

# Science of Writing

## A Primer



once

upon

a

time

fr.

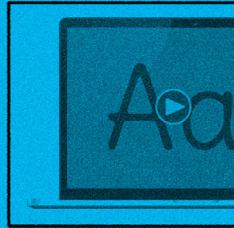
cc.

c.m.

Lo.

In the United States, we aim to be a society in which every adult can read, write, and understand text at a college-entry level or above. This ambition is so crucial, we consider schools that are not on track to achieve this goal to be failing their students.

**Effective educational systems support all students in achieving high literacy rates.**



h e d e  
g h i j  
l m n o

But reading is only part of the equation for literacy success. According to The Reading League,

“The Science of Reading is a vast, interdisciplinary body of scientifically-based research about reading and issues related to reading and writing.”

Literacy includes the ability to communicate effectively through writing. While we have always known the importance of writing, reading can sometimes overshadow it. In fact, reading and writing are inextricably linked and equally critical to literacy.

*language  
comprehension*

knowledge

vocabulary

sentences

reasoning

mental model

*word  
recognition*

sounds

letters

words

*increasingly strategic →*

*increasingly automatic →*

*skilled  
reading*

Braid diagram based on Scarborough, H. S. (2001). Connecting early language and literacy to later reading (dis)abilities: Evidence, theory, and practice. In S. Neuman & D. Dickinson (Eds.), *Handbook for research in early literacy* (pp. 97–110). New York: Guilford Press.



According to the National Assessment of Educational Progress (NAEP), only

**27%**

of 12th graders achieved a proficient level in writing in 2011.

Now consider that the 2024 survey from The National Association of Colleges and Employers found that

**73%**

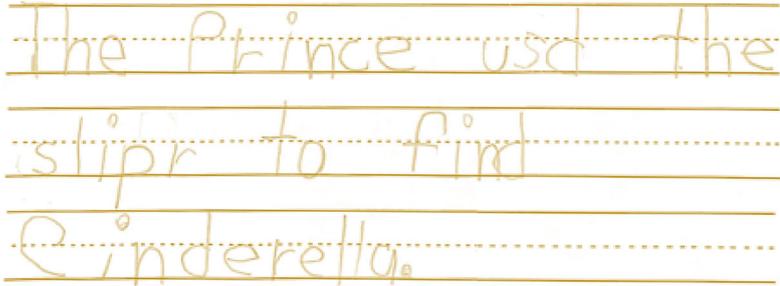
of employers look for written communication skills when selecting candidates for hire.

It's clear that an emphasis on developing **both reading and writing** will significantly benefit all students.



Learning to write begins long before children pick up a pencil. It starts with developing oral language skills, where they learn to express themselves and understand others. Then, when books are read aloud to them, they begin to connect spoken words to written ones.

Writing evolves at each developmental stage, from squiggles to sentences to essays. At each stage, we apply our growing knowledge and experience as we learn to communicate our thoughts.

A sample of a kindergarten student's handwriting on lined paper. The text is written in a simple, cursive-like style. The words are: "The Prince used the", "slipper to find", and "Cinderella." The lines are blue, with a dashed midline. The text is written in a dark blue or black ink.

Kindergarten student writing sample

ing, walking, and w  
gardens. She a  
pics to watch. She

sentences

essays

the young woman  
to kill them all  
before Christmas...  
whips all the time  
on a six months f  
e. get home next  
Poe was there at  
Uncle Manfred. ha  
she likes to see t

Handwritten squiggles and scribbles.

squiggles

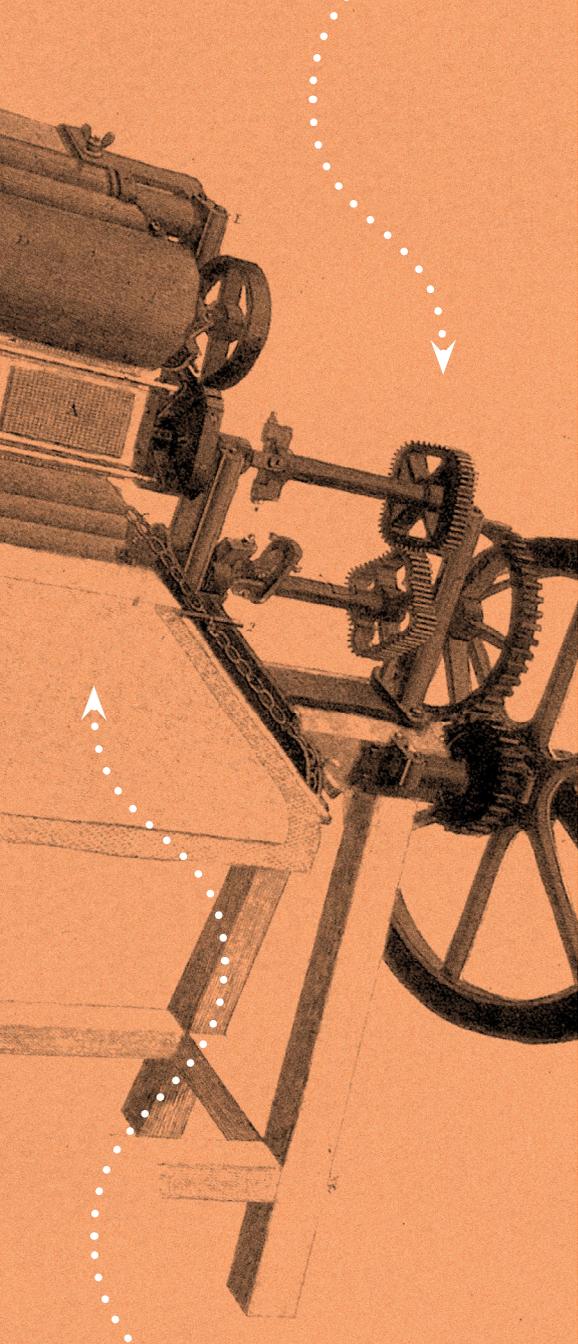






Writing originated in ancient civilizations to record information. The Sumerians developed cuneiform around 3400 BCE for trade and agriculture, while the Egyptians created hieroglyphics for religious texts and monuments.

