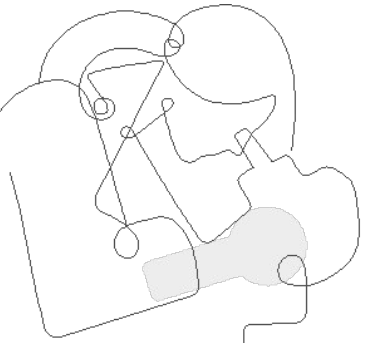
Amplify Science

Part 3: Supporting English Learners
Grade 4

Strengthen workshop



School/District Name
Date
Presented by Your Name

PLPG CERTIFIED PROVIDER

Amplify's purpose statement

Dear teachers,

You do a job that is nearly impossible and **utterly essential.**

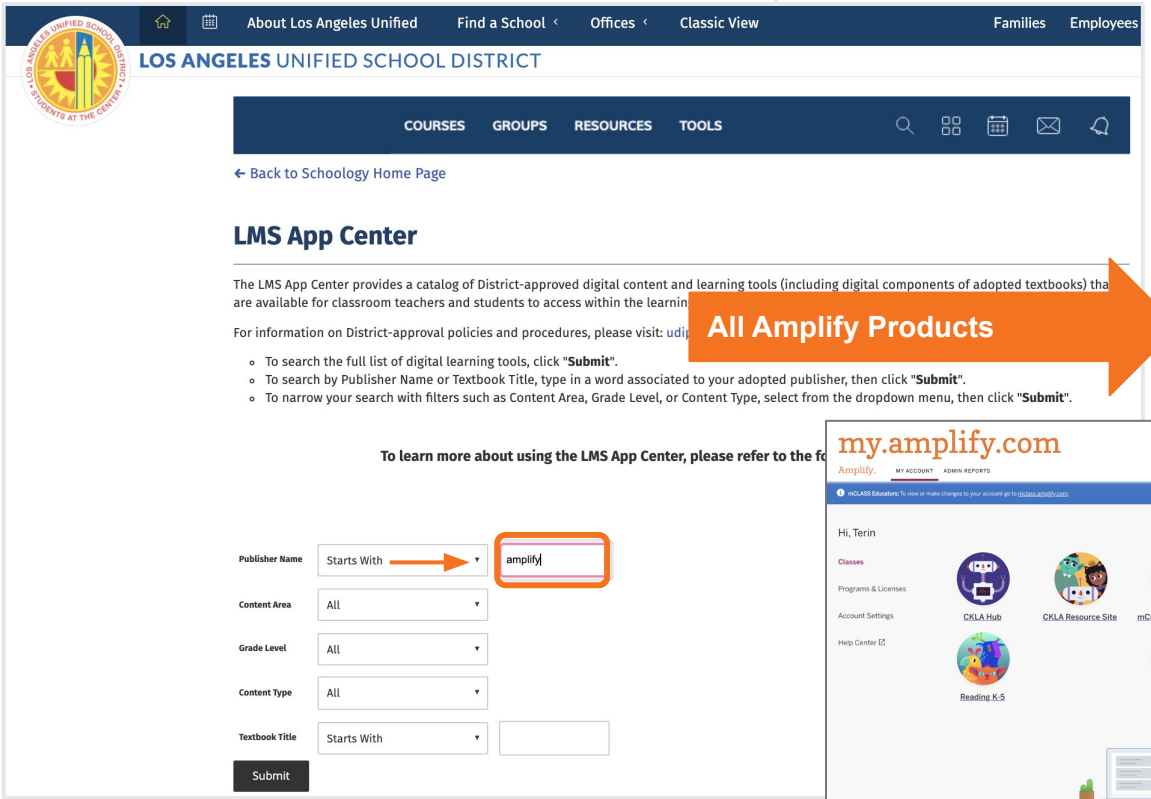
We are in your corner – extending your reach, saving you time, and enhancing your understanding of each student.

Thank you for working with us to craft rigorous and riveting learning experiences for your classroom.

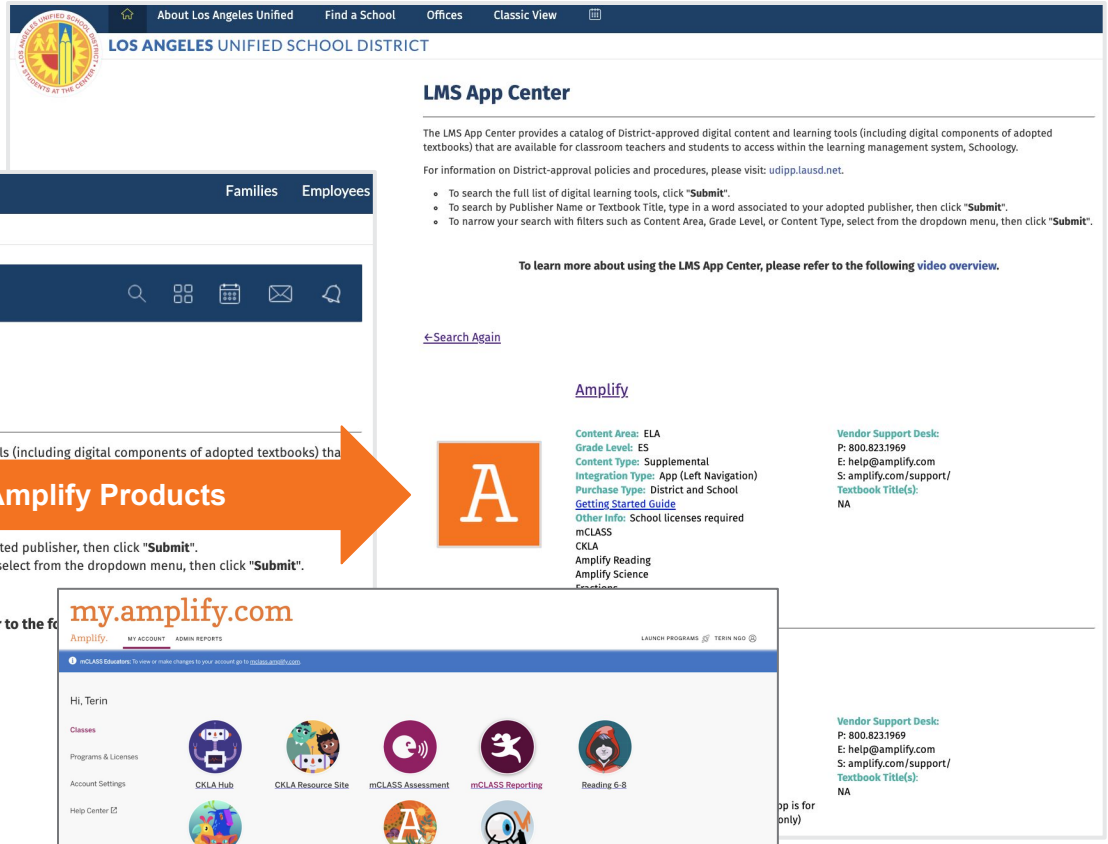
We share your goal of **inspiring all students to think deeply, creatively, and for themselves.**

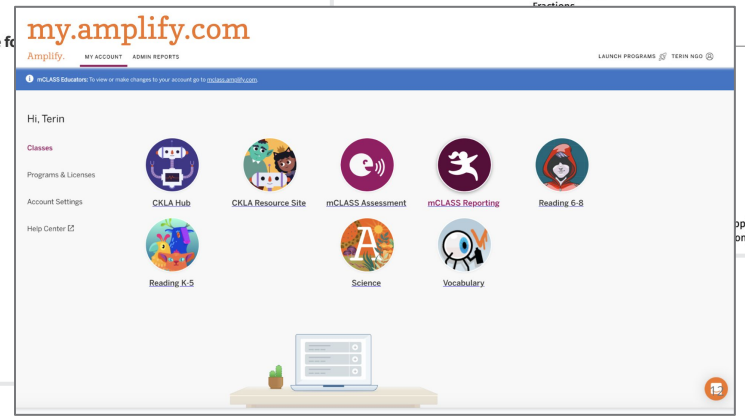
Sincerely,
Amplify

Schoology



All Amplify Products





Join Amplify Science Schoology Group

To join Amplify Science Schoology ES Group: W4PK-W466-63F5B

Navigation Temperature Check

Rate yourself on your comfort level accessing Amplify Science materials and navigating a digital curriculum.

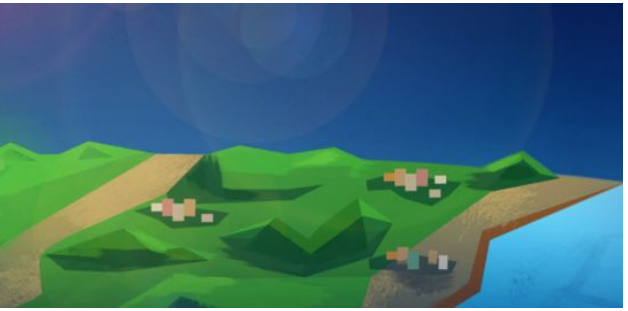
1 = Extremely Uncomfortable

2 = Uncomfortable

3 = Mild

4 = Comfortable

5 = Extremely Comfortable



Plan for the day

- Introduction
- Language of the Science Classroom
- Embedded and Additional Supports
- Experiencing a Lesson
- Planning for Supports
- Closing

Overarching goals

- ❏ Describe the language and literacy demands in a lesson and their role in students developing science understanding
- ❏ Implement key strategies to promote English learners' academic language development and science understanding

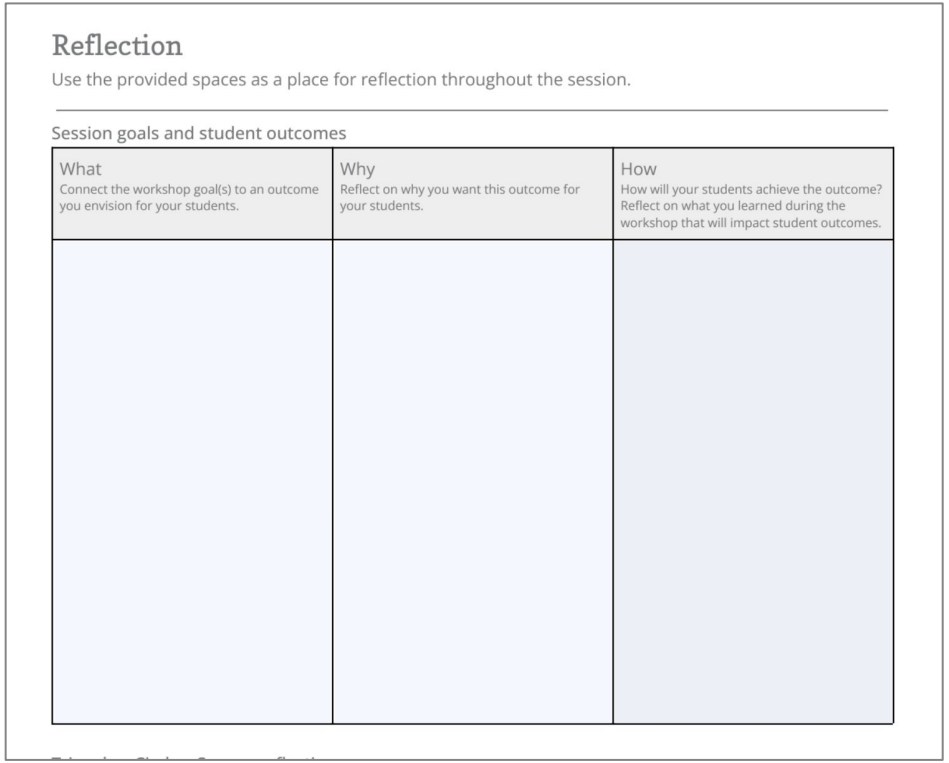
Opening Reflection

Pg. 2

What are your goals
for student outcomes?

Participant Notebook

https://bit.ly/3VqjiQa



Reflection

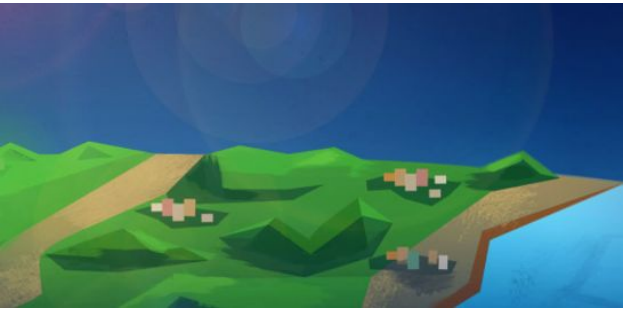
Use the provided spaces as a place for reflection throughout the session.

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.

Norms: Establishing a culture of learners

- **Take risks:** Ask any questions, provide any answers.
- **Participate:** Share your thinking, participate in discussion and reflection.
- **Be fully present:** Unplug and immerse yourself in the moment.
- **Physical needs:** Stand up, get water, take breaks.



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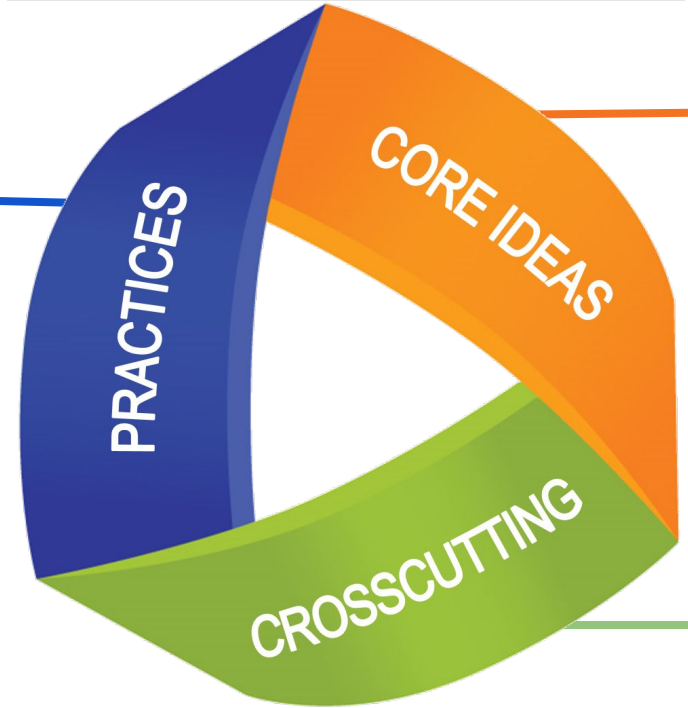
Language of the science classroom

Language and 3-D learning

What scientists do
Science and Engineering Practices



What scientists want to know
Disciplinary Core Ideas

How scientists think
Crosscutting Concepts

Science and Engineering Practices

inquiry

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations

math

4. Analyzing and interpreting data
5. Using mathematics and computational thinking

language

6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

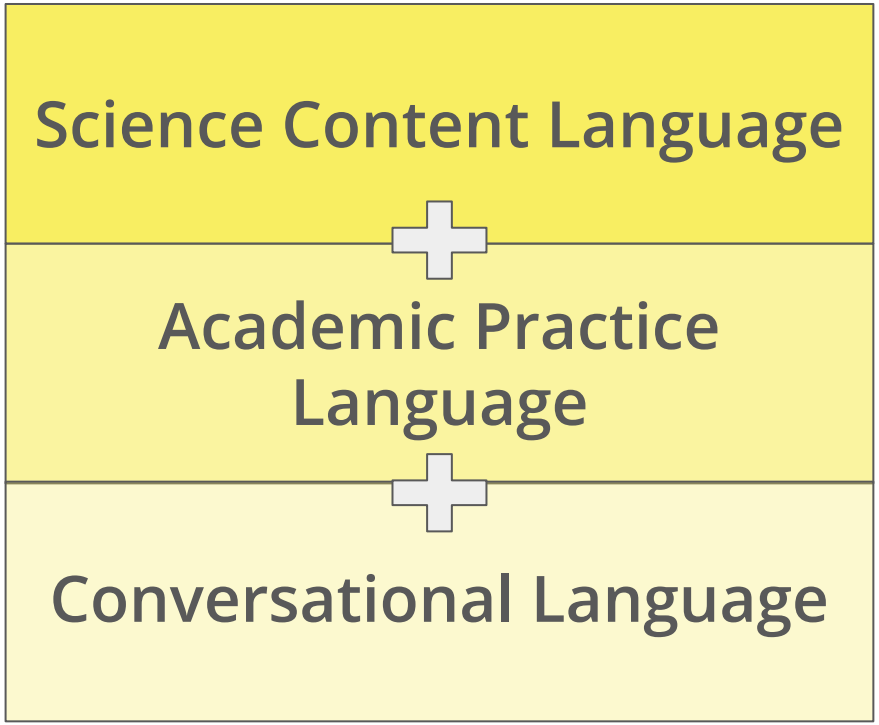
Academic language proficiency

The ability to successfully use language for reading and writing and for accessing information in disciplinary content areas.

Language acquisition

Language of Science

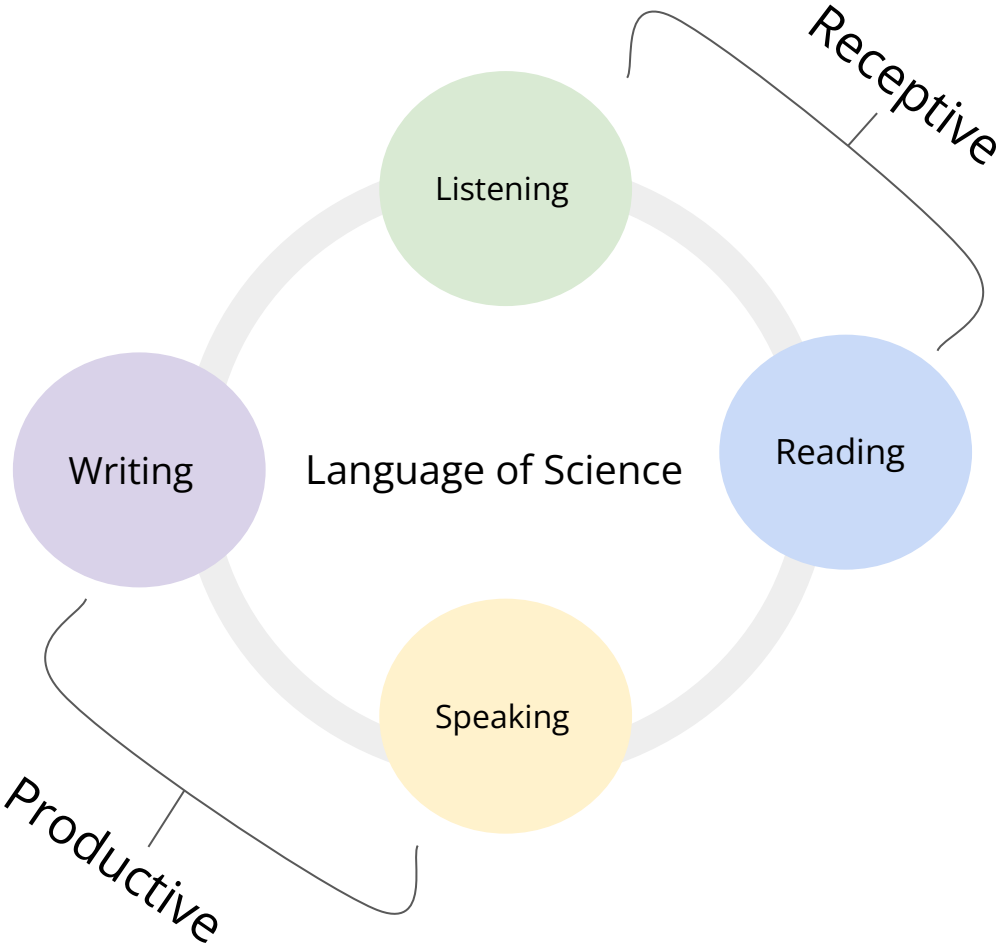
- Multimodal experiences with language
- Explicit instruction and practice



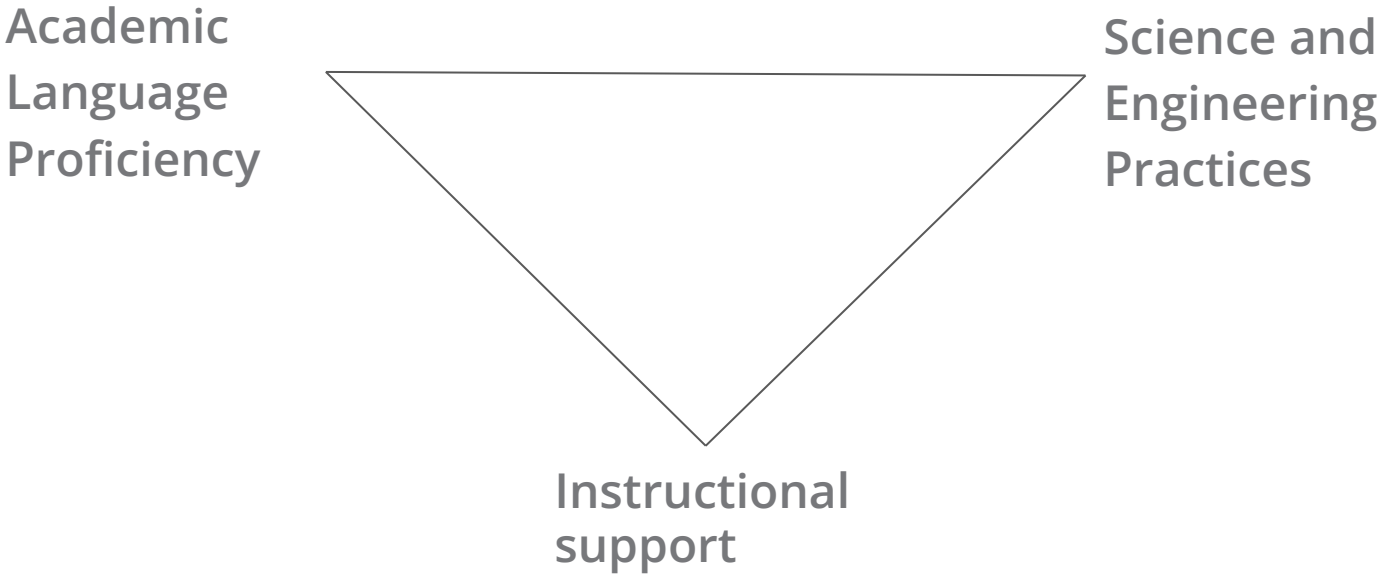
Language acquisition

Language of Science

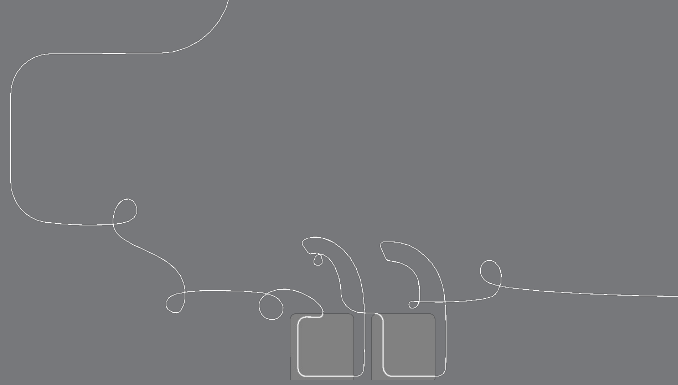
- Learning activities to support productive and receptive language

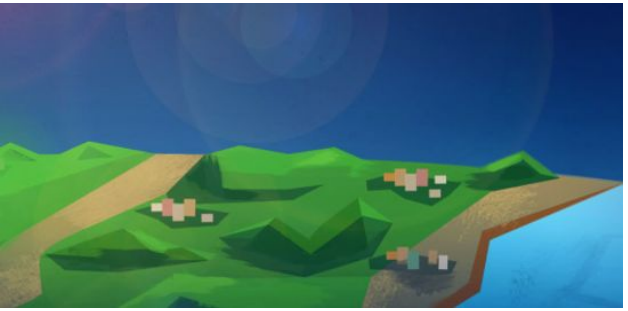


Establishing connections among concepts



Questions?





