



Addressing

Unfinished Learning

Practical, proven, content-specific resources for instructional leadership teams

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Introduction

Across the country, school systems are working tirelessly to determine how they can most effectively support students with unfinished learning after more than a year of unprecedented disruptions in schooling.

Last year, we partnered with a number of districts to do the deep work required to answer the question, “What is the best of what we know about supporting unfinished learning in each content area?”



Our approach

In 2020 we kicked off a project to support leaders and teachers in addressing unfinished learning. Drawing on our work over the past five years and the current research base, we worked shoulder to shoulder with several partners to develop and test replicable models for addressing widespread, ubiquitous unfinished learning challenges. Our team documented, refined, and codified effective practices in an effort to share what we learned and scale what worked with educators and those who support them.

We centered our work with leaders and teachers on the following four strategies:

- 1. Center on focus students.** Focus students are those students who need the greatest support to access the content being taught, relative to their classmates. We believe that by centering instruction on the needs of focus students, we will increase academic achievement for all students. This principle is grounded in the research and theory underlying Universal Design for Learning¹ and Targeted Universalism,² which both assert that addressing the needs of a minority ultimately benefits everyone.
- 2. Prioritize content.** Research, from TNTP³ and others, indicates it will be critical that students are given access to grade-level coursework to address unfinished learning and bolster academic achievement. To ensure that students master priority content (i.e., the content students need to learn at a given point in order to progress), educators will need to 1) adjust scopes and sequences to cover as much content as possible and 2) anticipate/respond to unfinished learning from prior years. Educators will need to be aware of what additional support their students need now and when they can defer teaching non-prioritized content (i.e., content that students will ultimately cover in a later grade or where a “just-in-time” support that offers the necessary prerequisite skills/knowledge could be provided at a later time) in favor of dedicating the maximum amount of instructional time to the major work of the current grade.⁴

¹University of Kansas; [An Equity-Based Evolution of Universal Design for Learning: Participatory Design for Intentional Inclusivity](#) (2018)

²Othering & Belonging Institute, University of California, Berkeley; [Targeted Universalism: Policy & Practice](#) (May 2019)

³TNTP; [Learning Acceleration Guide: Planning for Acceleration in the 2020-2021 School Year](#) (April 2020)

⁴TNTP; [Learning Acceleration Guide: Planning for Acceleration in the 2020-2021 School Year](#) (April 2020)

3. **Utilize data practices.** In any year, it is essential for educators to implement data practices that reveal what supports they need to provide to whom in order to ensure that all students can access grade-level content. However, due to the effects of disrupted schooling, it is more critical than ever that teachers have both a precise understanding of where their students have gaps and—somewhat paradoxically—the ability to minimize time spent on assessment and maximize the direct instructional time students need to fill in those gaps. It will be essential to ensure that leaders and teachers understand how to simplify and target assessments so they reveal actionable information that can be used to provide just-in-time supports to students.⁵
4. **Support teacher practice with professional learning.** Teachers need guidance from their school and district leaders on where and how to allocate their time among the broad array of challenges they will face in their classrooms, how to prioritize strategies that will lead to the greatest impact, and how to translate those strategies to everyday practice.⁶

We leveraged rapid cycles of improvement—identifying a challenge using data, planning a short intervention, measuring how well it worked, and adjusting quickly (e.g., using short data cycles to improve student engagement and assignment completion)—which allowed us to adjust our core instruction implementation support based on our measurements of change in leader practice, teacher practice, and student outcomes. These cycles proved invaluable as we worked with partners to serve students who experienced a wide array of schooling scenarios during the 2019–2020 and 2020–2021 school years and who, therefore, had great variance in their learning needs.

We also leveraged our prior work developing [teacher content competencies](#) to help educators understand how to support their students, prioritize content, and respond to short data cycles within their content discipline.

