Louisiana Guide to Implementing Carolina OpenSciEd: Grade 6

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Purpose

To assist teachers with the implementation of the Carolina OpenSciEd curriculum for grade 6, this document provides guidance regarding how Carolina OpenSciEd units correlate with the Louisiana Student Standards for Science (LSSS). The Carolina OpenSciEd curriculum provides ample instructional guidance for teachers. This Louisiana Guide for Implementing Carolina OpenSciEd goes a step further to point out places in which teachers may need to make strategic decisions, considering student needs.

Carolina OpenSciEd Grade 6 may include performance expectations featured in other grade levels. These units are intentionally designed to provide students the opportunity to incrementally make sense of phenomena to build understanding and abilities over time through a coherent storyline. Modification to the sequence or content of lessons within these units could undermine the design and, therefore, should be approached with caution and careful consideration.

This guidance document is considered a 'living' document, reflecting the expectation that teachers and other educators will continue to identify opportunities for improvement as it is applied in practice. Please send feedback to STEM@la.gov so that the Louisiana Department of Education (LDOE)may incorporate your suggestions when updating this guide.

Standards by Unit

	Unit 1 Light and Matter OpenSciEd 6.1	Unit 2 Contact Forces OpenSciEd 8.1	Unit 3 Sound Waves OpenSciEd 8.2	Unit 4 Forces at a Distance OpenSciEd 8.3	Unit 5 Earth in Space OpenSciEd 8.4	Unit 6 Cells and Systems OpenSciEd 6.6
Unit Question	Why do we sometimes see different things when looking at the same object?	Why do things sometimes get damaged when they hit each other?	How can a sound make something move?	How can a magnet move another object without touching it?	Why do we see patterns in the sky, and what else is out there that we can't see?	How do living things heal?
Standards	6-MS-PS4-2*	6-MS-PS2-1 6-MS-PS2-2 6-MS-PS3-1	6-MS-PS4-1 6-MS-PS4-2*	6-MS-PS2-3 6-MS-PS2-5 6-MS-PS3-2	6-MS-ESS1-1 6-MS-ESS1-2 6-MS-ESS1-3 6-MS-PS2-4 6-MS-PS4-2*	6-MS-LS1-1 6-MS-LS1-2 7-MS-LS1-3*

†6-PS1-1, 6-LS2-1, 6-LS2-2, L-LS2-3, and 6-ESS3-4 are not addressed by the Grade 6 Carolina OpenSciEd units. The performance expectation can be addressed by incorporating the Grade 6 Louisiana Sample Scope and Sequence and/or Chapters 1-4 of Disruptions in Ecosystems Alternative Unit as needed.
** The performance expectation is partially addressed using the identified phenomenon and is addressed in multiple units.*

Pacing and Unit Order Guidance

**Modification of the lessons, even in the ways suggested here, should be approached with careful consideration. Additional attention should be given to navigation in lessons where adjustments are made to maintain coherence from the student's perspective.*

Unit	Relevant OpenSciEd Guidance † for Teaching Units in a Different Sequence	Relevant OpenSciEd Guidance† for Condensing (This includes guidance directly from OpenSciEd as well as Louisiana-specific suggestions.)
Unit 1 **Light and Matter OpenSciEd Unit 6.1**	This is the first unit in the OpenSciEd Scope and Sequence and is intended to be used at the start of 6th grade.	• **Lessons 1 and 2:** There is an extended self-documentation activity that is introduced in Lesson 1 and revisited three times in Lesson 3. The purpose of the extended activity is to build a documentation board of related experiences; the use of a shorter related phenomenon chart, which is also included in Lesson 1, could be utilized instead. • **Lesson 3:** The lab investigation in this lesson could be completed as a demonstration lab in a Scientist Circle to get a class set of data for small group analysis. • **Lesson 6:** The investigation with flashlights and convex lenses could be cut out or changed to a brief demonstration. • ***LA suggestion*** - **Lesson 6**: Although understanding how light enters the eye and is processed by the brain is important to a cohesive storyline, these are not grade 6 standards. To condense into one day, assign a video as home learning and focus on refraction extension activities in this lesson. Note that additional adjustments may need to be made in lessons that follow to accommodate the decreased focus on how light enters the eye and how the brain responds to signals. • **Lesson 8:** This entire lesson could be shortened to only test glass in the box model with collaborative sense-making of what was observed, followed by the final transfer task assessment.

