

Amplify Science

Unit 1: Energy Conversions (with a focus on Science & Engineering Practices)

Grade 4

School/District Name: LAUSD

Date: April, 2022

Presented by: Suzy Takeda



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

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.

Navigation Temperature Check

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

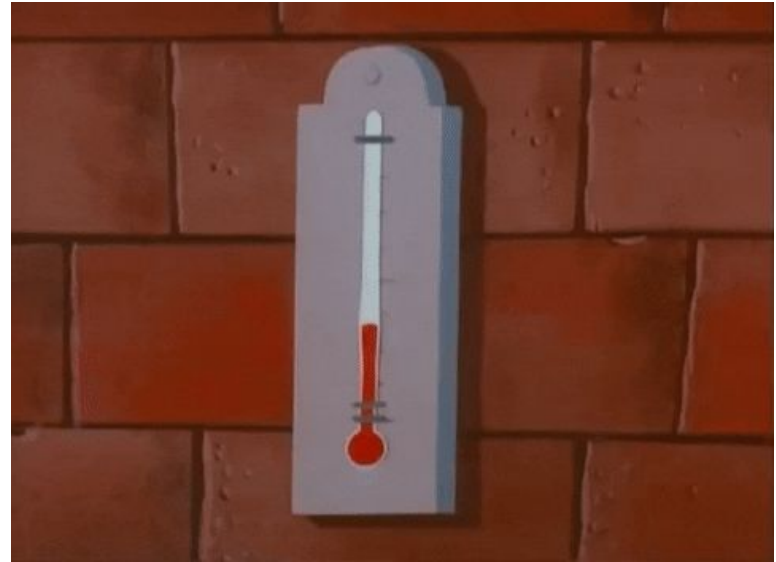
1 = Extremely Uncomfortable

2 = Uncomfortable


3 = Mild

4 = Comfortable

5 = Extremely Comfortable




Last year's Amplify apps.



[About Los Angeles Unified](#) [Find a School](#) [Offices](#) [Classic View](#)


LOS ANGELES UNIFIED SCHOOL DISTRICT



[mCLASS Student](#)

Content Area: ELA
Grade Level: ES
Content Type: Assessment
Integration Type: App (Left Navigation)
Purchase Type: District
[Getting Started Guide](#)
Other Info: App to be installed for all course members.


Vendor Support Desk:
P: 800.823.1969
E: help@amplify.com
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Textbook Title(s):
NA



[mCLASS Assessment](#)

Content Area: ELA
Grade Level: ES
Content Type: Assessment
Integration Type: App (Left Navigation)
Purchase Type: District
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[mCLASS Portal](#)


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S: amplify.com/support/
Textbook Title(s):
NA





LOS ANGELES UNIFIED


COURSES





Course Options


 **Materials**


 Updates


 Gradebook


 Grade Setup


 Mastery

 Amplify Reading: Teac...

 Amplify Science: Eleme...

 Amplify Science: Midd...

 mCLASS Portal

 mCLASS Student



This year's app(s).

LOS ANGELES UNIFIED SCHOOL DISTRICT

COURSES GROUPS RESOURCES TOOLS

[Back to Schoology Home Page](#)

LMS App Center

The LMS App Center provides a catalog of District-approved digital content and learning tools (including digital components of adopted textbooks) that are available for classroom teachers and students to access within the learning management system, Schoology.

For information on District-approval policies and procedures, please visit: [udpp.lausd.net](#).

- To search the full list of digital learning tools, click **"Submit"**.
- To search by Publisher Name or Textbook Title, type in a word associated to your adopted publisher, then click **"Submit"**.
- To narrow your search with filters such as Content Area, Grade Level, or Content Type, select from the dropdown menu, then click **"Submit"**.

To learn more about using the LMS App Center, please refer to the following [video overview](#).

Publisher Name Starts With

Content Area All

Grade Level All

Content Type All

Textbook Title Starts With

Submit

All Amplify Products

Grade Sync for MS Science



LMS App Center

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For information on District-approval policies and procedures, please visit: [udpp.lausd.net](#).

- To search the full list of digital learning tools, click **"Submit"**.
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To learn more about using the LMS App Center, please refer to the following [video overview](#).

[Search Again](#)

Amplify



Content Area: ELA
Grade Level: ES
Content Type: Supplemental
Integration Type: App (Left Navigation)
Purchase Type: District and School
Getting Started Guide
Other Info: School licenses required
mCLASS
CKLA
Amplify Reading
Amplify Science
Fractions

Vendor Support Desk:
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E: help@amplify.com
S: amplify.com/support/
Textbook Title(s):
NA

Amplify Classwork



Content Area: ELA
Grade Level: ES
Content Type: Supplemental
Integration Type: App (Left Navigation)
Purchase Type: District and School
Getting Started Guide
Other Info: School licenses required. This app is for teacher use only (install for Course Admins only)

Vendor Support Desk:
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E: help@amplify.com
S: amplify.com/support/
Textbook Title(s):
NA

 mCLASS Educators: To view or make changes to your account go to mclass.amplify.com.

Hi, Terin

Classes

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[CKLA Hub](#)



[CKLA Resource Site](#)



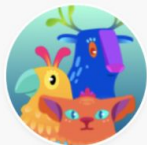
[mCLASS Assessment](#)



[mCLASS Reporting](#)



[Reading 6-8](#)



[Reading K-5](#)



[Science](#)



[Vocabulary](#)



Amplify. on Schoology

2021-2022



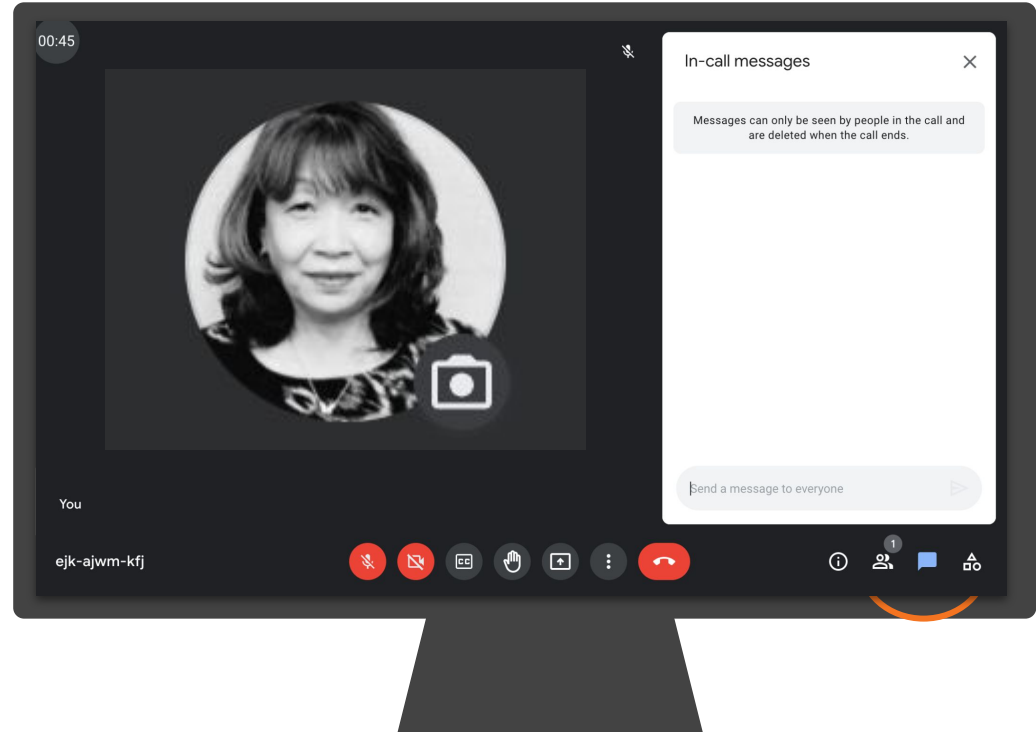
Schoology

- To join Amplify ES Group: **W4PK-W466-63F5B**



Ice Breaker!

