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State Superintendent
of Public Instruction

NEXT GENERATION SCIENCE STANDARDS

For States, By States

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Recapping the September Decision

- In September 2013, the State Board of Education (SBE) unanimously adopted NGSS as California's Science Standards for Grades Kindergarten through Grade Twelve.
- This decision included;
  - Grade specific standards in grades K-5
  - Grade span standards in grades 6-8
  - Grade span standards in grades 9-12.
  - And the NGSS Appendices
- The decision has allowed the SBE to meet the timeline for adoption of new standards.

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Thanks to You

- There's a buzz in the air!
- Over 1700 science educators attended CSTA's Palm Springs conference in October
- Stephen Pruitt, Keynote Speaker
- An additional 30 sessions were presented focused on helping to understand and begin to implement NGSS!

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To complete the process

- The SBE reviewed the Science Expert Panel's recommendation for an Integrated Model for grades 6-8 in July and in September.

- SBE agreed to defer this decision to November and asked the Department to gather more input on the proposed middle grades learning progression model.

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Before we get to the additional input, lets take a quick look at how the SEP developed the learning progressions.

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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
  - SBE Liaisons
    - Trish Williams
    - Ilene Strauss

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Development Process of the SEP

- SEP Meeting #1:
  Explore arrangements;
  Current integrated light;
  Research;
  Decision to integrate
- SEP meeting #2:
  Data from public meetings;
  Set criteria
- SEP Meeting #3:
  Data from SRT;
  NGSS topic arrangement

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National Benchmarking

- All [top scoring]countries require participation in integrated science instruction through Lower Secondary and seven of 10 countries continue that instruction through Grade 10, providing a strong foundation in scientific literacy. Achieve (2010).

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SEP's Criteria for 6-8 Design

The Performance Expectations (AKA: Standards) must :

- Provide for adolescent development with an INTENTIONAL PROGRESSION or scaffolding from elementary to high school
- ALIGN with the cognitive demands of Common Core Standards in ELA and Math
- BUILD within (i.e., 6, 7, 8) and across the grade levels (i.e., 6-8).
- Be BALANCED in complexity and quantity at each grade
- INTEGRATE engineering appropriately within each grade level.

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Dr. Bruce Alberts:

"[With this arrangement] the students will reinforce what they learned the previous year, returning to related ideas, and the focus in every year will be on SCIENCE itself, not biology, or earth sciences, or the physical sciences."

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Reminder

Standards are a list of what should be learned at each of the grade levels.

- How they are “bundled” for instruction is a local decision.

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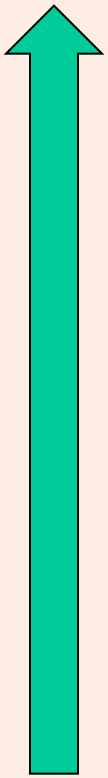
Articulation One Example

Life Science



- 8th Natural Selection
- 7th Ecosystems
- 6th Cells/Organisms
- 5th Food Chains/Webs
- 4th Internal and External Structures/Functions

