



Phil Lafontaine, Director
Professional Learning Support Division



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Why Science?

I Am a Scientist



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California to Revise Science Standards

- SB 300
- SB 1200
- Revise CA Science Standards based on NGSS
- Submit to SBE July 2013
- SBE to act by November 2013



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NATIONAL PROCESS FOR DEVELOPMENT



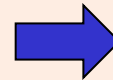
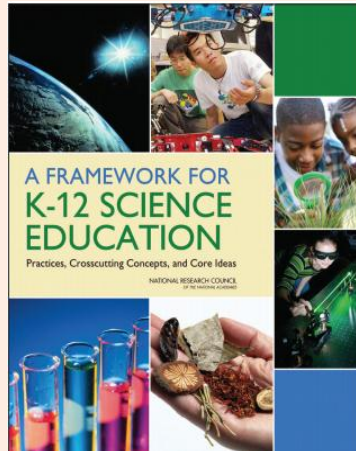
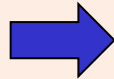
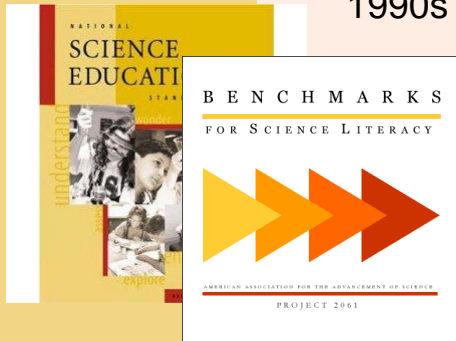
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Building on the Past; Preparing for the Future

Phase I

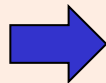
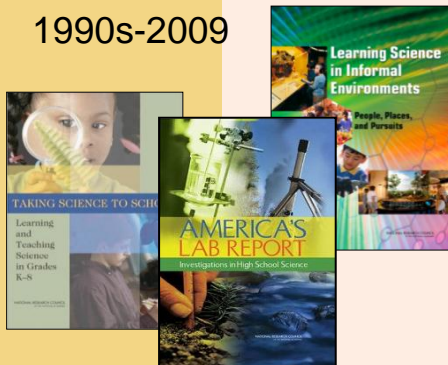
Phase II

1990s



7/2011 – April 2013

1990s-2009

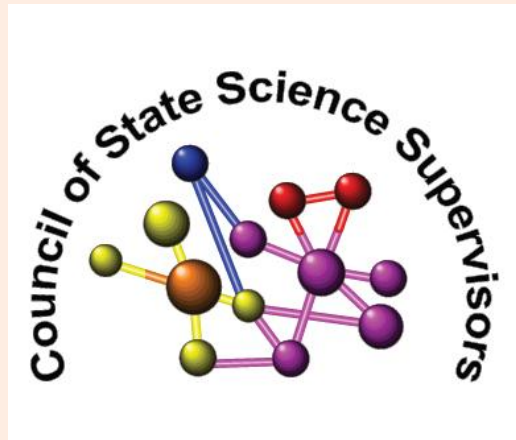


1/2010 - 7/2011



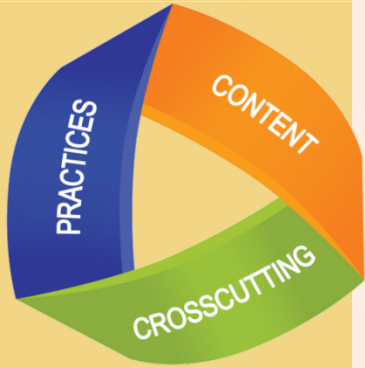
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Lead Partners





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Development of the NGSS

- California State Review Team (SRT) of 80 science experts reviewed and commented on five (private and public) drafts of the NGSS
- Second and final public review January 2013
- Thousands of comments submitted to Achieve
- Final copy of NGSS released April 2013



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Performance Expectations for NGSS

Developed in discipline core ideas

(Life Science, Earth and Space
Science, Physical Science,
and Engineering)

Arranged in

- K-5 grade specific
- 6-8 grade span
- 9-12 grade span



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5-LS2 Ecosystems: Interactions, Energy, and Dynamics

5-LS2 Ecosystems: Interactions, Energy, and Dynamics

Students who demonstrate understanding can:

- 5-LS2-a. Construct and use models of food webs to describe the transfer of matter among plants, animals, decomposers, and the environment and discuss limitations of these models.** [Clarification Statement: Examples of systems could be: organisms, ecosystems, and the Earth. Matter is transported among and within systems.]
- 5-LS2-b. Formulate questions and predict outcomes about how organisms, such as fungi and bacteria, operate as decomposers to restore (recycle) some materials back to the soil for plants to use in local ecosystems.** [Clarification Statement: Minerals and fertilizer are not food for plants.]
- 5-LS2-c. Use models to test the functioning of a designed process that mitigates a factor upsetting the stability of a local ecosystem.*** [Clarification Statement: Factors that upset an ecosystem's stability include: invasive species, drought, human development, and removal of predators. Models could include simulations, and representations, etc.]
- 5-LS2-d. Ask questions about what organisms obtain from the environment and what they release as waste matter back into the environment.** [Clarification Statement: Air, water, and minerals (fertilizer) are needed by plants but are not food for them; plants use energy from light to make food from non-food, primarily air and water.] [Assessment Boundary: Students should be assessed on the idea that plants make their own food from materials that are not food (air and water), not the process of photosynthesis.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p>Asking Questions and Defining Problems Asking questions and defining problems in grades 3–5 builds from grades K–2 experiences and progresses to specifying qualitative relationships.</p> <ul style="list-style-type: none"> Ask questions that relate one variable to another variable (5-LS2-d) Formulate questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships. (5-LS2-b) <p>Developing and Using Models Modeling in 3–5 builds on K–2 models and progresses to building and revising simple models and using models to represent events and design solutions.</p> <ul style="list-style-type: none"> Develop a model using an analogy, example, or abstract representation to describe a scientific principle or design solution. (5-LS2-a) Use simple models to describe phenomena concerning the functioning of a natural system. (5-LS2-a) Identify limitations of models. (5-LS2-a) Use a simple model to test cause and effect relationships concerning the functioning of a proposed object, tool or process. (5-LS2-c) <p>Connections to Nature of Science</p> <p>Scientific Knowledge is Based on Empirical Evidence</p> <ul style="list-style-type: none"> Science findings are based on recognizing patterns. (5-LS2-a) 	<p>LS1.C: Organization for Matter and Energy Flow in Organisms</p> <ul style="list-style-type: none"> Animals and plants alike generally need to take in air and water, animals must take in food, and plants need light and minerals. (secondary to 5-LS2-a) Plants acquire their material for growth chiefly from air and water and process matter. (secondary to 5-LS2-d) <p>LS2.A: Interdependent Relationships in Ecosystems</p> <ul style="list-style-type: none"> The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. (5-LS2-a) Either way, they are "consumers." Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as "decomposers." Decomposition eventually restores (recycles) some materials back to the soil for plants to use. (5-LS2-b) Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem. (5-LS2-c) <p>LS2.B: Cycles of Matter and Energy Transfer in Ecosystems</p> <ul style="list-style-type: none"> Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. (5-LS2-a) Organisms obtain gases, water, and minerals from the environment, and release waste matter (gas, liquid, or solid) back into the environment. (5-LS2-d) <p>ETS1.B: Developing Possible Solutions</p> <p>There are many types of models, ranging from simple physical models to computer models. They can be used to investigate how a design might work, communicate the design to others, and compare different designs. (secondary to 5-LS2-c)</p>	<p>Systems and System Models</p> <ul style="list-style-type: none"> A system is a group of related parts that make up a whole and can carry out functions its individual parts cannot. (5-LS2-c) A system can be described in terms of its components and their interactions. (5-LS2-c) <p>Energy and Matter</p> <ul style="list-style-type: none"> Matter is transported into, out of, and within systems. (5-LS2-a), (5-LS2-d), (5-LS2-b)
Connections to other DCIs in this grade-level: will be added in future version.		
Articulation of DCIs across grade-levels: will be added in future version.		
Common Core State Standards Connections:		
ELA/Literacy –		
RI.5.9	Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-LS2-d), (5-LS2-b)	
RI.5.10	By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, at the high end of the grades 4–5 text complexity band independently and proficiently. (5-LS2-c), (5-LS2-a), (5-LS2-d), (5-LS2-b)	
W.5.7	Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic. (5-LS2-d), (5-LS2-b)	
W.5.8	Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. (5-LS2-d), (5-LS2-b)	
SL.5.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly. (5-LS2-d), (5-LS2-b)	
SL.5.5	Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. (5-LS2-c), (5-LS2-a)	

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice, Disciplinary Core Idea, or Crosscutting Concept.

