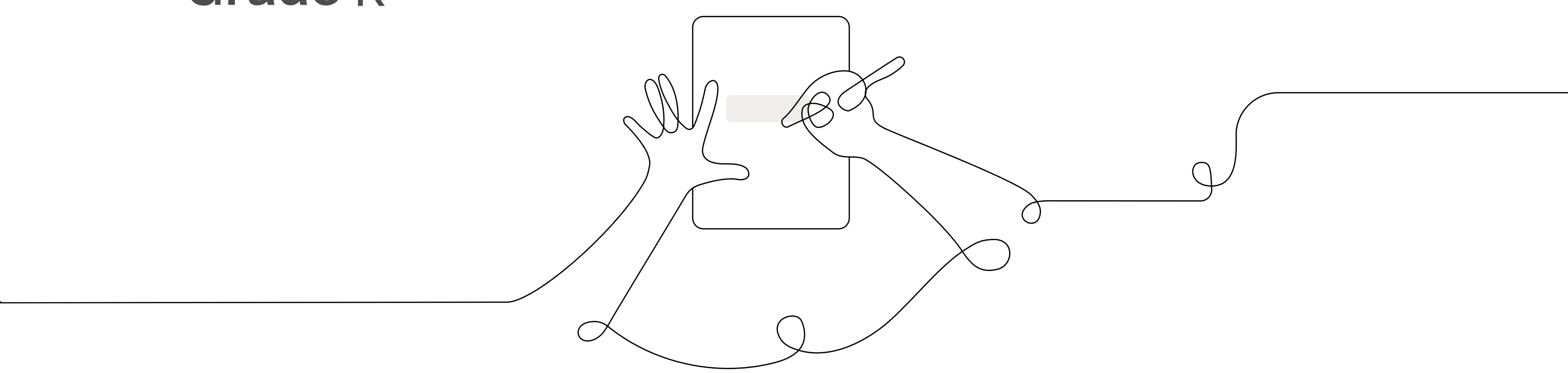
AmplifyScience

Participant Notebook

Supporting English Learners

Grade K



K-5 Supporting English Learners
Agenda

Launching the session

Language of the science classroom

Embedded and additional strategies for English Learners

Experiencing a Lesson

Planning for supports

Closing

Demo account for your workshop:

URL: **learning.amplify.com** (Log in with Google)

Temporary username: ____________________ **@pd.tryamplify.net**

Password: ____________________

Reflection

Use the provided spaces as a place for reflection throughout the session.

Session goals and student outcomes

What Connect the workshop goal(s) to an outcome you envision for your students.	Why Reflect on why you want this outcome for your students.	How How will your students achieve the outcome? Reflect on what you learned during the workshop that will impact student outcomes.

Triangle – Circle – Square reflection

△	
○	
□	

Three dimensional learning reference

3-D learning engages students in using scientific and engineering practices and applying crosscutting concepts as tools to develop understanding of and solve challenging problems related to disciplinary core ideas.

Science and Engineering Practices

1. **Asking Questions and Defining Problems**
2. **Developing and Using Models**
3. **Planning and Carrying Out Investigations**
4. **Analyzing and Interpreting Data**
5. **Using Mathematics and Computational Thinking**
6. **Constructing Explanations and Designing Solutions**
7. **Engaging in Argument from Evidence**
8. **Obtaining, Evaluating, and Communicating Information**

Disciplinary Core Ideas

Earth and Space Sciences:
- Earth's Place in the Universe
- Earth's Systems
- Earth and Human Activity

Life Sciences:
- From Molecules to Organisms
- Ecosystems
- Heredity
- Biological Evolution

Physical Sciences:
- Matter and its Interactions
- Motion and Stability
- Energy and their Applications

Engineering, Technology and the Applications of Science:
- Engineering Design
- Links among Engineering Technology, Science and Society

Crosscutting Concepts

1. **Patterns**
2. **Cause and Effect**
3. **Scale, Proportion, and Quantity**
4. **Systems and System Models**
5. **Energy and Matter**
6. **Structure and Function**
7. **Stability and Change**

Analyzing an activity: Language of Science

Unit: Balancing Forces
Lesson 1.4

Part 1:

Activity	Analyze the language of science in these activities, What do STUDENTS “do” with the language in this lesson?	How are STUDENTS using and developing language?	**Notes**
Activity 1:			
Activity 2:			
Activity 3:			
Activity 4:			
Word Bank: listening, speaking, writing, receptive language, productive language, individual, partner, group **Types of Language:** Conversational language, academic practice language, science content language			

Part 2: Instructional strategies for supporting English learner's use of language in science

Activity	What embedded strategies were there in the lesson to support students with engaging in the language of science?	What additional strategies might you use to support students in engaging in the language of science? *(Differentiation Brief, Teacher Support Tab, Teacher Toolkit)*
Activity 1:		
Activity 2:		
Activity 3:		
Activity 4:		

Principles for Supporting English Learners:
Principle 1: Leverage and build students' informational background knowledge.
Principle 2: Capitalize on students' knowledge of language.
Principle 3: Provide explicit instruction about the language of science.
Principle 4: Provide opportunities for scaffolded practice.
Principle 5: Provide multimodal means of accessing science content and expressing language.

Five Principles reference

Principle 1: Leverage and build students' background knowledge

Because of diverse cultural and linguistic backgrounds, informational background knowledge of English learner students can vary greatly. The activation and use of background knowledge is integral to students' development of science ideas, and supporting students in using what they already know helps them make connections to what they are learning. In the Amplify Science curriculum, students are asked to think through and discuss what they already know at strategic points within the instruction.

Embedded instructional design

Partner discourse routines	Throughout the program, students often discuss ideas with a partner. The purpose of this is to allow for more student-to-student talk and allow the space to practice using science vocabulary. Often, these discussions are designed to allow students to share their initial ideas about a topic or discuss experiences they have had related to a topic or idea.
Daily Written Reflections	These reflections allow students to reflect on what they already know or have just learned in order to prepare them for what they will learn in the coming session, and is designed to be accessible for all students.
Active reading	Active reading encourages students to ask their own questions and make connections between what they read and what they already know. This process helps students use their background knowledge to understand what they are reading and generate questions that can lead to new understanding.
Anticipation guides	With an anticipation guide, students learn how to activate their background knowledge, focus their reading, and support statements with textual evidence. An anticipation guide may help English learners engage with and reflect on key ideas before, during, and after reading.

Five Principles reference (cont.)

Principle 2: Capitalize on students' knowledge of language

By virtue of knowing more than one language, English learners are equipped with linguistic resources. They know that language can be used to describe, argue, explain, and persuade — and these are similar to the linguistic tools necessary for understanding science concepts and engaging in science practices. By building on this awareness of the use and function of language, students are able to learn the language of science and feel less anxious about their language abilities. The curriculum focuses on the transferable skills that English learners already possess in order to support their science language development. Related to this is the use of students' native languages in the classroom. Research shows that the use of native language helps students access relevant background knowledge and make sense of ideas. In addition to promoting culture and community in the classroom, use of native language helps English learners to transfer language skills from their home language to English.

Embedded instructional design

Science/Everyday Word Chart	The teacher leads the class in associating a science vocabulary term with an everyday approximation that students already know. The class discusses how the everyday term and the scientific term are similar but not exactly the same, and the teacher highlights the need for using more precise and specialized language in science to explain ideas. The running list in the classroom serves as a quick reminder for students to use scientific terms in place of everyday ones in their talk and writing.
Leveraging native language	At strategic points in the instruction, a Teacher Support note to the teacher suggests they invite students to share observations in English or their native language during informal conversation.
Cognates	The teacher provides instructions about cognates, and students are prompted to look for these as they read and use them to help understand the text.
Multilingual glossary	A glossary is provided with content-area vocabulary available in ten languages (Spanish, Haitian-Creole, Portuguese, Vietnamese, French, Arabic, Mandarin, Russian, Tagalog, and Urdu).

Five Principles reference (cont.)

Principle 3: Provide explicit instruction about the language of science

The study of science provides an authentic purpose for using academic language to describe, explain, and argue. When provided with explicit instruction and models of scientific language (from both teachers and peers), students gain constant exposure to it, and thus take up the language in their speech and writing. However, students do not tend to learn the academic language of science from immersion alone. Therefore, the curriculum includes explicit instruction on reading, talking, and writing like a scientist. Science vocabulary is emphasized throughout the program, as this is an area that is often difficult for English learners and native English speakers alike. Repeated contextualized exposure to, and work with, a small set of high-utility science vocabulary words helps English learners become proficient. The program also includes vocabulary routines that provide them with greater access to target words.

