LOUISIANA DEPARTMENT OF EDUCATION

Office of Teaching and Learning

Science Walk-Through Tool

Purpose:

This tool is intended to support science leaders in collecting evidence and providing feedback on science instruction during classroom walkthroughs and informal observations. Adapted from the Instruction Domain of the Louisiana Educator Rubric (LER), it reflects instructional practices associated with high-quality science teaching and learning.

The indicators included in this tool identify key practices that support students in making sense of scientific phenomena and engaging in grade-level science learning. Each indicator contains science-specific look-fors to help leaders identify strengths and opportunities for growth. The examples provided are not exhaustive, and leaders should use their professional judgment and knowledge of the lesson, unit, and curriculum when collecting evidence. Indicators included are Standards and Objectives, Presenting Instructional Content, Lesson Structure and Pacing, Activities and Materials, Teacher Content Knowledge, Questioning, and Thinking & Problem-Solving.

Not all indicators will be observable during a single classroom visit. Observers are encouraged to focus on one or two indicators aligned to the purpose of the walkthrough. An indicator explanation guide and glossary are included at the end of this document to support understanding of science-specific terminology and instructional practices.

How to Use This Tool:

This tool may be used by school leaders, instructional coaches, and district personnel during classroom walkthroughs, informal observations, collaborative learning visits, and coaching cycles. Observers should collect objective evidence aligned with the selected indicator(s) and use that evidence to identify strengths, trends, and potential next steps for teacher support. Evidence may include teacher actions, student actions, classroom artifacts, instructional materials, and examples of student thinking.

The tool is intended to support professional learning and instructional improvement. Observers are encouraged to discuss collected evidence through coaching conversations, professional learning communities, and collaborative planning opportunities.

Printing Considerations:

For classroom use, observers may print only the Observation Tool pages. The LER Indicators in the Science Classroom and Glossary are intended as additional resources and may be accessed digitally as needed.

Teacher ____________________ Grade ______ Date/Time _____________ School/System______________________________ Unit/Lesson:_______________________

Indicator	Descriptor	Examples of Observable Evidence	Evidence of Indicator	Notes
Standards and Objectives (SO)	Investigation question and its connection to student work expectations are ● explicitly communicated; and ● understood and can be expressed by students.	● Students are figuring out something observable and puzzling (phenomena). ● The lesson question connects to the anchoring phenomena. ● Students reference phenomena regularly. ● Students make connections between phenomena and previous learning or life experiences.	☐ Evidence ☐ Partial ☐ No Evidence	
	Suggested Coaching Questions: ● What question are students investigating about the phenomena in this lesson? ● How will students make connections between previous learning and life experiences and the lesson's objective? ● How will students make connections between the investigation question and the anchoring phenomenon?			
Presenting Instructional Content (PIC)	The presentation of science content includes ● use of phenomena, data sets, models, and investigations; ● explicit modeling of how scientists think, reason, and revise ideas; ● visual aids and scaffolds that support students in engaging in science and engineering practices; ● authentic scientific sources and evidence; and ● content-specific vocabulary in context.	● Students reference visuals, examples, and models via High-Quality Instructional Materials (HQIM) and a science wall. ● Students are engaged in the work of scientists* (investigating, sensemaking, critiquing). ● Student thinking is made public (chart/board/share out).	☐ Evidence ☐ Partial ☐ No Evidence	
	Suggested Coaching Questions: ● What teacher moves are crucial to supporting sensemaking in this lesson? ● How will you leverage the science and engineering practices and/or crosscutting concepts in this lesson?			
Lesson Structure and Pacing (LS)	The lesson's structure is ● aligned with the lesson design and intended instructional time per lesson component; ● based on the intended structure and focus of all lesson components; ● organized to meet students' needs, with time for reflection to ensure student understanding; and ● grade-appropriate, adjusted for rigor of content and individual student learning expectations.	● Students have opportunities to develop, discuss, and revise models throughout the lesson. ● Students understand and engage in established classroom routines. ● Lesson activities are coherent and aligned to the focus of the learning. ● Students have opportunities to make their thinking public, ask questions, and build on one another's ideas. ● Students spend the majority of instructional time actively engaging in sensemaking rather than passively receiving information. ● Students are aware of time expectations and transitions during the lesson.	☐ Evidence ☐ Partial ☐ No Evidence	

