

Science Standards on the GEAUX

Joni Smith

Jodi Sanchez



@TLS17js2

Teacher Leader Summit
2017



Agenda *for* June 8, 2017

- Surveys
- Introduction of Presenters
- Icebreaker: Where Y'all From? + Kitchen Utensils
- LDOE Implementation Timeline
- The Framework
 - Gallery Walk
- Three-Dimensional (3D) Learning
 - Science Instruction Past vs. Present Word Sort
 - *Digging Deeper Into 3D Learning: Speed Dating Cross-Cutting Concepts (CCCs) & Science and Engineering Practices (SEPs) Circus Activity*
- Key Instructional Shifts
- LDOE Implementation Resources and Support
- Closing: Kahoot Game

Please take a moment...

[Science Survey](#)



[Poll Everywhere](#)
[Survey- Teacher Info](#)





LSU Cain Center Science Standards on the Geaux



Who are we?



#TLS17js2



Joni Smith's Background

- Graduate of Southeastern Louisiana University in 2007
- Taught at Westside Jr. High; Currently teach at Albany Middle
- Louisiana State Teacher of the Year 2017
- Total of 9 years teaching experience (all in middle school)
- Served on LDOE Standards Committee

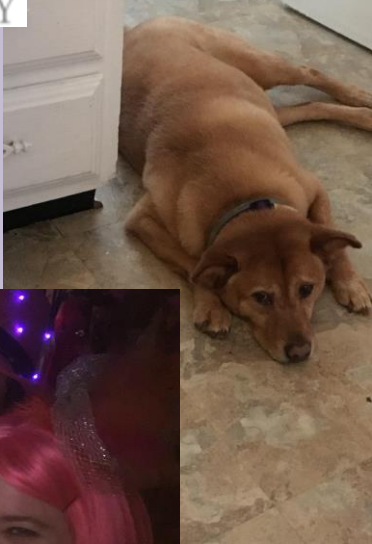




Who are we?

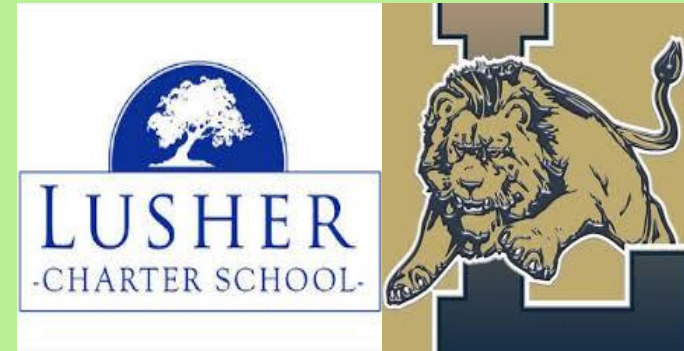


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Jodi Sanchez's Background

- Graduate of Eastern Illinois University- Bachelors in Education
- 7th Grade Life Science Teacher, 8 years
- Served on LDOE LSSS Workgroup 2016-17
- Total of 18 years teaching experience (K-8)
- Taught in Illinois, Georgia, and Louisiana
- Gwinnett County, GA Elementary Teacher of the Year 2009



Middle School Science is NOW Integrated *(a mix of all 3 areas of science)*



**Let's
Celebrate!**

Icebreaker: Kitchen Utensils

- Choose a utensil from the table.
- Decide how this tool can describe you as a teacher.
- Be prepared to state your name, what and where you teach, and why you chose your tool.

Be as creative as you dare!





**The famous Red Bull space
jump has impacted the world...**

I HAVE QUESTIONS?

Please write your questions on the provided post it notes and post to the Parking Lot Question Board. We will address them twice: before lunch and before closing.



