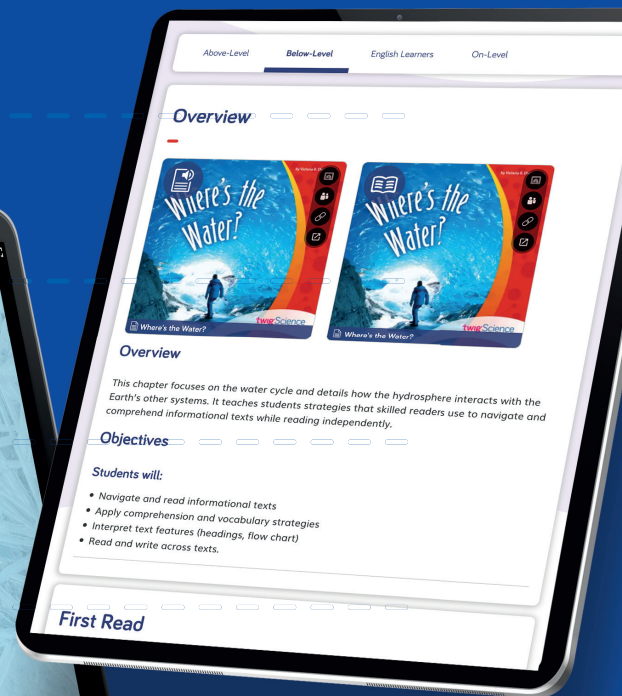


Thinking, talking, reading, and writing like scientists

Your Guide to Literacy in

twig SCIENCE





ALL THE SCIENCE, ALL THE LITERACY: HALF THE TIME

We know that teachers are tight on time — this is one of the biggest challenges teaching science. Amid new educational frameworks and standards, it's easy to forget that simply finding space in the schedule for science instruction — especially at the elementary level — is a stumbling block for many teachers. Science often takes a back seat because it isn't a frequently tested subject, so more time, money, and focus is spent on improving reading and math scores.

However, there's a strategy that not only streamlines teaching but can also deepen students' understanding: integrating literacy with other subjects, such as science. This approach doesn't just save precious time; it's a critical lever for boosting student literacy significantly.

Intertwining literacy with science makes sense. Science is deeply rooted in language — understanding scientific concepts, conducting experiments, and articulating findings all hinge on a precise knowledge of what words mean and how to use them. After all, real-world scientists make progress by talking to each other, collaborating, and communicating their ideas clearly.

This is the key to Twig Science's approach to melding language acquisition with knowledge expansion, creating the foundation for students to thrive in every subject. And this is your guide to the key features in Twig Science that help you to encourage that to happen.

Contents

Thinking, Talking, Reading, and Writing Like Scientists	4
Twig Science Pre-Kindergarten	6
Twig Science Elementary	8
Twig Science Middle School	12
Twig Science Professional Learning	14

Thinking, talking, reading, and writing like scientists

Why should a student want to use language like a scientist?

Because it can help to:

- **Access new ideas** — opening up a world of discoveries, theories, and amazing science facts through books, articles, and class discussions
- **Understand science basics** — making it easier for students to acquire and make use of foundational science concepts
- **Stay curious and up to date** — by exploring new findings and talking about them, students can keep their science knowledge fresh and exciting
- **Think critically** — discussion and writing teaches students to ask questions and find and evaluate evidence
- **Spark creativity and teamwork** — sharing stories about scientific discoveries inspires students to work together on projects
- **Improve communication** — reading, talking, and writing help students get better at explaining their science ideas clearly

In short, Twig Science activities are not just about learning facts. They help students become curious, thoughtful, and creative thinkers. A student with a broad and rich vocabulary navigates reading with ease, understands concepts more swiftly, and communicates more fluidly. This enhanced literacy paves the way for more effective learning across the board.



The Importance of Tier 2 Vocabulary

While most students arrive at school fairly confident in Tier 1 language (everyday words used in day-to-day life), it takes time to build up a broad Tier 2 and 3 vocabulary. Tier 3 words are subject-specific words that we rarely come across in our daily lives — for example, scientific vocabulary such as “molecule” or “isotope.” Tier 2 words, meanwhile, are not used as often in everyday speech, but are common in written text and can be applied to many contexts — words such as “analyze,” “process,” or “accurate.” Tier 2 words are crucial for comprehension because they are wide ranging and occur in various domains, so they are incredibly important for students to master in order for them to understand disciplinary text and confidently discuss various topics.