Example Integration 7th Grade

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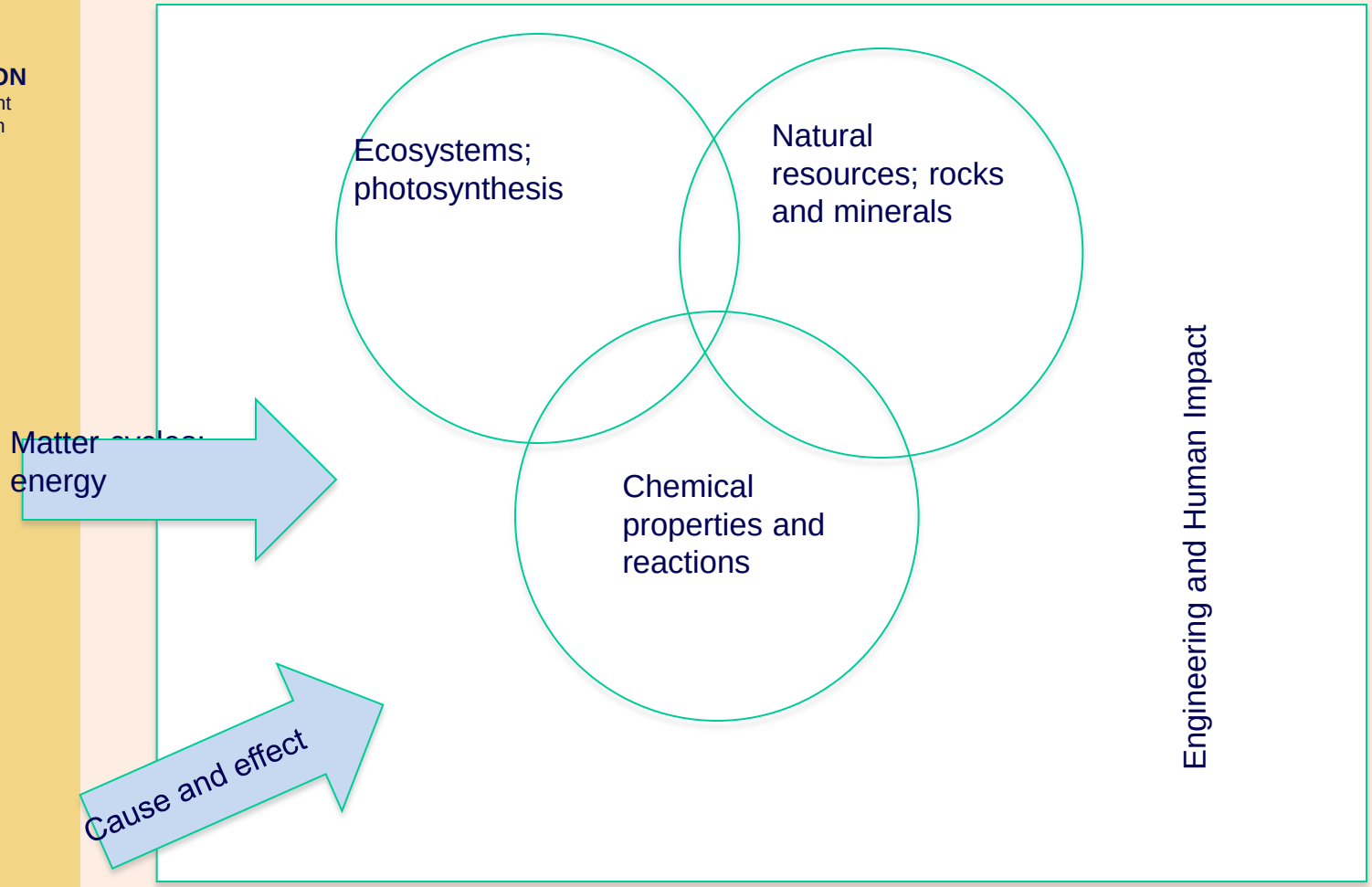