⁵Achievement Network; [3 Principles for Assessments During Instructional Recovery and Beyond](#) (May 2020); The 74 Million; Klompus & Odemwingie; [Time With Students Is More Precious Than Ever. A Smart Approach to Testing Can Help Educators Make the Most of It](#) (January 2021)

⁶Achievement Network; [Aligning professional learning to instructional priorities](#); TNTP; [Planning for Acceleration in the 2020-2021 School Year](#) (April 2020); EdWeek; [Leader to Learn From: How This District Leader Transformed Teacher PD](#) (February 2021)



Lessons learned

Lesson one

Tier 1 instruction is the primary lever for accelerating learning outcomes.

The most impactful decisions in teaching and learning—particularly the ones that matter most when it comes to unfinished learning—live in the thousands of real-time decisions teachers make every day. Moving forward into grade-level content in Tier 1 instruction—the whole-class instruction students receive—presents the best opportunity to accelerate learning. Teachers need extra planning support to make Tier 1 instruction as strong as possible in the core academic subjects, and this support must be contextualized within their subject, grade level, and even curriculum.

Lesson two

Addressing unfinished learning while moving forward requires teachers to spend *more* time on priority units, not less.

In our work with partners we found that, in most cases, the moves that supported more learning required teachers to slow down. Teachers need to be aware of where their students need additional support and when they can defer teaching non-prioritized content (i.e., content that students will cover in a later grade or where a “just-in-time” support that offers the necessary prerequisite skills/knowledge could be provided at a later time) in favor of dedicating the maximum amount of instructional time to the major work of the grade.⁷

Lesson three

The way to address unfinished learning is content-specific—in other words, it depends on what you are trying to teach.

Helping children learn how to decode words is not the same as helping them learn what happens to a cold can of soda on a hot day. Searching for a single approach or headline skips over context that should shape instructional decisions. Effectively supporting unfinished learning through Tier 1 instruction requires a nuanced understanding of both priority content as well as how children learn that particular content. Educators must understand the prerequisite skills and knowledge students need to be able to access grade-level content, and what skills and knowledge can be taught through, or alongside, grade-level content.

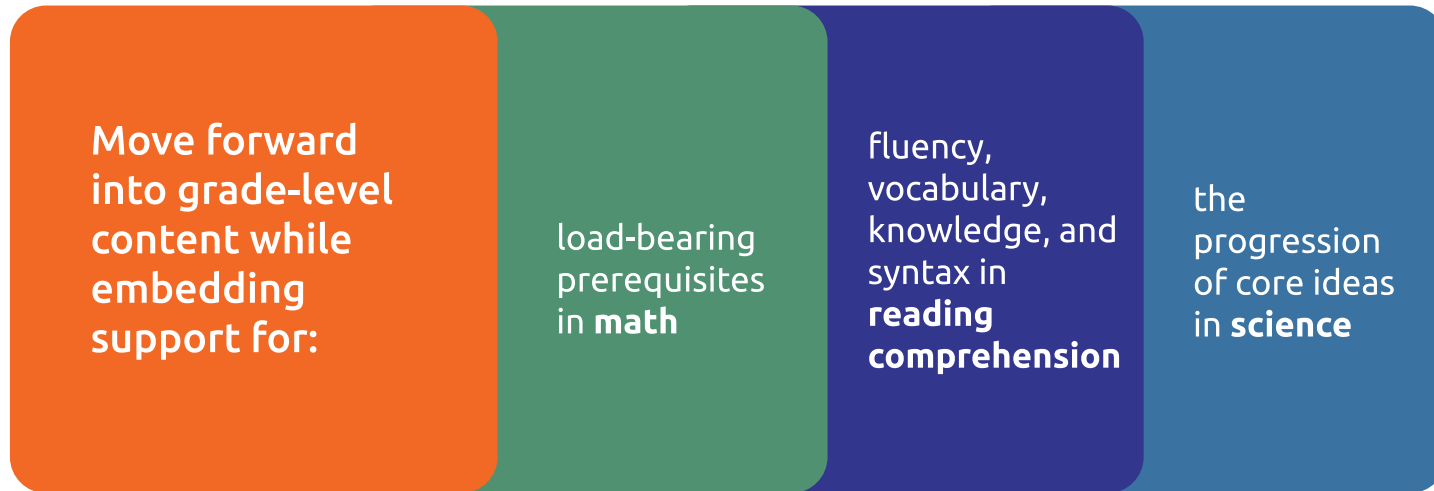
Lesson four


Leaders need support both helping teachers develop new skills and setting up a strong academic strategy.