Unit	Relevant OpenSciEd Guidance † for Teaching Units in a Different Sequence	Relevant OpenSciEd Guidance† for Condensing (This includes guidance directly from OpenSciEd as well as Louisiana-specific suggestions.)

Unit 2
 	
Contact Forces OpenSciEd Unit 8.1
	• If taught before 6.2, supplemental teaching of the following would be required:
	  ○ Energy transfer is the result of two colliding objects at the particle level.
	  ○ The role of independent and dependent variables, along with controlled variables, in an investigation.
	  ○ What criteria and constraints are, and how they can be used to inform design decisions.
	• If taught before 6.5, supplemental teaching of the following would be required:
	  ○ What a stakeholder is, and the role of stakeholders in the iterative design process.
		• ***LA suggestion* - Lesson 11:** To condense to a one-day lesson, conduct Parts 1-3 as a whole-class discussion, develop designs individually, then share in groups (eliminate Gallery Walk), and combine the discussions in Parts 7-9.
		• ***LA suggestion* - Lesson 12:** To condense to a one-day lesson, conduct a combined whole-class discussion for Parts 1-3, conduct investigations in groups, as suggested, combine Parts 6-8 into one whole-class discussion, and have students finish Part 9 at home if needed.
		• ***LA suggestion* - Lesson 14:** To condense into a one-day lesson, remove Parts 5-10 and focus more heavily on Parts 3 and 4.
		• ***LA suggestion* - Lesson 16:** To condense, remove this optional lesson.
		• **Lessons 11-16:** Since lesson sets 1 and 2 focus on explaining why some objects are damaged when they hit each other and others don't and lesson set 3 re-anchors the learning on designing protective devices for objects that we want to protect from getting damaged in a collision, one natural end~~point~~ for the unit would be at the end of lesson 10, which concludes lesson set 2.

Unit 3 **Sound Waves OpenSciEd Unit 8.2**	• Students may not have the prior knowledge that air is matter and has mass. Additional investigation may be needed to establish these ideas. (e.g., massing a soda bottle before and after opening it; massing a volleyball before and after adding air).	• ***LA suggestion* - Lesson 2:** If condensing is needed, reduce time for observations in Part 2 and complete Part 5 at the end of Day 1. On Day 2, combine navigation in Part 9 with navigation in Part 1 of Lesson 3 and begin planning the investigation. For Lesson 3 Day 1, pick up at Part 2, omit writing of clams, and build into the Part 4 discussion. Continue with Parts 5 and 6 on Day 1 and Part 7 if time allows. Part 7 may need to be addressed on the next day if there is no time to fully engage.

