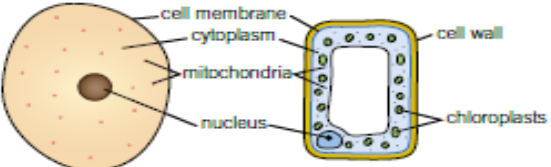


Plant and animal cells

- To be able to **observe** a **cell** we need to use a **microscope**, this magnifies the cell to a point to which we can see it
- Plant and animal cells have small structures inside known as **organelles**, each of these performs a certain role which allows the cell to survive



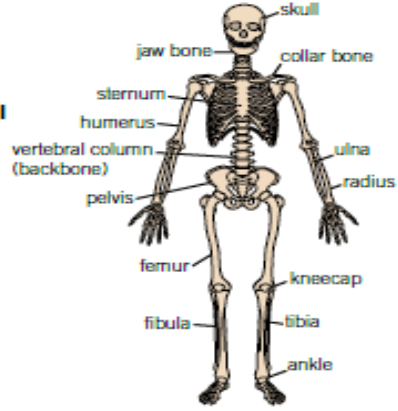
Labels: cell membrane, cytoplasm, mitochondria, nucleus, cell wall, chloroplasts

Specialised cells

- Specialised cells** are designed to carry out a particular function, because of this they have specific features and adaptations to allow them to carry this out
- Both plant and animal cells can be specialised, with these specialised cells working together to help the organism to survive

The skeleton

- The **skeleton** is made up of 206 **bones** which are a type of **tissue**
- Bones have a blood supply and are a living tissue
- The skeleton is part of the **muscular-skeletal system**
- The four main functions of the skeleton are:
 - To support the **body** – to keep you upright and hold **organs** in place
 - Protect organs – such as the skull protecting the brain
 - Movement – by working with muscles to allow you to move
 - Making blood cells – the **bone marrow** produces red and white blood cells



Labels: skull, jaw bone, collar bone, sternum, humerus, vertebral column (backbone), pelvis, femur, fibula, ulna, radius, kneecap, tibia, ankle

Muscles

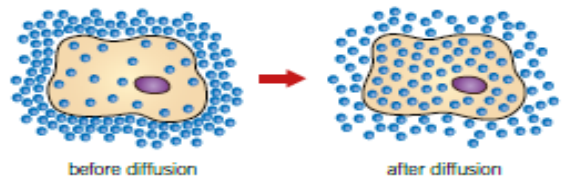
- Muscles** are a type of tissue which allows movement
- They pull on **tendons** which in turn pull on bones to allow movement
- Muscles like the **triceps** and **biceps** are known as **antagonistic muscle pairs**, they work together – as one contracts, the other will relax

Organs

- An organ is a group of tissues that have the same function
- They can work with other organs in an **organ system**, such as the respiratory system which uses organs like the heart and lungs to transfer oxygen around the body
- Vital organs are the organs that need to keep functioning for an **organism** to stay alive, e.g. the heart

Movement into and out of cells

- The process in which substances move into and out of cells is known as **diffusion**
- This occurs across the **cell membrane**
- During diffusion particles move from an area of high **concentration**, to an area of low concentration



Labels: before diffusion, after diffusion

- Oxygen and nutrients enter the cell by diffusion, carbon dioxide and waste products leave

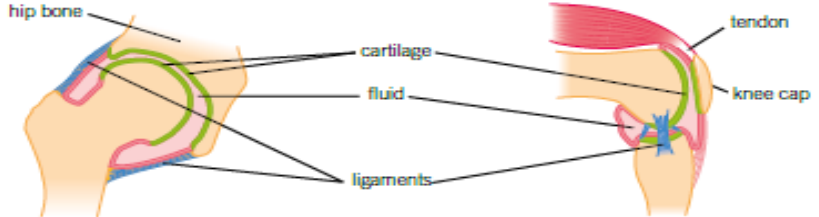
Movement

Joints occur between bones and allow movement, there are three main types of joints

Hinge	Ball and socket	Fixed
For back and forward movement, e.g. knees	For movement in all directions e.g. hips	Do not allow movement, e.g. skull

Joints have three main types of tissue:

Ligaments	Cartilage	Tendons
Connect bone to bone	Coats the end of bones as a protection	Connects bone to muscle