As civilizations expanded, writing systems evolved. The Phoenicians developed one of the first alphabets around 1200 BCE, influencing Greek and Roman scripts. Meanwhile, the Chinese created a logographic system that became modern Chinese script. These systems facilitated trade, governance, and cultural exchange, shaping early societies.



Johannes Gutenberg's 15th-century invention of the printing press made books widely accessible, spreading knowledge, literacy, and ideas across Europe. It marked the start of modern writing, significantly impacting literature, science, politics, and education.

**Without the invention of writing, reading would not be necessary.**

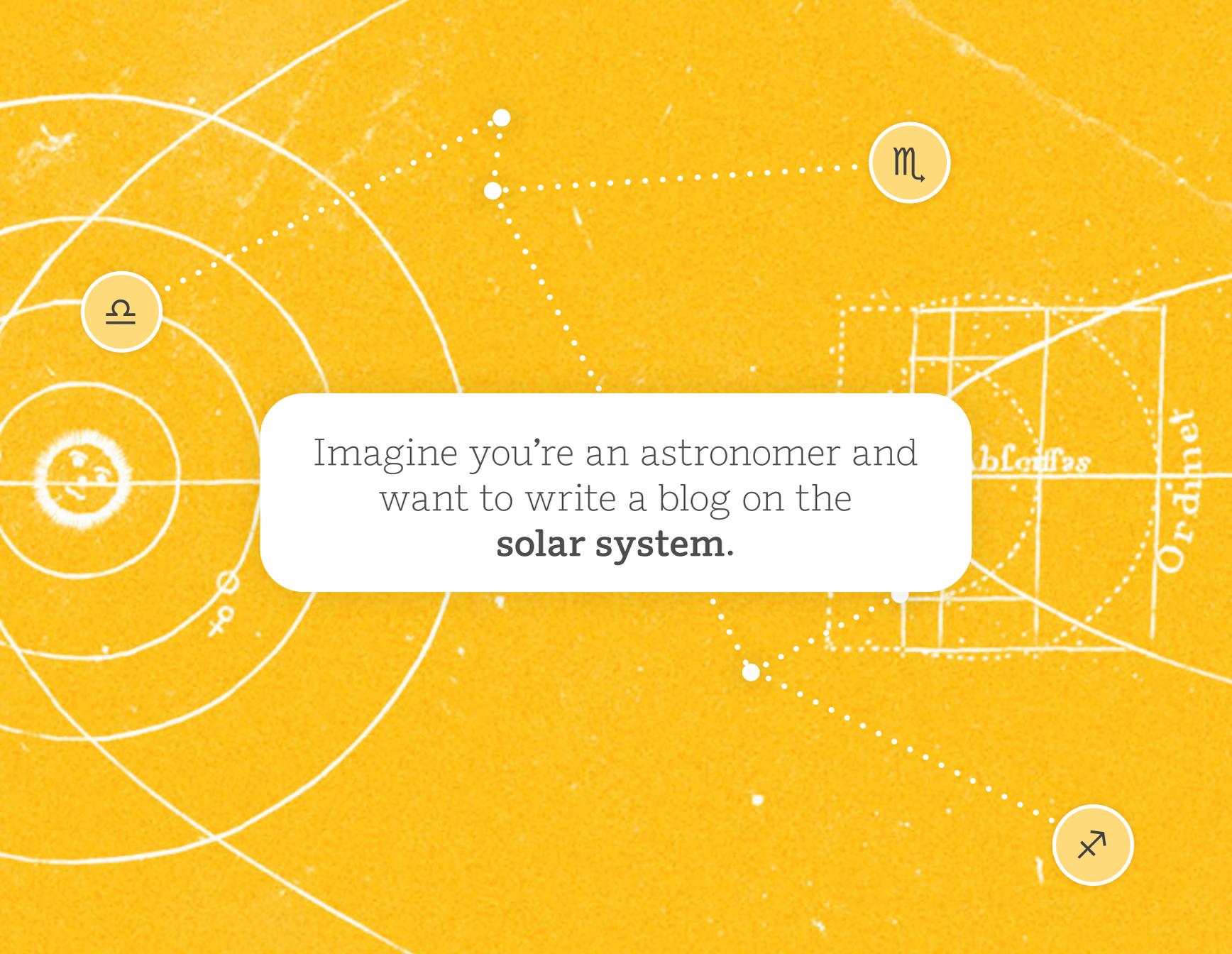
When we read, we aren't just deciphering words—we're exploring the thoughts and ideas of the writer.

When we write, we are representing our own thoughts and ideas for readers to understand and interpret.



“It’s been said that reading is the most difficult thing we ask students to do. In fact, that description applies more accurately to writing. ... Because it requires students to express themselves and not merely to receive and process information, writing imposes the greater cognitive load.”

