

Read Like a Scientist

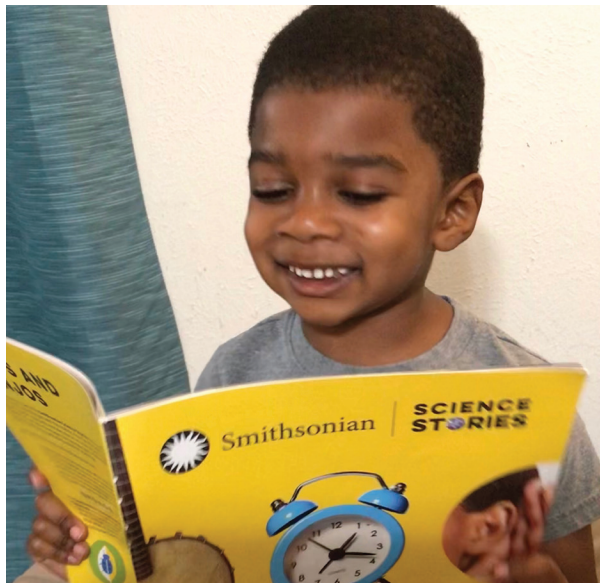
How to Integrate Science with English Language Arts Standards through Informational Text

Ask students to name their favorite school subject. One might say reading. Others might say science, math, or social studies. Notice the separation of these subjects.

Too often, we regard literacy as an end unto itself, especially when other disciplinary content gets marginalized in deference to devotion to literacy teaching and learning (Cervetti et al., 2006). Among these subjects, reading occupies a unique position in that teachers can use it as a vehicle to facilitate learning of other disciplines. Are students reading just because it's reading time, or are they reading to learn? Integrating informational text

with a discipline such as science is beneficial in multiple ways:

- Students can engage in scientific inquiry in multiple forms.
- Teachers have more time for discipline-specific instruction that meets Common Core English Language Arts (ELA) informational text standards.
- All students, regardless of their levels of English proficiency, can learn the grade-appropriate language and content they need to prepare them for college and careers.



Students need opportunities to read as a basis of inquiry.

Students Use Informational Text as a Basis for Inquiry

Scientists and engineers don't just mix solutions, look through a microscope, or build a robot. They have to read texts to gather and interpret information. Scientists learn about and come to understand the natural world through text as well as firsthand investigations (Cervetti et al., 2006). Reading to learn doesn't stop after absorbing what a text says. Scientists read to learn by digging deeper. They use informational text as a basis for inquiry.

Students need opportunities to read as scientists do at the point of use in their learning. For example, if students are learning about Earth's changes, using a text about the Grand Canyon serves two purposes. First, the text gives access

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to something that can't be directly observed in the classroom. Second, the text might tell the reader the facts of how deep the canyon is or what types of rock make up its layers, but equally important is what's not told that leads to inquiry. What did the Grand Canyon look like in the past? What lives or lived there? How do we know? All students,

especially ones who want to be scientists someday, need exposure to informational text to practice reading with a purpose.

Teachers Teach More Science alongside the ELA Standards

A 2018 survey of US elementary school teachers reports that teachers spend 18–27 minutes per day teaching science but nearly 90 minutes teaching ELA (Banilower et al., 2018). Plus, not everyone teaches science every day (see table below). This is precisely why the use of informational text is so critical for both teachers and students. Wendy Binder, from the National Science Teaching Association, interviewed a teacher from New Jersey who said, “I realized I had two choices: work faster or begin teaching more than one subject at a time.”

Class Schedule

	Monday	Tuesday	Wednesday	Thursday	Friday
8:35–8:50	Arrival	Arrival	Arrival	Arrival	Arrival
8:50–9:20*	SF & MCT	SF & MCT	SF & MCT	SF & MCT	SF & MCT
9:20–10:50	Language Arts	Language Arts	Language Arts	Language Arts	Language Arts
10:50–11:20	Lunch	Lunch	Lunch	Lunch	Lunch
11:20–12:20	Math	Math	Math	Math	Math
12:20–12:50	Recess	Recess	Recess	Recess	Recess
12:50–1:10	Music	Music	Art	PE	Technology
1:10–1:50	PE	PE		Media	
1:50–2:20**	Content	Content	Content	Content	Content
2:20–3:05	Student Selected Centers/Snack	Student Selected Centers/Snack	Student Selected Centers/Snack	Student Selected Centers/Snack	Student Selected Centers/Snack
3:05	Closure	Closure	Closure	Closure	Closure

* Social Foundation and Multiple Community Times

** Content includes Social Studies, Science, and Health

Student Objectives

Obtain and evaluate information from a text on the occurrence of a unique trait in California condors.

ELA and Math Connections

Reading:
Informational text
Key ideas and details
(RI.3.1)



Science Teaches New Language to All Students

Teachers often see a wide range of reading abilities among their students—from those who read far beyond grade expectation to those who can't read English. According to the National Center for Education Statistics, nearly 10 percent of students in the US public school population are still in the process of acquiring English language proficiency (McFarland et al., 2019). Teachers need a way to level the playing field. This is why it is important that language and literacy instruction be tied to a content area such as science so that students can simultaneously develop disciplinary understanding and language and literacy skills (Llosa, Kieffer, and Lee, 2016).

All students, especially English learners, need exposure to grade-level content and academic language to be truly prepared for college and careers. Informational text can better prepare students by building *all* students' vocabulary through introducing them to new concepts and words—like *plant anatomy*, *chemical reactions*, and *friction*—tied to real-world examples of phenomena they can observe. This grade-level content can range from what makes an apple turn brown to how to stop objects such as space shuttles from burning up when they return to Earth. Focusing students' reading on complex text with the proper amount of academic language could inspire the next generation of STEM professionals.

Bringing science into the ELA classroom through informational text related to the content in science standards is a way to address the imbalance. For example, in a current science unit, students are learning about similarities and differences among birds. They have bird-watched outside. They have observed and named types of birds they typically see around their school or homes. By using a science curriculum with integrated informational text, the teacher can also introduce students to a type of bird they won't find nearby. Through informational text, students can discover key ideas and details, such as the species of the bird and what makes it different. They can also explore craft and structure of text by grasping how the text is grouped by sections with headings, how captions give information about images, and the significance of bold print. Using informational text works best when it fits seamlessly into the content students have learned.

Science taps into students' natural curiosity and energy, and ELA tasks, including reading complex text, are not so daunting when they are a path to understanding something students really want to know (Tyler et al., 2017).



Informational text can address subjects such as how to stop a space shuttle from burning up when it returns to Earth.

Credit: Stockbyte/Stockbyte/Getty Images Plus

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How Smithsonian Science for the Classroom Curriculum Supports Integrated Informational Text

The Common Core State Standards for reading require more than the skill of reading alone. They require students to comprehend texts of steadily increasing complexity, which is why the Smithsonian Science Education Center integrated a literacy series called Smithsonian Science Stories into its new curriculum series, [Smithsonian Science for the Classroom](#). The literacy series is designed to give all students access to that staircase of complexity necessary to prepare them for college and careers while providing support for students without English language proficiency. Those supports include the availability of Spanish translated text, differentiated text that provides the same level of information and the same text features (i.e., vocabulary, headings, images, and captions) but at a reduced complexity score, and digital versions of the literacy series that are text-to-speech compatible.

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