Unit	Relevant OpenSciEd Guidance † for Teaching Units in a Different Sequence	**Relevant OpenSciEd Guidance† for Condensing** (This includes guidance directly from OpenSciEd as well as Louisiana-specific suggestions.)
Unit 3 **Sound Waves OpenSciEd Unit 8.2** ***continued from previous page***	• If taught before 6.2, students will need to develop some ideas around particle motion, including the behavior and spacing of particles in the different states of matter. • The unit rests on explaining sound as the collision of particles that transfers energy -- if needed, extra time can be spent on Lessons 7-9 to develop ideas of matter as composed particles and how they move.	• **Lesson 3:** If students have completed 6.1, they will have established the idea that all objects bend. To shorten this lesson, focus on how the vibration changes with more force. • ***LA suggestion*** **- Lesson 4:** If previous suggestions are used and Lesson 3 Building Understanding Discussion must be continued or completed on Day 1 of Lesson 4, some small adjustments will need to be made to complete Lesson 4 in two days. • ***LA suggestion*** **- Lessons 7 and 8:** If condensing is needed, combine Lessons 7 and 8 by reducing time spent on the investigations on both days and revisiting the initial model in Lesson 7. Navigation from Part 1 in Lesson 8 can be combined with Part 4 of Lesson 7 to move into Lesson 8 activities on the same day. Students may finish updating their progress trackers as a home learning assignment or at the beginning of Lesson 9 if more time is needed. • **Lesson 11:** This lesson provides an opportunity to apply what they have learned to a new phenomenon and to get feedback from peers before individually revising their model for the anchoring phenomenon. If short on time, either phenomenon can be used, and students can still give feedback and revise that one model. • **Lesson 12:** Eliminate this lesson - 6-MS-PS4-1 and 6-MS-PS4-2 do not address how humans hear sound. This Disciplinary Core Idea (DCI) is spread across multiple units. If this lesson is skipped, more time or support might be needed in future units to address this DCI. ***LA Addition***: To maintain coherence, consider navigating at the end of Lesson 11 and having students read and annotate the article as home learning. Integrate Part 4 class discussion into Lesson 13 navigation.

Unit	Relevant OpenSciEd Guidance † for Teaching Units in a Different Sequence	Relevant OpenSciEd Guidance† for Condensing (This includes guidance directly from OpenSciEd as well as Louisiana-specific suggestions.)
Unit 4 **Forces at a Distance OpenSciEd Unit 8.3**	No relevant guidance for LA suggested scope and sequence.	• ***LA suggestion*** **- Lesson 1:** If condensing is needed, combine Days 2 and 3 by conducting Parts 6 and 7 together. Begin Part 8 on Day 1, complete for home learning, and follow the additional suggestions. Parts 9-14 can be completed on Day 4. If needed, have students submit additional investigation ideas for home learning. Navigation from the end of Lesson 1 can be combined with the beginning of Lesson 2. • **Lesson 1:** The speaker dissection is best as a real-time investigation with students. However, there are two alternative approaches to the speaker dissection: using a previously dissected speaker or playing a video of a speaker dissection. If selecting an alternative approach, the preparation is different. First, watch the speaker dissection video to become familiar with how to conduct it as a real-time investigation with students. • ***LA suggestion*** **- Lesson 2:** If condensing is needed and students seem to have a great deal of prior knowledge about magnets, Part 2 can be conducted a bit more quickly, followed by a quick navigation to Part 6, and the Building Understanding Discussions (Parts 3 and 7) can be combined following Part 6. • ***LA suggestion*** **- Lesson 4:** If condensing is needed, begin Part 3 discussion during the Part 2 demonstration, combine the discussions in Parts 4 and 5, and complete the investigation in Part 7 on Day 1. Finish with Part 8 and assign home learning. Begin Day 2 by combining navigation in Parts 9 and 10, and complete the rest of the lesson as written.