Performance Expectations = Standard

MS.LS-MEOE Matter and Energy in Organisms and Ecosystems	
MS.LS-MEOE	Matter and Energy in Organisms and Ecosystems
Students demonstrate understanding of how organisms obtain and transfer the matter and energy needed by:	
a.	Developing an explanation for the role of photosynthesis in the cycling of matter and flow of energy on Earth. [Assessment Boundary: Limited to the explanation related to water, carbon dioxide, and light energy being used to produce sugars and release oxygen NOT the chemical equation for photosynthesis]
b.	Developing and using models of the cycling of matter among living and nonliving parts of ecosystems.
c.	Using models to explore the transfer of energy into, out of, and within the ecosystems. [Assessment Boundary: Only light, chemical, and thermal energy need to be addressed with an emphasis that the total amount of energy does not change]
d.	Constructing and communicating models of food webs that demonstrate the transfer of matter and energy among organisms (producers, consumers, and decomposers) within an ecosystem.
e.	Using evidence to explain that matter is conserved as atoms in food are rearranged as they pass through different organisms in a food web.
f.	Using evidence from credible sources to support arguments that changing a component of an ecosystem affects the species in the ecosystem.

- a) Stem: Each standard is written in the form of one sentence, that identifies the disciplinary core idea, the scientific practice and the crosscutting concept the student is expected to demonstrate at the end of instruction..
- b) The clarification statements provide a short description of a nuance of the standard
- c) The assessment boundary provides the depth of understanding all students are expected to demonstrate.



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Example of a Performance Expectation

Students who demonstrate understanding can:

- **5-ESS2-1.**Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. **[Clarification Statement: Examples could include the influence of the ocean on ecosystems, landform shape, and climate; the influence of the atmosphere on landforms and ecosystems through weather and climate; and the influence of mountain ranges on winds and clouds in the atmosphere. The geosphere, hydrosphere, atmosphere, and biosphere are each a system.] [Assessment Boundary: Assessment is limited to the interactions of two systems at a time.]**

Foundation boxes provide information that expands and explains the standard statements in relation to the three dimensions:

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Foundation Boxes

species in the ecosystem.		
Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models <ul style="list-style-type: none"> Use models to explore relationships between variables, especially those representing input and output. (b),(c),(d) Use various representations and models (including computer simulations) to predict, explain, and test ideas about phenomena in a natural or designed system. (b),(c),(d) Constructing Explanations and Designing Solutions <ul style="list-style-type: none"> Generate and revise causal explanations from data (e.g. observations and sources of reliable information) and relate these explanations to current knowledge. (a) Base explanations on evidence and the assumption that natural laws operate today as they did in the past and will continue to do so in the future. (a),(e) Engaging in Argument from Evidence <ul style="list-style-type: none"> Use arguments and empirical evidence to construct a convincing argument that supports or refutes a claim made by someone else. (f) 	LS1.C: Structure and Function <ul style="list-style-type: none"> Plants, algae (including phytoplankton), and many microorganisms use the energy from light to make sugars (food) from carbon dioxide from the atmosphere and water through the process of photosynthesis, which also releases oxygen. These sugars can be used immediately or stored for growth or later use. (a) Animals obtain food from eating plants or eating other animals. (d),(e) Within individual organisms, food moves through a series of chemical reactions in which it is broken down and rearranged to form new molecules, to support growth or to release energy. (e) In most animals and plants, oxygen reacts with carbon-containing molecules (sugars) to provide energy and produce waste carbon dioxide; anaerobic bacteria achieve their energy needs in other chemical processes that do not need oxygen. (c) LS2.B: Cycle of Matter and Energy Transfer in Ecosystems <ul style="list-style-type: none"> Food webs are models that demonstrate how matter and energy is transferred between producers (generally plants and other organisms that engage in photosynthesis), consumers, and decomposers as the three groups interact—primarily, for food—within an ecosystem. (d) Transfers of matter into and out of the physical environment occur at every level. For example when molecules from food react with oxygen captured from the environment, the carbon dioxide and water thus produced are transferred back to the environment, and ultimately so are waste products, such as fecal matter. Decomposers recycle nutrients from dead plant or animal matter back to the soil in terrestrial environments or to the water in aquatic environments. The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem. (b),(c),(d) LS2.C: Ecosystem Dynamics, Functioning, and Resilience <ul style="list-style-type: none"> Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations. (f) 	Systems and System Models <ul style="list-style-type: none"> Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy, matter, and information flows within systems. (b),(c),(d) Models are limited in that they only represent certain aspects of the system under study. (b),(c) Energy and Matter <ul style="list-style-type: none"> Matter is conserved because atoms are conserved in physical and chemical processes. This conservation of atoms helps explain the cycling of matter in nature. (b),(e) The transfer of energy can be tracked as energy flows through a designed or natural system. (c),(d) Within a natural or designed system, the transfer of energy drives the motion and/or cycling of matter. (a) Stability and Change <ul style="list-style-type: none"> Small changes in one part of a system might cause large changes in another part. (f)
Connections to other topics in this grade-level: MS.ESS-HE, MS.ESS-ESP, MS.PS-SPM, MS.PS-ECT, MS.PS-CR Articulation across grade-levels: 3.SFS, 5.MEE, HS.LS-MEOE, HS.LS-IRE Common Core State Standards Connections: ELA— W.6.8 Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources. W.7.8 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. W.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.		