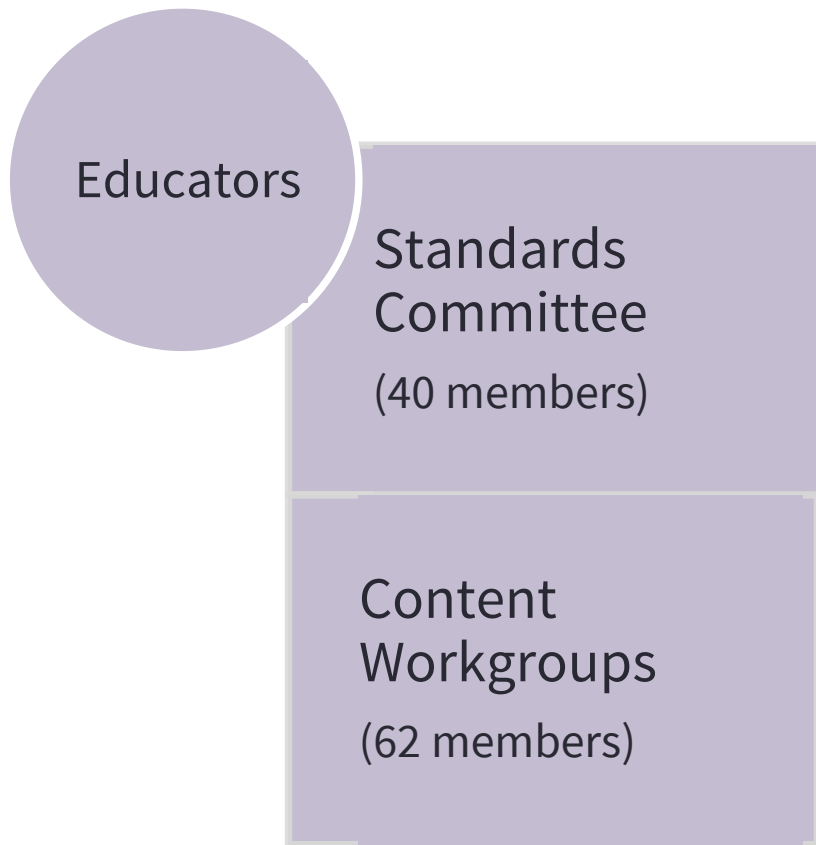
Why new standards?

The TIME is NOW.

Louisiana hasn't updated our state standards since 1999. We are PROUD to say that the new standards were built by 62 active teacher leaders in science across the state.



Review Process of New Standards



Educators

Standards
Committee

(40 members)

Content
Workgroups

(62 members)

- The content workgroup members worked from August to February.
- The workgroup spent an average of 70+ hours meeting in person as groups and 15+ more independently researching and reviewing drafts of standards.
- The Standards Committee reviewed the process along the way and approved the final draft of the new Louisiana Student Standards for Science.

Standards are only the start.....



Louisiana Student Standards for Science

State Timeline

The Department will provide multiple phases of support as districts and teachers work to implement the Louisiana Student Standards for Science