Labels: hip bone, cartilage, fluid, ligaments, tendon, knee cap

Key terms

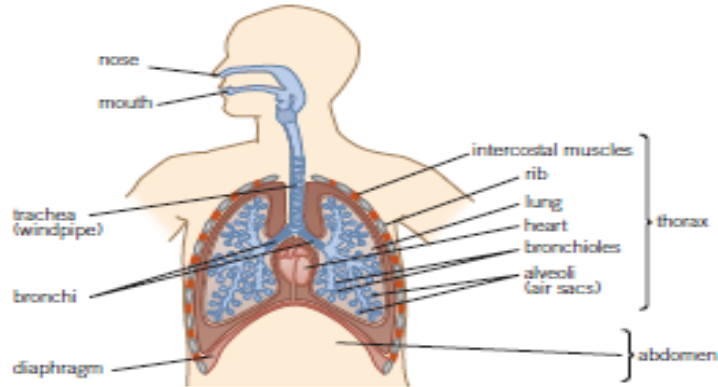
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antagonistic muscle pair bone bone marrow cartilage cell concentration diffusion joints ligaments microscope muscular skeletal system

nucleus organ organism organ system skeleton specialised cells tendons tissue

Gas exchange and breathing

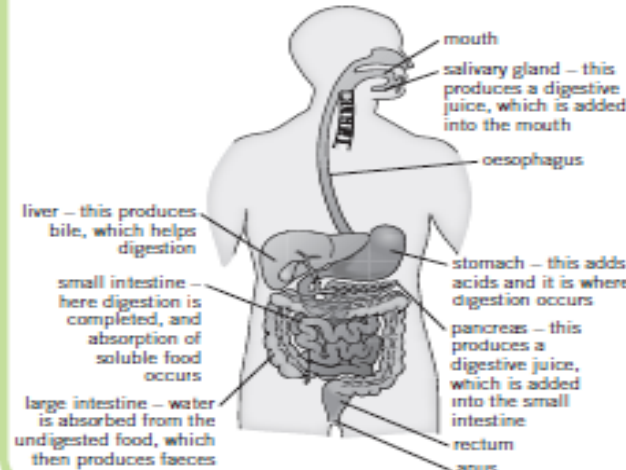
- **Gas exchange** is the process of taking in oxygen and giving out carbon dioxide
- This occurs in the **respiratory system**
- The proportions of gases in the air we **inhale** and **exhale** changes due to using oxygen in **respiration** and producing carbon dioxide



What happens when you breathe in and out

when you breathe in (inhale)	<ul style="list-style-type: none"> • muscles between the ribs contract • ribs are pulled up and out • diaphragm contracts and flattens • volume of the chest increases • pressure inside the chest decreases • air rushes into the lungs
when you breathe out (exhale)	<ul style="list-style-type: none"> • muscles between ribs relax • ribs are pulled in and down • diaphragm relaxes and moves up • volume in the chest decrease • pressure inside the chest increases • air is forced out of the lungs

The digestive system



Enzymes

- **Enzymes** are biological **catalysts**, they speed up the digestion of **nutrients**
- Each enzyme is specific to each nutrient
- The way the enzyme and nutrient bind with each other is called a **lock and key model**
- **Carbohydrases** break **carbohydrates** down into simple sugars
- **Proteases** break **proteins** down into amino acids
- **Lipase** breaks **lipids** (fats) down into fatty acids and glycerol



Drugs

- **Drugs** are chemicals that affect the way that our body works
- **Medicinal drugs** are used in medicine, they benefit health
- If medicinal drugs are not taken in the correct way they can harm health
- Examples include antibiotics and pain killers
- **Recreational drugs** are taken by people for enjoyment
- Recreational drugs normally have no health benefits and can be harmful for health
- Examples include alcohol and tobacco
- Drug **addiction** is when your body gets so used to a drug, it feels it cannot cope without it
- If someone who has an addiction stops taking the drug, they will experience **withdrawal symptoms**

