

California's Next Generation Science Standards (NGSS) for K-12
Grade Eight
Integrated Course
Standards arranged by Disciplinary Core Ideas

California Department of Education

MS-LS3 Heredity: Inheritance and Variation of Traits

<p>MS-LS3 Heredity: Inheritance and Variation of Traits Students who demonstrate understanding can: 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. [Clarification Statement: Emphasis is on conceptual understanding that changes in genetic material may result in making different proteins.] [Assessment Boundary: Assessment does not include specific changes at the molecular level, mechanisms for protein synthesis, or specific types of mutations.]</p>	<p>The performance expectations above were developed using the following elements from the NRC document <i>A Framework for K-12 Science Education</i>:</p>
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<p>Science and Engineering Practices Developing and Using Models Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems. ▪ Develop and use a model to describe phenomena. (MS-LS3-1)</p>	<p>Disciplinary Core Ideas LS3.A: Inheritance of Traits ▪ 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 (mutations) to genes can result in changes to proteins, which can affect the structures and functions of the organism and thereby change traits. (MS-LS3-1)</p>	<p>Crosscutting Concepts Structure and Function ▪ Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the shapes, composition, and relationships among its parts; therefore, complex natural and designed structures/systems can be analyzed to determine how they function. (MS-LS3-1)</p>
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*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea. The section entitled “Disciplinary Core Ideas” is reproduced verbatim from A Framework for K-12 Science Education: Practices, Cross-Cutting Concepts, and Core Ideas. Integrated and reprinted with permission from the National Academy of Sciences. This document was updated in April 2014.

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	<p>LS3.B: Variation of Traits 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. (MS-LS3-1)</p>	
<p><i>Connections to other DCIs in this grade-band: MS.LS1.A (MS-LS3-1)</i></p>		
<p><i>Articulation across grade-bands: 3.LS3.A (MS-LS3-1); 3.LS3.B (MS-LS3-1); HS.LS1.A (MS-LS3-1); HS.LS1.B (MS-LS3-1);</i></p>		
<p>HS.LS3.A (MS-LS3-1); HS.LS3-B (MS-LS3-1)</p>		
<p><i>Common Core State Standards Connections:</i></p>		
<p><i>ELA/Literacy –</i></p>		
<p>RST.6-8.1</p>	<p>Cite specific textual evidence to support analysis of science and technical texts. (MS-LS3-1)</p>	
<p>RST.6-8.4</p>	<p>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. (MS-LS3-1)</p>	
<p>RST.6-8.7</p>	<p>Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (MS-LS3-1)</p>	
<p>SL.8.5</p>	<p>Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points. (MS-LS3-1)</p>	

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