Unit	Relevant OpenSciEd Guidance † for Teaching Units in a Different Sequence	**Relevant OpenSciEd Guidance† for Condensing** (This includes guidance directly from OpenSciEd as well as Louisiana-specific suggestions.)
Unit 4 **Forces at a Distance OpenSciEd Unit 8.3** ***continued from previous page***		• **Lesson 8:** In previous lessons, students designed many aspects of the investigations they carried out and had a relatively long amount of time to do them. In the very short investigations students do in this lesson, the planning aspect is not the main focus of their work, and they have a very short amount of time for each investigation. This shift in focus for this lesson is because the goal of these investigations is different. Students are carrying out these investigations to produce data to serve as the basis for evidence that is framed around trying to figure out answers to a series of questions that the class will narrow in on at different points in the lesson. These explorations do not require students to follow a predetermined procedure. To accomplish the goal of each investigation in a short amount of time, students will need to attend to how they communicate, cooperate, and take turns with their group members. • ***LA suggestion*-Lesson 9-** If streamlining is needed and students can move through Part 2 more quickly than allotted, Parts 3 and 5 can be combined to make a consensus model on Day 1. Parts 6, 7, and 8 can be completed on Day 2 by reducing the time spent on each activity by a few minutes.
Unit 5 **Earth in Space OpenSciEd Unit 8.4**	No relevant guidance for LA suggested scope and sequence.	• **Lesson 4:** If students do not have as many questions about deep space interactions, trimming some of the lessons from Lesson Set 4 (Lessons 13–17)should be considered.

Unit	Relevant OpenSciEd Guidance † for Teaching Units in a Different Sequence	Relevant OpenSciEd Guidance† for Condensing (This includes guidance directly from OpenSciEd as well as Louisiana-specific suggestions.)
Unit 6 **Cells and Systems OpenSciEd Unit 6.6**	• If taught before 6.4, students will benefit from additional scaffolding for scale, proportion, and quantity. • If taught before 6.2 and 6.4, students will benefit from additional scaffolding for systems and system models. • If taught before, 6.2 and 6.3, students will benefit from additional scaffolding for planning and carrying out investigations. • If taught before, 6.2 students benefit from additional scaffolding for engaging in argument from evidence.	• **Lesson 4:** If microscopes are not available, shorten this lesson by one day by taking out the orientation to the microscopes. • **Lesson 6:** This is a two-day lesson that includes using the microscopes to look at skin, bone, and muscle slides. These images are in the https://www.openscied.org/general/microscope-blood/. If the technology is available, have students make observations of the images as home learning and do the sensemaking over the course of one day afterward.

† Adapted from the OpenSciEd TeacherBackground Knowledge for "How will I need to modify the unit if taught out of sequence?" and "How do I shorten or condense the unit if needed? How can I extend the unit if needed?" for each unit.

LDOE Formative Assessment Resources

LDOE formative assessment resources include a library of Louisiana educator-created discrete items and sets, LEAP Practice Test Items, and LEAP Assessment Guide Items correlated to the LSSS. These resources can be used alongside guidance from a high-quality curriculum to provide opportunities for students to showcase their learning.

Unit	Discrete Items	Sets
Light and Matter OpenSciEd 6.1	***LDOE Formative Assessment Items* (Password- Educate2020):** • Spectral Signature, Telescopes (6-MS-PS4-2) ***LEAP Practice Test Standalone Items*:** • N/A ***LEAP Assessment Guide Items:*** • N/A ***LEAP Science Released Items:*** • N/A	***LDOE Formative Assessment Sets* (Password- Educate2020):** • N/A ***LEAP Practice Test Sets*:** • N/A ***LEAP Assessment Guide Sets:*** • N/A ***LEAP Science Released Items:*** • N/A
Contact Forces OpenSciEd 8.1	***LDOE Formative Assessment Items* (Password- Educate2020):** • Satellite, Shin Guard Design (6-MS-PS2-1) • Soccer Ball, Juan's Skateboard (6-MS-PS2-2) • Sports Balls (6-MS-PS3-1) ***LEAP Practice Test Standalone Items*:** • 40 (6-MS-PS2-1) • 14, 33 (6-MS-PS2-2) ***LEAP Assessment Guide Items:*** • N/A ***LEAP Science Released Items:*** • N/A	***LDOE Formative Assessment Sets* (Password- Educate2020):** • Item Set: Bowling (6-MS-PS3-1, 6-MS-PS2-2) ***LEAP Practice Test Sets*:** • N/A ***LEAP Assessment Guide Sets:*** • Task Set: Laws of Motion and Bicycle Helmets (6-MS-PS2-1, 6-MS-PS2-2) ***LEAP Science Released Items:*** • N/A

