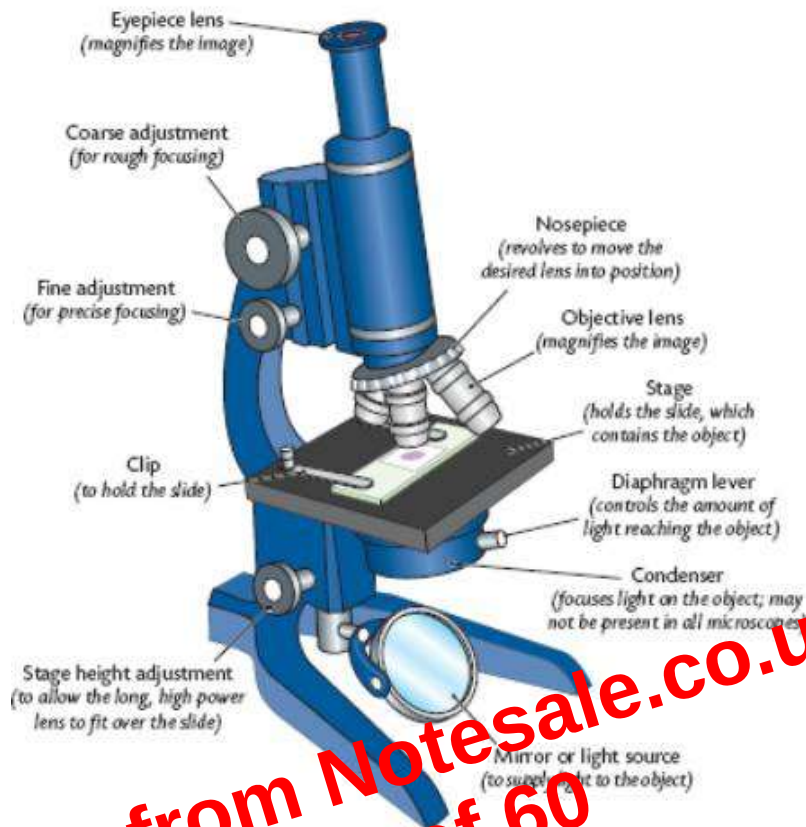


BIOLOGY REVISION

12.9.16 – CB1 KEY CONCEPTS



- allow us to see what isn't visible to the human eye
- Discovered in the 17th century by Antony Van Leeuwenhoek
- Maximum magnification usually x1500
- Use of light beams
- Lower resolution than electron microscopes

MAGNIFICATION – how many times bigger the image is in comparison to the original image

RESOLUTION – the minimum distance between two images before they aren't recognised as separate images (clear)

Using a light microscope –

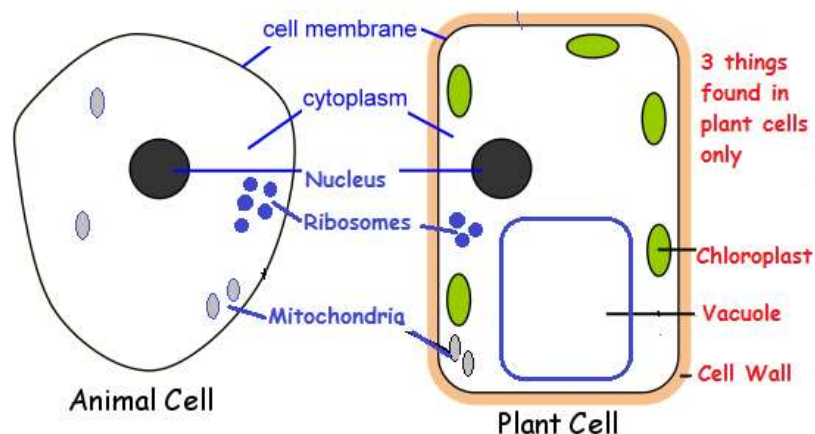
- Select the lowest power objective lens (x4)
- Place slide on stage, fasten with clips to secure – stain/cover slip specimen if necessary
- Look through objective lens, turn coarse focus knob to move down/up into focus
- Use fine adjustment to enhance vision
- Now change objective lens, make sure not to touch stage