- **Question:** In the chat, share out a positive experience with your students using Amplify Science.





Plan for the day

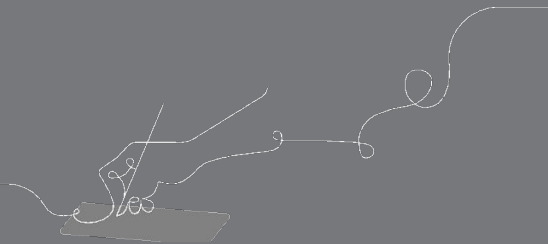
- Framing
- Introducing the Unit
- Unit Internalization
- Identifying the Science and Engineering Practices at the unit and chapter level
- Science and Engineering Practices within a lesson
- Lesson Planning
- Closing

Overarching goals

By the end of this workshop, you will be able to:

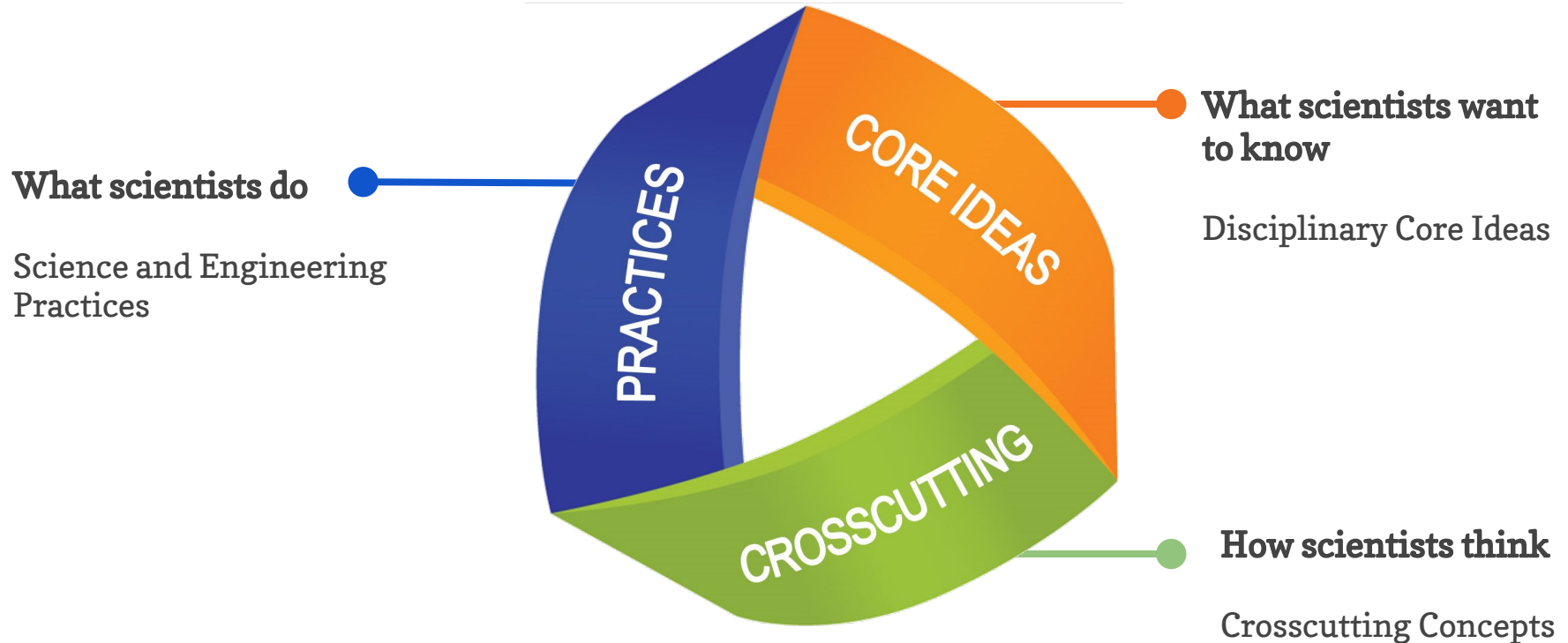
- ❑ Internalize the unit
- ❑ Identify the Science and Engineering Practices within the unit

