

## Ingenious Genes Curriculum Links for OCR A-Level Biology B (Advancing Biology) (H422)

### 2.1.4 Nucleic acids

### 3.1.2 The developing individual: meiosis, growth and development

### 5.1.1 Patterns of inheritance

### 5.1.2 Population genetics and epigenetics

#### 2.1.4 Nucleic acids

(a) the structure of a nucleotide as the monomer from which nucleic acids are made

(c) (i) the structure of the DNA molecule, including a review of the evidence for complementary base pairing (Chargaff's rules)

(e) the nature of the genetic code. To include reference to the triplet, non-overlapping, degenerate and universal nature of the code and how a gene determines the structure of proteins including enzymes by ordering the sequence of amino acids in a polypeptide.

(g) transcription and translation of genes resulting in the synthesis of polypeptides. To include the role of RNA polymerase, messenger (m)RNA, transfer (t)RNA and ribosomal (r)RNA

#### 3.1.2 The developing individual: meiosis, growth and development

(a) the significance of meiosis in sexual reproduction and the production of haploid gametes in plants and animals. To include the importance of meiosis in maintaining the chromosome number at fertilisation and between generations.

(b) the stages of meiosis in plant and animal cells To include the use of diagrams to describe interphase, prophase 1, metaphase 1, anaphase 1, telophase 1, prophase 2, metaphase 2, anaphase 2, telophase 2.

(c) how meiosis produces daughter cells that are genetically different. To include the importance of chiasma formation, crossing over, independent assortment of chromosomes (metaphase 1) and chromatids (metaphase 2), in producing genetic variation

#### 5.1.1 Patterns of inheritance

(a) patterns of monogenic (monohybrid) inheritance. To include the correct usage of the terms gene, allele (gene variant), locus, phenotype, genotype, dominant and recessive, heterozygous and homozygous and codominant.

(b) gene mutations. To include cystic fibrosis, sickle cell anaemia.

(c) patterns of inheritance which show codominance and multiple gene variants (alleles)

### **5.1.2 Population genetics and epigenetics**

(a) the role of natural selection in changing allele frequencies within populations. To include the link between malaria and the frequency of the sickle cell allele including the effect on the phenotype of each of the three possible genotypes for the normal and sickle cell allele.

(b) the link between the changes in the amino acid sequence to the change in structure and properties of proteins (e.g. haemoglobin)

(d) factors other than natural selection that contribute to genetic biodiversity. To include the role of the founder effect and genetic bottlenecks in creating genetic differences between human populations.