Louisiana Believes

Science: Connecting Standards, Instruction, and Assessment
Supervisor and Principal Implementation Support
January 2018

DEPARTMENT of EDUCATION

Purpose

Quality science instruction requires that teachers understand the standards and the shifts called for by the standards, have access to a high quality curriculum and understand what students will be held accountable for on the assessment. This session will you help "connect the dots" between the standards, instruction and assessment.

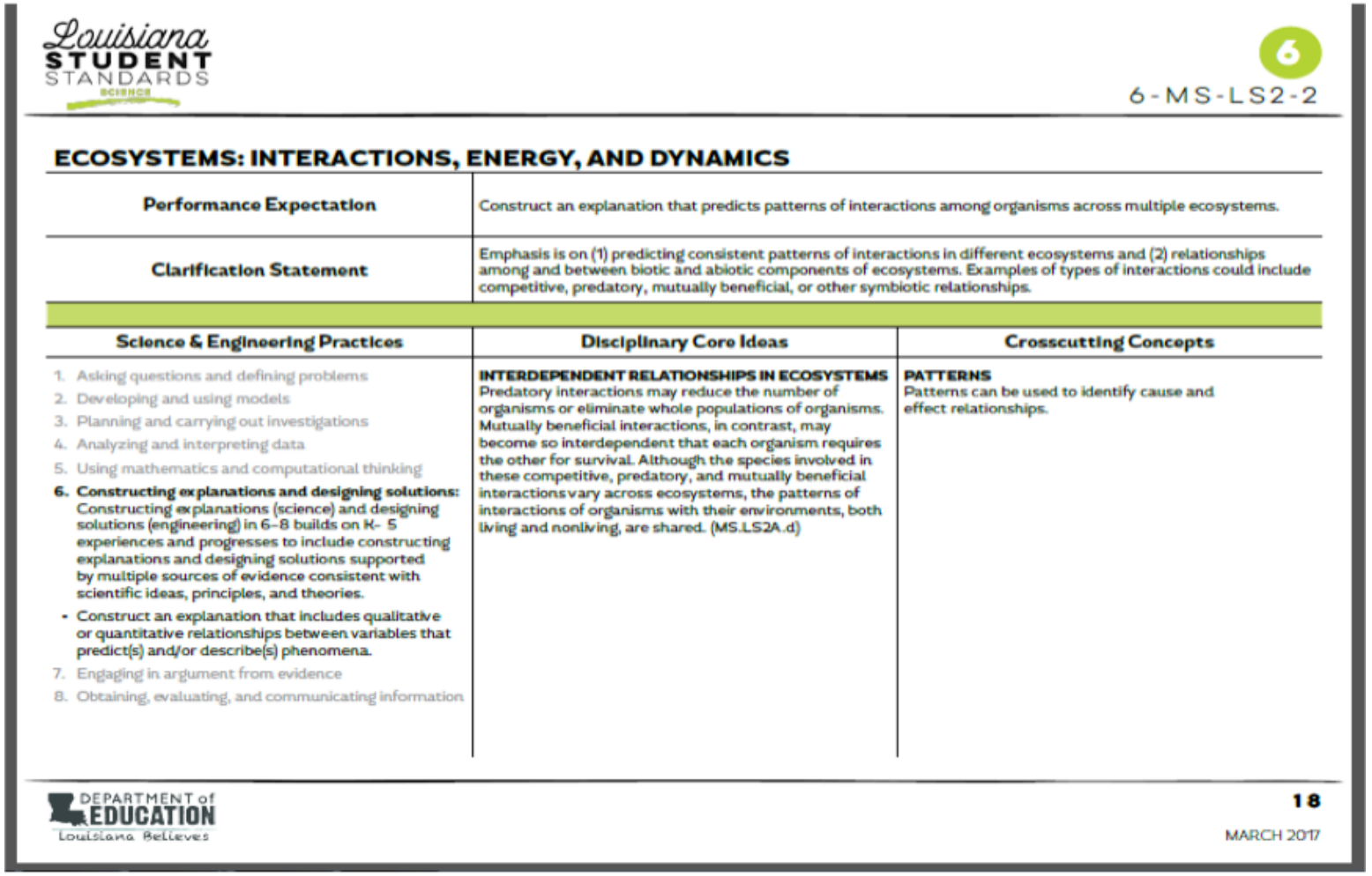
Schedule

- Standards
- Instructional shifts
- Instruction
- Assessment
- Classroom Observations
- Next Steps