e



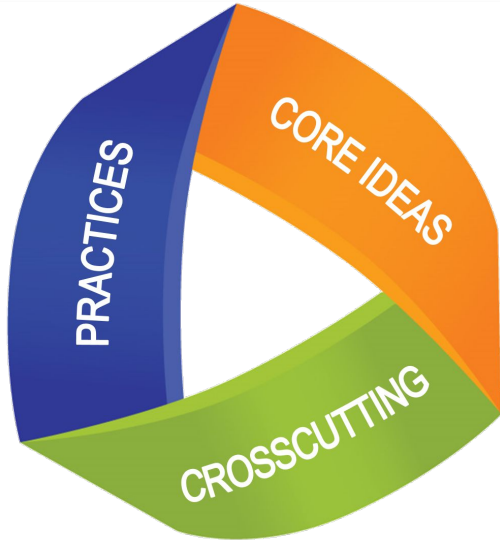
Next Generation Science Standards

Designed to help students build a cohesive understanding of science



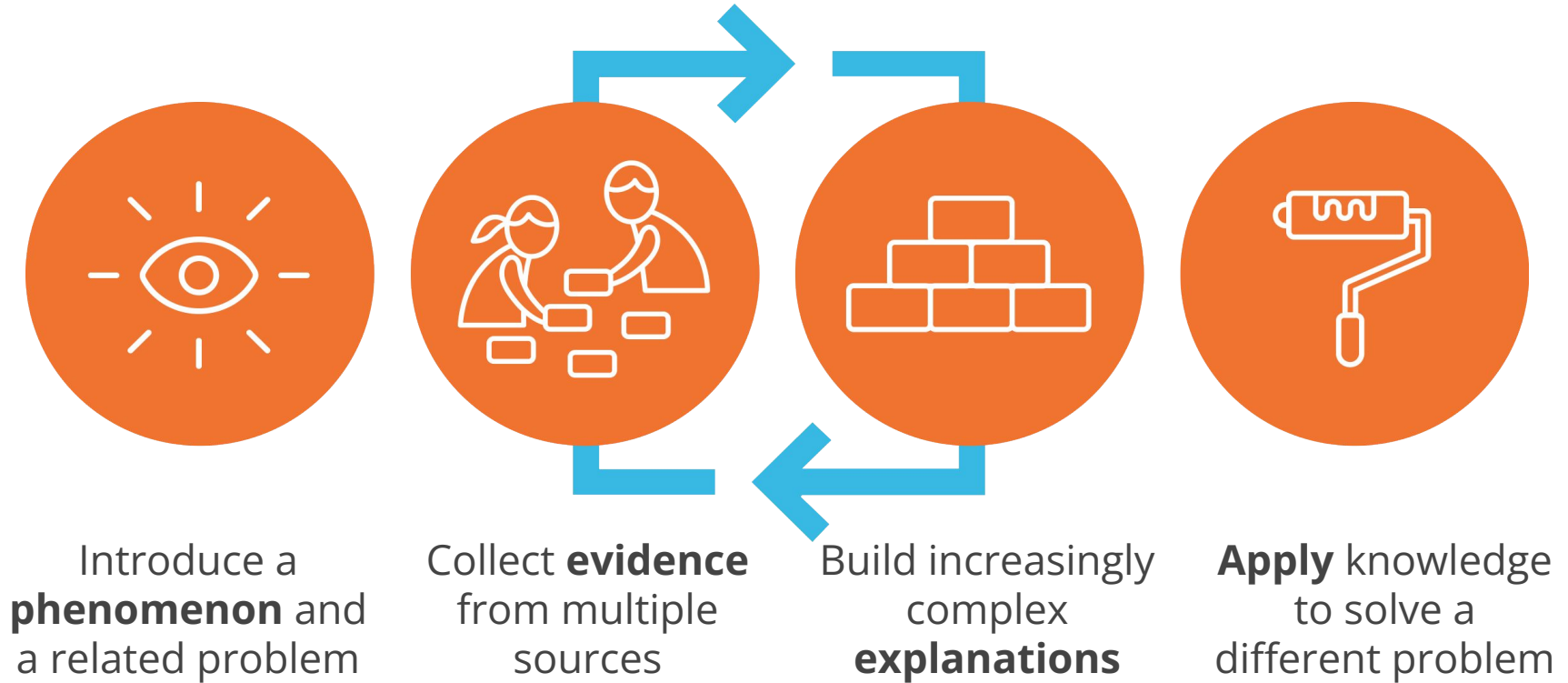
Next Generation Science Standards

Science and Engineering Practices

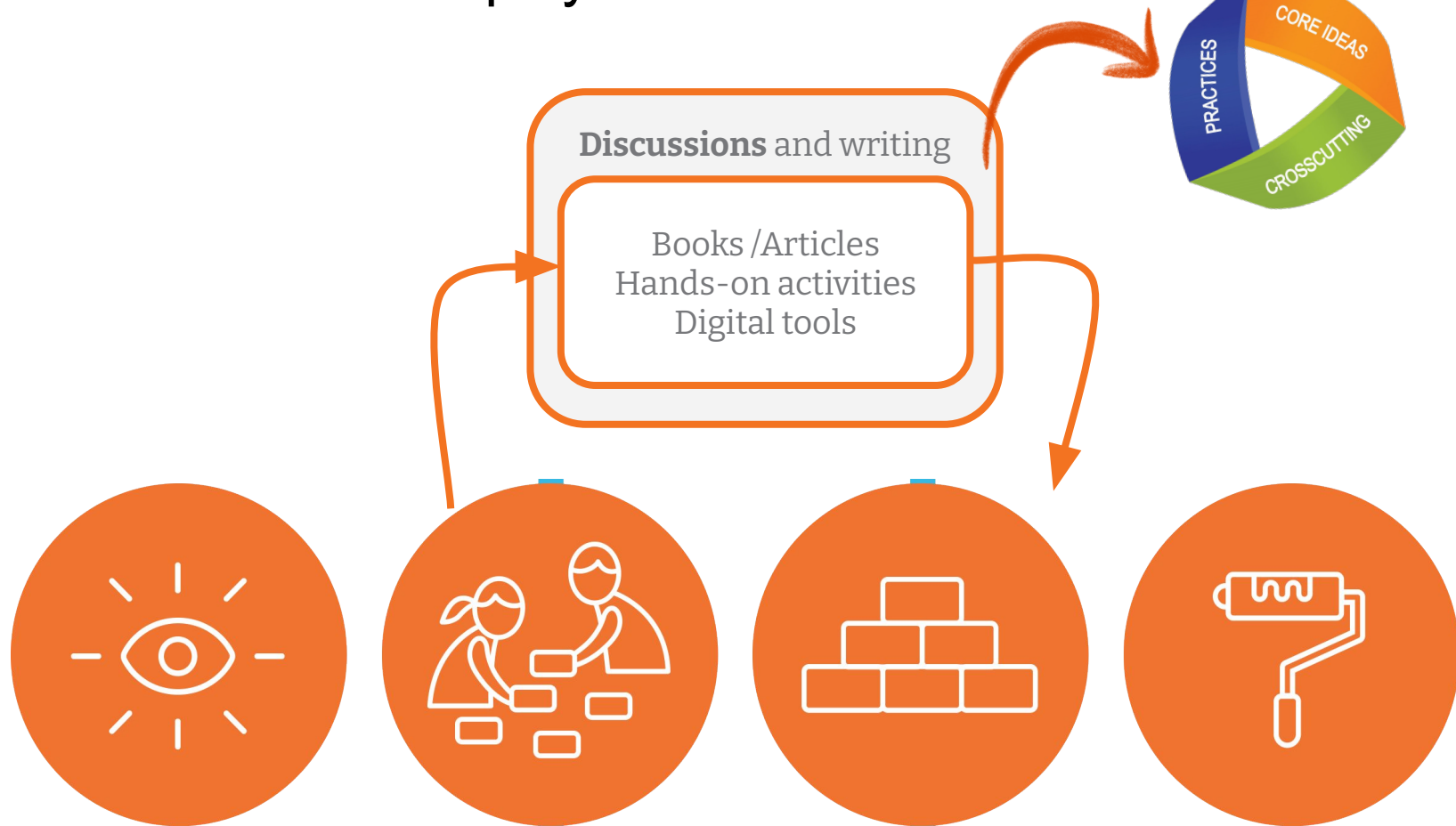


1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

Amplify Science Approach



Discourse within Amplify Science





Plan for the day

- Framing
- **Introducing the Unit**
- Unit Internalization
- Identifying the Science and Engineering Practices at the unit and chapter level
- Science and Engineering Practices within a lesson
- Lesson Planning
- Closing

Activity 2

Introducing the Problem



The unit we're beginning is called *Energy Conversions: Blackout in Ergstown*.

In this unit, you will **investigate why blackouts occur and come up with solutions to prevent them.**

Ergstown



This picture shows a town we'll call Ergstown.



What do you **see** in the picture?

Ergstown: a Few Moments Later



This is an image of the same town just a few moments later.



How is this picture different?

What do you think is going on in the picture?

Ergstown: Later That Night



What do you notice in this picture?



Have you ever been in a blackout? What was it like?



Why might blackouts be a problem?



To: Systems Engineers

From: Mayor Joules, Ergstown City Hall

Subject: Improvements to the Electrical System

Recently, Ergstown has been experiencing frequent blackouts. Blackouts can be dangerous and inconvenient, so I need a team to figure out how the electrical system can be improved.

Before the team can begin to solve this problem, it will first need to figure out why the blackouts have been happening. I would like to receive updates as the team discovers possible causes of the blackouts and as the team comes up with ideas about how to improve the electrical system.

The town of Ergstown will be very grateful to anyone who can help us solve our blackout problem!



Unit Question

How does the electrical system work?

Vocabulary



engineer

a person who uses science knowledge to design something in order to solve a problem

Energy Conversions

Problem: Why does Ergstown keep having blackouts?

Role: System Engineers

Energy Conversions

Coherent Storylines



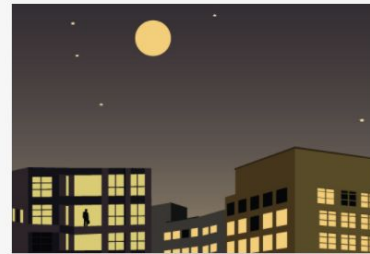
Chapter 1: What happened to the electrical system the night of the...

6 Lessons



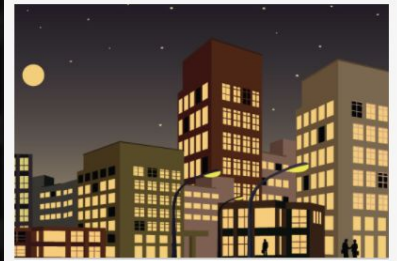
Chapter 2: What makes the devices in Ergstown output or fail to output...

4 Lessons



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

6 Lessons



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

6 Lessons

Energy Conversions

Unit Question: How does the electrical system work?

Energy Conversions

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

Energy Conversions, Progress Build

Assumed prior knowledge (preconceptions): Students are likely to recognize that many familiar devices need electricity to function. Students will also likely recognize the idea that there is a source of electricity for those devices, but what that source is, how it functions, or how it relates to the device will likely still be mysterious.

Level 3

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

Level 2

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

Level 1

Devices work by converting electrical energy to another form.

Prior knowledge


Deep, causal understanding



Plan for the day

- Framing
- Introducing the Unit
- **Unit Internalization**
- Identifying the Science and Engineering Practices at the unit and chapter level
- Science and Engineering Practices within a lesson
- Lesson Planning
- Closing

Navigate to the Unit Page




22 Lessons

Energy Conversions


[JUMP DOWN TO UNIT GUIDE](#)

[GENERATE PRINTABLE TEACHER'S GUIDE](#)




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 Ergstown...