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Example of a performance expectation cited to a foundation box

Students who demonstrate understanding can:

- **K-LS1-1.** Use observations to describe patterns of what plants and animals (including humans) need to survive.

Disciplinary Core Ideas

LS1.C: Organization for Matter and Energy Flow in Organisms

- All animals need food in order to live and grow. They obtain their food from plants or from other animals.

Plants need water and light to live and grow. (K-LS1-1)

Connection boxes provide:

- a) connections to other topics in a particular grade level.
- b) articulation across grade levels.
- c) connections to Common Core State Standards (CCSS).

<p>assumption that natural laws operate today as they did in the past and will continue to do so in the future. (a),(e)</p> <p>Engaging in Argument from Evidence</p> <ul style="list-style-type: none">Use arguments and empirical evidence to construct a convincing argument that supports or refutes a claim made by someone else. (f)	<p>LS2.B: Cycle of Matter and Energy Transfer in Ecosystems</p> <ul style="list-style-type: none">Food webs are models that demonstrate how matter and energy is transferred between producers (generally plants and other organisms that engage in photosynthesis), consumers, and decomposers as the three groups interact—primarily, for food—within an ecosystem. (d)Transfers of matter into and out of the physical environment occur at every level. For example when molecules from food react with oxygen captured from the environment, the carbon dioxide and water thus produced are transferred back to the environment, and ultimately so are waste products, such as fecal matter. Decomposers recycle nutrients from dead plant or animal matter back to the soil in terrestrial environments or to the water in aquatic environments. The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem. (b),(c),(d) <p>LS2.C: Ecosystem Dynamics, Functioning, and Resilience</p> <ul style="list-style-type: none">Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations. (f)	<p>(c),(d)</p> <ul style="list-style-type: none">Within a natural or designed system, the transfer of energy drives the motion and/or cycling of matter. (a) <p>Stability and Change</p> <ul style="list-style-type: none">Small changes in one part of a system might cause large changes in another part. (f)
<p>Connections to other topics in this grade-level: MS.ESS-HE, MS.ESS-ESP, MS.PS-SPM, MS.PS-ECT, MS.PS-CR</p> <p>Articulation across grade-levels: 3.SFS, 5.MEE, HS.LS-MEOE, HS.LS-IRE</p> <p>Common Core State Standards Connections:</p> <p>ELA –</p> <p>W.6.8 Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources.</p> <p>W.7.8 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.</p> <p>W.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.</p> <p>Mathematics –</p> <p>MP.3 Construct viable arguments and critique the reasoning of others.</p> <p>6.SP Summarize and describe distributions</p> <p>8.F Use functions to model relationships between quantities</p>		

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Connection
boxes



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Example of CCSS Connection

K-ESS3-2. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.* Connections to other DCIs in kindergarten: **K.ETS1.A** (K-ESS3-2),(K-ESS3-3)

Articulation of DCIs across grade-levels: **1.LS1.A** (K-ESS3-1); **2.ESS1.C** (K-ESS3-2); **2.ETS1.B** (K-ESS3-3); **3.ESS3.B** (K-ESS3-2); **4.ESS3.A** (K-ESS3-3); **4.ESS3.B** (K-ESS3-2); **5.LS2.A** (K-ESS3-1); **5.ESS2.A** (K-ESS3-1); **5.ESS3.C** (K-ESS3-3)

Common Core State Standards Connections:

ELA/Literacy - **RI.K.1** With prompting and support, ask and answer questions about key details in a text. (K-ESS3-2) **W.K.2** Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic. (K-ESS3-3) **SL.K.3** Ask and answer questions in order to seek help, get information, or clarify something that is not understood. (K-ESS3-2) **SL.K.5** Add drawings or other visual displays to descriptions as desired to provide additional detail. (K-ESS3-1)

Mathematics - **MP.2** Reason abstractly and quantitatively. (K-ESS3-1) **MP.4** Model with mathematics. (K-ESS3-1),(K-ESS3-2) **K.CC**Counting and Cardinality (K-ESS3-1),(K-ESS3-2)