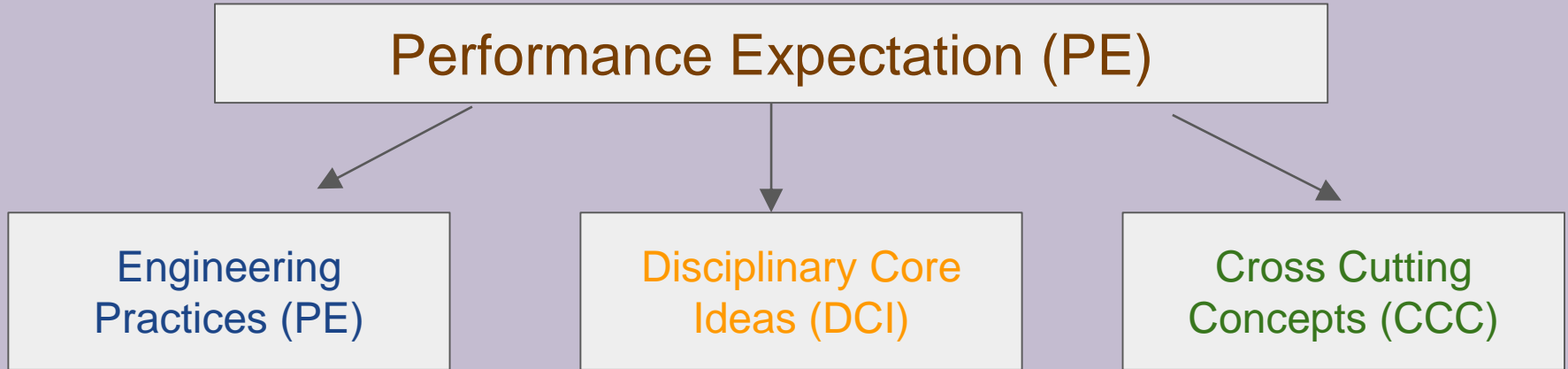
PHASE	TIMELINE	FOCUS
Phase 1	<i>Spring – Summer 2017</i>	<ul style="list-style-type: none">• Framework and make-up of the standards• Shifts in science instruction• Progressions of learning
Phase 2	<i>Fall 2017</i>	<ul style="list-style-type: none">• Educators begin implementation of the new standards, practice implementing aligned tasks, pilot 3-Dimensional lessons• LDOE releases scope and sequence documents, revised instructional tasks, sample EAGLE items
Phase 3	<i>Spring – Summer 2018</i>	<ul style="list-style-type: none">• Quality curriculum piloted• Suite of assessment items/item sets released on EAGLE• Field test in grades 3-8

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Framework for K-12 Science Education

Science for All Americans (1989), Benchmarks for Science Literacy (1993), and National Education Standards (1996)



Louisiana Student Standards for Science (LSSS) Cake Analogy



Baking a Cake
(Performance Expectation)



Baking Tools & Techniques
(Practices)



Cake
(Core Ideas)



Frosting
(Crosscutting Concepts)

LSSS Framework Gallery Walk



Framework of LSS for Science

Coding and Descriptor

Performance Expectation: States what students should be able to do to demonstrate that they have met the standard. Performance expectations are built on the foundation of the science and engineering practices, disciplinary core ideas, and crosscutting concepts.

Clarification Statement: Provides examples or additional clarification of the performance expectation.

<p>Science and Engineering Practices: Detail the behaviors that students should engage in that mimic those of scientists and engineers.</p>	<p>Disciplinary Core Ideas: Describe the most essential ideas (content) in the major science disciplines.</p>	<p>Crosscutting Concepts: Ideas that have applications across all areas of science.</p>
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Framework of LSS for Science

Performance Expectation: Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. (7-MS-LS2-4)

