# INTRODUCTION TO THE LOUISIANA SCIENCE STANDARDS

K. Renae Pullen
K-6 Science Curriculum
Instructional Specialist
krpullen@caddoschools.org
www.caddoscience.com

## WHY NEW STANDARDS?

*"Science is not just a body of knowledge that reflects current understanding of the world; it is also a set of practices used to establish, extend, and refine that knowledge. Both elements —**knowledge** and **practice** —are essential." (NRC 2012)*

# Agenda

- Conclude what standards are and what they aren’t
- Explain the review process for the standards
- Identify the shifts in the new science standards
- Analyze the framework for the new Louisiana Student Standards for Science
- Discuss the implementation plan for the new science standards

# Purpose of the Louisiana Student Standards for Science (LSS)

- Define what a student should know or be able to accomplish at the end of a specific time period, grade level or completion of a course.
- Represent the knowledge and skills needed for students to successfully transition to postsecondary education and the workplace.
- Build on skills learned in previous years and avoid repetition from year to year.
- Connect across grades and within grades.

# About the Science Standards

**They are quality standards that:**

1. Provide focus on fewer topics with more opportunity for students to engage deeply.
2. Identify key student knowledge and skills that students should demonstrate by the end of the year.
3. Connect learning within and across grades.

# About the Science Standards

| Past Science Instruction | Louisiana Student Standards for Science |
| --- | --- |
| Focus 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 |

# About the Science Standards

| Grade | Number of GLEs | Number of LSS for Science |
|---|---|---|
| Kindergarten | 32 | 10 |
| 3rd Grade | 62 | 15 |
| 6th | 87 | 18 |
| HS Biology | 58 | 20 |
| HS Chemistry | 63 | 13 |
| HS Physics | 51 | 12 |

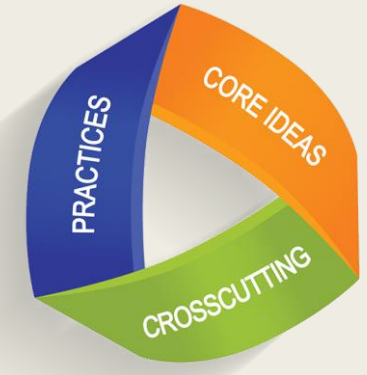
# Shifts in the Science Standards

- There are less standards compared to our previous standards
- Science concepts in LSS build coherently from K through 12; there are obvious learning progressions
- Science standards focus on deeper understanding of content as well as application of content
- Students must express ideas grounded in scientific evidence

# Shifts in the Science Standards

- Science standards and Louisiana State ELA and math standards are aligned
- Students must demonstrate the practices of scientists and engineers
- Middle school science standards will reflect more integrated science concepts rather than course specific learning.