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NGSS Supporting Materials



- Appendices have been added to support the NGSS and in response to feedback
 - Appendix A – Conceptual Shifts
 - Appendix B – Responses to Public Feedback
 - Appendix C – College and Career Readiness
 - Appendix D – All Standards, All Students
 - Appendix E – Disciplinary Core Idea Progressions in the NGSS
 - Appendix F – Science and Engineering Practices in the NGSS
 - Appendix G – Crosscutting Concepts in the NGSS
 - Appendix H – Nature of Science
 - Appendix I – Engineering Design in the NGSS
 - Appendix J – Science, Technology, Society, and the Environment
 - Appendix K – Model Course Mapping in Middle and High School
 - Appendix L – Connections to Common Core State Standards in Mathematics
 - Appendix M – Connections to Common Core State Standards in ELA



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NGSS Endorsements

- National Research Council (NRC)
 - Fidelity to K-12 Framework
- National Science Teachers Association (NSTA)





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California Headquartered Business Support

- Autodesk, Inc.
- Baybio Association
- Baybio Institute
- Broadcom
- Causecast
- Chevron
- Cisco Systems
- Intel
- Optum RX
- Parsons
- Pasco
- Sally Ride Science
- SSL
- Steller Solutions INC.
- Symantec



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Businesses with Significant California Presence

- Bayer
- Corning
- DuPont
- Eaton
- Eli Lilly
- EMC
- Hitachi
- IBM
- McKinstry
- Merck
- Microsoft
- Raytheon
- Dell
- Prudential
- Travelers
- State Farm



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Moving from Current CA Standards to NGSS-CA

Less emphasis on	More emphasis on
Discrete facts	Conceptual understanding with a focus on depth over breadth
Isolated investigation and experimentation process skills	Integration of science and engineering practices with content
Student acquisition of information	Student understanding and use of scientific knowledge within and across science disciplines, and science and engineering practices
Numerous standards	Limited number of Disciplinary Core Ideas and Cross Cutting Concepts that unify the study of science and engineering
Uneven articulation throughout grade levels	Learning progressions that develop K-12
No engineering	Engineering standards and practices that all students should encounter
Assessing science knowledge	Assessing scientific understanding and reasoning specified by the performance expectations
Limited correlation with other subjects	Correlation with CCSS ELA and Mathematics
Limited integration of science disciplines in middle school	Integration of science disciplines in middle school



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Grade 7 – Life Science

California 7th Grade Life Science

- *Students know the function of the Umbilicus and placenta during pregnancy.*
- **NGSS Life Science - Middle School**
Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.



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Grade 5 – Physical Science

- California 5th Grade Physical Science
- *Students know* the common properties of salts, such as sodium chloride (NaCl).
- NGSS Physical Science- Grade 5
- Make observations and measurements to identify materials based on their properties.



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High School – Earth and Space Sciences

California High School - Earth Science 1.b

- *Students know* the evidence from Earth and moon rocks indicates that the solar system was formed from a nebular cloud of dust and gas approximately 4.6 billion years ago.

California Investigation and Experimentation High School

- 1.i. Analyze the locations, sequencing, or time intervals that are characteristic of natural phenomena (e.g. relative ages of rocks, location of planets over time, and succession of species in an ecosystem)

Or/And

- 1.k. Recognize the cumulative nature of scientific evidence.

- **NGSS Earth and Space Science High school**

Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history.



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Engineering Design Standards Grades K-2

Students who demonstrate understanding can:

- **K-2-ETS1-1.** Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
- **K-2-ETS1-2.** Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
- **K-2-ETS1-3.** Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.