6 Lessons



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

6 Lessons

Key Unit Guide Documents for Planning

Planning for the Unit	Printable Resources
Unit Overview	Coherence Flowcharts
Unit Map	Copymaster Compilation
Progress Build	Flextension Compilation
Getting Ready to Teach	Investigation Notebook
Materials and Preparation	Multi-Language Glossary
Science Background	NGSS Information for Parents and Guardians
Standards at a Glance	Print Materials (8.5" x 11")
	Print Materials (11" x 17")
Teacher References	
Lesson Overview Compilation	
Standards and Goals	
3-D Statements	
Assessment System	
Embedded Formative Assessments	
Books in This Unit	
Apps in This Unit	
Flextensions in This Unit	

Offline Preparation

Teaching without reliable classroom internet? Prepare unit and lesson materials for offline access.

[Offline Guide](#)

Core Unit Planning & Internalization

Unit Title: 1

Overview

[Resources: Unit Overview, Teacher's Guide, Coherence Flowchart, Unit Map, 3-D Statements]

What is the phenomenon/real-world problem students are investigating in your unit?

2

Student Role:

3

Unit Question:

4

Relationship between the Unit Phenomenon and Unit Question:

5

By the end of the unit, students figure out...

6

How do students engage with three-dimensional learning to figure out the phenomenon/real-world problem in your unit?

7

Unit Guide resources:

- Unit Overview
- Unit Map
- Coherence Flowchart

Unit Guide resources:

- Lesson Overview Compilation
- Unit Overview

Unit Guide resources:

- Unit Map

Unit Guide resources:

- 3D Statements at the Unit Level

Core Unit Planning & Internalization

Unit Title:

Energy Conversions

Overview

[Resources: Unit Overview, Teacher's Guide, Coherence Flowchart, Unit Map, 3-D Statements]

What is the phenomenon/real-world problem students are investigating in your unit?

Ergstown experiences frequent blackouts. Students will figure out how an electrical system can fail.

Student Role:

System Engineers

Unit Question:

How does the electrical system work?

Relationship between the Unit Phenomenon and Unit Question:

Students will better understand the parts of the electrical system and how vital it is to modern life. Students will understand where energy comes from, how it moves through a system, and what forms it takes

By the end of the unit, students figure out...

Electrical energy that comes through the electrical grid must have a source and a source converter. Each source has a converter that changes the energy form of the source to electrical energy.

How do students engage with three-dimensional learning to figure out the phenomenon/real-world problem in your unit?

Students investigate—through firsthand experiences, a digital model, and by obtaining information by reading—how electrical systems convert and transfer energy (systems and system models, energy and matter). They use what they learn to design, test, and evaluate improvements to cause the electrical system to be more reliable, even during natural hazards and to make arguments based on evidence for the best improvements (cause and effect).



Plan for the day:

- Framing
- Introducing the Unit
- Unit Internalization
- Identifying the Science and Engineering Practices at the unit and chapter level
- Science and Engineering Practices within a lesson
- Lesson Planning
- Closing

Key Documents for Planning Work Time

The image shows a digital interface for planning work time, divided into two main columns. The left column contains a list of planning documents, and the right column contains printable resources and an offline preparation section. Orange arrows point to the 'Planning for the Unit' section, 'Materials and Preparation', 'Standards and Goals', 'Assessment System', 'Embedded Formative Assessments', and 'Apps in This Unit'. A blue arrow points to '3-D Statements'.

Planning for the Unit	Printable Resources
Unit Overview	Coherence Flowcharts
Unit Map	Copymaster Compilation
Progress Build	Flexextension Compilation
Getting Ready to Teach	Investigation Notebook
Materials and Preparation	Multi-Language Glossary
Science Background	NGSS Information for Parents and Guardians
Standards at a Glance	Print Materials (8.5" x 11")
	Print Materials (11" x 17")
Teacher References	
Lesson Overview Compilation	
Standards and Goals	
3-D Statements	
Assessment System	
Embedded Formative Assessments	
Books in This Unit	
Apps in This Unit	
Flexextensions in This Unit	

Offline Preparation

Teaching without reliable classroom internet? Prepare unit and lesson materials for offline access.

[Offline Guide](#)

Unit 3D Statements

Key

Practices

Disciplinary Core Ideas

Crosscutting Concepts

Unit Level

Students investigate—through firsthand experiences, a digital model, and by obtaining information by reading—how electrical systems convert and transfer energy (systems and system models, energy and matter). They use what they learn to design, test, and evaluate improvements to cause the electrical system to be more reliable, even during natural hazards and to make arguments based on evidence for the best improvements (cause and effect).

Unit 3D Statements

Key

Practices

Disciplinary Core Ideas

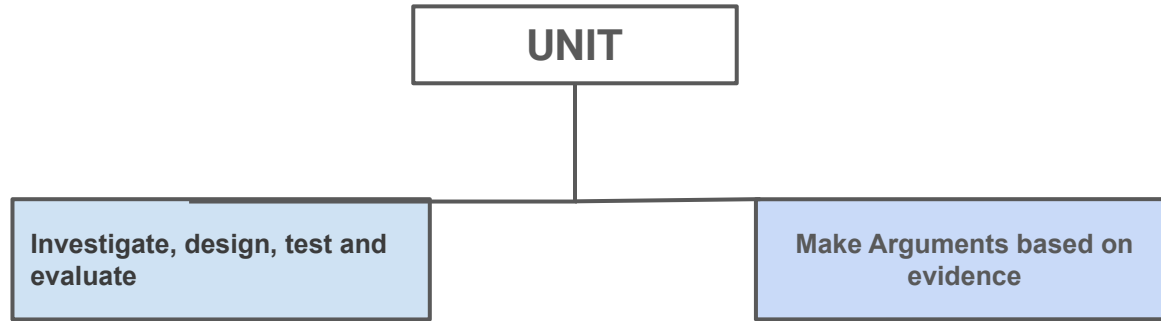
Crosscutting Concepts

Unit Level

Students investigate—through firsthand experiences, a digital model, and by obtaining information by reading—how electrical systems convert and transfer energy (systems and system models, energy and matter). They use what they learn to design, test, and evaluate improvements to cause the electrical system to be more reliable, even during natural hazards and to make arguments based on evidence for the best improvements (cause and effect).

