

The Breathing Action

Expiration and Inspiration

The Key to Breathing

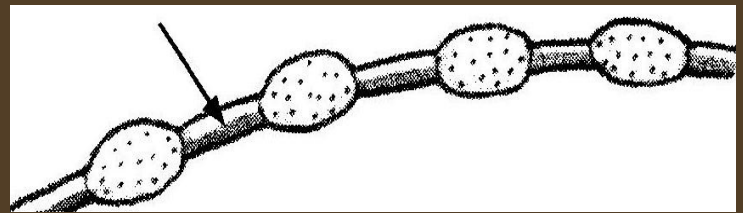
- Diaphragm

Is a muscle that divides the chest cavity from the abdominal cavity.



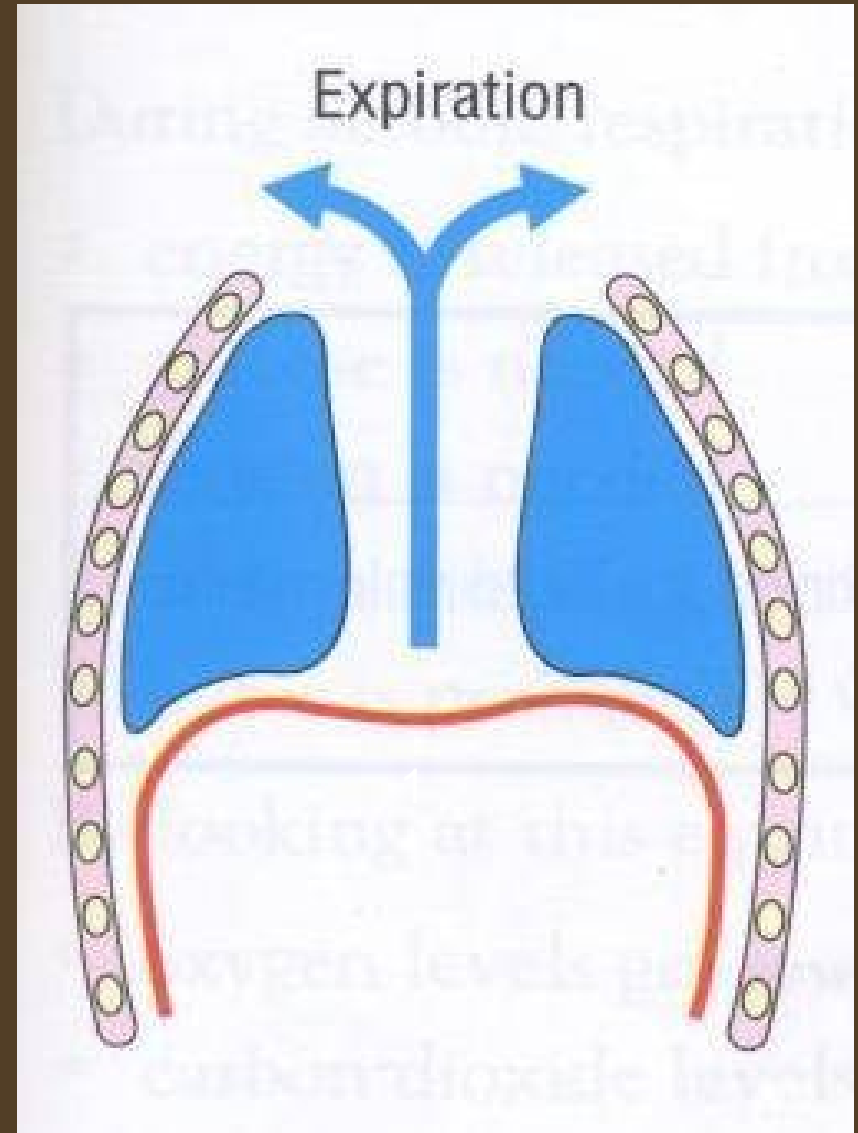
2. Inter-costal Muscles

Attach to the ribs and pull them up and out when breathing in.



