BRIEF

Integrating literacy and science: A powerful partnership for student success

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February 2025

nwea Research

Introduction

When elementary schools integrate literacy and science instruction, they create rich learning environments that allow students to develop an understanding of science ideas while improving their reading, writing, and speaking skills *at the same time*. Neither subject takes a back seat. Literacy instruction supports science and science instruction supports literacy.

By blending literacy and science, schools maximize time and accelerate learning—achieving more than either subject could alone. This is true for all students whether they speak English at home or are multilingual learners.

NWEA® has published a series of briefs detailing how the COVID-19 pandemic impacted learning. Not only did achievement fall in both reading and science, but it has continued to fall without rebounding. Recent NAEP and TIMSS results further suggest that students still require comprehensive supports to recover test score disparities stemming from the pandemic. Students aren't just behind, they're stuck. A fresh approach isn't optional; it's essential.

Given these continued gaps between pre- and post-pandemic performance and the strong research base behind the integration of literacy and science instruction, we argue that school and district leaders can accelerate student learning by supporting integration. In the sections that follow, we outline four key components of effectively integrated literacy and science instruction. For each component, we then provide specific recommendations for education leaders to create system-level supports that enable teachers to implement integration in their classrooms. For detailed classroom-level implementation guidance, see the *Practitioner's guide to integrating literacy and science*.

Key components and recommendations

Our recommendations for school and district leaders are grounded in key components of effective instruction in both literacy and science: **authenticity** (through use of authentic/relevant texts and real-world phenomena); development of **academic vocabulary**; **sustained**, **sequenced and structured content instruction**; and the importance of **meaningful student discourse**. In this section we unpack each component and its associated recommendation for school and district leaders. Since the key components of effective instruction require teachers to shift their instructional practice, we offer recommendations for how school and district leaders can provide teachers with structures, materials, and professional learning (PL) opportunities to support instructional change.[1]

Key component 1: Authenticity

> **Effective integrated literacy and science instruction starts with a real-world puzzle—an everyday phenomenon that sparks curiosity. Through authentic reading, writing, and discussion, students make sense of the science behind it, building the knowledge they need to explain or predict what they observe.**

What does authenticity mean for literacy instruction? In literacy instruction, authentic texts and writing tasks incorporate language that is situated in context and/or originates from a social activity or practice. This connection to the real-world can, in turn, motivate student learning of vocabulary, support the development of cognitive schemas for how words relate to each other, enhance background knowledge, and promote self-expression. In contrast, inauthentic texts and writing tasks lack wider social context and are often presented to students as arbitrary tasks–students see them purely as tasks or questions posed by their teacher, rather than as something relevant to everyday life.

What does authenticity look like in science instruction? "Phenomenon-based instruction"—a term used in state science standards—brings authenticity to the classroom by engaging students with a real-world puzzling phenomenon as a starting place for learning. For example, noticing that some surfaces outside on a sunny day feel hot, while others don't, might launch an early elementary unit on the effect of sunlight on Earth's surface. Students can easily connect to the phenomenon as relevant to their daily experiences, and more than that, students begin to understand that their daily experiences are science in real life. The puzzling phenomenon sparks curiosity and in turn can motivate student learning.

Linking authentic reading and writing activities with phenomenon-based science instruction can be a powerful combination to support student learning in literacy and science. Sensemaking in science is dynamic. It is collaborative and it involves doing (e.g., analyzing data, observing, testing, proposing claims, and supporting claims with evidence). All of this "doing" leads to learning the language and vocabulary of science and improving literacy in general. As students engage in sensemaking, they are motivated to learn about and explain the puzzling phenomenon they are investigating.

Recommendations for school and district leaders to support authenticity in integrated literacy and science classrooms:

- Build time in master schedules that allow for integration of literacy and science instruction.
- Encourage the acquisition and use of science written materials that emphasize or support

1 We recommend that district and school leaders adhere to several key features of effective PL to support positive impacts on teacher outcomes. Intensity and duration of PL are particularly important.

phenomenon-based instruction and engagement in authentic reading, writing, and science activity.

