Unit 5: Genetics

Chapters and Sections:

12.1-12.3, 13.1-13.4, 14.1-14.4, 15.1-15.5, 16.1-16.2, 17.1-17.5

Essential Knowledge Code and Learning Objectives (LO):

3.A.2

- 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]

3.C.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]

3.A.3

- 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]

4.C.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]

4.C.4

- LO 4.27 The student is able to make scientific claims and predictions about how species diversity within an ecosystem influences ecosystem stability. [See SP 6.4]

3.A.4

- 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]

3.C.1

- 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]

3.A.1

- 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]