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| Students will understand   * Population genetics studies allele frequencies in groups of organisms of the same species in the same geographical area. * Microevolution reflect changes in allele frequencies in populations. * The effect of migration on genotype frequencies. * The effect of geographical barriers and languages differences on allele frequencies. * Genetic drift occurs in a subset of a population with different allele frequencies than the larger population. * Bottleneck population die off and only a few contributes to the next generation of a specific species. * Natural selection is the cause for different allele survival in different environments. * The Importance of knowing allele frequencies * The effect of migration on allele and genotype frequencies * The history of the human origins. * The development of molecular evolution. * Molecular clocks estimate when two individuals or types of organisms most recently shared ancestors. * Eugenics role in Human Genetics | Essential Questions:   1. Why do different genes evolve at different rates? 2. What is not happening in a population in Hardy-Weinberg equilibrium? 3. Why is knowing the incidence of the homozygous recessive condition in population important in deriving allele frequencies? 4. Why are specific population databases necessary to interpret DNA profiles? 5. How is the Hardy-Weinberg equation used to predict the recurrence of X-linked recessive traits? 6. Why is it Important to know allele frequencies? 7. What is the founder effect? 8. What is the effect of migration on allele and genotype frequencies? 9. Why can increasing homozygosity in population be detrimental? 10. Why might a mutant allele that causes an inherited illness in homozygotes persist in a population? 11. How can genomics be used to develop new antibiotics? 12. How founder effect differs from population bottleneck? 13. How genetic drift, nonrandom mating, and natural selection interact? 14. What is the molecular evolution? 15. Why does comparing gene sequences offer more information for molecular evolution studies than comparing protein sequences? 16. What type of information needed to construct an evolutionary tree diagram? 17. What are the assumptions and the limitations of evolutionary trees? 18. How can a single gene change influence evolution? |
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Sub-Unit Components/Sub-Headings/Objectives

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| Allele Frequencies   * Knowing Allele Frequencies * When Allele Frequencies remain constant * Hardy-Weinberg Equilibrium * DNA Profiling * Genetic Privacy | Changing Allele Frequencies   * Non-random Mating * Migration * Genetic Drift * Mutation * Natural Selection * Gene Genealogy | Human Origins and Evolution   * Human Origins * Molecular Evolution * Molecular Clocks * Eugenics |  |  |  |

Knowledge—Students will know…

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| 1. Define, interpret, and use unit vocabulary. 2. Explain why it is important to know allele frequencies. 3. Explain why allele frequencies should stay constant. 4. Explain how the Hardy-Weinberg Equilibrium is calculated. 5. Describe DNA profiling. 6. Explain genetic privacy concerns and the concerns surrounding it. 7. Describe nonrandom mating. 8. Explain the effect of migration on allele and genotype frequencies. 9. Explain genetic drift. 10. Describe the Founder effect on disease frequencies. 11. Describe the major and continual source of genetic variations. 12. Explain natural selection. 13. Describe gene genealogy and its application. 14. Describe the human origins. 15. Explain the molecular evolution. 16. Explain how molecular clocks estimate the time when organism diverged from a common ancestor. 17. Distinguish between eugenics used today to eugenics of the past. |

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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 |