Revision Guide

AQA GSCE Trilogy Biology Paper 2 Higher

Name: Class:

10 Minutes on....

Homeostasis

Key Term	Definition	Example
Homeostasis	The regulation of internal conditions of a cell or organism to maintain optimum conditions.	Control of blood glucose levels. Water Levels Body Temperature
Receptor	Cells that detect a stimuli.	Rod and cone cells in the eye.
Stimuli	A change in the environment.	Change in temperature.
Coordination Centres	A structure such as the brain, spinal cord and pancreas which receive and process information from receptors.	Brain, spinal cord, pancreas.
Effectors	A muscle or gland that brings about a response.	Muscle or gland.

Examples of homeostasis.

Examples of homeostasis include control of blood glucose concentration, control of body temperature and control of water levels in the body.

Why homeostasis is important.

Homeostasis is important because it maintains optimal conditions for enzyme action and all cell functions.

10 Minutes on....

Nervous System

Key Term	Definition
Nervous System	A system that enables animals to react to their surroundings and to coordinate their behaviour.
Central Nervous System	The brain and spinal cord.
Sensory Neurone	Transmit impulses from receptors to relay neurones.
Synapse	A gap between neurones.
Relay Neurone	Transmit nerve impulses within the CNS.
Motor Neurone	Transmit impulses from relay neurones to effectors.

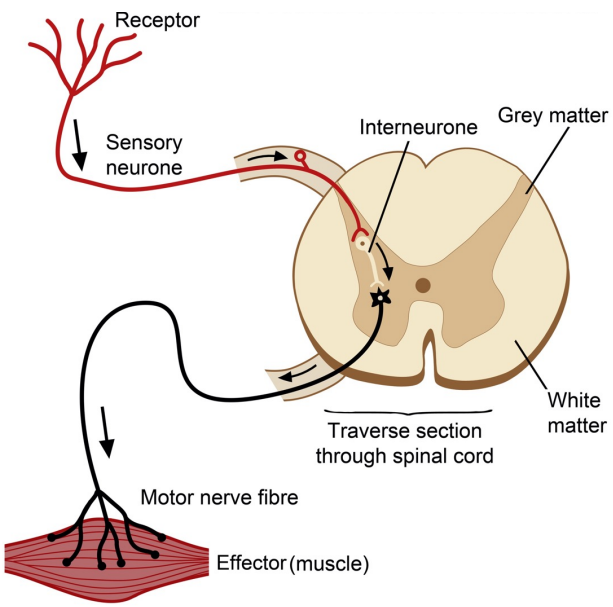
Model of a Reflex Arc

Receptor detects a change and generates an electrical impulse.

Impulse travels along the sensory neurone and crosses a synapse.

The impulse is processed by a relay neuron and the impulse then travels along a motor neurone to the effector.

The effector brings about a response.



10 Minutes on....

Reaction Time RP

A method to investigate the effect of a factor on reaction time.

1.
Person catching sits down, rests weaker arm across the table, with the hand overhanging the edge.

2.
Person dropping the ruler holds it so that the bottom end of the ruler is in line with the catches thumb and forefinger.

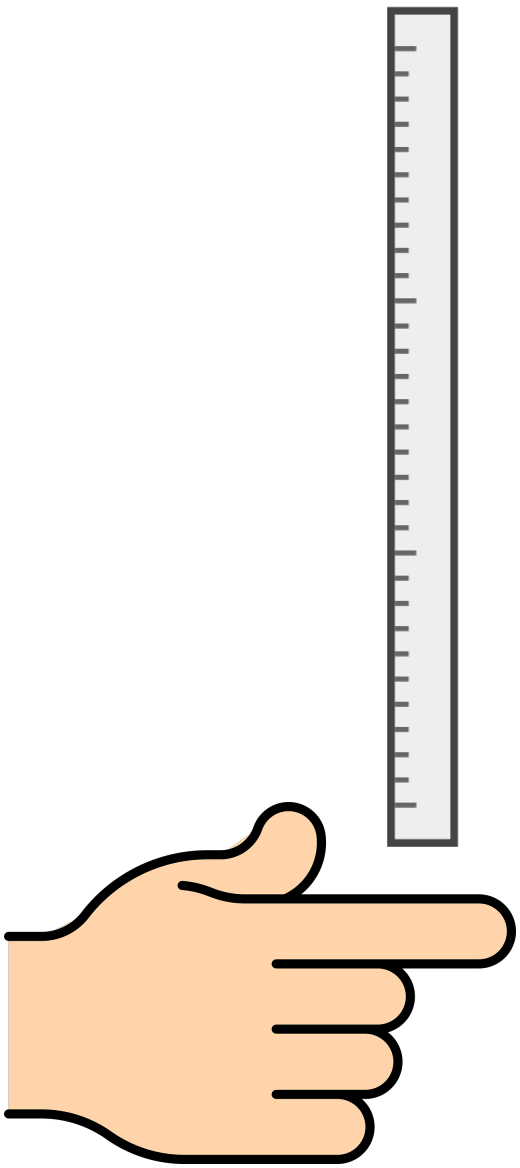
3.
Without warning the ruler is dropped.

4.
The other person catches the ruler and the distance the ruler fell is recorded.

5.
Repeat this several times.

6.
Identify outliers and calculate an average distance dropped.

7.
Convert this distance dropped to a reaction time using a table.`



If you were investigating the effect of caffeine, you could repeat this with increasing quantities of caffeine.

10 Minutes on....

Endocrine System

Key Term	Definition
Endocrine System	A system composed of glands which secrete chemicals called hormones into the bloodstream.
Master Gland	A gland that controls the function of other glands.
Pituitary Gland	A small master gland attached to the base of the brain that is important in controlling growth and development.
Pancreas	A leaf shaped gland behind the stomach that releases digestive enzymes and the hormones insulin and glucagon.
Thyroid	A gland in the neck that makes the hormone thyroxine.
Adrenal Gland	A located at the top of each of each kidney which releases adrenaline
Ovary	A gland found in the female reproductive system that secretes oestrogen and progesterone.
Testes	A gland found in the male reproductive system that secretes testosterone.

How the endocrine system works.

The endocrine system is composed of glands which secrete chemicals called hormones directly into the bloodstream. The blood carries the hormone to a target organ where it produces an effect. Compared to the nervous system the effects are slower but act for longer.