Tier 1	Basic Words	house, animal, table, pencil, book, find, look, etc.
Tier 2	High-Utility Words	analyze, process, accurate, evaluate, significant, interpret, correspond, consequence, etc.
Tier 3	Academic Content Words	molecule, isotope, biome, irrigation, photosynthesis, alliteration, estuary, etc.

Cross-Curricular Connections

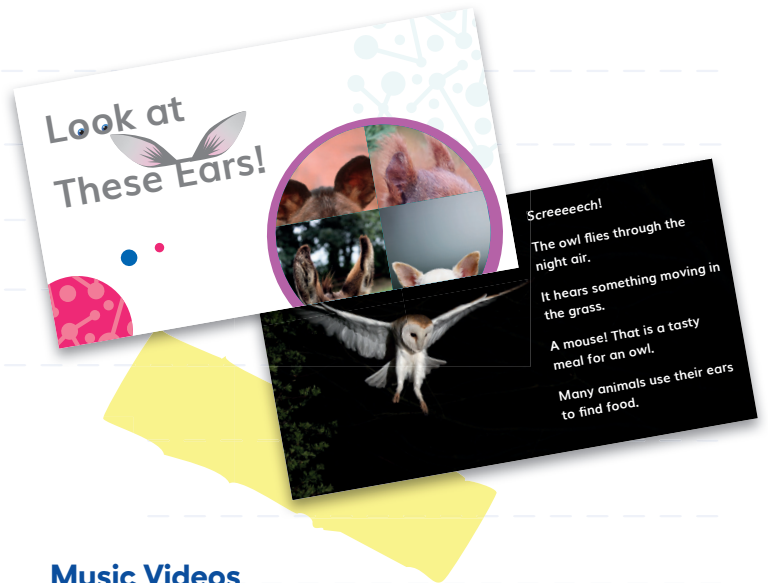
Since literacy is a crucial skill in all disciplinary studies, it is, of course, addressed in any subject-specific framework, often with emphasis placed on similar aspects such as explaining, arguing, and asking questions. There are numerous connections between science standards and ELA standards, including the need for students to be able to argue from evidence, develop explanations, obtain, synthesize, evaluate, and communicate information, and build knowledge through content-rich texts.



Through story-led modules, Twig Science Pre-Kindergarten’s hands-on investigations, videos, interactives, and songs introduce students to vocabulary and concepts that are foundational to scientific inquiry. As children interact with their environment and discuss scientific phenomena, they learn to describe their observations, ask questions, and communicate their findings. This integration of science and literacy at an early age lays the groundwork for lifelong learning and intellectual development.

Interactive Read-Alouds

Digital read-alouds provide students with an engaging auditory and narrative experience that enables them to build background knowledge, make sense of phenomena, accelerate depth of knowledge, think critically, and listen to others while interacting in rich discussion.



Music Videos

From body systems to weather to material properties, catchy music videos support auditory, visual, and kinesthetic conceptual development of challenging science concepts. Includes text tracking, vocabulary, graphics, and high-quality imagery that inspires the entire class to sing and dance!

Science Investigation Posters

Large format, dry-erase posters provide students with opportunities to use infographics, visuals, and academic vocabulary to produce memorable visual and kinesthetic models.



Interactives and Games

In Pre-K, the focus is on introducing students to digital literacy and collaborating and communicating in fun interactives and games — from building their own human body to investigating weather and seasons as they work together or independently.