SCALE BARS - A line drawn on a magnified image that shows a certain distance at that magnification

- When finding real size from scale diagram, multiply size times scale

21.9.16 -PLANT AND ANIMAL CELLS (CB1A)

STRUCTURE	FUNCTION	FOUND IN?
Nucleus	Controls the cell, contains genetic information (DNA)	Animal and plant cells
Cell membrane	Controls what leaves and enters the cell, holds it together (inner)	Animal and plant cells
Cytoplasm	Substance where most the chemical reactions occur	Animal and plant cells
Mitochondria	Where the respiration occurs, powerhouse	Animal and plant cells
Chloroplast	Where photosynthesis occurs, contains chlorophyll - absorbs light energy	plant cells
Cell wall	Holds the cell in place and supports it, made of cellulose (outer)	plant cells
Vacuole	Contains sap, maintains the cell's rigidity	plant cells
Ribosome	Where the making of protein occurs (protein synthesis)	Animal and plant cells



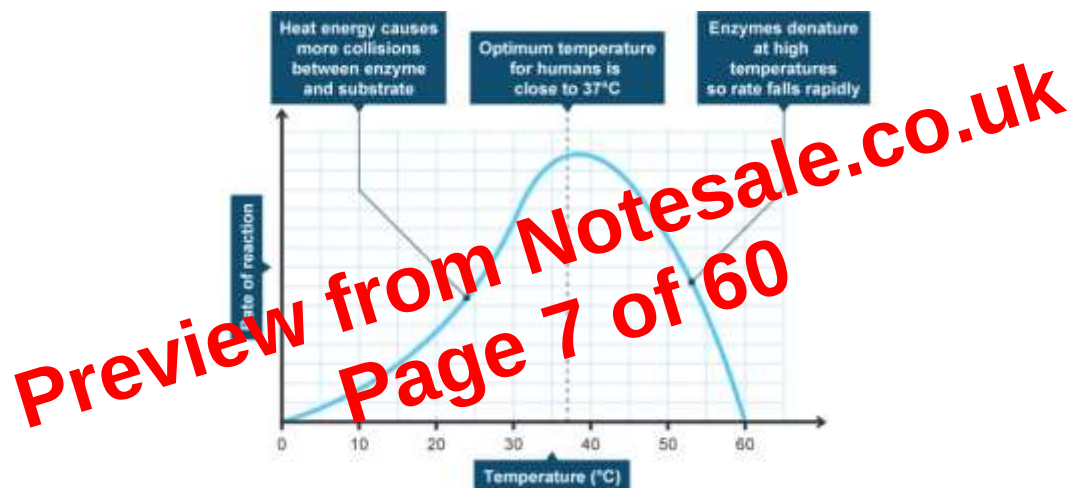
27.10.16 – ENZYME ACTIVITY (CB1G)

1. A solution of enzymes is mixed with a solution of substrates
2. One substrate molecule fits neatly into the active site of the enzyme, like a key into a lock
3. Some bonds in the substrate molecule break causing the formation of two product molecules
4. The product molecules are a different shape to the substrate, so they no longer fit into the active site and are then released
5. The active site of the enzyme molecule is free to accept another substrate molecule

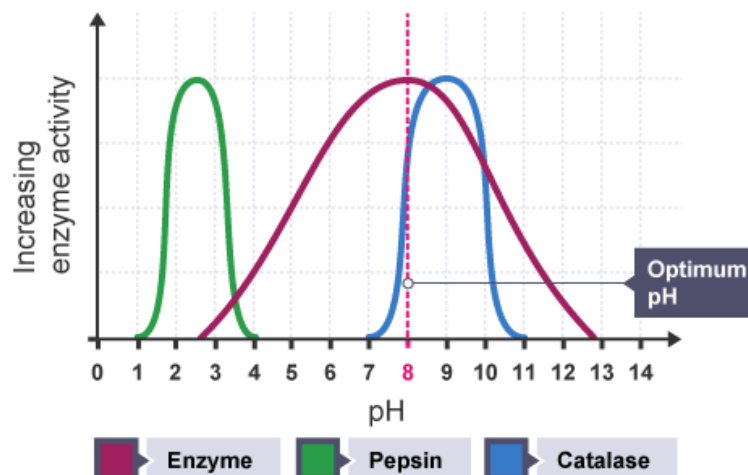
Factors that affect the rate of an enzyme-controlled reaction –

