



F17 102 Student Knowledge - Pre

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	I am confident I can do this task	I understand and can complete some of the task	I do not understand the task
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Arrange nucleotides by chemical structure and hydrogen-bonding capability

Apply knowledge of the chemical structure of nucleotides to explain DNA polarity notation

Predict the impact of changing temperature on DNA structure

Classify the structures and components of chromosomes

Compare a karyogram and karyotype to identify discrepancies

Identify restriction endonuclease sites in a DNA sequence

Locate the DNA sequence of a gene

Create a numbered DNA alignment and consensus sequence when provided individual sequences from multiple genes or species

Create a model of the chemical basis for the encoding of information

in DNA

Predict the frequency of a given nucleotide sequence in a genome

Identify the outcomes of various treatments/processes on nucleotide identity

Classify types of DNA sequence differences as indels or microsatellites, using appropriate notation

Evaluate the benefits and limitations of personal genomics

Diagram the relationship between DNA molecules, strands, chromosomes and chromatids

Relate the structures of chromosomes through the cell cycle, with special emphasis on S phase

Distinguish a genotype from a haplotype; homozygosity from heterozygosity; allele from gene

Create PCR primers that would amplify a specified amount of DNA from a given chromosome sequence

Calculate the probability of one crime suspect's DNA matching a forensic DNA sample found at a crime scene

Diagram the outcome of an agarose gel containing a restriction fragment length polymorphism assay

Evaluate experimental conclusions based on outcomes of control experiments

Compare and contrast how cellular proteins know where to begin replicating DNA, transcribing a gene, and translating an mRNA

Find consensus splice sites in a eukaryotic primary transcript

Identify possible outcomes of alternate splicing of a eukaryotic primary transcript

Use a codon table to translate mRNA

Explain how to identify the 5' and 3' UTRs of a mRNA

List the similarities between a eukaryotic gene, its mRNA transcript, and its protein product

Predict and rank mutations according to the severity of their impact on protein production

Describe, using an ecological/energetic framework, a rationale for the need to for gene expression regulation

Identify differences in gene content between different cell types in the same multicellular organism

Design a theoretical gene that will be expressed under specified conditions

Create and defend a definition of a genetically modified organism

Categorize given organisms as whether or not they are genetically modified

Label the components of DNA involved in regulating gene expression

Identify potential benefits and drawbacks of using a genetically modified organism

Diagram how epigenetic modifications to molecules control gene expression

Explain how different organisms use different physical mechanisms to control gene expression

Compare homologous

Compare homologous chromosomes to identify and classify chromosomal rearrangements

Identify specific DNA sequence differences that can genetic diseases

Relate ploidy and gain-of-function and loss-of-function mutations to dominance/recessiveness

Select a situation where dominance is not the same as predominance

Define crosses as monohybrid or dihybrid; test-, inter-, back-, or self

Organize genotype and phenotype data from a cross into a Punnett square

Predict the genotypic and phenotypic outcomes of a cross

Predict chromosomal segregation patterns resulting from meiotic nondisjunction

Modify the structure of a Punnett square based on the gametes and parents of a cross

Diagram the relationships between meiosis and mitosis, cell cycle, ploidy, DNA replication, and Mendel's laws

Use linkage analysis to predict the genetic distances between genes

Evaluate genetic mapping data using a chi-square test

Relate map units, centiMorgans, and recombination fraction

Predict genotypes based on the genotypes of immediate relatives

For a given pedigree, rank the likelihood of each transmission pattern as explaining the inheritance pattern of the disease

Define a null hypothesis for each inheritance pattern

Counsel an individual about the likelihood of inheritance of a genetic disorder in their family

Explain how sex chromosome hemizyosity impacts the expression of recessive traits in the heterogametic sex

Present and defend a situation outside of genetics where the chi-square test could be used

Locate and download the PDF file of a published manuscript, when provided the citation

Identify the hypothesis in a scientific manuscript

Interpret whether data from a figure in a scientific manuscript support the hypothesis

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