Embedded instructional design

Language frames/sentence starters	Students are provided with questions they can ask each other or ways they can begin their sentences in a discussion. Providing this language helps students get started in expressing their ideas, yet leaves cognitive work for them to do as they complete the language frame.
Argumentation	The emphasis of argumentation is on meaning-making, hearing and understanding the contributions of others, and communicating ideas to build understanding. Argumentation provides rich science language learning opportunities when students are required to obtain, evaluate, and communicate information to refine their ideas and reach conclusions.
Modeling active reading	Students are provided with examples of the types of annotations that they are expected to make during active reading. These come from fellow students and/or are demonstrated by the teacher using a think-aloud.
Word relationships	Students demonstrate how different vocabulary terms relate to one another, allowing English learners to understand the relationships between specific vocabulary and content.

Additional support

Word banks	Students may be provided with word banks to help them engage in discussions or express their ideas in writing. These range from key science words that students have been learning, to descriptive words and phrases for students to use when explaining their observations, to comparative language, and to transition words to include in a scientific argument.
Multiple-meaning words	English has a large percentage of words that have more than one meaning. Terms in science often have meanings that are different from how they are used colloquially (examples: plate, energy, mold, property). Teachers are provided with information on words that have more than one meaning, in order to clarify which meaning is meant in science texts.

Five Principles reference (cont.)

Principle 4: Provide opportunities for scaffolded practice

Contextualized practice with science content and the language of science can help English learners feel more comfortable participating in class. Lessons provide strategic experiences as well as opportunities for additional practice. When the class is engaged in independent work, teachers have opportunities to check in with English learners' progress, meet with small groups, and reinforce science concepts. In addition, teachers may be prompted to find time for English learners to extend discussions or spend more time engaged in reading and writing activities. This can be done through teacher modification of the instructional schedule or through homework.

Embedded instructional design

Gradual release	Units are designed so that there is an emphasis on teacher modeling and direction at the beginning of the unit, with students gaining more independence as the unit progresses. This also applies to the program as a whole: In **Grades K-5**, the units are designed and sequenced to provide a progression across the year. In **Grades 6-8**, the first launch unit provides a great deal of scaffolded instruction on reading, argumentation, and other scientific practices, while subsequent units provide deeper forays into these practices.
Graphic organizers	Graphic organizers help students collect their ideas and make connections between their background knowledge and new science concepts in order to synthesize information. These are used throughout the program as students collect data and make observations, organize arguments, and respond to questions.
Argumentation	Argumentation instruction is designed so that students consider various aspects of making an argument throughout the course of the unit before composing oral and/or written arguments at the end of the unit.
Reflective writing	Throughout the lessons students may be called upon to reflect on their understanding of the science content in a short writing activity. This allows students to reflect on, as well as pose, questions that will help them clarify their understanding of the content.
Clear and concise instructions	Instructions are tailored to students' learning needs so that they can understand the expectations quickly, and easily clarify what is expected of them at any point during an activity. This includes the use of icons or illustrations for procedural directions when needed.

Language practice	Before sharing in a group of four or with the whole class, students discuss their ideas with a partner. This provides students an opportunity to practice expressing their ideas and use the language of science in a low-stakes way before sharing their ideas with a larger group.
Creating and using models	Scientific models require language use that builds conceptual understanding and refines student thinking. Models also provide a non-verbal way to express initial understanding and can support the development of student explanations.
Modeling tools *(Grades 2-5)*	Modeling tools allow students to use visuals to make sense of science content in a low-stakes environment. Modeling tool uses are often embedded as students construct or apply their understanding of science concepts to build a new explanation. These opportunities can help students build confidence with science concepts.
Strategic grouping	Strategies for strategic partnering are essential for English learners as they interact and develop their understanding of new content. Opportunities for them to engage in conversations that are slightly above their language proficiency level can accelerate second-language learning and increase students' confidence engaging in science discourse. However, both homogeneous and heterogeneous partners can lend themselves to supportive and productive discourse opportunities. At times, it may be helpful to allow students with similar native language proficiency to talk together. At other times, it will be helpful to allow students with varied linguistic proficiencies to talk together.
Promoting inclusion in discussions	Many English learners may be hesitant to contribute to class or small-group discussions. There are several steps you can take to help English learners feel comfortable contributing and increase their participation in class discussions: ○ Before a whole-class discussion, give students an opportunity to practice telling a partner something they might want to share with the whole class. Give students a heads-up about the topic of an upcoming discussion well ahead of time so that English learners have more time to consider and prepare for their contributions. ○ Make a suggestion about what a particular student might share in a coming discussion, saying something like, "I see that you and your partner observed ________. Would you be willing to share about that with the class?"