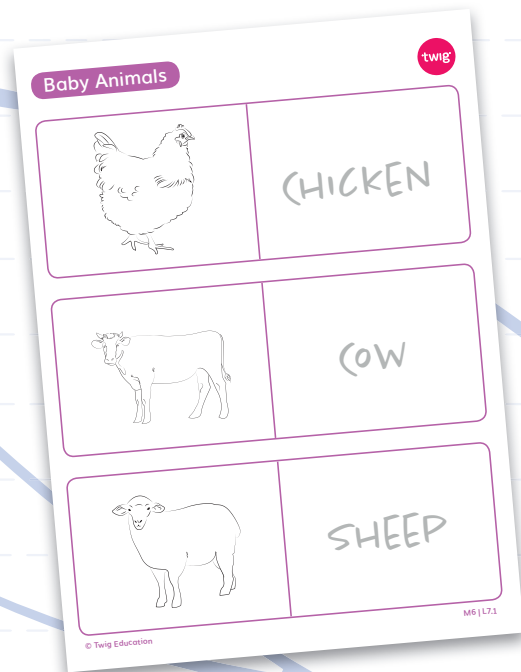


Interactive Activity Sheets

Inquiry-based activity sheets engage students to use graphic organizers, drawings, text, and visuals to explore, create, innovate, and explain phenomena.

Vocabulary Cards

Bilingual (English and Spanish) vocabulary cards provide multiple opportunities for students to develop their use of scientific language and practice social and literacy skills. With suggested games, activities, and routines at the class, group, and individual level.



English Learner and Language Development

English Learner scaffolds for Emerging, Bridging, and Expanding levels of proficiency, plus interactive read-alouds that promote discussion and language acquisition.

English Learners

Preview the **What to Wear?** video with ELs. Pause the video at key points to elicit understanding.

Substantial Support (Emerging Proficiency)

In a small group, replay the video and stop to ask yes/no or simple one-word answer questions.

Moderate Support (Expanding Proficiency)

Stop the video at key points and ask students to explain their understanding. Provide sentence frames for students need support in restating key ideas.

Light Support (Bridging Proficiency)

Stop the video and have students explain what they learned to a partner. Listen to their sentences.

English Learners

Work with a small group of ELs to complete the sentences. Use the images in the read-aloud to review the animals and their ears. **Optional:** Have students dictate their sentences to you. Guide them to read aloud the completed sentence.

Twig Science Elementary engages students more deeply in scientific concepts, hands-on activities, and inquiry. The integration of science education with literacy allows students to practice reading and writing through authentic texts, instructions, and explanations. This exposure not only enriches their vocabulary with technical terms but also enhances their ability to understand complex sentences and ideas, argue logically, and present information clearly.

This period is particularly important because it lays a foundation for academic success across disciplines, fostering a love for learning and curiosity about the natural world, while simultaneously developing essential literacy skills that are crucial for future educational achievements and everyday life.

Leveled Readers

Use magazine-style leveled readers to inspire students to explore ideas in depth at their own pace while meeting real-world scientists and engineers. Readers are available in print and digital at four levels — On-, Above-, Below-Level, and English Learner — and are ideal for use in differentiated small-group reading time.



1. Exploring Phenomena

Build curiosity about a phenomenon as students discover what we know and how we know it.

2. STEM Career

Introduce students to real professionals working in STEM careers in fascinating interviews.

3. Real-World Connection

Showing why students should care about a phenomenon and how it affects them.

CHAPTER 1 THE CURIOUS SCIENTIST

Today, the idea that loud noises can cause an earthquake makes us laugh. But long ago, people believed it could. In ancient times, people didn't have scientific explanations for what happened in the natural world. Still, they needed to make sense of natural disasters—like earthquakes—that could wipe out a whole town in a matter of minutes. So they came up with some pretty way-out explanations.

It's an EARTHQUAKE!!

Nah, it's just that rock band over there practicing again.

CHAPTER 2 MEET A SEISMOLOGIST

Many different kinds of scientists study the Earth's activity in and around the Ring of Fire. Volcanologists study volcanoes. Seismologists study earthquakes. They look at movements, or energy waves, in the Earth's crust. Let's find out more from seismologist Dr. Rebecca Bell.

Dr. Rebecca Bell

What does a seismologist do?

We are like detectives. We look for clues about the past in rocks. We study seismic waves. We do experiments and examine data to discover the source, size, and cause of seismic waves. They cause earthquakes.

Where do you do your work?

We spend a lot of time in the lab. We study rocks. We create and test computer models of earthquakes. I interpret images of what the Earth looks like below the surface. These images have been produced with sound waves. They show me where faults are located. These faults could cause earthquakes. I also use information from drilling into the ground to learn about how the ground might respond in an earthquake.

CHAPTER 3 EARTHQUAKE PROOFING: WHAT'S THE COST?

