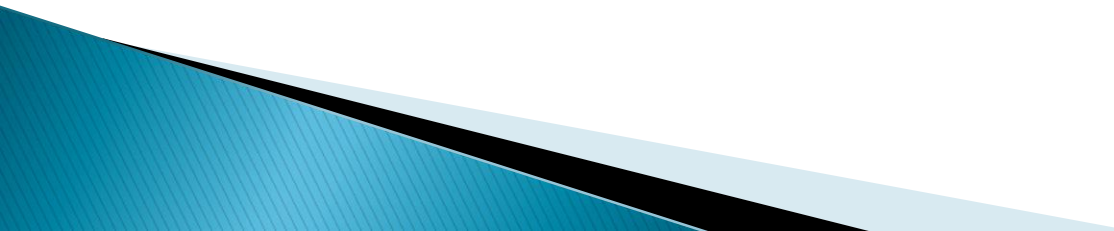
The mechanism of breathing is handled by three muscles these are

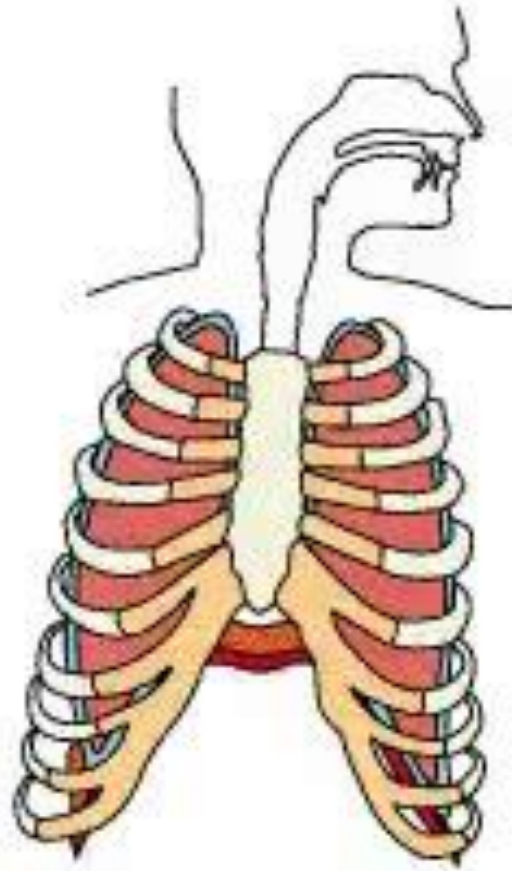
The external and internal intercostal muscle and also the diaphragm muscle

These three muscles continuously change the volume of the thorax. As a result if the volume increases air is drawn in if it decreases then air is pushed out