Teachers need strategic and explicit guidance and support from leadership teams on how to allocate their time among the broad array of challenges they will face, how to prioritize strategies that will lead to the greatest impact, and how to translate those strategies to everyday practice.⁸ Leaders will need to articulate and implement a coherent, targeted approach to assessment; offer clear guidance about priority content; and provide the professional learning teachers need to meet the challenges of this moment.

For deeper support, get in touch to learn about our [unfinished learning virtual series](#) and our [shoulder-to-shoulder partnerships](#).

Overview of content-specific guidelines





Effectively supporting unfinished learning through Tier 1 instruction requires a nuanced understanding of both priority content as well as how children learn that particular content. Educators must understand the prerequisite skills and knowledge students need to be able to access grade-level content as well as what skills and knowledge can be taught through, or alongside, grade-level content.

We are currently engaged in on-the-ground research and creating resources for foundational reading skills, and we will share our learnings as they emerge. For now, you can review our initial findings [here](#) or watch this [video walkthrough](#). If you are interested in partnering with us on our foundational reading work, [please get in touch](#).

Prioritizing content

Math

Year

- Ensure teachers have a strong understanding of the arc of the year.
- Prioritize content to create extra time for addressing unfinished learning.
- Identify the number of available flex days, if any.

Unit

- Understand the story of the unit/module.
- Examine the standards in the unit to determine if any lessons can be omitted or combined, using curriculum guidance about pacing.
- Understand the load-bearing walls for the grade-level standards in that unit/module.
- Use pre-unit assessment questions aligned to those load-bearing standards to understand where students will need support.

Reading Comprehension

- Determine how long each unit/module is designed to last.
- Determine whether Unit/Module 1 is required to establish the learning routines and procedures necessary in future units/modules.
- Consider the knowledge story for each unit/module.
- Determine whether future grade levels depend on the knowledge built in a particular unit/module in this grade level.
- Prioritize units/modules with scientific or historical text if there is no other dedicated time during the day for students to engage in this learning.
- Avoid eliminating units/modules that center argumentative writing.
- Include the units/modules with texts that maintain diversity across grade level and grade band; apply an equity lens; are rich in scientific, historical, and literary content and vocabulary; provide the necessary background knowledge for current or future learning; and/or include a standard only addressed once during the school year.

Science

- Schedule daily science instructional time for K–12 students.
- Audit and adjust curricular materials to ensure materials support students in figuring out observable, relevant phenomena rather than learning about science topics; the science ideas support students' explanation of the phenomena; and the incorporated phenomena connect to students' personal experiences, are culturally and/or community relevant, and are considered through an equity lens.
- Schedule professional learning focused on the qualities of three-dimensional science instruction rooted in high-quality materials.

Unit/module internalization

Math

- Understand the story of the unit/module.
- Develop the concept(s) and the visual model/ representation(s) of the unit/module.
- Determine the problem-solving strategies used in the unit/module.
- Return to the assessments to develop the visual model/ representation(s) and strategies that students may use for each assessment question.

Unfinished learning considerations

- Review student work from the pre-assessment. This reveals which load-bearing concepts and strategies students know and which will need support in order for students to be able to access the grade-level content.
- If students need support to access the grade-level content, plan to use the newly created time to support access via a bridge task, a mini lesson, or a full lesson.
- Understand the problem-solving strategies used within the unit/module.

Reading Comprehension

- Orient to the unit/module at a high level.
- Orient to the assessments at a high level.
- Select an anchor text and engage in a text chat with your colleagues.
- Determine which pedagogical strategies are needed to promote access to grade-level learning (e.g., background knowledge and fluency).

Unfinished learning considerations

- Determine the knowledge necessary to build in advance of or while reading a complex text (i.e., knowledge that the author assumes the reader already has and/or knowledge that is not provided in the text or in other texts in a unit/module but is critical to helping a reader unlock meaning).
- Gather data to determine what prior knowledge students bring to the unit/module.
- Identify which strategies to leverage in advance of or while reading a complex text that help students build necessary background knowledge not learned through other texts in the lesson or unit/module based on background knowledge, vocabulary, syntax, and fluency.

