Arizona Science Standards Revision Working Group

June 14, 2018

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Introductions

- Brea Rivera
  - Science Specialist
- Sarah Sleasman
  - STEM Specialist
- Jonathan Moore, Ed. D.
  - Deputy Associate Superintendent
- Carol Lippert
  - Associate Superintendent

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Today we will review technical feedback and make changes to the standards document

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Housekeeping

1. Sign in
2. Parking validation
3. Restrooms
4. Breaks/Lunch
5. Travel Questions – Fill out W9 if needed
6. Sign forms – All members

Cell phones should only be used during breaks and lunch. If you need to take a call, please go to the break room. Please check text and email only during break due to non-disclosure.

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Housekeeping

Dr. Eugene Judson

Associate Professor - Science Education
Arizona State University

ASU Research project – IRB consent

Participation in this research project is completely voluntary and does not impact your participation in standards work.

Biggest Thank You!

Introductions

Introduce yourself by telling everyone in the group:

1. Your name
2. Your school/district
3. Your current position

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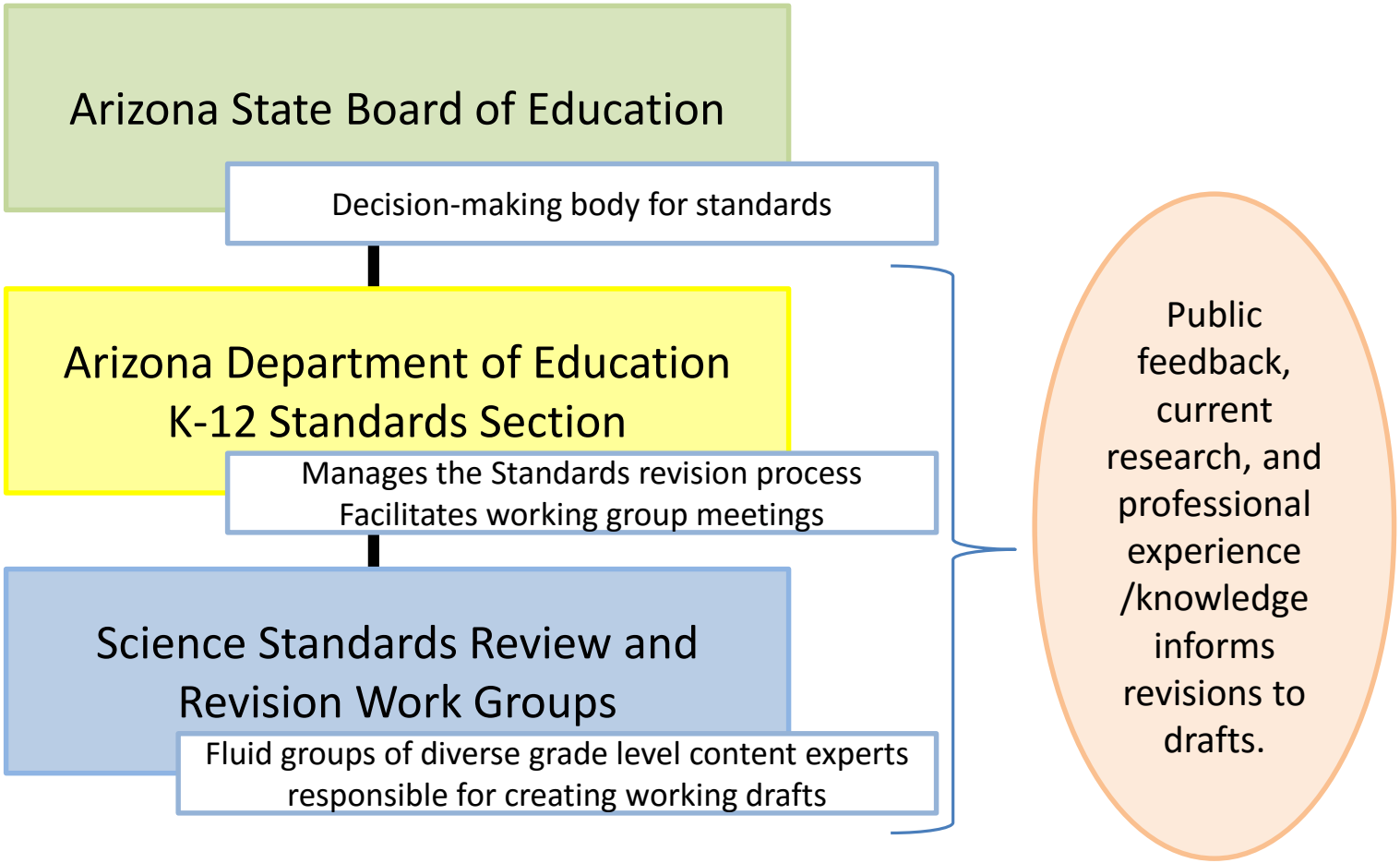
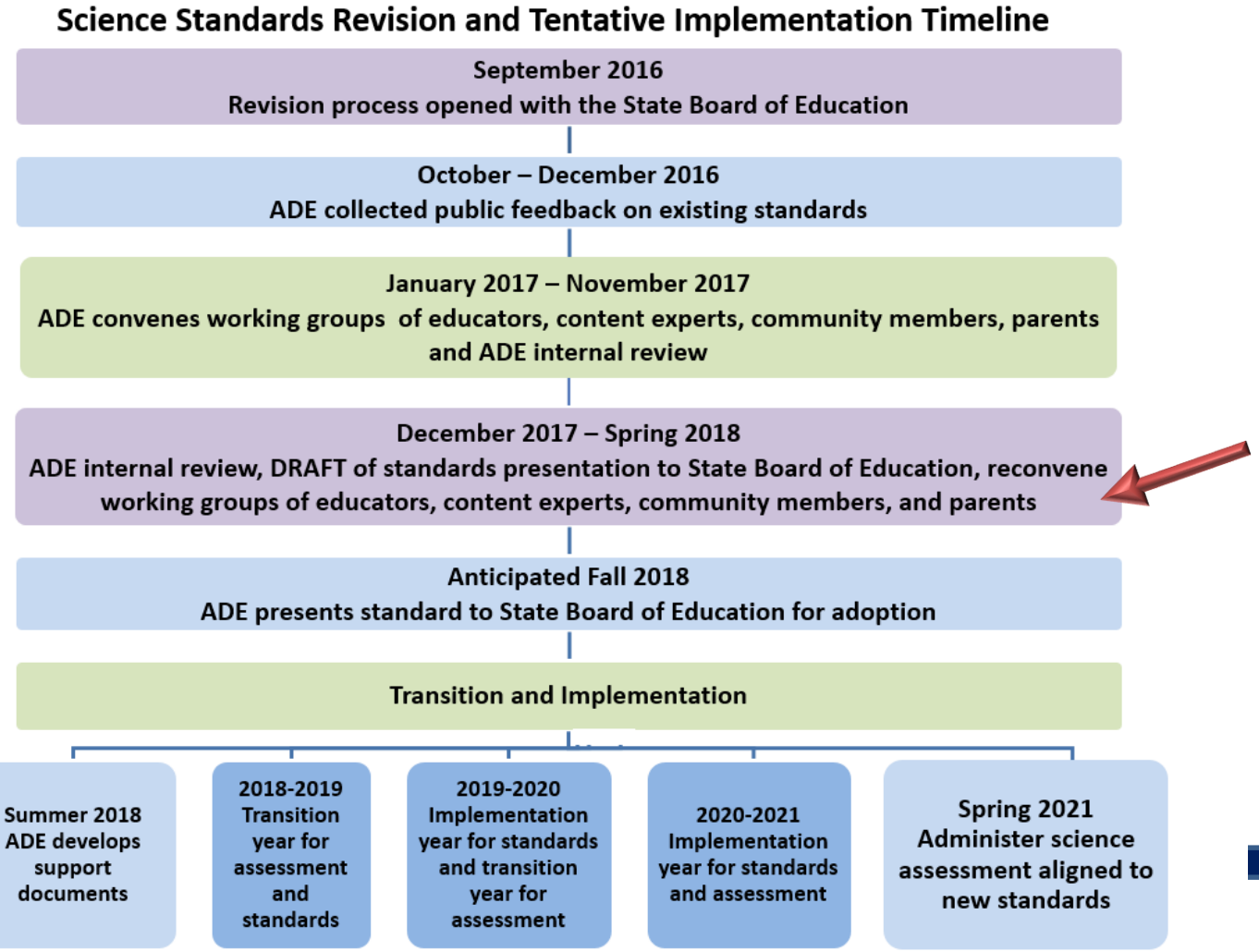
Standards Review - Structure



Science Standard Revision and Implementation Timeline



Working Group Norms

- Actively engage in all discussions
- Be open-minded
- Have an attitude that fosters collaboration, agreement, and consensus
- Be mindful of timelines and scope of work
- **Cell phone/email checks are limited to breaks**

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Standards, Curriculum, & Instruction

Standards – What a student needs to know, understand, and be able to do by the end of each grade. Standards build across grade levels in a progression of increasing understanding and through a range of cognitive demand levels.

