

# HudsonAlpha *High School* Field Trip Experiences Alignment with 2015 Alabama Course of Study

	Cytogeneticist for a Day	Extreme Extraction	All in the Family – Or Is It?	GenomeCache®	Investigating the Genetics of Cancer	Genetically Modified Snacks?	Jumping Genes	Genes & ConSEQUENCES®
<b>Scientific and Engineering Practices</b>								
Asking questions (for science) and defining problems (for engineering)		•						
Developing and using models		•						
Planning and carrying out investigations		•						
Analyzing and interpreting data	•	•	•		•	•	•	•
Constructing explanations (for science) and designing solutions (for engineering)								•
Engaging in argument from evidence	•	•	•		•	•	•	
Obtaining, evaluating, and communicating information	•	•	•		•	•	•	•
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<b>Crosscutting Concepts</b>								
Patterns	•							
Cause and Effect	•		•		•	•	•	•
Scale, proportion, and quantity				•				
Systems and system models		•						
Structure and function		•						

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<b>Biology Standards</b>								
1. Use models to compare and contrast how the structural characteristics of carbohydrates, nucleic acids, proteins, and lipids define their function in organisms.		•						
2. Obtain, evaluate, and communicate information to describe the function and diversity of organelles and structures in various types of cells (e.g., muscle cells having a large amount of mitochondria, plasmids in bacteria, chloroplasts in plant cells).		•						
3. Formulate an evidence-based explanation regarding how the composition of deoxyribonucleic acid (DNA) determines the structural organization of proteins. <u>a. Obtain and evaluate experiments of major scientists and communicate their contributions to the development of the structure of DNA and to the development of the central dogma of molecular biology.</u>		•						
3. Formulate an evidence-based explanation regarding how the composition of deoxyribonucleic acid (DNA) determines the structural organization of proteins. <u>b. Obtain, evaluate, and communicate information that explains how advancements in genetic technology (e.g., Human Genome Project, Encyclopedia of DNA Elements [ENCODE] project, 1000 Genomes Project) have contributed to the understanding as to how a genetic change at the DNA level may affect proteins, and in turn, influence the appearance of traits.</u>	•			•				•

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4. Develop and use models to explain the role of the cell cycle during growth and maintenance in multicellular organisms (e.g., normal growth and/or uncontrolled growth resulting in tumors).			•		•			
11. Analyze and interpret data collected from probability calculations to explain the variation of expressed traits within a population. <u>c. Analyze and interpret data (e.g., pedigree charts, family and population studies) regarding Mendelian and complex genetic disorders (e.g., sickle-cell anemia, cystic fibrosis, type 2 diabetes) to determine patterns of genetic inheritance and disease risks from both genetic and environmental factors.</u>			•		•			
12. Develop and use a model to analyze the structure of chromosomes and how new genetic combinations occur through the process of meiosis. <u>a. Analyze data to draw conclusions about genetic disorders caused by errors in meiosis (e.g., Down syndrome, Turner syndrome).</u>	•							
14. Analyze and interpret data to evaluate adaptations resulting from natural and artificial selection that may cause changes in populations over time (e.g., antibiotic-resistant bacteria, beak types, peppered moths, pest-resistant crops).						•	•	