Nutrients

- the three macronutrients: carbohydrates, fats and proteins
    - all contain oxygen, carbon and hydrogen
    - protein also has nitrogen and sulfur

Tests

Starch – iodine solution

- add iodine solution into the food
- if it turns blue-black: starch is present
- if it stays orange/yellow: no starch is present

Reducing sugars - Benedict's solution

- e.g. glucose
- add benedict solution and heat it in a hot water bath
- turns from blue to green to yellow and finally red if sugars are present

Protein - biuret test

- use Fehling's Solutions A and B
- add sodium hydroxide to the solution and shake well
- then add pale blue copper sulphate solution
- should turn purple if present

Fats - ethanol

- involves adding very small amounts of ethanol
- shake or crush the food to make it dissolve
- filter or dilute the food and ethanol
- mix so that you get a clear liquid
- add to a test tube of water
- a white emulsion (milk-like) indicates the presence

Importance of macronutrients

Carbohydrates

- needed to give the body energy
- starch and sugar are the two types of carbohydrates
    - starch is found in cereals, corn flour, potatoes, pasta and flour
    - sugar: fruit, veg, honey, milk

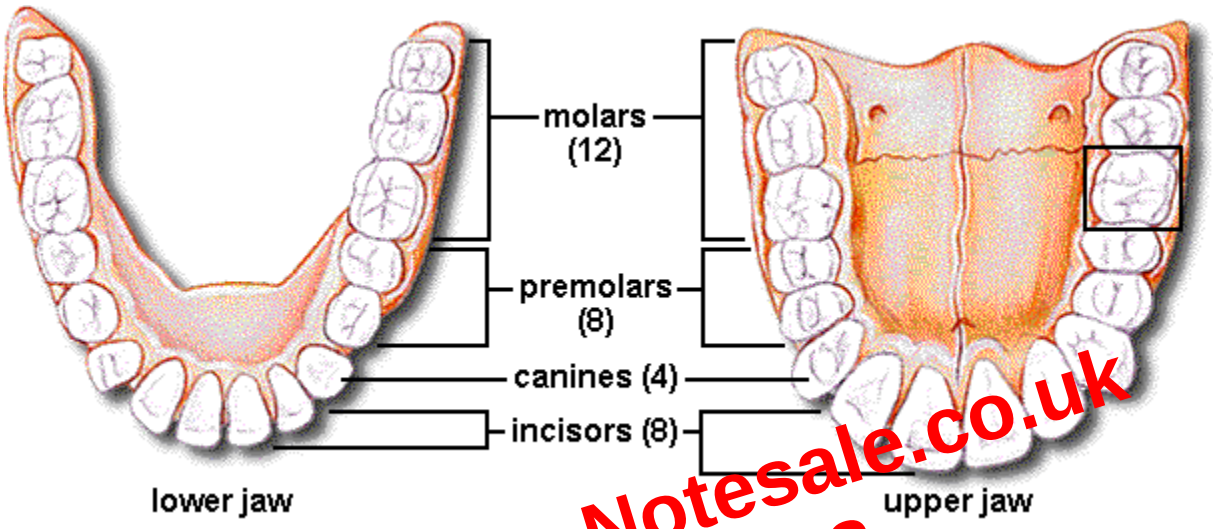
Fats

- help to provide concentrated sources of energy
- help to insulate the body in cold weather
- saturated fats: obtained from animal sources, e.g. butter and lard
- polyunsaturated fats – vegetable sources e.g. sunflower oil

Oral health

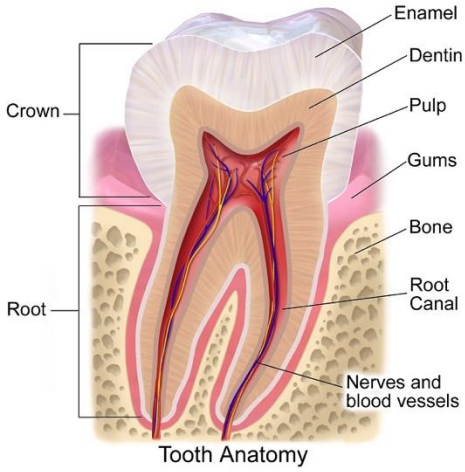
Types of teeth

- incisor: for cutting and biting
- canine: for holding and cutting
- premolars: for chewing and crushing
- molars: chewing and crushing