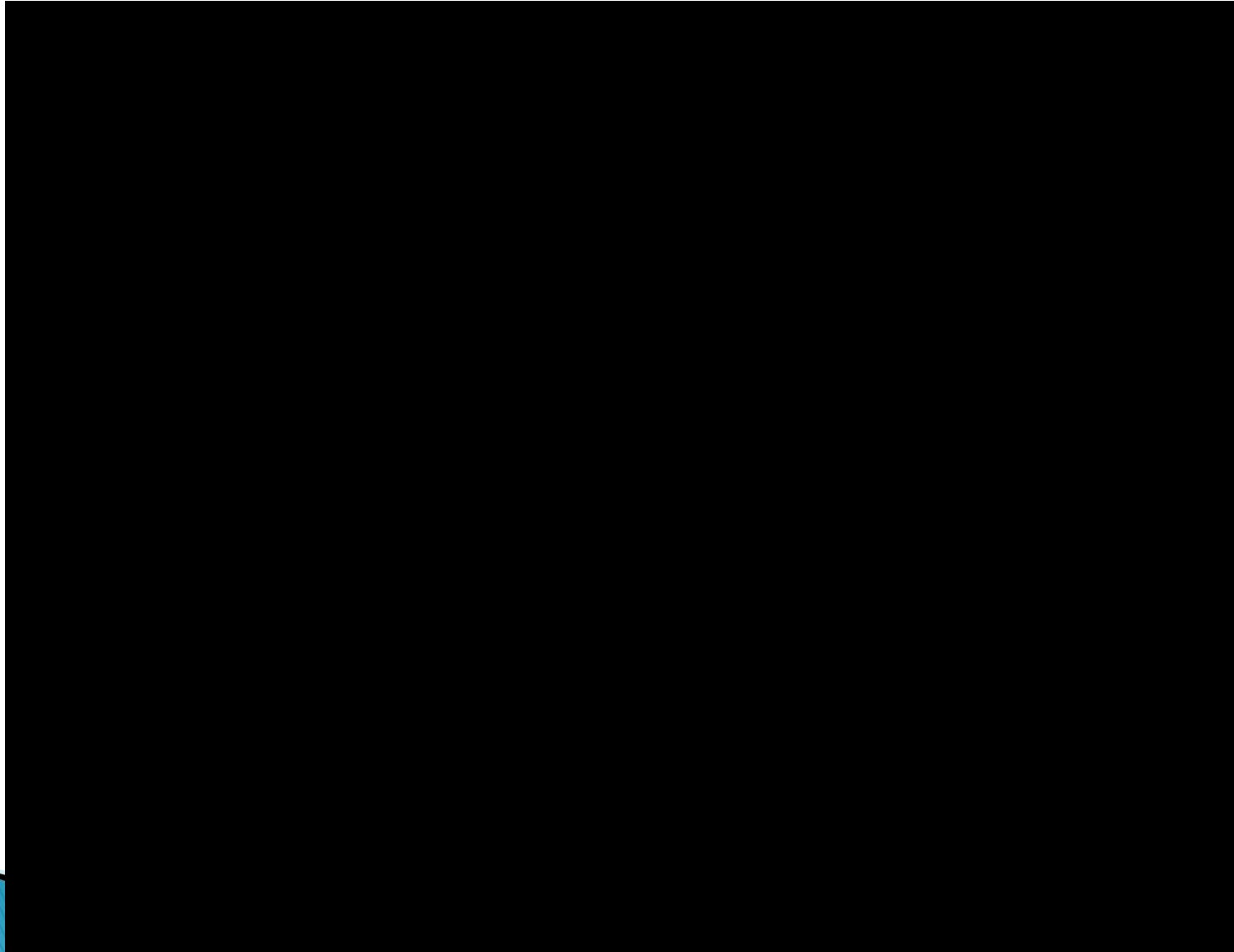
When we breathe in the internal intercostal muscles contract. The diaphragm flattens. The volume of the thorax increases and air is drawn in.

When we breathe out the external intercostal muscles contract the diaphragm returns to its dome shape, The volume of the thorax decreases and air is pushed out.