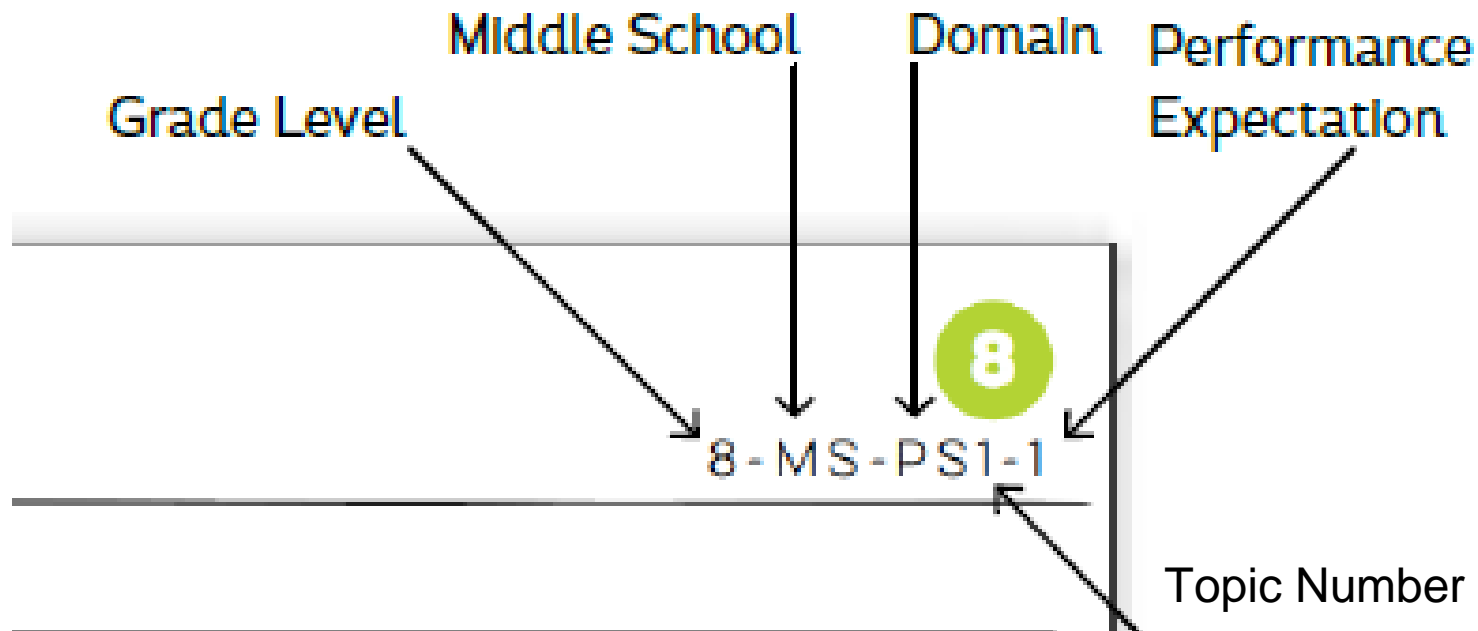
Clarification Statement: Emphasis is on recognizing patterns in data, making inferences about changes in populations, and on evaluating empirical evidence supporting arguments about changes in ecosystems.

Scientific & Engineering Practices: 7. Engaging in argument from evidence: Construct, use, and/or present an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem.

Disciplinary Core Ideas: Ecosystem Dynamics, Functioning, and Resilience 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.



Crosscutting Concepts: Stability and Change: Small changes in one part of a system might cause large changes in another part.

DISSECTING THE CODING:



Descriptor

Grade Level Middle School Domain Performance Expectation

		
8 8-MS-PS1-1		
MATTER AND ITS INTERACTIONS		
Performance Expectation	Develop models to describe the atomic composition of simple molecules and extended structures.	
Clarification Statement	Emphasis is on developing models of molecules that vary in complexity. Examples of extended structures could include minerals such as but not limited to halite (NaCl), agate (SiO ₂), calcite (CaF ₂), or sapphire (Al ₂ O ₃). Examples of molecular-level models could include drawings, 3-D models, or computer representations showing different molecules with different types of atoms.	
Science & Engineering Practices		
	Disciplinary Core Ideas	Crosscutting Concepts
<ol style="list-style-type: none"> Asking questions (for science) and defining problems (for engineering) 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. <ul style="list-style-type: none"> Develop and/or use a model to predict and/or describe phenomena. Planning and carrying out investigations Analyzing and interpreting data Using mathematics and computational thinking Constructing explanations and designing solutions Engaging in argument from evidence Obtaining, evaluating, and communicating information 	<p>STRUCTURE AND PROPERTIES OF MATTER Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms. (MS.PS1A.a)</p> <p>Solids may be formed from molecules, or they may be extended structures with repeating subunits (e.g., crystals). (MS.PS1A.e)</p>	<p>SCALE, PROPORTION, AND QUANTITY Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.</p>
		1 MARCH 2017