Plan for the day

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Embedded supports

5 Principles for Supporting English Learners

Principle 1: Leverage and build students' informational background knowledge.

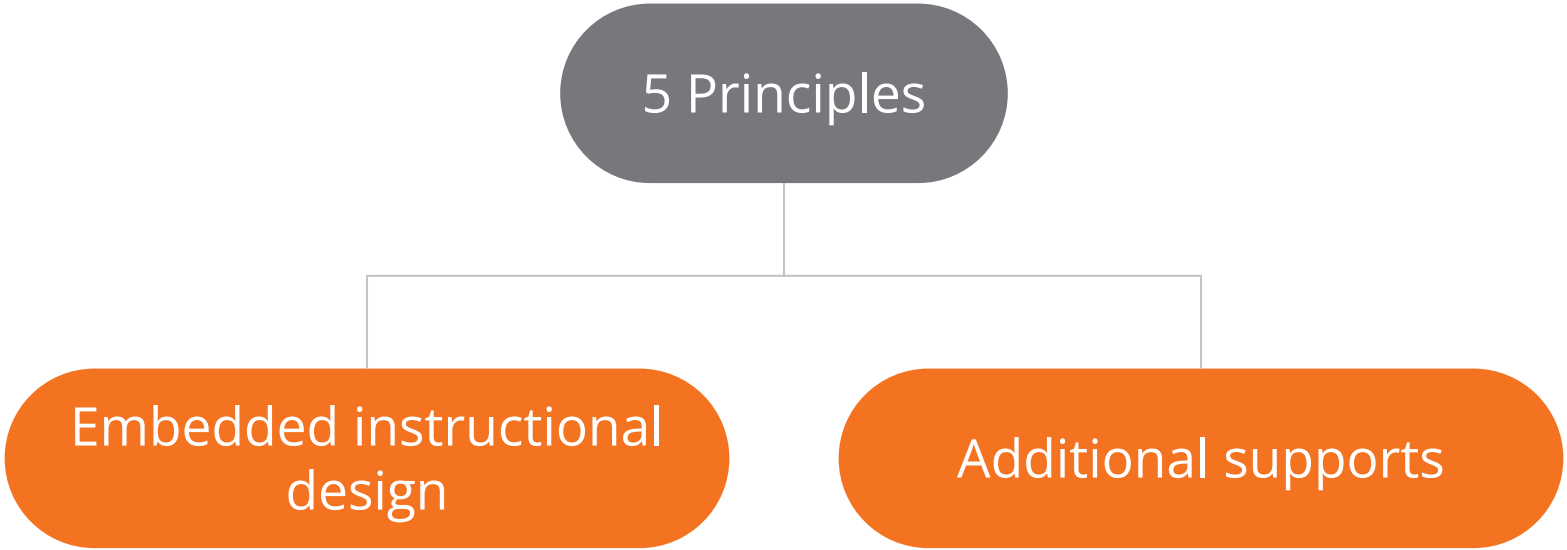
Principle 2: Capitalize on students' knowledge of language.

Principle 3: Provide explicit instruction about the language of science.

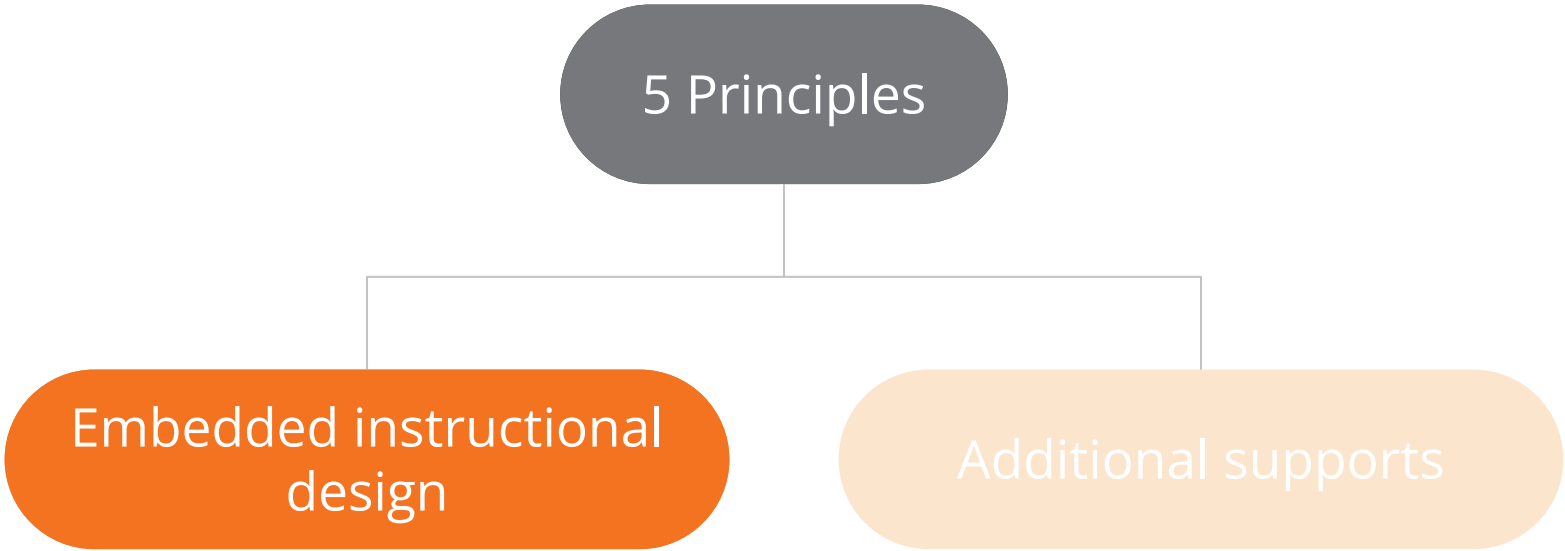
Principle 4: Provide opportunities for scaffolded practice.

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

Supports for English learners



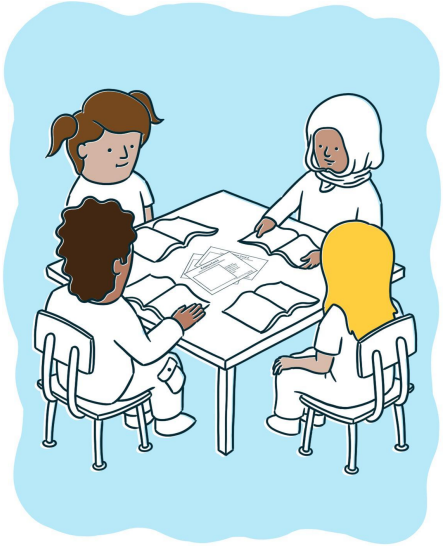
Supports for English learners

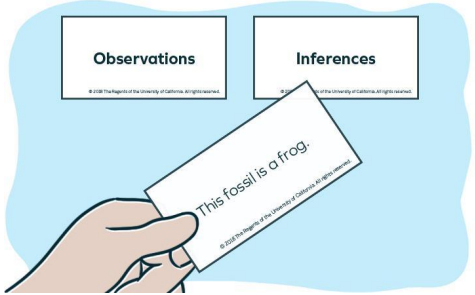


Embedded supports

Examples

- Discourse and sensemaking Routines

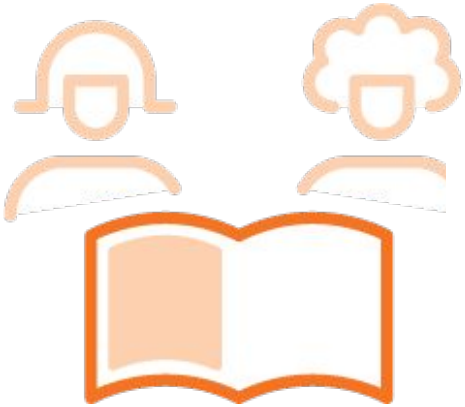




Embedded supports

Examples

- Reading routines
- Multimodal Instruction

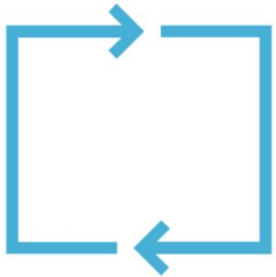


Partner Reading Guidelines

1. Sit next to your partner and place the book between you.
2. Take turns reading.
3. Read in a quiet voice.
4. Be respectful and polite to your partner.
5. Ask your partner for help if you need it. Work together to make sure you both understand what you read.

Multimodal learning

Gathering evidence over multiple lessons

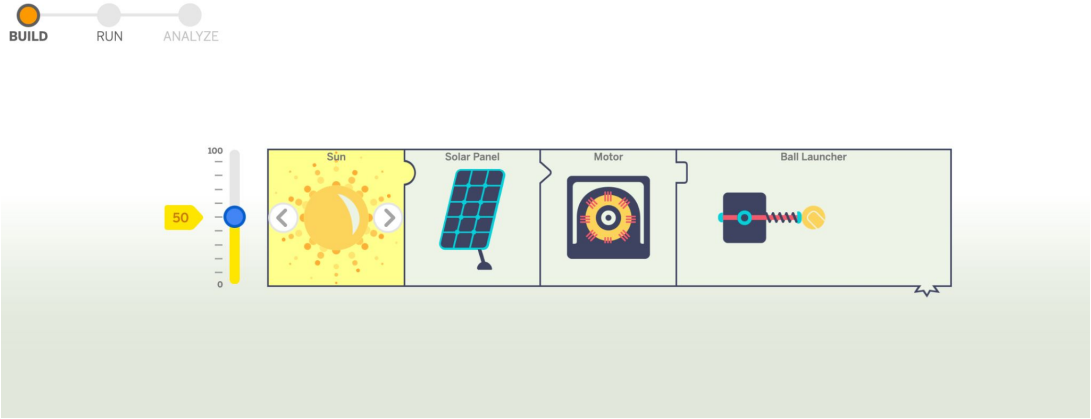


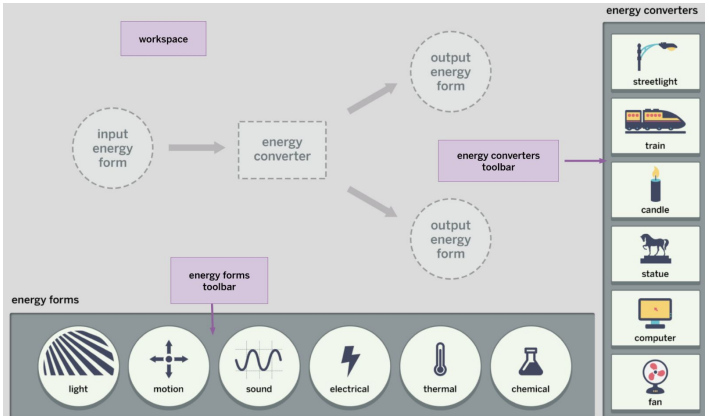
Do,
Talk,
Read,
Write,
Visualize

Embedded supports

Examples

- Visual and digital models
- Visual Representations



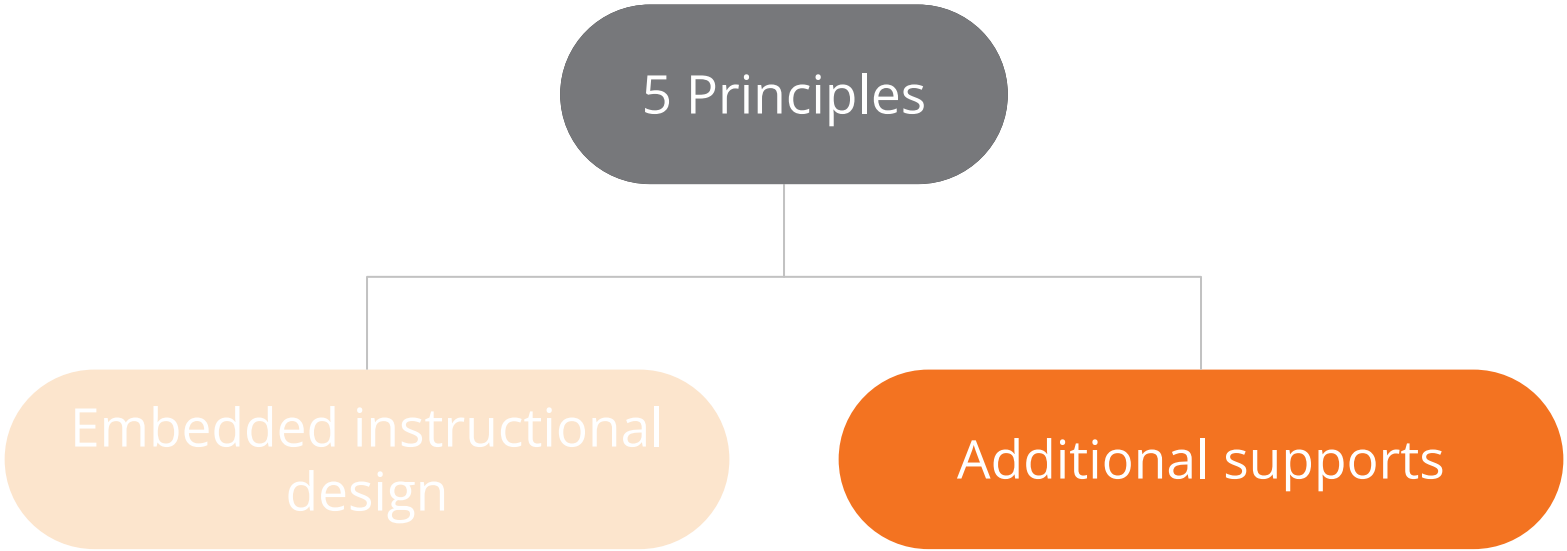


Embedded supports

Examples

- Discourse and sensemaking Routines
- Reading routines
- Visual Representations
- Multimodal Instruction
- Visual and digital models

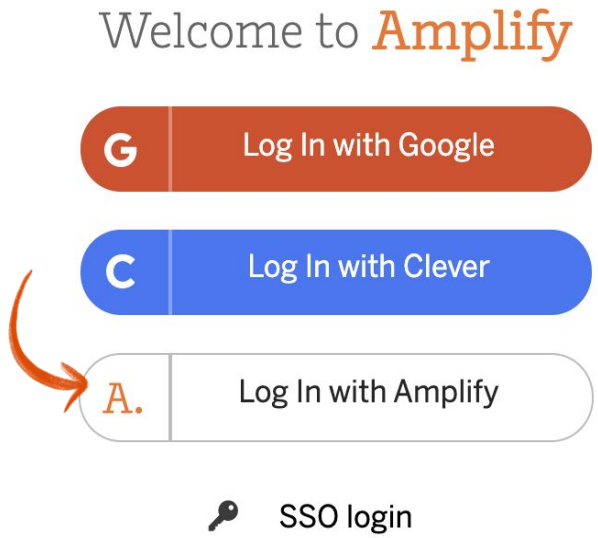
Supports for English learners



Log in through your Schoology account

or use Demo Account

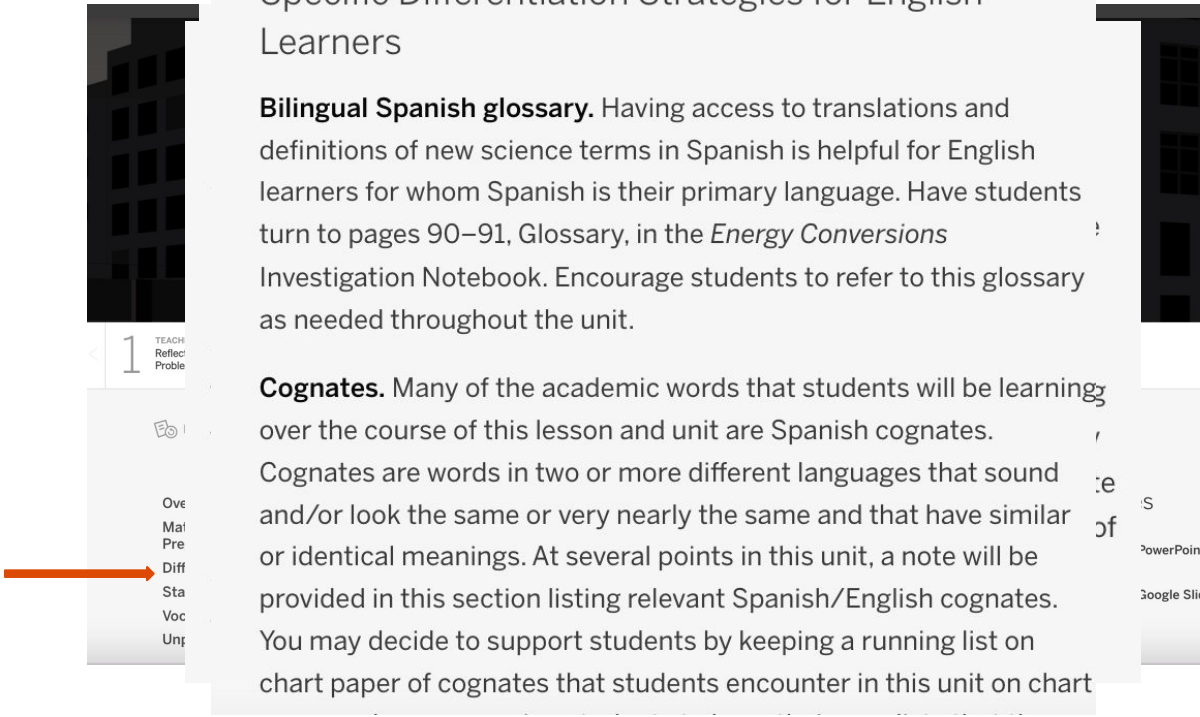
1. Go to **learning.amplify.com**
2. Select **Log in with Amplify**
3. If you're already logged in with other Google accounts, click **Use another account**
4. Enter teacher demo account credentials
   - UN: californiasci@pd.tryamplify.net
   - PW: AmplifyNumber1



Providing additional support

Lesson-specific differentiation

- Embedded supports for diverse learners
- Potential challenges in this lesson
- Specific differentiation strategies for:
  - English Learners
  - Students Who Need More Support
  - Students Who Need More Challenge



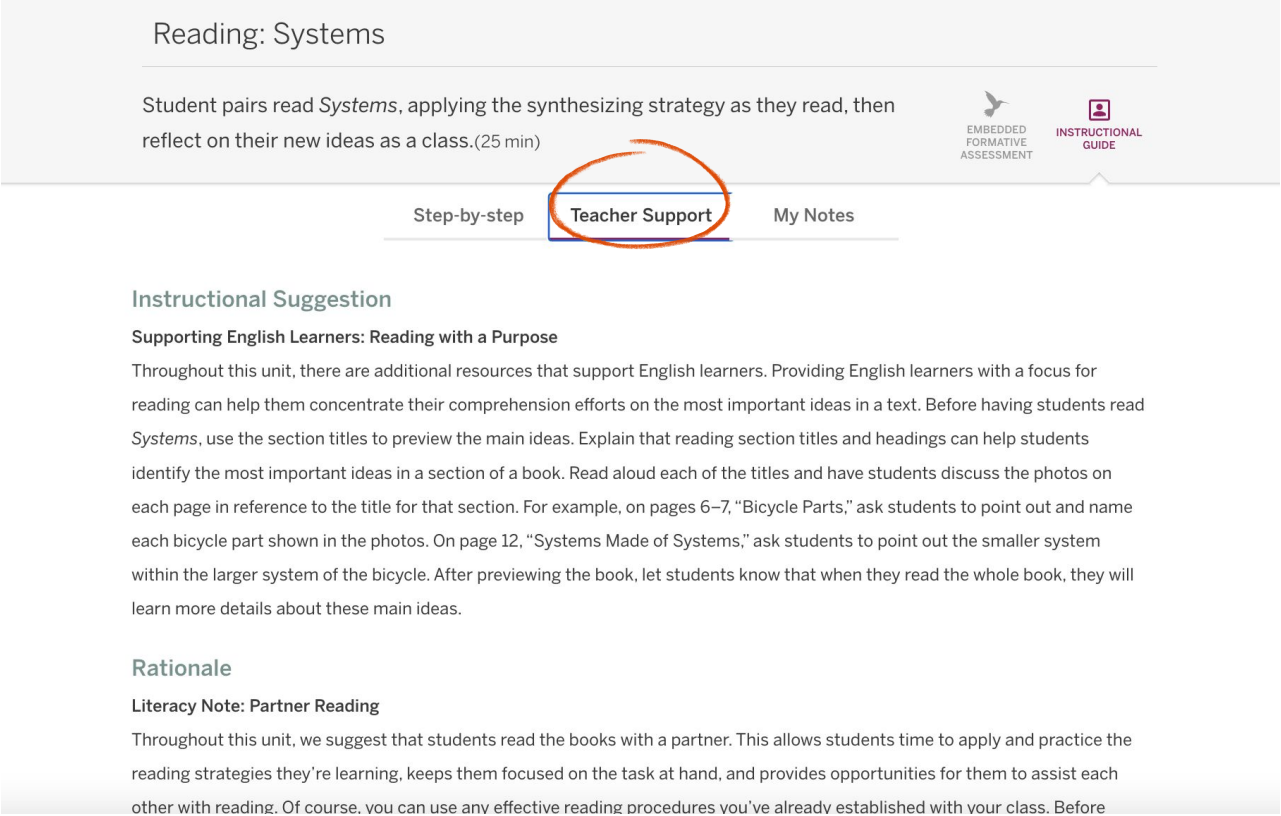
Specific Differentiation Strategies for English Learners

Bilingual Spanish glossary. Having access to translations and definitions of new science terms in Spanish is helpful for English learners for whom Spanish is their primary language. Have students turn to pages 90–91, Glossary, in the *Energy Conversions* Investigation Notebook. Encourage students to refer to this glossary as needed throughout the unit.

