Phoenixville Area School District Understanding by Design (UbD) Science Unit Plan

Grade Level &/or HS Subject: BIOLOGY **Unit Name: GENETIC INHERITANCE AND VARIATION**

Stage 1 Desired Results

Overarching NGSS & PA Standards:

HS-LS3-1

HS-LS3-3

Which branch(es) of science apply:

BIOLOGY

Transfer

Students will be able to independently use their learning to…

- ask questions and/or define problems
- analyze and interpret data using computational thinking

Meaning-Making

Students will understand that…

- there are relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.
- there are variations and distribution of expressed traits in a population.

ESSENTIAL QUESTIONS

Students will keep considering...

- How are the characteristics of one generation related to the previous generation?
- Why/how do individuals of the same species vary in how they look, function, and behave?

Knowledge and Skills Acquisition

UNDERSTANDINGS

Students will know…

- all cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins.
- each chromosome consists of a single very long DNA molecule, and each gene on the chromosome is a particular segment of that DNA. The instructions for forming species' characteristics are carried in DNA. All cells in an organism have the same genetic content, but the genes used (expressed) by the cell may be regulated in different ways. Not all DNA codes for a protein; some segments of DNA are involved in regulatory or structural functions, and some have no as-yet known function.
- environmental factors also affect expression of traits, and hence affect the probability of occurrences of traits in a population. Thus, the variation and distribution of traits observed depends on both genetic and environmental factors.
- Describe and/or predict observed patterns of inheritance (i.e., dominant, recessive, co-dominance, incomplete dominance, sex-linked, polygenic, and multiple alleles).*
- Explain how genetic engineering has impacted the fields of medicine, forensics, and

Students will be skilled at…

- Asking questions that arise from examining models or a theory to clarify relationships.
- Applying concepts of statistics and probability (including determining function fits to data, slope, intercept, and correlation coefficient for linear fits) to scientific and engineering questions and problems, using digital tools when feasible.

	agriculture (e.g., selective breeding, gene splicing, cloning, genetically modified organisms, gene therapy).* • Explain the functional relationships among DNA, genes, alleles, and chromosomes and their roles in inheritance.*	
	KEY VOCABULARY Alleles, Cloning, Co-dominance, Dominant, F1 Generation, F2 Generation, Gene Splicing, Gene Therapy, Genes, Genetically Modified Organisms, Genotype, Heterozygous, Homozygous, Hybrid, Incomplete dominance, Karyotype, Multiple alleles, P Generation, Phenotype, Polygenic, Purebred, Recessive, Sex-Linked Traits, Trait	

Stage 2 – Evidence		
Evaluative Criteria	***Assessment Evidence***	
What criteria will be used in each assessment to evaluate attainment of the desired results?	PERFORMANCE TASK(S): • Inheritance Modeling Lab • Genetic Drift Modeling Lab	Differentiation Considerations: • Grouping of students • Split Screen Activities • Scaffolding of Information
What criteria will be used in each assessment to evaluate attainment of the desired results?	OTHER EVIDENCE: • Quizzes and Unit Exams • Genetic Engineering Project – OPTIONAL • Epigenetics Video Response - OPTIONAL	Differentiation Considerations: • Grouping of students • Split Screen Activities • Scaffolding of Information