Louisiana Student Standards for Science

Coding and Descriptor:		
Performance Expectation:		
Clarification Statement:		
Science and Engineering Practices:	Disciplinary Core Ideas:	Crosscutting Concepts:

Louisiana Student Standards for Science



Louisiana STUDENT STANDARDS SCIENCE

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6-MS-LS2-2

ECOSYSTEMS: INTERACTIONS, ENERGY, AND DYNAMICS

Performance Expectation	Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
Clarification Statement	Emphasis is on (1) predicting consistent patterns of interactions in different ecosystems and (2) relationships among and between biotic and abiotic components of ecosystems. Examples of types of interactions could include competitive, predatory, mutually beneficial, or other symbiotic relationships.

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
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:** Constructing explanations (science) and designing solutions (engineering) in 6–8 builds on K- 5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories. - Construct an explanation that includes qualitative or quantitative relationships between variables that predict(s) and/or describe(s) phenomena. 7. Engaging in argument from evidence 8. Obtaining, evaluating, and communicating information	**INTERDEPENDENT RELATIONSHIPS IN ECOSYSTEMS** Predatory interactions may reduce the number of organisms or eliminate whole populations of organisms. Mutually beneficial interactions, in contrast, may become so interdependent that each organism requires the other for survival. Although the species involved in these competitive, predatory, and mutually beneficial interactions vary across ecosystems, the patterns of interactions of organisms with their environments, both living and nonliving, are shared. (MS.LS2A.d)	**PATTERNS** Patterns can be used to identify cause and effect relationships.

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MARCH 2017

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Instructional Shifts

The Louisiana Student Standards for Science represent the knowledge and skills needed for students to successfully transition to postsecondary educations and the workplace. The standards call for science students to:

- Apply Content Knowledge
- Investigate, Evaluate, and Reason Scientifically
- Connect Ideas Across Disciplines

Analyze the “shifts” page and standard 6-LS2-2. In a group, create a chart that demonstrates how these shifts are aligned to the standards.

Louisiana Student Standards for Science

The new standards call for changes in the science classroom. Key shifts called for by the Louisiana Student Standards for Science:

Apply content knowledge	Content knowledge is critical and evident in the standards in the Disciplinary Core Ideas, 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.
Investigate, evaluate, and reason scientifically	Scientists do more than learn about science; they "do" science. Science instruction must integrate the practices, or behaviors, of scientists and engineers as they investigate real-world phenomenon and design solutions to problems.
Connect ideas across disciplines	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 have applications across all domains.

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

Contact LouisianaStandards@la.gov with questions.

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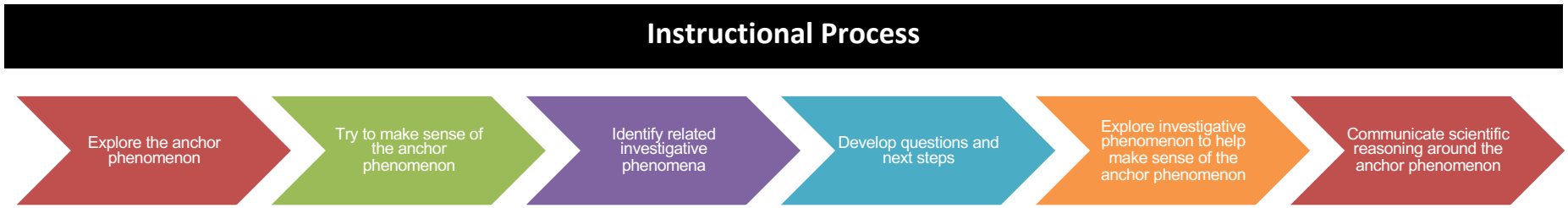
Sample Scope and Sequence