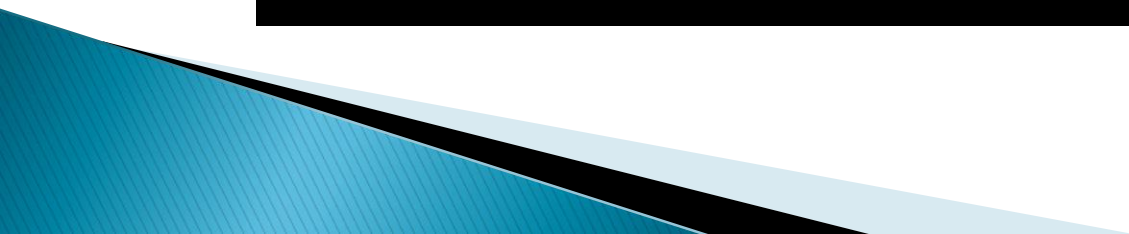
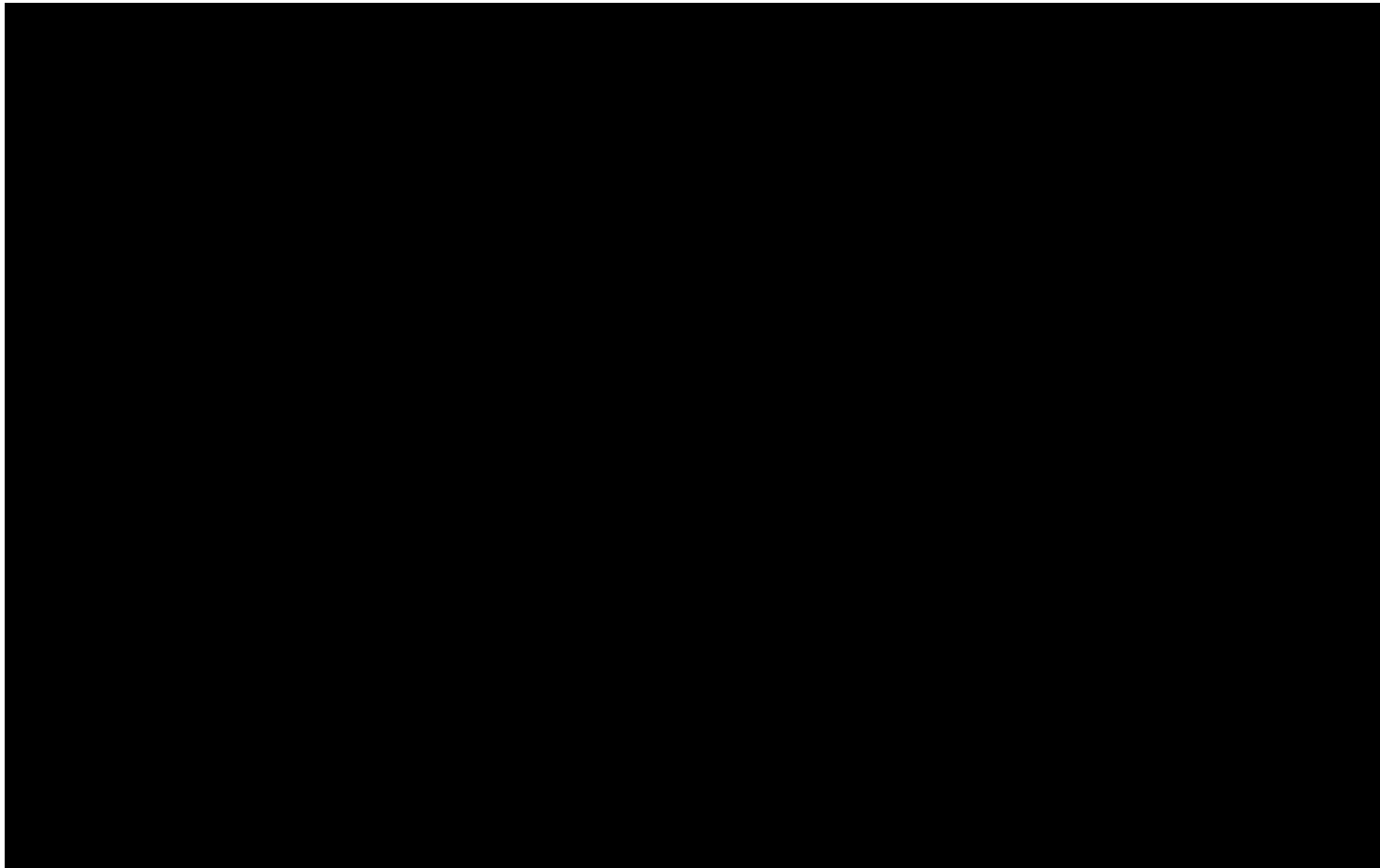




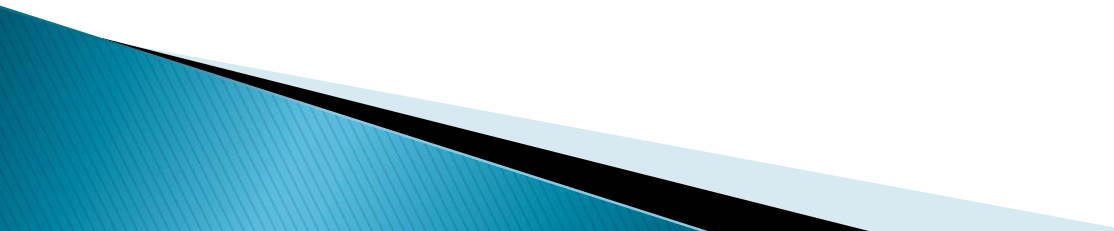
Click below to see video




Click below to show
video



Vital capacity is the maximum amount of air a person can expel from the lungs after a maximum inspiration.



