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

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| **Learning outcomes** |
| Can you:• define the terms DNA, gene and chromosome and explain the relationship between them• interpret a human karyotype |
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| Can you:• define DNA • describe the structure of a nucleotide• explain how nucleotides join to form a polynucleotide• explain how complementary base pairs join  |
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| 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.
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| 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. |
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| 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. |
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| 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.  |
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| 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.  |
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| 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. |
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