Topic Number

BRAIN BREAK



- Don't talk about the standards...truly take a brain break
- Use the restroom...just please wash your hands
- Meet someone new....don't be shy
- Talk about where you are going to get eat tonight

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Scientific and Engineering Practices

**Principle goals are to “engage in scientific inquiry”
and to “reason in scientific context”**

**Asking Questions (science)
and Defining Problems (engineering)**

Developing and Using Models

Planning and Carrying out Investigations

Analyzing and Interpreting Data

Using Mathematics and Computational Thinking

**Constructing Explanations (science) and
Designing Solutions (engineering)**

Engaging in Argument from Evidence

**Obtaining, Evaluating, and Communicating
Information**

Crosscutting Concepts (CCC)

Patterns

**Cause and
Effect:
Mechanism and
explanation**

**Scale, proportion,
and quantity**

**Systems and
System Models**

**Structure and
Function**

**Energy and
Matter: Flows,
cycles and
conservation**

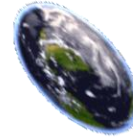
**Stability and
Change**

Disciplinary Core Ideas (DCI)

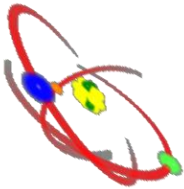
Life Science



**Earth & Space
Sciences**



Physical Science



**Engineering &
Technology**



Disciplinary Core Ideas

Domain	Topics
Physical Science	PS1: Matter and its interactions PS2: Motion and stability: Forces and Motions PS3: Energy PS4: Waves and their applications in technologies for information transfer
Life Science	LS1: From molecules to organism: Structures and processes LS2: Ecosystems: Interactions, energy, and dynamics LS3: Hereditary: Inheritance and variation of traits LS4: Biological evolution: Unity and diversity
Earth and Space Science	ESS1: Earth's place in the universe ESS2: Earth's systems ESS3: Earth and Human activity
Environmental Science	EVS 1: Resources and Resource Management EVS 2: Environmental Awareness and Protection EVS 3: Personal Responsibility
Engineering, Technology, and Applications of Science	ETS1: Engineering design ETS2: Links among engineering, technology, science, and society

K-12 DCI Progression of Learning

Earth Space Science Progression

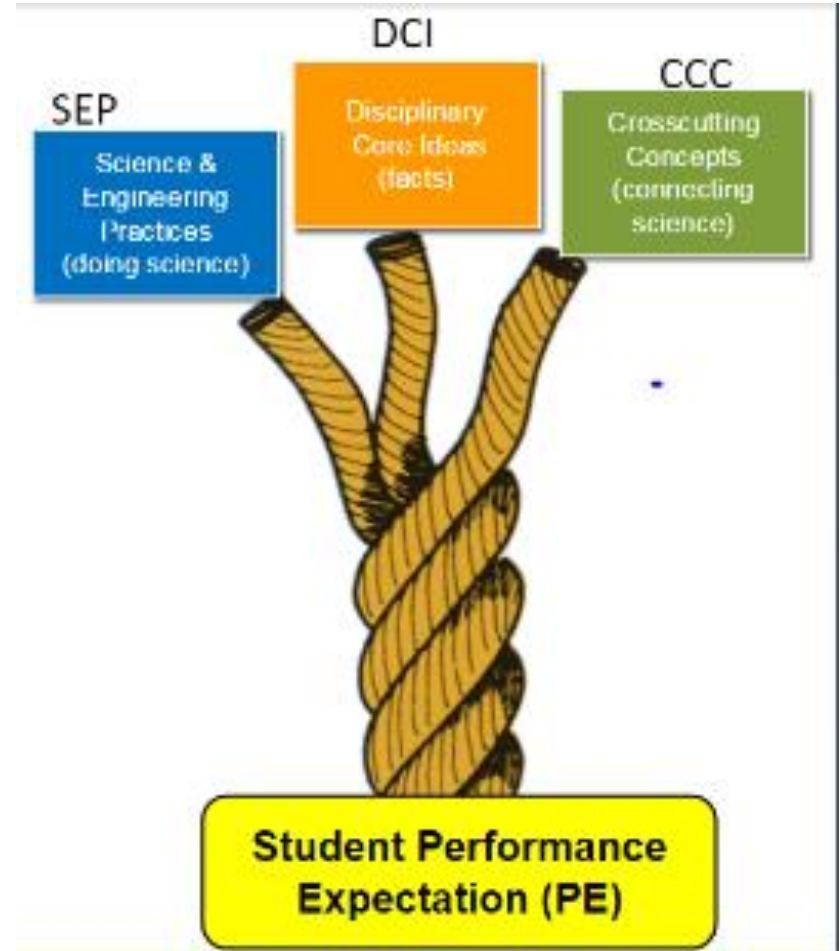
INCREASING SOPHISTICATION OF STUDENT THINKING