# Framework for the Louisiana Student Standards for Science




**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.

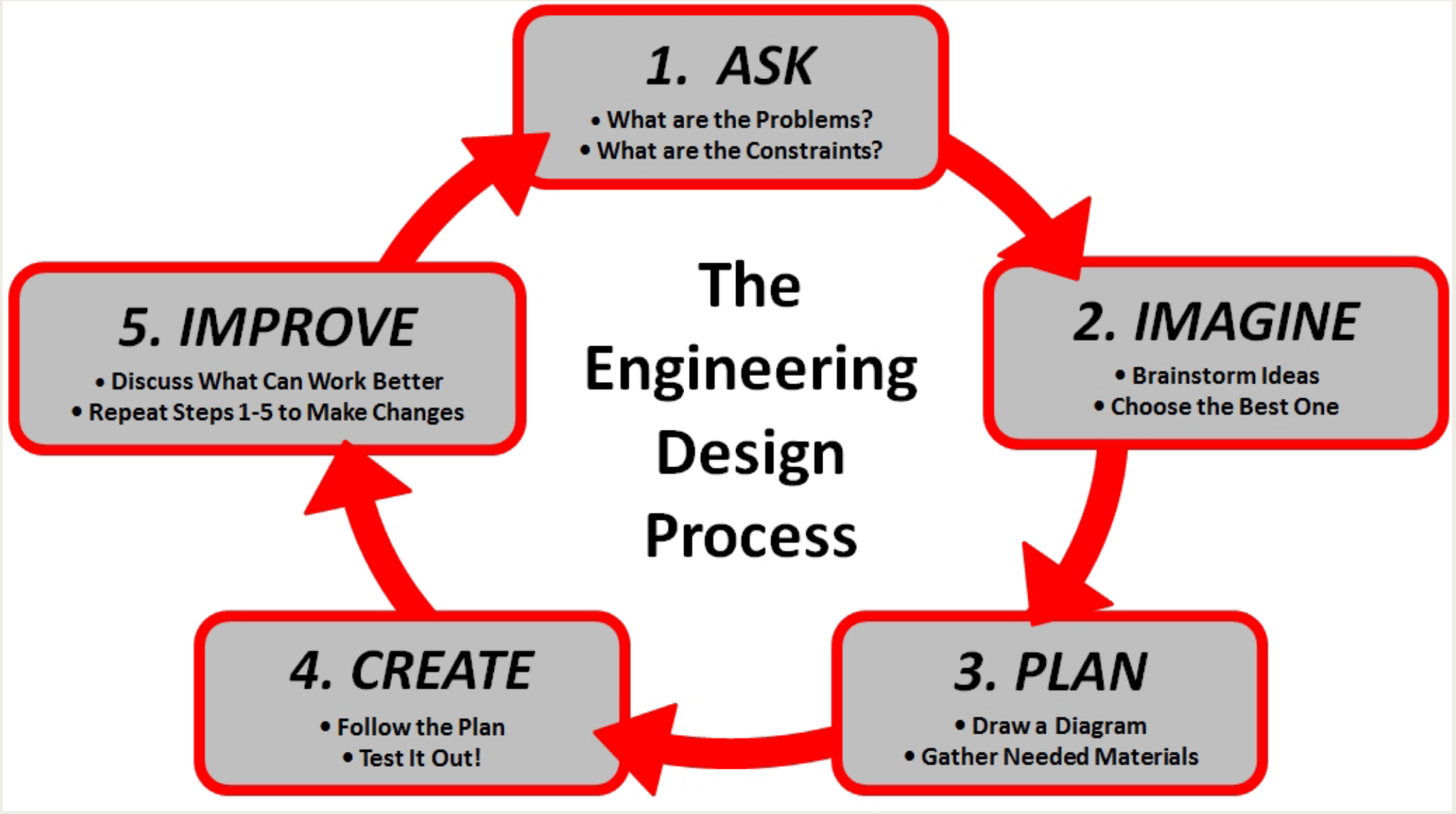
**Clarification Statement:** Provides examples or additional clarification of the performance expectation.

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

# What Is Science and Engineering?

| Science… | Engineering … |
| --- | --- |
| is the body of knowledge of the physical and natural worlds. | is the application of knowledge in order to design and build solutions. |
| seeks to describe and understand the natural world and its physical properties. | seeks to design solutions for societal problems, needs, and wants. |
| uses varied approaches—scientific methods such as controlled experiments or observational studies—to generate knowledge. | uses varied approaches—for example, *engineering design*—to solve problems and design solutions. |
| can be used to make predictions. | aims to produce the best solutions to real-world problems. |

# Overview of Engineering Design



# Science and Engineering Practices

1. Asking questions (science) and defining problems (engineering)
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 (science) and designing solutions (engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

# Disciplinary Core Ideas

| | |
|---|---|
| Physical Science | PS1: Matter and its interactions<br>PS2: Motion and stability: Forces and Motions<br>PS3: Energy<br>PS4: Waves and their applications in technologies for information transfer |
| Life Science | LS1: From molecules to organism: Structures and processes<br>LS2: Ecosystems: Interactions, energy, and dynamics<br>LS3: Heredity: Inheritance and variation of traits<br>LS4: Biological evolution: Unity and diversity |
| Earth and Space Science | ESS1: Earth's place in the universe<br>ESS2: Earth's systems<br>ESS3: Earth and human activity |
| Environmental | EVS1: Resources and resource management<br>EVS2: Environmental awareness and protection<br>EVS3: Personal responsibilities |
| Engineering, Technology, and Applications of Science | ETS1: Engineering Design<br>ETS2: Links among engineering, technology, science, and society |