Standards are adopted at the state level by the State Board of Education.

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This is the "WHAT"

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Standards, Curriculum, & Instruction

Curriculum – The resources used for teaching and learning the standards. **Curricula are adopted at a local level by districts and schools**.

Instruction – The methods used by teachers to teach their students. **Instructional techniques are employed by individual teachers** in response to the needs of the students in their classes to help them progress through the curriculum in order to master the standards.

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This is the "HOW"

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Working Group Norms

No "I" Statements

Learning Progressions

Physical Science Standards	Learning Progressions, Key Terms, and Crosscutting Concepts
2.P1U2.1	
Plan and carry out an investigation to determine that matter has mass, takes up space, and is recognized by its observable properties; use the collected evidence to **develop and support an explanation**.	All the 'stuff' encountered in everyday life, including **air,** water and different kinds of **solid substances**, is called **matter** because it has **mass**, and therefore **weight** on Earth, and takes up space. Different materials are recognizable by their properties, some of which are used to classify them as being in the **solid**, **liquid** or **gas state**. Crosscutting Concepts: **energy and matter**, **systems and system models**, patterns, cause and effect, stability and change
2.P1U2.2	
Plan and carry out investigations to gather evidence to support an explanation on how heating or cooling can cause a transformation (solid, liquid, gas).	
2.P4U1.3	
Gather, reason, and communicate information about ways heat energy can cause change in objects or materials.	There are various ways of causing an event or bringing about change in objects or materials. Heating can cause **change**, as in cooking, **melting solids** or changing water to **vapor**. Crosscutting Concepts: **energy and matter**, **systems and system models**, patterns, cause and effect, stability and change, structure and function

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Format of HS + Standards

Chemistry	**Essential HS.P1U1.2** ***Describe patterns in the transfer or sharing of electrons to predict the formation of ions, molecules, and compounds in both natural and synthetic processes.*** Connections: 5.P1U1.2, 8.P1U1.2, HS.E2U1.15, HS.L2U1.25	**HS+C.P1U2.5** Develop and use models to predict and explain forces within and between molecules. **HS+C.P1U2.6** Develop and use models to explain the differences between chemical compounds using patterns as a method for identification.	Chemical processes, their rates, and whether or not **energy** is stored or released can be understood in terms of the collisions of **molecules** and the rearrangements of **atoms** into new molecules, with consequent changes in total **binding energy** (i.e., the sum of all bond energies in the set of molecules) that are matched by changes in **kinetic energy**. In many situations, a dynamic and condition-dependent balance between a **reaction** and the reverse reaction determines the numbers of all types of molecules present. The fact that atoms are conserved, together with knowledge of the chemical properties of the **elements** involved, can be used to describe and predict **chemical reactions**. Chemical processes and properties of materials underlie many important biological and geophysical phenomena. Crosscutting Concepts: Crosscutting Concepts: **system and system models; stability and change;** cause and effect; **energy and matter**; patterns; **structure and function**[4]
Chemistry	**Essential HS.P1U4.3** ***Engage in argument from evidence about how the use of chemistry has positive and negative ethical, social, economic, and/or political implications.***	**HS+C.P1U1.7** Plan and conduct investigations to test predictions of the outcomes of chemical reactions, based on patterns of chemical properties. Connection: HS.P1U2.1	Although **energy** cannot be destroyed, it can be converted to less useful forms—for example, to **thermal energy** in the surrounding environment. **Machines** are judged as efficient or inefficient based on the amount of energy input needed to perform a particular useful task. Inefficient machines are those that produce more waste heat while performing a task and thus require more energy input. It is therefore important to design for high efficiency so as to reduce costs, waste materials, and many environmental impacts.[4] The behavior and arrangement of the atoms explains the properties of different materials. In **chemical reactions** atoms are rearranged to form new substances. The opposite

Physical Science Plus (+) Standards HS+ Standards are designed for students taking a high school chemistry (C) or honors chemistry course.