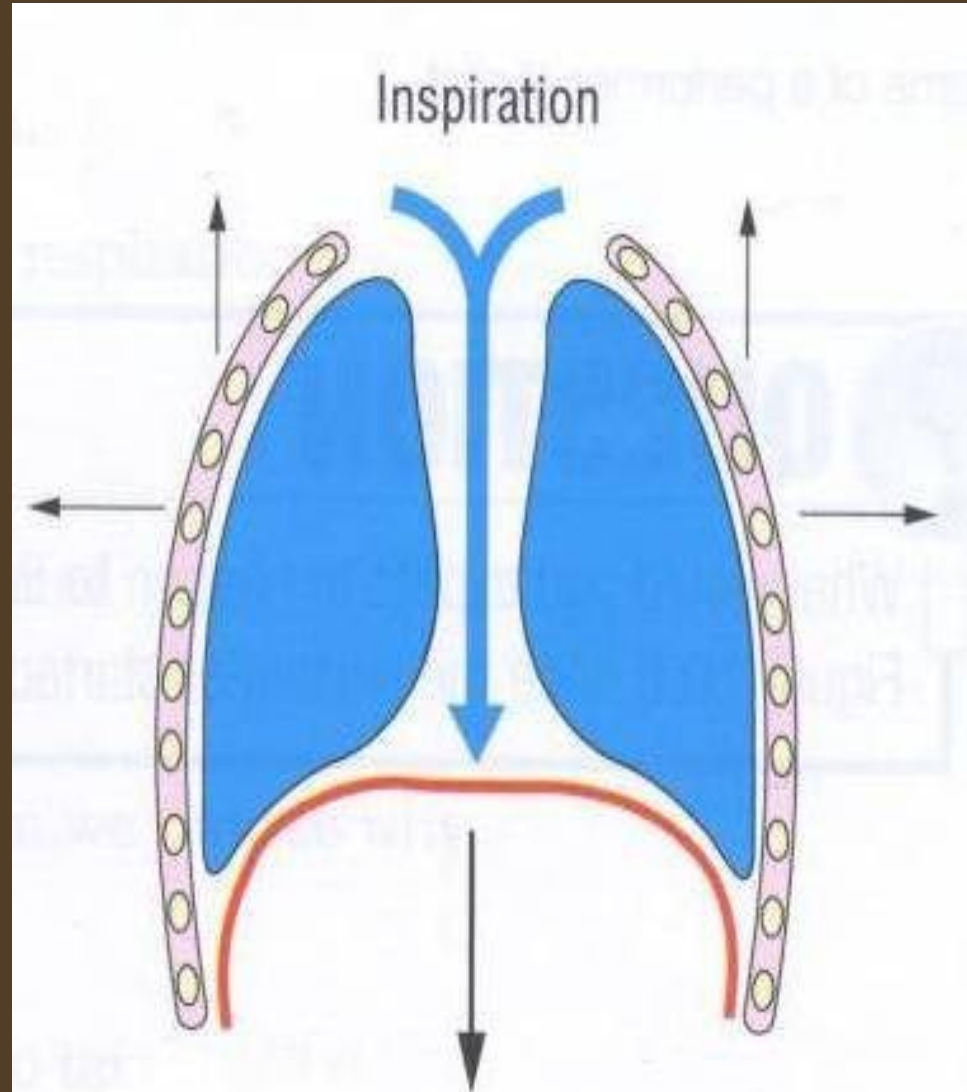
Expiration

- When we breathe out the following happens;
2. Our diaphragm relaxes into its dome position
 3. Our inter-costal muscles relax
 4. Our chest becomes smaller
 5. Pressure increases on our lungs.
 6. Air is forced out.



Inspiration

- When we breathe in
2. Our diaphragm pulls down.
 3. Our inter-costal muscles contract.
 4. Air pressure is reduced
 5. Air is sucked through the tubes into the lungs.
 6. Our chest expands.