Extended modeling	In this support, the teacher works with a small group of English learners while the rest of the class is engaged in reading. The teacher provides additional, more explicit modeling with the same text and gives students opportunities to practice with small sections of the text under their guidance. Teacher Support notes sometimes direct teachers to provide brief individual coaching to English learners about strategies for active reading. These include engaging with the visual representations in a text first, chunking the text, previewing the text, and providing additional modeling of annotation.
Partner reading	ELs may benefit from partner reading, rather than individual reading, during reading-focused lessons.

Five Principles reference (cont.)

Principle 5: Provide multimodal means of accessing science content and expressing science knowledge

Students are provided with multiple pathways to access science content. Lessons are designed with varied access points for English learners so that they are able to understand instruction, use visual representations, and participate in and contribute to collaborative groups. Language-level appropriate student work products help ELs express their understanding of science concepts. They also provide English learners with accountability measures at their level of language acquisition that are not only multimodal, but engaging. This allows them to accurately demonstrate their acquired science knowledge. For example, if students are asked to write an explanation of a science concept, students might also be able to create an annotated visual representation to show their understanding of the same idea.

Embedded instructional design

Multimodal instruction	For each key concept, students Do, Talk, Read, Write, and/or Visualize the important ideas in at least three modalities. Each chapter includes multiple exposures to and activities designed around the same concept. In units, a small set of key ideas are addressed in multiple ways, rather than covering a lot of territory without allowing for deeper understanding to develop.
Use of visual representations and images	The visual nature of science is supportive for English learners (and all students) in learning the language of science. The program capitalizes on this by strategically providing visual representations for vocabulary words, ideas, and concepts when needed.
Interpreting and creating visual representations	The program includes instruction on interpreting and analyzing visual representations, and does not assume that just because they are visual that students will know how to interpret them. Students can express their understanding of science content through explaining or creating visual representations.
Use of physical and digital models	Visually rich models, including Sims, modeling tools, and physical models, allow students to show their thinking or make a visual claim. These are often embedded before discussion or writing.

Additional support

Additional practice in other modalities	Engaging in more extensive whole-class discussions about relevant ideas can support English learners before they write. Whole-class discussions can help less certain students finalize ideas as they listen to the ideas of their peers. Posting key vocabulary words or providing a word bank enables students to draw from discipline-specific vocabulary as they write.
Additional visual representations	English learners can access science content through visual representations. They can build on this visual understanding by then engaging in the text.
Optional graphic organizers	Because graphic organizers provide a visual framework for English learners to express their thinking, it allows them more time to focus on their understanding of essential science content. English learners may be provided with optional graphic organizers to help them collect, organize, and/or synthesize their ideas. Or, a graphic organizer that is provided to English learners may have some language included or may be partially completed to reduce the language demands of the task.
Response options	When an extended written response is called for, it may be more appropriate for some English learners to express their understanding by using a combination of drawings/diagrams and words, rather than a purely written response.
Increase wait time for student responses	English learners often need more time to process oral questions than teachers typically allow before calling on students. In addition to considering the content of a question, English learners are likely to need time to make sense of unfamiliar words or phrases and/or to mentally translate questions into their native language. Increasing your wait time to ten seconds before calling on students will likely increase the participation of English learners in class discussions.
Students summarize	Extended discussions or complicated instructions may be challenging for some English learners to understand. Hearing a summary in students' words can help them in these situations. After giving a set of instructions or after a period of class discussion, invite a student or several students to summarize the main ideas of the discussion or the steps of the instructions. If many of your English learners speak the samenative language, you might invite students to summarize in their native language.

