



Your teacher will tell you which topic you should revise. Read and learn all the information in the topic, ready for a Quiz in lesson.

Topic 1: The Breathing System

Respiration releases energy from glucose so that life processes can carry on. Aerobic respiration needs oxygen but anaerobic respiration does not. The respiratory system is adapted for gas exchange.

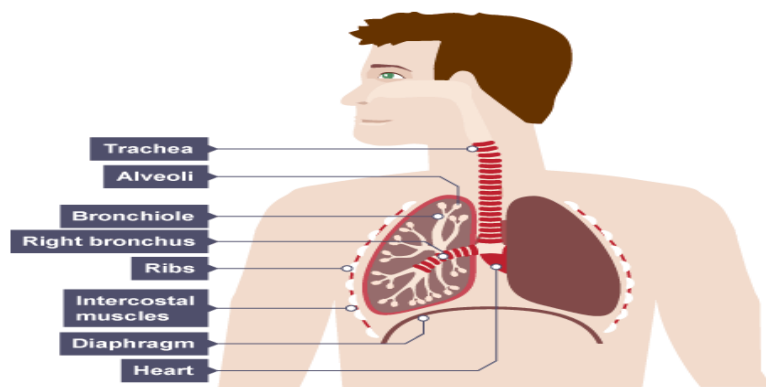
Energy is needed for life processes such as: growth and repair, movement, control of body temperature in mammals. Respiration is a chemical reaction that happens in all living cells, including plant cells and animal cells. It is the way that energy is released from glucose so that all the other chemical processes needed for life can happen. Do not confuse respiration with breathing (which is properly called ventilation).

Aerobic respiration: Glucose and oxygen react together in cells to produce carbon dioxide and water and releases energy. The reaction is called aerobic respiration because oxygen from the air is needed for it to work. **glucose + oxygen → carbon dioxide + water.**

Anaerobic respiration: During hard exercise, not enough oxygen can reach your muscle cells. So, aerobic respiration is replaced with anaerobic respiration. This does not need oxygen for it to happen. Here is the word equation for anaerobic respiration in humans: **glucose → lactic acid.** Anaerobic respiration produces much less energy than aerobic respiration. The waste product, lactic acid, builds up in the muscles causing pain and tiredness. This leads to cramp. Lactic acid is only broken down when you start aerobic respiration again.

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The human gas exchange system: Aerobic respiration needs oxygen, and it produces carbon dioxide as a waste product. The human respiratory system contains the organs that allow us to get the oxygen we need and to remove the waste carbon dioxide we do not need. It contains these parts: two lungs, tubes leading from the mouth and nose to the lungs and various structures in the chest that allow air to move in and out of the lungs:



Ventilation

Ventilation or breathing involves movements of the ribs, intercostal muscles and diaphragm to move air into and out of the lungs:

- when we breathe in, we inhale
- when we breathe out, we exhale

	Aerobic	Anaerobic
Needs oxygen?	Yes	No
Needs glucose?	Yes	Yes
Product(s) formed	Carbon dioxide and water	Lactic acid



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Topic 2: The Digestive system

The food we eat has to be broken down into other substances that our bodies can use. This is called digestion. Without digestion, we could not absorb food into our bodies and use it. Digestion happens in the digestive system, which begins at the mouth and ends at the anus.

After we swallow, our food passes through these organs in turn: oesophagus or gullet – stomach - small intestine - large intestine. **Liver and pancreas:** The liver and the pancreas play an important part in digestion. The liver produces bile, which helps the digestion of lipids (fats and oil). The pancreas produces biological catalysts called digestive enzymes which speed up the digestive reactions.

Digestion and enzymes: Our teeth break food down into small pieces when we chew. This is only a start to the process of digestion, as chewed pieces of food are still too large to be absorbed by the body. Food has to be broken down chemically into really small particles before it can be absorbed. Enzymes are the biological catalysts needed to make this happen quickly enough to be useful.

Stages of digestion:

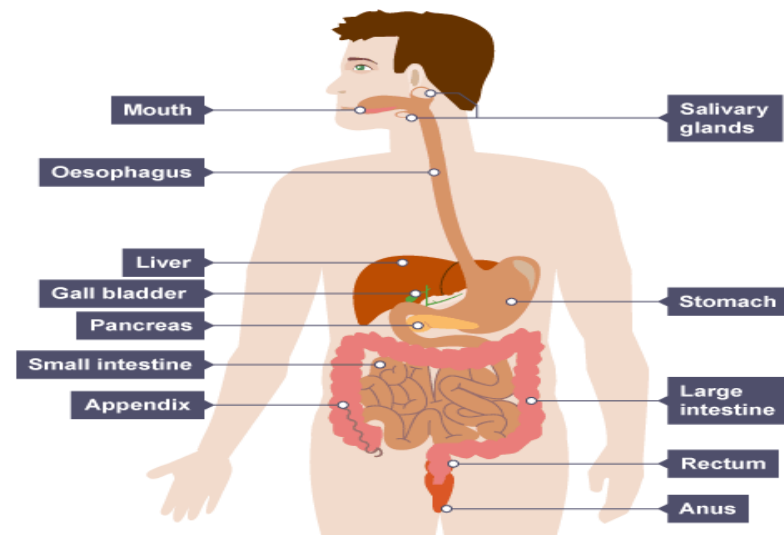
Different things happen to food as it passes through the digestive system:

- food is digested in the mouth, stomach and small intestine
- digested food is absorbed into the bloodstream in the small intestine
- excess water is absorbed back into the body in the large intestine
- any undigested food passes out of the anus as faeces when we go to the toilet