	K-2	3-5	6-8	9-12
ESS1.A The universe and its stars	Patterns of movement of the sun, moon, and stars as seen from Earth can be observed, described, and predicted.	Stars range greatly in size and distance from Earth and this can explain their relative brightness.		Light spectra from stars are used to determine their characteristics, processes, and lifecycles. Solar activity creates the elements through nuclear fusion, and short-term solar variations cause space weather and insolation changes that significantly affect humanity. The development of technologies has provided the astronomical data that provide the empirical evidence for the Big Bang theory.
ESS1.B Earth and the solar system		The Earth's orbit and rotation, and the orbit of the moon around the Earth cause observable patterns.	The solar system contains many varied objects held together by gravity. Solar system models explain and predict eclipses, lunar phases, and seasons.	Kepler's laws describe common features of the motions of orbiting objects. Observations from astronomy and space probes provide evidence for explanations of solar system formation. Changes in Earth's tilt and orbit cause climate changes such as Ice Ages.

The Performance Expectation is an intertwine of the three strands (3D Learning):

1. Science & Engineering Practices
2. Disciplinary Core Ideas
3. Crosscutting Concepts

Notice that if you mix the colors **blue**, **orange** and **green**, you would get **brown**.



Louisiana Student Standards for Science

“Word Sort”

**Out with
the Old,
In with the
New**



Science Instruction Past vs. Present

Past Science Instruction	Louisiana Student Standards for Science
Focuses on content acquisition	Students develop and apply knowledge in new situations
Many topics, little depth	Fewer topics, more depth
Teacher dominated discourse and instruction	Students engage in developmentally appropriate experiences using similar behaviors as a scientist and engineers
Specify every piece of knowledge needed to demonstrate the standard	Leaves room for teachers and curriculum writers to support student understanding
Prescribe the instructional steps	Describe what students should know and be able to do to demonstrate at the conclusion of instruction
Encourage students to read a textbook and answer questions at the end	Encourage students to read multiple sources, including science journals and magazines, and web-based resources.
Encourage “lecture” classrooms or asking students questions with a right/wrong answer.	Encourage students to perform investigations, solve problems, and engage in open-ended discussion.

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Questions to Consider

- How does Ms. Shelton make the crosscutting concepts explicit in the classroom?
- What about this classroom looks different from a “traditional” lab experience? What evidence can you see of how this shift impacts student learning?
- How does Mrs. Shelton empower her students to lead their own learning?