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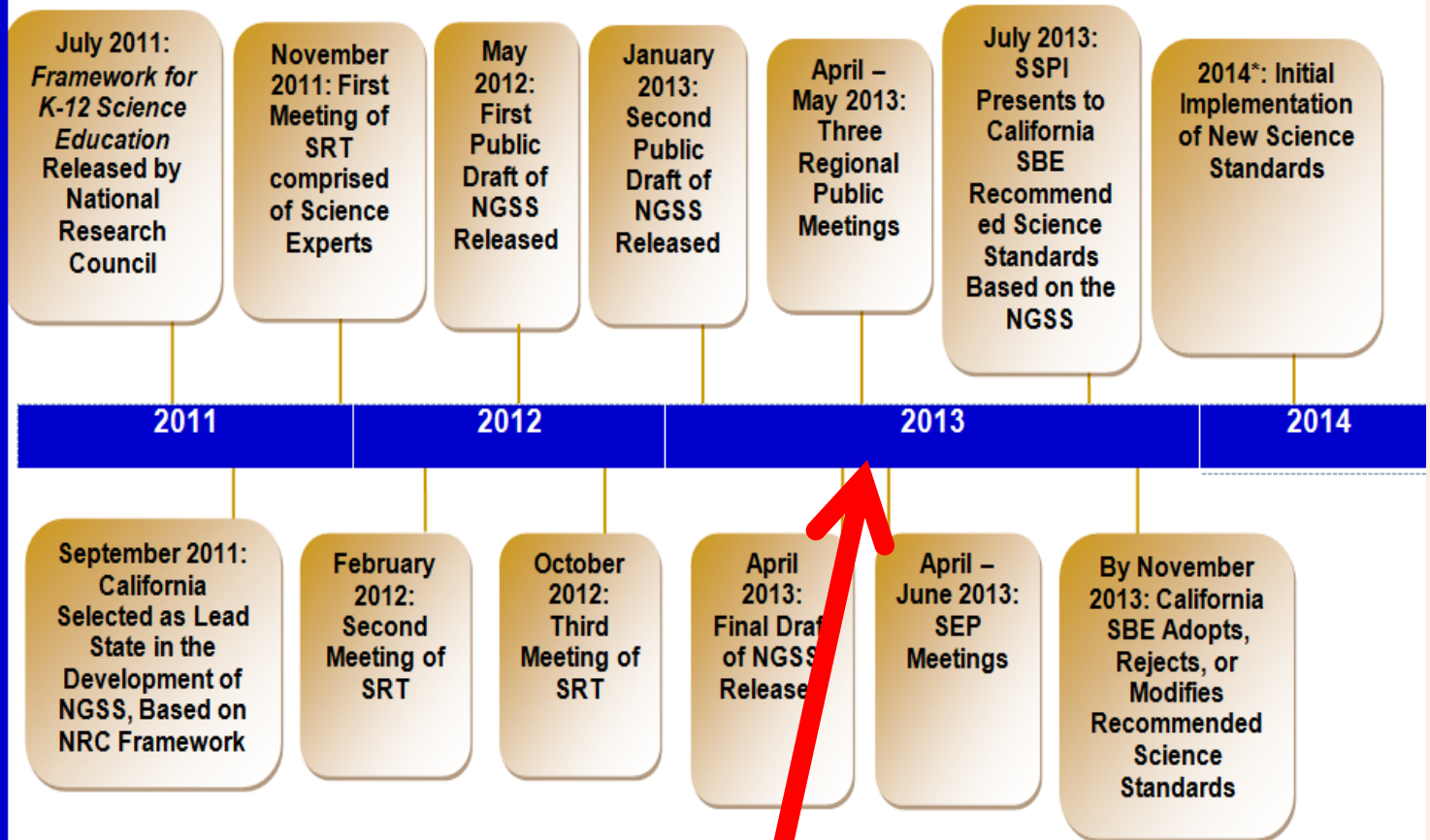


California's Process to Adoption



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Next Generation Science Standards Development Process



* Pending SBE's action



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California Science Expert Panel (SEP)

- 27 Science Experts who are representative of the SRT
 - K-12 Teachers, COE Science Leaders, IHE Faculty, Business, Industry, and Informal Science Centers
 - Noted Scientist Advisors
 - Dr. Bruce Alberts
 - Dr. Helen Quinn
 - Dr. Art Sussman





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SEP Role

- Review National NGSS to make preliminary recommendations for field comment
- Review feedback from public forums and SRT surveys
- Recommend new California Science Standards based on the NGSS to the Superintendent of Public Instruction
- The SEP met for three times during April, May, and June



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SEP April Meeting Recommendations to the Field

- Accept NGSS for California
- Build on current California middle grades semi-integrated standards to integrated standards for grades 6-8.



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Regional Public Meetings

- Sacramento County Office of Education (COE) – April 29
- Santa Clara COE – April 30
 - Also broadcast via live Webinar
- Riverside COE – May 2



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Responses

- Majority supported the recommendation of the SEP to adopt the NGSS for California
- Confirmed the notion of integrated standards at middle grades
- Some questions about the implementation of NGSS and clarification of the content



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SEP Response

- Modified clarification statements when appropriate.
- Wrote implementation recommendations for the Framework.





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Clarification



- Grade 6 NGSS
- MS-LS1-1 Conduct an investigation to provide evidence that living things are made of cells; either one or many different numbers and types of cells. **[Clarification Statement; Emphasis is on developing evidence that living things (Including Bacteria, Archaea , and Eukarya) are made of cells, distinguished between living and non-living cells, and understanding living things may be made of one cell or many varied cells. Viruses, while not cells, have features that are both common with, and distinct from, cellular life].**



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Performance Expectations

NGSS:

- K-5 grade specific
- 6-8 grade span
- 9-12 grade span

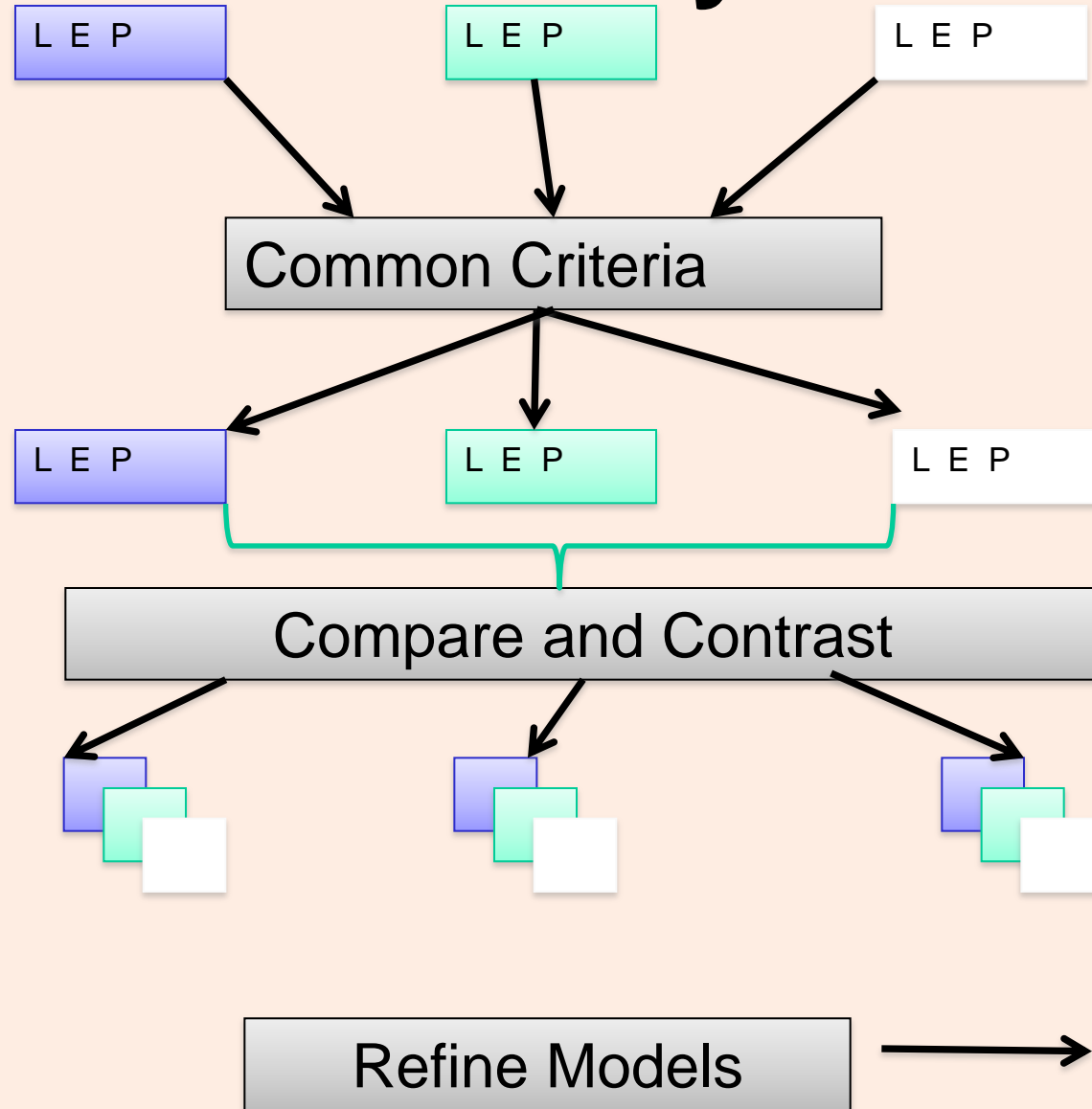
For CA:

- K-8 grade specific instructional materials adoption
- 6-8 must be grade specific