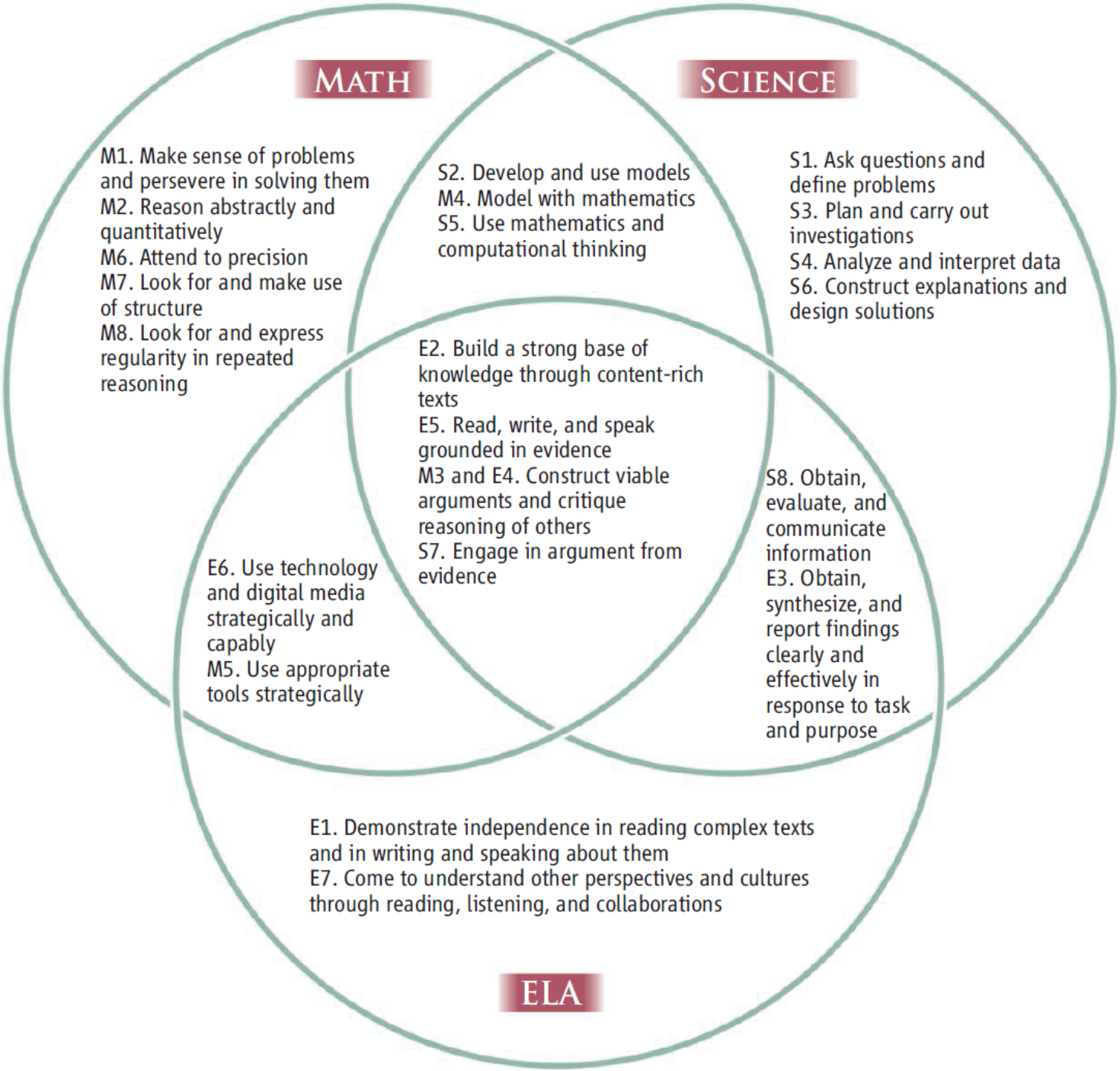
# Cross Cutting Concepts

1. Patterns
2. Cause and effect
3. Scale, proportion, and quantity
4. Systems and system models
5. Energy and matter
6. Structure and function
7. Stability and change