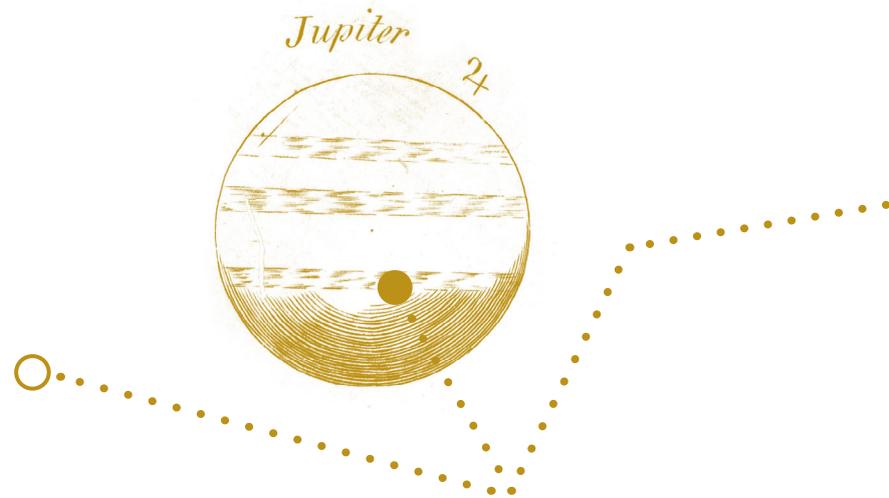
Natalie Wexler  
Author, *The Knowledge Gap* and *The Writing Revolution*



Imagine you're an astronomer and want to write a blog on the **solar system.**

Because you're an expert, you have deep knowledge about the solar system and vocabulary to explain it. You've gained that knowledge, in part, by reading broadly and deeply on the subject.

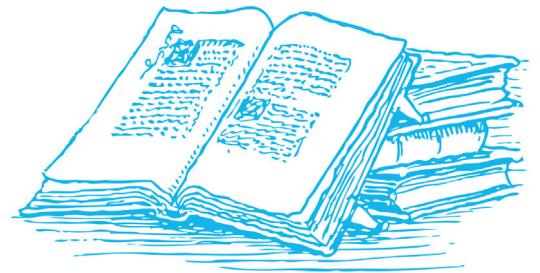
As you begin to write the blog, you must organize that knowledge to convey information so your readers can understand what you've written. You must carefully construct each sentence to support that understanding. And all this is not easy.

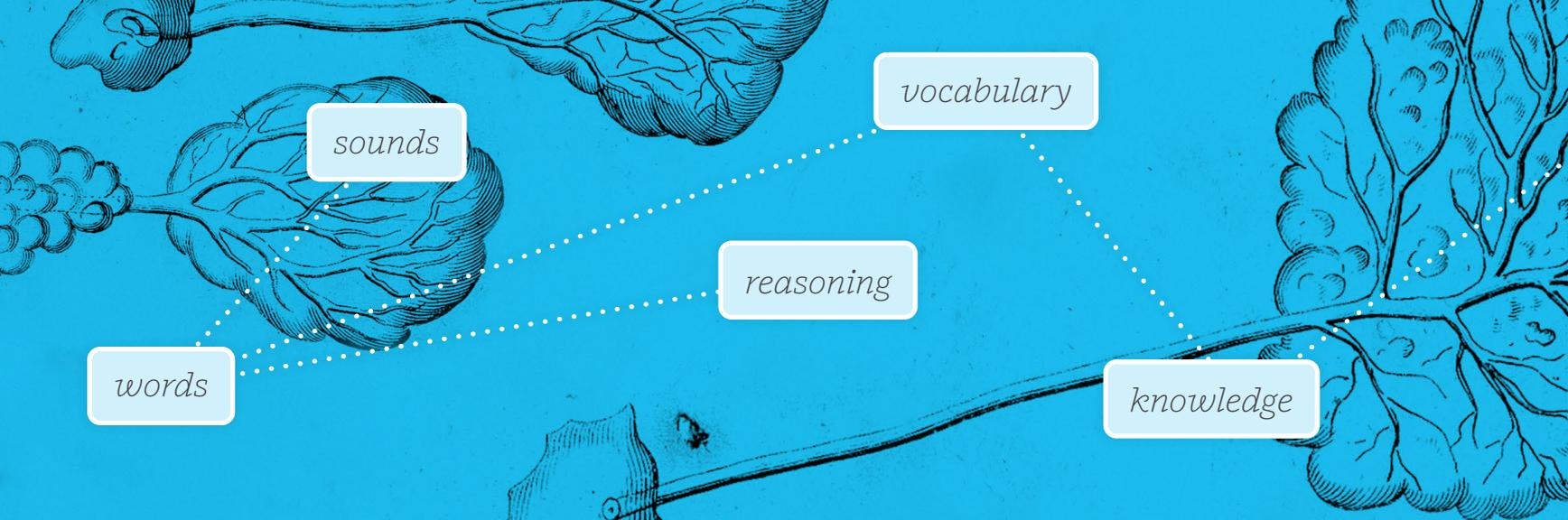


In an article in the journal *Educational Psychologist*, Dr. Jill Fitzgerald and Dr. Tim Shanahan describe reading and writing as two processes that are built on a common foundation of knowledge (2000). The skills of reading and writing are related and are best taught together.

**“Combining reading and writing is part of the Science of Reading. ...** If you want better reading scores, the Science of Reading says do not neglect writing, nor dispatch it to someplace else in the curriculum. When you feel especially pressured to improve reading achievement, that is the time to embrace more tightly the combination of reading and writing.”

Tim Shanahan  
Distinguished Professor Emeritus, University of Illinois at Chicago (UIC)  
Literacy Researcher and Writer





**If** we teach students decoding skills,  
**then** they become better spellers.

**If** we teach students strategies for planning, drafting, and revising during composition,  
**then** their reading comprehension improves.

**If** students are instructed in word and vocabulary knowledge,  
**then** they are able to express their ideas in a more precise and effective way.

