Ingenious Genes Curriculum Links for OCR Gateway Science Biology A (J247)

B1.1 Cell structures
B1.2 What happens in cells (and what do cells need?)
B1.3 Respiration
B5.1 Inheritance
B5.2 Natural selection and evolution
B6.3 Monitoring and maintaining health

Topic B1: Cell structures
B1.1b explain how the main sub-cellular structures of eukaryotic cells (plants and animals) and prokaryotic cells are related to their functions (To include nucleus, genetic material, chromosomes)
B1.2 What happens in cells (and what do cells need?)
B1.2a describe DNA as a polymer
B1.2b describe DNA as being made up of two strands forming a double helix
B1.2c describe that DNA is made from four different nucleotides; each nucleotide consisting of a common sugar and phosphate group with one of four different bases attached to the sugar (To include the pairs of complementary bases (A-T and G-C))
B1.2d recall a simple description of protein synthesis (To include the unzipping of the DNA molecule around the gene, copying to mRNA in nucleus (transcription), (translation) of the nucleotide sequence, in the cytoplasm)
B1.2e explain simply how the structure of DNA affects the proteins made in protein synthesis (To include triplet code and its use to determine amino acid order in a protein)
B1.3 Respiration
B1.3e explain the importance of amino acids in the synthesis and breakdown of proteins (To include use of the terms monomer and polymer)
B5.1 Inheritance
B5.1a explain the following terms: gamete, chromosome, gene, allele/variant, dominant, recessive, homozygous, heterozygous, genotype and phenotype
B5.1b describe the genome as the entire genetic material of an organism
B5.1c describe that the genome, and its interaction with the environment, influence the development of the phenotype of an organism
B5.1d Recall that all variants arise from mutations, and that most have no effect on the phenotype, some influence phenotype and a very few determine phenotype
B5.1e describe how genetic variants may influence phenotype: • in coding DNA by altering the activity of a protein • in non-coding DNA by altering how genes are expressed • in coding: DNA related to mutations affecting protein structure, including active sites of enzymes • in non-coding: DNA related to stopping transcription of mRNA
B5.1g explain the terms haploid and diploid
B5.1h explain the role of meiotic cell division in halving the chromosome number to form gametes (To include that this maintains diploid cells when gametes combine and is a source of genetic variation)

B5.1i explain single gene inheritance (To include the context of homozygous and heterozygous crosses involving dominant and recessive genes)
B5.1j predict the results of single gene crosses
B5.1k describe sex determination in humans using a genetic cross
B5.1l recall that most phenotypic features are the result of multiple genes rather than single gene inheritance
B5.2 Natural selection and evolution
B5.2c explain how evolution occurs through the natural selection of variants that have given rise to phenotypes best suited to their environment (To include the concept of mutation)
B6.3 Monitoring and maintaining health
B6.3x discuss the potential importance for medicine of our increasing understanding of the human genome (To include the ideas of predicting the likelihood of diseases occurring and their treatment by drugs which are targeted to genomes)