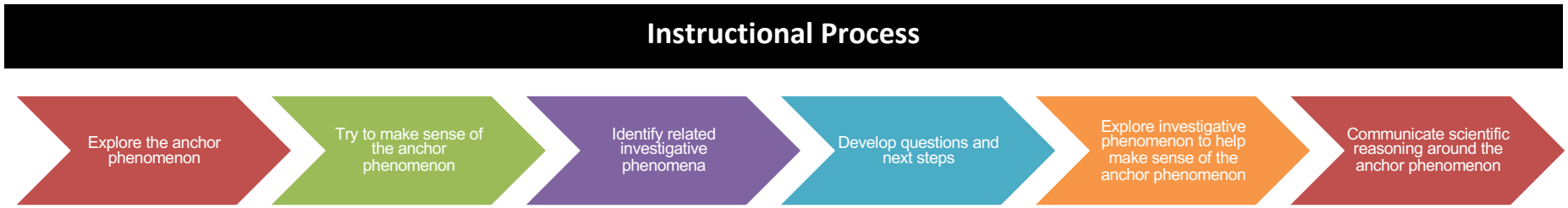
- The LSSS scope and sequence documents guide teachers on how to engage students in science using phenomena. In the documents, observing and explaining phenomenon and designing solutions provide the purpose and opportunity for students to engage in learning
- During today's presentation, we will review LSSS 6th Grade Sample Scope and Sequence Document to understand how the standards, instruction, and assessment are connected.
- In your own words, describe the instructional approach illustrated by this graphic.

Sample Scope and Sequence

- Phenomena are observable events that occur in the universe and that we can use our science knowledge to explain or predict.

Past Science Learning	Phenomenon-Based Learning
Focused on teaching general knowledge	Allow students to build general science knowledge in the context of their application to understanding phenomena
Failed to clarify why students needed to learn key content knowledge	Supports students agency for wanting to build science and engineering knowledge
Focused on teaching specific topics	Help students figure out what or why something happens

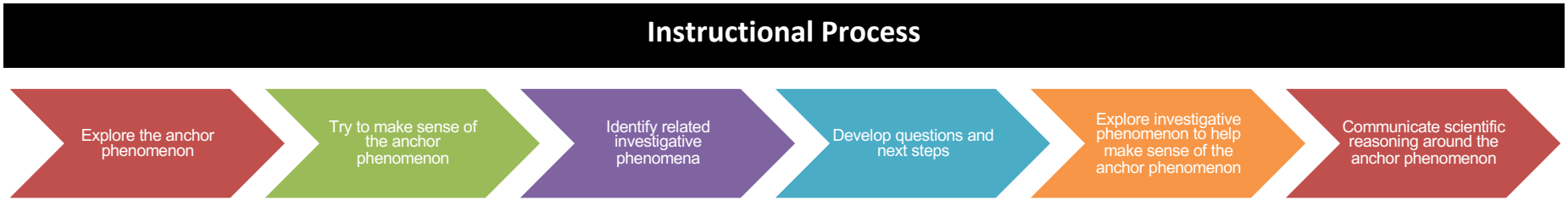
Sample Scope and Sequence



As a table,

- Review Bleaching of Coral Reefs
- Review Grade 6, Unit 6 Putting the Standards into Practice
- What is the anchor phenomenon for Unit 6?
- How could teachers use this anchor phenomenon in their instruction?
- How often should students come back to the anchor phenomenon?

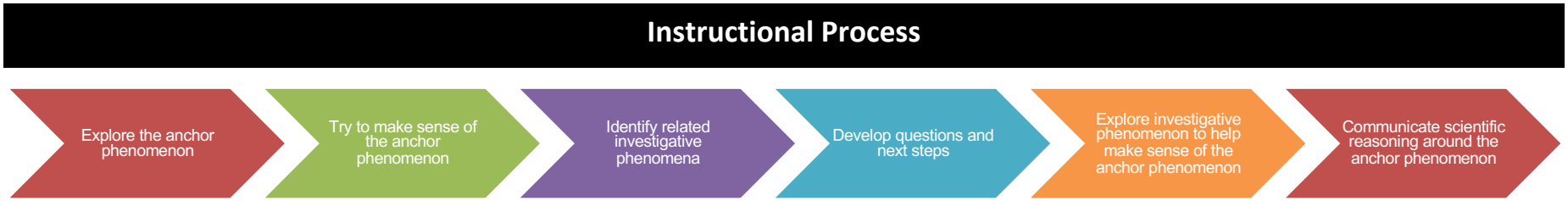
Sample Scope and Sequence



As a table,

- Analyze the printed resources and the Questions Students May Pose That Could be Used for Future Learning or Investigations
- How can teachers use these resources to elicit student generated questions about the anchor phenomenon and drive student learning throughout the unit of study?
- How can students apply content knowledge to explain the real-world phenomenon?

Sample Scope and Sequence



As a table,

- Review the Sample Anchor Phenomenon Reflection Questions
- How are the reflection questions connected to the performance expectation?
- How will the activities lead students to answer the reflection questions and make sense of the anchor phenomenon?