Energy Conversions

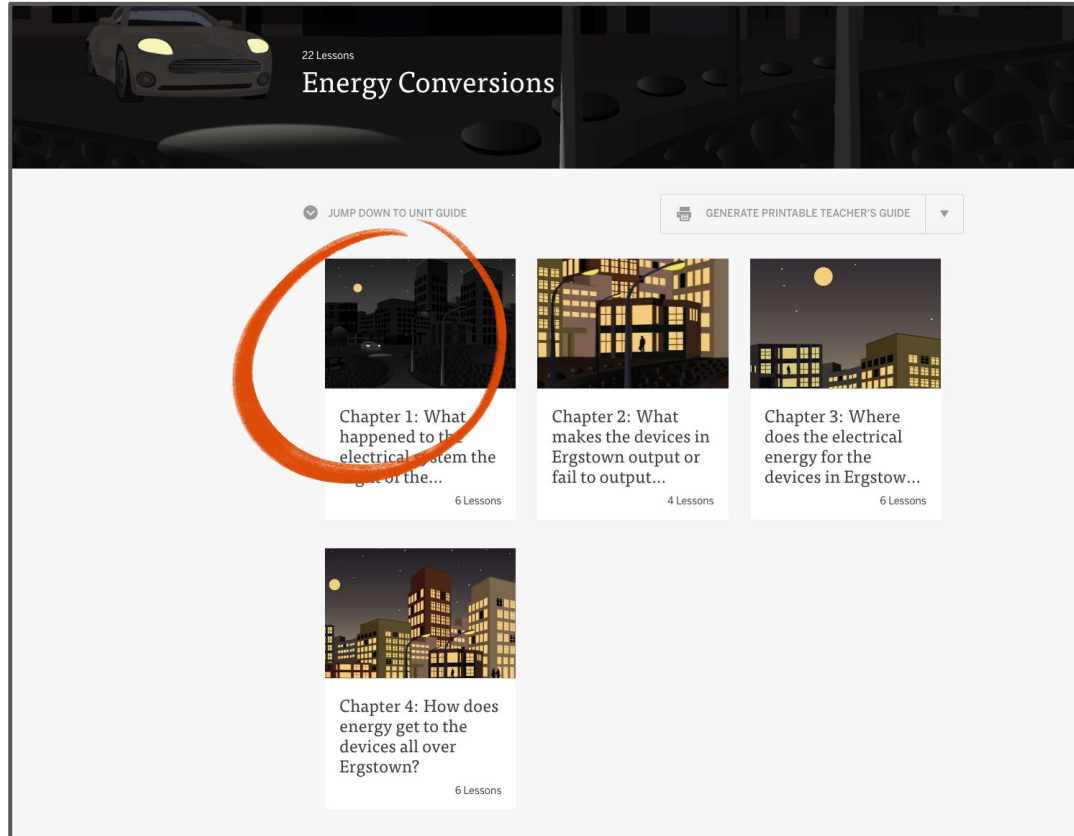
Science & Engineering Practices



These are the two main categories of Science and Engineering Practices that the students will be engaged with in this unit.



Waves, Energy and Information



The screenshot shows a digital learning interface for a unit titled "Energy Conversions". At the top left, there is a dark banner with a car icon and the text "22 Lessons" and "Energy Conversions". Below this, there is a navigation bar with a "JUMP DOWN TO UNIT GUIDE" button and a "GENERATE PRINTABLE TEACHER'S GUIDE" button. The main content area displays four chapter cards, each with a night cityscape image, a chapter title, and a lesson count. A large orange circle is drawn around the first chapter card.

22 Lessons
Energy Conversions

JUMP DOWN TO UNIT GUIDE

GENERATE PRINTABLE TEACHER'S GUIDE

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 Ergstown...
6 Lessons

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

Chapter 1 3D Statements

Key

Practices

Disciplinary Core Ideas

Crosscutting Concepts

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

Students obtain information about electrical systems and the different forms of input and output energy (systems and system models; energy and matter) by reading and by using a digital model. They then apply what they have learned about systems and energy (systems and system models; energy and matter) to explain what might have caused the problem with the electrical system (cause and effect).

Science & Engineering Practices

Energy Conversions,
Unit SEP

Investigate, design, test and
evaluate

Make Arguments based on
evidence

Chapter 1: By obtaining
information by reading and
using a digital model

Chapter 2

Chapter 3

Chapter 4

Chapter 1: Explain

Chapter 2

Chapter 3

Chapter 4

Chapter 1 Overview

22 Lessons

Energy Conversions

JUMP DOWN TO UNIT GUIDE

GENERATE PRINTABLE TEACHER'S GUIDE

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 Ergstown...
6 Lessons

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

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

JUMP DOWN TO CHAPTER OVERVIEW

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

Chapter Overview

Students are introduced to the problem they will consider throughout the *Energy Conversions* unit: The fictional city of Ergstown suffers from frequent blackouts, and Mayor Joules is seeking help in designing improvements to the electrical system. Students take on the role of systems engineers who are challenged to discover what parts of the electrical system make Ergstown particularly vulnerable to blackouts. In Chapter 1, students work to answer the question *What happened to the electrical system the night of the Ergstown blackout?* After learning that a system is made of parts that interact to perform a function, they read about and engage with several different systems, including a simple circuit powered by a solar cell. Students use a digital simulation to explore the different parts of an electrical system. They then learn about different forms of energy and come to realize that devices that they use every day need energy to function. By the end of the chapter, students apply what they have learned about systems and energy to conclude that the reason that the blackout occurred was that there was a problem with the electrical system. The purpose of this chapter is to introduce students to foundational concepts about systems and energy, and for students to understand that many devices people use every day require electrical energy.

3D Statements Work time

1. Go to the **3D Statement** on the **Unit Page**.
2. Look at the 3D Statement **for each chapter**
3. Identify the **Science and Engineering Practices** for each chapter.
4. **Categorize** them.

3-D Statements
Energy Conversions
Teacher References

Lesson 1.2: Introducing Systems

Students read the book Systems to obtain information about what a system is and how parts within a system interact (systems and system models).

Lesson 1.3: Exploring Systems

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).

Lesson 1.4: Electrical Energy

Students use a digital model to investigate various electrical systems (systems and system models), to build an understanding of what energy is, and to gather evidence about which devices have electrical energy as an input (energy and matter).

Lesson 1.5: Forms of Energy

Students design and make different electrical systems (systems and system models) and communicate through discussion about how they can highlight, model, or avoid energy as an output (energy and matter).

Energy Conversions
Teacher References

3-D Statements
Key
Practices Disciplinary Core Ideas Crosscutting Concepts

Unit Level

Students investigate through firsthand experiences, a digital model, and by obtaining information by reading—how electrical systems convert and transfer energy (systems and system models, energy and matter). They use what they learn to design, test, and evaluate improvements to cause the electrical system to be more reliable, even during natural disasters and to make arguments based on evidence for the best improvements (cause and effect).

Chapter Level

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

Students obtain information about electrical systems and the different forms of input and output energy (systems and system models, energy and matter) by reading and by using a digital model. They then apply what they have learned about systems and energy (systems and system models, energy and matter) to explain what might have caused the problem with the electrical system (cause and effect).

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

Students read, use a digital model, and analyze data to figure out that there are many ways that energy can be converted from one form to another (systems and system models, energy and matter). They then construct arguments to support a claim about one solution for reducing blackouts (cause and effect) in Ergstown.

Chapter 3: Where does the electrical energy for the devices in Ergstown come from?

Students obtain information by reading and using a digital model to figure out that the energy for an electrical system must come from a source and that some energy is converted to electrical energy by a converter (such as a fuel-burning power plant, solar panel, or wind turbine) (systems and system models, energy and matter). They figure out that each energy source has different impacts on natural resources (cause and effect). At the end of the chapter, students design, make, and test their own wind converters.

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

Students investigate, obtain, and evaluate information about the electrical grid—the wires that connect the other parts of the electrical system (systems and system models, energy and matter, structure and function). They then argue for the best solution for improving the electrical grid to reduce blackouts (cause and effect).

Lesson Level

Lesson 1.1: Pre-Unit Assessment

Students are presented with a simple illustration of a town, and they write initial explanations about what might cause a lamp to not turn on (cause and effect).

Planning for the Unit

Unit Overview
Unit Map
Progress Build
Getting Ready to Teach
Materials and Preparation
Science Background
Standards at a Glance

Teacher References
Lesson Overview Compilation
Standards and Goals
3-D Statements
Assessment System
Embedded Formative Assessments
Books in This Unit
Apps in This Unit
Flexextensions in This Unit

Printable Resources
Coherence Flowcharts
Copymaster Compilation
Flexextension Compilation
Investigation Notebook
Multi-Language Glossary
NGSS Information for Parents and Guardians
Print Materials (8.5" x 11")
Print Materials (11" x 17")

Offline Preparation
Teaching without reliable classroom internet? Prepare unit and lesson materials for offline access.
Offline Guide

