Edward Peake Church of England Middle School		
Topic: Organisms . Breathing and digestion	**Year: 8**	**Strand: Biology**

What should I already know?

Breathing and gas exchange
Animals, including humans, need air to survive. Breathing is taking air in and out of our lungs.
The air around us contains oxygen.
Diet and nutrition
Animals cannot make their own food and must eat plants or other animals for energy.
Humans must eat a balanced diet containing the correct types of food to stay healthy.
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What will I know by the end of the unit?

The breathing system
Breathing occurs through the action of muscles in the ribcage and diaphragm causing a change in volume of the chest.
The breathing system is well adapted to get gases in and out of our bodies.
During gas exchange, oxygen is transported to cells for aerobic respiration and carbon dioxide is removed from the body.
Disease and lifestyle can affect our breathing system, for example, asthma and smoking.
A healthy diet
Each component of a healthy diet has a different role. For example, carbohydrates provide energy, fibre supports the large intestine and protein allows growth and repair.
Different foods provide different amounts of energy and different people have different energy requirements depending on age and lifestyle.
Both starvation and obesity can cause serious health issues
The digestive system
Each part of the digestive system has a specific role. For example, protein digestion begins in the stomach, the small intestine allows absorption of nutrients, and the large intestine removes water.
Each organ of the digestive system is well adapted to do its job.
Following digestion, food molecules are transported to cells for respiration.
Enzymes are biological catalysts, and they digest specific food molecules to smaller molecules.
Bacteria live in the gut and some of these help us to digest food.

Vocabulary

Chemical digestion	When food is broken down into small soluble chemicals, enzymes help with this.
Digestive system	The organ system that breaks down food into small molecules.
Enzymes	Protein molecules that speed up chemical reactions (biological catalyst)
Mechanical digestion	When large pieces of food are broken down into smaller ones (e.g. chewing)
Symbiotic	Where both organisms benefit from each other.
Alveoli	(Singular alveolus) where gas exchange occurs in the lungs
Asthma	
Breathing	The process of moving air in and out of the lungs

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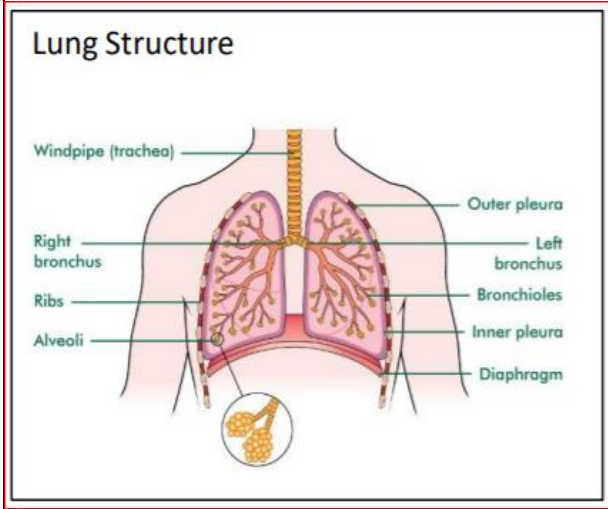
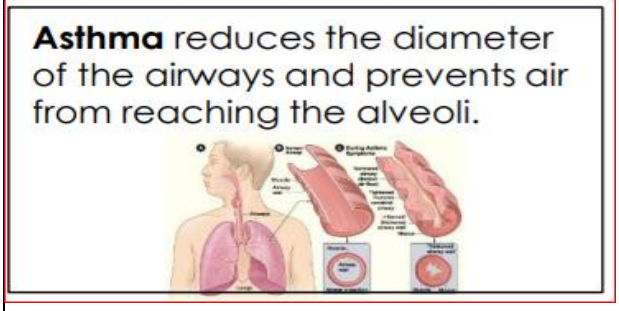
Bronchioles	The **bronchi** divide into smaller passageways called **bronchioles** which take air into the **alveoli**
Capillary	A small blood vessel. Capillaries surround the alveoli
Cilia	Are tiny hairs on cells in the bronchioles which sweep out any dirt particles that could damage the lungs. They are damaged by smoking
Diaphragm	A layer of muscle at the base of the chest cavity
Diffusion	Particle movement that causes particles in a liquid or gas to spread out evenly
Hypothesis	An idea that explains set of facts or observations, and is the basis for experiment to prove it
Lung volume (Vital capacity)	The amount of air that you can breathe out following a deep breath
Cigarettes	Nicotine is an addictive chemical in cigarettes. Tar can cause cancer. Carbon monoxide reduces the amount of oxygen the blood can carry. Many other chemicals cause multiple health problems.
Respiration	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).**
Ribs	Curved bones, in pairs forming the **rib cage** which protect the **thoracic cavity** and **organs**
Trachea (Windpipe)	A tube connecting the back of the mouth to the lungs. It is supported by cartilage in Humans. It becomes the two **bronchi** taking air into and out of the lungs (singular **bronchus**)
Variable	Independent variable is the variable we change in an investigation. Dependent variable is the variable we measure in an investigation . Control variables ar factors we need to control during an investigation