Planting Guide

This guide is intended to provide background about the growth of the different plants students will investigate throughout the unit, as well as provide tips for adjusting the Plant Investigations based on the circumstances of your schedule. We recommend you read this document in its entirety at the beginning of the unit, and then refer to it as needed as your class works through the investigations.

For specific details on how to set up each investigation, see the Preparation section for the lesson during which it is scheduled to begin.

Timelines by Investigation

The timelines below assume you teach science every day. Please use the information to plan accordingly, being careful to pay attention to how weekends and holidays may affect scheduling.

Do Plants Need Water Investigation

Garlic cloves placed in water need about two or three days to begin growing roots; they will show the most growth and change between three to ten days after they are put in water. Be certain to keep the water clean so that the cloves do not mold. If the water is kept clean, the cloves should continue to live and grow without soil for two or three weeks. You may wish to prepare a couple of extra cloves just in case one or two do not grow.

Lesson 1.7: Students set up the Do Plants Need Water Investigation.

Lesson 2.3: Students observe initial growth, using their investigation materials.

Lesson 2.5: Students observe more growth, using their investigation materials. This is the last day students work directly with the Do Plants Need Water Investigation materials.

Lesson 2.6: Teacher shows a demonstration garlic plant to support student discussion of the investigation. This is the last day the class works directly with the Do Plants Need Water Investigation materials.

This investigation generally works with little additional maintenance from the teacher, as long as there is no mold in the water.

Do All Plants Need Water Investigation

Students plant radish seeds in soil. Make sure the seeds are right up against the clear walls of the plastic cups so that students can see the plants' roots as the seeds begin to sprout. Radish seeds will start to sprout within two or three days if the the soil stays moist during that time. Roots and a small green shoot will begin to grow first. The radish plants will grow observable roots within four or five days.

Lesson 2.1: Students put seeds in moist soil. They do not add water to either of the two cups.

Lesson 2.2: Teacher adds water to the soil in one of the cups.

Lesson 2.3: Students add water to the soil in one of the cups.

Lesson 2.6: Students observe the cup with water and the cup with no water, noticing the roots growing below the soil.

Having the students water the radish seeds in Lesson 2.3 should leave sufficient time for the roots to grow by Lesson 2.6. It is important to keep the soil moist, but not wet, after students have watered one of their cups in Lesson 2.3. The soil should feel cool and damp to the touch, but should not leave water on your finger when you remove your finger from the soil. Too much water will cause the radish plant to mold and, thus, not grow.

It is imperative that the radishes have grown roots for Lesson 2.6. If possible, plan for a weekend to fall between Lessons 2.3 and 2.6 in order to provide ample time for root growth.

Do All Plants Need Light Investigation

The Do All Plants Need Light Investigation allows students to observe watered seeds and compare how they grow when they get light to how they grow when they do not get light. The impact of the lack of light on plant growth is not immediately obvious. Many plants will grow for some time in the dark—getting tall, spindly, and white. Plants grown in the dark also tend not to grow new leaves.

For students to be able to observe these effects, they will need to look at sunflowers that have grown in the light and in the dark for at least two weeks. Given the multiple Plant Investigations in this unit, there will not be adequate time for students to plant the sunflower seeds themselves and observe the seeds' growth. For this reason, you will plant two sunflower seeds for each pair of students far in advance of students realizing that they will do this investigation.

Like the Do All Plants Need Water Investigation, it is important to keep the soil with the sunflower seeds moist, but not wet. It may surprise you that you need to water the seeds in the dark as well as the ones in the light, but watering both will prompt students to make more engaging comparisons about the impact of light on plant growth. The soil in both cups should feel cool and damp to the touch, but should not leave water on your finger when you remove your finger from the soil. Note that less water will evaporate from the soil in the cups kept in the dark, so these seeds will likely not need to be watered as frequently.

Lesson 1.7:	Teacher sets up the Do All Plants Need Light Investigation and maintains the plants until students will use them.
Lesson 3.1:	Students observe the plants that have been growing behind the scenes and record their observations.

