DEPARTMENT of EDUCATION
Louisiana Believes

#LATeacherLeaders

TL SUMMIT 2021

MAY 25–27 • 2021 | NEW ORLEANS • LA

Science Instructional Planning:
Unit Launch Deep Dive
Grades K - 12

Session Goals

1. Explore how Unit Unpacking is critical for unit preparation
2. Analyze sample annotated curriculum
3. Explore the Anchoring Phenomenon Routine in the context the Unit Launch
4. Plan supports for addressing unfinished learning and equity in the science classroom

Planning Guide for Science Instruction

Planning Guide for Science Instruction

To assist teachers in planning with high-quality science curriculum, the Department has released a step-by-step Planning Guide for Science Instruction.

This resource includes guiding questions and protocols for each of the following:

- Unit Unpacking
- Unit Launch Deep Dive
- Lesson Set Annotation
- Student Work Analysis

Accessing the Planning Guide

Louisiana Believes Website

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HIGH QUALITY SCIENCE CURRICULUM

File
High Quality Science Curriculum PDF
→ Planning Guide for Science Instruction PDF

Unit Unpacking

Step 1: Unit Unpacking

Planning Guide for Science Instruction

Step 1: Unit Unpacking — **Time Estimate: 60 to 90 minutes**

Question: As students engage with phenomena, how will they use the science and engineering practices, apply the crosscutting concepts, and develop understanding of the disciplinary core ideas?

Purpose: Team members analyze the unit performance expectation(s) to deepen understanding of what students should know and be able to do according to the Louisiana Student Standards for Science (LSSS).

Annotating Science Curriculum

What Does It Mean to Annotate?

- interacting with instructional materials
- showing your thinking while you read and study
- noting questions you need to answer
- marking ideas you want to revisit
- creating exemplar student responses
- identifying places where students may struggle

What Does Annotation Look Like?

- highlighting, underlining, or adding stars to emphasize important ideas
- writing questions or comments in the margins
- bracketing or circling content you want to revisit
- using ??? or !!! to indicate questions or critical ideas
- noting instructional strategies to implement
- indicating accommodations to meet the needs of diverse learners

Step 1: Unit Unpacking

Annotation resources needed for Unit Unpacking:

1. Teacher materials from your high quality science curriculum
   a. Unit Overview - information on standards and three-dimensionality
   b. Storyline - progression of knowledge about the phenomenon
   c. Background Information - additional information about content
2. Learning Progressions - Appendix A in the K-12 Louisiana Student Standards for Science

UNIT OVERVIEW

Why does a lot of hail, rain, or snow fall at some times and not others? ← Anchoring Phenomenon

Part 1

This unit on weather, climate, and water cycling is broken into [four separate lesson sets.] In the first two lesson sets, students explain small-scale storms. In the third and fourth lesson sets, students explain mesoscale weather systems and climate-level patterns of precipitation. Each of these two parts of the unit is grounded in a different anchoring phenomenon.
The unit starts out with anchoring students in the exploration of a series of videos of hailstorms from different locations across the country at different times of the year. The videos show that pieces of ice of different sizes (some very large) are falling out of the sky, sometimes accompanied by rain and wind gusts, all on days when the temperature of the air outside remained above freezing for the entire day. These cases spark questions and ideas for investigations [such as investigating how ice can be falling from the sky on a warm day, how clouds form, why some clouds produce storms with large amounts of precipitation and others don't, and how all that water gets into the air in the first place.] - ways to organize DQB (first 2 sets)
In this first half of the unit, students investigate weather data specific to these events and the temperature profile of the atmosphere above the Earth's surface. They conduct investigations into how sunlight affects the temperature of different surfaces and the air above them, and how this contributes to cloud formation and growth. They work with manipulatives, simulations, and labs to figure out how molecules in different phases change states under different conditions and they conduct investigations into why air moves the way it does as it is heated and cooled.