Additional Instructional Resources

- The Sample Scope and Sequence Documents include anchor phenomena for all units of study and investigative phenomena for the first unit of study.
- Identifying related investigative phenomena for the remaining units of study is challenging but necessary work.
- We will now look at a high quality unit that has already identified the investigative phenomenon to help you better understand what this looks like in day-to-day instruction.

Additional Instructional Resources

As a table,

- Review standard 6-MS-LS2-2
- Review the Disruptions in Ecosystem Unit pages 140-145
- Identify at least two investigative phenomena for the unit of study
- How will the investigative phenomena help students make sense of the anchor phenomenon?
- What steps will teachers have to take to help students connect their learning of the investigative to the anchor phenomenon?

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Connecting to the Assessment

Three Dimensions

Disciplinary Core Ideas

Science and Engineering Practices

Crosscutting Concepts

Instructional Shifts

Apply Content Knowledge

Investigate, Evaluate, and Reason Scientifically

Connect Ideas Across Disciplines

Analyze the 6th grade assessment items.

- Identify 2 ways in which the items connect to the instructional shifts.
- Identify how the instructional materials discussed today will prepare students to complete the items.

Connecting to the Assessment

Apply content knowledge	**On the field test**, students answer questions aligned to PE bundles (groupings of like PEs) and the corresponding DCIs. The students begin each set of questions by reading through stimulus materials connected to a scientific phenomenon.
Investigate, evaluate, and reason scientifically	**On the field test**, students do more than answer recall questions about science; they apply the practices, or behaviors, of scientists and engineers as students investigate each real-world phenomenon and design solutions to problems.
Connect ideas across disciplines	**On the field test**, sets of questions assess student application of knowledge across the domains of science for a comprehensive picture of student readiness for their next grade or course in science.

Contact Assessment@la.gov with questions.

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Observation Tool

Three Dimensions
Science and Engineering Practices
Disciplinary Core Ideas
Crosscutting Concepts

Instructional Shifts
Apply Content Knowledge
Investigate, Evaluate, and Reason Scientifically
Connect Ideas Across Disciplines

Analyze the science observation tool.

- How is the tool aligned with LSSS standards, instruction and assessment?
- How can you use this tool to coach and develop science teachers?

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Science Curriculum

Option	Benefits	Challenges	Resources
Pilot	MS teachers pilot 6 high quality units	Teachers and students don't have a full program	An application will be released for additional districts to apply to pilot the 6 middle school units in the Spring.
Hold and wait for materials	A number of vendors are working on updates and/or new materials for the 2019-2020.		Use the scope and sequence documents for one more year
Purchase something on your own.	Quickly gets a full program in teachers / students hands	Nothing has been identified as Tier 1 Multi-year contracts may tie you to a poorly aligned program	Instructional Materials Review Weekly Report
Work individually with vendors to pilot materials	A number of vendors have reached out and communicated ongoing work to align their materials to the IMR rubric.	Nothing has been identified as Tier 1 Teachers and students don't have a full program	

IMR Timeline

The Instructional Materials Review and Science Content Teams are currently working on a number of reviews:

Program	Grades	Status
Living by Chemistry	HS Chemistry	Tier 3
StemScopes	K-5	Under review
Amplify Science	K-5	Under review
FOSS Next Generation	K-5	Under review
CPO Foundations of Physical Science / Foundations of Physics	HS	Under review
HMH Science Dimensions	6-8, Biology	Under review
Know Atom	6-8	Under review

Science Curriculum

The Department is working with national and local educators to kick off an science curriculum writing project, OpenSciEd.

- The curriculum will be licensed under the CC BY 4.0 license, which means that it will be open to share, copy, redistribute, remix, transform, or build upon.
- The curriculum is being built with the criteria for a Tier 1 rating on the Instructional Materials Review Rubric at the forefront.
- Middle school units will be piloted in the 2018-2019 school year in districts awarded the relative MSP grants.
- Training for these pilots will begin this summer and will be led by Louisiana providers.
- An RFP will be released in late 2018 to complete the middle school program and address additional grade levels.

Standards Implementation Support

Tools: The following tool are on the Science Planning Page.

- Louisiana Student Standards for Science.
- Shifts in Science
- Appendix A: Progressions of Learning
- Appendix B: Connections to ELA and Math Standards
- Middle School Sample Transition Plan
- Sample Scope and Sequence Documents

Email Lydia.hill@la.gov with questions.