- Temperature
- pH level
- Substrate concentration

Effect of temperature –



Effect of pH level –



8.5.17 - CB5A HEALTH AND DISEASE

GOOD HEALTH – more than simply feeling well, but at a state of complete **physical** (staying fit, preventing harm), **social** (family/friends, communications, relationships) and **mental** (feeling happy, positive) well being

Lack of	Causes	Problems	Cure with
Protein	Kwashiorkor	Small muscles	Meat, fish, dairy
Vitamin c	Scurvy	Bleeding gums, joint problems	Citrus fruits and some vegetables
Vitamin d/calcium	Rickets/osteomalacia	Soft bones	Dairy products
Iron	Anaemia	Less/smaller red blood cells	Red meat, dark vegetables

Excising in groups improving you're -

Physical well-being – keeps you fit, exercise

Social well-being – taking part in a group, improving social skills and building relationships

Mental well-being – helps to release stress and anxiety

DISEASE – an illness that prevents the body from functioning properly

COMMUNICABLE – any disease that can be spread from one person to another through

INCOMMUNICABLE – when a disease can't be spread from person to person

- One disease can increase chances of other diseases
- Damages immune system, making you more prone to disease
- Damages body's barriers and defence system
- Allows pathogens to enter body more easily

9.5.17 – NON-COMMUNICABLE DISEASES CB5B

Causes –

- Genetic – faulty alleles within DNA (cystic fibrosis, Parkinson's)
- Diet – poor diet/malnutrition (anorexia, anaemia)
- Lifestyle – amount of exercise/drug intake (obesity, stroke)

Large alcohol consumption – requires liver to break down large sums of ethanol (drugs), causing great damage (Leads to liver disease, cirrhosis)

Waist: hip measurement –

- Measuring abdominal fat which is closely related to cardiovascular disease
- Higher the ratio, higher the chance of cardiovascular disease

Causes of CVD – obesity, lack of exercise, smoking, drug consumption, over exercise, high blood pressure, high cholesterol, diabetes (type 2)

Preventing CVD – balanced/healthy diet, regular exercise, changing lifestyle if necessary and maintaining healthy weight

- More important to prevent rather than treat as can be fatal before treatment given and reduces life expectancy

17.5.17 – **SMOKING AND DISEASE**

HEART ATTACK – blood can't access part of the heart due to blockage in vessel

STROKE – blood and oxygen can't reach part of brain due to clot in vessel

- Smoking can increase chance of stroke and heart attack due to it depositing fats in the vessels, making it hard for blood to travel pass and reach heart/brain

Treating CVD –

- **Medicine** – ACE (reduces blood pressure and stress on heart), aspirin (thins blood to reduce chance of clot) and beta blocker (slows down the heart and reduces its activity)
- **Angioplasty** – balloon like structures inserted into vessels, expand to increase size and stent used to maintain shape
- **Bypass surgery** – new blood vessel used to replace faulty one
- **Heart transplant** – replacing the faulty heart with a more healthy one

18.5.17 – **CB5D PATHOGENS**

PATHOGENS – micro-organisms that spread disease (communicable)

SECONDARY INFECTION – an infection due to the immune system being weakened previously by a different pathogen

1. **BACTERIA** – produce toxins that damage host tissue
2. **VIRUSES** – break open and destroy white blood cells
3. **FUNGI** – digest living cells and destroy them
4. **PROTISTS** – take over cells and break them down

Viruses causing disease –

- Infect body cells
- Take over body cells DNA
- Begin to produce toxins
- Damages cell when new viruses released

- Lack of good hygiene
- Poor sanitation
- Insufficient amounts of food

Outbreak of cholera –

- Occurred in large cities before 20th century
- Communicable disease
- Causes severe diarrhoea
- 1854 outbreak in London
- Thought it was due to contaminated air
- Human waste was collected outside houses
- Notice of 500 deaths within 10 days, all in same area