10 Minutes on....

Control of Blood Glucose

Key Term	Definition
Pancreas	A leaf shaped gland behind the stomach that releases digestive enzymes and the hormones insulin and glucagon.
Insulin	A hormone produced by the pancreas that causes glucose to move from the blood into cells.
Glycogen	A hormone produced by the pancreas that causes glycogen to be converted into glucose.

What happens when blood glucose levels rise.

If the blood glucose concentration is too high, the pancreas produces the hormone insulin that causes glucose to move from the blood into the cells. In liver and muscle cells excess glucose is converted to glycogen for storage.

What happens when blood glucose levels fall.

If the blood glucose concentration is too low, the pancreas produces the hormone glucagon that causes glycogen to be converted into glucose and released into the blood.

10 Minutes on....

Diabetes

Diabetes	Description	Treatment	Prevention
Type 1	A disorder in which the pancreas fails to produce sufficient insulin. It is characterised by uncontrolled high blood glucose levels	Insulin injections	Can't be prevented.-
Type 2	In Type 2 diabetes the body cells no longer respond to insulin produced by the pancreas.	A carbohydrate controlled diet and an exercise regime are common treatments.	Eat a healthy balanced diet and exercise regularly.

Risk factors of Type 2 diabetes.
Obesity, family history, age

Comparing Type 1 and Type 2 diabetes.

Type 1 diabetes usually appears early in life while type 2 diabetes appears later. Type 1 is a genetic disease while Type 2 diabetes is linked to lifestyle and develops over time. Type 1 diabetes cannot be prevented while Type 2 diabetes can be prevented through making changes to lifestyle. A risk factor for both is a family history. In type 1 diabetes the body produces little or no insulin, while in type 2 diabetes insulin is produced, but the body cells do not respond to it.

10 Minutes on....

Human Reproduction

Key Term	Definition
Menstrual Cycle	The process of menstruation and ovulation in females.
Puberty	A stage of development in which reproductive hormones cause secondary sex characteristics to develop.

Hormone	Where it is Produced	What it Does
Testosterone	Testes	Stimulates sperm production.
Oestrogen	Ovaries	Involved in maintaining the uterus lining. Inhibits FSH production and stimulates production of LH.
Progesterone	Ovaries	Involved in maintaining the uterus lining. Inhibits FSH and LH production.
FSH	Pituitary Gland	Causes maturation of an egg in the ovary. Stimulates release of oestrogen.
LH	Pituitary Gland	Stimulates the release of the egg.

10 Minutes on....

Contraceptives

Contraceptive	Hormonal/ Non-Hormonal	What it Does	+	-
Oral	Hormonal	Contain hormones to inhibit FSH production so that no eggs mature	Can reduce some types of cancer	Risk of high blood pressure.
Injection	Hormonal	Slow release progesterone to inhibit the maturation and release of eggs for a number of months	Don't have to remember to take a pill everyday.	Side effects
Barrier Method	Non-Hormonal	Prevent the sperm reaching an egg	Easy to use	Can tear or rip.
Intrauterine Device	Hormonal	Prevent the implantation of an embryo or release a hormone	Can remain in position for a long time	Risk of ectopic pregnancy.
Spermicidal Agents	Non-Hormonal	Kill or disable sperm	Can be added to a barrier contraceptive	Can cause allergic reactions
Abstaining	Non-Hormonal	Not having intercourse when an egg may be in the oviduct	Cam be used for religious reasons.	If timings are not accurate the chance of pregnancy is high.
Surgical Methods	Non-Hormonal	Sterilisation	Effective a preventing pregnancy.	Can't be reversed

10 Minutes on....

Infertility

Process of IVF.

1. IVF involves giving a mother FSH and LH to stimulate the maturation of several eggs.
2. The eggs are collected from the mother and fertilised by sperm from the father in the laboratory.
3. The fertilised eggs develop into embryos.
4. At the stage when they are tiny balls of cells, one or two embryos are inserted into the mother's uterus (womb).

Advantages	Disadvantages
It works where other fertility treatments fail.	It is very emotionally and physically stressful.
Can use donated sperm or eggs.	The success rates are not high.
Increases the chance of having a healthy baby.	It can lead to multiple births which are a risk to both the babies and the mother.

10 Minutes on....

Negative Feedback

Effect adrenaline has on the body.

Adrenaline is produced by the adrenal glands in times of fear or stress. It increases the heart rate and boosts the delivery of oxygen and glucose to the brain and muscles, preparing the body for 'flight or fight'.

Effect thyroxine has on the body.

Thyroxine from the thyroid gland stimulates the basal metabolic rate. It plays an important role in growth and development.

How thyroxine levels are controlled by negative feedback.

When thyroxine levels in the bloodstream are low this causes the pituitary gland to release a hormone (thyroid stimulating hormone) which stimulates the thyroid to release more thyroxine. When thyroxine levels are normal the pituitary gland doesn't release as much of the hormone (TSH) which then inhibits the release of thyroxine from the thyroid gland. This is negative feedback. Negative feedback is a mechanism where changes to conditions cause an action to reverse the change, to keep conditions stable.

10 Minutes on....

Reproduction

Key Term	Definition
Meiosis	A type of cell division that results in four daughter cells each with half the number of chromosomes of the parent cell,
Mitosis	A type of cell division in which two identical daughter cells are produced.
Sperm Cell	A male sex cell found in animals.
Egg Cell	A female sex cell.
Pollen	A male sex cell found in plants.
Sexual Reproduction	A type of reproduction in which a male and female sex cell fuse together.
Asexual Reproduction	A type of reproduction that only involves one parent.
Clone	Organism that is genetically identical to another.

Comparing sexual and asexual reproduction

- In sexual reproduction there are 2 parents while in asexual there is one.
- Sexual reproduction involves sex cells, asexual does not.
- Sexual reproduction involves meiosis and mitosis, asexual reproduction just involves mitosis.
- Offspring in sexual reproduction show genetic variation, while clones are produced in meiosis.

10 Minutes on....

Meiosis

Key Term	Definition
Meiosis	A type of cell division that results in four daughter cells each with half the number of chromosomes of the parent cell,
Gamete	Male and female sex cells.
Fertilisation	The process by which a male and female sex cell fuse together restoring the chromosome number.