Cognates. Many of the academic words that students will be learning over the course of this lesson and unit are Spanish cognates. Cognates are words in two or more different languages that sound and/or look the same or very nearly the same and that have similar or identical meanings. At several points in this unit, a note will be provided in this section listing relevant Spanish/English cognates. You may decide to support students by keeping a running list on chart paper of cognates that students encounter in this unit on chart

Providing additional support

Teacher Support notes



Reading: Systems

Student pairs read *Systems*, applying the synthesizing strategy as they read, then reflect on their new ideas as a class.(25 min)

EMBEDDED FORMATIVE ASSESSMENT

INSTRUCTIONAL GUIDE

Step-by-step | Teacher Support | My Notes

Instructional Suggestion

Supporting English Learners: Reading with a Purpose

Throughout this unit, there are additional resources that support English learners. Providing English learners with a focus for reading can help them concentrate their comprehension efforts on the most important ideas in a text. Before having students read *Systems*, use the section titles to preview the main ideas. Explain that reading section titles and headings can help students identify the most important ideas in a section of a book. Read aloud each of the titles and have students discuss the photos on each page in reference to the title for that section. For example, on pages 6–7, "Bicycle Parts," ask students to point out and name each bicycle part shown in the photos. On page 12, "Systems Made of Systems," ask students to point out the smaller system within the larger system of the bicycle. After previewing the book, let students know that when they read the whole book, they will learn more details about these main ideas.

Rationale

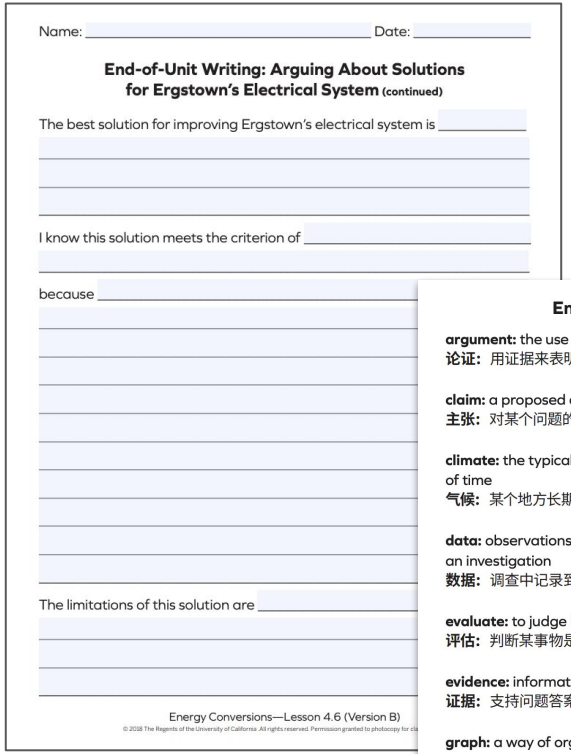
Literacy Note: Partner Reading

Throughout this unit, we suggest that students read the books with a partner. This allows students time to apply and practice the reading strategies they're learning, keeps them focused on the task at hand, and provides opportunities for them to assist each other with reading. Of course, you can use any effective reading procedures you've already established with your class. Before

Providing additional support

Additional resources

- Multilingual glossaries
- Response options
- Version B Assessments (3-5)
- Word banks
- Read aloud functions
- K & 1 speaking and writing Explanation Frames



Name: _____ Date: _____

End-of-Unit Writing: Arguing About Solutions for Ergstown's Electrical System (continued)

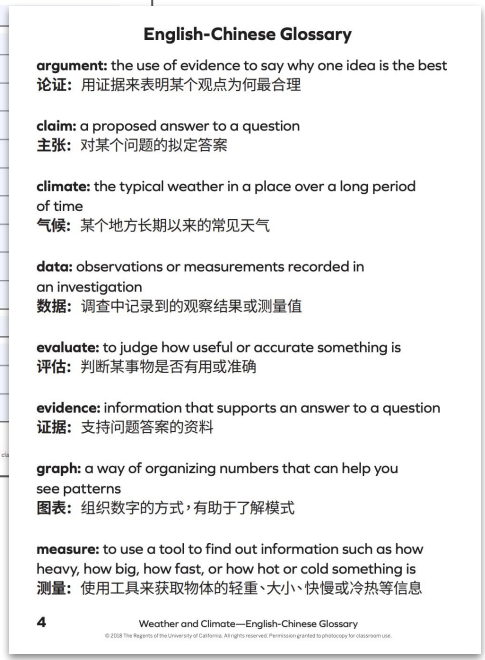
The best solution for improving Ergstown's electrical system is _____

I know this solution meets the criterion of _____

because _____

The limitations of this solution are _____

Energy Conversions—Lesson 4.6 (Version B)



English-Chinese Glossary

argument: the use of evidence to say why one idea is the best
论证： 用证据来表明某个观点为何最合理

claim: a proposed answer to a question
主张： 对某个问题的拟定答案

climate: the typical weather in a place over a long period of time
气候： 某个地方长期以来的常见天气

data: observations or measurements recorded in an investigation
数据： 调查中记录到的观察结果或测量值

evaluate: to judge how useful or accurate something is
评估： 判断某事物是否有用或准确

evidence: information that supports an answer to a question
证据： 支持问题答案的资料

graph: a way of organizing numbers that can help you see patterns
图表： 组织数字的方式，有助于了解模式

measure: to use a tool to find out information such as how heavy, how big, how fast, or how hot or cold something is
测量： 使用工具来获取物体的轻重、大小、快慢或冷热等信息

4 Weather and Climate—English-Chinese Glossary

Providing additional support

Additional resources for K & 1

Support for Speaking and Writing K & 1

- Explanation Frames

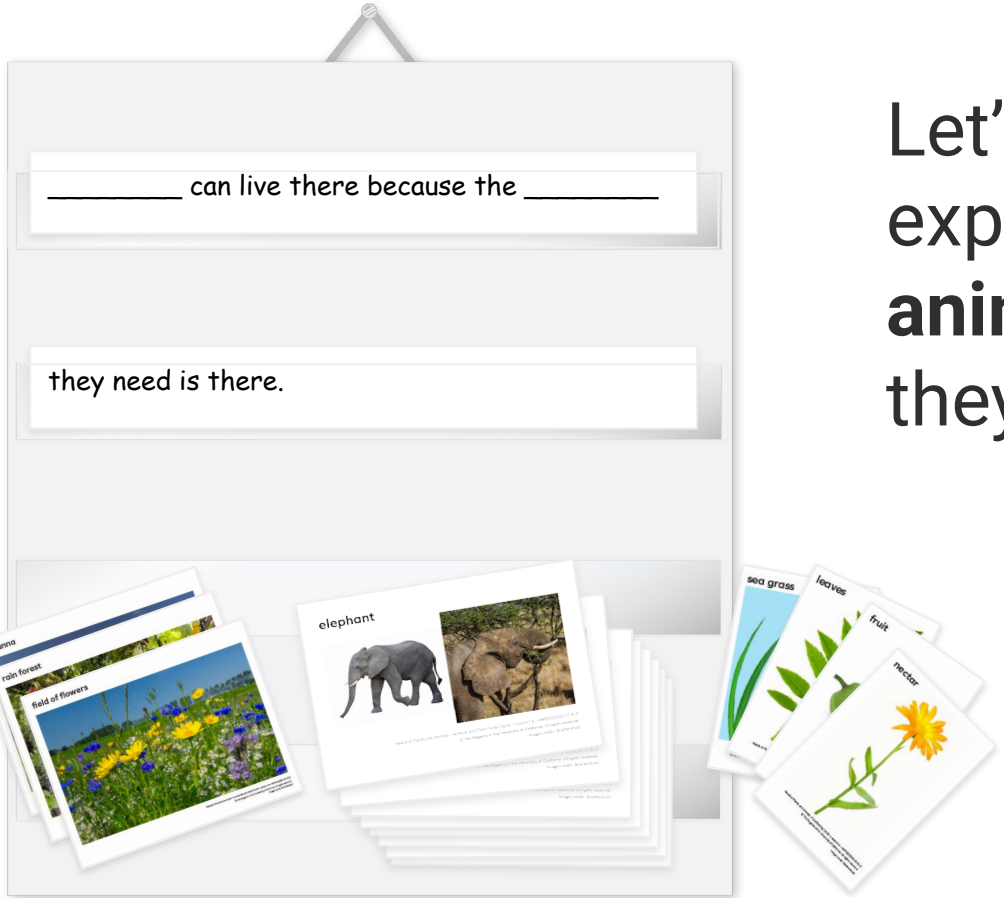
Support for Speaking and Writing K & 1 Explanation Frames

We can talk about animals and what they need the way **scientists** do.

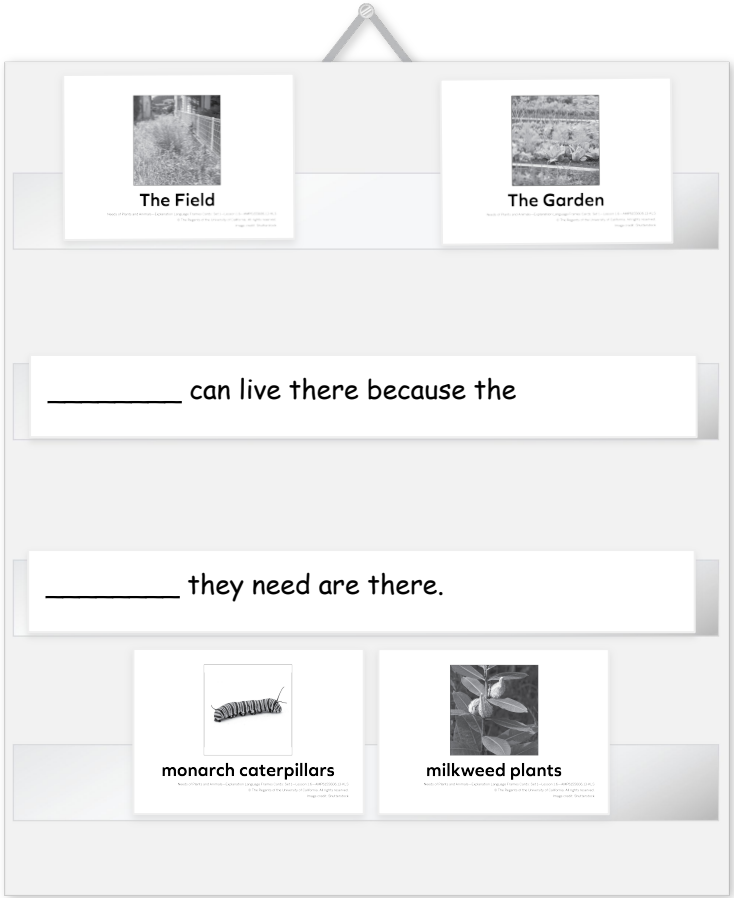
_____ can live there because the _____

they need is there.

Let’s use these words to explain why a **manatee** can live where it does.



Let's use these words to explain why the **other animals** can live where they do.



Now we can explain our ideas as a scientist would.

First, let's explain why **monarch caterpillars can live in the Field.**

Why are there no monarch caterpillars since the Field was made into the Garden?

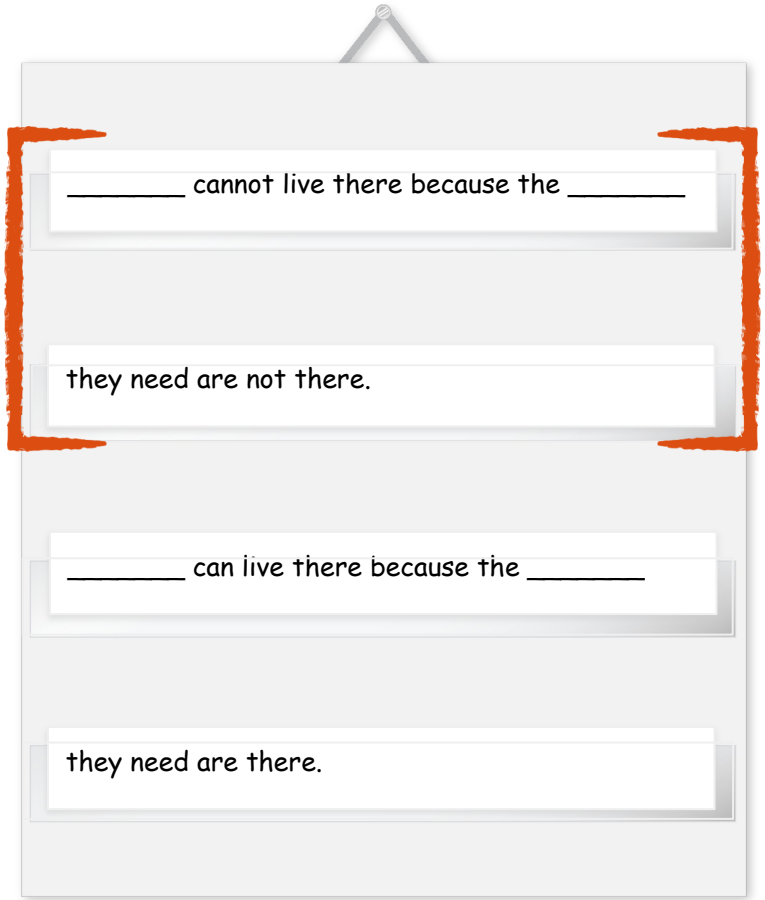
The Garden

Needs of Plants and Animals
Mariposa Grove Cards—Lesson 1.6—AMPG150606.08-KLS

Image credit: Shutterstock

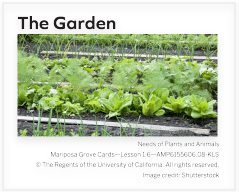
We will think about **the Garden** first.

First, you will share your ideas. Then, I will write them on this chart.



You can use these words to talk with a partner about **why monarch caterpillars cannot live in the Garden**.

Why are there no monarch caterpillars since the Field was made into the Garden?



Let's **record** our ideas.

5 Principles for Supporting English Learners

Pg. 6-14

Embedded and Additional Supports in Amplify Science

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.

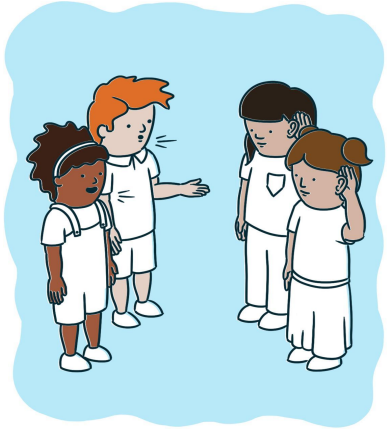
Principle 5: Provide multimodal means of accessing science content and expressing language.

Let's Work

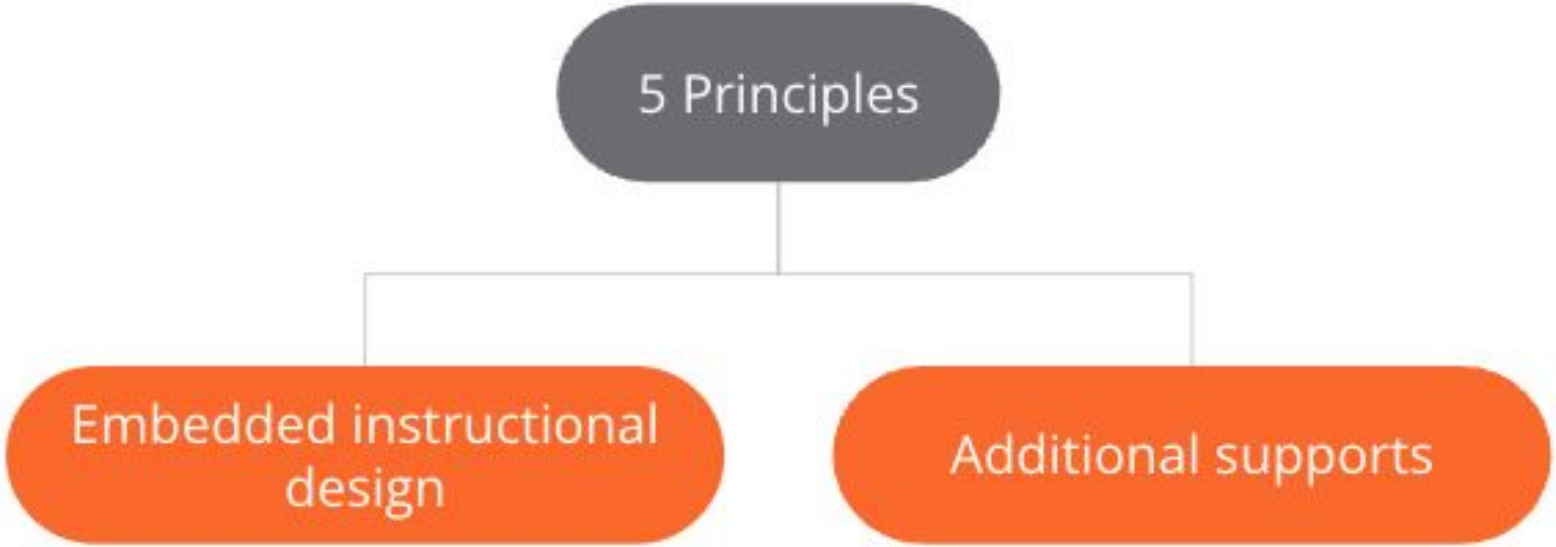
Pg. 6-14

What are the Principles for Supporting English Learners?

- Form 5 groups in the room (could be by tables)
- Each group will be assigned a Principle to internalize.
- Independently read your group's Principle for Supporting ELLs.
- Discuss and Summarize with your group.
- Create an illustration/poster of your findings
- Share out

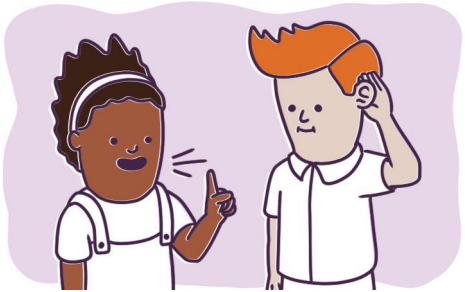


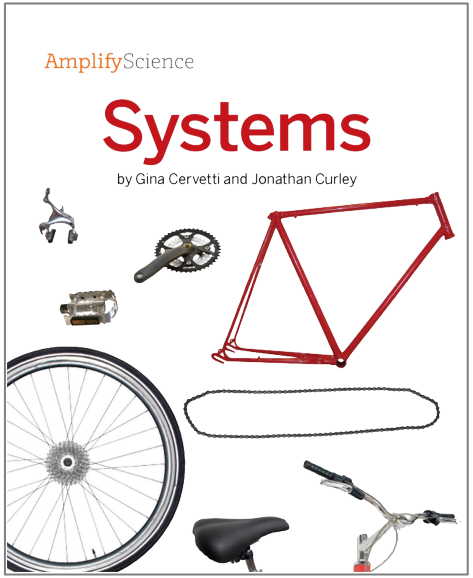
What are the embedded and additional supports that apply to each principle?

