**Heredity:**

**Cellular Genetics:**

gene: a unit of heredity which is transferred from a parent to offspring and is held to determine some

characteristic of the offspring

genome: the total amount of genetic information in the chromosomes of an organism, including its genes and

DNA sequences

trait: a distinguishing quality or characteristic

dominant trait: an inherited characteristic that appears in an offspring if it is contributed from a parent

through a dominant allele

recessive trait: a trait that is expressed when an organism has two recessive alleles, or forms of a gene

homozygous: having two identical alleles of a particular gene

heterozygous: having two different alleles of a particular gene

genotype: the genetic constitution of an individual organism

phenotype: the set of observable characteristics of an individual resulting from the interaction of its genotype

with the environment

allele: a variant form of a given gene

chromosome: thread-like structures in the nucleus of a cell containing the DNA

gametes: sex cells

somatic cell: body cell

autosomal chromosome: any of the numbered chromosome; not a sex chromosome

cell cycle: The regular sequence of growth and division that cells undergo

apoptosis: process of programmed cell death

mitosis: cell division in which the nucleus divides into two daughter cells containing the same number of chromosomes

meiosis: a type of cell division that results in four daughter cells each with half the number of chromosomes of

the parent cell, as in the production of gametes and plant spores

**Structure and Function of DNA in Cells:**

DNA: deoxyribonucleic acid, the hereditary material in almost all organisms

RNA: nucleic acid essential in coding, decoding, regulation, and expression of genes

nitrogenous bases: one of the nitrogen containing purines (adenine, guanine) or pyrimidines (cytosine,

thymine or uracil) found in the nucleic acids DNA and RNA

amino acid: building blocks of proteins

**Genetic Mechanisms and Inheritance:**

crossing over: the exchange of genes between homologous chromosomes, resulting in a mixture of parental characteristics in offspring.

protein: macromolecule consisting of one or more long chains of amino acids

protein synthesis: process whereby biological cells generate new proteins

transcription: first step of gene expression in which a segment of DNA is copied into RNA

translation: process in which cellular ribosomes create proteins

Mendelian inheritance: follows the laws proposed by Gregor Mendel with dominant and recessive alleles

Law of Segregation: a parent’s two gene copies are randomly distributed to its gametes

Law of Independent Assortment: alleles for separate traits are passed independently of one another

incomplete dominance: a form of intermediate inheritance in which one allele for a specific trait is not

completely expressed over its paired allele

codominance: a form of dominance wherein the alleles of a gene pair in a heterozygote are fully expressed

sex-linked traits: genes carried by either sex chromosome

monohybrid cross: a mating between two individuals with different alleles at one genetic locus of interest

dihybrid cross: a cross between two different lines/genes that differ in two observed traits

Punnett Square: a square diagram that is used to predict the genotypes of a particular cross or breeding

experiment

polygenic inheritance: a group of non-epistatic genes that together influence a phenotypic trait

epistasis: the interaction of genes that are not alleles, in particular the suppression of the effect of one such

gene by another

linked genes: genes that are found near each other on the same chromosome that tend to be inherited

together

chromosome map: a diagram showing the relative positions of genes along the length of a chromosome

pleiotropy: the phenomenon of one gene being responsible for or affecting more than one phenotypic

characteristic

**Mutations:**

gene mutations: permanent alteration of the nucleotide sequence of the genome of an organism

insertion: A mutation involving the addition of one or more nucleotide pairs to a gene.

deletion: A change to a chromosome in which a fragment of the chromosome is removed.

substitution: A mutation in which a nucleotide or a codon in DNA is replaced with a different nucleotide

frameshift: mutation that shifts the "reading" frame of the genetic message by inserting or deleting a nucleotide

**Modern Genetics:**

recombinant DNA: DNA that has been formed artificially by combining constituents from different organisms

goodness of fit test (Chi Square): relating to or denoting a statistical method assessing the goodness of fit

between observed values and those expected theoretically

electrophoresis: DNA separation technique based on the movement of charged particles in a fluid or gel under

the influence of an electric field

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