Planned Course: Biology	Course Number: S401		Department: Science
Unit: Genetics and Evolution Estimated Time: 45 days	Grade Level: 9-10 Level/Track: College Prep		Date Approved: 08/22/2016
Biology Keystone Eligible Content ▶ **PA Academic Standards**	▶ **Core Concepts (in question format)** • **Skills/Knowledge**	**Activities/Strategies/Study Skills (identify some activities as remedial or enrichment activities)**	**Assessments (include types and topics)**
❖ Bio.B.3.3.1 • 3.1.B.A9 ❖ Bio.B.1.2.1 • 3.1.B.B1 • 3.1.B.B3 • 3.1.B.B5 • 3.1.B.C2 • 3.1.C.C2 Bio.B.1.2.2 • 3.1.B.B1 • 3.1.B.B5 • 3.1.B.B2 • 3.1.B.B3 • 3.1.C.C2 ❖ Bio.B.2.2.1 • 3.1.B.B1 • 3.1.B.B3 • 3.1.B.B5 • 3.1.C.B3 • 3.1.C.C2 ❖ Bio.B.2.2.2 • 3.1.B.A5 • 3.1.B.B3 • 3.1.B.B5 • 3.1.C.B3 ❖ Bio.B.2.3.1 • 3.1.B.B1 • 3.1.B.B3 • 3.1.B.C2 • 3.1.C.B3 • 3.1.C.C2 ❖ Bio.B.2.1.1	▶ What role does DNA play in the production of proteins necessary for growth and function of cells? DNA: • Identify the chemical components of DNA. • Discuss the experiments leading to the identification of DNA as the molecule that carries the genetic code. • Describe the steps leading to the development of the double-helix model of DNA. • Summarize the events of the DNA replication. • Compare DNA replication in prokaryotes with that of eukaryotes. RNA: • Contrast RNA and DNA. • Explain the process of transcription. • Identify the genetic code and explain how it is read. • Summarize the process of translation. • Describe the "central dogma" of molecular biology. • Define mutations and describe the different types of mutations.	▶ Suggested Labs and Activities: • KNEX DNA Structure Lab • KNEX DNA Replication Lab • KNEX Transcription / Translation Lab • Protein Synthesis Scavenger Hunt • RNA and Protein Synthesis Gizmo • Constructing a Human Pedigree Lab • Constructing a Human Karyotype Lab (Identifying Genetic Disorders) • Human Karyotyping Gizmo • Modeling Restriction Enzymes • Click and Clone Mouse Genetics • DNA Fingerprinting Simulation • DNA Fingerprinting Gizmo • Amino Acid Sequences Lab • Comparing Bones Activity • Natural Selection Gizmo • Microevolution Gizmo • Ecosystems and Speciation Lab ▶ Scientific Article Assignments ▶ Homework / Classwork to reinforce major concepts ▶ Data Analysis ▶ Visual Quizzes ▶ Graphic Organizers / Diagrams	▶ Formative Assessments ▶ Quizzes ▶ Chapter/topic summative assessments ▶ Lab Reports/Assessments ▶ Quarterly Assessment #3

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• 3.1.B.B5 ❖ Bio.B.2.1.2 • 3.1.B.B1 • 3.1.B.B2 • 3.1.B.B3 • 3.1.C.C2 ❖ Bio.B.2.4.1 • 3.1.B.B4 • 4.4.7.A • 4.4.10.A • 4.4.12.A • 4.4.7.B • 4.4.10.B • 4.4.12.B ❖ Bio.B.3.2.1 • 3.1.B.C3 • 3.1.B.C1 • 3.1.B.B3 ❖ Bio.B.3.1.1 • 3.1.B.C1 ❖ Bio.B.3.1.2 • 3.1.B.C1 • 3.1.B.C2 ❖ Bio.B.3.1.3 • 3.1.B.C2 • 3.1.B.B1	• Describe the effects mutations can have on genes. ▶ How is hereditary information in genes is inherited and expressed? Human Heredity • Identify the types of human chromosomes in a karyotype. • Describe the patterns of the inheritance of human traits. • Explain how pedigrees are used to study human traits. • Explain how small changes in DNA cause genetic disorders. • Summarize the problems caused by nondisjunction. Genetic Engineering • Explain the purpose of selective breeding. • Explain how people increase genetic variation. • Explain how scientists manipulative DNA. • Describe the importance of recombinant DNA. • Define transgenic and describe the usefulness of some transgenic organisms to humans. • Describe the benefits of genetic engineering as they relate to agriculture and	▶ Study Guides	

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	industry. • Explain how recombinant DNA technology can improve human health. • Summarize the process of DNA fingerprinting and explain its uses. ▶ How does evolution result from the random processes selecting for survival and reproduction of a population? Darwin's Theory of Evolution • Describe the conditions under which natural selection occurs. • Explain the principle of common descent. • Explain how geologic distribution of species relates to their evolutionary history. • Explain how fossils and the fossil record document the descent of modern species from ancient ancestors. • Describe what homologous structures and embryology suggest about the process of evolutionary change. • Explain how molecular evidence can be used to trace the process of evolution.		

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	• Explain the results of the Grants' investigation of adaptation in Galapagos finches. ▶ Evolution of Populations • Define evolution in genetic terms. • Identify the main sources of genetic variation in a population. • State what determines the number of phenotypes for a trait. • Explain how natural selection affects single-gene and polygenic traits. • Describe genetic drift. • Explain how different factors affect genetic equilibrium. • Identify the types of isolation that can lead to the formation of new species. • Describe the current hypothesis about Galapagos finch speciation.		