When it comes to earthquakes, there's good news and there's bad. Remember those ancient myths? The good news is we've learned a lot about earthquakes since then. Scientists near you are putting this know-how to work.

Leveled Reader Lessons

Leveled reader lessons include in-depth reading activities and writing opportunities. They encourage students to distinguish between and navigate different types of text, apply comprehension and vocabulary strategies, interpret text features, and read and write a variety of text types.



Shake, Rattle, and Roll

Level Up
For students who struggle with the On Level book, guide them through a reading of the Level book first. Then have them listen to a recording of the On Level book and follow along with the text. This scaffolding should prepare students for reading the On Level book in small groups.

Pacing
It is recommended that you read one chapter each Driving Module every two weeks. Driving Modules extend past the Driving Questions, revisit the related books from your reading library in later weeks. Engage students in reading across texts activities to help them analyze and synthesize how the information. For example, Venn diagram to compare and contrast two of the books, followed by writing a summary of their findings.

Special Needs
Provide digital tools (e.g. tables) for students to record or expressing ideas, such as through drawings.

The Curious Scientist

Read
Ask students how they might approach reading Chapter 1. Model text navigation, if needed. Since students have already previewed the text, they should start by rereading the title and introduction. Tell students to begin their reading of the main text. If they struggle with a boldfaced term, prompt them to use context clues and/or structural analysis to pronounce and determine its meaning.
Note: If necessary, they may turn to the Visual Glossary on page 31. The author may suggest the reader look at a photograph, chart, or other visual. In this case, they should stop and do so. If not, they should read the section or page and then look at its visuals.
• **Does the visual illustrate something in the text?**
Remind students they can go back and study the photos and illustrations more closely when they finish reading. Tell students that if the page has a sidebar, they should read it last.

Connect to Writing—Note-Taking
Have students turn to the Note-Taking Chart on page 103 of their Twigo Books.
As students read Chapter 1, ask them to
1 Write down key words and phrases to help them remember the big ideas; they can also draw pictures.
2 Note their questions and confusions about the number of the confusing sentence or paragraph.
3 Write a two- or three-sentence chapter summary.
While students are reading and taking notes, circulate and take note of any common confusion. During the after-reading discussion, you can go back to the text and model your thinking to clarify.

Build Content Knowledge
During the discussion of the text, focus on the following Oklahoma Academic Standards for Science.

PERFORMANCE EXPECTATIONS	4-ESS2-2 Analyze and interpret data from maps to describe patterns of Earth's features.
DISCIPLINARY CORE IDEAS	ESS3.B Natural Hazards
SCIENCE AND ENGINEERING PRACTICES	SEP-1 Asking Questions and Defining Problems
CROSSCUTTING CONCEPTS	CCC-1 Patterns

Ask Text-Dependent Questions
Ask the following text-dependent questions to deepen students' comprehension. Prompt students to cite evidence in the text (specific words, sentences, and illustrations) to support their answers.

- pages 3–5 Why did the author include the information on earthquake myths? How does it help the reader?
- pages 6–7 Why did the author include the illustration of the stone being dropped in the water? How does the author have included it?
- pages 8–9 How does the comic strip on page 11 add to what you know about tsunamis? Why might the these procedures similar to the ones you use for natural disasters where you live?
- pages 10–11 What patterns do you notice on the map?
- pages 12–13 Why did the author include the information on Aristotle? How does it compare to the recorded data, asked questions, made based on evidence, relate these practices.
- pages 14–15 Highlight the steps Aristotle took to arrive at his conclusions about earthquakes (collected facts, observations, arrived at conclusions, made to today's science and engineering illustrations) to support their answers.

Focus on reading and interpreting the maps on pages 10, 12, and 13. Teach students a map-reading routine; discuss how these maps complement the text. Stress the three kinds of natural hazards mentioned in the text and students record details on the causes and effects of earthquakes. Highlight the patterns that can be determined by looking at the Ring of Fire maps on pages 12–13.