Composition of Air

Air that we breathe
In consists of the
following

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graph TD; A["Air that we breathe  
In consists of the  
following"] --- B["21% Oxygen"]; A --- C["78% Nitrogen"]; A --- D["0.03%  
Carbon Dioxide"];
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21% Oxygen

78% Nitrogen

0.03%
Carbon Dioxide

Expired Air

Air that we breathe
Out consists of the
following

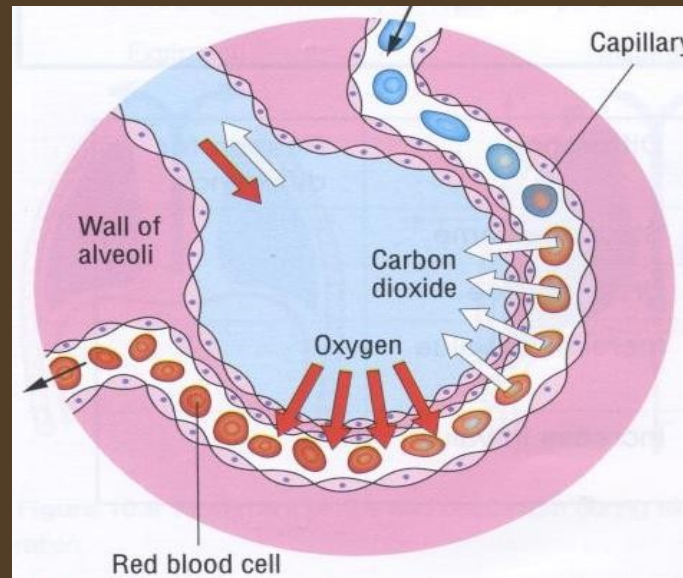
17% Oxygen

78% Nitrogen

4% Carbon
dioxide

Can You Explain the Changes?

- Points to think about
- 3. Oxygen is needed to release energy
- 4. Carbon dioxide needs to be removed from the body.



How Exercise Affects Breathing

- We have learned how important the action of breathing is. It puts oxygen into the body and removes carbon dioxide. At rest we take an average of 15 breaths per minute. This is called the *tidal volume*. This is enough breath for rest but when we begin to exercise greater amounts of oxygen are needed and greater amounts of carbon dioxide are produced which need to be removed.

Vital Capacity & Residual Volume

Vital Capacity

- Is the largest amount or volume of air that can be exhaled after the largest possible inhalation.

Residual Volume

- Is the amount of air that, even after as much air as possible has been exhaled, is left in the lungs.

We will check yours
now!

Aerobic Respiration

- AEROBIC = WITH OXYGEN

During Aerobic Respiration

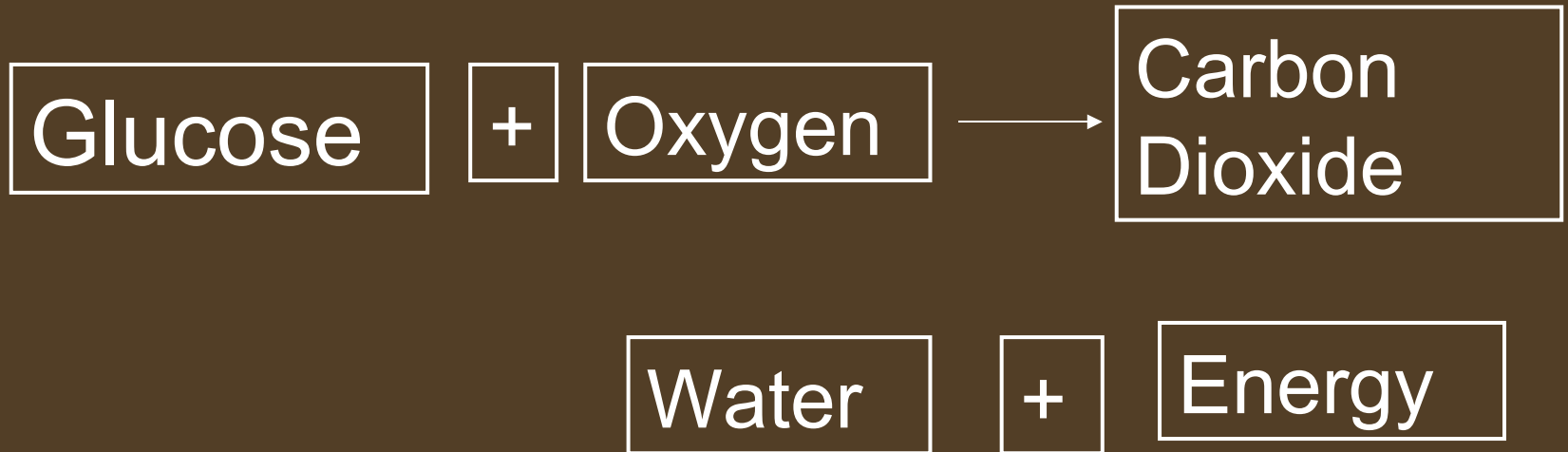
- There needs to be a sufficient supply of oxygen to the tissues.
- This fitness allows us to keep going at a moderate level for long periods
- Breathing becomes more regular and deeper.