Diagram	Key information
 	Respiration and breathing are not the same! Respiration is a chemical reaction occurring in living cells, breathing brings air into and out of your lungs. **Why do we breathe in and out?** We inhale to take in oxygen (used in respiration) and exhale to remove carbon dioxide (waste product- turns limewater cloudy). The harder you exercise, the faster your breathing rate and greater your depth of breathing. This allows you to take in more oxygen for respiration (transferring more energy to the muscle cells) Gas exchange takes placed inside your lungs. Lungs are made of elastic tissue and expand when you breathe in. As they are delicate, they are protected buy your ribs. **How does glucose get into the cells?** Glucose is found in food. Once the food is digested, glucose molecules are absorbed into the bloodstream and then transported around the body in the blood. Glucose dissolves in plasma and can diffuse into cells for respiration. **How does oxygen get into the cells?** Oxygen from the air diffuses into the bloodstream. Oxygen binds to haemoglobin in

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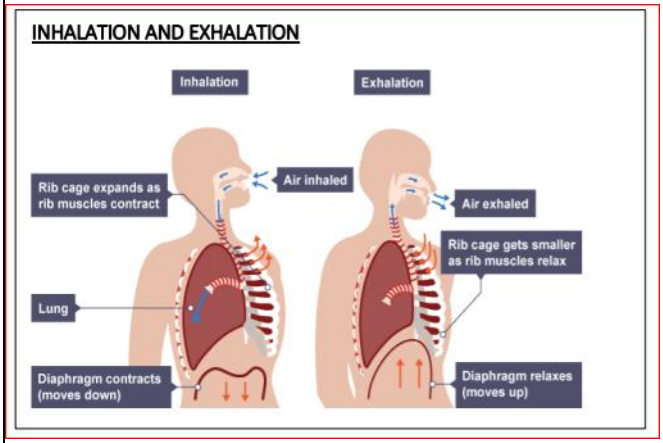
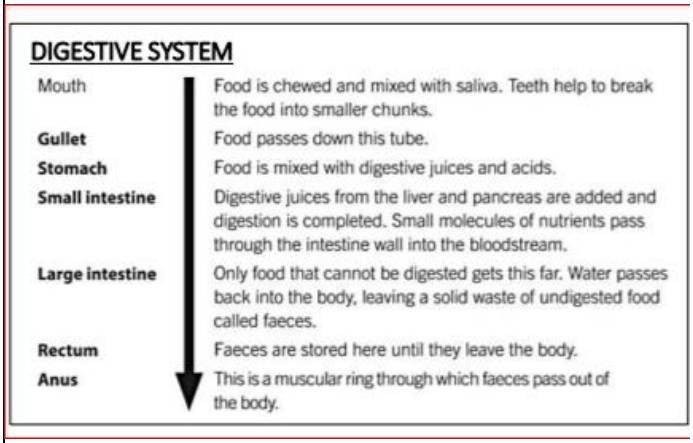


Inhalation is also called inspiration

How are the alveoli adapted to their function?
Alveoli have a **huge surface area** to allow more diffusion
They have **thin walls** so that gases have a short distance to travel
They have a **good blood supply** to remove oxygenated blood quickly



the red blood cells and gets carried around the body in the blood vessels. It then diffuses into the cells.
How does carbon dioxide leave the body? Carbon dioxide produces diffuses out of the cells and into the blood plasma. The blood transports it to the lungs

Digestion

Food is digested in the digestive system, this is an organ system. You should be able to name all parts of the diagram below:
•The mouth has teeth that mechanically digest the food, it also has a salivary gland that releases enzymes to break the food down.
•The oesophagus is a muscular tube that pushes the food into the stomach.
•The stomach churns the food up, while also adding acid and enzymes to break the food down.
•In the small intestine, food is broken down further and is absorbed thorough the walls of the intestine into the blood stream.
•The large intestine absorbs any remaining water
•Finally the food passes through the anus as faeces
the liver.