Part 2

The second half of the unit is anchored in the exploration of a weather report of a winter storm that affected large portions of the midwestern United States. The maps, transcripts, and video that students analyze show them that the storm was forecasted to produce large amounts of snow and ice accumulation in large portions of the northeastern part of the country within the next day. This case sparks questions and ideas for investigations around [trying to figure out what could be causing such a large-scale storm and why it would end up affecting a different part of the country a day later.] - ways to organize DQB (last 2 lesson sets)
In the second half of the unit, students also investigate changes in weather conditions over the entire country over multiple days, as well as forecasts of three other storms that are forecasted to affect other parts of the country. They explore how the interactions of air masses, prevailing winds, proximity to the ocean, ocean currents, and surface elevation profiles work together to influence how much precipitation different regions receive. At the end of the second half of the unit, they apply their understandings to develop an explanation for why South America has a tropical rainforest in one part of the continent and temperate rainforest in another part of the continent, despite having some of the driest places on Earth relatively close by both.

☆ **Focal Disciplinary Core Ideas (DCIs):** ESS2.C, ESS2.D, PS1.A, PS3.A
Focal Science and Engineering Practices (SEPs): Developing and Using Models; Planning and Carrying Out Investigations; Analyzing and Interpreting Data
Focal Crosscutting Concepts (CCCs): Patterns; Cause and Effect; Systems and System Models; Matter and Energy

Full Sample Annotation

Building Toward NGSS Performance Expectations

MS-PS1-4: 7-MS-PS1-4
Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.

MS-ESS2-4: 7-MS-ESS2-4
Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.

MS-ESS2-5: 7-MS-ESS2-5
Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.

MS-ESS2-6: 7-MS-ESS2-6
Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.

Middle School Domain Performance Expectation

Grade Level

Descriptor

Topic Number

Louisiana STUDENT STANDARDS SCIENCE

8-MS-PS1-1

MATTER AND ITS INTERACTIONS

Performance Expectation	Develop models to describe the atomic composition of simple molecules and extended structures.
Clarification Statement	Emphasis is on developing models of molecules that vary in complexity. Examples of extended structures could include minerals such as but not limited to halite ($NaCl$), agate (SiO_2), calcite (CaF_2), or sapphire (Al_2O_3). Examples of molecular-level models could include drawings, 3-D models, or computer representations showing different molecules with different types of atoms.

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
1. Asking questions (for science) and defining problems (for engineering) 2. **Developing and using models:** Modeling in 6–8 builds on K–5 experiences and progresses to developing, using and revising models to describe, test, and predict more abstract phenomena and design systems. • Develop and/or use a model to predict and/or describe phenomena. 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	**STRUCTURE AND PROPERTIES OF MATTER** Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms. (MS.PS1A.a) Solids may be formed from molecules, or they may be extended structures with repeating subunits (e.g., crystals). (MS.PS1A.e)	**SCALE, PROPORTION, AND QUANTITY** Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.

EARTH'S SYSTEMS

Performance Expectation	Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.
Clarification Statement	Emphasis is on the ways water changes its state and location as it moves through the multiple pathways of the hydrologic cycle. Examples of models can be conceptual or physical.

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
1. Asking questions and defining problems 2. **Developing and using models:** Modeling in 6–8 builds on K-5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems. • Develop a model to describe unobservable mechanisms. 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	**THE ROLES OF WATER IN EARTH'S SURFACE PROCESSES:** Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land. (MS.ESS2C.a) Global movements of water and its changes in form are propelled by sunlight and gravity. (MS.ESS2C.c) **LOUISIANA'S NATURAL RESOURCES** Replenishable resources such as groundwater and oxygen are purified by the movement through Earth's cycles. (MS.EVS1A.c)	**ENERGY AND MATTER** Within a natural or designed system, the transfer of energy drives the motion and/or cycling of matter.

It is important to look at each dimension when unpacking a standard so that you can see how each dimension progressively builds over the grade bands.