Middle School Process – May



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Criteria for Design

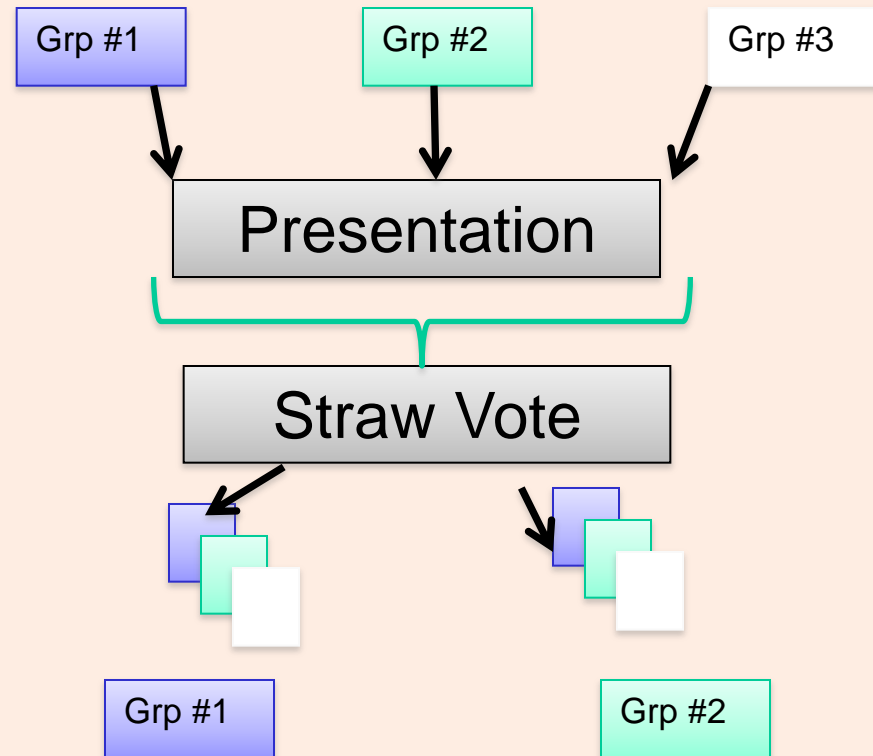
PEs must :

- Be arranged to provide a transition from elementary to high school
- Align with CCSS ELA and Math
- Build within and across grade levels
- Be balanced in complexity and quantity at each grade
- Integrate engineering appropriately

Middle School Process – June



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MS Learning Progression

100% Consensus



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Middle School Storyline

- Dr. Bruce Alberts
Professor Emeritus
UC San Francisco
- Dr. Helen Quinn
Professor Emeritus
Stanford Linear Accelerator



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Middle Grade Learning Progression

Grade	Cross cutting concepts	Life	Earth and Space	Physical		Engineering
8th	Stability and change; scale, proportion and quantity	Natural Selection	History of the Earth Space systems	Waves and Electromagnetic radiation Energy Forces and Interactions	Human Impact	ETS
7th	Energy and Matter: flows, cycles, and conservation; cause and effect	Ecosystems	Natural resources	Structure and property of matter	Human Impact	ETS
6th	Patterns; structure and function; systems and system models	Cells and Organisms	Weather and climate	Energy	Human Impact	ETS
5th	Energy and matter: flows, cycles and conservation; Scale, proportion and quantity	Matter cycles through living and non living things	Earth in space, interactions of earth systems	Properties and structure of matter	Human Impact	ETS



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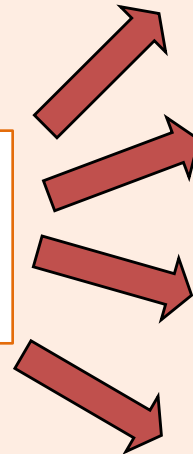
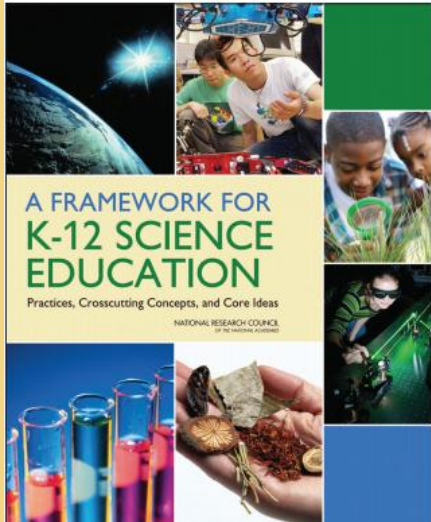
Endorsement

- Achieve Inc. has reviewed and endorsed the learning progressions as defined by California.



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Lots of work completed, underway, and left to do



CA Framework

Assessment

Instruction

Teacher
Development



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Support NGSS for Adoption in California

- California Science Expert Panel (SEP)
- California Science Project (CSP)
- California Science Teachers Association (CSTA)
- California STEM Learning Network (CSLNet)
- Children Now
- The Education Trust-West
- K-12 Alliance/WestEd
- Resource Area for Teaching (RAFT)
- Silicon Valley Education Foundation (SVEF)



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State Superintendent of Public Instruction, Tom Torlakson, recommends that the California State Board of Education adopt the Next Generation Science Standards for California Public Schools, Kindergarten Through Grade Twelve



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NGSS for California Public Schools; Kindergarten Through Grade Twelve Includes:

- K-5** grade specific performance expectations as defined by the national NGSS.
- 6-8** modified grade specific performance expectations based on integrated topics defined by NGSS
- 9-12** grade span performance expectations as defined by the national NGSS.



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Thank you!

To all who worked on the project.