<table>
<tr>
<td></td>
<td colspan="4">Suggested Coaching Questions:
How did you determine the pacing of each part of the lesson to ensure students meet the goal (purpose) of the lesson?
How does the structure of this lesson support students in making sense of the science ideas?
How will students have opportunities to reflect on their learning orally or in writing?</td>
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<tr>
<td rowspan="2">Activities and Materials (ACT)</td>
<td>Activities and materials
utilize the system-designated HQIM;
support mastery of the lesson objectives and content standards;
provide time for student-student interaction; and
include opportunities for student ownership of learning.</td>
<td>Students use high-quality materials (i.e., curriculum slides, workbooks, data).
Students gather or analyze evidence.
Students talk to each other about ideas.
Students have all necessary materials for hands-on activities.
Students reflect on their progress toward mastery of the objective.
Students can articulate how lesson components connect to the lesson objective.
Students are engaged in tasks that facilitate thinking and interaction.
Students learn with and from one another in collaborative group activities.</td>
<td>☐ Evidence
☐ Partial
☐ No Evidence</td>
<td></td>
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<tr>
<td colspan="4">Suggested Coaching Questions:
How do the lesson components (activities and materials) support students in achieving the lesson objective?
How will students use materials to gather or analyze evidence?
How will students interact with one another to discuss ideas and build understanding?
How will students reflect on their progress toward the objective during the activity?</td>
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<tr>
<td rowspan="2">Questioning (QU)</td>
<td>Teacher Questions
stem from HQIM suggestions;
are varied and should include inferential, literal, and evaluative question types;
provide opportunities for all students to think, respond, and contribute; and
lead to student-generated questions, further investigation, and/or self-directed learning.</td>
<td>Students respond to a variety of questions (from designated HQIM and teacher-generated questions).
Students ask questions and generate ideas for further learning during lesson activities.
Students respond authentically to each other’s ideas (agree, disagree, clarify, ask follow-up questions).
Participation is distributed (not always the same voices).
Teachers circulate to listen and probe thinking.
Student responses shape the discussion.</td>
<td>☐ Evidence
☐ Partial
☐ No Evidence</td>
<td></td>
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<tr>
<td colspan="4">Suggested Coaching Questions:
How will your questions guide students in making sense of the phenomenon?
What look-fors are students expected to notice, and how will your questions help surface those ideas?
How will you use HQIM sample questions to support student thinking?
How will your questions help students analyze evidence and explain their reasoning?
How will students have opportunities to generate their own questions about the phenomenon?</td>
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Teacher Content Knowledge (TCK)	Teacher displays • appropriate and accurate content knowledge; • understanding of the [Louisiana Student Standards for Science](); and • application of their adopted or approved curriculum.	• The teacher connects the lesson objective to the anchoring phenomenon. • The teacher accurately explains scientific concepts and addresses competing ideas. • The teacher uses science and engineering practices to support student sensemaking. • The teacher highlights key scientific ideas and connects them to other concepts in the unit. • The teacher supports students in making claims using evidence and reasoning. • The teacher uses HQIM and investigations effectively to support learning. • The teacher highlights crosscutting concepts to help students connect scientific ideas and explain the phenomenon.	☐ Evidence ☐ Partial ☐ No Evidence	
	Suggested Coaching Questions: • What key scientific ideas will students understand in this lesson, and how will you highlight them during instruction? • How does this lesson help students connect the phenomenon to broader scientific concepts in the unit? • What competing ideas might students have about this concept, and how will you address them? • How will you help students apply crosscutting concepts to explain the science ideas in this lesson? • How will you use the HQIM (investigations, models, data) to support student understanding?			
Thinking (TH) and Problem Solving (PS)	Students are actively engaged in multiple types of thinking. Examples include: analytical, practical, creative, and research-based thinking. The teacher and students model metacognitive strategies. Students are provided opportunities to • generate a variety of ideas and alternatives; • analyze problems from multiple perspectives and viewpoints; and • monitor their thinking to ensure they understand what they are learning, are attending to critical information, and are aware of the learning strategies they are using and why. Students engage in activities that reinforce a variety of problem-solving types. Examples include: • Categorization • Drawing conclusions/justifying solutions • Predicting outcomes • Observing and experimenting • Improving solutions • Identifying relevant/irrelevant information • Generating ideas	Students engage in Science and Engineering Practices to make sense of phenomena and solve problems by • analyzing evidence; constructing, critiquing, and revising explanations, models, or solutions; and using evidence and reasoning to support claims; and • identifying patterns, cause-and-effect relationships, and other crosscutting concepts to deepen understanding and refine their thinking.	☐ Evidence ☐ Partial ☐ No Evidence	