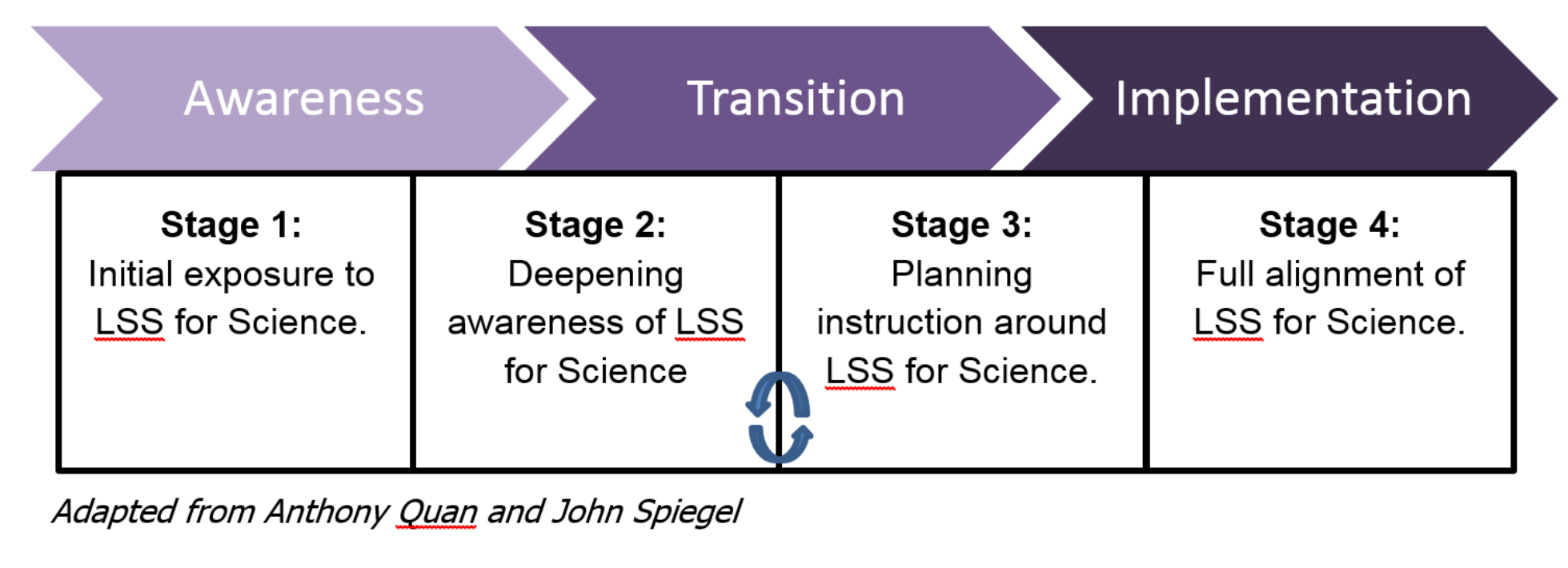
# Performance Expectations

- The assessable part of the standard
- State what students should be able to do to demonstrate that they have met the standard
- Do not specify every intermediate piece of knowledge needed to demonstrate the performance expectation
- Leave room for teachers and curriculum developers to support student understanding
- Do not prescribe the instructional steps
- Represent all 3 dimensions and do not stand alone

# Relations and convergences in literacy, math, and science and engineering practices.



# From Awareness to Implementation




The ***Awareness*** is an introduction to the LSS for Science, the initial planning of implementation, and establishment of collaborations.

The ***Transition*** phase is the concentration on building foundational resources, implementing needs assessments, establishing professional learning opportunities, and expanding collaborations.

The ***Implementation*** phase expands the professional learning support, fully aligns curriculum, instruction, and assessments.

# Initial Look Fors

- Teachers are becoming aware and modifying lessons to align with LSS.
- Students are engaged, exploring, explaining, elaborating, and evaluating in science.
- Activities are designed with the purpose of enhancing the standard.
- There is a focus of the entire standard and not just the **performance expectation**.

# The Future of Science Assessments

- Grades 3-8 will field test the new science standards during 2017-2018.
- Biology will test over current GLEs during 2017-2018.
- Full assessment over standards will begin 2018-2019.

*Note: This is current as of April 25, 2017.*

# Resources

- Caddo Science Website- http://www.caddoscience.com/new-science-standards.html
- Louisiana Student Standards for Science: https://goo.gl/0kqs8X
- LDOE: http://www.louisianabelieves.com/resources/library/academic-standards