7-MS-ESS2-4	K-2	3-5	6-8	High School
ESS2.C: The Roles of Water in Earth's Surface Processes	**Grade 2:** LE.ESS2C.a Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form.	**Grade 5:** UE.ESS2C.a Nearly all of Earth's available water is in the ocean. Most freshwater is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere. UE.ESS2C.b Liquid water can become the gas form of water (water vapor) and liquid water can become a solid as ice.	**Grade 7:** MS.ESS2C.a Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land. MS.ESS2C.b The complex patterns of the changes and the movement of water in the atmosphere, determined by winds, landforms, and ocean temperatures and currents, are major determinants of local weather patterns. MS.ESS2C.c Global movements of water and its changes in form are propelled by sunlight and gravity. MS.ESS2C.d	HS.ESS2C.a The abundance of liquid water on Earth's surface and its unique combination of physical and chemical properties are central to the planet's dynamics. These properties include water's exceptional capacity to absorb, store, and release large amounts of energy, transmit sunlight, expand upon freezing, dissolve and transport materials, and lower the viscosities and melting points of rocks.

1. How does student understanding of ESS2C.a grow through the grade bands to 7th grade?
2. What do you notice about MS.ESS2C.c across the grade bands?

Let's Practice

Spend some time unpacking a standard at your grade level using Appendix A from the K-12 Louisiana Student Standards for Science.

What do you notice about how student understanding of each dimension builds across the grade bands?

Louisiana STUDENT STANDARDS SCIENCE

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7-MS-ESS2-5

EARTH'S SYSTEMS

Performance Expectation	Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.
Clarification Statement	Emphasis is on how air masses flow from regions of high pressure to low pressure, causing weather (defined by temperature, pressure, humidity, precipitation, and wind) at a fixed location to change over time, and how sudden changes in weather can result when different air masses collide. Emphasis is on how weather can be predicted within probabilistic ranges. Examples of data can be provided to students (such as weather maps, diagrams, and visualizations) or obtained through laboratory experiments (such as condensation).

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:** Planning and carrying out investigations to answer questions (science) or test solutions (engineering) to problems in 6-8 builds on K-5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or solutions. • Collect data to produce data to serve as the basis for evidence to answer scientific questions or test design solutions under a range of conditions. 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	**THE ROLES OF WATER IN EARTH'S SURFACE PROCESSES:** The complex patterns of the changes and the movement of water in the atmosphere, determined by winds, landforms, and ocean temperatures and currents, are major determinants of local weather patterns. (MS.ESS2C.b) **WEATHER AND CLIMATE** Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local and regional geography, all of which can affect oceanic and atmospheric flow patterns. Because these patterns are so complex, weather can only be predicted probabilistically. (MS.ESS2D.a)	**CAUSE AND EFFECT** Cause and effect relationships may be used to predict phenomena in natural or designed systems.

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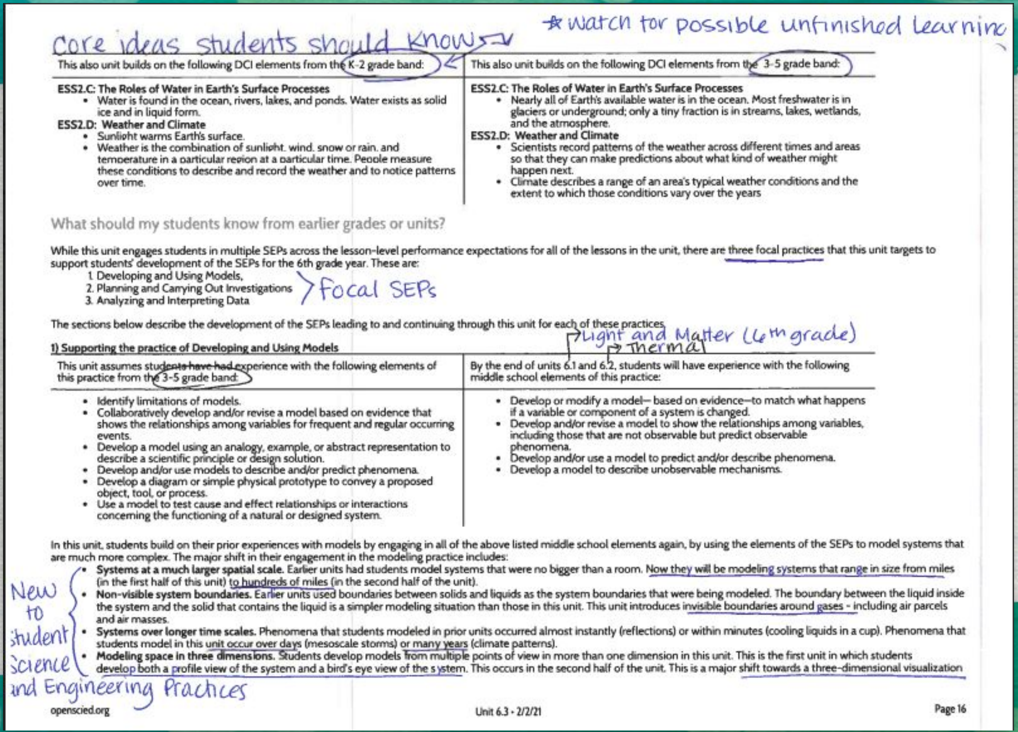
MARCH 2017