How to Adjust Timing of Investigations If Science Is Not Taught Everyday

In order to ensure students will be able to observe the intended growth of the plants, you will need to adjust the timing of the Plant Investigations. First, decide on which days you will teach Lessons 2.3 and 3.2. Then, use this information to figure out when you should plan to set up the investigations.

Do Plants Need Water Investigation

Activities 3 and 4 of Lesson 1.7 should be taught three to seven days before the day on which you will teach Lesson 2.3.

Do All Plants Need Water Investigation

Providing additional time for the radish seeds to grow is advantageous and will lead to more observable roots for students to see. Therefore, no modifications are required to the timeline provided on page 2 of this document. As long as you keep the soil in the watered cup moist, you do not need to make additional adjustments.

Do All Plants Need Light Investigation

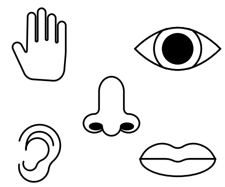
Using the instructions in the Preparation section of Lesson 1.7, set up the Do All Plants Need Light Investigation 14 to 20 days before students will observe the sunflower plants in Lesson 3.1. Be sure to keep the soil in both cups moist throughout the entire time the seeds are growing.

What Scientists Do

To answer questions, scientists . . .

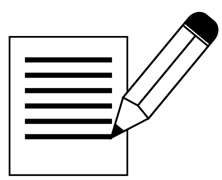
observe

(1.3)



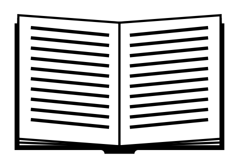
record

(1.3)



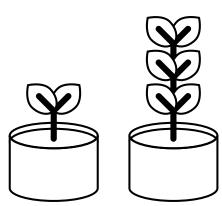
read

(1.5)



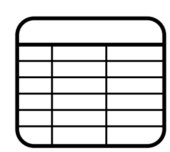
compare

(1.4)



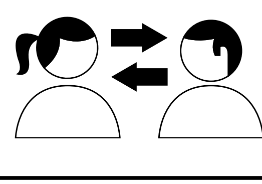
investigate

(1.7)



communicate

(1.7)



Planning for Support in your Unit

- Navigate to a lesson you'll teach in the upcoming week.
- Skim the lesson to get a sense of the activities.
- Read the 3-D statement for the lesson
- Navigate to the Differentiation section of the Lesson Brief, and read the "Specific differentiation strategies for English learners" section.
- Explore the "Teacher Support" tabs at the activity level

Unit: ___________________________________

<table>
<tr><th>Lesson #:</th><th>3-D Statement</th><th>What will students "do" with the language in this lesson? What language will support students in constructing science ideas?</th></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td colspan="2">What are the instructional suggestions for supporting students? How do you envision enacting these suggestions?</td><td>What else might you do or modify to support your students with the language of science in this lesson?</td></tr>
<tr><td colspan="2"></td><td></td></tr>
</table>

Lesson #:	3-D Statement	What will students "do" with the language in this lesson? What language will support students in constructing science ideas?
What are the instructional suggestions for supporting students? How do you envision enacting these suggestions?		What else might you do or modify to support your students with the language of science in this lesson?

Notes

Additional Amplify resources

Program Guide

Additional insight into the program's structure, intent, philosophies, supports, and flexibility. You can find your Program Guide through the Program and Apps menu, which is located in the top right corner of your screen. The Program Guide icon can be found under the "Other Resources" section.

Amplify Help

Frequently updated compilation of articles with advice and answers from the Amplify team.

my.amplify.com/help

Caregivers Site

https://amplify.com/science-caregivers

Amplify Support

Contact the Amplify support team for information specific to enrollment and rosters, technical support, materials and kits, and teaching support.

Email: help@amplify.com

Email: edsupport@amplify.com (pedagogical questions)

Phone: 800-823-1969

Or, reach Amplify Chat by clicking the icon at the bottom right of the digital Teacher's Guide.

When contacting the support team:

- Identify yourself as an Amplify Science user.
- Note the unit you are teaching.
- Note the type of device you are using (Chromebook, iPad, Windows, laptop).
- Note the web browser you are using (Chrome or Safari).
- Include a screenshot of the problem, if possible. Copy your district or site IT contact on emails.

Amplify Science