Let's Review

Energy Conversions, Unit SEP

**Investigate, design, test and
evaluate**

**Chapter 1: By obtaining
information by reading and
using a digital model**

Chapter 2

Chapter 3

Chapter 4

**Make Arguments based on
evidence**

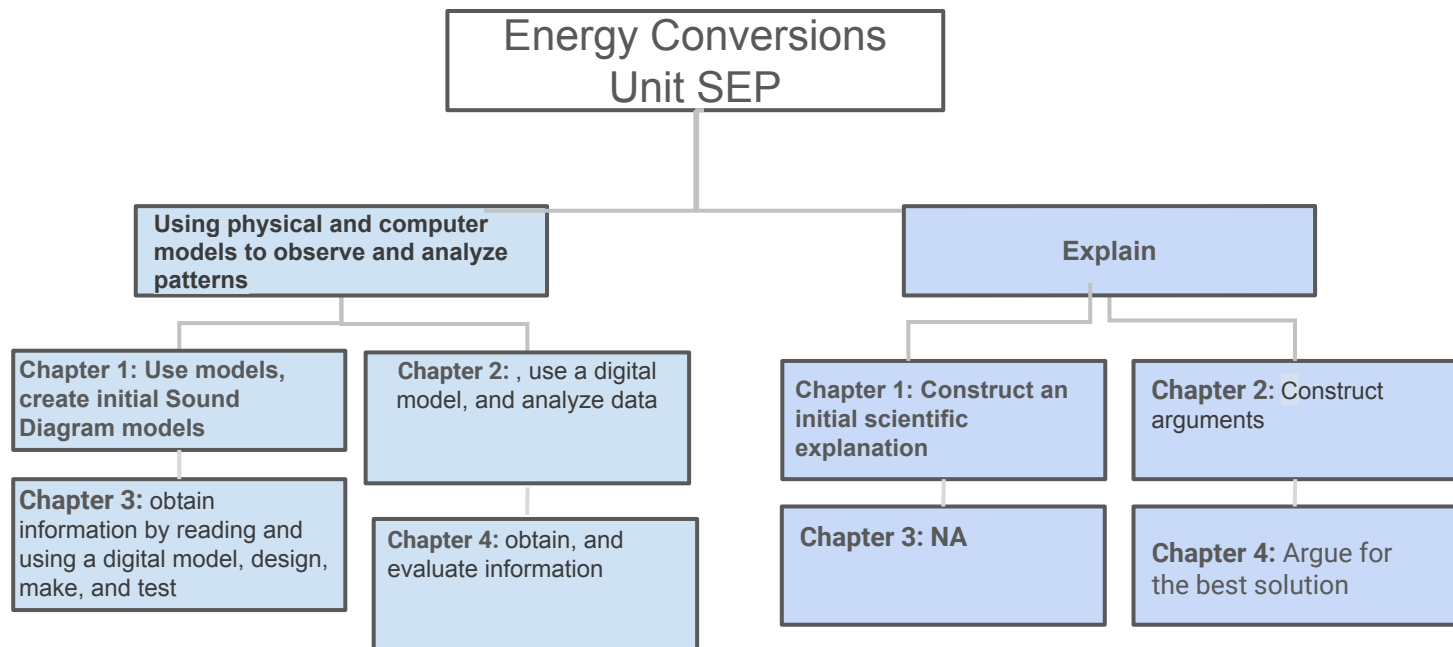
Chapter 1: Explain

Chapter 2

Chapter 3

Chapter 4

Let's Review



Questions?



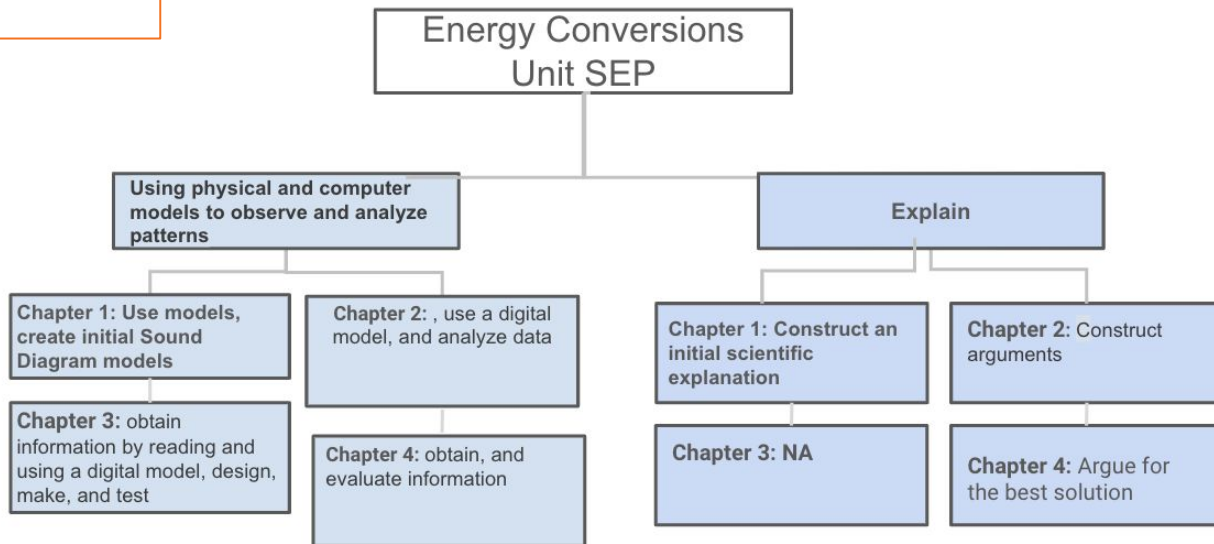
Share Out

Jamboard

Reflect on how these practices are scaffolded through the unit and what that means for student learning.

Science & Engineering Practices:

Building the practices incrementally,
chapter by chapter.

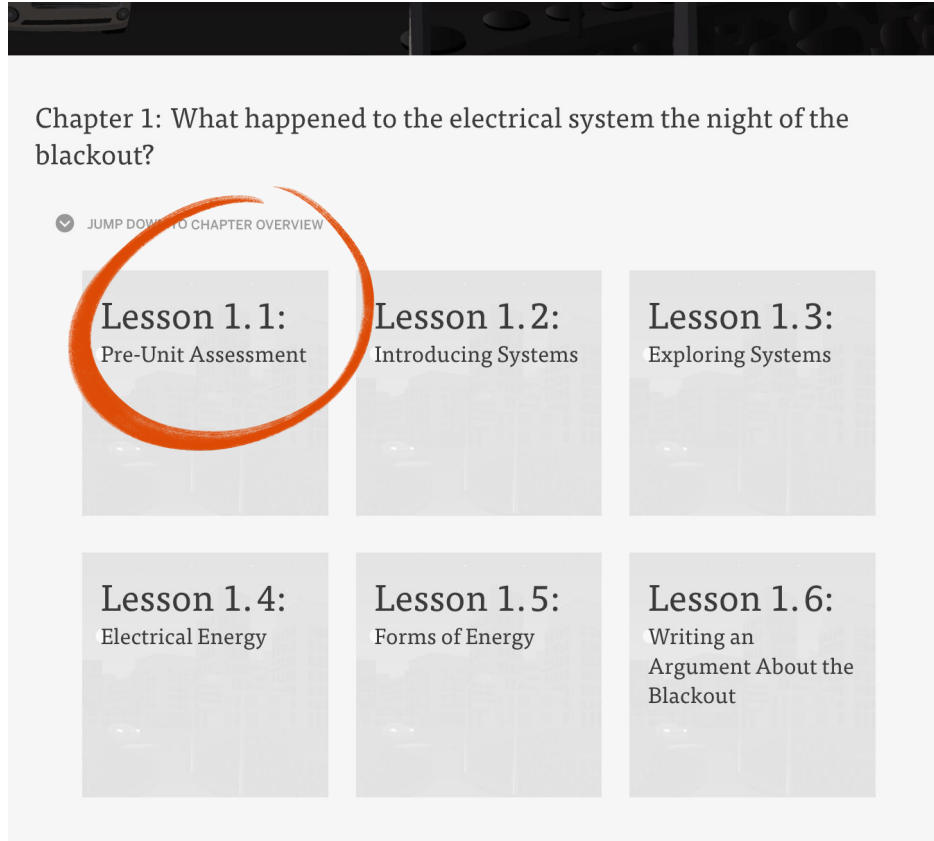




Plan for the day

- Framing
- Introducing the Unit
- Unit Internalization
- Identifying the Science and Engineering Practices at the unit and chapter level
- Science and Engineering Practices within a lesson
- Lesson Planning
- Closing

Energy Conversions



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

▼ JUMP DOWN TO CHAPTER OVERVIEW

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

3D Statements, Lesson 1.1

Key

Practices

Disciplinary Core Ideas

Crosscutting Concepts

Students are presented with a simple illustration of a town, and they write initial explanations about what might cause a lamp to not turn on (cause and effect)

A stylized, dark illustration of a city at night. Several tall buildings with many windows are visible. A large, bright yellow sun or moon is in the upper left sky. Small white stars are scattered across the dark sky. In the foreground, a car with its headlights on is driving on the left, and a street lamp is visible. The overall tone is dark and atmospheric.