Structure of the human teeth

- crown: part of the teeth that shows
- root: embedded in the jawbone
- enamel: hardest tissue, made of calcium salts, the top of the teeth
- cement: helps to anchor the tooth to the jaw
- pulp cavity: contains tooth-producing cells, blood vessels and nerve endings which detect pain
- dentine: very hard, contains series of fine canals which extend to the pulp cavity
- gum: covers the junction between the enamel and cement
- membrane: has nerve endings which detect pressure during chewing and biting



Tooth Anatomy

Transport in plants

How water travels through the plant

1. Osmosis occurs to move water and inorganic ions from the soil to the root hair cells, down a concentration gradient
2. the inorganic ions and water travel to the xylem tube, which moves them to the leaves
3. the water and inorganic ions leave the xylem and is absorbed by the cells in the leaves

Transpiration: the evaporation of water at the surface of the mesophyll cells followed by loss of water vapor from plant leaves, through the stomata

Wilting: occurs if water loss exceeds water uptake – cells become flaccid and tissues become limp

Transport in humans

Circulatory system: the system in which blood is pumped around the body

- we need this system to transport oxygen and nutrients to our body cells for respiration

Valves

- they control the direction of the flow of blood in the body
- they ensure blood flows one way
  - they do this by opening and closing – prevent back flow

The body contains a 'double circulatory system' – one circuit pumps blood to the lungs – blood becomes oxygenated

- the oxygenated blood then enters the second circuit, which takes oxygen both to the brain and the entire body

The heart

Pulmonary veins: transports oxygenated blood from the lungs to the left atrium

Aorta: transports oxygenated blood from the heart to the rest of the body and the brain

Vena cava: transports deoxygenated blood from the body to the heart

Pulmonary artery: transports deoxygenated blood from the heart to the lungs

Hepatic portal vein: transports blood from the alimentary canal to the liver, blood is rich in nutrients to be produced by the liver

Renal artery: supplies kidney with oxygenated blood

Gas exchange systems

Parts of the gas exchange system: in lungs

Trachea
- windpipe
- tube that carries air towards the lungs
- C-shaped rings of cartilage prevent the trachea from collapsing

Larynx
- voice box
- air passes through here during breathing

Bronchus
- first branch from the trachea
- one bronchus for each lung

Bronchiole
- final branch
- very fine branch leading into the alveolus

Alveoli
- tiny round spaces filled with air and surrounded by capillaries

Alveolus
- air sacs
- where gas exchange takes place

Pulmonary artery
- delivers deoxygenated blood at high pressure from the right ventricle of the heart to lungs

Pulmonary vein
- returns oxygenated blood to the heart

Inside the alveolus
- deoxygenated blood enters
- oxygen diffuses into red blood cells
- carbon dioxide diffuses out of the blood plasma
- oxygenated blood moves towards the body

Homeostasis
Definition: the maintenance of a constant internal environment

Maintenance of a constant body temperature

Sweating
- sweat glands near the surface of the skin begin to secrete sweat in hot, humid weathers
- the sweat absorbs the bodies heat and allows it to evaporate
- the vessels are bought near to the surface of the skin to reduce distance heat has to travel to escape
- sweating allows the body to cool down

Shivering
- muscles in limbs start to contract and relax
- this increases the rate of respiration and the amount of energy released
- shivering heats up the body

Vasodilation
- dilatation of blood vessels
- decreases blood pressure
- allows the body to quickly lose heat
- the lumens of blood vessels (arterioles – small branch of a artery, leading into capillaries) start widening
- this increases the amount of blood flow flowing to the surface of the skin
- heat is then lost by radiation and through sweating

Vasoconstriction
- constriction of blood vessels
- increases blood pressure
- causes arterioles to be lower to reduce the amount of blood flowing to the surface skin
- less heat is lost results in shivering

Concept of negative feedback
- ensures that changes are reversed and returned back to the set level
    - e.g. temperature changes, glucose levels

Process
1. blood temperature changes with body internal temperature
2. when blood vessels flow through the brain, the hypothalamus detects this change
3. it sends electrical impulses to the rest of the body so that it can start heating or cooling itself