Unit	Discrete Items	Sets
Sound Waves OpenSciEd 8.2	***LDOE Formative Assessment Items* (Password- Educate2020):** • Trials, Reverberation (6-MS-PS4-1) ***LEAP Practice Test Standalone Items*:** • 41 (6-MS-PS4-1) ***LEAP Assessment Guide Items:*** • Sound Waves (6-MS-PS4-1) ***LEAP Science Released Items:*** • N/A	***LDOE Formative Assessment Sets* (Password- Educate2020):** • Item Set: Ocean Waves (6-MS-PS4-1) ***LEAP Practice Test Sets*:** • Item Set: Properties of Light and Sound Waves (6-MS-PS4-1, 6-MS-PS4-2) ***LEAP Assessment Guide Sets:*** • N/A ***LEAP Science Released Items:*** • N/A
Forces at a Distance OpenSciEd 8.3	***LDOE Formative Assessment Items* (Password- Educate2020):** • Electric Motor (6-MS-PS2-3) • Popcorn (6-MS-PS2-5) ***LEAP Practice Test Standalone Items*:** • 37 (6-MS-PS2-5) • 35 (6-MS-PS3-2) ***LEAP Assessment Guide Items:*** • Electric and Magnetic Forces (6-MS-PS2-3) ***LEAP Science Released Items:*** • Compass Needle (6-MS-PS2-3)	***LDOE Formative Assessment Sets* (Password- Educate2020):** • N/A ***LEAP Practice Test Sets*:** • Item Set: Changes in the Earth's Magnetic Field (6-MS-PS2-3, 6-MS-PS2-5) • Task Set: Marbles (6-MS-PS3-1, 6-MS-PS3-2) ***LEAP Assessment Guide Sets:*** • N/A ***LEAP Science Released Items:*** • N/A
	***LDOE Formative Assessment Items* (Password- Educate2020):** • Moons, Midnight_Sun (6-MS-ESS1-1)	***LDOE Formative Assessment Sets* (Password- Educate2020):** • N/A

Unit	Discrete Items	Sets
Earth in Space OpenSciEd 8.4	• Spitzer (6-MS-ESS1-2) • Dwarf Planets (6-MS-ESS1-3) • Gr6 Moons (6-MS-PS2-4) ***LEAP Practice Test Standalone Items*:** • 23 and 32 (6-MS-ESS1-1) • 38 (6-MS-ESS1-2) • 39 (6-MS-PS2-4) ***LEAP Assessment Guide Items:*** • Gravitational Force (6-MS-PS2-4) ***LEAP Science Released Items:*** • Eclipses (6-MS-ESS1-1)	***LEAP Practice Test Sets*:** • Item Set: Asteroids in the Solar System (6-MS-ESS1-2, 6-MS-ESS1-3) ***LEAP Assessment Guide Sets:*** • Item Set: Eclipses (6-MS-ESS1-1, 6-MS-ESS1-2) ***LEAP Science Released Items:*** • Item Set: Solar System Properties (6-MS-ESS1-3)
Cells and Systems OpenSciEd 6.6	***LDOE Formative Assessment Items* (Password- Educate2020):** • Gr6 Minerals (6-MS-LS1-1) • Slugs and Chloroplasts, Plant Cells (6-MS-LS1-2) ***LEAP Practice Test Standalone Items*:** • 34 (6-MS-LS1-1) • 21 (6-MS-LS1-2) ***LEAP Assessment Guide Items:*** • N/A ***LEAP Science Released Items:*** • N/A	***LDOE Formative Assessment Sets* (Password- Educate2020):** • N/A ***LEAP Practice Test Sets*:** • Item Set: Organelles (6-MS-LS1-1, 6-MS-LS1-2) ***LEAP Assessment Guide Sets:*** • N/A ***LEAP Science Released Items:*** • N/A