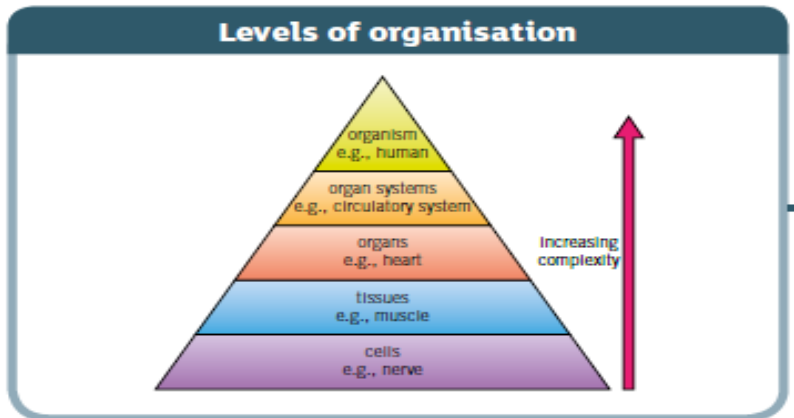
Nutrients

- A **balanced diet** involves eating the right amount of nutrients for your body to function
- Not eating enough of a nutrient means you have an unbalanced diet, and this can lead to a **deficiency**

Nutrient	Role in your body
carbohydrates	main source of energy
lipids	fats and oils provide energy
proteins	growth and repair of cells and tissues
vitamins and minerals	essential in small amounts to keep you healthy
water	needed in all cells and body fluids
fibre	provides bulk to food to keep it moving through the gut

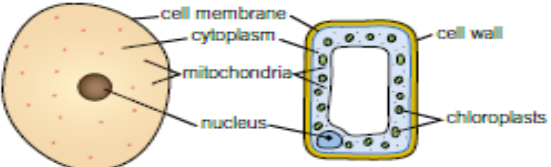
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addiction balanced diet carbohydrate carbohydrases catalyst deficiency drug enzyme exhale fibre gas exchange inhale lipid medicinal drug mineral nutrient protease protein recreational drug respiration respiratory system vitamin withdrawal symptoms



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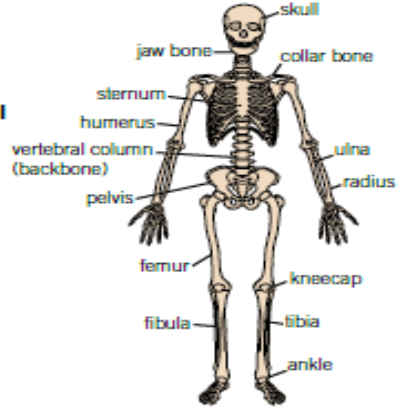
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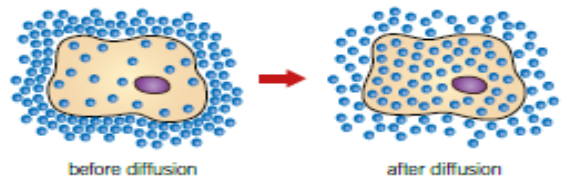
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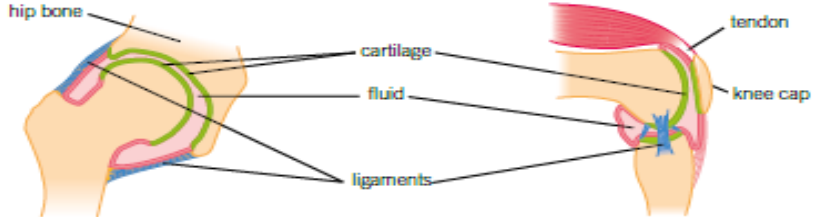
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Enzymes catalyse (increase the rate of) specific reactions in living organisms

An organ system in which organs work together to digest and absorb food.

