

Grade 7: Heredity and Genetics

Stage 1 Desired Results		
ESTABLISHED GOALS: <u>Competencies:</u> ● <i>Cause and Effect- Students will investigate, explain, and evaluate potential causal relationships, using evidence to support claims and predictions about the mechanisms that drive those relationships</i> ● <i>Structure and Function- Students will analyze the relationship among structure and function of natural or human designed objects, using evidence to redesign or support claims about survival and/or improved performance.</i> ● <i>Students will demonstrate the ability to analyze and summarize text and integrate knowledge to make meaning of discipline-specific materials.</i> ● <i>Students will demonstrate the ability to produce coherent and supported writing in order to communicate effectively for a range of discipline-specific tasks, purposes, and audiences.</i> ● <i>Students will demonstrate the ability to speak purposefully and effectively by strategically making decisions about content, language use, and discourse style.</i> <u>Content Standards:</u> ● MS-LS1-5 Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. ● MS-LS3-1 Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism. ● MS-LS3-2 Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation. ● MS-LS4-5 Gather and synthesize information about technologies that have changed the way humans influence	<i>Transfer</i>	
	<i>Students will be able to independently use their learning to evaluate advances in genetics.</i>	
	<i>Meaning</i>	
	ENDURING UNDERSTANDINGS <i>Students will understand that...</i> ● cause and effect relationships may be used to predict phenomena in natural systems. ● phenomena that can be observed at one scale may not be observable at another scale. ● engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems. ● some cause and effect relationships in systems can only be described using probability.	ESSENTIAL QUESTIONS ● Which is more important, nature or nurture? ● Should there be limits to advances in genetics based on ethics? ● How does the creation of proteins impact the organism?
	<i>Acquisition</i>	
	<i>Students will know...</i> ● that organisms reproduce, either sexually or asexually, and transfer their genetic information to their offspring. ● that in sexually reproducing organisms, each parent contributes half of the genes acquired (at random) by the offspring. Individuals have two of each chromosome and hence two alleles of each gene, one acquired from each parent. These versions may be identical or may differ from each other. ● that genes are located in the chromosomes of cells, with each chromosome pair containing two variants of each of many distinct genes. Each distinct gene chiefly controls the production of specific proteins, which in turn affects the traits of the individual. Changes	<i>Students will be skilled at...</i> ● describing cause and effect relationships using probability concepts. ● using Punnett Squares to predict the inheritance of traits. ● modeling complex and microscopic structures and systems. ● visualizing and modeling how function depends on the shapes, composition, and relationships among its parts.

the inheritance of desired traits in organisms.	(mutations) to genes can result in changes to proteins, which can affect the structures and functions of the organism and thereby change traits. • that variations of inherited traits between parent and offspring arise from genetic differences that result from the subset of chromosomes (and therefore genes) inherited. • that in addition to variations that arise from sexual reproduction, genetic information can be altered because of mutations. Though rare, mutations may result in changes to the structure and function of proteins. Some changes are beneficial, others harmful, and some neutral to the organism. • that in artificial selection, humans have the capacity to influence certain characteristics of organisms by selective breeding. One can choose desired parental traits determined by genes, which are then passed onto offspring. • that DNA is too small to see and study without the use of special tools. <u>vocabulary:</u> trait, generation, mutation, inherit, ancestor, RNA, heredity, relative, protein, genetics, genotype, chromosome, phenotype, DNA, heterozygous, gene, homozygous, allele, genetic engineering, dominant allele, selective breeding, recessive allele, clone	
Content Area Literacy Standards	21st Century Skills	
• RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts. • RST.6-8.2 Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions. • RST.6-8.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics. • RST.6-8.8 Distinguish among facts, reasoned judgment based on research findings, and speculation in a	• <i>reason effectively</i> • <i>make judgments and decisions</i> • <i>communicate clearly</i> • <i>collaborate with others</i> • <i>access and evaluate information</i> • <i>use and manage information</i>	

text. • WHST.6-8.1 Write arguments focused on discipline-specific content. • WHST.6-8.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. • WHST.6-8.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. • WHST.6-8.5 With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed. • WHST.6-8.6 Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently. • WHST.6-8.7 Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. • WHST.6-8.8 Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. • WHST.6-8.9 Draw evidence from informational texts to support analysis, reflection, and research.	• <i>be flexible</i>
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Stage 2 - Evidence	
<i>Evaluative Criteria</i>	<i>Assessment Evidence</i>
	PERFORMANCE TASK(S):
	OTHER EVIDENCE:

Stage 3 – Learning Plan
<i>Summary of Key Learning Events and Instruction</i>

<i>Language Arts Integration</i>	<i>Mathematics Integration</i>
• 1.OA.1 Use	• 1.OA.1 Use
<i>Technology Integration Science and Engineering Practices</i>	<i>District Materials</i>
• 1.OA.1 Use	
<i>Science and Engineering Practices</i>	