Science

- Identify the anchoring phenomena of the unit.
- Determine the progression of science ideas that support students in explaining the phenomena.
- Make phenomena observable.
- Elicit student thinking to determine current understanding.
- Integrate tasks within units to address any gaps in understanding.
- Prioritize tasks where students engage in scientific practice.

Unfinished learning considerations

- Identify the prerequisite science ideas students need to access the grade-level content introduced in the unit.
- Listen for those ideas as students make predictions and initial explanations of the anchoring phenomena.
- When tasks need to be integrated to address foundational ideas, strive to maintain the coherence of the unit by supporting students in making explicit connections between the science ideas learned and the anchoring phenomena.

Lesson preparation

Math

- Articulate the goal of the lesson.
- Do the work of the lesson and assessments.
- Determine the learning steps to build toward the learning goal.
- Determine the scaffolding needed to promote access to grade-level learning.

Unfinished learning considerations

- Leverage pre-unit assessment data to plan how to use the allotted extra time to support unfinished learning.

Reading Comprehension

- Articulate the goal of the lesson.
- Do the work of the lesson and assessments.
- Determine the learning steps to build toward the learning goal.
- Determine the scaffolding needed to promote access to grade-level learning (e.g., vocabulary and syntax).

Unfinished learning considerations

- Determine which words and phrases from the text are worthy of instructional attention.
- Identify which strategies to leverage to help students increase vocabulary knowledge to access grade-level text.
- Determine which, if any, sentences from the text have syntax worthy of instructional attention.
- Identify which strategies to leverage to help students untangle the syntax on complex text.

Science

- Identify the investigative phenomena of the lesson.
- Summarize the key science idea(s) students will learn.
- Determine how activities support understanding of key science idea(s).
- Determine the instructional strategies that support student engagement in scientific practice and reasoning.
- Identify formal and informal opportunities to assess student progress toward key science ideas.

Unfinished learning considerations

- Consider and attend to barriers to access, such as unfamiliar technical scientific vocabulary or lack of experience with a specific scientific practice.
- Identify strategies to support students in making sense of evidence gathered during integrated tasks and connect that learning back to the lesson's learning goal.
- Use student discussions, questions, explanations, and/or models throughout the lesson to determine whether students need additional support around foundational prerequisite ideas.

Math





In mathematics, unfinished learning is better supported when embedded within the relevant grade-level units.

Too often math is treated like a linear sequence of learning or a checklist of skills. Our [conversations with math experts and practitioners](#) led us to think about teaching math like helping students build a house: Some walls are load-bearing and need to be strong before moving up a level; other walls can be useful for connections but should not be considered prerequisites.

Grounding principles

We know . . .

A deep exploration of core content is necessary for building students' conceptual understanding.

Conceptual understanding is more beneficial to students than “tricks” for answer-getting.

Coherence is essential, year to year and lesson to lesson.

All students have the ability to access grade-level material.

So we will . . .

Adjust scope and sequence for each grade to ensure time to access prioritized grade-level content.

Prioritize conceptual development tasks within lessons.

Prioritize collaborative unit study to build teachers' content knowledge and understanding of coherence.

Collect data to inform instructional practices that will provide the bridge students need to address unfinished learning.

Guidelines

Actions

Planning stage: Prioritizing content

Year-long guidance

- Understand the story of the year.
- Identify where priority content lives in the story.
- Make more time in the units where the priority content is the heaviest.

Unit guidance

- Understand the story of the unit/module.
- Identify the load-bearing walls for the key work of the unit.
- Identify pre-assessment items.