When unpacking the unit materials, look out for opportunities to plan for supporting student unfinished learning based on your new understanding of how student learning progresses over the grade bands.



Core ideas students should know

★ watch for possible unfinished learning

This also unit builds on the following DCI elements from the K-2 grade band:	This also unit builds on the following DCI elements from the 3-5 grade band:
ESS2.C: The Roles of Water in Earth's Surface Processes • Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form. **ESS2.D: Weather and Climate** • Sunlight warms Earth's surface. • Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time.	**ESS2.C: The Roles of Water in Earth's Surface Processes** • Nearly all of Earth's available water is in the ocean. Most freshwater is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere. **ESS2.D: Weather and Climate** • Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next. • Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over the years

What should my students know from earlier grades or units?

While this unit engages students in multiple SEPs across the lesson-level performance expectations for all of the lessons in the unit, there are three focal practices that this unit targets to support students' development of the SEPs for the 6th grade year. These are:

1. Developing and Using Models,
2. Planning and Carrying Out Investigations
3. Analyzing and Interpreting Data

Focal SEPs

The sections below describe the development of the SEPs leading to and continuing through this unit for each of these practices.

Light and Matter (6th grade)
Thermal

1) Supporting the practice of Developing and Using Models

This unit assumes students have had experience with the following elements of this practice from the 3-5 grade band:	By the end of units 6.1 and 6.2, students will have experience with the following middle school elements of this practice:
• Identify limitations of models. • Collaboratively develop and/or revise a model based on evidence that shows the relationships among variables for frequent and regular occurring events. • Develop a model using an analogy, example, or abstract representation to describe a scientific principle or design solution. • Develop and/or use models to describe and/or predict phenomena. • Develop a diagram or simple physical prototype to convey a proposed object, tool, or process. • Use a model to test cause and effect relationships or interactions concerning the functioning of a natural or designed system.	• Develop or modify a model— based on evidence—to match what happens if a variable or component of a system is changed. • Develop and/or revise a model to show the relationships among variables, including those that are not observable but predict observable phenomena. • Develop and/or use a model to predict and/or describe phenomena. • Develop a model to describe unobservable mechanisms.

In this unit, students build on their prior experiences with models by engaging in all of the above listed middle school elements again, by using the elements of the SEPs to model systems that are much more complex. The major shift in their engagement in the modeling practice includes:

- **Systems at a much larger spatial scale.** Earlier units had students model systems that were no bigger than a room. Now they will be modeling systems that range in size from miles (in the first half of this unit) to hundreds of miles (in the second half of the unit).
- **Non-visible system boundaries.** Earlier units used boundaries between solids and liquids as the system boundaries that were being modeled. The boundary between the liquid inside the system and the solid that contains the liquid is a simpler modeling situation than those in this unit. This unit introduces invisible boundaries around gases - including air parcels and air masses.
- **Systems over longer time scales.** Phenomena that students modeled in prior units occurred almost instantly (reflections) or within minutes (cooling liquids in a cup). Phenomena that students model in this unit occur over days (mesoscale storms) or many years (climate patterns).
- **Modeling space in three dimensions.** Students develop models from multiple points of view in more than one dimension in this unit. This is the first unit in which students develop both a profile view of the system and a bird's eye view of the system. This occurs in the second half of the unit. This is a major shift towards a three-dimensional visualization

New to student Science and Engineering Practices

openscied.org Unit 6.3 • 2/2/21 Page 16

Unit Launch Deep Dive

Step 2: Unit Launch Deep Dive

Planning Guide for Science Instruction

Step 2: Unit Launch Deep Dive **Time Estimate: 60 minutes**

Question: How will students engage in phenomenon-based instruction?