CHAPTER 1

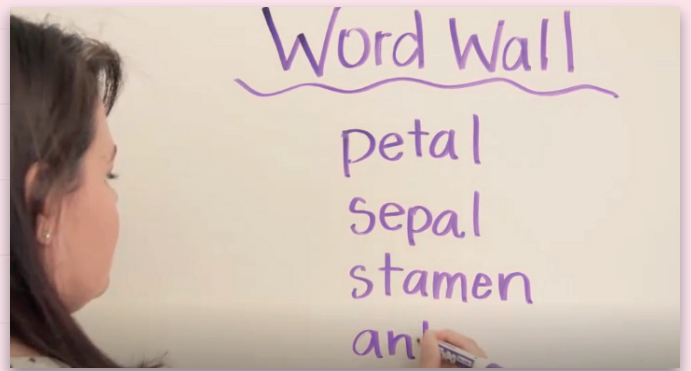
Language Routines

Language routines support questioning strategies as a tool for formative assessment and promote scientific discussion and reasoning. Twig Science language routines have been developed in partnership with Stanford’s SCALE team. They provide rich opportunities for student-driven learning sequences through questions and discourse, and teachers can use them to help students expand and clarify their thinking.

- Whole Class Questioning
- Turn and Talk
- Stronger and Clearer Each Time
- Collect and Display
- Meta Think-Aloud
- Critique, Collect, and Clarify

Word Walls

A word wall displays key terms on the class wall for students to see frequently and refer to when reading/writing to remind them of meaning. By seeing and using the words regularly, students become familiar with spelling, meaning, and usage.



Prior-Knowledge Read-Alouds

Prior-Knowledge Read-Alouds address background knowledge and academic content vocabulary while providing examples of informational text and scientific writing models.

Extreme Seasons

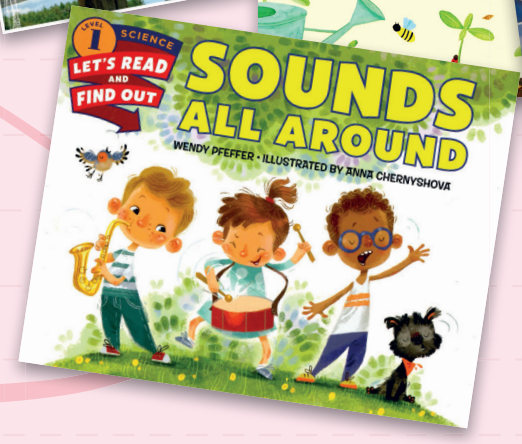
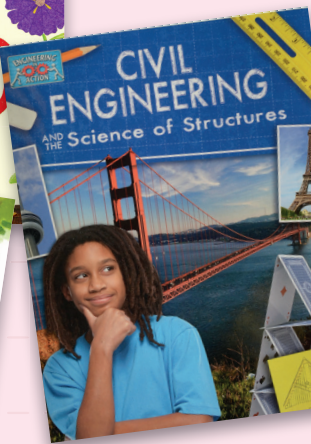
How does the black bear stay warm?
It eats a lot. It grows a thick coat.

It moves into a den.
It hibernates, or sleeps, for many months.

Super Soil

Grab a tray of dirt.
Scientists call it soil.
Let's be scientists!
Let's investigate, or find out about, soil.

Let's add a little water.
What do you think will happen to the soil?
Does the soil feel different?



Trade Books

Trade books build content background knowledge and vocabulary while creating a sense of wonder and curiosity. Twig Science uses award-winning, high-interest, authentic literature from established authors.

English Learners

Use visuals to support students during the discussion.

Substantial Support (Emerging Proficiency)

Replay the video and pause it at images of an earthquake, tsunami, and volcano as you discuss the questions. Also project the Natural Disasters visual to support students' ability to describe what is viewed.

Moderate Support (Expanding Proficiency)

Write earthquake, tsunami, and volcano on the board. Guide students to connect each word to an image on the Natural Disasters visual prior to the discussion.

Light Support (Bridging Proficiency)

Show the Natural Disasters visual. Guide students to name and describe each image prior to the discussion. Add vocabulary, as needed.

English Learners

ELs, and indeed the entire class, may need some support with the vocabulary in the text. The following words may need to be explained with a synonym, a definition, and an explanation: originate, epicenter, tilt, split, landslides, massive, trough, generated, tsunami, buoys, erupt, predicting, detect, vents, and evacuate.