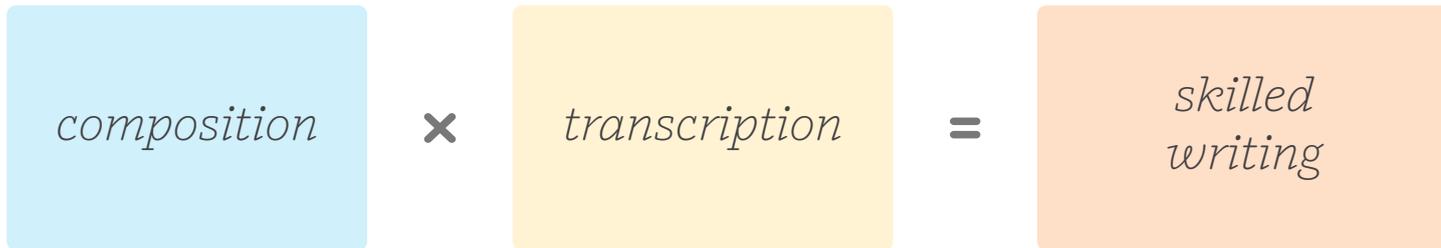
**If** we help students build knowledge on various and diverse topics,  
**then** they are better able to draw on this knowledge of topics to write about.

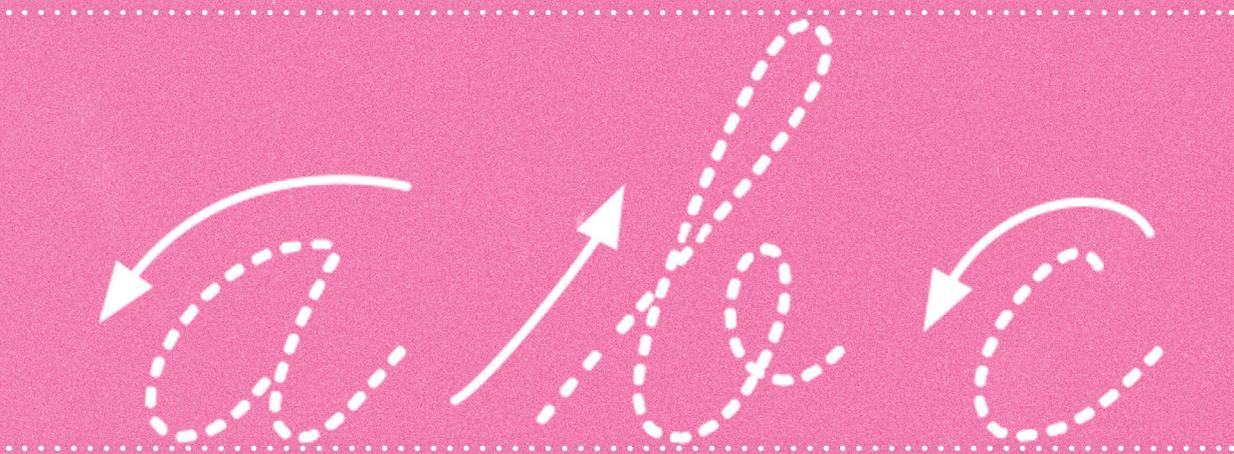
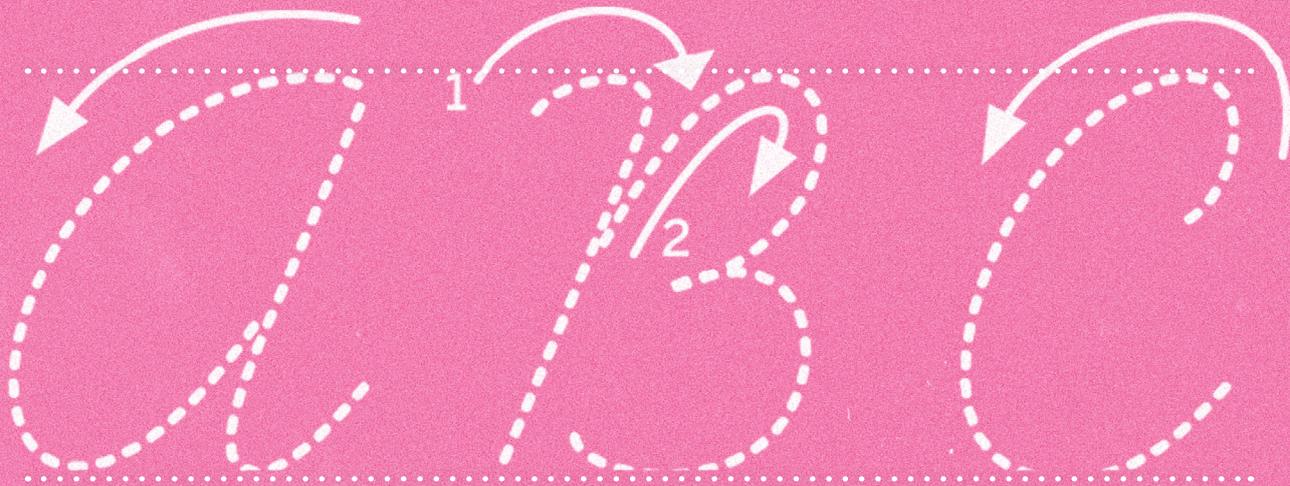
The Simple View of Reading describes two critical capacities required for skilled reading: language comprehension and word recognition.

Similarly, the **Simple View of Writing** describes two critical capacities required for skilled writing: composition and transcription skills.