Purpose: Team members build an understanding of the unit launch experience by exploring the unit overview and the elements of the Anchoring Phenomenon Routine from the student perspective.

- Explore Phenomenon
- Make Sense of Phenomenon
- Identify Related Phenomena
- Develop Questions About the Phenomenon

Step 2: Unit Launch Deep Dive

Resources needed for the Unit Launch Deep Dive:

1. From the teacher materials from your high quality science curriculum
   a. Storyline - progression of knowledge about the phenomenon
   b. Lesson 1 plan - how students first interact with the Anchoring Phenomenon
2. Student-facing phenomenon resources

Unit Launch Deep Dive: Explore Phenomenon

What do you notice?

What do you wonder?

Video 1

Video 2

Step 2: Unit Launch Deep Dive | **Time Estimate: 60 minutes**

Question: How will students engage in phenomenon-based instruction?

Purpose: Team members build an understanding of the unit launch experience by exploring the unit overview and the elements of the Anchoring Phenomenon Routine from the student's perspective.

What activities will students complete during initial and consensus discussions about the phenomenon?

Anchoring Phenomenon Routine Elements	Annotation Discussion Questions
Explore Phenomena	What activities will students complete during initial and consensus discussions about the phenomenon?
	How will the investigations help students develop an understanding of the phenomenon?
	How will you support access to the content for students who have unfinished learning?
Develop Questions About the Phenomena	Develop evidence-based questions students may pose that can be used to navigate future lessons and investigations that advance the storyline.
	How will you use the driving question board from the anchor phenomenon launch throughout the unit of study?

Unit Launch Deep Dive: Explore Phenomenon

ALTERNATE ACTIVITY

To make this type of phenomenon even more locally relevant, you could search the internet for videos of hail in your state or region. It is recommended to only use video that foregrounds the falling of hail rather than the damage or impact after the event. The latter will generate questions that are better raised and addressed in the later OpenSciEd Unit 6.5. If you find a video you want to add, show it after https://youtu.be/Lx4TUg3TD-s and then end with the timelapse video https://youtu.be/wwPnb-1qRtQ .

local connection

Before starting the next video clip, tell students it is a time-lapse video from before, during, and after a hailstorm that produced smaller hail than the other two videos. Explain that this video was recorded on June 10, 2013, in Winnipeg, Manitoba, Canada, and is sped up 60 times, so each second in the video is equal to 1 minute of real time; therefore, though the video is only 99 seconds long, it represents 99 minutes of real time.

Show the third hail video. Play https://youtu.be/wwPnb-1qRtQ . Give students an additional minute to record what they notice and wonder. Have students share these observations with the class, and add them to your public record.
Don't worry about generating a comprehensive list when students report out what they noticed. Here are some anticipated student observations:

- *It looked like big pieces of ice or snow were falling in all the videos, but the size of them looked different in each of the three cases.*
- *When it hit the ground, it bounced really high in the first and second videos. It made noise when it hit things in those videos.*
- *The plants in the area had green leaves (e.g., grass, flowers, trees).*
- *There was wind at some point in all of them. It was very strong in the second one (Arizona), and there was some in the first one (Kansas).*
- *There was rain at one point along with the hail in the second one (Arizona), and there was rain before the hail in the third one (Canada), and it looked like the ground was wet in the first one—maybe from previous rain.*
- *It seemed windy in the second video. And there was a moment in the third video when the tarp on the ground seemed to flap a lot.*
- *It didn't seem to last very long in all three cases.*

"listen fors"
possible student connections/notices

When annotating unit materials, consider what student ideas you need to highlight as "listen fors" and consider how you can make connections to locally-relevant related phenomena.

Step 2: Unit Launch Deep Dive **Time Estimate: 60 minutes**

Question: How will students engage in phenomenon-based instruction?