Forming gametes

When a cell divides to form gametes:

- Copies of the genetic information are made
- The cell divides twice to form four gametes, each with a single set of chromosomes
- All gametes are genetically different from each other.

How fertilisation restores the number of chromosomes.

Gametes join at fertilisation to restore the normal number of chromosomes. Each sex cell has a half set of chromosomes. When two sex cells fuse together during fertilisation the chromosome number is restored. For example, an animal's body cell has 46 chromosomes while an egg and sperm cell contain just 23. When the two cells fuse together 23+23 = 46.

10 Minutes on....

DNA and the Genome

Key Term	Definition
DNA	A polymer made up of two strands forming a double helix.
Genome	The entire genetic material of an organism.
Gene	A small section of DNA that codes for proteins.

Structure of DNA.

A polymer made up of two strands forming a double helix.

Advantages of studying the genome.

The whole human genome has now been studied and this will have great importance for medicine in the future. Knowledge of the genome can be useful for:

- Searching for genes linked to different types of disease
- Understanding and treatment of inherited disorders
- Use in tracing human migration patterns from the past.

10 Minutes on....

Genetic Inheritance

Key Term	Definition
Gamete	Male and female sex cells.
Chromosome	A structure found within the nucleus that carries genetic information in the form of genes.
Gene	A small section of DNA that codes for proteins.
Allele	Version of a gene
Dominant Allele	A variation of a gene that will produce a phenotype in the presence of other alleles.
Recessive Allele	A variation of a gene that will not produce a phenotype in the presence of another dominant allele.
Homozygous	Having two identical alleles of a particular gene.
Heterozygous	Having two different alleles of a particular gene.
Genotype	The genes an organism has.
Phenotype	The characteristic expressed because of the genes an organism has.

Examples of characteristics controlled by a single gene.
Fur colour in mice and red-green colour blindness

10 Minutes on....

Inherited Disorders

Polydactyly

Polydactyly is a genetically inherited disorder that causes an organisms to have extra fingers or toes. It is caused by a dominant allele which means you just need to inherit one allele to have the condition.

Cystic fibrosis

Cystic fibrosis is a genetically inherited of cell membranes that mainly affects the lungs and digestive system. It is caused by a recessive allele which means you just need to inherit two alleles to have the condition.

Arguments For Embryo Screening	Arguments Against Embryo Screening
Parents can be prepared emotionally and financially..	May receive a false positive or negative
Parents can make decisions from the test results.	Risk of miscarriage
Regulations are in place to prevent misuse of the screening (can't pick gender)	Ethical implications
It could stop people from suffering.	

10 Minutes on....

Sex Determination

How sex is determined.

Ordinary human body cells contain 23 pairs of chromosomes. 22 pairs control characteristics only, but one of the pairs (pair 23) carries the genes that determine sex. In females the sex chromosomes are the same (XX). In males the chromosomes are different (XY). In the egg cell there is always an X chromosome, while in the sperm cell there may be an X or a Y. If the offspring inherits a Y chromosome from the father, then they will be male, if the offspring inherits an X chromosome from the father, then they will be female.

Genetic cross to model sex inheritance.

Father / Mother	X	Y
X	XX	XY
X	XX	XY

XX: Female: 2:4 so 50% chance of offspring being female
XY: Male: 2:4 so 50% chance of offspring being male

10 Minutes on....

Variation

Key Term	Definition
Genome	The entire genetic material of an organism.
Phenotype	The characteristic expressed because of the genes an organism has.
Variation	Difference between organisms.
Mutation	A random change in genetic material that can lead to new characteristics.

Causes of variation within a population.

The genome and its interaction with the environment influence the development of the phenotype of an organism.

How a change in phenotype may occur.

Mutations occur continuously. Very rarely a mutation will lead to a new phenotype. If the new phenotype is suited to an environmental change it can lead to a relatively rapid change in the species.

10 Minutes on....

Evolution

Key Term	Definition
Evolution	A change in the inherited characteristics of a population over time through a process of natural selection which may result in the formation of a new species.
Natural Selection	A process by which a species changes over time in response to changes in the environment, or competition between organisms, in order for the species to survive.
Species	A group of organisms that can breed with one another to produce fertile offspring

Process of evolution.

The theory of evolution by natural selection states that all species of living things have evolved from simple life forms that first developed more than three billion years ago. Evolution occurs through natural selection of variants that give rise to phenotypes best suited to their environment.

Individuals in a species show a wide range of variation due to differences in their genes. Individuals with characteristics most suited to their environment are more likely to survive and reproduce. The genes are passed on to their offspring, which results in these specific genes becoming more common. Those that are poorly adapted to their environment are less likely to survive and reproduce. Their genes are less likely to be passed on to the next generation. Over a period of time, a species will gradually evolve.

How to determine if a new species has formed.

If two populations of one species become so different in phenotype that they can no longer interbreed to produce fertile offspring, they have formed two new species.

10 Minutes on....

Selective Breeding

Process of selective breeding.

Selective breeding (artificial selection) is the process by which humans breed plants and animals for particular genetic characteristics. Humans have been doing this for thousands of years since they first bred food crops from wild plants and domesticated animals. Selective breeding involves choosing parents with the desired characteristic from a mixed population. They are bred together. From the offspring those with the desired characteristic are bred together. This continues over many generations until all the offspring show the desired characteristic.

Examples of selective breeding.

Disease resistance in food crops, animals which produce more meat or milk, domestic dogs with a gentle nature, large or unusual flowers.

Benefits of Selective Breeding.	Risks of Selective Breeding
New varieties may be economically beneficial by making more or better-quality food. Animals can be selected that cannot cause harm, for example cattle without horns.	Inbreeding can occur where some breeds are particularly prone to disease or inherited defects. Reduced genetic variation can lead to attach by diseases or insects. Rare disease genes can un unknowingly selected.

10 Minutes on....

Genetic Engineering

Process of genetic engineering.

In genetic engineering, genes from the chromosomes of humans and other organisms can be 'cut out' and transferred to cells of other organisms. Enzymes are used to isolate the required gene; this gene is inserted into a vector, usually a bacterial plasmid or a virus. The vector is used to insert the gene into the required cells genes are transferred to the cells of animals, plants or microorganisms at an early stage in their development so that they develop with desired characteristics.

Examples of genetic engineering.