Grade 4 | Energy Conversions

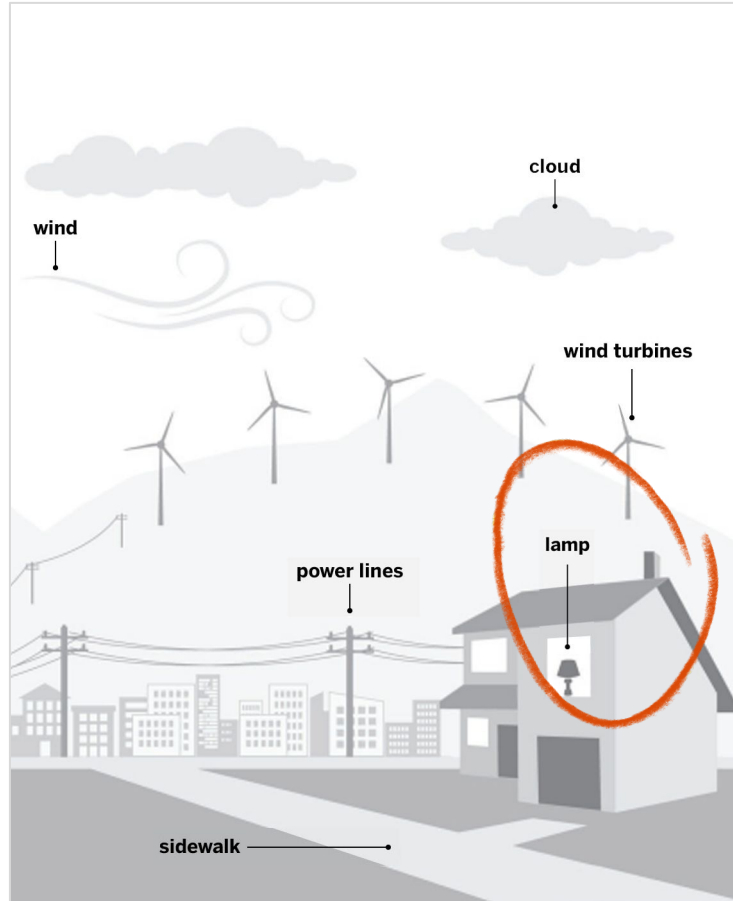
Lesson 1.1: Pre-Unit Assessment

Activity 1

Students Write Initial Explanations



Students are presented with a simple illustration of a town, and they write initial explanations about what might cause a lamp to not turn on (cause and effect)



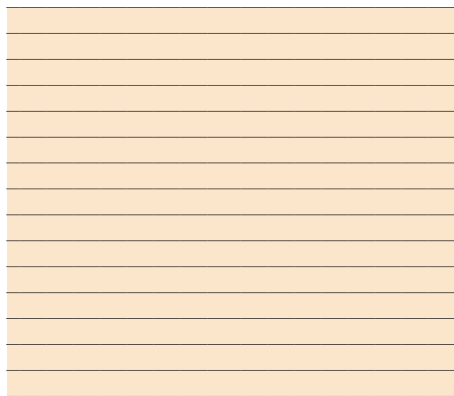
We are beginning a new unit about energy and the electrical system.

There is one page for the **question**, one page where you can make a **drawing**, and one page with the **picture** you saw.

Name: _____ Date: _____

**Pre-Unit Writing:
Explaining Why the Lamp Won't Turn On**

Look at the picture of the town. A person in this town plugged a lamp into the wall, then turned the lamp switch to "on." Nothing happened! The lamp did not light up. What are all of the possible reasons that the lamp did not light up? Write a paragraph to explain your answer. Explain all of your ideas as completely as you can, even if you are not sure of the answer.



Energy Conversions—Lesson 1.1

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Energy Conversions—Lesson 1.1

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Energy Conversions—Lesson 1.1

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Write and draw your ideas about why the lamp won't turn on.

Activity 2

Introducing the Problem



The unit we're beginning is called *Energy Conversions: Blackout in Ergstown*.

In this unit, you will **investigate why blackouts occur and come up with solutions to prevent them.**

Ergstown



This picture shows a town we'll call Ergstown.



What do you **see** in the picture?

Ergstown: a Few Moments Later



This is an image of the same town just a few moments later.



How is this picture different?

What do you think is going on in the picture?

Ergstown: Later That Night



What do you notice in this picture?



Have you ever been in a blackout? What was it like?



Why might blackouts be a problem?



To: Systems Engineers

From: Mayor Joules, Ergstown City Hall

Subject: Improvements to the Electrical System

Recently, Ergstown has been experiencing frequent blackouts. Blackouts can be dangerous and inconvenient, so I need a team to figure out how the electrical system can be improved.

Before the team can begin to solve this problem, it will first need to figure out why the blackouts have been happening. I would like to receive updates as the team discovers possible causes of the blackouts and as the team comes up with ideas about how to improve the electrical system.

The town of Ergstown will be very grateful to anyone who can help us solve our blackout problem!



Unit Question

How does the electrical system work?

Vocabulary



engineer

a person who uses science knowledge to design something in order to solve a problem

Activity 3

Introducing Investigation Notebooks



AmplifyScience



Energy Conversions:

Blackout in Ergstown

Investigation Notebook

We are going to be using
an **Investigation
Notebook** like scientists
use.

End of Lesson



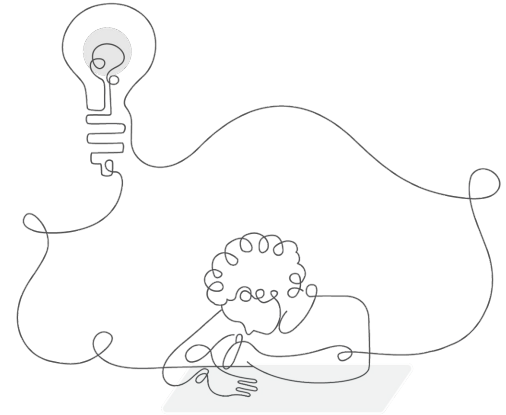
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Science and Engineering Practices

Describe the science and engineering practices the students were engaged in during this lesson.



Science & Engineering Practices

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

Chapter 1: By obtaining information by reading and using a digital model

Lesson 1:
NA

Chapter 1: Explain

Lesson 1:
What - Write their initial explanations
How - Pre-Unit Assessment

Lesson Brief

Lesson at a Glance

1: Students Write Initial Explanations (20 min.)

Students' initial explanations of why a lamp will not turn on reveal their initial understanding of the core content of the unit.

Explanations can be assessed by using the Assessment Guide: Interpreting Students' Pre-Unit Explanations About Why the Lamp Won't Turn On (in Digital Resources). Asking students to take stock of their initial knowledge also helps prepare them to make connections to new knowledge.

2: Introducing the Problem (15 min.)

By viewing slides of a blackout in the fictional town of Ergstown and reading a message from the town's mayor, students are introduced to the problem that they will investigate and design solutions for throughout the unit—how to design improvements to an electrical system in order to prevent blackouts. They are also introduced to their role as systems engineers.

3: Introducing Investigation Notebooks (10 min.)

Students receive their *Energy Conversions* Investigation Notebooks and learn some of the ways that scientists use notebooks.