To capture our thoughts on paper, we need to:

1. Generate and organize our thoughts and ideas.
2. Transcribe those ideas into written language.







*ball*

*dance*



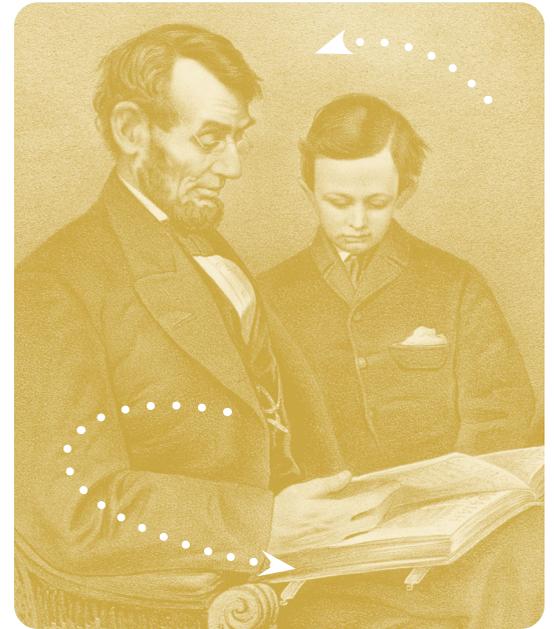
By generating ideas and structuring narratives, students learn to create meaningful and organized texts. This is known as **composition**.



*prince*

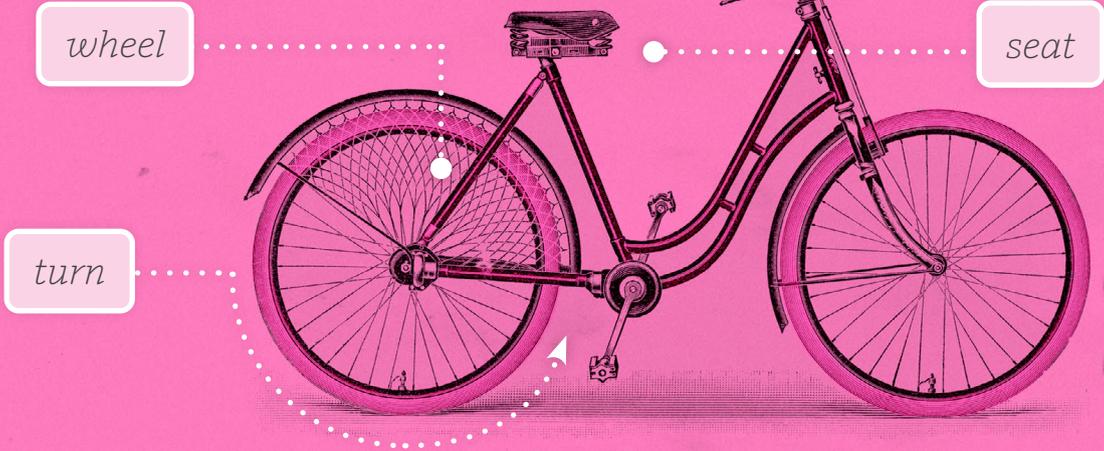
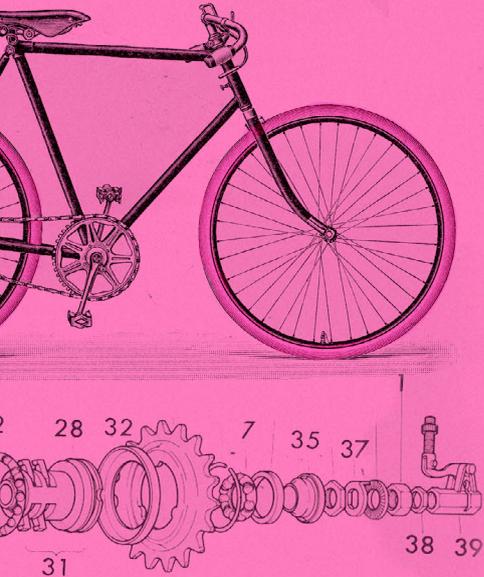
Consider what Abraham Lincoln had to say about writing:

“Writing—the art of communicating thoughts to the mind, through the eye—is the great invention of the world. ... Great, very great, in enabling us to converse with the dead, the absent, and the unborn, at all distances of time and space; and great not only in its direct benefits, but greatest help, to all other inventions.”



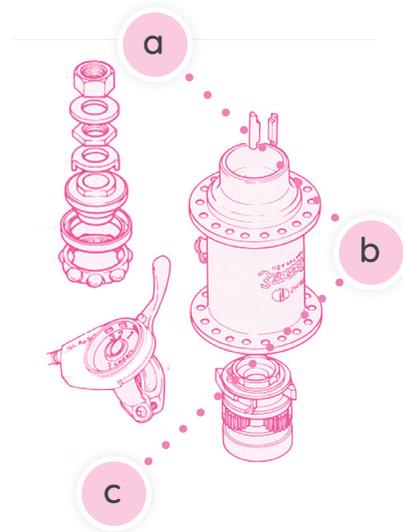
... She went to the  
ball and danced  
with the Prince.

Kindergarten student writing sample



To communicate thoughts through writing, composition weaves vocabulary and knowledge on a topic into a specific structure to elucidate that topic. This demands a deep understanding of a topic and the ability to choose just the right words to precisely describe our viewpoint about it.

We can't write about things we don't know anything about.



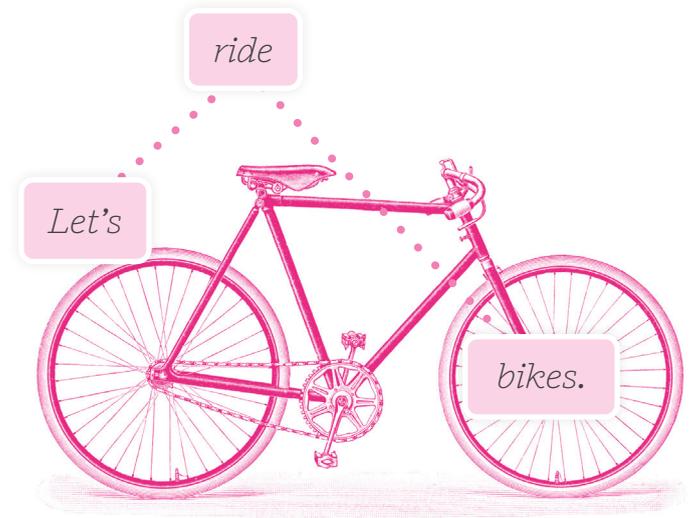
The more readers know about a topic they're reading about, the better they'll comprehend what they're reading. Likewise, the more writers know about a topic, the better they'll be able to write and communicate about it.