It is equal to the
inspiratory reserve
volume plus the
tidal volume plus
the expiratory
reserve volume.

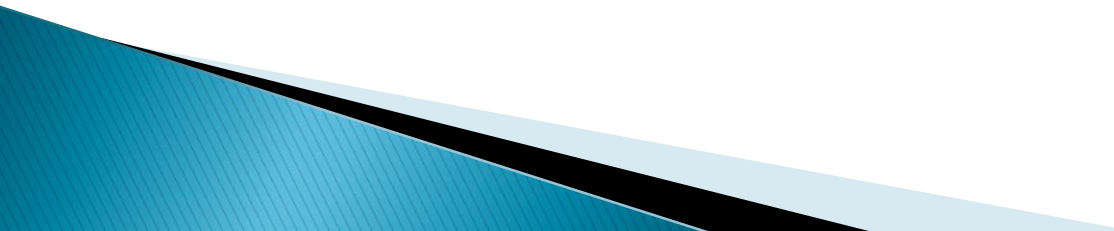


**inspiratory reserve
volume – the maximal
amount of additional
air that can be drawn
into the lungs by
determined effort after
normal expiration**

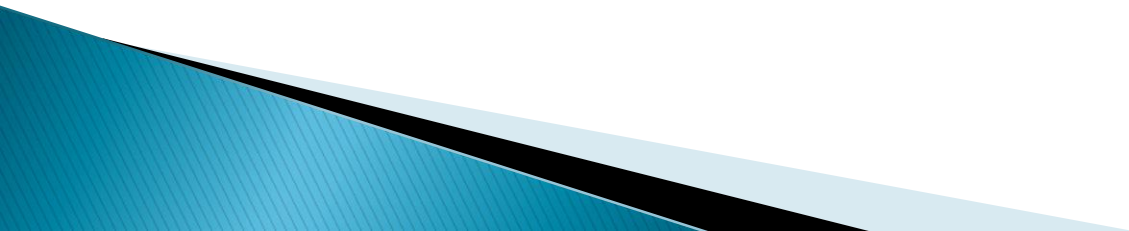
**expiratory reserve
volume –the
additional amount of
air that can be
expired from the
lungs by determined
effort after normal**

Tidal volume is the lung volume representing the normal volume of air displaced between normal inspiration and expiration when extra effort is not applied

Residual volume -
the amount of air
that cannot be
removed from the
lungs by expiration.



Mouth to mouth resuscitation



CPR is most successful when administered as quickly as possible, but you must first determine if it's necessary. It should only be performed when a person isn't breathing or circulating blood adequately.

Steps : For mouth to mouth resuscitation.

1. Tilt the person's head back by placing your hand on his forehead and lifting his chin with the first two fingers of your other hand

2. Look, listen, and feel for air coming out of the victim's mouth by bending your own ear down to his mouth. Tilt your head towards the victims feet, so you can also look to see if his chest is rising and falling. Continue to tilt the head back with both hands as you look, listen and feel for

3. See if there is an obstruction. If you do not feel any air, look for anything that may be obstructing the victim's airway. Perform a sweep of the person's mouth using your two fingers while tilting the head back to see if anything is caught in the air passage.

4. Take a deep breath, pinch the victim's nose closed with the hand that is holding the forehead, seal your lips around the victim's mouth and give them several deep breaths. Pause in between each one to inhale shortly.

5. Look, listen and feel for breathing from your victim. Continue to give him mouth-to-mouth at steady, regular intervals, pausing only to breathe yourself. Always look to see if the chest is rising and falling, to ensure your breaths are getting through.