	• Creating and designing			
	Suggested Coaching Questions: • How will students use evidence to construct explanations for the phenomenon? • How will students analyze patterns or relationships in the data? • How will students revise their thinking or models as new evidence emerges? • How will students defend or critique ideas using evidence and reasoning? • How will students connect scientific ideas and evidence to explain the phenomenon?			
Additional Focus Indicator for this teacher:			☐ Evidence ☐ Partial ☐ No Evidence	

Reinforcement:

Refinement:

Indicator	LER Indicators in the Science Classroom
Standards and Objectives (SO)	In a science classroom, instruction is anchored in **three-dimensional** state standards, integrating disciplinary core ideas (DCI), science and engineering practices (SEP), and crosscutting concepts (CCC). Lessons provide students with an opportunity to engage in authentic **sensemaking** to incrementally build an explanation of the **anchoring phenomenon**. Lesson-level investigation questions build coherently and guide students toward developing and revising scientific explanations or design solutions. **Performance expectations** are unpacked to ensure **lesson objectives** align with the anchoring phenomenon and the intended scientific understanding and practices. Objectives reflect what students are **figuring out**, not simply what they are doing. It is important that students consistently make **connections** to the anchoring phenomenon throughout the lesson and that the phenomenon is frequently referenced to support formative **checks for understanding** and ongoing sensemaking.
Presenting Instructional Content (PIC)	The **presentation** of science content prioritizes **interactive, authentic student sensemaking** rather than lecture. Students regularly engage in scientific practices such as analyzing data, constructing explanations, planning and conducting investigations, developing and using models, and engaging in argument from evidence. Effective science instruction includes the use of authentic scientific sources and evidence, such as data sets, models, simulations, and scientific texts, to support student understanding. Instruction also incorporates **visual aids and scaffolds** that support students in interpreting information and developing explanations. Teachers **model** scientific thinking to support students in revising ideas, connecting ideas across lessons, and applying crosscutting concepts to deepen understanding. Additionally, teachers consistently emphasize **content-specific scientific vocabulary in context** to support deeper conceptual understanding and communication of scientific ideas.
Lesson Structure and Pacing (LS)	The majority of instructional time allows for students to actively engage with scientific ideas through investigation, discussion, and sensemaking. While brief explanations may be used to clarify ideas, **students are not frontloaded** with information for extended periods of the lesson. In a science classroom, lesson structure and pacing are **purposeful, coherent, and aligned** to the focus of the learning. Instructional time is organized to **support student sensemaking**, ensuring all students have opportunities to analyze evidence, discuss ideas, make their thinking public, and **reflect** on their learning orally or in writing. Teachers establish clear **classroom routines** that support productive discourse, collaboration, and engagement in scientific practices. Effective pacing ensures lesson activities remain aligned to the learning goal, transitions are smooth, and students are aware of **time expectations** throughout the lesson. Teachers understand the purpose of each lesson component, the suggested time provided in the HQIM, and how each component connects to the three dimensions of the standards, ensuring sufficient time is allocated for students to engage in sensemaking.
Activities and Materials (ACT)	High-quality science instruction utilizes system-designated **HQIM**, including investigations, data sets, simulations, texts, and models that **support three-dimensional learning**. Activities are intentionally sequenced to help students build understanding over time rather than engage in isolated experiments. Students regularly engage in collaborative discourse, gather and analyze evidence, construct and revise scientific explanations, and use models and representations to explain phenomena. Materials support student interaction and thinking, ensuring students have access to the resources needed to participate in hands-on investigations and discussions. Students also reflect on their progress toward the lesson objective(s) and make connections between their learning activities and the lesson objective(s).