Purpose: Team members build an understanding of the unit launch experience by exploring the unit overview and the elements of the Anchoring Phenomenon Routine from the student's perspective.

Anchoring Phenomenon Routine Elements	Annotation Discussion Questions
Explore Phenomena	What activities will students complete during initial and consensus discussions about the phenomenon?
	How will the investigations help students develop an understanding of the phenomenon?
Make Sense of Phenomena	Highlight or note relevant data, models, images, and texts—that represent the language and style used and produced by scientists—that students will engage with to generate initial explanations about the anchoring phenomenon.
	Create sample anchor charts (e.g. notice and wonder charts, initial models, etc.) for the unit's launch.
	Identify places in the unit launch where students may struggle and determine appropriate supports.
	study?

Identify places in the unit launch where students may struggle and determine appropriate supports.

Unit Launch Deep Dive:
Make Sense of Phenomenon

can help those struggling to get started

Cue students to [create their initial models by first representing what type of changes they saw happening outside before, during, and after the precipitation event.]

each box = point in time

Emphasize that the handout divides the event into three time points. Say something like, *Use the middle box to show what was happening above and around the place where the precipitation fell* (1) *at the time that it started falling. The box on the left is for showing what was happening above and around the place where the precipitation fell, but an hour beforehand* (2)*. The box to the right is for showing what was happening an hour* (3) *afterward.*

Provide additional guidance. The handout doesn't provide a scale for distance. Help students include their ideas about the scale in their model through prompts such as, *One thing to consider in your model is how big of a space you are trying to represent. So include labels and notes to show the distance between the place where things in the air are happening and the place where the precipitation fell (How high are the clouds? How high did this precipitation fall from?).*✱

Lastly, remind students that even though they are drawing what was happening at different points of time in each box, they can use arrows, symbols, and annotations to connect things between the boxes, to help show how things that happened an hour in the past caused the hail to form and fall when it did.

remind it's ok for this to be hard!

Emphasize that identifying what is causing the observed changes in their models can be the most challenging part, because we need to consider things that may be happening even though we can't see them. Remind students that a combination of written descriptions, labels, and diagrams helps make their thinking visible, both for themselves and for others. Ask them to write down any questions that come to mind as they work. Encourage students to use different-colored writing implements if it is helpful.

While students construct their models, walk around the room and quietly ask probing questions of students who have no written labels or descriptions on their models, to help them represent their thinking more clearly and elaborate upon their ideas.✱

After giving students 8 minutes to do this, ask them to pause their individual work on this part of the model.

what we learn in the next few lessons

an area. [This initial model provides an opportunity to get a sense of students' intuitions about the height of storm clouds. Students are unlikely to indicate that they picture those clouds having started elsewhere and moved from relatively far away (e.g., many miles) over the course of an hour.]

✱ SUPPORTING STUDENTS IN ENGAGING IN DEVELOPING AND USING MODELS

Here are some additional prompts to help students create their initial models or make their ideas more explicit:

- *What did you draw in the air here? Can you label what that is? Can you explain how it got there?*
- *Where did this water come from? Can you label and explain that?*
- *What do these lines or arrows represent? Can you label them?*
- *It looks like you included the Sun in this box. How is it connected to the changes you're showing?*
- *It looks like you're showing something happening in the clouds. Can you describe what you think is happening to cause that?*
- *How far up do you picture this happening? Can you include a description or a scale to show that?*
- *How far away do you picture this happening an hour beforehand? Can you include a description or a scale to show that?*

use if st. need additional support

Consider specific supports already built into your curriculum and how you might support specific students during instruction.

Step 2: Unit Launch Deep Dive | **Time Estimate: 60 minutes**

Question: How will students engage in phenomenon-based instruction?

Purpose: Team members build an understanding of the unit launch experience by exploring the unit overview and the elements of the Anchoring Phenomenon Routine from the student's perspective.

Identify local or culturally relevant phenomena that students may identify during the unit's launch.

