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| **Students will understand**   * Genetics investigates inherited traits and their variations * Genes composed of DNA, and their unit of inheritance, and they specify particular proteins. * Why a genome is the complete set of genetic information for an organism. * How genome information will personalize medicine. * One genetic determines inherited traits by one or more genes and the environment. * How genetic determinism is the false idea that an inherited trait cannot be modified? * The cell, its structure and function. * The series of events in the cell cycle. * The development of the reproductive system. * Most birth defects develop during the embryonic period and they are more severe than the problems arise during fetal development. * Most single-gene disorders are recessive, and the onset begins early in life. * The effects of genes versus the effect of environmental factors on longevity. | **Essential Questions:**  How genetics can be considered at the level of DNA, genes, cells, tissue, organs, individuals, families and population?  How a gene can exist in more than one form, or allele?  How can comparing genomes among species reveal evolutionary relatedness?  How might absolute risk that the probability that an individual will develop a certain condition.  How might relative risk based on persons population group be compared to another population group?  What are the main applications of Genetics?  What are the components and the functions of the cell?  What are the stages of Meiosis?  What are the steps in the reproductive system’s development?  What birth defects arise during embryonic and the fetal periods?  What are the effects of genes versus environmental factors on longevity? |

**Sub-Unit Components/Sub-Headings/Objectives**

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| Genetic Testing | **Levels of Genetics**   * DNA * Genes, Chromosomes, and Genomes * Cells Tissue, and Organs * Individuals * Family * Population * Evolution | **Applications of Genetics**   * Establishing Identity and Origins * Health Care * Agriculture * Ecology * Genetics from a Global Perspective | **The Components of Cells**   * Chemical Constituents of cells * Organelles * The Plasma Membrane * The Cytoskeleton | **Cell-Cell Interactions**   * The Cell Cycle * Apoptosis * Signal Transduction * Cellular Adhesion * Cell Lineages * Using Embryos * Using Somatic Cells | **Development**   * Male and Female Reproductive System * Meiosis * Gamete Maturation * Prenatal Development * Birth Defects * Maturation and Aging |

**Knowledge—Students will know…**

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| 1. Define, interpret, and use unit vocabulary 2. Define and describe genetic testing. 3. Explain how the human genome does personalize the medical process. 4. Analyze the levels of genetics. 5. Explain why most genes do not function alone. 6. Distinguish between absolute risk and relative risk. 7. Discuss how traits are by one gene or more genes and the environment. 8. Distinguish between absolute risk and relative risk. 9. Explain the practical application of genetics. 10. Describe the components of cells. 11. Describe the differences between cell division and death 12. Explain Cell-Cell Interactions. 13. Analyze the practical applications between stem cell and cell specialization. 14. Describe the structures and the functions of the male and female reproductive systems. 15. Describe the events of fertilization. 16. Describe birth defects that arise during embryonic and the fetal periods. 17. Analyze the relationship between environmental influences, personal genes and longevity. |

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| **Standards** | **Assessments/Evidence** |
| *List the standards set used and the individual standards to be taught and assessed. Highlight or* ***Bold*** *the standards of significance.* Example:   * HS-LS1-1: Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring. * HS-LS1-2: Make and defend a claim based on evidence that inheritable genetic variations may result from   (1) new genetic combinations through meiosis  (2) viable errors occurring during replication, and/or  (3) mutations caused by environmental factors.   * HS-LS1-3: Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population. | **Which assessments will provide the best evidence of meeting the learning objectives? Consider the DOK required.**   * Bell-Ringer * Journal Activities * Exit-Slips * Exams * Quizzes * Small Group (Team Activities) * Experiments * Projects * Presentations * Case Studies * Vocabulary |

**Reading and Writing Standards (except for English/Language Arts courses)**

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| Include at least one CCSS Literacy and one Writing standard that will be taught and assessed. Access them with these links and then list below:   * [CCSS.ELA-Literacy.RST.9-10.8](http://www.corestandards.org/ELA-Literacy/RST/9-10/8/) Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.  * [CCSS.ELA-Literacy.RST.9-10.9](http://www.corestandards.org/ELA-Literacy/RST/9-10/9/) Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. |

**Instructional Resources/Materials**

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| * Lewis, R. (2008). *Human genetics: Concepts and applications*. Boston: McGraw-Hill Higher Education. * Lewis, R. (2007). *Case workbook to accompany Human genetics: Concepts and applications*. Boston: McGraw-Hill Higher Education. * Brooker, R. J. (2018). *Genetics: Analysis and Principles*. New York: McGraw Hill Education. * Robinson, T. R. (2010). *Genetics for dummies:* Hoboken, NJ: Wiley. * <Http://Wardisiani.com> * WWW.mhhe.com/lewisgenetics7 |