

# Arizona Science Standards Revision Working Group



April 27, 2017

# Housekeeping

1. Sign in
2. Parking validation
3. Restrooms
4. Breaks/Lunch
6. Travel Questions – Fill out W9 if needed
7. Sign non-disclosure form – 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.*

# Thank you!

“If we teach today’s student as we taught yesterday’s, we rob them of tomorrow”

John Dewey, 1915

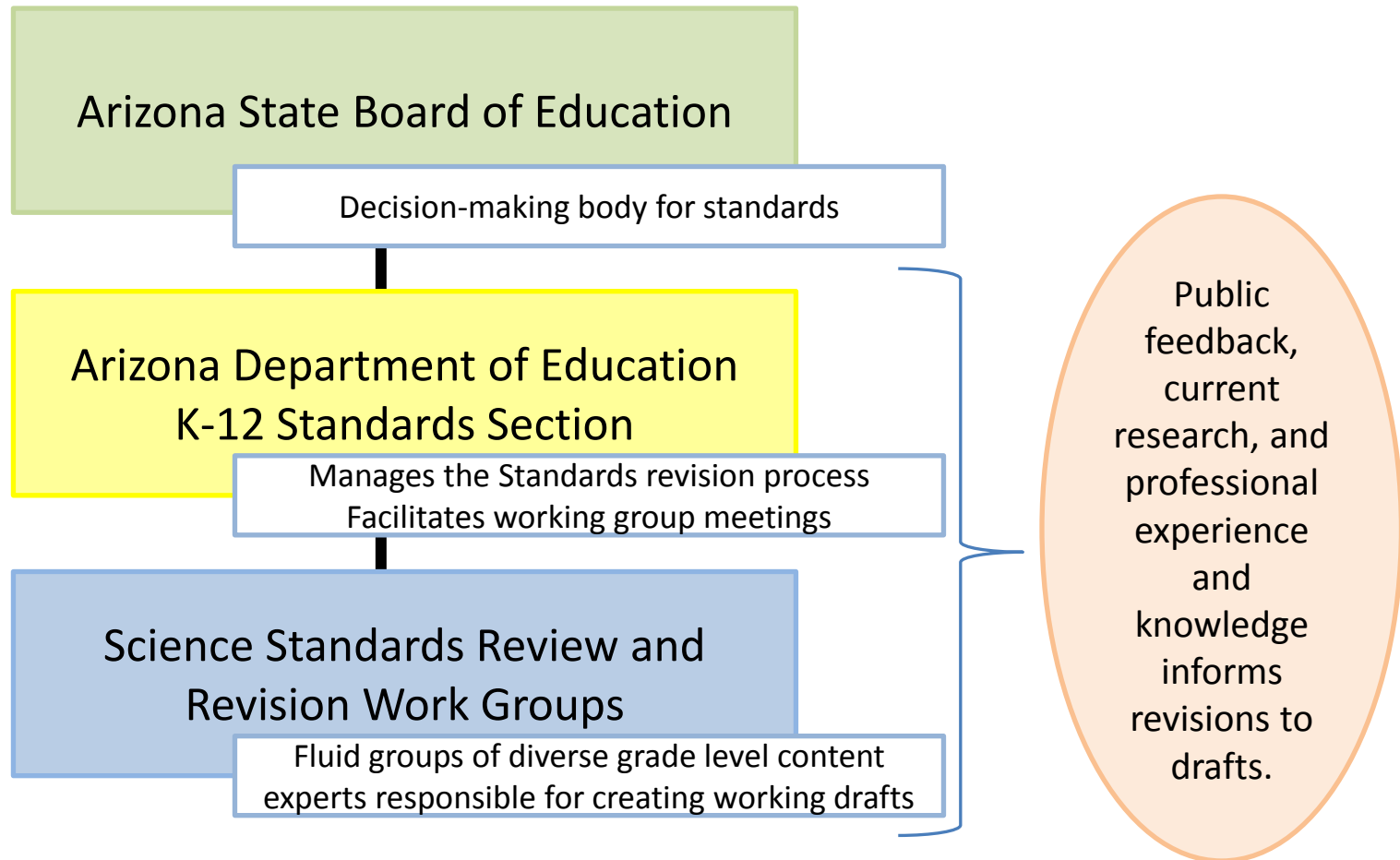


# Introductions

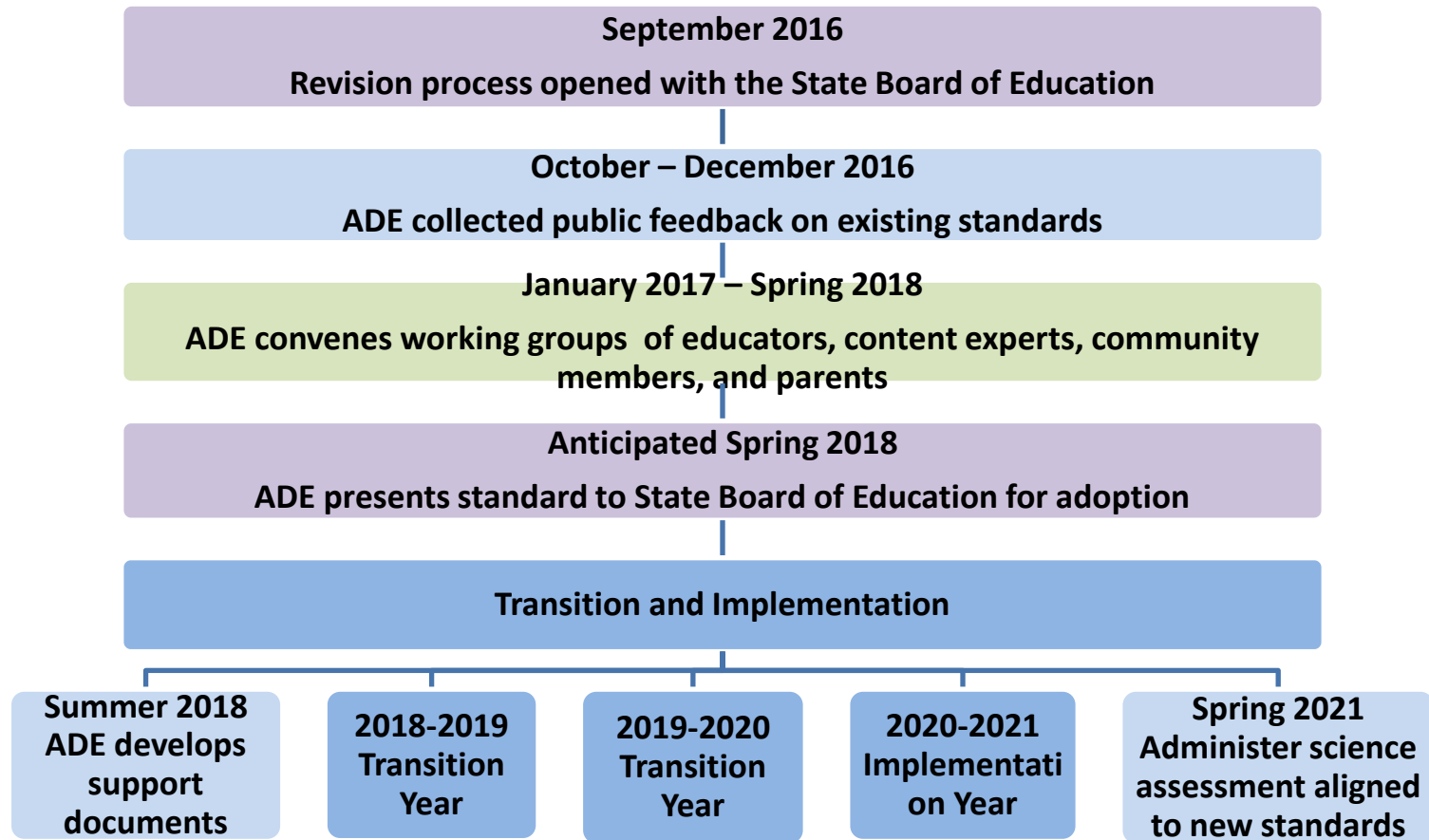
Introduce yourself by telling everyone in the group:

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

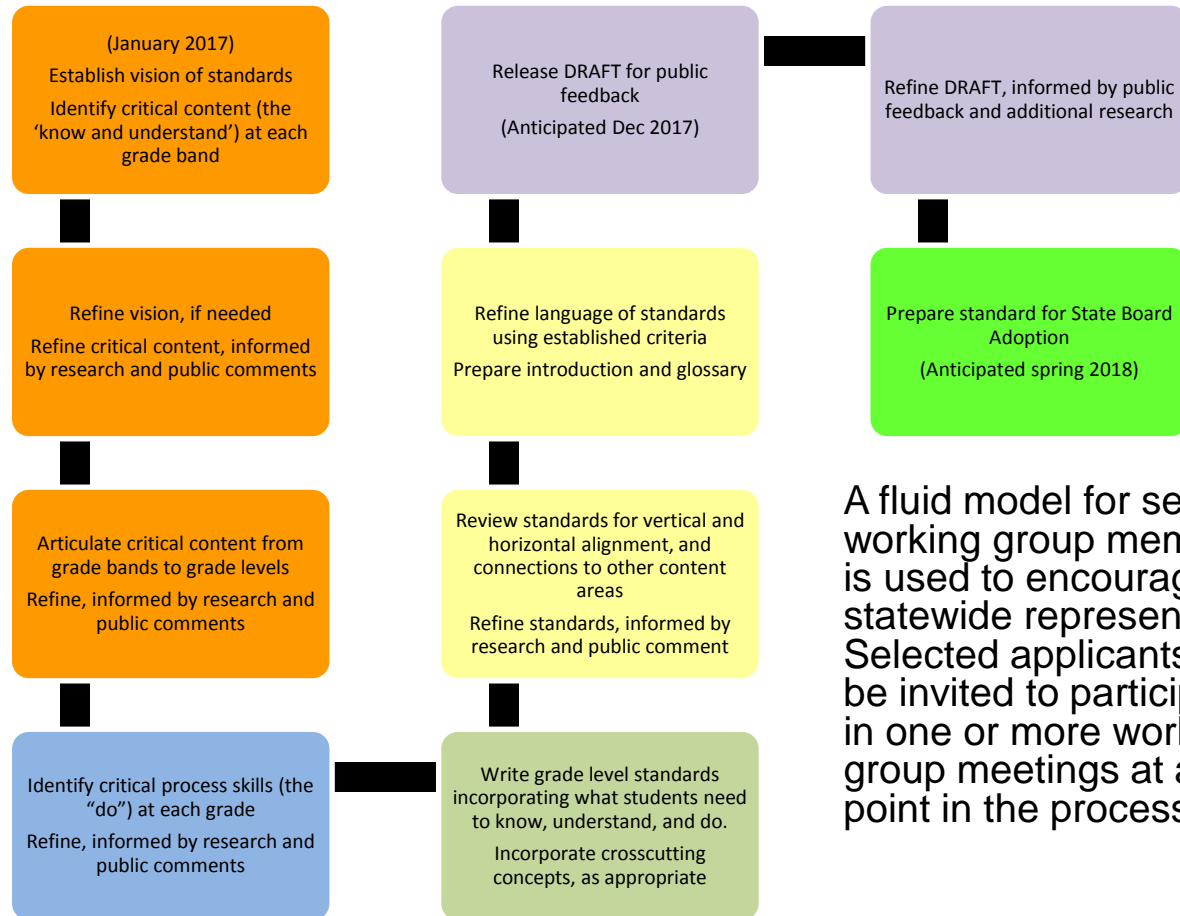
# Standards Review - Structure



# Science Standard Revision and Implementation Timeline



# Standards Review - Structure



A fluid model for selecting working group members is used to encourage statewide representation. Selected applicants may be invited to participate in one or more working group meetings at any point in the process.

# **Roles/Responsibilities: ADE K-12 Standards Staff**

## ADE K-12 Standards Members

- Facilitate work group meetings
- Provide meeting goals, agendas, tasks, and instructions
- Provide needed materials
- Organize committee members into vertical, horizontal, and/or content groups, as appropriate.



# **Roles/Responsibilities: Working Groups**

- 1. Develop the vision for the revised Science Standards**
- 2. Develop drafts of K-12 Science Standards**
  - Make decisions about content and structure of grade level standards
  - Apply content knowledge, grade-level expertise, research, and public feedback to inform all decisions
- 3. Develop drafts of the introduction, glossary, and other appendices, as needed for the K-12 Science Standards**

# Structure: Working Groups

Use a fluid membership model (“accordion model”) to include multiple voices and perspectives throughout the process

- K-12 teachers, coaches, curriculum directors, administrators
- Higher education: science education and science content instructors, professors, and/or researchers
- Content experts from the community
- Parents

# 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 (non-disclosure)**

# Questions on Structure



# ADE Directive for the Science Standards

- Arizona standards, written for Arizona teachers and students, by Arizona educators and content experts
- Write grade-level standards and not performance objectives

# 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.



**This is the “WHAT”**



# 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.

# Standards versus Performance Objectives

## Content Standards

Standards are what students need to know, understand, and be able to do **by** the end of each grade level. Standards build across grade levels in a progression of increasing understanding and through a range of cognitive demand levels.

## Performance Objectives

Performance Objectives are **incremental steps** toward mastery of individual content standards. Performance Objectives are knowledge and skills that a student must demonstrate at each grade level. Performance objectives do not imply a progression of learning and, because they are discrete skills, reach a limited level of cognitive demand.



# Work to Date:

- Developed a working vision to guide all future science standards work
- Identified critical content for each grade band/big idea



# Discuss Critical Content



In grade bands, review critical content work from last meeting

- Returning members update new members

# Critical Content/Progressions

Break into content area groups (Life, Earth, Physical, NOS) with representation from each grade band.

- Review public feedback for each progression.
- Refine critical content/progressions based on public feedback, research, and expertise.



## **A Framework for K-12 Science Education**

### **Science and Engineering Practices**

- 1. Asking questions and defining problems**
- 2. Developing and Using Models**
- 3. Planning and Carrying Out Investigations**
- 4. Analyzing and Interpreting Data**
- 5. Using Mathematics and Computational Thinking**
- 6. Constructing Explanations and Designing Solutions**
- 7. Engaging in Argument from Evidence**
- 8. Obtaining, Evaluating, and Communicating Information**

# **A Framework for K-12 Science Education**

## **Cross-cutting Concepts**

- 1. Patterns**
- 2. Cause and effect**
- 3. Structure and Function**
- 4. Energy and Matter**
- 5. Systems and System Models**
- 6. Scale, Proportion and Quantity**
- 7. Stability and Change**

# Articulation Considerations

Form new groups.



Discuss:

As we articulate grade band content by grade level, what is the role of

- crosscutting concepts?
- science and engineering practices?

# Articulation Considerations

- Each group presents thoughts
- Whole group discussion and consensus building