Examples of uses of genetic engineering include plant crops that have been genetically engineered to be resistant to diseases or to produce bigger better fruits or better shelf life. Bacterial cells have been genetically engineered to produce useful substances such as human insulin to treat diabetes.

Benefits of Genetic Engineering	Risks of Genetic Engineering
Crops can be grown that have an increased yield. Crops can be grown that are resistant to insects and herbicides. Could be used to overcome genetic disorders. Can be used to treat diabetes. Faster than selective breeding.	Ethical concerns around genetic engineering as some people think it is wrong to transfer a gene from one species to another. Concerns around possible health risks of eating genetically modified food. Gene may spread to other species.

10 Minutes on....

Evidence for Evolution

Key Term	Definition
Evolution	A change in the inherited characteristics of a population over time through a process of natural selection which may result in the formation of a new species.
Fossils	The 'remains' of organisms from millions of years ago, which are found in rocks
Antibiotic Resistance	Bacteria that are not killed by some antibiotics

Why the theory of evolution is now widely accepted.

Evidence for Darwin's theory is now available as it has been shown that characteristics are passed on to offspring in genes. There is further evidence in the fossil record and the knowledge of how resistance to antibiotics evolves in bacteria.

10 Minutes on....

Fossils

How fossils may form.

1. From parts of organisms that have not decayed because one or more of the conditions needed for decay are absent
2. When parts of the organism are replaced by minerals as they decay
3. As preserved traces of organisms, such as footprints, burrows and rootlet traces.

What we can learn from fossil evidence.

We can learn from fossils how much or how little different organisms have changed as life developed on Earth.

Why we can't be sure about how life began on Earth.

Scientists cannot be certain about how life began on Earth because many early forms of life were soft-bodied, which means that they have left few traces behind. What traces there were have been mainly destroyed by geological activity.

10 Minutes on....

Extinction

Key Term	Definition
Extinction	When there are no remaining individuals of a species still alive.

Factor Which May Contribute Towards Extinction	Explanation
New Diseases	With the arrival of a new disease the animal will have no immunity to it. If the pathogen is deadly there can be a rapid decrease in the animals numbers.
New Predators	With the arrival of a new predator animals that it prays upon will have their decrease as there are more animals now hunting them. They will also be unaware that the new predator could eat them. The animals that already preyed upon the new predator's food will not have less to eat and so their numbers could decrease rapidly also.
New More Successful Competitors	Organisms competing with these new competitors will have less resources available as there is more competition, this will cause their numbers to decrease
Climate Change	The change in climate can lead to changes within the habitat. This means that organisms adapted to the habitat can be under new pressures and stresses as they are no longer as well adapted.
Volcanic Eruptions	There is mass destruction of the habitats in the surrounding area leading to death of animals and plants.
Collision With an Asteroid	The force of an asteroid colling with Earth could destroy habitats and kills plants and animals.

10 Minutes on....

Resistant Bacteria

Key Term	Definition
Mutation	A random change in genetic material that can lead to new characteristics.
Antibiotic Resistant	Bacteria that are not killed by some antibiotics
MRSA	A bacterium that can cause infections in different parts of the body that is resistant to common antibiotics.

How antibiotic resistant bacteria strains may emerge.

Mutations of bacterial pathogens produce new strains. Some strains might be resistant to antibiotics, and so are not killed. They survive and reproduce, so the population of the resistant strain rises. The resistant strain will then spread because people are not immune to it and there is no effective treatment.

10 Minutes on....

Classification

Key Term	Definition
Carl Linnaeus	Developed a classification system in which living things were classified into groups depending on their structure and characteristics.
Linnaean System	A system of classification in which living things are classified into kingdom, phylum, class, order, family, genus and species. Organisms are named by the binomial system of genus and species.
Archaea	Primitive bacteria that usually live in extreme environments.
Bacteria	True bacteria. They are prokaryotic cells in which their DNA is not found enclosed within the nucleus.
Eukaryota	Organisms that have eukaryotic cells. This means that their genetic material is found enclosed in the nucleus.

The Linnaean System.
A system of classification in which living things are classified into kingdom, phylum, class, order, family, genus and species. Organisms are named by the binomial system of genus and species.

The Three Domain System
This is a system of classification developed by Carl Woese. This system was created due to evidence available from chemical analysis. In this system organisms are divided into achaea, bacteria and eukaryote.

10 Minutes on....

Communities

Key Term	Definition
Ecosystem	Interaction of a community of living organisms and their environment.
Interdependence	The relationship between different species in a community in which changes to one population will cause a change to another population.
Competition	When different organisms within a community are seeking the same limited resource.
Biotic	A non-living factor which can affect a community.
Abiotic	A living factor which can affect a community.
Stable Community	A community in which all the species and environmental factors are in balance so that population size remain fairly constant.

What Animals Compete For	What Plants Compete For
Mates Territory Food	Light Space Water Mineral Ions

10 Minutes on....

Abiotic Factors

Abiotic Factor	How a Change Could Affect a Community
Light Intensity	Typically, when light intensity increases the rate of photosynthesis increases and so there will be more growth. There are however some plants that prefer shade, they will not grow as well when light intensity increases. You aren't expected to know any examples of these plants, but they may be given in the exam question, watch out for this!
Temperature	Animals and plants are adapted to survive in particular temperatures. If they are taken from this temperature and put in a different one, they will struggle to survive.
Moisture Levels	Too little water and plants and animals will die. If plants are overwatered and the moisture levels are too high the roots are unable to get oxygen from the soil, are unable to respire, die and then rot which kills the rest of the plant.
Soil pH	Some plants and aquatic organisms are adapted to survive in different pH's. Some survive in acidic conditions while others will survive in alkaline conditions. If the pH changes, the organism will struggle to survive.
Soil Mineral Content	When mineral content becomes low plants will lack the nutrients that they require to grow and survive.
Wind Direction & Intensity	Lots of organisms prefer more sheltered locations. Plant seeds are more likely to settle and germinate there, and animals which depend upon these are more likely to live close to where they grow.
Carbon Dioxide Levels for Plants	Carbon dioxide is required for photosynthesis. This means that areas with high levels of carbon dioxide have high rates of photosynthesis which results in healthy plants. If carbon dioxide is limited, then rate of photosynthesis decreases, and so plant growth will be less.
Oxygen Levels for Aquatic Animals	Water contains oxygen. This is a combination of oxygen produced by aquatic plants and oxygen that has dissolved in from the air. This oxygen is vital for organisms that live underwater as they need it for respiration. Without it aquatic animals would suffocate and die. Healthy bodies of water such as lakes and rivers have high levels of oxygen while polluted waters often have low levels of oxygen. Only certain species such as sludge worms can survive in polluted bodies of water. This pollution means that only certain **species** can survive there such as sludge worms. Sludge worms are a bioindicator species because their presence or absence informs us about the condition of the habitat. If they are present the habitat is polluted.