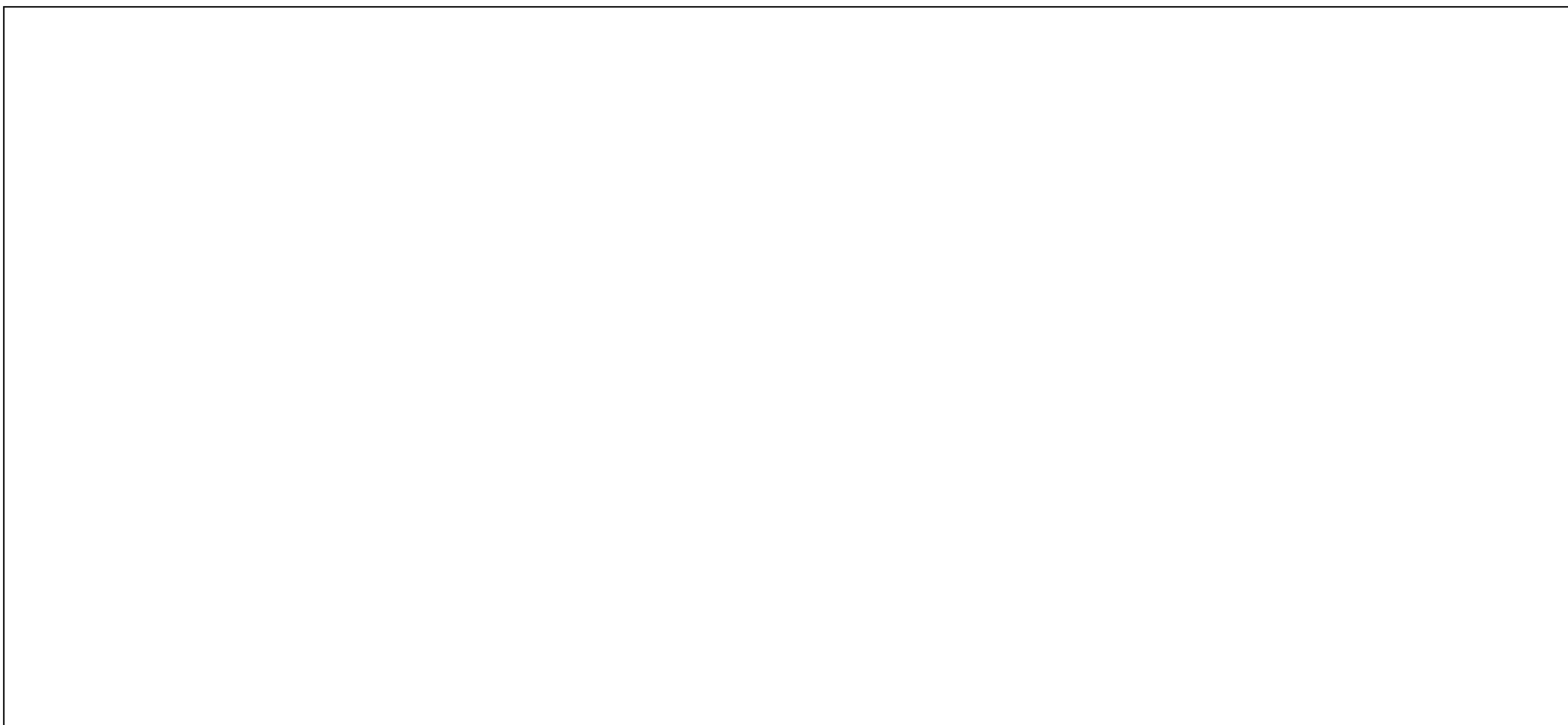
Absorption and egestion: These are the processes that happen in the digestive system: ingestion (**eating**) → digestion (**breaking down**) → absorption → egestion (**removal from the body**)

Absorption: Digested food molecules are absorbed in the small intestine. This means that they pass through the wall of the small intestine and into our bloodstream. Once there, the digested food molecules are carried around the body to where they are needed.

You need to know all parts of this diagram in the correct order:



The small intestines are very important but here is a key fact to remember: Only small, soluble substances can pass across the wall of the small intestine. Large insoluble substances cannot pass through. Larger insoluble substances pass through the large intestines and is carried away as waste products.





Vocabulary	Wider Research	Apply
<ol style="list-style-type: none">1. Respiration2. Digestion3. Lactic Acid4. Intestines5. Villi6. Glucose7. Carbon Dioxide8. Enzymes9. Absorption10. Bloodstream11. Insoluble12. Aerobic13. Anaerobic14. Egestion15. Stomach16. Ventilation17. Molecules18. Soluble19. Trachea20. Alveoli	<p>Respiration:</p> <p>[1] https://www.bbc.co.uk/teach/class-clips-video/biology-ks3-gcse-aerobic-respiration/zmncqp3</p> <p>[2] https://www.youtube.com/watch?v=ncv3nnieNEo</p> <p>[3] https://www.youtube.com/watch?v=CjLzQntKnN8</p> <p>Digestion:</p> <p>[1] https://www.youtube.com/watch?v=Og5xAdC8EUI</p> <p>[2] https://www.youtube.com/watch?v=1sISguPDIhY</p> <p>[3] https://www.youtube.com/watch?v=1UvuBYUbfk0</p>	<ol style="list-style-type: none">1. Sketch a diagram to show the stages of the digestive system. You should include the journey of a piece of food for mouth to the anus.2. Create a table to show the similarities and differences between aerobic and anaerobic respiration.3. Which enzymes are involved with turning starch to glucose?4. Write a balanced chemical equation for aerobic respiration in animals.5. Suggest three different ways in which animals use the energy released by aerobic respiration.