Resources

- [Grounding principles and criteria for success](#)
- [Prioritizing math content](#)
- [Priority content in practice: 4th-grade math](#)
 - A [video walkthrough](#) of our 4th-grade example
 - The [slides](#) we used in our walkthrough
- [High-impact strategies for assessment](#)
- Student Achievement Partners' [priority content guidance](#)
- ANet's [Important Prerequisite Math Standards](#)
- Achieve the Core's [Coherence Map](#)

Planning stage: Unit/module

- Understand the story of the unit/module.
- Develop the concept(s) and the visual model/ representation(s) of the unit/module.
- Determine the problem-solving strategies used in the unit/module.
- Return to the assessments to develop the visual model/ representation(s) and strategies that students may use for each assessment question.

Unfinished learning considerations

- Review student work from the pre-assessment. This reveals which load-bearing concepts and strategies students know and which will need support in order for students to be able to access the grade-level content.
- If students need support to access the grade-level content, plan to use the newly created time to support access via a bridge task, a mini lesson, or a full lesson.
- Understand the problem solving strategies used within the unit/module.

- [Unit internalization guidance and worksheet](#)
- [PLC agenda template](#)

Planning stage: Lesson

- Articulate the goal of the lesson.
- Do the math of the lesson and formative assessments.
- Determine the learning steps to build toward the learning goal.
- Determine the scaffolding needed to promote access to grade-level learning.

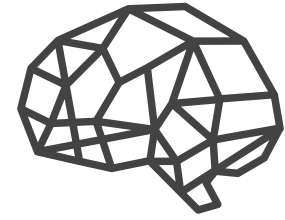
Unfinished learning considerations

- Leverage pre-unit assessment data to plan how to use the allotted extra time to support unfinished learning.

- [Lesson preparation guidance and worksheet](#)



Reading Comprehension



Unfinished learning in reading comprehension is best supported when embedded within complex, grade-level text.

Building comprehension flows from practice and experience working with grade-level complex text. Comprehension skills alone will not build strength in comprehension; to get better at independently comprehending complex texts, students need to engage with complex texts with support. To address unfinished learning in comprehension, teachers will need to know the text and their students, and they will need to make strategic decisions about how to use their time.

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Within a given text, teachers will need to identify the demands and features of the text that will need support. In particular, they need to attend to support for knowledge, vocabulary, syntax, and fluency.

- Reading does not flow from skill alone; **background knowledge** matters to our ability to understand what we are reading. The famous [baseball study](#) points to the impact.⁹
- **Vocabulary** is critical to reading comprehension. According to [research](#), knowledge of individual word meanings accounts for as much as 50–60% of the variance in reading comprehension.¹⁰
- Readers need to be ready to make a series of mental moves when they encounter a sentence they do not understand. Skilled readers make those moves by knowing how to navigate **syntax**, essentially the grammar of language.
- The most frequent performance breakdowns for students struggling with reading generally stem from inadequate practice with foundational reading or scarce opportunities to gain **fluency** with grade-level texts, both relatively straightforward to reinforce.¹¹

High-quality instructional materials will support these choices but teachers will need opportunities, especially before each unit, to do thoughtful planning to identify key moments, as well as a wide range of data (including observation of conversation, written thoughts, and understanding of oral reading fluency) to isolate the key support needs. To provide these supports, teachers will need to slow down instruction, likely covering fewer units in greater depth.

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⁹ Leslie, Lauren & Recht, Donna R. Donna R., "Effect of Prior Knowledge on Good and Poor Readers' Memory of Text." *Journal of Educational Psychology* 80(1):16-20 (1988, March).

¹⁰ Progress in the General Curriculum Statewide Network, "[Literacy Strategies for Students with Disabilities](#)." ¹¹ Wexler, J., Vaughn, S., Edmonds, M., & Reutebuch, C. K., "A synthesis of fluency interventions for secondary struggling readers." US National Library of Medicine National Institutes of Health (2008, June).

Grounding principles

We know . . .

Students need more time on texts that have more complex features.

Students need to dive deeply into a text as opposed to trying to “cover” it all.

The knowledge story must remain intact because language comprehension cannot be taught separately from content.

Text complexity should increase as the year progresses according to the guidelines provided by the standards.

Remediating or going backward will not serve our students well.

So we will . . .

Adjust pacing guides to ensure time to engage in additional fluency, vocabulary, and syntax work, and the background knowledge building necessary to access these complex texts.