Enzymes in digestion

The human digestive system

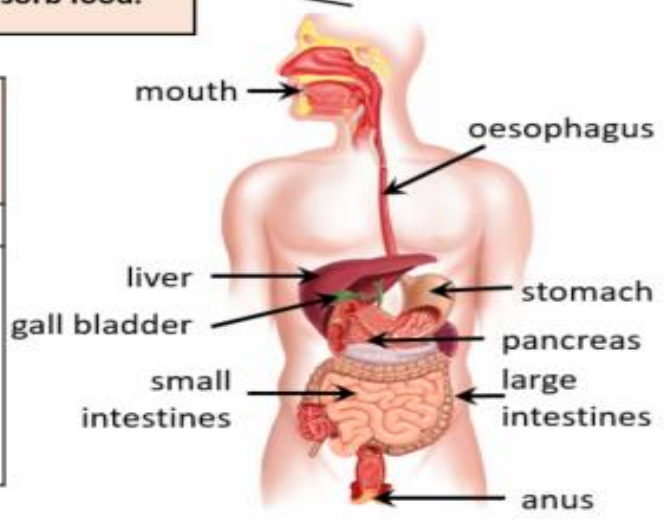
AQA GCSE ORGANISATION Part 1

Principles of organisation

Non-communicable diseases

Food tests

Cells, tissues, organs and systems

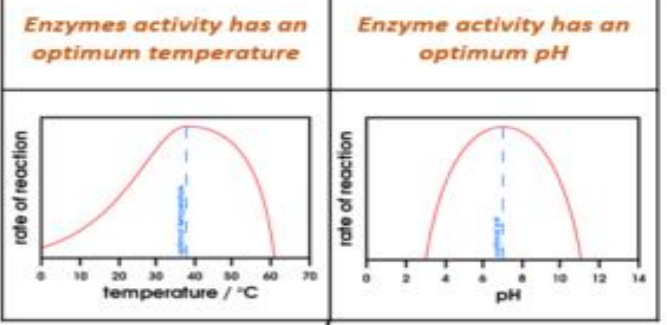


More energy consumed in food and drink than used
obesity
Linked to increased rates of cardiovascular disease and development of diabetes type 2.

Sugars (glucose)	<i>Benedict's test</i>	Orange to brick red precipitate.
Starch	<i>Iodine test</i>	Turns black.
Biuret	<i>Biuret reagent</i>	Mauve or purple solution.

Cells		<i>e.g. muscle cells</i>	The basic building blocks of all living organisms.
Tissues		<i>e.g. muscle tissue</i>	A group of cells with a similar structure and function.
Organs		<i>e.g. the heart</i>	Aggregations (working together) of tissues performing a specific function.
Organ systems		<i>e.g. the circulatory system</i>	Organs working together to form organ systems, which work together to form an organism.

The activity of enzymes is affected by changes in temperature and pH



Large changes in temperature or pH can stop the enzyme from working (denature)

<i>Temperature too high</i>	<i>pH too high or too low</i>
Enzyme changes shape (denatures) the substrate no longer fits the active site.	

The 'lock and key theory' is a simplified model to explain enzyme action



Enzymes catalyse specific reactions in living organisms due to the shape of their active site

Digestive enzymes speed up the conversion of large insoluble molecules (food) into small soluble molecules that can be absorbed into the bloodstream

Carbohydrases (e.g. amylase)		<i>Made in salivary glands, pancreas, small intestine</i>	Break down carbohydrates to simple sugar (e.g. amylase breaks down starch to glucose).
Proteases		<i>Made in stomach, pancreas</i>	Break down protein to amino acids.
Lipases		<i>Made in pancreas (works in small intestine)</i>	Break down lipids (fats) to glycerol and fatty acids.
Bile (not an enzyme)		<i>Made in liver, stored in gall bladder.</i>	Emulsifies lipids to increase surface area to increase the rate of lipid break down by lipase. Changes pH to neutral for lipase to work

The products of digestion are used to build new carbohydrates, lipids and proteins. Some glucose is used for respiration.

Farmers optimise conditions for making compost for use as a natural fertiliser.

Ecosystem	Environment	The conditions surrounding an organism; abiotic and biotic.
	Habitat	Place where organisms live e.g. woodland, lake.
	Population	Individuals of a species living in a habitat.
	Community	Populations of different species living in a habitat.