Questioning (QU)	In a science classroom, the teacher consistently employs a variety of **high-quality questions** to promote scientific reasoning and deepen understanding. Questions, including those **from the HQIM**, guide students in uncovering scientific ideas by prompting them to analyze data, identify patterns, make evidence-based claims, explain cause-and-effect relationships, and revise models or explanations. Questioning reflects **intentional planning** around the key “look-fors” and “listen-fors” of the lesson, helping students focus on the ideas they are expected to investigate and explain. Students are also encouraged to **generate their own investigable questions** around the phenomenon, respond to one another’s ideas, and engage in collaborative discourse that supports curiosity, critical thinking, and scientific sensemaking.
Teacher Content Knowledge (TCK)	In a science classroom, teachers demonstrate a strong and **accurate understanding** of scientific concepts, **three-dimensional state standards**, and the adopted HQIM. Teachers highlight **key scientific ideas** and connect them to the **anchoring phenomenon** and broader concepts within the unit. When needed, teachers utilize curriculum-embedded resources to build their scientific understanding around a topic they are teaching. Instruction reflects how disciplinary core ideas, science and engineering practices, and crosscutting concepts work together to support student sensemaking. Teachers leverage evidence, models, investigations, and scientific explanations to deepen conceptual understanding, address competing ideas, and clarify scientific concepts.
Thinking (TH) **Problem Solving (PS)**	In a science classroom, students engage in thinking and problem-solving as they work to **make sense of scientific phenomena**. Students analyze evidence, identify patterns, develop and revise models, construct explanations, and apply scientific ideas to new situations. These learning experiences require students to reason with evidence, evaluate ideas from multiple perspectives, and refine their thinking as new information becomes available. While the Louisiana Educator Rubric identifies Thinking and Problem-Solving as separate indicators, they are closely **interconnected** in science instruction. Phenomena-based science learning requires students to use analytical, practical, and creative thinking to investigate questions and solve scientific problems. For this reason, these indicators are combined in this walkthrough tool to emphasize scientific sensemaking, where students actively use evidence, reasoning, and collaboration to develop and refine explanations of the natural world.

Key Term	Definition
Phenomena	An observable event or occurrence that can be explained through science.
Anchoring Phenomena	A meaningful observable event or question that drives student learning and sensemaking throughout a lesson or unit.
Scientific Sensemaking	The process of students actively using evidence, models, existing and emerging scientific ideas, and discussion to develop and refine explanations.
Modeling	The use of diagrams, representations, simulations, or explanations to represent and explain scientific ideas or phenomena.
Three-Dimensional Learning	Instruction that integrates disciplinary core ideas (DCIs), science and engineering practices (SEPs), and crosscutting concepts (CCCs).
Competing Ideas	Different explanations, claims, or understandings students may have about a scientific concept or phenomenon. Formerly referenced as misconceptions.
Listen-fors	Specific evidence of student thinking, reasoning, or understanding that teachers intentionally monitor for during instruction and discussion.
Work of Scientists	The practices scientists use to investigate questions and make sense of the natural world. Examples include: analyzing data, developing models, constructing explanations, engaging in argument from evidence, and revising ideas based on evidence.