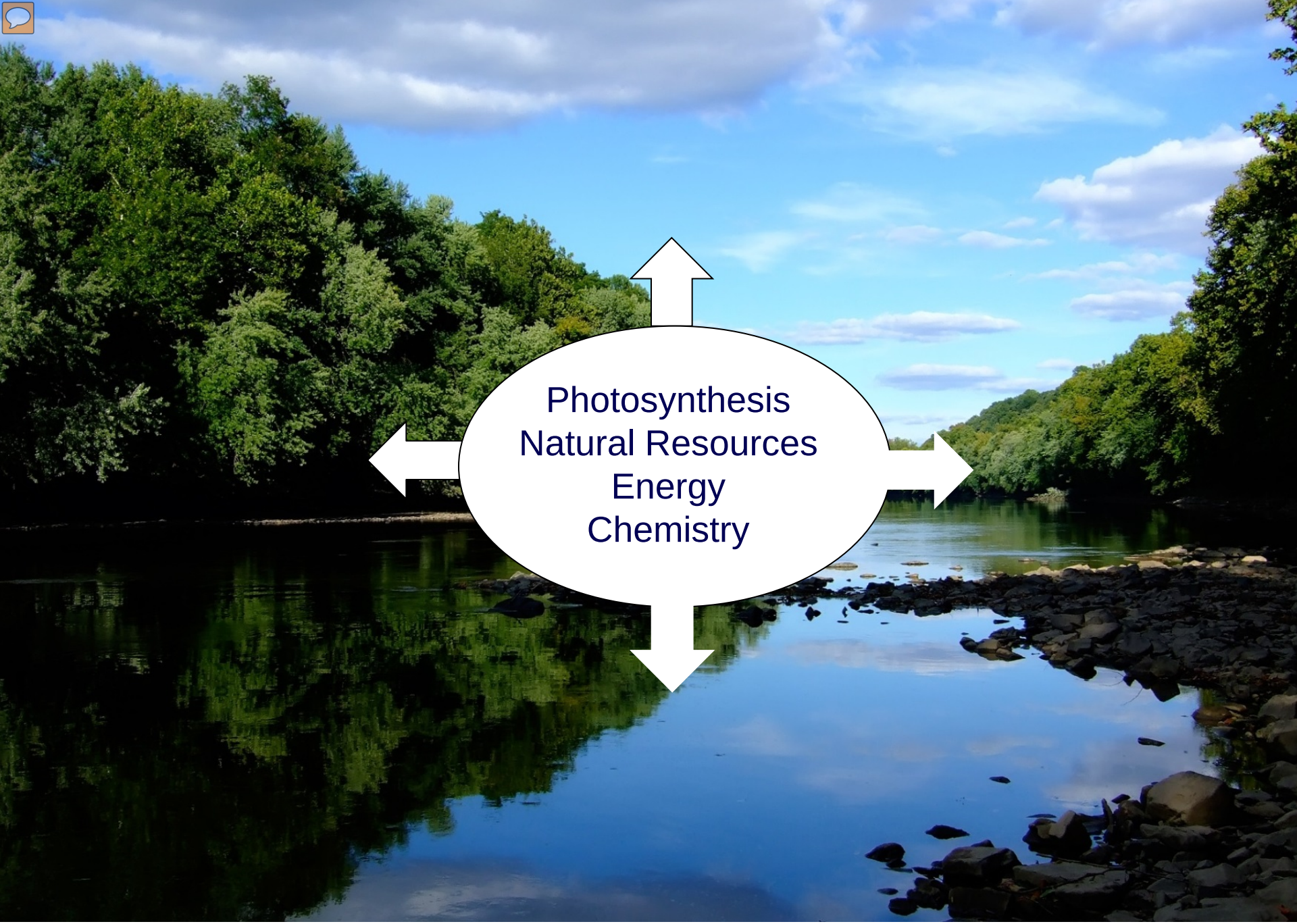
Photosynthesis
Natural Resources
Energy
Chemistry

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Pros of Two Models

Discipline Specific

- Teacher Content Expertise
- Teacher Passion

Integration

- NGSS vision for science, not taught in silos
- Implementation of Crosscutting Concepts
- Articulated Learning progression with Life/Earth/Physical with Engineering at each year
- SEP recommendation

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Dr. Helen Quinn

"The recommended middle school sequence was developed with careful attention to many factors that will enhance student learning, as has been presented elsewhere. The evidence that such interleaved learning of topics, where past learning is connected to, applied and further developed in each subsequent unit or year provides the best opportunity for students to develop deeper understanding and transferrable, that is useable, knowledge. I strongly recommend that this sequence should be adopted. While it presents some challenges for teacher assignments it will in the long run be the most productive for in-depth student learning."

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Department's Outreach Efforts Since September

- ACSA
- CSU East Bay, Alameda COE
- Los Angeles Unified School District
- Modesto City Schools
- UC Davis
- Two NGSS 101 Sessions at CSTA
- NGSS middle school conversation at CSTA
- Hosted a Webinar
- On-line Implementation Survey

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Feedback from Science Educators

- Educators all along have been supportive of the middle school arrangement and are eager to begin implementation.
- Educators, after receiving more information and deepening their understanding of the thinking behind the integrated arrangement, are now ready to implement.
- Educators were concerned about the integrated model due to;
  - Lack resources
  - Lack of capacity to implement or teacher expertise in all science disciplines.

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Dr. Helen Quinn

As I stated previously, I think that the integrated sequence … is excellent in that it provides students with a logical and coherent development of ideas across subject areas, with increasingly complex ideas as the grades progress. I strongly recommend that schools should consider implementing such a sequence.

However, I do recognize that many middle school teachers have developed expertise in at most one of the three areas of science… I think it is therefore reasonable to consider also developing and approving an alternate sequence which maintains year-by-year subject matter emphasis…

…I would hope that future decisions about [integrated] middle school science would encourage schools to plan to eventually move to that sequence.

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The Superintendent recommends that:

- The California SBE adopt the proposed integrated model as the preferred model for middle grades science instruction.
- That the SBE requests the CDE to reconvene the Science Expert Panel to develop as an alternative model a discipline specific model based upon the domain specific model that is outlined by Achieve in the NGSS Appendix K.