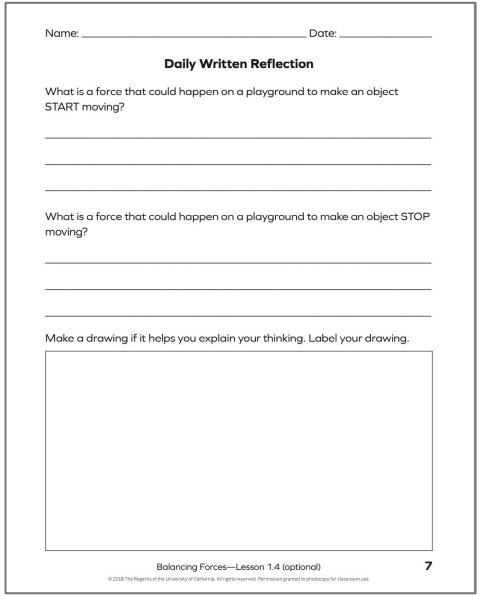


Principle 1: Leverage and build students' informational background knowledge.

- Partner discourse routines
- Daily written reflections
- Active reading
- Anticipation guides







Name: _____ Date: _____

Daily Written Reflection

What is a force that could happen on a playground to make an object START moving?

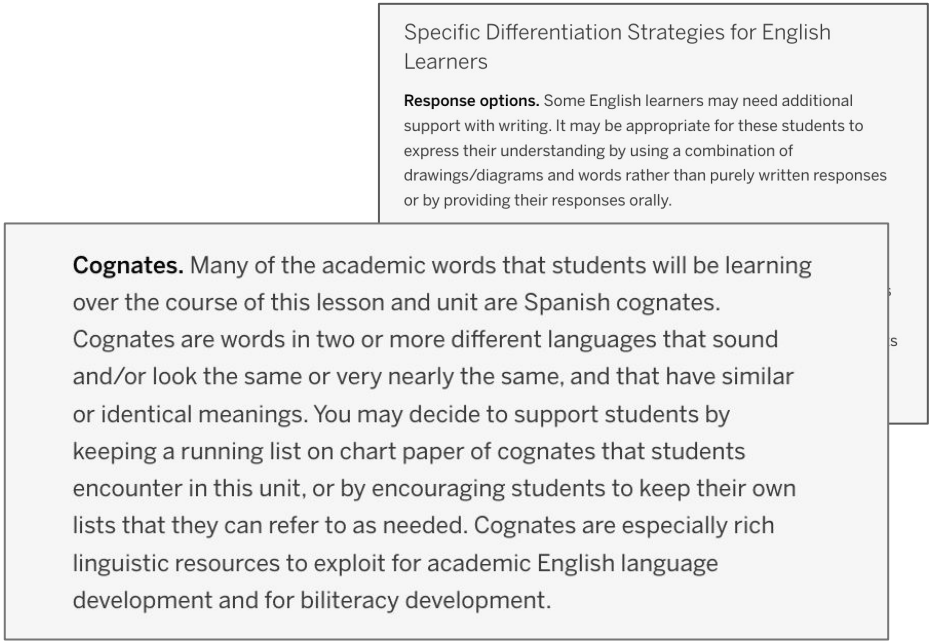
What is a force that could happen on a playground to make an object STOP moving?

Make a drawing if it helps you explain your thinking. Label your drawing.

Balancing Forces—Lesson 1.4 (optional) 7

Principle 2: Capitalize on students' knowledge of language.

- Science/Everyday word charts
- Leveraging native language
- Cognates
- Multilingual glossary



Principle 3: Provide explicit instruction about the language of science.

- Language Frames /sentence starters
- Argumentation
- Modeling active reading
- Word Relationships
- Word banks
- Multiple meaning words

Name: _____ Date: _____

Multiple Meaning Words

Directions:
Some words can mean more than one thing. For each word in the chart:
1. Read the sentence from the book **Forces All Around** that uses the word.
2. Read the two meanings the word can have.
3. Decide which meaning the word has in the sentence from the book and circle that meaning in the table.

Word	Sentence from the book	Meaning 1	Meaning 2
	ard at was	a push or a pull	to make someone do something they don't want to do
	ame?" nany	the sharp end of something	what you count in the score of a game
	ts were nd	a thing that can be seen or touched	the goal of a game

What Is a Scientific Argument?

1. It answers a question with a claim about the natural world.
2. It includes evidence to support the claim.
3. It uses scientific language.
4. It is written for an audience.

Principle 4: Provide opportunities for scaffolded practice.

- Gradual release
- Graphic organizers
- Argumentation
- Reflective writing
- Clear and concise instructions
- Language Practice
- Modeling tools

Simple Electrical System

Part	sun	solar panel	wire	motor with fan
Function	to provide energy to the system	to send electrical energy throughout the system	to move electrical energy from one place to another	to use electrical energy to run

_____ System

Part				
Function				

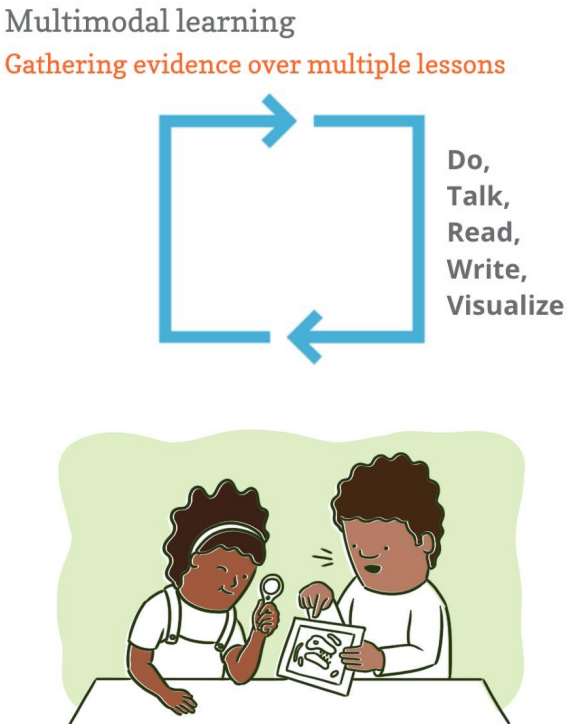
Function of both systems: _____

Principle 4: Provide opportunities for scaffolded practice (cont'd)

- Create and using models
- Strategic grouping
- Promoting inclusion in discussion
- Extended modeling
- Partner reading

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

- Multimodal instruction
- Use of visual representations of images
- Interpreting and creating visual representations
- Use of physical and digital models
- Additional practice in other modalities
- Additional visual representations



Principle 5: Provide multimodal means of accessing science content and expressing language (cont'd)

- Additional visual representations
- Optional graphic organizers
- Response options
- Increase wait time for student responses
- Student summarize

Now it's your turn

5 Principles for Supporting English Learners

There are several resources available to review for embedded and additional supports

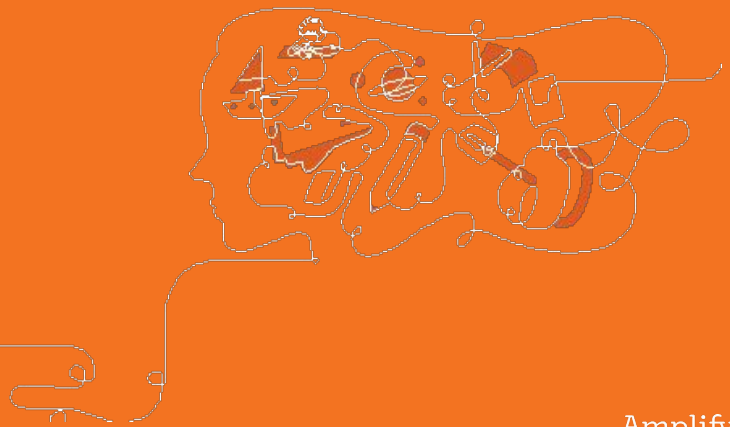
Unit 1 Landing page

- Printable Resources
  - Investigation Notebook
  - Multi-language Glossary
  - Eliciting and Leveraging....

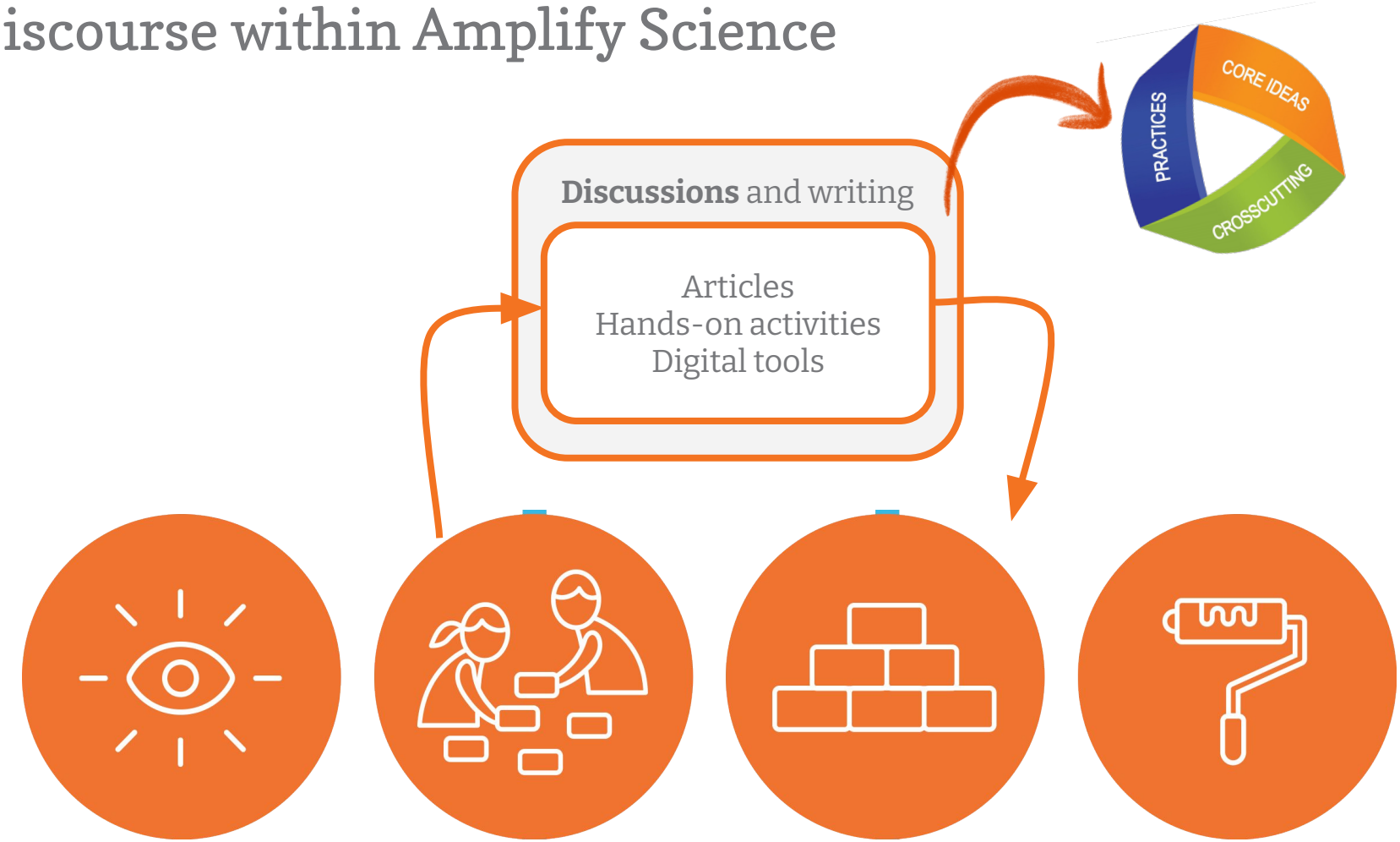
Lesson Page

- Lesson Brief
  - Teacher support tab
- Digital resources (depends on lesson)
  - Classroom Slides
  - Additional resources

Break

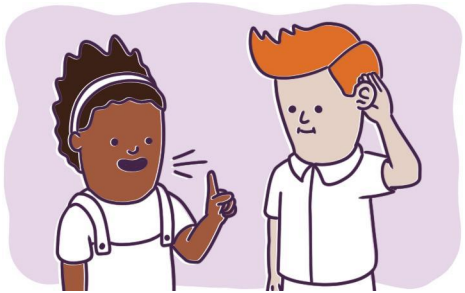


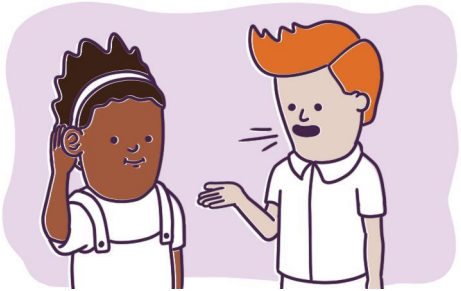
Discourse within Amplify Science



Let's Practice

Discourse Routines





Discourse Routine Reference

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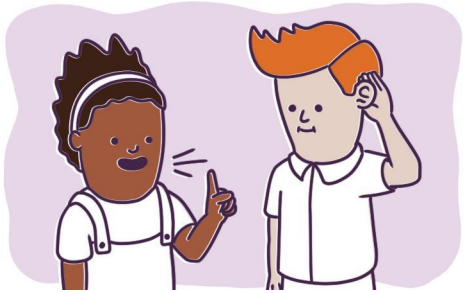
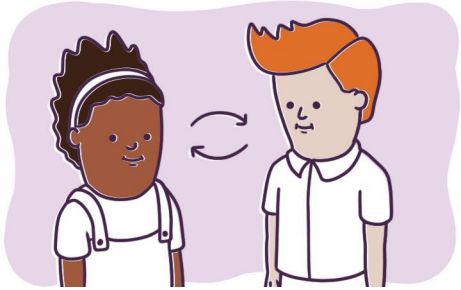
Shared Listening

Shared Listening



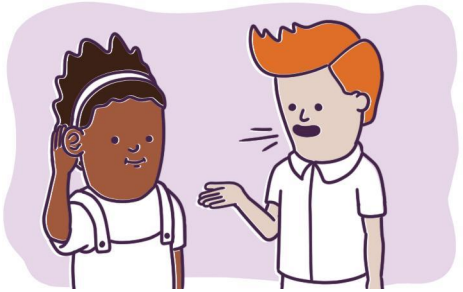
1.

Partner A shares.
Partner B listens.



2.

Partners switch.



3.

Partner B shares.
Partner A listens.

Share ideas on ways you support your English learners.

After doing the shared listening routine, call on individuals to share what their partner said. This demonstrates their ability to listen.

Think-Pair-Share

Think-Pair-Share Routine

Think

Think silently about the question.

Pair

Turn and talk to a partner about the question.

Share

Share your ideas about the question with the class.

Think-Draw-Pair-Share Routine

Think

Think silently about the question.

Draw

Draw your ideas in your notebook.

Pair

Turn and talk to a partner about the question.

Share

Share your ideas about the question with the class.

Think-Write-Pair-Share Routine

Think

Think silently about the question.

Write

Write your ideas about the question in your notebook.

Pair

Turn and talk to a partner about the question.

Share

Share your ideas about the question with the class.

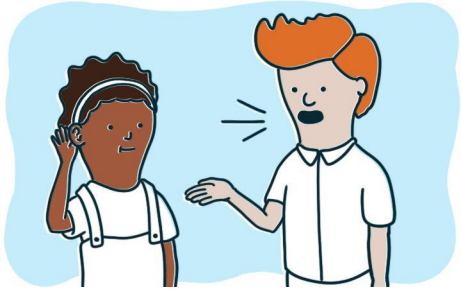
We are used to using this routine. Is there anyone that has tried to build on this strategy or different ways to group students?

Building on Ideas

Building on Ideas

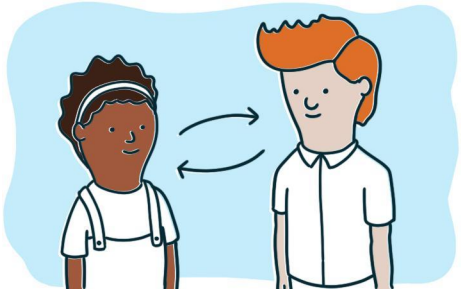
Step 1

I will pose a question. **Partner A shares** for one minute while **Partner B listens.**



Step 2

Partner B repeats what Partner A said, and then **agrees or disagrees.**



Step 3

Partner A repeats what Partner B said, and then says if that **changed their mind or not.**

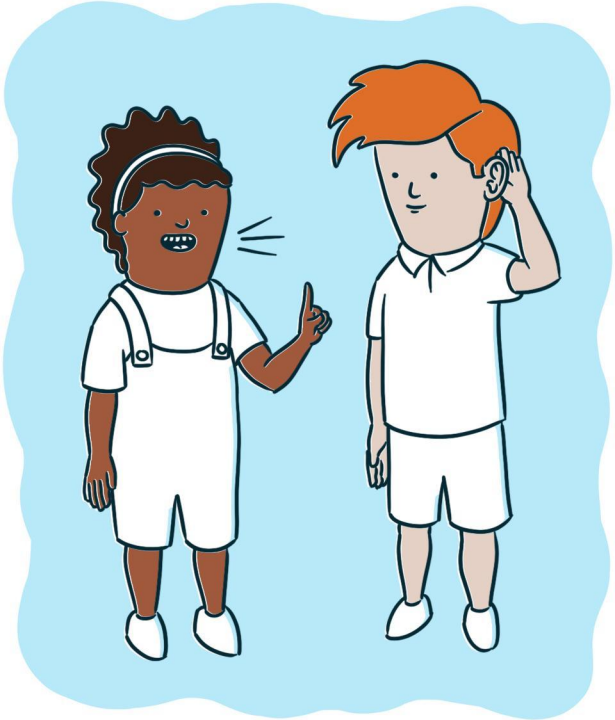
Building on Ideas: Question 1

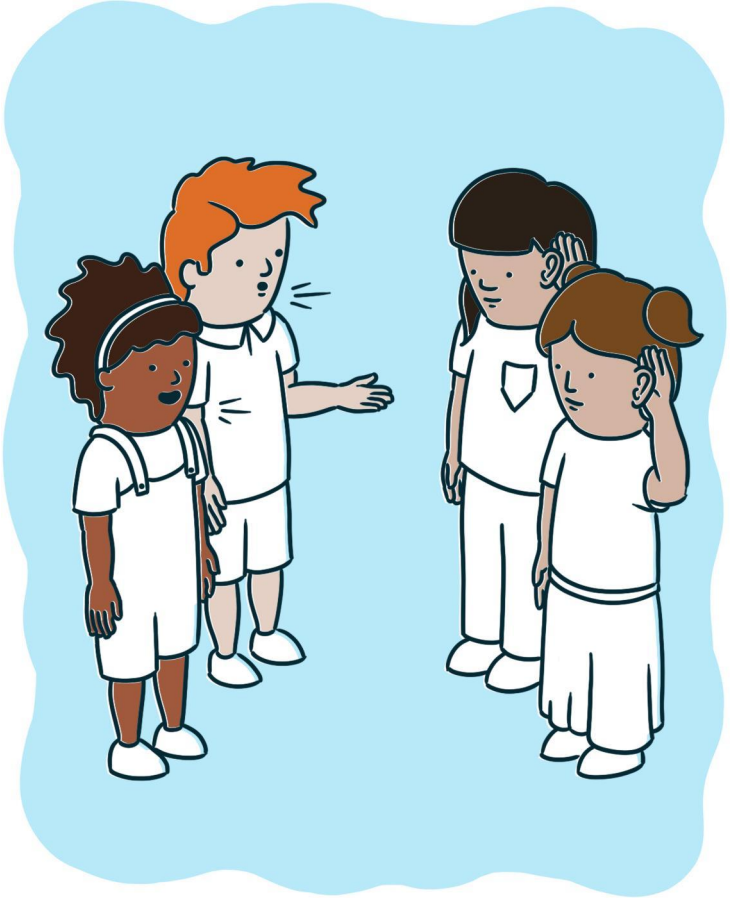
Why do we need to teach Amplify science with fidelity?

Partner A
We need to teach with fidelity because _____.

Partner B
I heard you say _____.
I agree/disagree because _____.

Partner A
I heard you say _____.
This changed/didn't change what I think because _____.





You will now join another pair and discuss your ideas about Question 1.

Why do we need to teach Amplify science with fidelity?