- Collaborate with school literacy and science teachers and school librarians to ensure students have access to authentic, relevant, and grade-appropriate trade books or journals that align with science ideas being taught.
- Provide teachers with instructional models and PL that is tightly aligned with classroom instructional plans. Teachers should get a sense of what their integrated science and literacy units might look like and feel like in action.

Key component 2: Rich academic vocabulary

Effective integrated literacy and science instruction takes advantage of the specialized language of science to enhance reading comprehension and writing across domains. Science texts—whether authentic trade books, informational texts, or student-created journals—expose students to precise and meaningful vocabulary that supports both science learning and broader literacy development.

What does leveraging academic vocabulary mean for literacy instruction? Academic vocabulary is a critical bridge between decoding and comprehension. When students encounter complex, domain-specific words in meaningful contexts, they develop deeper word knowledge, recognize relationships between concepts, and improve their ability to communicate effectively. In contrast, vocabulary instruction that focuses on isolated word lists or decontextualized definitions fails to provide the depth of understanding needed for strong reading and writing skills.

What does leveraging academic vocabulary look like in science instruction? Phenomenon-based instruction immerses students in real-world scientific investigations, creating a natural need for new vocabulary. As students explore puzzling questions, they are motivated to use precise language to describe their observations, analyze data, and explain scientific concepts. For example, in a unit investigating why some surfaces heat up more than others, students may learn and apply words like *absorption* or *reflection*—not through rote memorization but through active exploration and discussion.

Reading and writing in science classrooms provide rich opportunities for reinforcing academic vocabulary. When students read trade books, analyze informational texts, and write about their investigations, they repeatedly encounter and use key terms in meaningful ways. These literacy-rich experiences strengthen both content knowledge and language skills, making science an ideal context for vocabulary development that benefits all areas of learning.

Recommendations for school and district leaders to support engagement with rich academic vocabulary:

- Provide shared PL for literacy and science teachers (or generalists) and reading specialists designed to support integrated vocabulary acquisition and use across content domains. For example, teachers from literacy and science domains might work together in a PL wearing their ‘student hats.’ Their task is to first write in their journals and then share what they noticed about temperature differences on the playground. As they do so, the PL leader draws attention to the vocabulary words that might be new for some students. Teachers revise their journal entries using new vocabulary words and add the words to their glossary at the back of the notebook. After this exercise, they put on their ‘teacher hats’ and reflect on the experience. Which moves by the PL leader (in the role of teacher) helped them acquire and use new vocabulary? What were missed opportunities?

- Create opportunities for collaborative planning time for teachers across domains to apply the lessons learned in PL to the design of integrated instruction that leverages rich academic vocabulary.

Key component 3: Sustained, sequenced, and structured instruction

Integrated literacy and science instruction must be sustained, sequenced, and structured. Even when instructional materials are well-sequenced and structured, literacy and science teachers alike need to ensure students recognize key conceptual connections from lesson to lesson.

Effective science instruction builds over time, with each lesson connecting to the next to help students develop coherent understanding. Instead of memorizing facts in isolation, students develop ideas as part of a larger storyline, using science ideas to explain real-world phenomena. This structured approach not only deepens scientific thinking but also strengthens reading comprehension.

When science instruction builds cumulatively—linking new ideas to prior learning—it strengthens students' scientific thinking, literacy skills, and long-term academic success. The best instruction is coherent from the students' perspective, with each day of instruction building from previous lessons. But ensuring that students know exactly what they figured out today, and what they need to figure out tomorrow to help them explain or predict the phenomenon, takes careful teacher guidance. Journaling can help students identify those takeaways and connections and plan for next steps while also giving them essential, authentic practice with writing and use of science vocabulary. Additionally, sustained exposure to coherent instruction, through a vertically aligned science curriculum that intentionally structures and sequences material, can ensure students learn to develop knowledge-in-context, a key ability that will transfer to novel reading and writing tasks.