Anchoring Phenomenon Routine Elements	Annotation Discussion Questions
Explore Phenomena	What activities will students complete during initial and consensus discussions about the phenomenon?
	Identify places in the unit launch where students may struggle and determine appropriate supports.
Identify Related Phenomena	Identify local or culturally relevant phenomena that students may identify during the unit's launch.
	How might students connect to the identified examples?
	How will you support access to the content for students who have unfinished learning?
Develop Questions About the Phenomena	Develop evidence-based questions students may pose that can be used to navigate future lessons and investigations that advance the storyline.
	How will you use the driving question board from the anchor phenomenon launch throughout the unit of study?

Unit Launch Deep Dive:
Identify Related Phenomena

→ provides access to ALL st.

Start off with the phenomenon everyone experienced—the hail events in the videos—and ask students where it should go. Students should assign it to the first poster (relatively short time). Write "The 3 hail events in the videos" on that poster.

As students share their examples, record them on the corresponding posters according to students' suggestions. Related phenomena that students will likely share as "short" include severe thunderstorms. Related phenomena that students will share as "longer" include things like multi-hour or -day hurricanes, northeasters, blizzards, and drizzle.

create/put on Unit Wall

★ If students aren't sure where an example goes, you could add it between both posters with a question mark or with arrows pointing to both posters to indicate the uncertainty. Alternatively, you could write it on another sheet of chart paper.

With each example shared, ask for a show of hands of students who described a similar event in their science notebooks. Put tally marks showing the number of students next to that event on the poster, and have students put a check mark next to their own similar event if it gets written up on the poster. This will ensure everyone's example is represented on the posters and consolidate the overlapping examples. A sample poster from one class of students is shown here.

builds equity

Related Phenomena

Short	Longer
Hail event (VT) (daytime, dark)	Hurricane (rainy, windy, bad outside) (flooding, force from water, thunder, really strong winds)
rain (rainbow, rainy, sunny)	Thunderstorm (warm, summer, windy, rainy, lot of rain, thunder, lightning, foggy)
Snow & rain (canada)	Snowstorm (a lot of snow over night)
2021 snow (local connection)	2016 Flood - local connection

★ listen for connections and st. assets

★ be prepared for tough emotions/memories

Connect mechanisms across related phenomena. Present slide L. Give students 3 minutes to discuss the question on this slide with a partner.

Record additional individual questions. Make sure extra markers and sticky notes are provided. Say, *Let's try to capture any additional questions we have about what is happening in these different precipitation events too, before we form our Driving Question Board.*

Present slide M. Give students at least 3 minutes to generate their questions on sticky notes. To prompt an array of questions, remind students to think carefully about the hail events in the videos in addition to other related phenomena. Encourage students to write more than one question, but only one question per sticky note, and put their initials in pencil on the back of each.

While students write questions, move the Related Phenomena poster to hang next to the Initial Consensus Model poster where all students can see it from a Scientists Circle. These posters together will serve as the space where students can add their questions to build their DQB, and will be referred to as the DQB in subsequent activities and lessons.

Brainstorm a possible list of related phenomena your students might share.

How will you use the Driving Question Board from the anchor phenomenon launch throughout the unit of study?

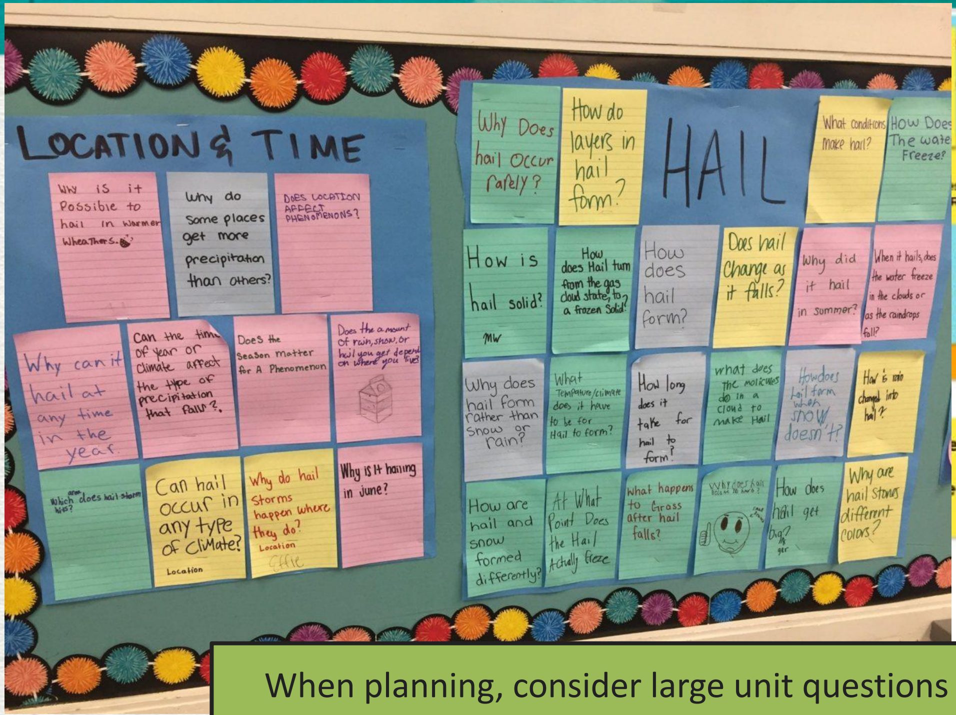
Step 2: Unit Launch Deep Dive — **Time Estimate: 60 minutes**