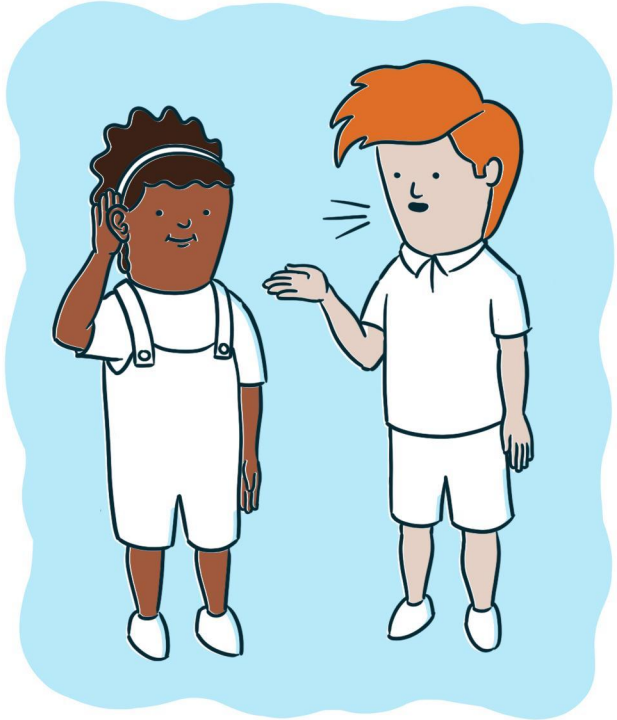
Building on Ideas: Question 2

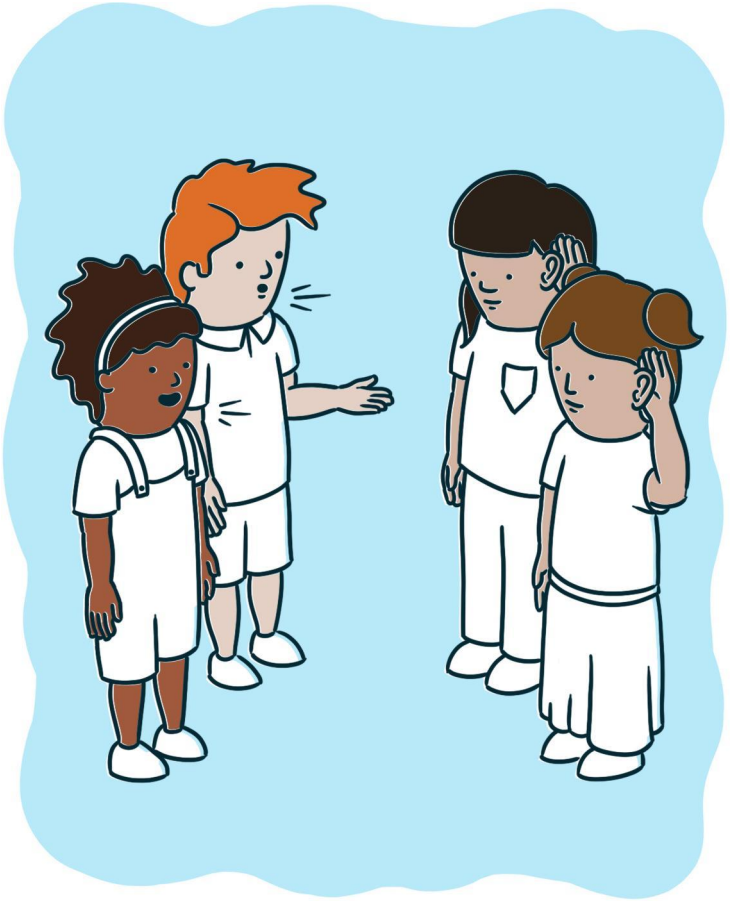
Why is timing important?

Partner B
Timing is important because _____.

Partner A
I heard you say _____.
I agree/disagree because _____.

Partner B
I heard you say _____.
This changed/didn't change what I think because _____.





Join another pair and **discuss** your ideas about Question 2.

Why is timing important?

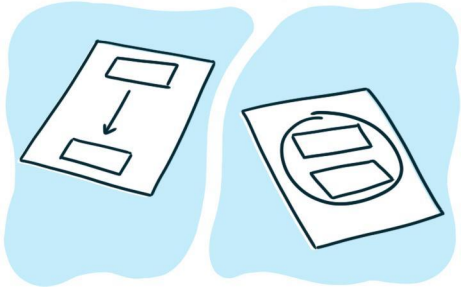
Concept Mapping

Concept Mapping

Step 1

Choose two or three word cards at a time.

Talk about how the words are related.



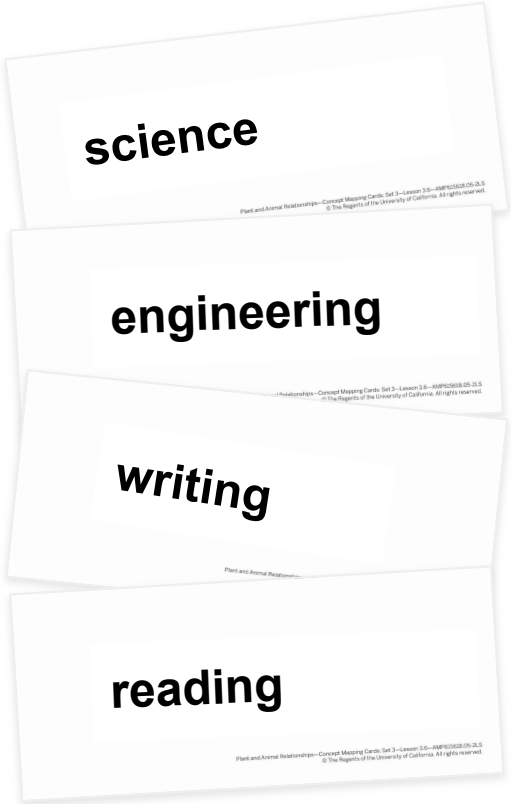
Step 2

Glue the words to a piece of paper.

Draw lines or **circles**, and **write** to show how the words are related.

Step 3

You can **record more words** if you would like.



Choose **two or three** words and **discuss** how those words are related to each other.

Paste two or three word cards on the paper.

Draw and write to show how the words are related.

Thought Swap

Thought Swap

Step 1

Make two lines so that you each have a partner directly across from you.

Step 2

Discuss the first question with your partner.

Step 3

Switch partners and discuss the next question.

Thought Swap Question 1:

What have you been successful with in teaching Amplify Science?

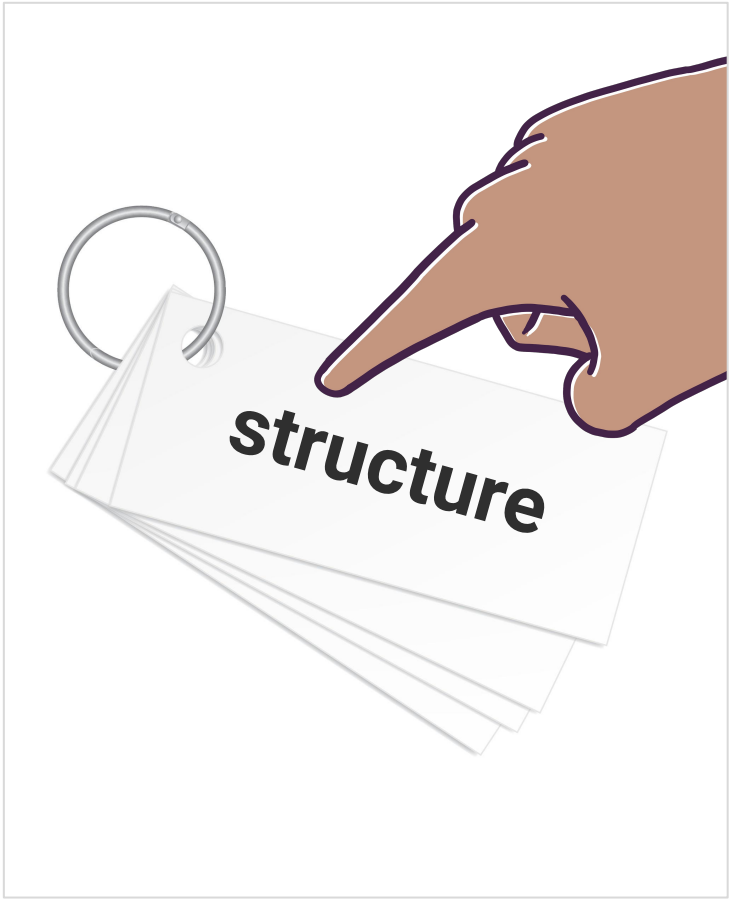
Now, switch partners for Thought Swap Question 2:

What have you struggled with in teaching Amplify Science? How did you address it?

Variation on Thought Swap

Put students in groups of 8 (or 6) and have them rotate as the questions change.

Word Relationships



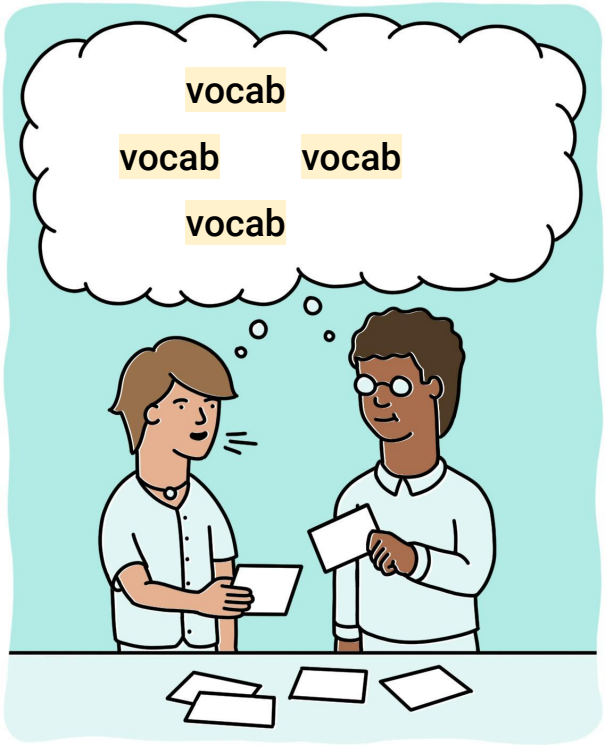
This **word ring** is a tool we can use to remember a word or how to spell it.

Word Relationships Routine

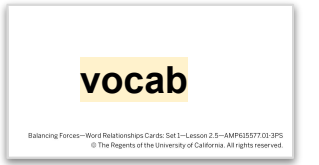
Make Sentences
Use at least two words from the Word Relationships Cards in each sentence. You may use the same word more than once. Try to use all the vocabulary words.

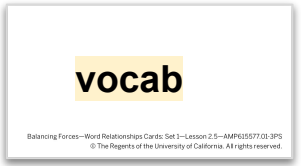
Take Turns
Take turns as both the speaker and the listener.

Create More Than One Sentence
There are many different sentences that could help to answer the Investigation Question. You and your partner will need to create multiple sentences in order to answer the question completely.



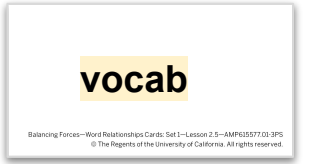
Here is a sentence using two of the word cards:

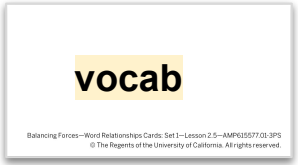
A 

causes 

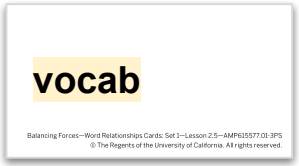
to occur.

Here is a sentence using three of the word cards:

A 

can 

a paperclip

with a 

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Evidence Circles

Scientific Language for Evidence Circles

Ways to share ideas:

- I think Claim _____ (A, B, or C) is best because _____ .
- The evidence shows that _____ .
- This means that _____ .

Ways to respond to others:

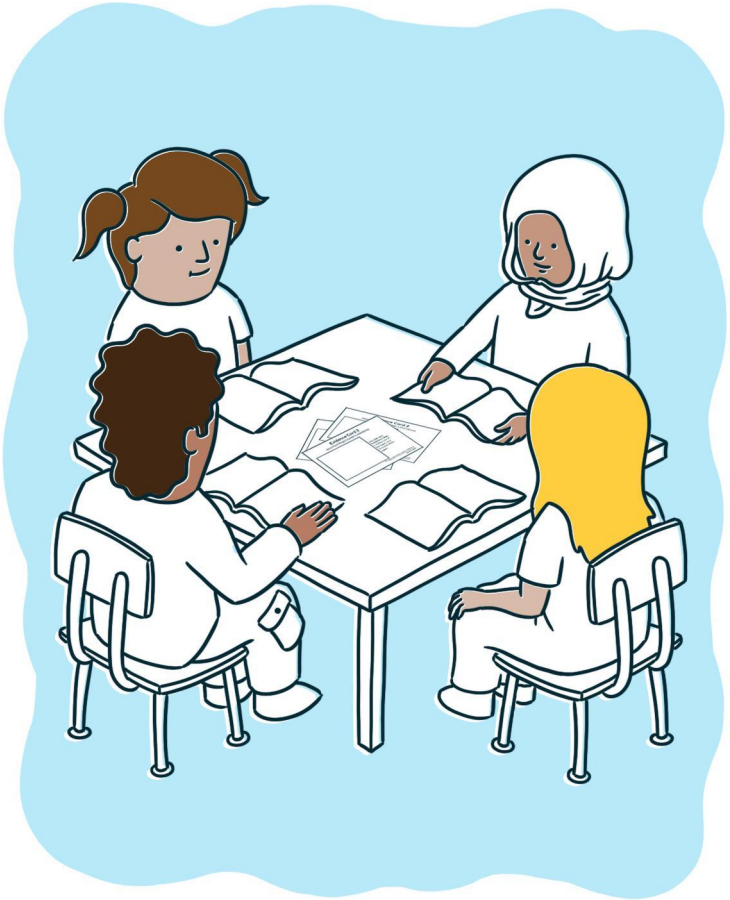
- I agree because _____ .
- I disagree because _____ .

Questions to ask during the discussion:

- What evidence supports your claim?
- Could you say more about why the evidence you shared supports your claim?

You can use the scientific language to help you discuss.

Make sure each person gets to read the cards.



Begin your **Evidence Circles.**

Discuss to decide which claim is best.

I will call on a volunteer to share for each group.

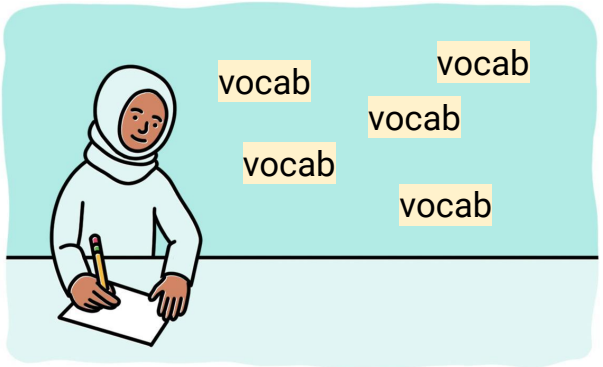
Did your group come to an **agreement?**

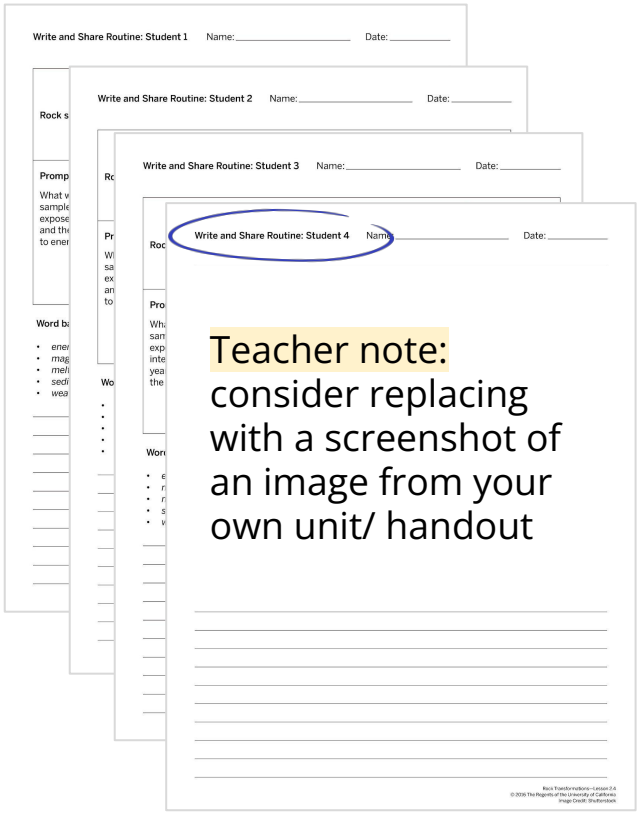
Why did you choose to link the **evidence** that you did?

Write and Share

Write and Share Routine

1. Carefully **read and annotate** the information you're given.
2. **Answer your prompt** using the vocabulary words.
3. After everyone in your group has had a chance to write, **take turns introducing your prompts and sharing** your responses.
4. While one student presents, the others should **listen carefully.**
5. After each student presents, the other students in the group can **ask questions** or make comments.

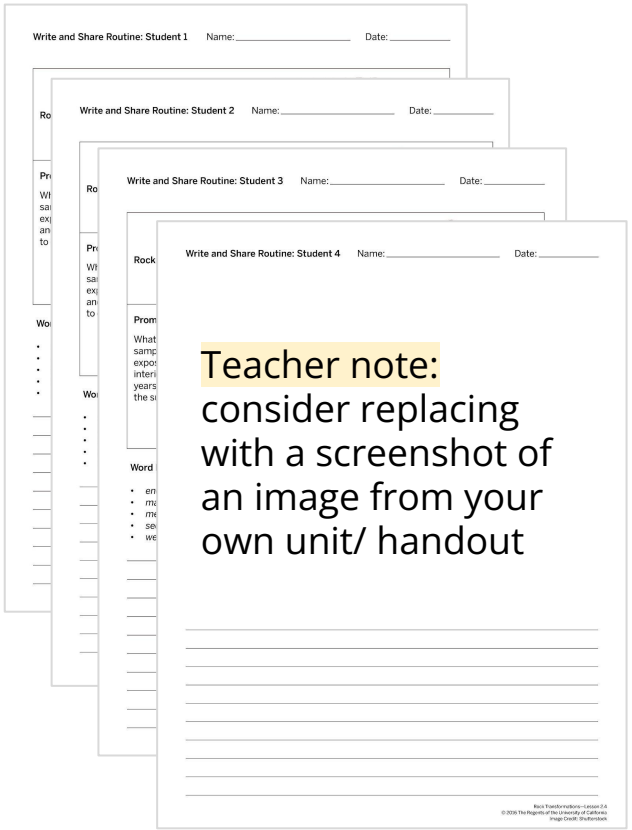




I'll give each member of your group a number.

Find the sheet that matches your number. This is the piece of evidence you will respond to.

Investigation Notebook **pgs XX- XX**



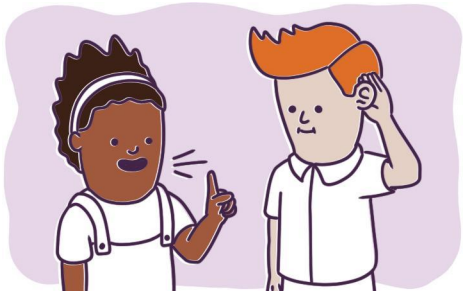
Let's hear from a few different groups.

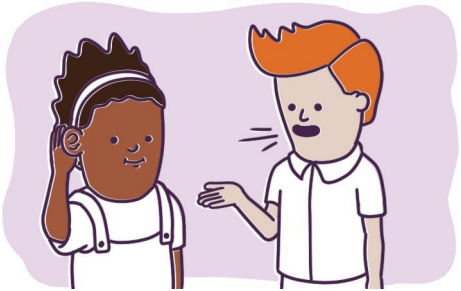
What ideas did you share in your group?

What did you **learn** from another group member?

Discourse Routine Templates

Discourse Routines





Discourse Routine Templates

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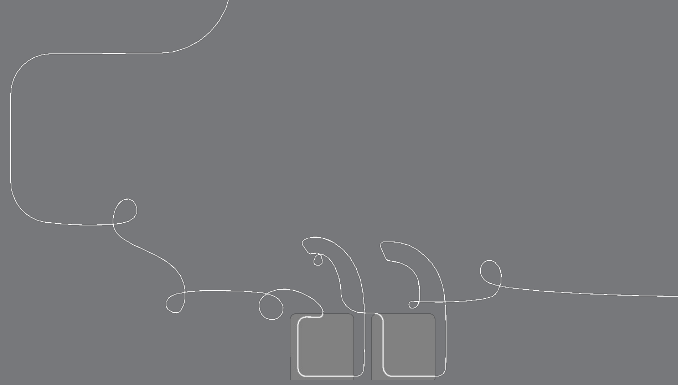
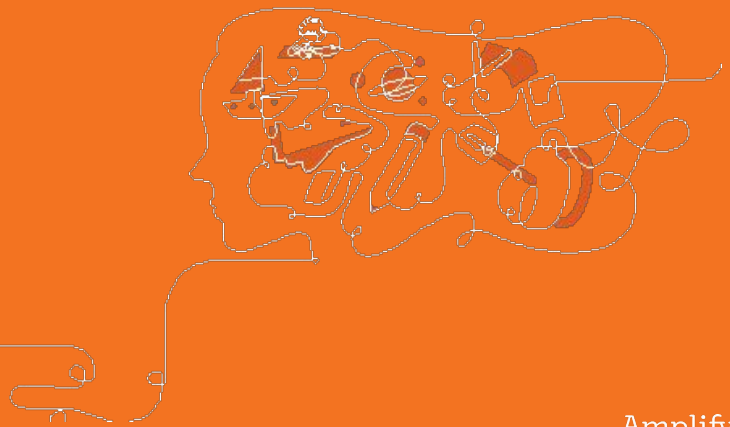
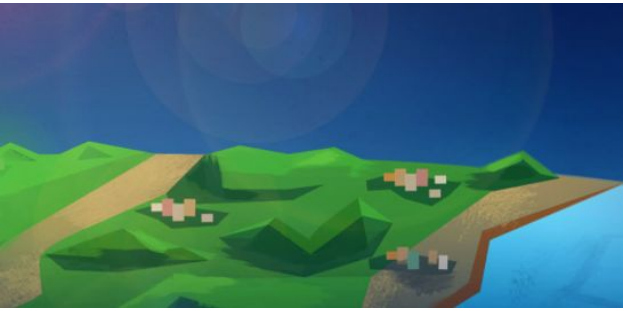
Questions?



Lunch Break





Plan for the day

- Introduction
- Language of the Science Classroom
- Embedded and Additional Supports
- Experiencing a Lesson
- Planning for Supports
- Closing

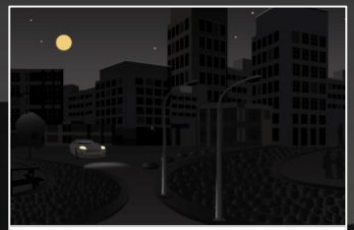
Energy Conversions

Problem: Why does Ergstown keep having blackouts?

