Topic: Year 10 Genetics

Due: Term 3, Week 3

Weighting: 15%

The transmission of heritable characteristics from one generation to the next involves DNA and genes (ACSSU184)

* describing the role of DNA as the blueprint for controlling the characteristics of organisms
* using models and diagrams to represent the relationship between DNA, genes and chromosomes
* recognising that genetic information passed on to offspring is from both parents by meiosis and fertilisation
* representing patterns of inheritance of a simple dominant/recessive characteristic through generations of a family
* predicting simple ratios of offspring genotypes and phenotypes in crosses involving dominant/recessive gene pairs or in genes that are sex-linked
* describing mutations as changes in DNA or chromosomes and outlining the factors that contribute to causing mutations

|  |
| --- |
| **Learning outcomes** |
| Can you:  • define the terms DNA, gene and chromosome and explain the relationship between them  • interpret a human karyotype |
|  |
| Can you:  • define DNA  • describe the structure of a nucleotide  • explain how nucleotides join to form a polynucleotide  • explain how complementary base pairs join |
|  |
| Can you:   * Recognise that genetic information is passed onto offspring by the methods of sexual or asexual reproduction. * Compare and contrast sexual and asexual reproduction. |
|  |
| Can you:  • explain the importance of DNA being able to make copies of itself and carry information.  • describe the purpose of mitosis and cytokinesis  • distinguish between diploid and haploid  • describe the stages of mitosis  • explain how two diploid somatic cells are produced in mitosis  • explain how and why a cell undergoes apoptosis. |
|  |
| Can you:  • describe the purpose of mitosis and cytokinesis  • describe the stages of meiosis I and II  • explain how four haploid gametes are produced in meiosis  • compare and contrast mitosis and meiosis. |
|  |
| Can you:  • describe alleles in relation to genes and chromosomes  • explain how combinations of dominant and recessive alleles produce different genotypes and phenotypes in individuals  • identify individuals as homozygous dominant, homozygous recessive, heterozygous, and carriers based on their genotype and phenotype  • predict genotypic and phenotypic ratios of a monohybrid cross using Punnett squares. |
|  |
| Can you:  • distinguish between autosomes and sex chromosomes  • identify a trait as one of the four patterns of inheritance (autosomal dominant, autosomal recessive, X-linked dominant, X-linked recessive)  • explain how and why sex-linked traits are inherited differently in males and females  • describe how different sex-linked traits such as haemophilia and red-green colour blindness are inherited  • predict genotypic and phenotypic ratios for sex-linked traits using Punnett squares. |
|  |
| Can you:  • define mutagen and mutation  • identify different types of mutagens  • distinguish between genetic and chromosomal mutations  • explain how substitution mutations alter nucleotide and amino acid sequences of a protein  • explain how frameshift mutations alter nucleotide and amino acid sequences of a protein  • explain how non-disjunction occurs during meiosis to alter chromosomal numbers in gametes  • give examples of human syndromes caused by non-disjunction. |
|  |