

Exam Title: 2000440 Genetics

Courses Assessed by this Exam: Genetics

Key Vocabulary: eukaryotic, mitosis, daughter cells, genetic variation, probability, asexual reproduction, binary fission, sexual reproduction, crossing over, independent assortment, cytokinesis, cloning, non-disjunction, diploid cell, haploid cell, cell division, DNA replication, nitrogenous base, adenine, cytosine, guanine, thymine, template strand, complementary strand, transfer RNA, mRNA, DNA, mutation, replication, transcription, translation, genotype, phenotype, protein chain, anticodon, gene expression, operons, RNA polymerase, Introns, poly-A tail, guanosine triphosphate cap, ribosomes, DNA polymerase, RNA polymerase, macromolecules, controlled experiment, gamma radiation, Hardy-Weinberg, natural selection, random mating, colorblindness, genetic drift, allele, codominant, dominant, recessive, polygenic, incomplete dominance, Huntington's disease, gene therapy, restriction enzymes, stem cells, genetically modified, DNA fingerprinting, polymerase chain reaction (PCR), nonpolar, polarized, thermal cycling, gel electrophoresis, stem cell, transformation, endonucleases, plasmid, conjugation, transduction, immune response, viral proteins, oncogene, proto-oncogene, p53 tumor suppressor gene, cell cycle, sex-linked trait, Law of independent assortment, Punnett square, Law of Dominance, Law of segregation, Law of incomplete dominance

Student Tasks:

- Understand the key differences between sexual and asexual reproduction.
- Identify specific asexual processes
- Understand the key differences between mitosis and meiosis
- Identify key events that occur in meiosis
- Understand the process of DNA replication, the key enzymes involved, and their functions.
- Understand Mendelian genetics and the laws that comprise it.
- Understand the process of transcription, the enzymes involved, and how nitrogenous base pairs are involved in the process.
- Understand how transcription occurs in prokaryotic cells
- Understand the process of translation and how transfer RNA and messenger RNA serve specific roles in the process.
- Be able to transcribe and translate a specific strand of DNA
- Compare and contrast prokaryotic and eukaryotic gene expression (i.e. operons)
- Be able to identify the major organic macromolecules and understand the differences between them.
- Know the components of an effective experimental design, including a controlled experiment, and be able to identify a valid controlled experiment given specific scenarios
- Understand Hardy-Weinberg equilibrium
- Be able to differentiate between genetic drift and gene flow
- Understand the difference between dominant vs. recessive genes

- Be able to differentiate between co-dominance, multiple alleles, incomplete dominance, polygenic inheritance and simple dominance.
- Be familiar with dominant genetic disorders, sex-linked genetic disorders, and recessive genetic disorders.
- Understand ABO blood typing
- Be familiar with the process of gene therapy and its positive applications
- Understand the function of restriction enzymes and how they are used in biotechnology (i.e. PCR and gel electrophoresis/DNA fingerprinting)
- Be familiar with the following biotechnological processes and be able to identify arguments for and against using them (stem cell research, genetic modification, and recombinant DNA)
- Understand the process and examples of bacterial transformation
- Understand the process of bacterial conjugation
- Understand unique ways of developing vaccines
- Understand how mutations can specifically alter the cell cycle and cause cancer
- Be able to decipher a pedigree