Role: Systems Engineers

Through firsthand experiences, discourse, reading, writing, and engaging with a digital simulation, students make discoveries about the way electrical systems work. Then, students apply what they have learned as they choose new energy sources and energy converters for the town,

Coherent Storylines

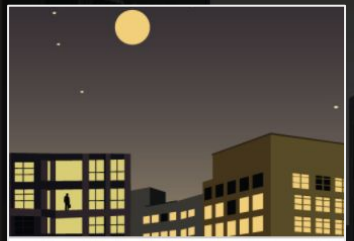


Chapter 1: What happened to the electrical system the night of the...

6 Lessons

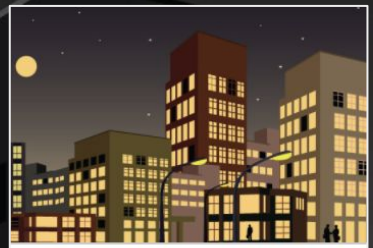
Chapter 2: What makes the devices in Ergstown output or fail to output...

4 Lessons



Chapter 3: Where does the electrical energy for the devices in Ergstow...

6 Lessons



Chapter 4: How does energy get to the devices all over Ergstown?

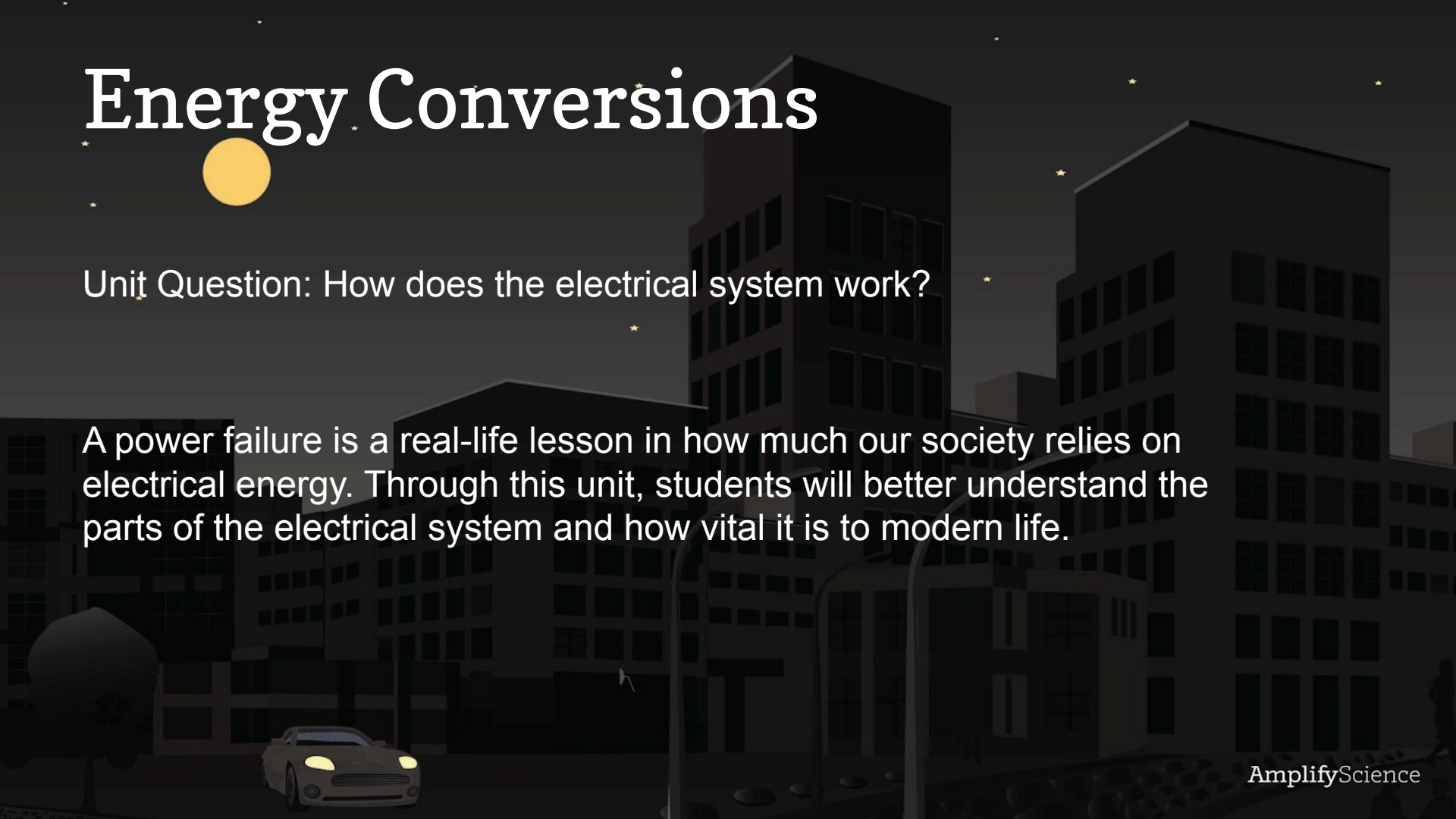
6 Lessons

AmplifyScience

Energy Conversions

Unit Question: How does the electrical system work?

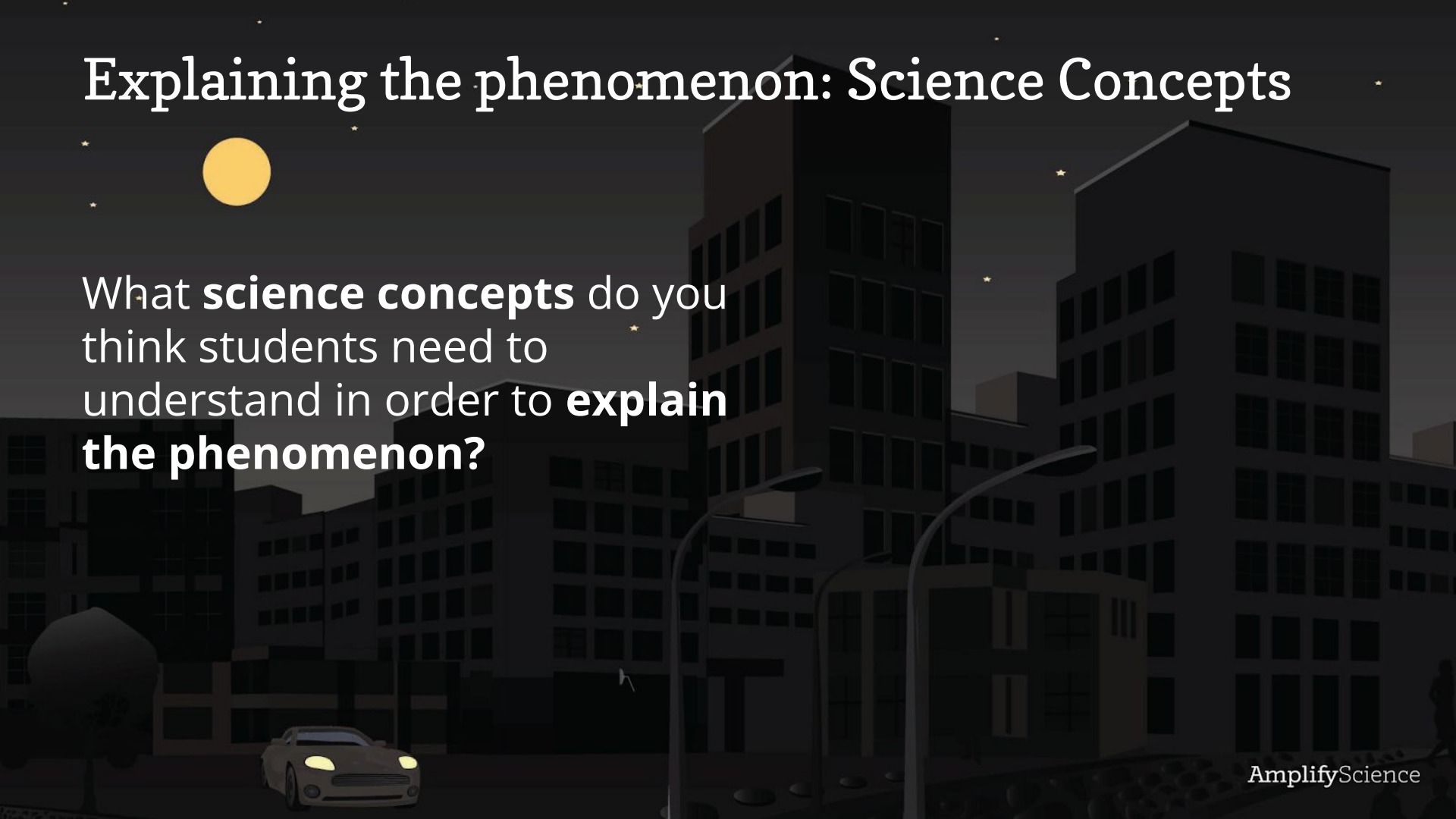
A power failure is a real-life lesson in how much our society relies on electrical energy. Through this unit, students will better understand the parts of the electrical system and how vital it is to modern life.



AmplifyScience

Explaining the phenomenon: Science Concepts

What **science concepts** do you think students need to understand in order to **explain the phenomenon?**



Progress Build

Energy Conversions

Assumed prior knowledge (preconceptions): Students are likely to recognize that many familiar devices need electricity to function.

Level 1

Devices work by converting electrical energy to another form.

Level 2

Energy must be supplied from a source and converted or there is no electrical energy available for devices to convert.

Level 3

Electrical energy can be transferred by wires connecting the source converter to the device.

Explaining the phenomenon: Ergstown has frequent blackouts.

The energy that comes from the source is transferred through the electrical grid. The devices won't function if the wires that connect the source converter and devices are broken. This can happen if the connections between the grid and the converters aren't strong enough, if the wires aren't in a secure location, or if there aren't enough backup wires.

Energy Conversions: Blackout in Ergstown

Unit Anchor Phenomenon
Problem students work to solve

Ergstown has frequent blackouts.
Why does Ergstown keep having blackouts?

Chapter-level Anchor Phenomenon
Chapter 1 Question

There was a blackout in Ergstown.
What happened to the electrical system the night of the Ergstown blackout?

Investigation Questions

What is a system? (1.2, 1.3)
(Note: See Lesson Overviews for lesson-level Investigative Phenomena)

What can electrical energy in a system be used for? (1.4, 1.5)
(Note: See Lesson Overviews for lesson-level Investigative Phenomena)

Evidence sources and reflection opportunities

- Observe a simple system (1.2)
- Read *Systems* (1.2)
- Build a simple electrical system (1.3)
- Discuss parts and functions of a system (1.3)

- Find electrical energy in the Sim (1.4)
- Build simple electrical systems and observe various types of energy outputs (1.5)
- Read about forms of energy in *It's All Energy* (1.5)
- Write about ideas from the reading and hands-on investigation (1.5)

Key concepts

- A system is a collection of interacting parts that work together. Each part in the system plays a role to perform an overall system function. (1.3)

- Light, motion, sound, and thermal energy are all forms of energy. You can observe evidence of these different forms as outputs of electrical devices. (1.5)

Application of key concepts to the problem

- Observe and write about forms of energy in the Ergstown subway (1.6)

Explanation that students can make to answer the Chapter 1 Question

The devices stopped working in Ergstown because they weren't able to get electrical energy from the electrical system. When devices work, they output light, heat, motion, or sound. These are forms of energy. During the blackout, the devices weren't getting electrical energy.

Gathering evidence

Energy Conversions Lesson 1.2

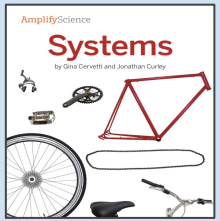
Chapter Question: What happened to the electrical system the night of the Ergstown blackout?

Investigation Question: What is a system?

Cherry Pitter System

Part	handle	cherry cup	poker	spring
Function	to hold and squeeze	to hold the cherry in place	to push the pit out of the cherry	to open the handle after you squeeze it closed

System function: To take the pits out of cherries.



What have students figured out so far?

Energy Conversions

Chapter 1: What happened to the electrical system the night of the blackout?

LESSON 1.1
Pre-Unit Assessment

LESSON 1.2
Introducing Systems

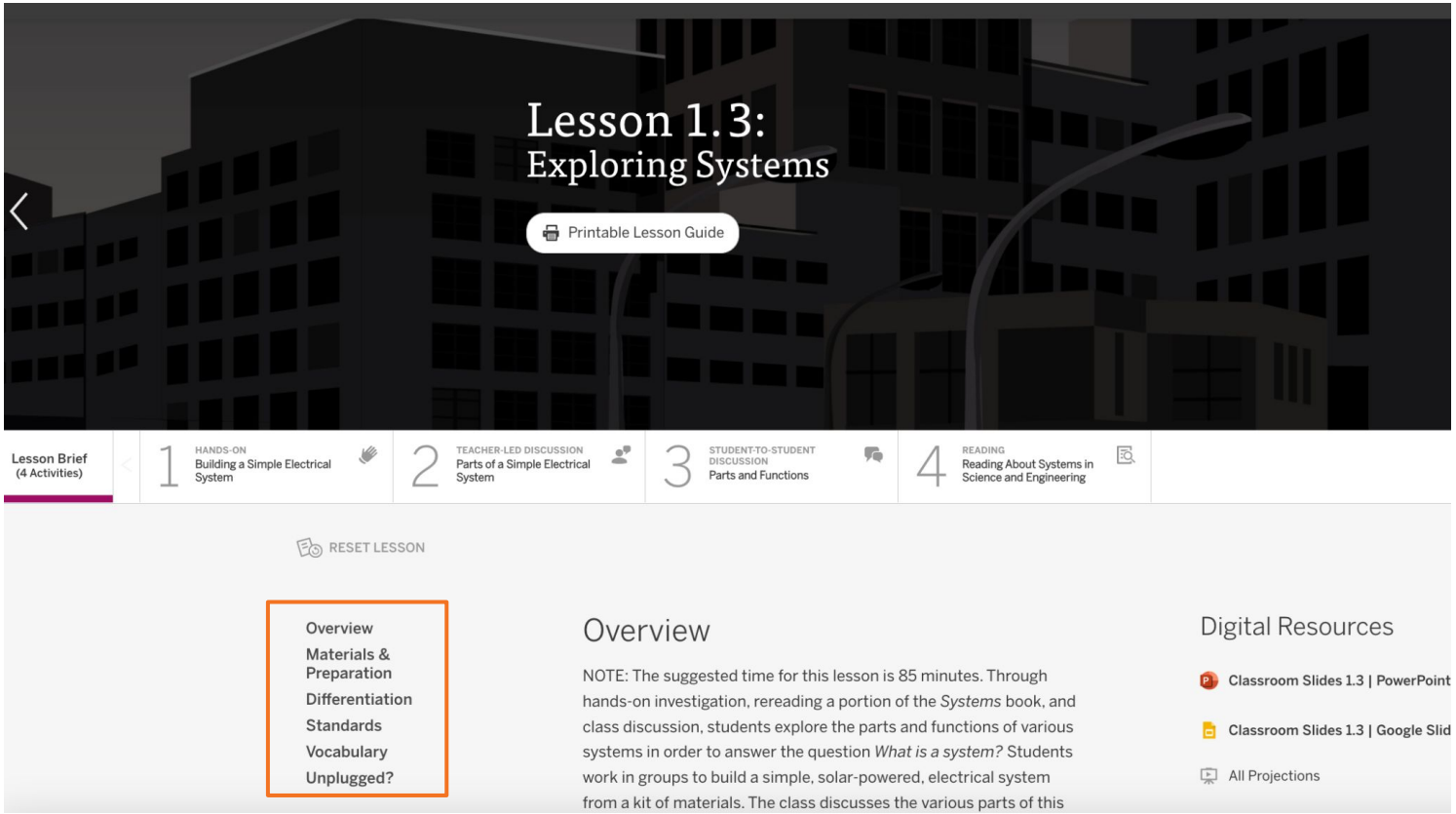
LESSON 1.3
Exploring Systems

LESSON 1.4
Electrical Energy

LESSON 1.5
Forms of Energy

LESSON 1.6
Writing an Argument About the Blackout

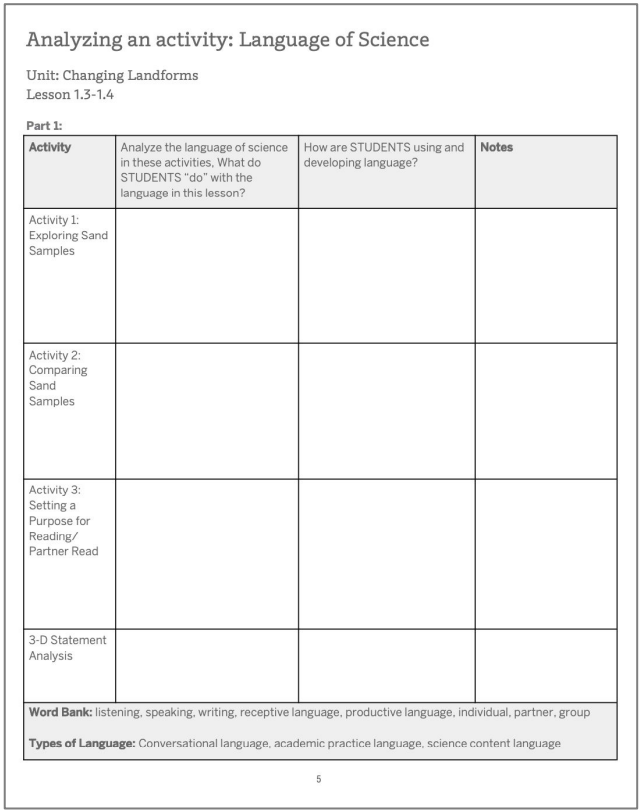
The Lesson Brief



Considering language demands

Read over the lesson brief and consider:

- What will students “do” with language in this lesson? (*receptive or productive)*
- What types of language will support students in engaging with the lesson?



Analyzing an activity: Language of Science

Unit: Changing Landforms
Lesson 1.3-1.4

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: Exploring Sand Samples			
Activity 2: Comparing Sand Samples			
Activity 3: Setting a Purpose for Reading/ Partner Read			
3-D Statement Analysis			

Word Bank: listening, speaking, writing, receptive language, productive language, individual, partner, group

Types of Language: Conversational language, academic practice language, science content language

5

Language demands

The 3-D Statement can help focus us in on the goal of the lesson.

- Design and Make simple solar powered electrical systems (Productive Model)
- Explanations of their design (Productive Language)
- Investigate how the parts of their electrical systems interact and function together (Productive)
- Energy and Matter, Systems and System Models (Comparative language)

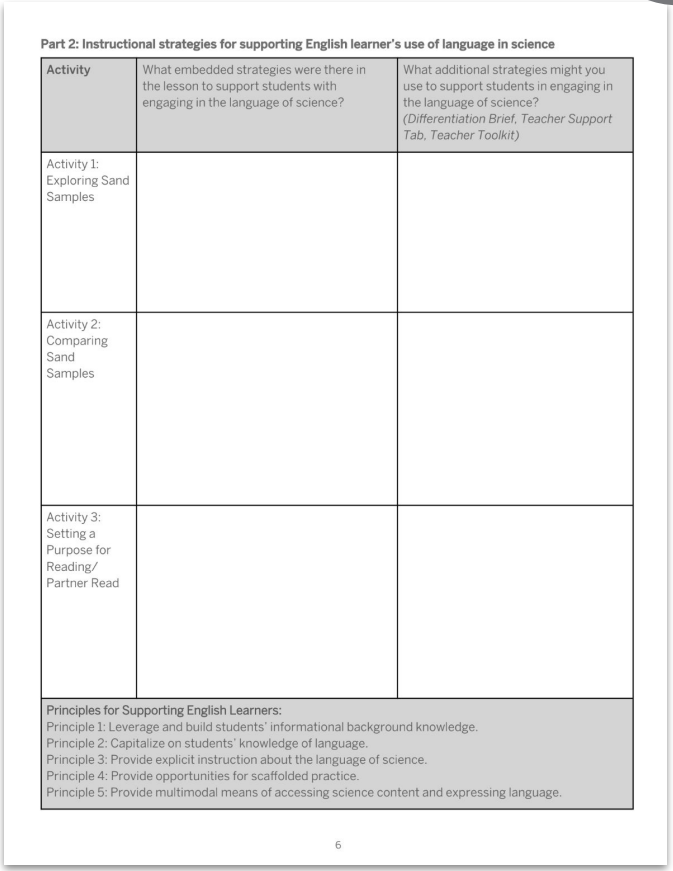
Students design and make simple solar-powered electrical systems (energy and matter), developing solutions to make a fan spin. They investigate how the parts of their electrical systems interact and function together (systems and system models).

Practices Disciplinary Core Ideas Crosscutting Concepts

Strategies and supports

As we go through the lesson, think about what strategies or supports are used to engage students in the language of science.

- Embedded
- Additional



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: Exploring Sand Samples		
Activity 2: Comparing Sand Samples		
Activity 3: Setting a Purpose for Reading/ Partner Read		

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.

6

Energy Conversions

Materials for Lesson 1.3

For the Classroom Wall

Key Concept: A system is a collection of interacting parts that work together. Each part in the system plays a role to perform an overall function.