10 Minutes on....

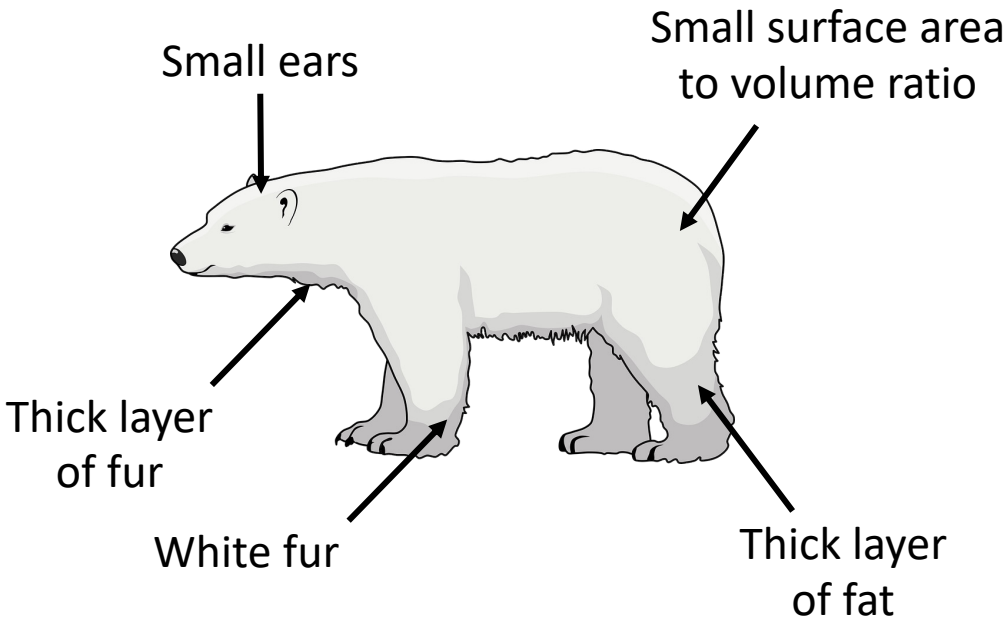
Biotic Factors

Biotic Factor	How a Change Could Affect a Community
Availability of Food	If food is plentiful then the numbers of organisms in the community should increase. The number of organisms that eat the food will increase first, followed by the predators that eat them. If availability of food is limited, then the number of organisms in the community will decrease.
New Predators Arriving	The arrival of new predators in an ecosystem can have a devastating effect to the entire ecosystem. Normally, in a balanced ecosystems, predators and prey have evolved together, their numbers increasing and decreasing in a cycle, there is a balance. A new predator arriving can destroy this balance. There could be a huge decline in the numbers of prey, which then reduces the food supply for the original predators.
New Pathogens	It is very common for organisms that are new to an ecosystem to bring pathogens with them. The organisms that live in the community may not have come across the pathogen before and so will not have immunity which can have huge consequences for them and can cause death. An example of this in recent human history is the death of Native Americans from flu when Europeans first colonised North America.
One Species Out Competing Another	The introduction of a new species into an ecosystem can result in it out-competing another native species. This can lead to the native species struggling to survive and resource. For example, red squirrels are native to the UK while grey squirrels were introduced a few hundred years ago. The grey squirrels outcompeted the red squirrels and so the numbers of red squirrels has really decreased.

10 Minutes on....

Animal Adaptations
Cold Climates

Adaptations of animals living in cold habitats.

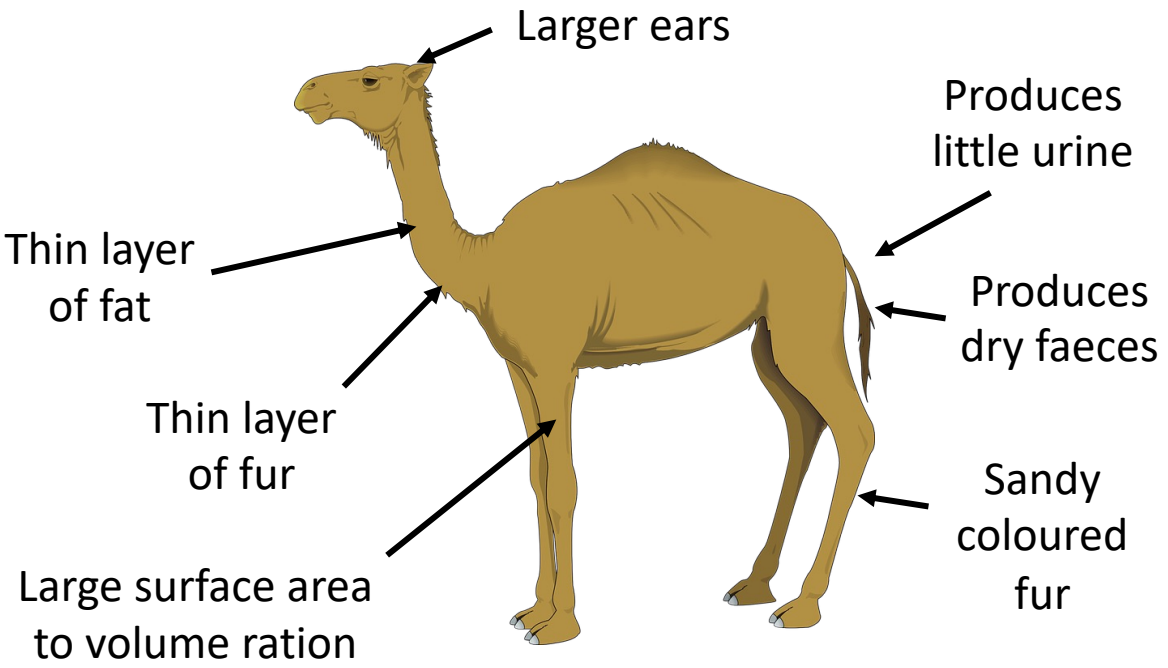


Adaptation for the Cold	How It Helps The Animal Survive
Thick fur Small ears White fur Small surface area to volume ratio Thick layer of fat	Insulation Reduced heat loss Camouflage Reduces heat loss Insulation

10 Minutes on....

Animal Adaptations
Hot Dry Climates

Adaptations of animals living in hot and dry habitats.