As readers, we gain new vocabulary by reading and building our knowledge on specific topics. As writers, we need deep vocabularies to communicate ideas effectively.

Equipped with knowledge and vocabulary about a topic, writers must structure their writing to express their thoughts and ideas effectively.

Engaging young students in discussions and oral activities enhances their ability to express and organize ideas, which directly benefits their writing skills.

Transferring thoughts to paper starts with the composition of sentences. Individual sentences work together to communicate overall ideas.



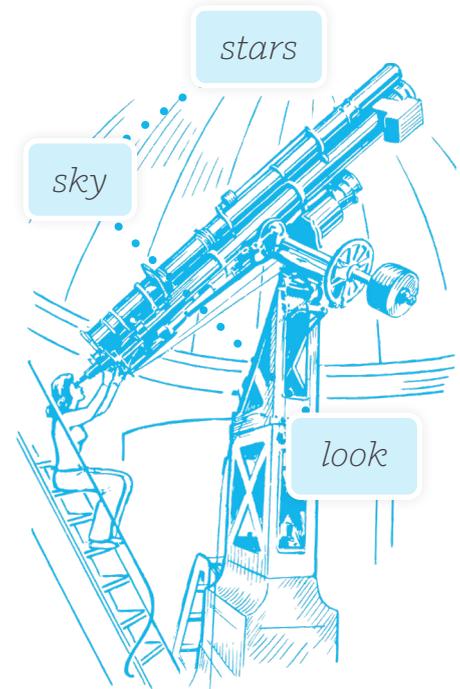
The sentence is an essential building block in both reading and writing.

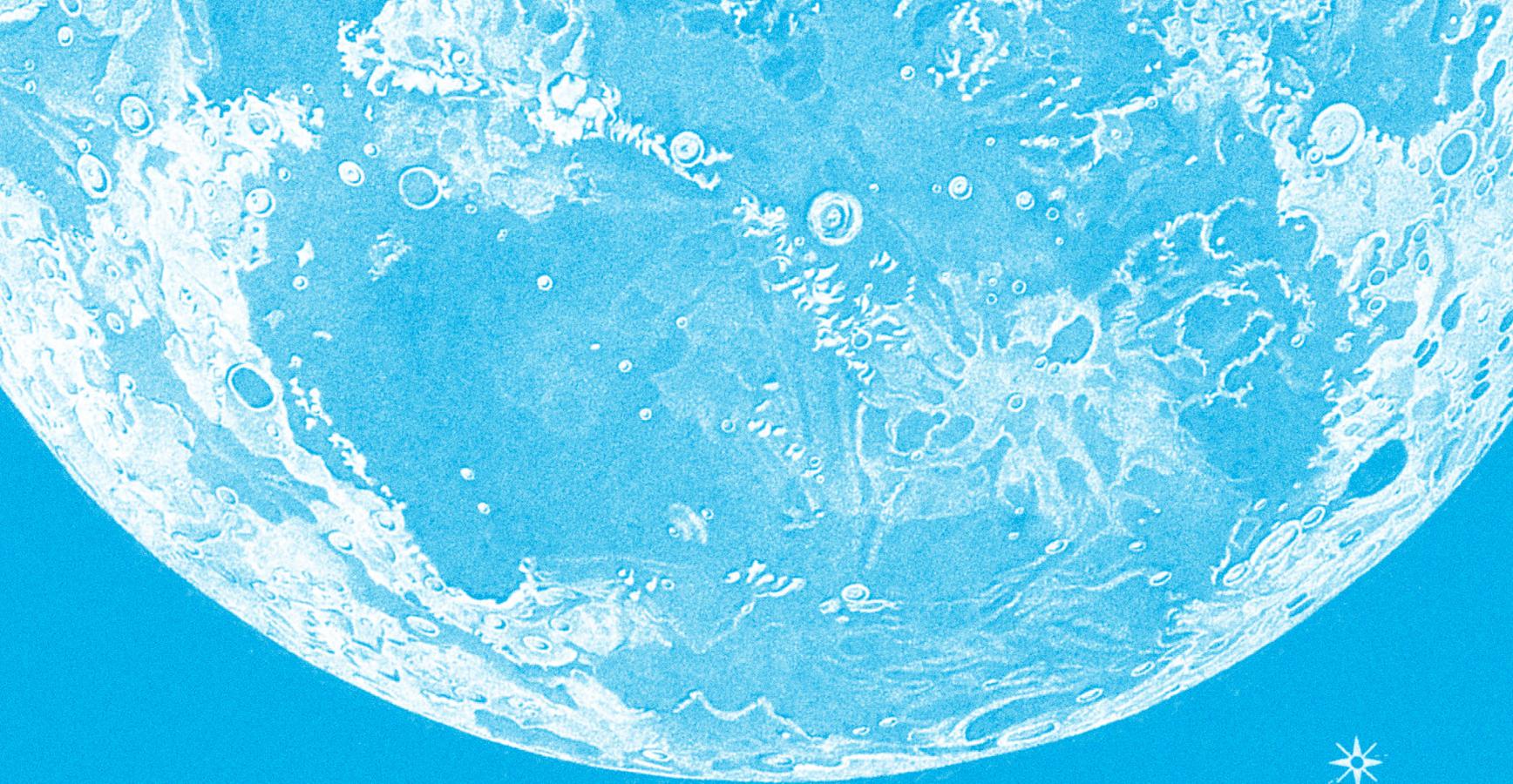
As readers, we understand texts better when we know how sentences are formed.