Vocabulary Card: system

For the Class:

- 1 sheet of chart paper*
- 1 marker*
- An area outside whether bright sunlight is available*
- Optional: 1 clamp light
- Optional: 1 light bulb: 150 watt

Each Group of Four Students

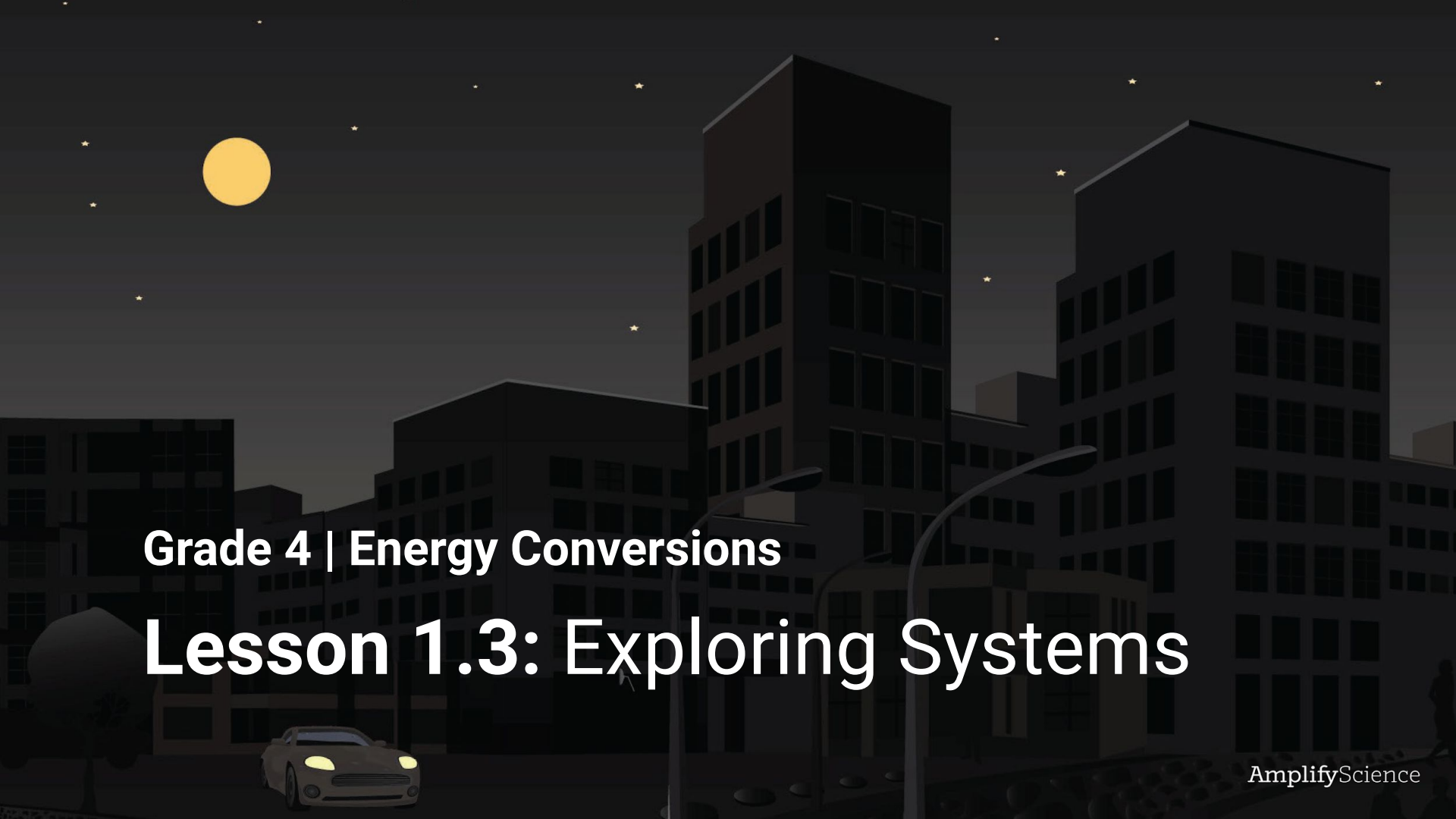
- 1 solar panel
- 1 electric motor
- 1 fan blade attachment
- 2 cables with alligator clips

For Each Pair of Students

- 1 Copy of systems
- 1 copy of *Who Thinks About Systems?*

For Each Student:

- Investigation Notebook pages 6-10



Grade 4 | Energy Conversions

Lesson 1.3: Exploring Systems

AmplifyScience

Energy Conversions

Classroom Wall

Problem: What happened to the electrical system the night of the Ergstown blackout?
Unit Question: How does the electrical system work?

Chapter 1 Question: What happened to the electrical system the night of the Ergstown blackout?

Investigation Question: what is a system?

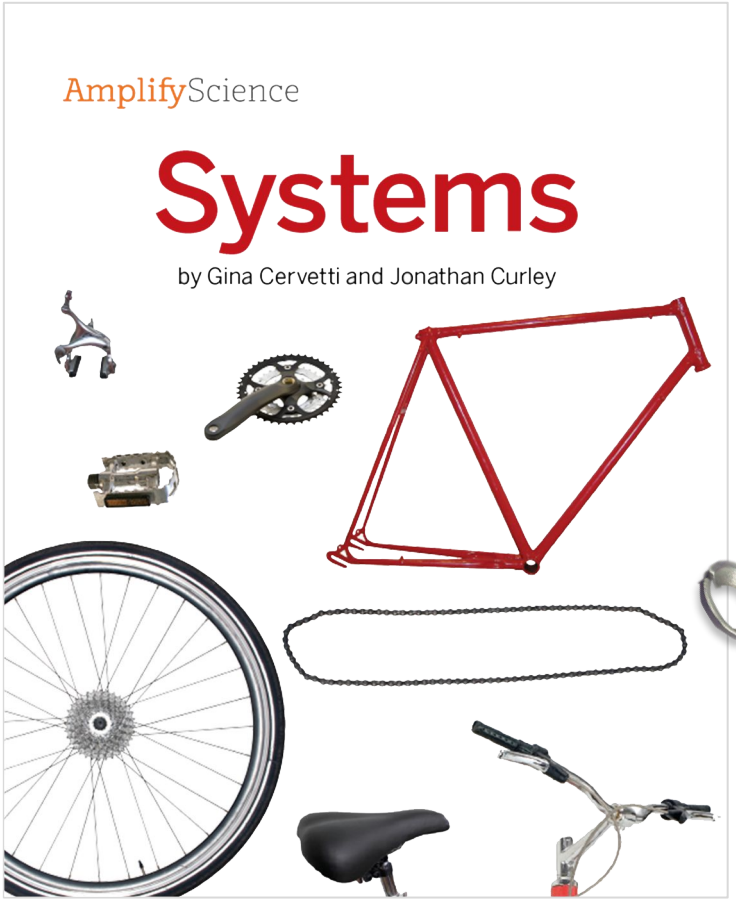
Key Concept:

Vocabulary:
engineer
function
synthesize

25 MIN

Activity 1

Building a Simple Electrical System



What do you remember from the last lesson?

It will be your job to figure out a way to put these materials together into a functioning system.

Electrical Safety Guidelines

- Only attach the clips to the electrical devices that are part of the lesson.
- Keep the moving fan away from your face.
- Keep all electrical investigation materials away from electrical outlets.
- Keep all electrical investigation materials away from water.

Scientists and engineers are careful to do their investigations in a safe way.

Name: _____ Date: _____

Building a Simple Electrical System

1. With your group, use a solar panel, a fan, and two wires to build an electrical system that functions. (The fan will spin when it functions.)
2. Predict what you can do to make the fan spin more quickly or slowly. Test your ideas, and then discuss what caused the fan to spin more quickly or slowly.
3. Predict what you can do to make the fan spin in a different direction. Test your ideas, and then discuss what caused the fan to spin in a different direction.
4. In the space below, draw your functioning system. Be sure to label every part. (Hint: In order to function, the system needs one part that was not included in your bag of materials.)

Energy Conversions—Lesson 1.3 7

Turn to page 7, Building a Simple Electrical System, in your notebooks.

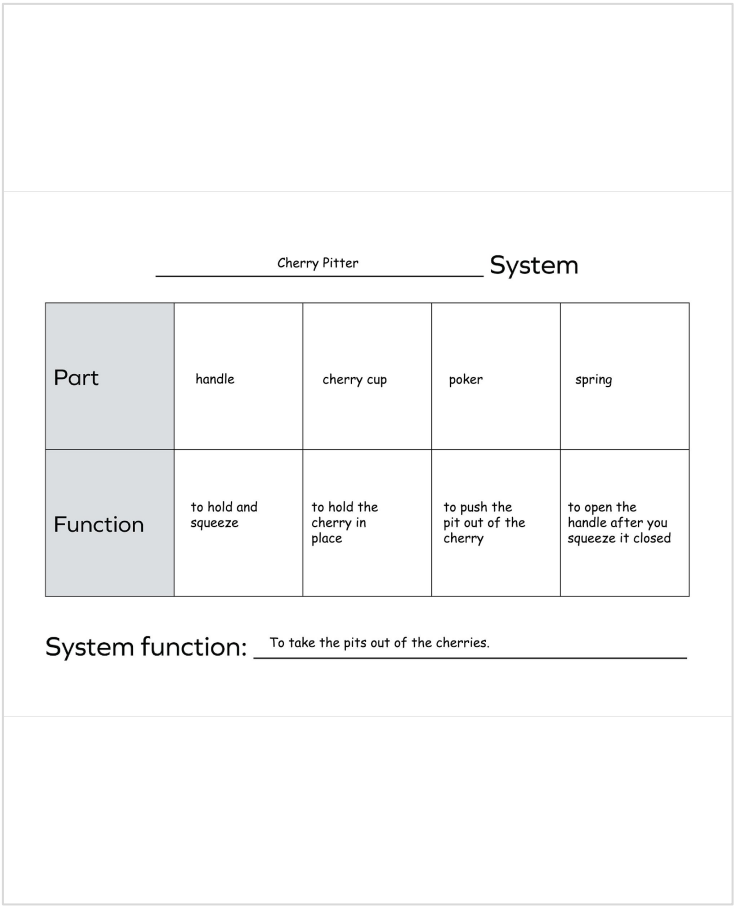
Build your simple electrical system and then **draw** what your system looks like.

How did your group make a simple electrical system?

What are the parts of your system?

Activity 2

Parts of a Simple Electrical System



Cherry Pitter System

Part	handle	cherry cup	poker	spring
Function	to hold and squeeze	to hold the cherry in place	to push the pit out of the cherry	to open the handle after you squeeze it closed

System function: To take the pits out of the cherries.

The Cherry Pitter System table showed the parts of the system and the function of each part.

Now we will complete a table about a **simple electrical system**.

_____ System

Part				
Function				

_____ System

Part				
Function				

Function of both systems: _____

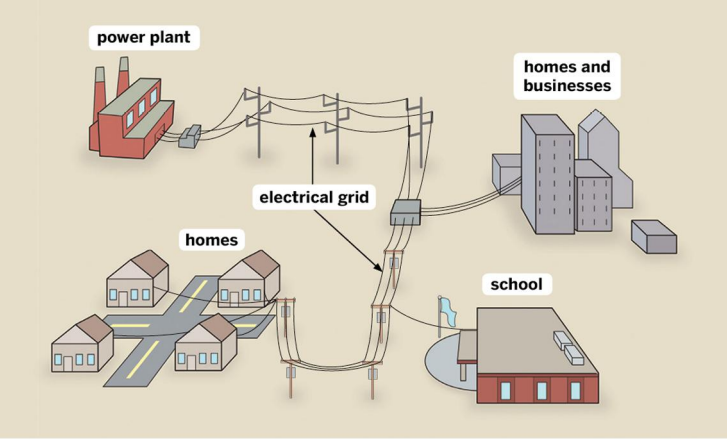
Simple Electrical System

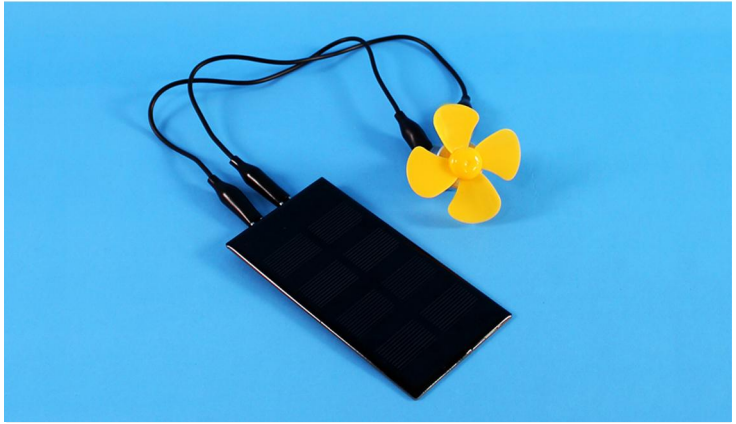
Part	sun	solar panel	wire	motor with fan
Function	to provide energy to the system	to send electrical energy throughout the system	to move electrical energy from one place to another	to use electrical energy to run

_____ System

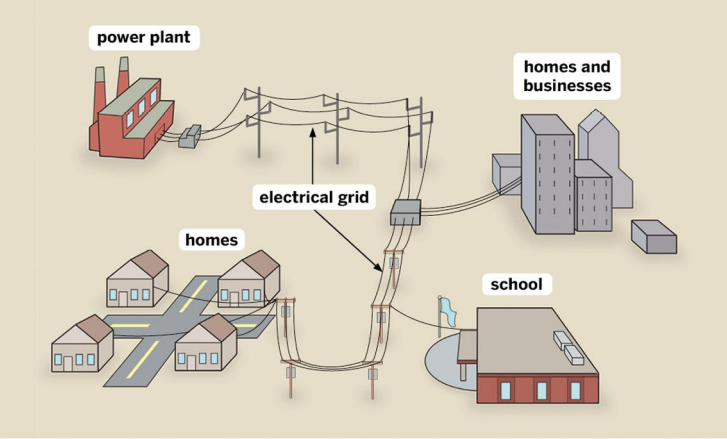
Part				
Function				

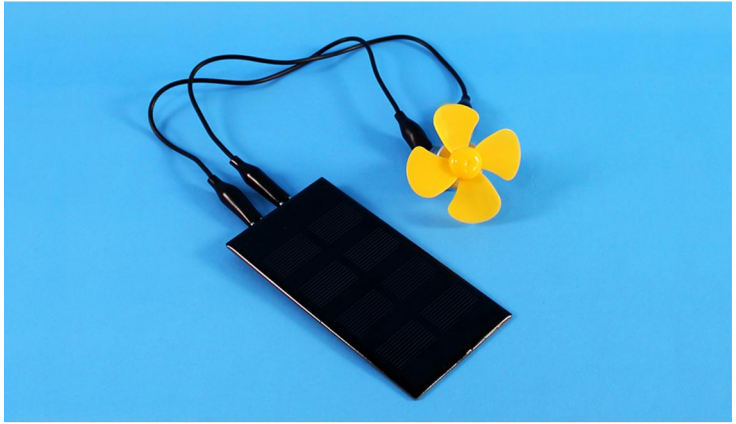
Function of both systems: _____



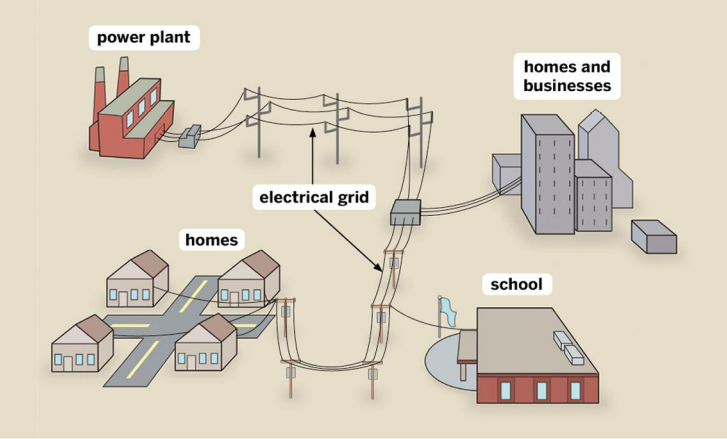


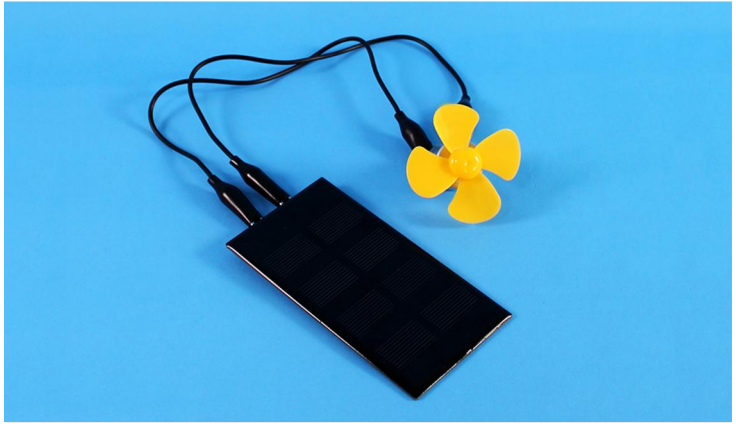
In many ways, the **simple electrical system** you built is a lot like the **larger electrical system**.





Compare this diagram we read about to the simple electrical systems we built.





How are the diagram of the system and the simple system that we built **similar**?

Simple Electrical System

Part	sun	solar panel	wire	motor with fan
Function	to provide energy to the system	to send electrical energy throughout the system	to move electrical energy from one place to another	to use electrical energy to run

_____ System

Part				
Function				

Function of both systems: _____

Simple Electrical System

Part	sun	solar panel	wire	motor with fan
Function	to provide energy to the system	to send electrical energy throughout the system	to move electrical energy from one place to another	to use electrical energy to run

Electrical Energy System

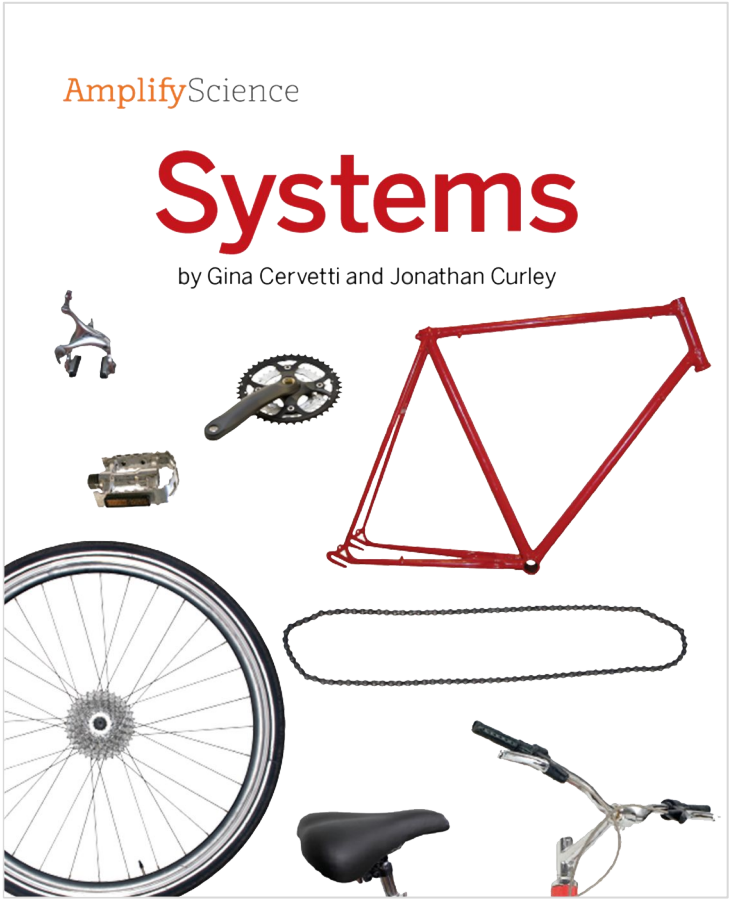
Part	?	power plant	wires (the grid)	devices in homes, etc.
Function		to send electrical energy throughout the system	to move electrical energy from one place to another	to use electrical energy to run

Function of both systems: to provide electricity to power devices

20 MIN

Activity 3

Parts and Functions



You'll use the *Systems* book again with your reading partners and fill out tables for different systems in the book.

Contents

Turn to page 3.

The **table of contents** lists sections of the book. We can use it to find out what page a section starts on.

What Makes a Wheel a Wheel?

This is a wheel from a bicycle. You have probably seen a bicycle wheel before, but have you ever really thought about why a wheel is the way it is?

It's the **structure** of a wheel—the way the wheel is shaped and built—that makes it a wheel. This wheel is round and has long, thin spokes crossing in the middle. The spokes keep the wheel from bending out of shape.

Why is the structure of the wheel important? Its structure has to do with its **function**—what it does or what it is used for. The function of this wheel is to roll so that the bicycle can move forward.

Turn to page 5.

Who would like to read the heading?

Bicycle Parts

A wheel is just one part of a bicycle. A bicycle is made of lots of parts. One bike can have more than 100 different parts. Each part of a bicycle has a function and a structure that helps the part perform its function well.

pedals

brakes

frame

front wheel

back wheel

6

Turn to page 6.

What do you notice?

What do the heading and images tell us the page is about?

This **table** lists some bicycle parts and the function of each part.

Part	Function
seat	holding up the person who is riding the bike
handlebars	steering the bike
frame	holding the other parts of the bike together
pedal	*What is the function of the pedal?*

7

Turn to page 7.

This table gives us more information about each of the bicycle parts, including the function.

A Bicycle Is a System

Of course, bike parts don't do much good unless they are all put together to make a bicycle. You can't ride just a wheel! A bicycle with all its parts connected is a **system**.

A system is a group of parts that work together. When the pedals on a bicycle move, they turn the gear. When the gear turns, it moves the chain. The moving chain makes the back wheel turn—and that pushes the bicycle forward. The handlebars are connected to the frame. The handlebars, frame, and front wheel work together for steering. All the parts of a bicycle have to work together for the bicycle to work.

8

Look through the book for **text features**.

Show your partners any text features you find.

Name: _____ Date: _____

Parts of a System

1. With your partner, look through *Systems* and choose one of the systems described in the book.
2. Write the name of the system and its function on the two lines below.
3. Record each part of the system in the left column of the table below.
4. Beside each part, record the part's function.
5. Use as many rows as you need.