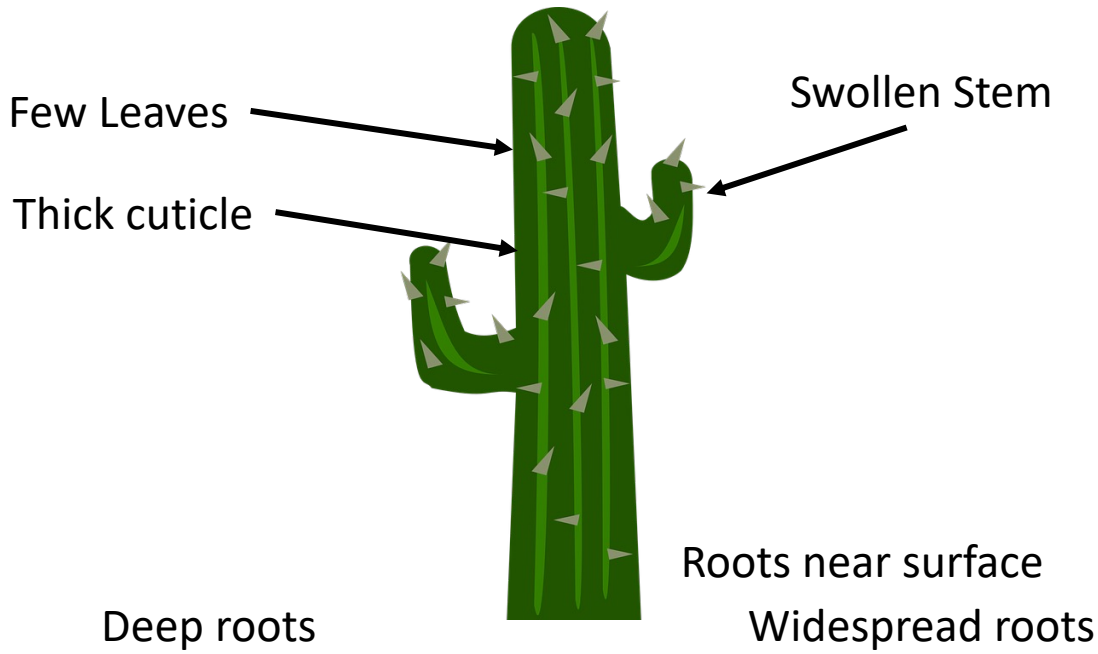


Adaptation for Survival in the Desert	How It Helps The Animal Survive
Produces little urine	Reduces water loss
Produces dry faeces	Reduces water loss
Thin layer of fur	Reduces insulation
Larger ears	Increased heat loss
Large surface area to volume ratio	Increased heat loss
Thin layer of fat	Reduces insulation
Sandy coloured fur	Camouflage

10 Minutes on....

Plant Adaptations
Hot Dry Climates

Adaptations plants have for living in hot and dry habitats.



Adaptation for Survival in the Desert	How It Helps The Plant Survive
Few leaves	Reduces water loss
Thick cuticle	Reduces water loss
Deep roots	Can reach water from deep underground
Roots near surface	Can obtain water when it rains
Widespread roots	Can obtain water from a large area
Swollen stem	To store water

10 Minutes on....

Extremophiles

Key Term	Definition
Extremophile	Organisms that live in environments that are extreme such as high temperature, pressure or salt concentration.
Deep Sea Vents	Places on the ocean floor where the volcanic gases of underground magma chambers bubble through.

Examples of extreme environments.

Examples of extreme environments include polar regions such as the Arctic and Antarctica, deserts and the deep ocean bed. Further examples include hot geothermal springs and the tops of high mountains which are at high altitudes..

Conditions around a deep-sea vent.

Deep sea vents are completely dark, and the temperature and pressure are very high.

What would happen to a normal cell if it were in very salty conditions.

In very salty conditions the concentration of the cell will be more dilute and so water will move out of the cell into the surrounding solution by osmosis. The cell will shrink, and this can affect the chemical reactions that take place in the cell.

10 Minutes on....

Levels of Organisation

Key Term	Definition
Biomass	The total quantity or weight of an organism in a given area/volume
Photosynthetic Organisms	An organism such as algae and plants which harness the suns energy to produce glucose.
Food Chain	A diagram that models feeding relationships within a community.
Producer	Organisms that photosynthesise.
Consumer	An organism that eats another organism.
Predator	Consumers that hunt and eat other consumers
Prey	Consumers eaten by predator
Stable Community	A community in which all the species and environmental factors are in balance so that population size remain fairly constant.

Labelled food chain to model a feeding relationship you may find in a garden.

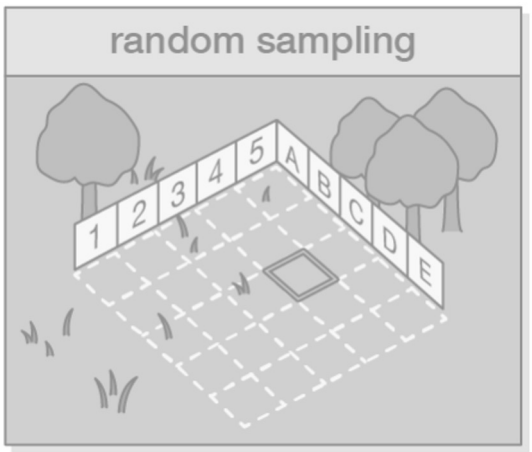
Producer → Primary Consumer → Secondary Consumer → Tertiary Consumer

Leaf → Aphid → Ladybird → Thrush

10 Minutes on....

Quadrat RP

A method to approximate the number of dandelion that are in a field.