Prioritize units/modules to create space in the pacing guide for students to do this work.

Make strategic decisions within and across grade levels when prioritizing units/modules.

Ensure that the sequence of units/modules over the course of the year results in students being able to access texts moving toward the higher end of the grade-level band.

Emphasize what students *can* do rather than what they can't do.

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Guidelines

Actions

Planning stage: Prioritizing content

- Determine how long each unit/module is designed to last.
- Determine whether Unit/Module 1 is required to establish the learning routines and procedures necessary in future units/modules.
- Consider the knowledge story for each unit/module. Reading comprehension can not be taught separately from content.
- Determine whether future grade levels depend on the knowledge built in a particular unit/module in this grade level.
- Prioritize units/modules with scientific or historical text if there is no other dedicated time during the day for students to engage in this learning.
- Identify the units/modules students are particularly invested in.

Resources

- [Grounding principles and criteria for success](#)
- [Prioritizing content in reading comprehension](#)
- [Priority content in practice: 10th-grade ELA](#)
- [High-impact strategies for assessment](#)
- [Addressing Unfinished Learning After COVID-19 School Closures](#)
- [How the #DisruptTexts Movement Can Help English Teachers Be More Inclusive](#)
- TNTP's [Learning Acceleration Guide](#)
- Student Achievement Partners' [Reading as Liberation—An Examination of the Research Base](#)

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- Avoid eliminating units/modules that center argumentative writing.
- Include the units/modules with texts that:
 - maintain diversity across grade level and grade band, particularly ones that center the voices of BIPOC (genres, authors, subjects);
 - apply an equity lens;
 - are rich in scientific, historical, and literary content and vocabulary;
 - provide the necessary background knowledge for current or future learning; and/or
 - include a standard only addressed once during the school year (e.g., if students only read one play during the year, keep the play).

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Planning stage: Unit/module

- Orient to the unit/module at a high level.
- Orient to the assessments at a high level.
- Select an anchor text and engage in a text chat with your colleagues.
- Determine which pedagogical strategies are needed to promote access to grade-level learning.

Unfinished learning considerations

- Determine the knowledge necessary to build in advance of or while reading a complex text (i.e., knowledge that the author assumes the reader already has and/or knowledge that is not provided in the text or in other texts in a unit/module but is critical to helping a reader unlock meaning).
- Gather data to determine what prior knowledge students bring to the unit/module.
- Identify which strategies to leverage in advance of or while reading a complex text that help students build necessary background knowledge not learned through other texts in the lesson or unit/module based on background knowledge, vocabulary, syntax, and fluency.

- [Unit/module internalization guidance and worksheet](#)
- [Background knowledge guidance](#)
- [Fluency guidance](#)

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Planning stage: Lesson

- Articulate the goal of the lesson.
- Do the work of the lesson and assessments.
- Determine the learning steps to build toward the learning goal.
- Determine the scaffolding needed to promote access to grade-level learning.

Unfinished learning considerations

- Determine which words and phrases from the text are worthy of instructional attention.
- Identify which strategies to leverage to help students increase vocabulary knowledge to access grade-level text.
- Determine which, if any, sentences from the text have syntax worthy of instructional attention.
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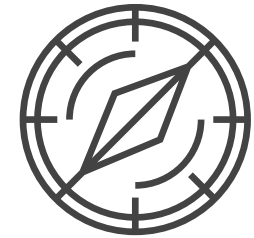
- [Lesson preparation guidance and worksheet](#)
- [Vocabulary guidance](#)
- [Syntax guidance](#)

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Science

Science is all about discovering and pursuing unfinished learning.



Great science instruction and scientific thinking anchors to questions, not infographics; it explores the phenomena of our world and empowers students to ask and answer new questions. Instead of being told “this is how the water cycle works,” great science instruction helps students construct their own understanding of how the water cycle works by engaging in the phenomena of our world—for example, a hail storm or a hurricane or the condensation on a cold can of soda on a hot day. It starts with questions like, “What is going on there? What do I know that can help me explain it? What do I need to know more about and how do I find that out?”; and it ends with students exploring the evidence from different interactions in order to construct a model that explains the answer.