VECTOR – something that carries the pathogen onto the organism

DIRECT CONTACT – micro-organisms are passed from one human to another by close contact (contact, air borne, sexual intercourse, HIV, blood)

INDIRECT CONTACT - pathogens travel from one individual to another indirectly (water, vectors, food, body fluids, sharing of needles)

VEHICLE BORNE – microbes carried by non-living things

VECTOR BORNE – microbes carried by other living things

HYGIENE - keeping things clean by removing/killing pathogens

ORAL ROUTE – when something enters the body through the mouth

EPIDEMIC – when many people over a large area are affected with the same pathogen/disease at the same time

Factors that affect transmissions of communicable diseases –

- Poor sanitation
- Overcrowding
- Lack of nutrition
- Medical provisions
- Compromised immune system
- Quality of hygiene and sanitation
- Climate change
- Poor waste removal

24.5.17 – **CB5F PHYSICAL AND CHEMICAL BARRIERS**

PHYSICAL AND CHEMICAL BARRIERS – prevent entry of pathogens

CHEMICAL DEFENCE – use of chemical compounds to defend against attacks

PHYSICAL BARRIER – structure that stops something entering the body

8.6.17 – CB5G THE IMMUNE SYSTEM

Immune system consists of –

- Tonsils and adenoids
- Thymus
- Spleen
- Peyer's patch
- Bone marrow
- Appendix
- Lymph nodes

- In some cases, pathogens pass through the chemical and physical barriers, into the body

- Immune system becomes active in attempt to protect body

Two types of white blood cells –

1. **PHAGOCYTES** – engulf and trap bacteria
2. **LYMPHOCYTES** – produce specific antibodies

ANTIGEN – proteins on the outside of all cells and virus particles, white blood cells are able to detect pathogens because of their antigens (makes them recognisable)

ANTIBODY – a protein produced by lymphocytes, attaches to specific antigen on a microorganism and helps to destroy/neutralise it



Immune response to a first-time infection by pathogen –

1. Pathogen enters body (all those of the same type have the same antigen on their surface)
2. Pathogens in blood come in contact with lymphocytes, different variations have different antibodies on their surface
3. Antibodies match antigens and slot together to attack pathogen and become activated
4. Activated lymphocytes divide rapidly to produce many identical copies with the same antibodies on the surface
5. Some of the lymphocytes release antibodies into the blood
6. Antibodies attach to pathogens and cause them to die
7. When all are dead, a few memory lymphocytes remain in blood

Adaption	Purpose
Epidermis is thin and transparent	To allow more light to reach the palisade cells
Thin cuticle made of wax	To protect the leaf without blocking out light
Palisade cell layer at top of leaf	To absorb more light
Spongy layer	Air spaces allow carbon dioxide to diffuse through the leaf, and increase the surface area
Palisade cells contain many chloroplasts	To absorb all the available light
Large surface area	To absorb more light
Thin	Short distance for carbon dioxide to diffuse into leaf cells
Chlorophyll	Absorbs sunlight to transfer energy into chemicals
Network of veins	To support the leaf and transport water and carbohydrates
Stomata	Allow carbon dioxide to diffuse into the leaf

CB6B – FACTORS EFFECTING PHOTOSYNTHESIS –

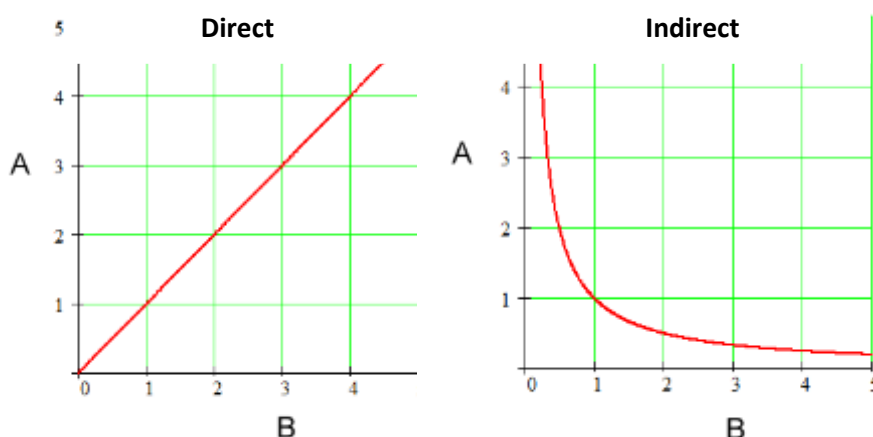
1. Light intensity
2. CO₂ concentration
3. Temperature
4. No. of chloroplasts
5. Chlorophyll concentration
6. Water availability

