

**California’s Next Generation Science Standards (NGSS) for K-12**  
**Grade Six**  
**Integrated Course Model**  
Standards arranged by Disciplinary Core Ideas

**MS-LS3 Heredity: Inheritance and Variation of Traits**

<b>MS-LS3 Heredity: Inheritance and Variation of Traits</b>		
Students who demonstrate understanding can:		
<b>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.</b> [Clarification Statement: Emphasis is on using models such as Punnett squares, diagrams, and simulations to describe the cause and effect relationship of gene transmission from parent(s) to offspring and resulting genetic variation.]		
The performance expectations above were developed using the following elements from the NRC document <i>A Framework for K-12 Science Education</i> :		
<b>Science and Engineering Practices</b>	<b>Disciplinary Core Ideas</b>	<b>Crosscutting Concepts</b>
<p><b>Developing and Using Models</b>  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.</p> <ul style="list-style-type: none"> <li>▪ Develop and use a model to describe phenomena. (MS-LS3-2)</li> </ul>	<p><b>LS1.B: Growth and Development of Organisms</b></p> <ul style="list-style-type: none"> <li>▪ Organisms reproduce, either sexually or asexually, and transfer their genetic information to their offspring. (<i>secondary to MS-LS3-2</i>)</li> </ul> <p><b>LS3.A: Inheritance of Traits</b></p> <ul style="list-style-type: none"> <li>▪ Variations of inherited traits between parent and offspring arise from genetic differences that result from the subset of chromosomes (and therefore genes) inherited. (MS-LS3-2)</li> </ul> <p><b>LS3.B: Variation of Traits</b></p> <ul style="list-style-type: none"> <li>▪ In sexually reproducing organisms, each parent contributes half of the genes acquired (at random) by the offspring.</li> </ul>	<p><b>Cause and Effect</b></p> <ul style="list-style-type: none"> <li>▪ Cause and effect relationships may be used to predict phenomena in natural systems. (MS-LS3-2)</li> </ul>

Clarification statements were created by the writers of NGSS to supply examples or additional clarification to the performance expectations and assessment boundary statements

California clarification statements were incorporated by the California Science Expert Review Panel

\*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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	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. (MS-LS3-2)	
<i>Connections to other DCIs in this grade-band:</i>		
<i>Articulation across grade-bands:</i> <b>3.LS3.A</b> (MS-LS3-2); <b>3.LS3.B</b> (MS-LS3-2); <b>HS.LS1.B</b> (MS-LS3-2); <b>HS.LS3.A</b> (MS-LS3-2); <b>HS.LS3-B</b> (MS-LS3-2)		
<i>Common Core State Standards Connections:</i>		
<i>ELA/Literacy –</i>		
<b>RST.6-8.1</b>	Cite specific textual evidence to support analysis of science and technical texts. (MS-LS3-2)	
<b>RST.6-8.4</b>	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-LS3-2)	
<b>RST.6-8.7</b>	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-LS3-2)	
<b>SL.8.5</b>	Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points. (MS-LS3-2)	
<i>Mathematics –</i>		
<b>MP.4</b>	Model with mathematics. (MS-LS3-2)	
<b>6.SP.B.5</b>	Summarize numerical data sets in relation to their context. (MS-LS3-2)	

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