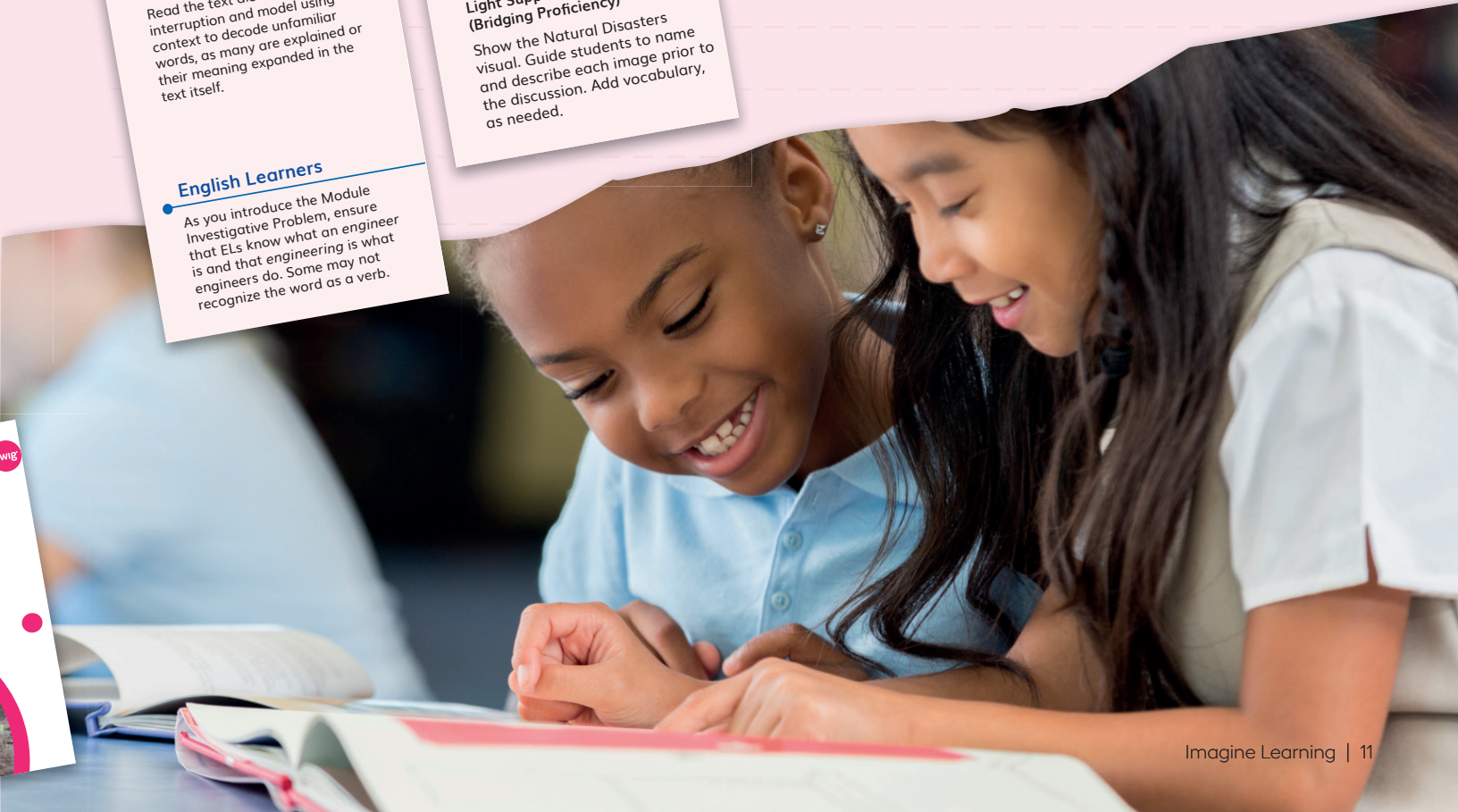
Read the text aloud without interruption and model using context to decode unfamiliar words, as many are explained or their meaning expanded in the text itself.

English Learners

As you introduce the Module Investigative Problem, ensure that ELs know what an engineer is and that engineering is what engineers do. Some may not recognize the word as a verb.

Sidebar Supports

English Learners sidebars throughout the Teacher Edition provide differentiation strategies for teachers to support English Learners of all proficiency levels, with specific guidance on how to tailor the lesson to accommodate English Learners. Strategies include cognates, cloze frames, language comprehension, language production, and close reading strategies.