_____ System

Function: _____

Part	Function

Turn to page 10, Parts of a System, in your notebooks.

Choose a system from the book *Systems* and **record its parts and functions**.

ON-THE-FLY

Name: _____ Date: _____

Parts of a System

1. With your partner, look through *Systems* and choose one of the systems described in the book.
2. Write the name of the system and its function on the two lines below.
3. Record each part of the system in the left column of the table below.
4. Beside each part, record the part's function.
5. Use as many rows as you need.

_____ System

Function: _____

Part	Function

What **system** did you choose?

What are the **parts** and **functions**?

Name: _____ Date: _____

Parts of a System

1. With your partner, look through ***Systems*** and choose one of the systems described in the book.
2. Write the name of the system and its function on the two lines below.
3. Record each part of the system in the left column of the table below.
4. Beside each part, record the part's function.
5. Use as many rows as you need.

_____ System

Function: _____

Part	Function

How are the systems we read about **similar**?

What do they have **in common**?

We have been investigating the question: ***What is a system?***

What do you think a system is now?

Key Concept

A system is a collection of interacting parts that work together. Each part in the system plays a role to perform an overall system function.

Vocabulary

system

a group of parts that work together

End of Lesson

THE LAWRENCE HALL OF SCIENCE
UNIVERSITY OF CALIFORNIA, BERKELEY

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Energy Conversions Science Wall

Unit Question

How does the electrical system work?

Chapter 1 Question

What happened to the electrical system the night of the Ergstown blackout?

Key Concepts

Vocabulary

engineer

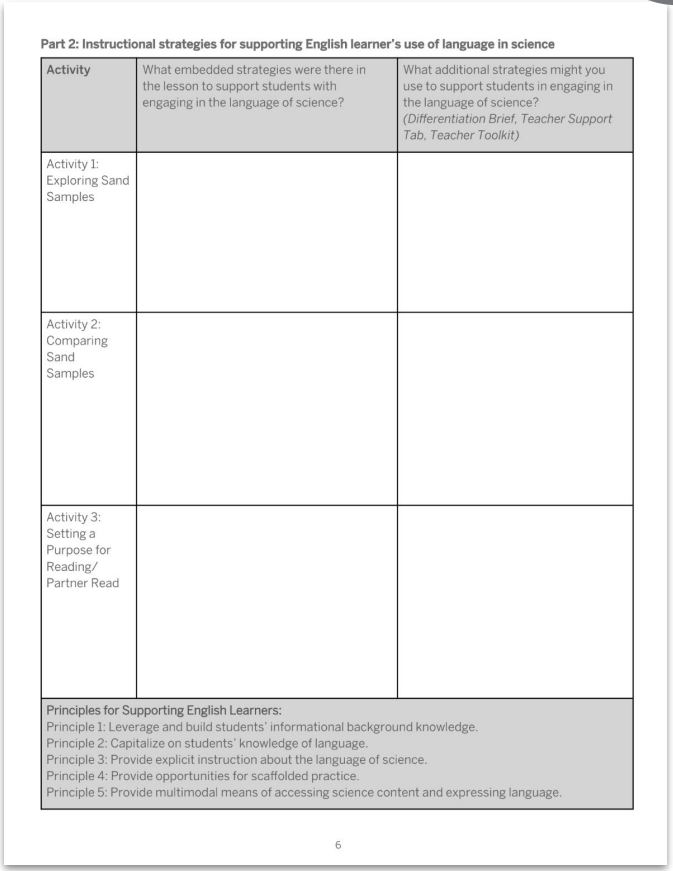
function

Reflecting

Strategies and supports

What strategies and supports were used to support engaging in the language of science?

- Embedded
- Additional



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)*
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Activity 2: Comparing Sand Samples		
Activity 3: Setting a Purpose for Reading/ Partner Read		

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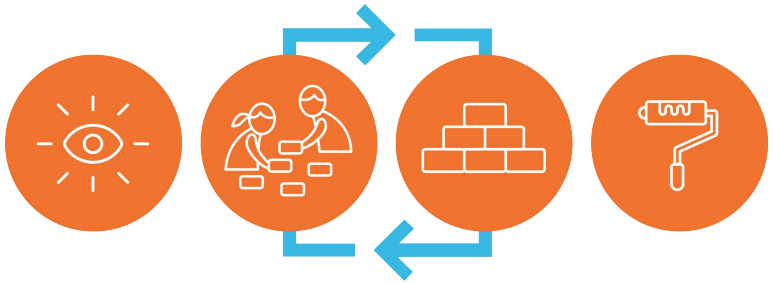
Principle 4: Provide opportunities for scaffolded practice.
Principle 5: Provide multimodal means of accessing science content and expressing language.

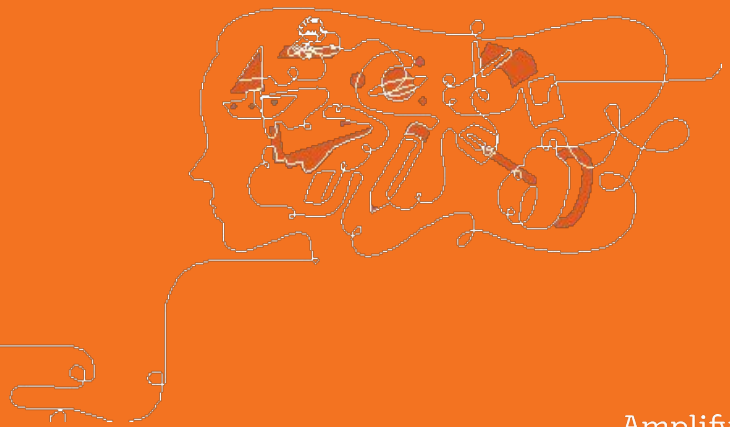
6

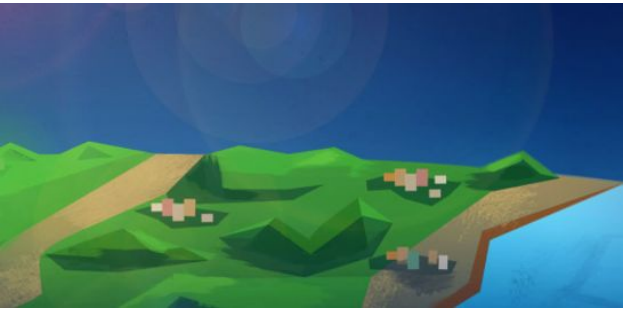
Strategies for engaging English learners

- Oral and visual support
- Multiple Meaning words
- Multimodal instruction
    - Do, Talk, Read, Write, Visualize
- Using different registers



Break



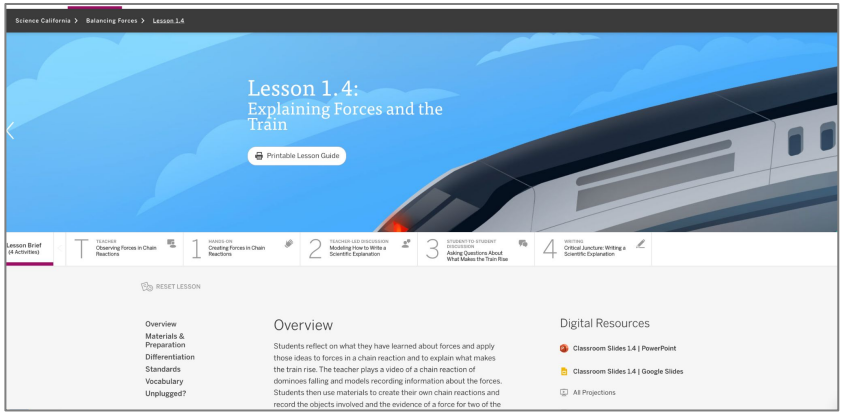


Plan for the day

- Introduction
- Language of the Science Classroom
- Embedded and Additional Supports
- Experiencing a Scaffolded Lesson
- Planning for Supports
- Closing

Work time

- Navigate to the Differentiation section of the Lesson Brief, and read the “Specific differentiation strategies for English learners” section.
- Click through the activity tabs and explore any Teacher Support Notes
- Consider any additional supports from your own teacher toolkit

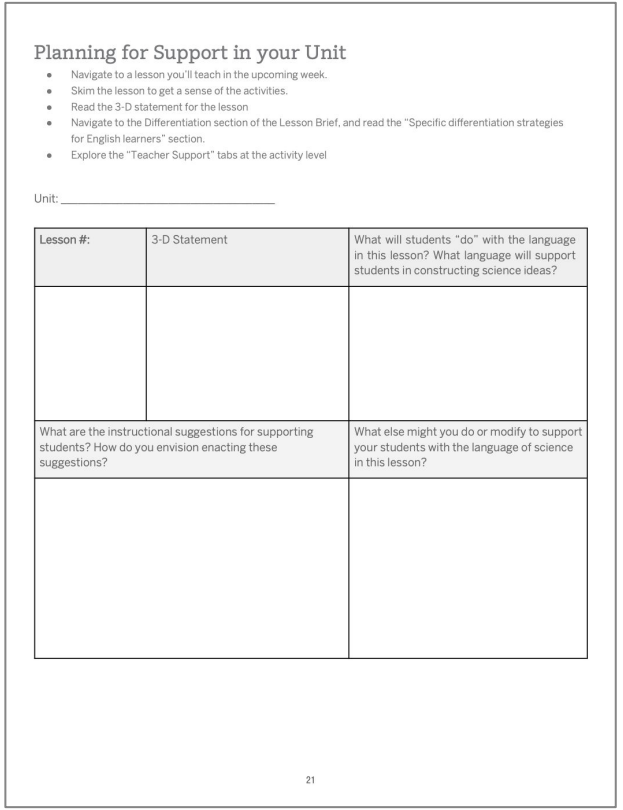


Work time

- Navigate to the Differentiation section of the Lesson Brief, and read the “Specific differentiation strategies for English learners” section.
- Click through the activity tabs and explore any Teacher Support Notes
- Consider any additional supports from your own teacher toolkit

  Possible Suggestion: Download the classroom slides for your lesson and add an additional support from your Discourse Template resource.

Pg. 17-18



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

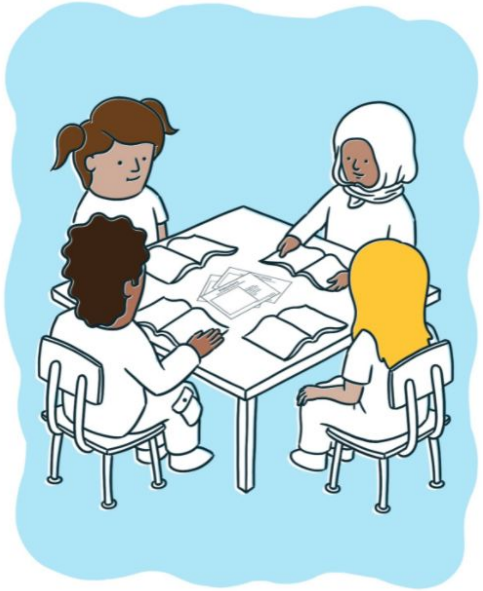
Unit: _____

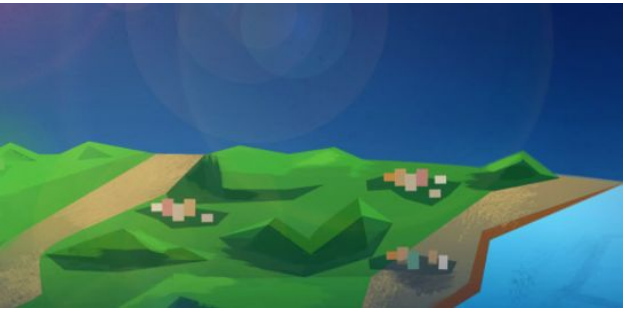
Lesson #:	3-D Statement	What will students "do" with the language in this lesson? What language will support students in constructing science ideas?
What are the instructional suggestions for supporting students? How do you envision enacting these suggestions?		What else might you do or modify to support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

21

Share Out

Share the additional strategies and supports you chose for your lesson.





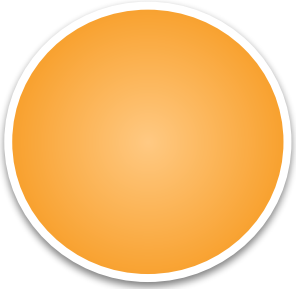
Plan for the day

- Introduction
- Language of the Science Classroom
- Embedded and Additional Supports
- Experiencing a Lesson
- Planning for Supports
- Closing

Closing reflection

Based on our work today, share:

1-3 big points you're taking away from this session



A question or topic that's still circling in your mind

Something that's "squaring" (resonating) with you from this session

Overarching goals

- ☑ Describe the language and literacy demands in a lesson and their role in students developing science understanding
- ☑ Implement key strategies to promote English learners' academic language development and science understanding

Let's connect this goal to our students

Additional resources

Welcome, caregivers!

—

We hope you enjoy learning more about Amplify Science and what students are learning in science this year.

Para acceder a este sitio en español haga clic aquí.

Amplify welcomes you and your learner to the Science program for the new school year. We are very excited to

TOP RATED BY EDREPORTS

Grades 6-8

[Caregivers]

LAUSD Microsite- https://amplify.com/lausd-science

Welcome to Amplify Science!

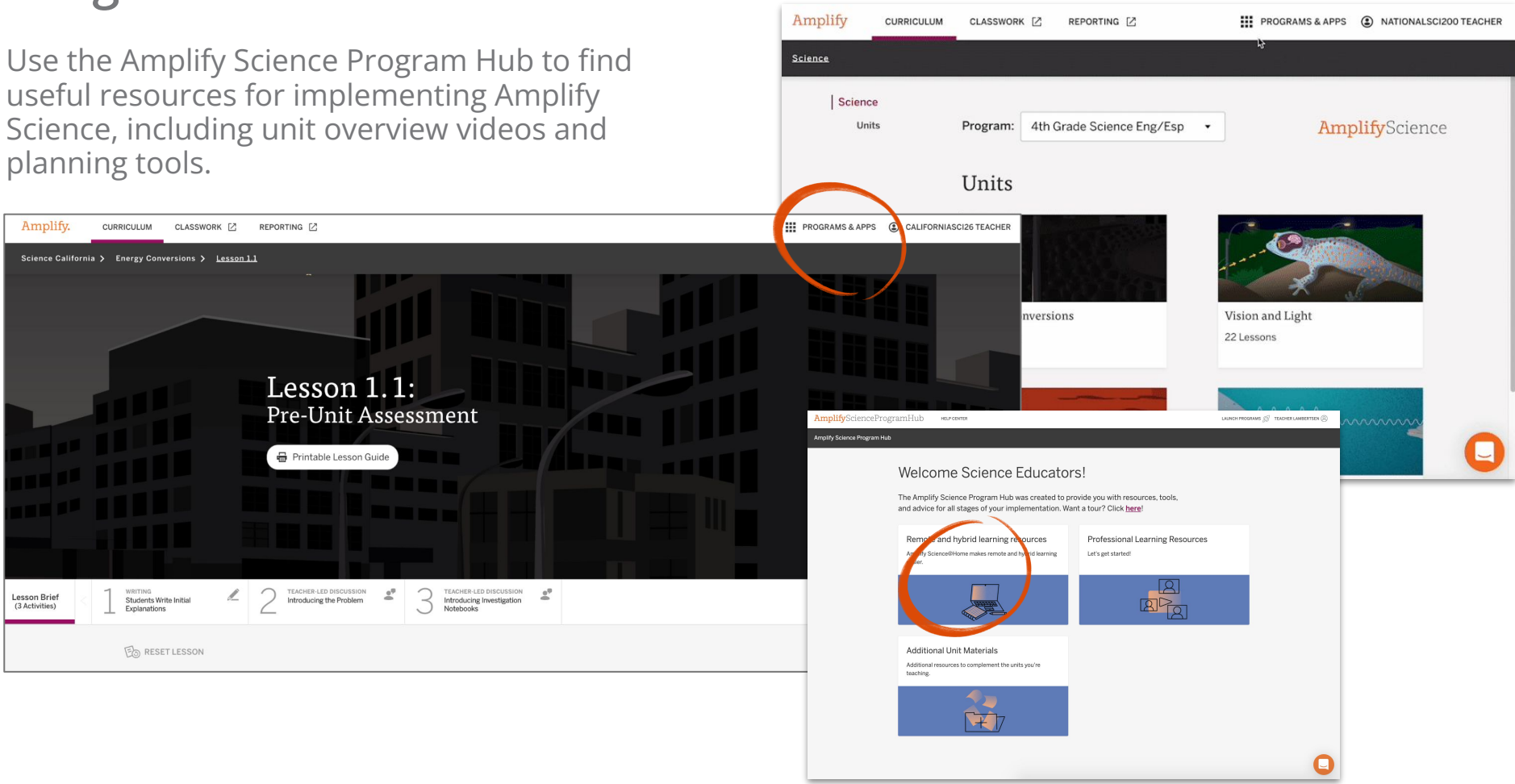
This site contains supporting resources designed for the LAUSD Amplify Science adoption for grades TK–8.

- Access the Amplify Science Program Hub (To help orient you to the new design, watch this video and view this reference guide.)
- Find out more about Amplify Science@Home
- Share the Caregiver Hub (Eng/Span) with your families
- For LAUSD ES Teachers- Amplify Science & Benchmark Advance Crosswalk
- Instructional guidance for a Responsive Relaunch of Amplify Science in 21-22

Click the button below to preview the digital Teacher's Guide, and check back for exciting updates to this site!

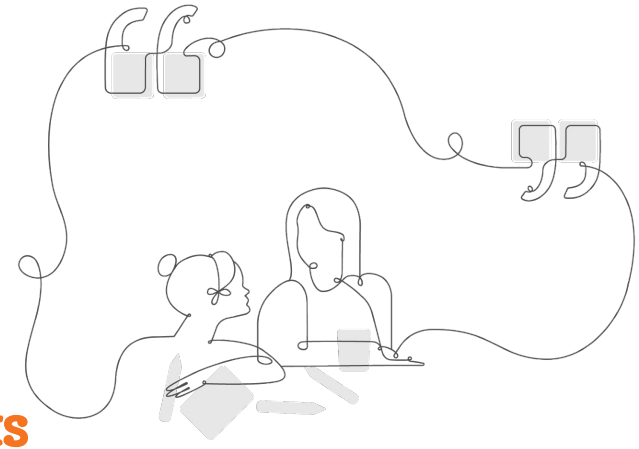
Program Hub

Use the Amplify Science Program Hub to find useful resources for implementing Amplify Science, including unit overview videos and planning tools.



Upcoming Professional Development!

Unit 2 Internalization / Guided Planning (remote, 4:30-6:00 pm)



- 11/2 - Part 1, 11/3 - Part 2 (grades 3-5)
- 11/9 - Part 1, 11/10 -Part 2 (grades K-2)

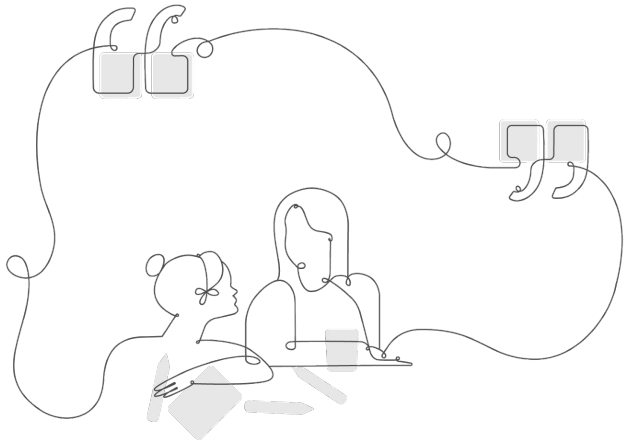
Unit 2. Part 3 - with a focus on assessments (onsite 8:00 am - 3:00 pm)

- December 3 (grades 3-6)
- December 12 (grades K-2)

Upcoming Professional Development!

Part 3: Unit 1 - Supporting English Learners

- October 29th (Ochoa Learning Center, East)



Unit 2 Internalization / Guided Planning

- 11/2,11/3 Unit 2 Internalization / Guided Planning
  - 3-5 (remote)
- 11/9,11/10 Unit 2 Internalization / Guided Planning
  - K-2 (remote)

Additional resources and ongoing support

Seek information specific to enrollment and rosters, technical support, materials and kits, and teaching support.

help@amplify.com

800-823-1969

Amplify Chat

Your feedback matters!

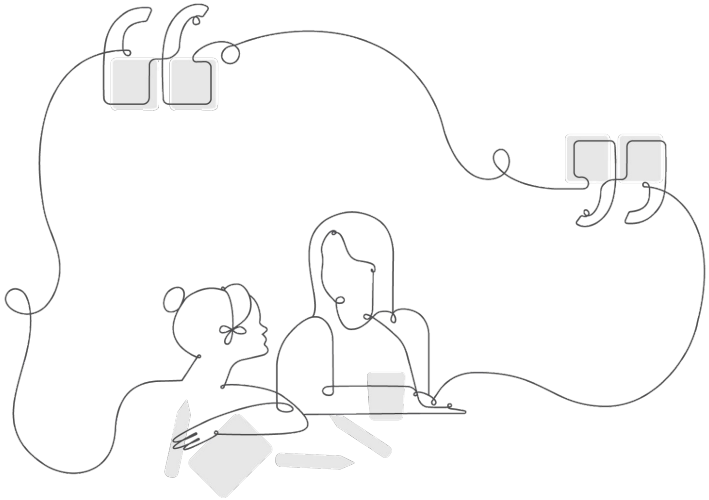
Survey

Facilitation

Session design

Final Question: Is there anything else you would like us to know?

- Curriculum
- Materials
- Enrollment and licensing
- And more!



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