LIMITING FACTOR - a single factor, when in short supply, can affect rate of a process

- When specific factor increases (i.e light), it is no longer a limiting factor, however others remain
- As temperature increases, rate also increases, up until it reaches the optimum temperature whereby enzymes denature and rate falls

DIRECT PROPORTION – the two values correspond to one another, whereby one increases, so does the other

INDIRECT PROPORTION – the two values are indirect to one another, whereby one increases, the other decreases



CELL TYPE	FUNCTIONS	ADAPTATIONS
ROOT HAIR CELL	Absorbs water and mineral ions	- Large S.A to increase rate of absorption - Mitochondria for active transport
XYLEM CELL	- Carries water and mineral ions up to plant tissue - Supports the plant	- No cell wall at ends so liquid can pass through cells - Dead cells with no cytoplasm to form tubes - Pores to allow water and ions to enter and exit - Thick side walls and rings of lignin
PHLOEM SIEVE CELL	Carries sucrose around plant	- Pores to allow movement of liquid - Large central channel in tube
PHLOEM COMPANION CELL	Supplies sugar to sieve cells	Mitochondria to release energy to pump sucros
GUARD CELL	Pairs open and close stomata	Difference in cell wall thickness causing shape change

7.9.17- CB7A HORMONES

HORMONES – Chemical released in certain parts of body, carried within blood

- Produced in endocrine glands
- Act like messengers
- Carried from organ to organ in blood stream
- Isn't very efficient (travels at rate of blood flow)
- Every hormone has its own target organ and will only fit into its receptor site
- Cause organs to respond in their presence
- Removed from body through kidneys

	Type of signal	Transmission	Effectors	Type of transmission	Speed and duration
Nerve cells	Electrical	Nerve cells	Muscle/glands (specific)	Muscle contraction	Rapid and short
Hormones	Chemical	bloodstream	Target cells in blood (general)	Chemical change	Slow and long

Animals -

- Food (energy/respiration)
 - Water (cell hydration/ blood plasma formation)
 - oxygen (respiration)
 - shelter (health/protection)
- Organisms are continually interacting with one another within their environments
 - all the organisms living/interacting in an ecosystem form a community
 - community is made up of populations, of different species
 - all depend on one another for resources, interdependent
 - each population lives in a particular habitat within eco.s
 - habitat includes other organisms that affect the population and environment

Measuring population -

- Measuring population size by counting all the organisms is impossible
- Instead, can be estimated by taking samples using a quadrant
- Placed randomly in the area, and number per each quadrant is counted to gain a more accurate result

$$\text{population size} = \frac{\text{number of organisms in all quadrats}}{\text{total area of quadrats}} \times \frac{\text{total size of area where organism lives}}{\text{total area of quadrats}}$$

FOOD WEB – shows the feeding relationships between organisms in a community

PRODUCER – organisms which produce their own food using light energy from the sun, CO₂, O₂ and water (plants)

PRIMARY CONSUMER/HERBIVORE – organisms that feed directly off of producers for food, only eats plants

SECONDARY CONSUMER – organisms that feed off of other consumers, eat other animals

CARNIVORE – organisms that only eat other animals for food

OMNIVORE – organisms that eat both other plants and animals

TERTIARY CONSUMER – high level consumer, often the top predator of ecosystem/food chain

HETEROTROPHIC – organisms which use organic substrates to get their energy, carbon and nutrients for growth and development

DECOMPOSERS – organisms which break down dead or decaying organisms, and whilst doing so, perform decomposition

20.2.18 – CB9B/C BIOTIC AND ABIOTIC FACTORS