As students investigate science in Twig Science Middle School, there is increased focus on Tier 3 words. These are the words infrequently used in conversation but which students will encounter in curriculum texts and tests. So they are important if students are to comprehend often challenging informational texts in lessons and ultimately perform well on tests. Given the extent of Tier 3 vocabulary use and the central part it plays within scientific texts, strategies to enable learners to understand and internalize key vocabulary are embedded in all areas of the Twig Science program. Many of the strategies provided for English Learners can also be used more widely where key vocabulary requires direct teaching.

Language Routines

Research-based language routines developed in collaboration with Stanford University’s SCALE team are woven throughout each module. They are used to support sense-making and language development concurrently, as the two are inextricably linked. The embedded routines support all students in their acquisition of and facility with domain-specific language while giving students agency around their own learning, opportunities to make meaning together, and metacognitive awareness.

- Productive Discussion with Collect and Display
- Stronger and Clearer Each Time
- Co-Craft Questions

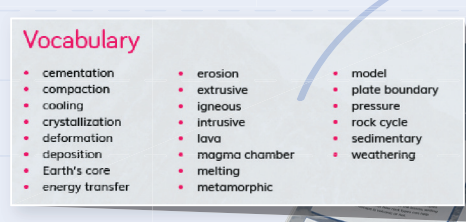
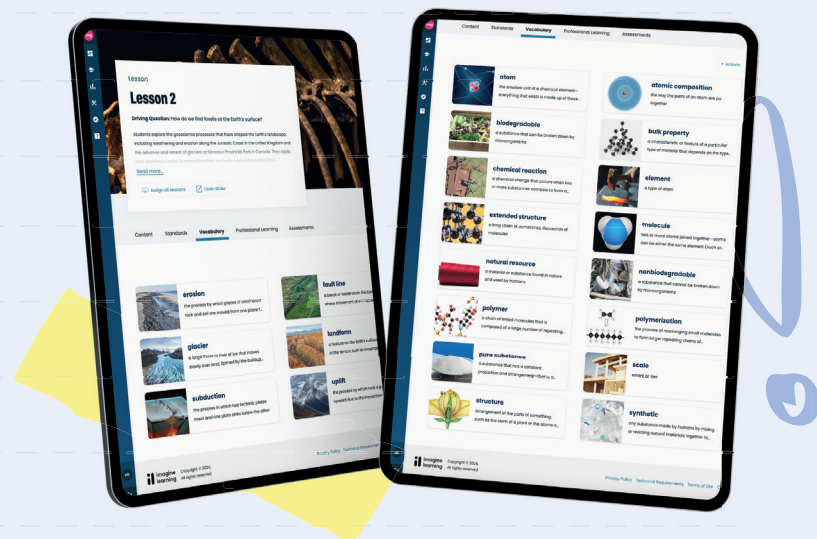
Science Glossary

Key Tier 3 terms can be searched at point of use in the digital Science Glossary, where there are student-facing definitions, audio to help with pronunciation, and images and videos. Words can be filtered by lesson and also assigned to students for further study using the suggested Vocabulary Routines, Graphic Organizers, or your own tasks.

A variety of printable resources are also available to support students and teachers, including an All About a Word sheet for each glossary term. All About a Word sheets include space for students to add definitions, sentences, synonyms, antonyms, common prefixes, suffixes, and root words.

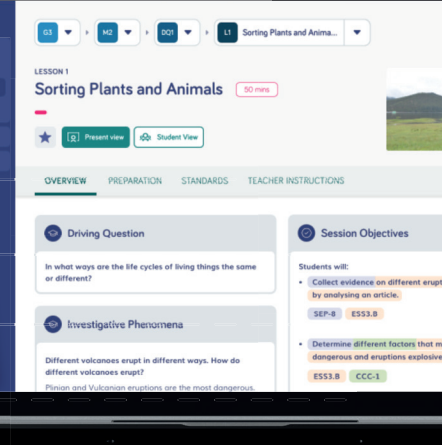
Vocabulary Lists

Vocabulary lists in Teacher Editions alert teachers to the key terms needed for the lesson. They also appear in the students’ Twig Journals so that students are aware of their importance.