Anaerobic Respiration

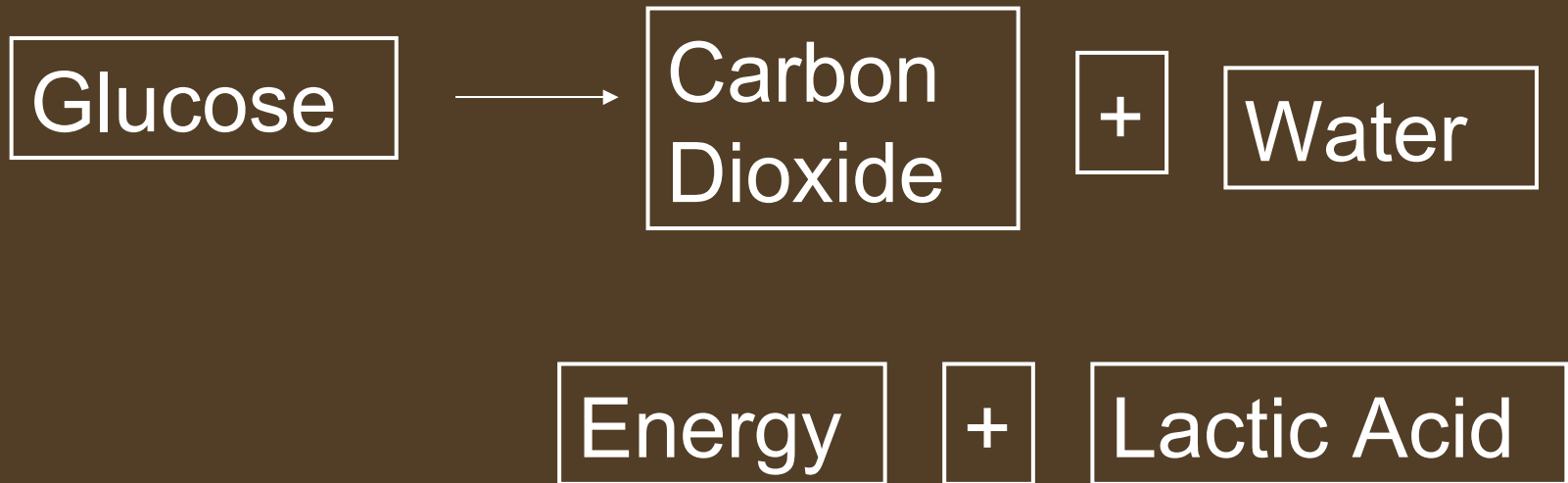
ANAEROBIC = WITHOUT OXYGEN

- The heart cannot supply blood and oxygen to the muscles as fast as the cells can use them, so energy is initially released without oxygen present!
- When exercising in short, fast bursts the anaerobic system is used
- Sprint events, jumping, throwing, lifting, exercise that is short and sharp

Aerobic Equation



Anaerobic Equation



Anaerobic Energy

- Is provided by (Energy already stored in the body)
3. ATP (Adenosine Triphosphate)
 4. CP (Creatine Phosphate)
- **ATP** and **CP** can only supply energy for a short time (**60seconds**)
 - If the demand for energy continues for over a minute then it releases energy by breaking down **carbohydrates**. As a result **lactic acid** is produced.

Oxygen Debt

- A state in which the body needs more oxygen than it can supply.
- After working very hard your breathing becomes shallow and gasping, this is an indication that an 'oxygen debt' has built up.
- So you have to either 'stop' or 'reduce the intensity' to 'pay back' the debt.