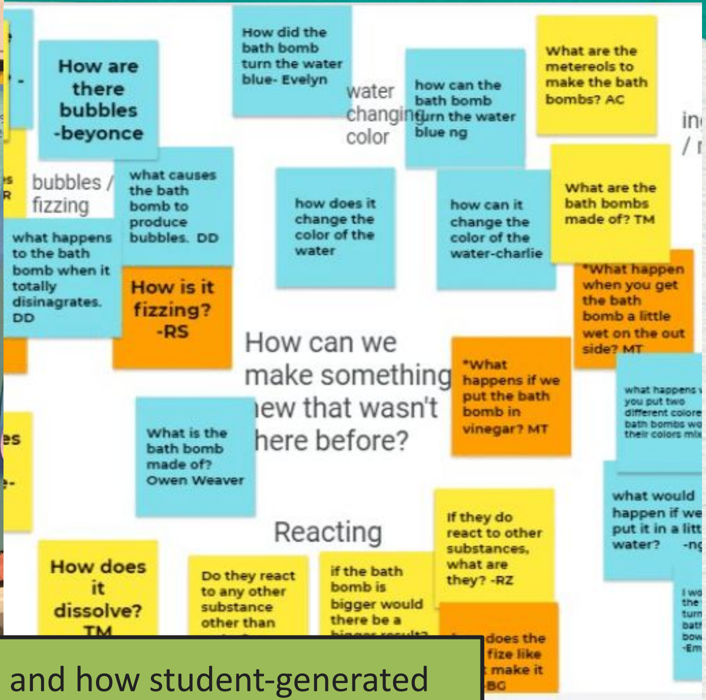
Question: How will students engage in phenomenon-based instruction?

Purpose: Team members build an understanding of the unit launch experience by exploring the unit overview and the elements of the Anchoring Phenomenon Routine from the student's perspective.

Anchoring Phenomenon Routine Elements	Annotation Discussion Questions
Explore Phenomena	What activities will students complete during initial and consensus discussions about the phenomenon?
	Identify places in the unit launch where students may struggle and determine appropriate supports.
Identify Related Phenomena	Identify local or culturally relevant phenomena that students may identify during the unit's launch.
	How might students connect to the identified examples?
	How will you support access to the content for students who have unfinished learning?
Develop Questions About the Phenomena	Develop evidence-based questions students may pose that can be used to navigate future lessons and investigations that advance the storyline.
	How will you use the driving question board from the anchor phenomenon launch throughout the unit of study?

Unit Launch Deep Dive:
Develop Questions About Phenomenon





When planning, consider large unit questions and how student-generated questions may fit into these categories.

For questions, email STEM@la.gov.

Resources

- K-12 Louisiana Student Standards for Science
- sample annotated materials for all identified High Quality Instructional Materials
- OpenSciEd Teacher Handbook*
- OpenSciEd Unit 6.3 Weather, Climate and Water Cycle*

**Examples used can be substituted with materials from other high-quality science instructional materials.*