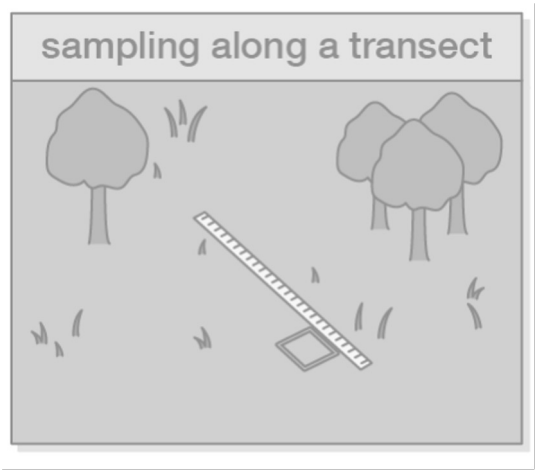


1. Measure the dimensions of the field and use this to calculate an area.
2. Place 10 0.25m^2 quadrats randomly in the field.
3. Count the number of the organism growing within that quadrat.
4. Identify outliers and calculate an average.
5. Multiply your average by 4 to find the average number of dandelions in 1m^2
6. Multiply the average number of dandelions in 1m^2 by the total area of the field.

10 Minutes on....

Transect RP

A method to investigate the effect of light on the distribution of dandelion in a field.



1.
Place a tape measure across the length of the field.

2.
Put the quadrat at the 0cm mark and count how many of that organism are within the transect.

3.
Record the abiotic conditions such as light intensity.

4.
Place a quadrat every 5m and count the number of organisms within the quadrat. Record the abiotic factors.

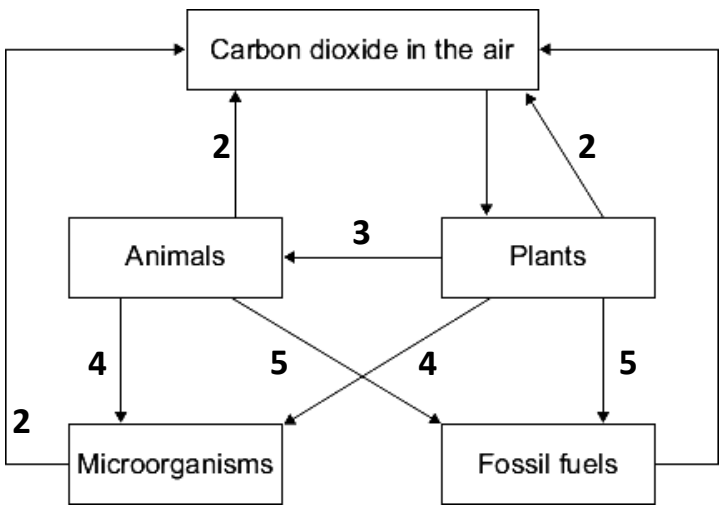
5.
Repeat these steps with 4 more transect lines.

10 Minutes on....

Carbon Cycle

Key Term	Definition
Combustion	When fuels are burned which produces carbon dioxide gas.
Respiration	A process in which glucose and oxygen react to release energy. Carbon dioxide and water are products.
Decay	The process by which organic matter is broken down by microorganisms.
Photosynthesis	The process by which carbon dioxide and water make glucose and oxygen. It takes place in chloroplasts.

Diagram to model the carbon cycle.



Key Terms	
1	Photosynthesis
2	Respiration
3	Consumption
4	Decay
5	Fossil Fuels
6	Combustion

Role of microorganisms in the carbon cycle.

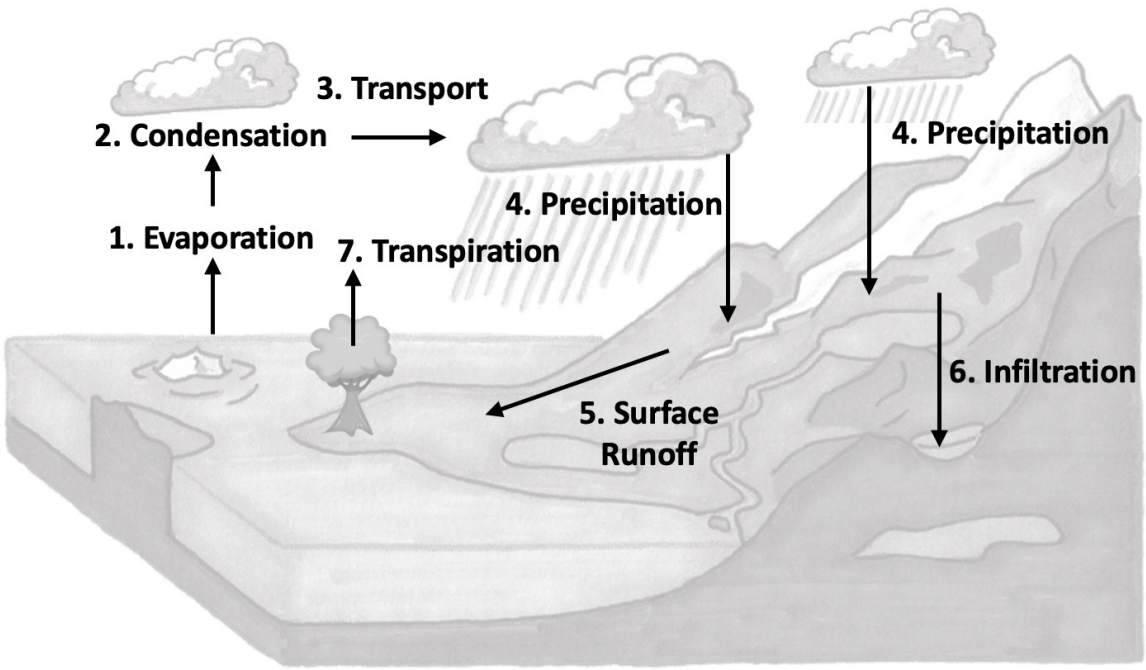
Microorganisms feed on organic matter. As they do they respire. As they respire carbon dioxide is released into the atmosphere.

10 Minutes on....

Water Cycle

Key Term	Definition
Evaporation	This is when water turns from a liquid to a gas to form water vapour. Water evaporates from all places on the Earth's surface such as puddles, ponds, rivers, lakes and oceans. Evaporation is sped up by the Sun and the wind.
Condensation	Water vapour cools and turns from a gas to liquid. This forms clouds.
Precipitation	When rain falls from the sky. Precipitation can also include snow, hail and sleet.
Transpiration	There is a constant stream of water from the plants roots to their leaves. Water evaporates from the surface of the plants leaves by transpiration.