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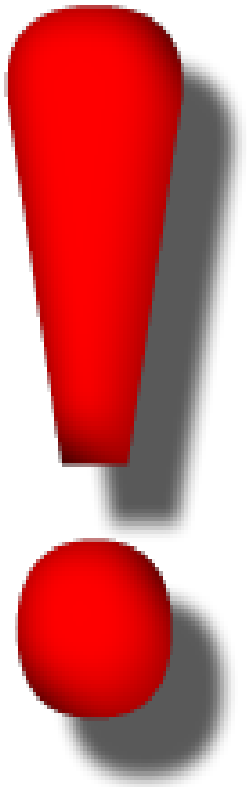
Today's Tasks

Mark your charts as things have been completed.

Reminder:

Keep in mind our work product is public record.

Today's Tasks



Items that are not actionable:

- Curriculum
- Instruction
- Funding/Budget
- Assessment

Actionable:

Specific actionable comments related to

- Standard
- Organization
- Introduction

Etc.…

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Today's Tasks

Technical Review/Edits

1. If not already, sign into your groups google account
   (example: azscigroup1@gmail.com)
1. Go to mail, and open the link of the google doc
2. When editing, please check that you can see other groups editing at the same time ☺
3. Go to your assigned section. Read the technical review comments. If the comment is valid, make changes to your section based off of technical review.

Today's Tasks

Making changes to the DRAFT document.

Highlight items that should be deleted in red.

Your changes you make to the document should be in red font.

Notes changes to the documents based off public survey in the spreadsheet by saying "yes or no/key words (evolution or other appropriate terms)" in the "addressed" column and highlighting that comment number and addressed column in yellow.

	Survey Question	12. Please comment on the Introduction section.				
addressed	Comment #	Public Comment	Actionable Yes/No	Actionable Yes/No	Suggested Changes	Committee Notes
Evolution	56	The Introduction itself explains well the design and intended implementation, but on page 4, the Core Ideas, Life Science, LS section: evolution is a not a theory, (or a theory in the science discipline). unity and diversity of organisms IS a result of adaptation, which is a component of evolution.	Yes	Introduction pg 4		Big Idea 10 is the basis for L4 on Intro p 4 and frame work pp 139-168 - Core Idea LS4 pp. 164-168 but discussed in group the differences of chemical evolution, macro evolution and micro evolution.
yes	143	I believe that some of the wording that was added however is not accurate, as mention prior I have concerns with the paragraph at the bottom of page 2 which explains patterns, I strongly disagree with the statement that identifies the Science and Engineering Practices to the scientific method, if anything in our current document it is related to the Inquiry process not the scientific method. Science has changed even since I was in high school 25 years ago, the scientific method is a mode of communicating findings not the way that science is done.	Yes	Introduction pg 2-3	Remove "Formerly known as the scientific method.." statement from beginning of the Science and Engineering Practices pg. 3	The Science and Engineering Practices did not derive from the Scientific Method.The Scientific Method is procedure and the SEPs are critical components of scientific literacy.
yes	145	Take all the green out. Non- experts clearly wrote the additional pieces and do not have an understanding of the science and engineering practices nor the crosscutting concepts.	yes	comment		Public feedback is being reviewed
	152	The terms cross-cutting and intertwining are confusing at best. This attempt to intermingle three levels of cognition regarding science is very confusing and to what end, at that. Why aren't that standards simply setting out the core concepts needed for functional literacy and practice in science? Rather than cross-cutting why not simply call them ways of looking at the world ?	Yes	comment	Possible rewording/word clarification (intertwined)	
yes	163	Overall, the introduction provides enough information and context to understand the standards. I'm confused by the ADE changes that were made. The example for Patterns doesn't really capture the intent of that practice. I recommend that if an example is included, the ADE allow the working groups of educators to write a better example or to pull one from the Framework, as several examples are cited in that document. I am also confused about the statement about the scientific method, this indicates that there isn't a clear understanding of the practices (even the 2004 standards didn't refer to the scientific method) Please consult with high education faculty or research documents such as the Framework to better understand why the reference to the scientific method is misleading and inappropriate.	Yes	comment	Rewrite bottom paragraph on page 2 using pgs. 85-87 from the Framework to use examples from simple to complex patterns. See comment 143 about Scientific Method statement.	examples for physical and life science were from the framework: pg 85

Grade Level Standards

Read your grade level draft standards that correspond with your working group today.

Begin when your group is ready on your assigned section!

Note: Let us know when you are done to…

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Out to
LUNCH!

Final Thoughts

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