WHAT DO
**YOU
SEE?**

Video
Analysis



Teaching Channel
Presents

[Teaching Channel Video](#)

Speed Dating: Cross-Cutting Concepts



[California Academy Speed Dating Activity](#)



CCC - SPEED DATING DIRECTIONS

Part I

- 1. Each participant will be given a card with either the title of a CCC (e.g.; Patterns, Cause and Effect, etc.) or a CCC definition.**
- 2. Your task is to mingle around the room looking for your CCC match. ***NOTE: There are multiple copies of each CCC title and definition.**
- 3. When you find your match, sit down together at any table to show that you have completed the activity..**

Speed Dating Definitions (KEY)

Patterns	The CCC of _____ highlights that structures or events are often consistent and repeated.
Cause and effect	The CCC of _____ investigates how things are connected by identifying the reasons behind an occurrence, and what that occurrence results in.
Scale, proportion, and quantity	Different measures of size and time affect a system's structure, performance, and our ability to observe phenomena.
Systems and system models	The CCC of _____ helps us understand the world by describing how things connect and interact. We can use simple representations to explore these interactions.
Energy and matter	These things are neither created nor destroyed, but may flow into and out of a system and influence its functioning.
Structure and function	The way something is built and the parts that it has determine how it works.
Stability and change	Over time, a system might stay the same or become different, depending on a variety of factors.

Speed Dating: Cross-Cutting Concepts Reflection

- Were any definitions particularly difficult or easy to match. Why?
- Are any of these definitions surprising or confusing to you?

[California Academy Speed Dating Activity](#)



Speed Dating: Cross-Cutting Concepts Part II

OBJECTIVE: Teachers will look over various content documents and identify the CCC that unifies all of the examples at each station.

[California Academy Speed Dating Activity](#)



BRAIN BREAK



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Investigating the Scientific & Engineering Practices (SEPs) Activity



ENGINEERING



SEP Circus Activity:



1. Distribute the “Practices Circus chart handout”
2. Participants will have ~35 minutes to visit the 7 stations.
3. At each station, you should identify the practice best represented by the underlined portion of the prompt.
4. After you are finished exploring, you should place a tally mark on the chart paper to vote for the one practice you identified at each station. (It’s okay if your answers are different from your neighbor).

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Key Instructional Shifts in LSS for Science

<p>Apply content knowledge</p>	<p>Content knowledge is critical and evident in the standards in the Disciplinary Core Ideas (DCIs), the key ideas in science that have broad importance within or across multiple science or engineering disciplines. However, simply having content knowledge is not enough. Students must investigate and apply content knowledge to scientific phenomenon.</p>
<p>Investigate, evaluate, and reason scientifically</p>	<p>Scientists do more than learn about science; they “do” science. Science instruction must integrate the practices, or behaviors, of scientists and engineers (SEPs) as they investigate real-world phenomenon and design solutions to problems.</p>
<p>Connect ideas across science disciplines</p>	<p>For students to develop a coherent and scientifically-based view of the world, they must make connections across the domains of science (life science, physical science, earth and space science, environmental science, and engineering, technology, and applications of science). The Crosscutting Concepts (CCCs) have applications across all domains.</p>

Three Dimensional Learning: the integration of the Science and Engineering Practices, **Disciplinary Core Ideas**, and **Crosscutting Concepts** in science instruction

LET'S SIFT THROUGH THE KEY INSTRUCTIONAL SHIFTS



[Teaching Channel Video Transitioning](#)

ANCHOR PHENOMENA



[Muppets Mana Mana Song](#)

Natural phenomena are observable **real-world events or situations** that occur in the universe. Exposing our students to natural phenomena with the support of 3D Learning will help our students develop a better understanding of the world.

Let's look at an example Anchor Phenomenon for an environmental unit:
[Holgate Glacier Calving](#)

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Where can you find the NEW standards?

WEBSITE:

<http://www.louisianabelieves.com/resources/library/k-12-science-resources>

Louisiana Student Standards for Science

Area	Support and Timeline
<p data-bbox="146 336 548 366">Curriculum and Resources</p> <p data-bbox="146 834 571 864">LouisianaStandards@la.gov</p>	<p data-bbox="614 336 1089 366">Instructional Materials Review</p> <ul data-bbox="643 383 1696 503" style="list-style-type: none"><li data-bbox="643 383 1315 413">● Rubric released and call for submissions<li data-bbox="643 426 1696 457">● TLA's: hiring (applications due June 13) and training (June 28-29)<li data-bbox="643 470 1193 501">● First review released - <i>Fall 2017</i> <p data-bbox="614 563 942 594">New Standards Tools</p> <ul data-bbox="643 610 1561 798" style="list-style-type: none"><li data-bbox="643 610 1335 641">● Connections to ELA and math standards*<li data-bbox="643 658 1335 689">● Key shifts and instructional implications*<li data-bbox="643 713 1460 743">● Middle School sample transition plan - <i>June 2017</i><li data-bbox="643 767 1561 798">● Sample scope and sequence documents - <i>Summer 2017</i> <p data-bbox="614 860 1785 983">*To access standards tools, click on the links above, click “download” next to “K-12 Louisiana Student Standards for Science (2017),” then open the zip file that downloads on your computer.</p>

Louisiana Student Standards for Science

Area	Support and Timeline
<p data-bbox="34 312 384 339">Professional Development</p> <p data-bbox="34 856 397 883">LouisianaStandards@la.gov</p>	<p data-bbox="426 312 687 339">Self-paced Learning</p> <p data-bbox="426 358 1025 385">Live and recorded webinars on new standards</p> <ul data-bbox="455 401 1837 656" style="list-style-type: none"><li data-bbox="455 401 1837 478">• Monday, June 19 @ 9:00 a.m. - LSS Science Series Part 1: Overview of the Louisiana Student Standards for Science<li data-bbox="455 489 1599 516">• Monday, June 26 @ 9:00a.m. - LSS Science Series Part 2: Instructional Shifts<li data-bbox="455 532 1740 560">• Monday, July 10 @ 9:00 a.m. - LSS Science Series Part 3: Three-Dimensional Learning<li data-bbox="455 576 1653 603">• Monday, July 17 @ 9:00 a.m. - LSS Science Series Part 4: Learning Progressions<li data-bbox="455 620 1785 647">• Monday, July 24 @ 9:00 a.m. - LSS Science Series Part 5: Phenomenon-Based Instruction <p data-bbox="426 707 736 734">Summer Opportunities</p> <ul data-bbox="426 751 1885 893" style="list-style-type: none"><li data-bbox="426 751 1885 816">• Louisiana Tech will provide intensive four-day summer training institutes this summer in both <u>north</u> and <u>south</u> Louisiana<li data-bbox="426 827 1885 893">• LSU Cain Center will provide summer training in an intensive two-day workshop to be held in June in <u>Baton Rouge</u> <p data-bbox="426 942 620 969">Collaborations</p> <ul data-bbox="426 986 973 1013" style="list-style-type: none"><li data-bbox="426 986 973 1013">• Sessions at 2017-2018 collaborations

Louisiana Student Standards for Science

Area	Support and Timeline
<p data-bbox="73 336 285 373">Assessment</p> <p data-bbox="73 751 421 893">Email assessment@la.gov with questions</p>	<p data-bbox="479 340 1638 438">Previous RFP (Request for Policy) secured vendor for assessment development</p> <ul data-bbox="510 460 1603 620" style="list-style-type: none"><li data-bbox="510 460 1240 500">● Field test for grades 3-8 – <i>Spring 2018</i><li data-bbox="510 521 1112 561">● Operational test – <i>Spring 2019</i><li data-bbox="510 583 1603 620">● Platform the same as ELA, Math, Social Studies, and EAGLE <p data-bbox="479 696 904 733">EAGLE Assessment Tool</p> <ul data-bbox="510 766 1727 941" style="list-style-type: none"><li data-bbox="510 766 1727 864">● Teacher Leader Advisors, who will help create sample assessment items, hired and trained Summer 2017<li data-bbox="510 897 1626 941">● EAGLE items created throughout the 2017-2018 school year

What is a Can of Blessings?



Exit Ticket-Closing Play Kahoot!

LSSS Kahoot Exit Ticket



Have a Great Summer!