As writers, we must craft sentences and paragraphs to flow logically to support the reader's comprehension.

For readers, comprehending individual sentences is key to understanding larger chunks of text.

For writers, the ability to construct clear and coherent sentences is essential for composing more extensive works.





We look up at the stars and the  
*moon* when it gets dark.

he

has

have

hat

boy

ball

baby

big

dog

Students translate their thoughts  
and ideas to paper through  
handwriting and spelling. This is  
known as **transcription**.

bird

girl

good

you

my

play

may

fly

to

Handwriting isn't just about neatness. As writers, we don't want to struggle remembering how to form letters—whether a “b” has a line on the left or right. Instead, this needs to be automatic.

“The research is convincing across the board: Handwriting is important to the writing process, and direct, explicit handwriting instruction makes fluent handwriting happen. Compellingly, handwriting instruction also positively affects reading skills.”

William Van Cleave  
Educational Consultant, Teacher, and Administrator  
Author, *Writing Matters: Developing Sentence Skills in Students of All Ages*





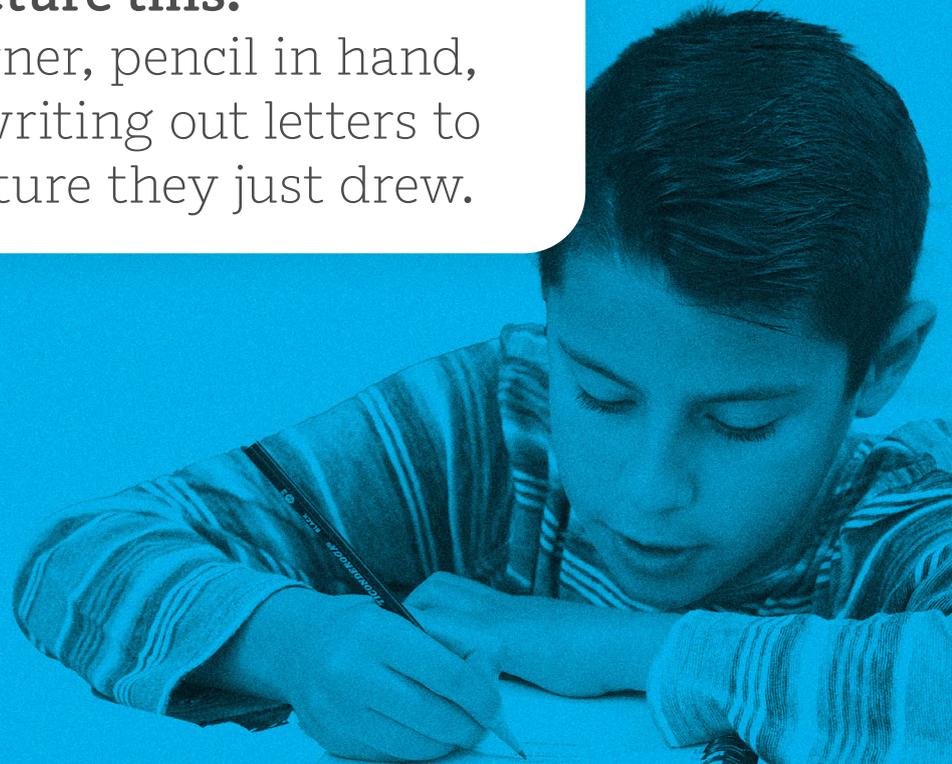
*water*

*balloon*

### **Picture this:**

A young learner, pencil in hand, is carefully writing out letters to label the picture they just drew.

*day*

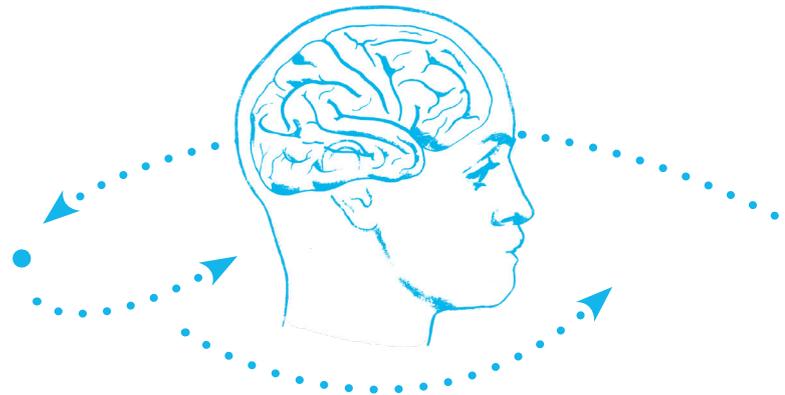


If we looked into the brain of this child, we would see it lighting up in areas that are associated with reading—specifically recognizing letters and decoding words.

So teaching handwriting explicitly helps young learners develop skills that support them as readers AND writers.