Diagram to model the water cycle.



10 Minutes on....

Biodiversity

Key Term	Definition
Biodiversity	Biodiversity is the variety of all the different species of organisms on earth, or within an ecosystem.

Change on Earth	Effect on Biodiversity Explained
Deforestation	Deforestation destroys habitats of the organisms that live there, and it kills many species. This is reducing biodiversity and causing extinctions.
Waste	All of the above has resulted in the loss of habitats for different species, reduces biodiversity and is causing some species to become extinct.
Global Warming	Global warming is destroying habitats which is putting animals and plants at risk of extinction. Biodiversity is decreasing.

Why biodiversity is important.

A great biodiversity ensures the stability of ecosystems by reducing the dependence of one species on another for food, shelter and the maintenance of the physical environment. The future of the human species on Earth relies on us maintaining a good level of biodiversity. Many human activities are reducing biodiversity and only recently have measures been taken to try to stop this reduction.

10 Minutes on....

Waste Management

Key Term	Definition
Waste	A material that is discarded as it is not useful.

Pollution	Examples
Water	Water can become polluted by different sources including residential areas, industry and agriculture. Sewage from residential areas can contaminate water while rivers can also be contaminated from nearby farmland. Chemicals that farmers add to their fields can wash into nearby water. Examples of chemicals include pesticides, herbicides and fertilisers.
Air	Fuels are burned which releases carbon dioxide into the atmosphere. This contribute to the greenhouse effect and can cause global warming. When fuels burn sulfur dioxide and nitrogen oxides may also be produced. They may dissolve in water and cause acid rain. Acid rain can damage trees and can also lower the pH of rivers and lakes which can kill the organisms such as fish living in it. Acid rain can also react with metals and rock which causes them to change in appearance. Air pollution can also be caused by tiny particulates in the smoke which cause smog.
Land	Any rubbish that is thrown out and not recycled goes to landfill. These are large holes in the earth where rubbish is dumped. Sometimes people dump rubbish in public places to avoid paying for it to be disposed of. This is known as fly tipping.

Why the amount of waste on Earth is increasing.

Rapid growth in the human population and an increase in the standard of living mean that increasingly more resources are used, and more waste is produced.

10 Minutes on....

Land Use

Ways humans reduce land available for animals and plants.

Humans reduce the amount of land available for other animals and plants by:

- Building
- Quarrying
- Farming
- Dumping Waste

Why the destruction of peat bogs is reducing biodiversity.

When peat bogs are destroyed this reduces the area of the habitat. This then reduces the variety of different plant, animal and microorganism species that live there which means biodiversity is reduced.

Arguments for the Destruction of Peat Bogs	Arguments Against The Destruction of Peat Bogs
The peat can from the bog can be used to make garden compost. The peat can be used as a fuel source.	The decay and burning of peat releases carbon dioxide into the atmosphere and increase global warming. Destroys habitats which can reduce biodiversity and lead to extinction of certain species.

10 Minutes on....

Deforestation

Why deforestation is occurring.

Deforestation occurs to:

- Provide land for cattle and rice fields
- Grow crops for biofuels

Advantages of Deforestation	Disadvantages of Deforestation
Provides land for farming	Decreased biodiversity
Provides land for quarrying	Destruction of habitats
Provides land for building	Disruption of food chains
To provide wood for building materials	Loss of habitats
To provide fuel	Increased carbon dioxide
To provide paper	Global warming
	Soil erosion

10 Minutes on....

Global Warming

Key Term	Definition
Global Warming	This is the increase in the mean temperature of the Earth.
Climate Change	A change in global or regional climate conditions.

Biological Consequence of Global Warming	Effect on Biodiversity Explained
Glaciers and Polar Ice Melting	Organisms that live in these areas are losing their habitat causing their numbers to decrease. Sea levels will rise causing flood and destruction of habitats elsewhere also.
Expansion of Seawater	The rising temperatures will cause the seawater to expand. This can cause flooding of of low-lying land around the world.
Extreme Weather	The extreme weather destroys habitats and so reduces biodiversity.
Changes in Animal Migration Patterns	This disrupts food chains and so puts other species who are in the same food web/chain at risk also. Biodiversity decreases.
Changes in Rainfall	Some areas will have heavier rainfall and become much wetter, while other areas will have much less rainfall and become drier. This can cause deserts to form in a process called desertification
Loss and Extinction of Animals and Plants	Other organisms may depend on these plants and animals and so they will be at risk also.
Habitats Changing	Organisms may struggle to survive in their changed habitat and so biodiversity decreases.

10 Minutes on....

Maintaining Biodiversity

Way to Maintain Biodiversity	Description	+	-
Breeding Programmes	The planned breeding of a group of animals or plants, usually involving at least several individuals and extending over several generations.	Stable, healthy populations created. It also increases the numbers of endangered organisms and organisms are protected from natural predators. Eventually we may be able to reintroduce species back into their natural habitat.	Reduced genetic variation can lead to attack by specific insects or disease, which could be extremely destructive. Rare disease genes can be unknowingly selected as part of a positive trait.
Protection and Regeneration of Rate Habitats	A management practice that looks to conserve protect and restore habitats.	Protects animals and plants that otherwise would be at risk of extinction.	It reduces land available to humans for other uses.
Reintroduction of Field Margins	Hedges are planted in areas around farmland to reintroduce some habitats back.	Increases biodiversity around the fields.	Farmers lose space to grow their crops.
Reduction of Deforestation	Strategies include planting more trees and reducing our consumption of paper.	Reduces climate change, desertification, soil erosion and it reduces greenhouse gases in the atmosphere	It reduces land available to humans for other uses and reduces wood for timber and fuel.
Reduction in Carbon Dioxide Emissions	Reducing our CO_2 emissions by changing our behaviour. For example, reducing energy consumption.	Reduces the rate of global warming and climate change.	Cost
Recycling Resources	Recycling resources rather than dumping waste in landfill. Paper, glass, plastics and metals can all be recycled rather than putting them into landfill.	Reduces the amount of waste sent to landfills and incinerators. Conserves natural resources such as timber, water and minerals.	Cost Possible release of pollutants.