Definitions and Concepts for Edexcel (A) Biology A-level

Topic 4 - Biodiversity and the Genome

Topic 4 - Human impact on resources

Captive breeding programme: Breeding wild animals in a safe environment like a zoo or sanctuary to increase population size.

Double blind trial: A drug trial is completed where neither the researcher or patient know which drug is a placebo and which is the working drug in order to remove researcher bias.

Phase 1 clinical trial: A clinical trial where the drug is tested on a small group of healthy volunteers to test for safety and side effects.

Phase 2 clinical trial: A clinical trial where the drug is tested on a small group of patients suffering from the disease to determine how effective the drug is and what the most appropriate dose is.

Phase 3 clinical trial: The final phase in clinical trials where the drug is tested to observe its effects in a much larger group of patients.

Placebo: A replica of the drug being tested that is indistinguishable from the real drug yet it exerts no effects on the patient whatsoever.

Reintroduction programmes: Releasing animals from captivity back into the wild in a controlled and safe manner.

William Withering's digitalis soup: One of the first examples of drug testing where the correct dose of digitalis from the poisonous foxglove plant to treat heart disease was determined by William Withering.

Topic 4 - Properties of plants

Amyloplasts: Organelles found in the cytoplasm of plant cells that are used to store starch.

Calcium ion: A type of ion with the formula Ca^{2+} which is used to form pectins and is very important for the structure of the cell wall in plants.

Cellulose: A polysaccharide made of beta glucose monomers joined by β-1,4 bonds that is used as a structural polysaccharide which provides strength to plant cell walls.

Cell vacuole: A membrane bound structure found in plant cells that contains cell sap.

Cell wall: A permeable layer that surrounds plant, algae and fungi cells made of polysaccharides which provides strength to the cell.

Chloroplast: An organelle found in plants and algae that is the site of photosynthesis.

Magnesium ions: A type of ion with the formula Mg^{2+} which is needed for chlorophyll to function so that plants can carry out photosynthesis.

Middle lamella: A layer made up of pectins which joins the cell walls of adjacent plant cells together.

Nitrate ion: A type of ion with the formula NO_3^- which is taken up by plants from the soil and is used to make proteins.

Phloem: A tissue found in plants which is specialised for the transport of assimilates from their site of production to different parts of the plant where they are needed.

Phloem sieve tubes: Living phloem cells joined together to create a long tube for the efficient transport of assimilates.

Pits: Thin sections of the cell wall that allow for the exchange of water and minerals between adjacent cells.

Plasmodesmata: Cytoplasmic bridges between adjacent plant cells that allow the transport of molecules between the cells.

Sclerenchyma: Plant tissue made up of cells with thickened cell walls which is used for strength and support.

Tonoplast membrane: The membrane which surrounds the cell vacuole.

Xylem: A tissue found in plants which is specialised for the transport of water and dissolved minerals up the plant.

Topic 4 - Variety of life

Adaptation: The changes organisms undergo to become more suited to their environment.

Anatomical adaptations: Changes to the physical features of an organism that help it cope with factors in its environment.

Behavioural adaptations: The ways in which an organism acts differently to cope with factors in its environment.

Biodiversity: A measure of the variety of life in an area.

Classification: A means of organising the variety of life based on relationships between organisms using differences and similarities in phenotypes and in genotypes.✣

Endemism: A species which only exists in a certain area.

Evolution: The change in a population's inherited characteristics over time.

Hardy-Weinberg principle: A principle that states that the frequency of alleles in a population will not change over time unless evolutionary factors are present. It can be used to calculate the frequencies of the other two genotypes when given the frequency of one genotype using the equation given below:

$$p^2 + 2pq + q^2 = 1$$

p^2 = Frequency of homozygous dominant

$2pq$ = Frequency of heterozygous

q^2 = Frequency of homozygous recessive

Heterozygosity index (H): A measure of the proportion of a population which is heterozygotic which can be calculated using the following equation:

$$H = \frac{Number\ of\ hetrozygotes}{Number\ of\ individuals\ in\ the\ population}$$

Index of diversity (D): A measure of the diversity of a population which takes into account the number and abundance of a species and can be used to compare different habitats - it is calculated using the following equation:

$$D = \frac{N(N-1)}{\sum n\,(n-1)}$$

N = Total number of organisms

n = Total number of organisms of the species of interest

Natural selection: The phenomenon seen where better adapted organisms are able to survive and reproduce which causes the population to become better adapted over time.

Niche: The position occupied by an organism in its ecosystem.

Physiological adaptations: The internal body changes that an organism undergoes to cope factors in its environment.

Reproductive isolation: The inability of some organisms of a species to breed with other members of the same species due to barriers.

Species: Organisms that can breed together to produce fertile offspring.

Species richness: The number of different species in a habitat.