Surviving and reproducing	Competition	Plants in a community or habitat compete with each other for light, space, water and mineral ions. Animals compete with each other for food, mates and territory.
	Interdependence	Species depend on each other for food, shelter, pollination, seed dispersal etc. Removing a species can affect the whole community

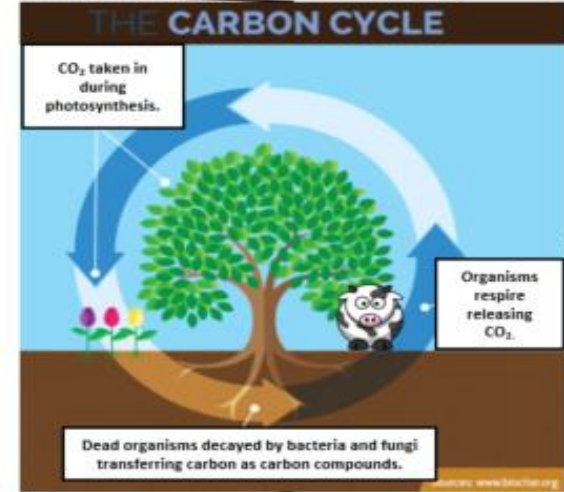
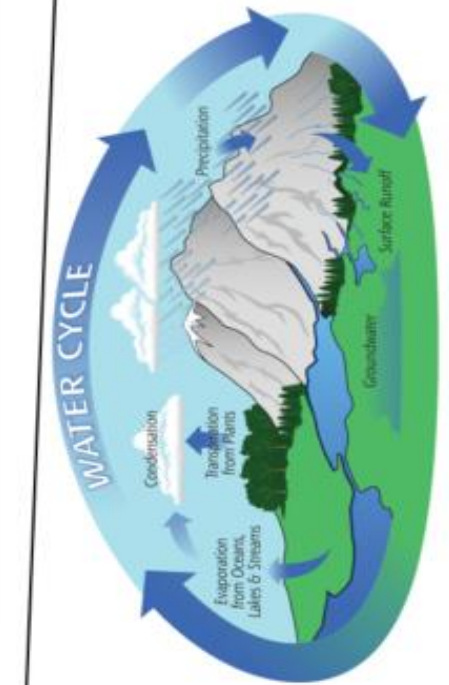
EXAMPLE: Introduction of grey squirrels to UK increased competition for food for red squirrels. The greys also carry a pathogen that kills reds.

Anaerobic decay in biogas generators produces methane gas, used as a fuel.

Organisms require a supply of materials from their surroundings and from the other living organisms.
Bacteria respire when breaking down dead organisms releasing CO₂.

Decomposition and material cycling

EXAMPLE: climate change is leading to more dissolved CO₂ in oceans lowering the pH of the water affecting organisms living there.



AQA GCSE ECOLOGY PART 1

Interdependence and competition

Abiotic	Biotic
Non-living factors that affect a community	Living factors that affect a community
Living intensity.	Availability of food.
Temperature.	
Moisture levels.	New predators arriving.
Soil pH, mineral content.	
Wind intensity and direction.	New pathogens.
Carbon dioxide levels for a plant.	
Oxygen levels for aquatic organisms.	One species outcompeting so numbers are no longer sufficient to breed

Abiotic and biotic factors.

Adaptations

Organisms adaptations enable them to survive in conditions where they normally live.

Adaptations may be structural, behavioural or functional.

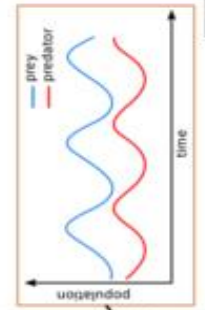
Materials are recycled to provide the building blocks for future organisms

Photosynthetic organisms are the producers of biomass for life on Earth

Factors affecting rate of decay
Temperature, water, oxygen
Increase the rate of decay. In enzyme controlled reactions raising the temperature too high will denature the enzymes.

Breakdown of dead organisms releases mineral ions can into the soil.

Food chains			
Feeding relationships in a community			
Producer	Primary consumer	Secondary consumer	Tertiary consumer
Grass	→ Grasshopper	→ Mouse	→ Owl
All food chains begin with a producer e.g. grass that is usually a green plant or photosynthetic algae.		Consumers that kill and eat other animals are predators and those eaten are prey.	



In a stable community the numbers of predators and prey rise and fall in cycles.

Adaptations		
Plants	Animals	Extremophiles
Cactus in dry, hot desert	Polar bear in extreme cold artic	Deep sea vent bacteria
No leaves to reduce water loss, wide deep roots for absorbing water.	Hollow hairs to trap layer of heat. Thick layer of fat for insulation.	Populations form in thick layers to protect outer layers from extreme heat of vent.