

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

	Exploring Enzymes	Kitchen DNA with a Twist of Inquiry	What is Biotechnology?	GenomeCache®
<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		●		
Engaging in argument from evidence		●		
Obtaining, evaluating, and communicating information		●		
	Exploring Enzymes	Kitchen DNA with a Twist of Inquiry	What is Biotechnology?	GenomeCache®
<b>Crosscutting Concepts</b>				
Cause and Effect			●	
Scale, proportion, and quantity				●
Systems and system models		●		
Structure and function		●		
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<b>7th Grade Standards</b>				
1. Engage in argument from evidence to support claims of the cell theory.		●		
2. Gather and synthesize information to explain how prokaryotic and eukaryotic cells differ in structure and function, including the methods of asexual and sexual reproduction.		●		
3. Construct an explanation of the function (e.g., mitochondria releasing energy during cellular respiration) of specific cell structures (i.e., nucleus, cell membrane, cell wall, ribosomes, mitochondria, chloroplasts, and vacuoles) for maintaining a stable environment.	●	●		
4. Construct models and representations of organ systems (e.g., circulatory, digestive, respiratory, muscular, skeletal, nervous) to demonstrate how multiple interacting organs and systems work together to accomplish specific functions.	●			
13. Construct an explanation from evidence to describe how genetic mutations result in harmful, beneficial, or neutral effects to the structure and function of an organism.				●

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	<b>Biology Standards</b>			
<p>3. Formulate an evidence-based explanation regarding how the composition of deoxyribonucleic acid (DNA) determines the structural organization of proteins.</p> <p><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></p>			•	
<p>3. Formulate an evidence-based explanation regarding how the composition of deoxyribonucleic acid (DNA) determines the structural organization of proteins.</p> <p><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></p>			•	•
<p>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).</p>				•