3. Genetics

Content Area: **Science**
Course(s): **Generic Course**
Time Period: **Marking Period 2**
Length: **7 weeks**
Status: **Published**

Standards

AP Biology Essential Knowledge Standards:

1A.2, 1A.3, 1A.4, 1B.1, 1C.1, 1C.3

2C.1, 2D.1, 2E.1

3A.1, 3A.2, 3A.3, 3A.4, 3B.1, 3B.2, 3C.1, 3C.2, 3C.3

4A.1, 4A.2, 4A.3, 4A.4, 4B.1, 4B.2, 4C.1, 4C.2

Goals/Objectives

Learning Objectives:

LO 3.7 The student can make predictions about natural phenomena occurring during the cell cycle. [See **SP 6.4**]

LO 3.8 The student can describe the events that occur in the cell cycle. [See **SP 1.2**]

LO 3.9 The student is able to construct an explanation, using visual representations or narratives, as to how DNA in chromosomes is transmitted to the next generation via mitosis, or meiosis followed by fertilization. [See **SP 6.2**]

LO 3.10 The student is able to represent the connection between meiosis and increased genetic diversity necessary for evolution. [See **SP 7.1**]

LO 3.11 The student is able to evaluate evidence provided by data sets to support the claim that heritable information is passed from one generation to another generation through mitosis, or meiosis followed by fertilization. [See **SP 5.3**]

LO 3.24 The student is able to predict how a change in genotype, when expressed as a phenotype, provides a

variation that can be subject to natural selection. [See **SP 6.4, 7.2**]

LO 3.25 The student can create a visual representation to illustrate how changes in a DNA nucleotide sequence can result in a change in the polypeptide produced. [See **SP 1.1**]

LO 3.26 The student is able to explain the connection between genetic variations in organisms and phenotypic variations in populations. [See **SP 7.2**]

LO 3.12 The student is able to construct a representation that connects the process of meiosis to the passage of traits from parent to offspring. [See **SP 1.1, 7.2**]

LO 3.13 The student is able to pose questions about ethical, social or medical issues surrounding human genetic disorders. [See **SP 3.1**]

LO 3.14 The student is able to apply mathematical routines to determine Mendelian patterns of inheritance provided by data sets. [See **SP 2.2**]

LO 3.15 The student is able to explain deviations from Mendel's model of the inheritance of traits. [See **SP 6.5**]

LO 3.16 The student is able to explain how the inheritance patterns of many traits cannot be accounted for by Mendelian genetics. [See **SP 6.3**]

LO 3.17 The student is able to describe representations of an appropriate example of inheritance patterns that cannot be explained by Mendel's model of the inheritance of traits. [See **SP 1.2**]

LO 4.22 The student is able to construct explanations based on evidence of how variation in molecular units provides cells with a wider range of functions. [See **SP 6.2**]

LO 4.23 The student is able to construct explanations of the influence of environmental factors on the phenotype of an organism. [See **SP 6.2**]

LO 4.24 The student is able to predict the effects of a change in an environmental factor on the genotypic expression of the phenotype. [See **SP 6.4**]

LO 3.1 The student is able to construct scientific explanations that use the structures and mechanisms of DNA and RNA to support the claim that DNA and, in some cases, that RNA are the primary sources of heritable information. [See **SP 6.5**]

LO 3.2 The student is able to justify the selection of data from historical investigations that support the claim that DNA is the source of heritable information. [See **SP 4.1**]

LO 3.3 The student is able to describe representations and models that illustrate how genetic information is copied for transmission between generations. [See **SP 1.2**]

LO 3.4 The student is able to describe representations and models illustrating how genetic information is translated into polypeptides. [See **SP 1.2**]

LO 3.5 The student can justify the claim that humans can manipulate heritable information by identifying *at least two* commonly used technologies. [See **SP 6.4**]

LO 3.6 The student can predict how a change in a specific DNA or RNA sequence can result in changes in gene expression. [See **SP 6.4**]

LO 3.22 The student is able to explain how signal pathways mediate gene expression, including how this process can affect protein production. [See **SP 6.2**]

LO 3.23 The student can use representations to describe mechanisms of the regulation of gene expression. [See **SP 1.4**]

LO 3.24 The student is able to predict how a change in genotype, when expressed as a phenotype, provides a variation that can be subject to natural selection. [See **SP 6.4, 7.2**]

LO 3.25 The student can create a visual representation to illustrate how changes in a DNA nucleotide sequence can result in a change in the polypeptide produced. [See **SP 1.1**]

LO 3.26 The student is able to explain the connection between genetic variations in organisms and phenotypic variations in populations. [See **SP 7.2**]

LO 3.27 The student is able to compare and contrast processes by which genetic variation is produced and maintained in organisms from multiple domains. [See **SP 7.2**]

LO 3.28 The student is able to construct an explanation of the multiple processes that increase variation within a population. [See **SP 6.2**]

Content

- Classical Genetics
- Mendelian Genetics Extensions to Mendelian Genetics Human Genetic Disease
- Molecular Genetics
- Historical Approaches to Determination of DNA Structure and Function DNA Replication
- Protein Synthesis Regulation of Gene Expression Biotechnology: Tools, Applications & Ethics Systems Perspectives on Genetics: Development & Genomics

Skills

Science Skills Practices for AP Biology

- use representatives and models to communicate scientific phenomena and solve problems
- use mathematics appropriately
- engage in scientific questioning to extend thinking or to guide investigations
- plan and implement data collection
- perform data analysis and evaluation
- work with scientific explanations and theories
- connect and relate knowledge across various scales, concepts, and representations in and across domains.