

Wright City Science Curriculum

7th Grade

Grade	7
Unit of Study	Natural Selection
Length of Unit	9 Weeks
Sample Essential Questions	Sample Corresponding Big Ideas
Student will self-select an ecosystem review of different varieties and differing inheritable genetic traits that offer advantages to certain populations within that environment (food, predators, weather).	Create a scatterplot showing the change in the frequency of the two traits over many generations. The scatterplot should include symbols that distinguish between those bacteria that carry Variant X and those that carry Variant Y as well as include a title, scale, axis labels, unit labels, and legend.
Construct an explanation that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.	Construct an explanation for how natural selection is acting over generations in the new environment to lead to a change in the frequency of the genetic traits in the population.
Use evidence to describe how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.	Be sure to address how the specific traits may increase some bacteria's chance of surviving in the new environment and cite the plots and relationships in the data to support your explanation.
List some characteristics within an environment that will aid in a population's survival (food supply, water source, availability of shelter, predators).	Review a chart and explain the reasoning that supports the scientist's plan to study the bird population sizes.

Missouri Learning Standards

Priority Standards

6-8.LS4.B.1 Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.

Unit 1 Sequence			
MLS	Topic(s)	Learning Targets	Academic Vocabulary
6-8.LS4.B.1	Variation Within Populations	- Identify examples of genetic variation within a population. - Explain that individuals of the same species can have different inherited traits. - Distinguish between inherited and acquired characteristics. - Describe how genetic variation provides the starting point for natural selection. - Use observations and data to identify patterns of variation.	abiotic factor biotic factor competition ecosystem evidence
6-8.LS4.B.1	Environmental Factors	- Identify biotic and abiotic factors that influence survival. - Explain how environmental conditions create challenges for organisms. - Describe how organisms compete for limited resources. - Explain why a trait may be beneficial in one environment but not another. - Identify characteristics that can increase an organism's likelihood of survival.	frequency genotype phenotype mutation
6-8.LS4.B.1	Genetic Variation and Survival	- Explain how genetic variation can result in different traits within a population. - Connect an inherited trait to an organism's ability to survive.	predator prey resource survival advantageous

		● Use evidence to determine whether a trait provides a survival advantage. ● Explain how environmental conditions influence which traits are advantageous.	
6-8.LS4.B.1	Natural Selection	● Define natural selection. ● Describe the four major ideas associated with natural selection: ● Variation exists within populations. ● Some variation is inherited. ● Organisms with advantageous traits are more likely to survive and reproduce. ● Traits that provide advantages can become more common in a population over generations. ● Explain why individuals do not "choose" to adapt. ● Explain that natural selection changes populations over generations.	disadvantageous limiting factor reproductive success
6-8.LS4.B.1	Changes in Trait Frequency	● Define trait frequency. ● Analyze data showing changes in trait frequency. ● Identify patterns across multiple generations. ● Explain why an advantageous trait may increase in frequency. ● Use quantitative evidence to support an explanation.	trend pattern population size trait frequency environmental change
6-8.LS4.B.1	Data Analysis	● Interpret tables and graphs related to natural selection. ● Create and analyze scatterplots. ● Identify independent and dependent variables. ● Describe trends and relationships in data. ● Use data to construct evidence-based explanations.	
6-8.LS4.B.1	Environmental Change	● Predict how environmental changes may affect populations. ● Explain how changing environmental conditions can change selection pressures. ● Compare the survival of organisms with different traits under different conditions. ● Explain why adaptations are related to specific environments.	
6-8.LS4.B.1	Evidence for Natural Selection	● Evaluate evidence supporting natural selection. ● Use data to identify changes in populations.	

		• Compare evidence from different organisms. • Construct explanations using Claim-Evidence-Reasoning (CER). • Cite specific data as evidence.	
6-8.LS4.B.1	Application and Assessment	• Construct a complete explanation of natural selection. • Explain how genetic variation and environmental conditions interact. • Use graphs and data to support claims. • Predict changes in trait frequencies over generations. • Defend an explanation using scientific evidence.	

MLS	Learning Activities	
6-8.LS4.B.1	Students will participate in a trait variation gallery walk to identify differences in inherited traits among individuals.	Must Do ▾
6-8.LS4.B.1	Students will sort examples of inherited and acquired traits and analyze how genetic variation occurs within a population. Students will complete a population variation investigation and record observations in a science journal.	Must Do ▾
6-8.LS4.B.1	Students will identify biotic and abiotic factors that affect an organism's ability to survive in an environment.	Must Do ▾
6-8.LS4.B.1	Students will participate in a bird-beak simulation using different tools to model how variations in traits can affect an organism's ability to obtain food.	Can Do ▾
6-8.LS4.B.1	Students will participate in a natural selection simulation to model how environmental pressures affect which organisms survive and reproduce.	Can Do ▾
6-8.LS4.B.1	Students will conduct a multi-generation population simulation to observe changes in the frequency of traits over time.	Must Do ▾
6-8.LS4.B.1	Students will analyze tables, graphs, and scatterplots showing changes in trait frequencies over multiple generations.	Must Do ▾
6-8.LS4.B.1	Students will participate in an environmental change simulation to investigate how changing conditions can alter which traits provide a survival advantage.	Must Do ▾
6-8.LS4.B.1	Students will rotate through evidence stations involving fossils, camouflage, bird beaks, bacterial resistance, and other examples of natural selection.	Can Do ▾

Assessments

MLS	Description or Location	Rubric/Location
6-8.LS4.B.1	Environmental Factors & Survival	CFA/Summative
6-8.LS4.B.1	Genetic Variation & Survival	CFA/Summative
6-8.LS4.B.1	Natural Selection Over Generations	CFA/Summative
6-8.LS4.B.1	Environmental Change & Selection	CFA/Summative

Additional Resources	
• MAP Practice (Session 2, #10, 11)- Released Item: http://tinyurl.com/kj4uuubn • MAP Scoring Rubric Guide- http://tinyurl.com/23m4hzrn	
• Resource: Natural Selection - Khan Academy: http://tinyurl.com/3edmf9ev • Video: Natural Selection: http://tinyurl.com/6x9c384n • Video: Variation is essential: http://tinyurl.com/2hw36sad	
• Example Assessment - Snail: http://tinyurl.com/mpmp2ycx	