Gut bacteria make important vitamins (vitamin K) and help break down food

There are 7 different types of nutrients.
1. Carbohydrates; simple carbohydrates provide a quick source of energy. Complex carbohydrates release energy more slowly.
2. Lipids (fats and oils)
3. Proteins
4. Vitamins
5. Minerals
6. Water (needed in all cells and body fluids) 7. Dietary fibre

UNHEALTHY DIET
• Energy in food is measure in joules or kilojoules (1 kilojoule = 1000 joules).
• The amount of energy you need depends on your age, body size, gender and fitness.
• If energy in food is less than the energy you use, you will lose body mass (become underweight). Underweight people suffer

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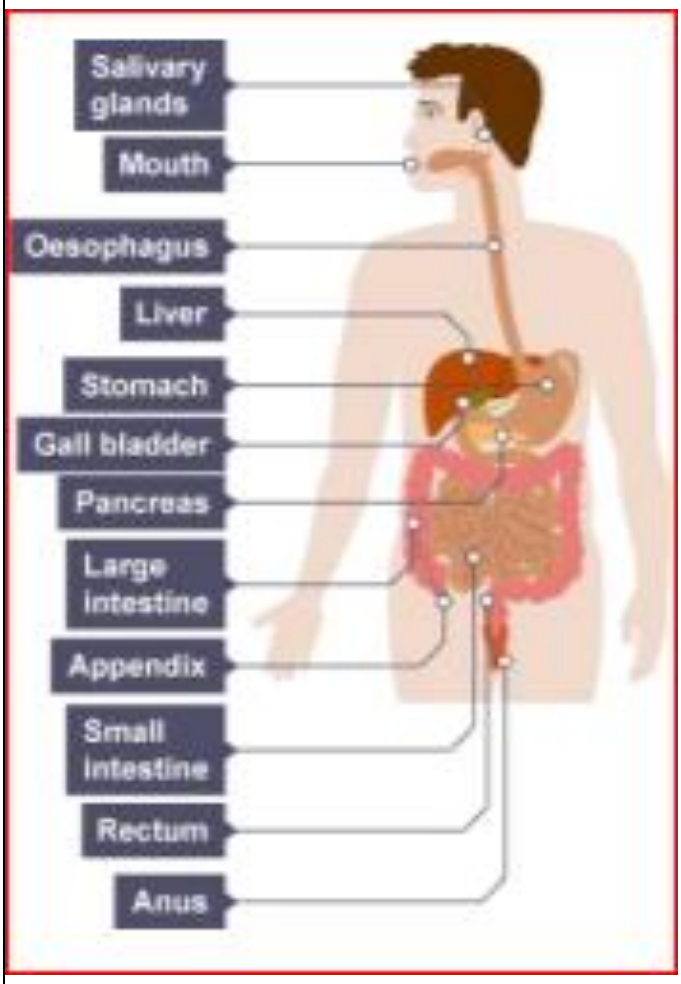

from health problems, lack energy and are likely to have mineral deficiencies.
• Overweight people have an increased risk of heart disease, stroke, diabetes and some cancers.
• Vitamin and mineral deficiencies can damage a person's health; vitamin D deficiency can lead to weak bones (rickets).

The small intestine has a thin wall, covered in villi. These structures increase the surface area for absorption. They also contain blood capillaries to carry away absorbed food molecules.

Nutrient	Use in the body	Good sources
Carbohydrate	To provide energy	Cereals, bread, pasta, rice and potatoes
Protein	For growth and repair	Fish, meat, eggs, beans, pulses and dairy products
Lipids (fats and oils)	To provide energy. Also to store energy in the body and insulate it against the cold.	Butter, oil and nuts
Minerals	Needed in small amounts to maintain health	Salt, milk (for calcium) and liver (for iron)
Vitamins	Needed in small amounts to maintain health	Fruit, vegetables, dairy foods
Dietary fibre	To provide roughage to help to keep the food moving through the gut	Vegetables, bran
Water	Needed for cells and body fluids	Water, fruit juice, milk

Useful Websites

https://www.bbc.co.uk/bitesize/guides/zq349j6/revision/1#:~:text=Respiration%20is%20a%20chemical%20reaction,which%20is%20properly%20called%20ventilation).
https://www.bbc.co.uk/bitesize/guides/zq349j6/revision/2

https://www.bbc.co.uk/bitesize/guides/z9pv34j/revision/1

http://www.childrensuniversity.manchester.ac.uk/learning-activities/science/the-body-and-medicines/digestive-system/