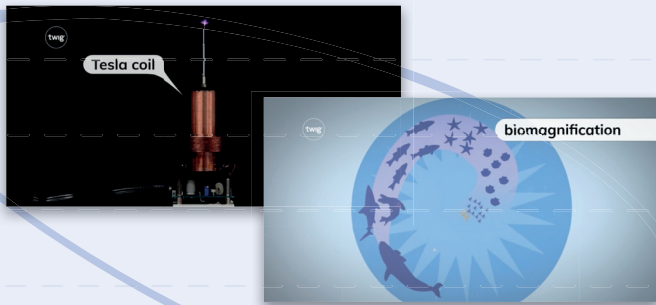
ELA Teaching Aids

Twig Science Middle School includes comprehensive teacher resources to support the development and use of scientific language. They include a guide to the scientific discourse, language routines, and vocabulary in the program, as well as a range of multipurpose worksheets that can be used to extend the literacy component of any activity or project.



Videos

Integrated videos reinforce key vocabulary through the audio, on-screen text, and imagery to aid understanding and help with memory.



Visuals

Diagrams and graphics — both in student Twig Journals and classroom visuals — introduce and make clear key terms.



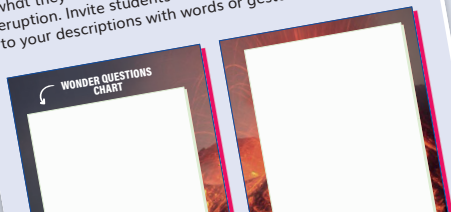
Integrated 3-D Challenges

These project-based learning tasks challenge students to solve problems and present their research through a variety of media, including video, writing scripts and then using the built-in video editing platform preloaded with all the footage they need.



English Learners

Support students as they discuss their observations of the **Before and After** visual. Pair ELs with a partner who has a higher level of English proficiency to help them have students repeat it. Show the visual and point to the volcano and eruption on the board, say each word, and share their observations before the discussion. Write what's happening to support students' ability to describe damage the volcano caused. Model how to describe what they're seeing before and after the volcanic eruption. Invite students to repeat, modify, or add to your descriptions with words or gestures.



Sidebar Supports

There is additional support for Below-Level Learners, and three differentiated levels of support for English Learners at points where new vocabulary is introduced. Students are also encouraged to use context to work out the meaning of new words.



SCIENCE

PROFESSIONAL LEARNING

Twig Science professional learning sessions help science teachers and leaders maximize the use of the Twig Science curriculum, assessment, and resources. To see the full range of sessions, use the QR code. The sessions below are specifically designed to be relevant to the approach to literacy instruction in Twig Science.

Twig Science Elementary & English Language Arts

Second Year of Instruction

Teachers / Leaders / Coaches; TK-5

Virtual: 3 hours

Onsite: Full Day / Half Day

Explore the informational text embedded in the Twig Science program. Learn how to use text features, structures and content to make this challenging type of reading more accessible to students. Find classroom time to teach ELA through science with this cross-curricular approach.

English Language Learners in Twig Science Elementary

Second Year of Instruction

Teachers / Leaders / Coaches; TK-5

Virtual: 3 hours

Onsite: Full Day / Half Day

Setting up English learners for success while using Twig Science is easy with point-of-use differentiation in every lesson. Sentence frames, visual organizers, vocabulary pre-teaching, and cultural connections can all be utilized during class or designated ELD time.

ELA Integration in Twig Science Middle School

Second Year of Instruction

Teachers / Leaders / Coaches; 6-8

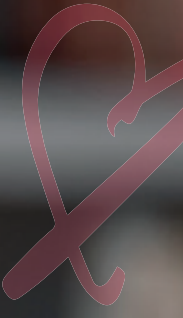
Virtual: 3 hours

Onsite: Full Day / Half Day

This session allows teachers to gain insight into the five types of informational text included in Twig Science as well as scaffolding strategies for students who need support. Using a teaching strategy, participants will examine the 5W's of informational text embedded in Twig Science and discuss the benefits and challenges of explicit reading instruction in the science classroom.

LEARN MORE





You've never seen core like this before



imagineD
classroom



·twig· **SCIENCE**

Imagine Learning is with you every step of the way.

To learn more or to connect with your local account executive, go to www.imaginelearning.com/contact-us

 imagine
learning
empower potential™