Recommendations for school and district leaders to support sustained, sequenced, and structured instruction:

- Ensure teachers have access to high-quality, coherent science and literacy materials that build knowledge over time.
- Provide teachers with PL on how to help students make connections between ideas across lessons and across units. This might include having teachers experience sample lessons wearing a 'student hat,' using journals at the beginning and end of lessons to reflect on key ideas and experiencing the power of an instructor-led summary/discussion at the end of a lesson. Wearing 'teacher hats,' the teachers then reflect on the importance of drawing explicit connections to key lesson take-aways.
- Support teachers with pacing guidance to ensure that any changes to an instructional sequence don't derail instructional coherence.
- District leaders can also support school leaders with their own professional learning opportunities to ensure they share a common vision of coherent science instruction.

Key component 4: Engaging students in scientific discourse

Engaging in scientific discussions—whether planning investigations, making claims, modeling ideas, or debating evidence—deepens students' understanding of science while also building critical literacy skills.

Students need to talk, argue, and explain their thinking—because real learning happens in conversation. Through spoken language, students can engage in scientific reasoning and practice communicating their thought processes to others, while also developing skills in language and literacy. Student discourse in integrated literacy and science courses can enhance inferential thinking skills, which in turn are an important predictor of reading comprehension. Gone must be the days of students sitting quietly at lab tables and completing a cookie-cutter science experiment. Instead, students need to talk about what they're seeing and discuss possible explanations using evidence from data collected or supporting texts. A discourse-rich, integrated learning environment accelerates learning in literacy and science.

For an example of how this could play out in an elementary classroom, students might fan out across a playground to gather information about the apparent temperature of different surfaces in the sunlight and in the shade. Back in the classroom, they might share their observations with the class, discussing their claims about why some surfaces feel hotter or cooler than others.

Engaging students in scientific discourse to support literacy and science learning leverages cognitive and meta-cognitive processes common to both domains, such as asking questions and engaging in the practices of science (including using evidence, making inferences, and connecting ideas or concepts). As a result, scientific discourse can have synergistic effects on vocabulary development, reading comprehension, and science learning.

Recommendations for school and district leaders to support engaging students in scientific discourse:

- Facilitate joint PL for literacy teachers, reading specialists, and science teachers that includes hands-on practice with discussion protocols, questioning techniques, and scaffolds to support student discourse in the classroom.
- Support educational leaders in learning to recognize and coach teachers on effective scientific discourse by providing concrete examples, observation tools, and practice opportunities for identifying meaningful student talk.

Summary

Integration of literacy and science instruction offers a powerful solution for elementary schools seeking to maximize instructional time while accelerating student learning. When implemented effectively, integration creates rich learning environments where students develop scientific understanding while strengthening their reading, writing, and speaking skills. Neither subject takes a back seat—literacy instruction supports science learning and science instruction enhances literacy development.

To support successful integration, school and district leaders should:

- Create dedicated time and space for collaboration between literacy and science teachers
- Provide access to high-quality instructional materials that support phenomenon-based instruction
- Invest in sustained professional learning that helps teachers implement the four key components
- Build systematic supports that enable teachers to plan and deliver integrated instruction

The benefits of this approach extend beyond efficient use of instructional time. Students engage more deeply in both subjects when they see authentic connections between literacy and science. Teachers develop new instructional strategies that enhance learning across domains. And schools create more cohesive learning experiences that better prepare students for future academic success.

The time to act is now. As schools continue working to accelerate student learning, integrated instruction offers a practical, evidence-based approach that maximizes limited resources while delivering powerful results for students.

Acknowledgements

This paper underwent several rounds of internal review to help strengthen our recommendations and guidance. The following people provided generous feedback to this document, and we thank them for their time and effort in helping us improve and refine our guidance.

- Simona Beattie, Communications Director
- Renee Behring, Efficacy Research Director
- Miah Daughtery, Vice President of Academic Advocacy
- Carolyn Frost, Lead Assessment Designer
- Karyn Lewis, Vice President of Research and Policy Partnerships
- Beth Praska, Senior Professional Learning Consultant
- Monica Rodriguez, Senior Content Marketing Manager
- Adam Withycombe, Principal Content Designer

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FEB25 | NWEA_WF2178850a