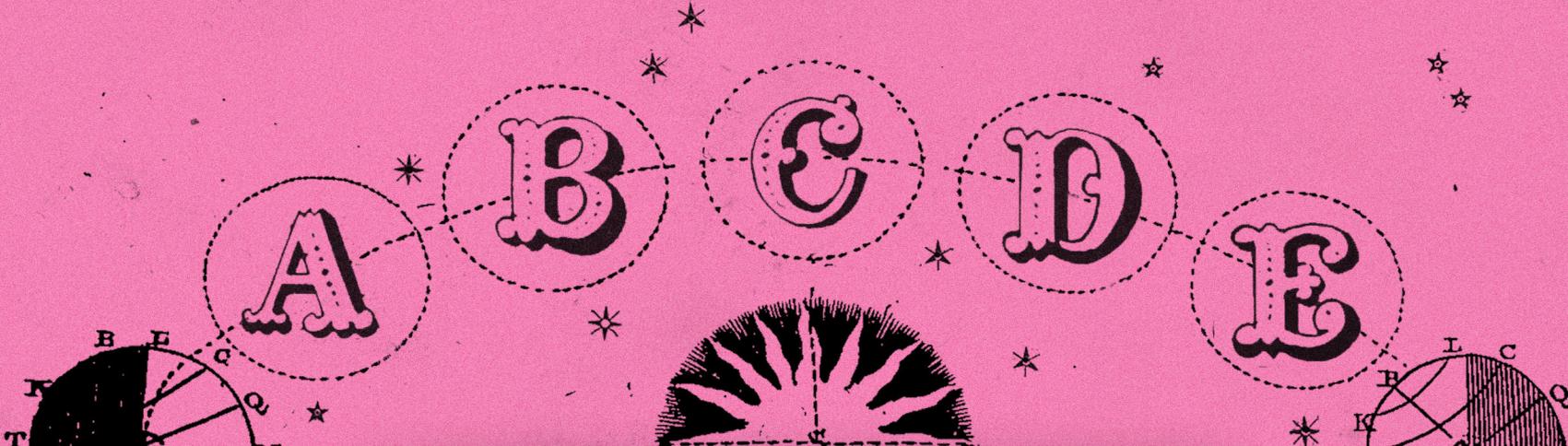
As readers, we must be able to recognize which letters represent which sounds (phonemes); this is the alphabetic principle.

As writers, we must be able to form the letters that represent each of those sounds. For this reason, fluent and efficient handwriting and spelling (encoding) are critical.



And spelling isn't about memorizing words. Instead, it's about recognizing and representing sounds and patterns. The ability to hear individual and combined sounds that make up words helps writers spell.





Students organize their thoughts, communicate them clearly, and transcribe them accurately. This is known as **skilled writing**.



As educators, we must provide instruction that builds readers and writers. The Science of Reading and Science of Writing emphasize the practices of:

- 1. Integrated instruction:** Write about what you're reading; read about what you're writing.
- 2. Explicit instruction:** Connect word recognition with handwriting and spelling by teaching them in tandem.
- 3. Sentence-level instruction:** Focus on sentence types, sentence expansion, and sentence combining while teaching reading and writing.
- 4. Purposeful instruction:** Examine text types (for example narrative, descriptive, or persuasive) when reading and select appropriate text types for writing.

Focusing on these practices will help students become skilled writers.

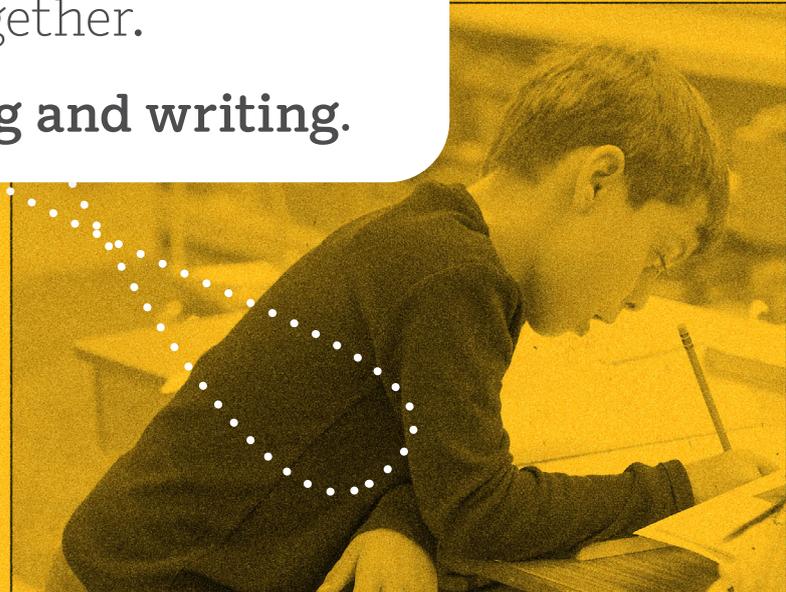




Reading and writing are  
related processes.

Reading and writing should be  
taught together.

**Literacy is reading and writing.**



“Literacy is the ability to identify, understand, interpret, create, communicate, and compute using printed and written materials associated with varying contexts. **Literacy involves a continuum of learning in enabling individuals to achieve their goals, to develop their knowledge and potential, and to participate fully in their community and wider society.**”

UNESCO definition of “literacy,” 2017







## Suggestions for further reading:

- What Works Clearinghouse has produced guides for teaching students to write effectively. ***Teaching Elementary School Students to Be Effective Writers*** and ***Teaching Secondary Students to Write Effectively*** offer evidence-based, actionable guidance for helping students develop and grow strong writing skills, and are geared toward educators of all levels and disciplines who want to help improve their students' writing.
- ***"The Importance of Teaching Handwriting"*** is aimed at educators, and makes a compelling case for maintaining handwriting instruction in the digital age.
- ***"Reading and Writing: A Reciprocal Relationship"*** explores the interconnected nature of the two skills, presenting evidence-based strategies for educators to foster both reading and writing proficiency and emphasizing how improvement in one area can enhance the other.
- And lastly, ***"Adult Literacy in the United States"*** provides a comprehensive analysis and details about the efforts needed to improve it.

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