The progression of disciplinary core ideas in science deepens over time, but engaging in science does not have the same kind of load-bearing walls as mathematics—missing the earthquake unit does not prevent a student from launching into the digestion unit. However, depending on the design of the unit, teachers may need to reinforce some core ideas so that students can engage in key activities. Across topics, engaging in authentic scientific thinking is a muscle that develops with practice. Students will come into a unit with a range of strength in this scientific thinking, and teachers need to be ready to help students find both the questions *and* the path to the answer.

When we understand this vision of phenomena-driven science instruction, it is easy to see that the way to address unfinished learning in science is simply to teach science and teach it well.

Grounding principles

We know . . .

Effective science instruction requires consistent, dedicated instructional time.

Authentic connections with content that emphasize personal experience and/or community relevance are important.

Science and engineering practices (SEPs) and crosscutting concepts (CCCs) are just as important to the content as the disciplinary core ideas (three-dimensionality).

Standards should be prioritized in service of coherence and curricular story lines (phenomena-based instruction).

So we will . . .

Ensure K–8 students get daily instructional time dedicated to science.

Prioritize anchoring and investigating phenomena that are culturally relevant, connected to student experience, and applicable to their lives.

Engage in three-dimensional instruction that requires students to engage in the SEPs and CCCs in order to access key science ideas.

Provide professional learning opportunities that highlight the coherent path to deepening student understanding of phenomena over time.

Guidelines

Actions

Planning stage: Prioritizing content

- Schedule daily science instructional time for K–12 students.
- Audit and adjust curricular materials to ensure:
 - materials support students in figuring out observable, relevant phenomena rather than learning about science topics;
 - the science ideas support students' explanation of the phenomena; and
 - the incorporated phenomena connect to students' personal experiences, are culturally and/or community relevant, and are considered through an equity lens.

Resources

- A [video walkthrough](#) of how to prioritize content in middle school life science, and [the slides](#) we used in our walkthrough
- Our set of [high-impact strategies for assessment](#)
- NSTA's list of Next Generation Science Standards by [topic](#) and [disciplinary core idea](#).

Planning stage: Unit/module

- Identify the anchoring phenomena of the unit.
- Determine the progression of science ideas that support students in explaining the phenomena.
- Make phenomena observable.
- Elicit student thinking to determine current understanding.
- Integrate tasks within units to address any gaps in understanding.
- Prioritize tasks where students engage in scientific practice.

Unfinished learning considerations

- Identify the prerequisite science ideas students need to access the grade-level content introduced in the unit.
- Listen for those ideas as students make predictions and initial explanations of the anchoring phenomena.
- When tasks need to be integrated to address foundational ideas, strive to maintain the coherence of the unit by supporting students in making explicit connections between the science ideas learned and the anchoring phenomena.

Planning stage: Lesson

- Identify the investigative phenomena of the lesson.
- Summarize the key science idea(s) students will learn.
- Determine how activities support understanding of key science idea(s).
- Determine the instructional strategies that support student engagement in scientific practice and reasoning.
- Identify formal and informal opportunities to assess student progress toward key science ideas.

Unfinished learning considerations

- Consider and attend to barriers to access, such as unfamiliar technical scientific vocabulary or lack of experience with a specific scientific practice.
- Identify strategies to support students in making sense of evidence gathered during integrated tasks and connect that learning back to the lesson's learning goal.
- Use student discussions, questions, explanations, and/or models throughout the lesson to determine whether students need additional support around foundational prerequisite ideas.

More science resources

- The [Solidify workbook](#) integrates some of the best available science instructional support tools and resources into a practical, self-paced series for science leaders seeking to deepen their understanding of the instructional shifts characterizing excellent science teaching and learning.
- The [Science Classroom Observation Tool](#) provides a set of indicators describing the instructional content, teacher actions, and student outcomes indicative of excellent science teaching and learning. Best used in combination with Solidify.
- [OpenSciEd](#) publishes open-source, research-based instructional materials.
- The [STEM Teaching Tools website](#) includes resources authored and reviewed by teachers and researchers.