The screenshot shows a digital interface for a lesson plan. At the top, there is a navigation bar with three main sections: 1. WRITING: Students Write Initial Explanations, 2. TEACHER-LED DISCUSSION: Introducing the Problem, and 3. TEACHER-LED DISCUSSION: Introducing Investigation Notebooks. Below this, there is a 'RESET LESSON' button. The main content area is titled 'Overview' and 'Students' Initial Explanations'. It describes the unit's focus on investigating electrical system failures and designing solutions. A sidebar on the left lists navigation options: Overview, Materials & Preparation, Differentiation, Standards, Vocabulary, and Unplugged?. On the right, there is a 'DIGITAL RESOURCES' section with a list of links: Classroom Slides 1.1 | PowerPoint, Classroom Slides 1.1 | Google Slides, All Projections, Pre-Unit Writing: Explaining Why The Lamp Won't Turn On copypaster, Assessment Guide: Interpreting Students' Pre-Unit Explanations About Why the Lamp Won't Turn On, Energy Conversions Investigation Notebook, Questioning Strategies for Grades 2–5, and Energy Conversions Family Connections Homework. An orange arrow points to the 'Classroom Slides 1.1 | Google Slides' link.

1 WRITING: Students Write Initial Explanations

2 TEACHER-LED DISCUSSION: Introducing the Problem

3 TEACHER-LED DISCUSSION: Introducing Investigation Notebooks

RESET LESSON

GENERATE PRINTABLE LESSON GUIDE

Overview

Materials & Preparation

Differentiation

Standards

Vocabulary

Unplugged?

Overview

Students' Initial Explanations

In this unit, students investigate what might cause an electrical system to fail, and they design solutions to improve the electrical system in order to reduce blackouts. In this Pre-Unit Assessment, students are presented with a simple illustration of a town and asked to explain why they think a lamp in one of the houses will not turn on. The explanations they provide in this lesson serve as a Pre-Unit Assessment for formative purposes, designed to reveal students' initial understanding of the unit's core content, both unit-specific science concepts and the crosscutting concept of Systems and System Models, prior to instruction. As such, students' explanations offer a baseline from which to measure growth of understanding over the course of the unit. These explanations can also provide the teacher with insight into students' thinking as they begin this unit of instruction. This three-dimensional assessment will allow the teacher to draw connections to students' experiences and to watch for preconceptions that might get in the way of students' understanding.

Digital Resources

- Classroom Slides 1.1 | PowerPoint
- Classroom Slides 1.1 | Google Slides
- All Projections
- Pre-Unit Writing: Explaining Why The Lamp Won't Turn On copypaster
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- Energy Conversions Family Connections Homework

3D Statements, Lesson 1.2

Key

Practices

Disciplinary Core Ideas

Crosscutting Concepts

Students read the book *Systems* to obtain information about what a system is and how parts within a system interact (systems and system models).

A stylized, dark illustration of a city at night. Several tall buildings with many windows are visible. A large, bright yellow sun or moon is in the upper left sky. Small stars are scattered across the dark sky. In the foreground, a car with its headlights on is parked on the left, and a street lamp is in the center. The overall tone is dark and atmospheric.

Grade 4 | Energy Conversions

Lesson 1.2: Introducing Systems

Activity 1

Reflecting on the Unit Problem



Ergstown: Later That Night



Remember you are taking on the role of systems engineers to help Ergstown.




What are your ideas about **what your job will be** as systems engineers?



Chapter 1 Question

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





What do you **recall** was happening in each of these scenes from Ergstown?

Ergstown



Ergstown: a Few Moments Later



Ergstown: Later That Night



Today, we are going to investigate this question:

What is a system?

Activity 2

Observing a Simple System





What are some **systems** you have heard of before?

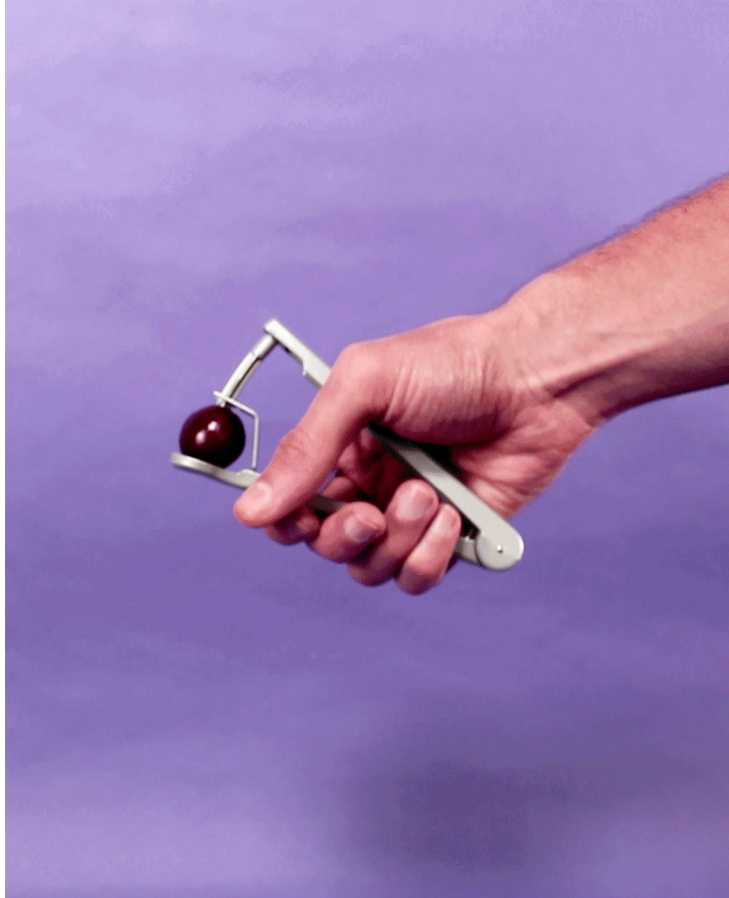


We will use this **mystery system** as an example for you to begin understanding what a system is.



What do you observe about how the mystery system works?

What do you think the mystery system might be used for?



Observe the system carefully to see how it works.

_____ System

Part				
Function				

System function: _____

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.

Vocabulary



function

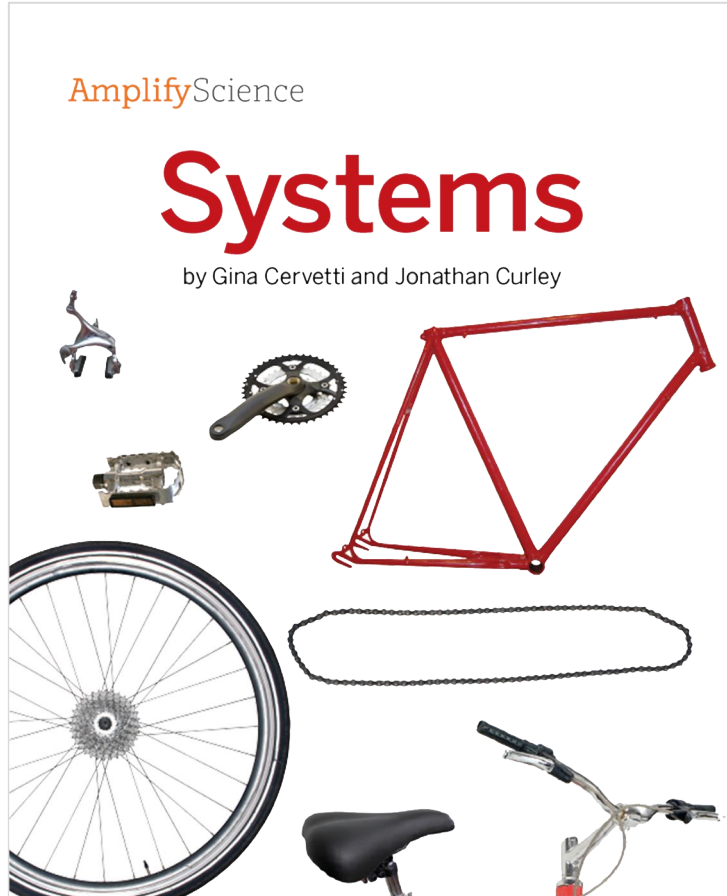
what something can do

Activity 3

Introduction to Synthesizing

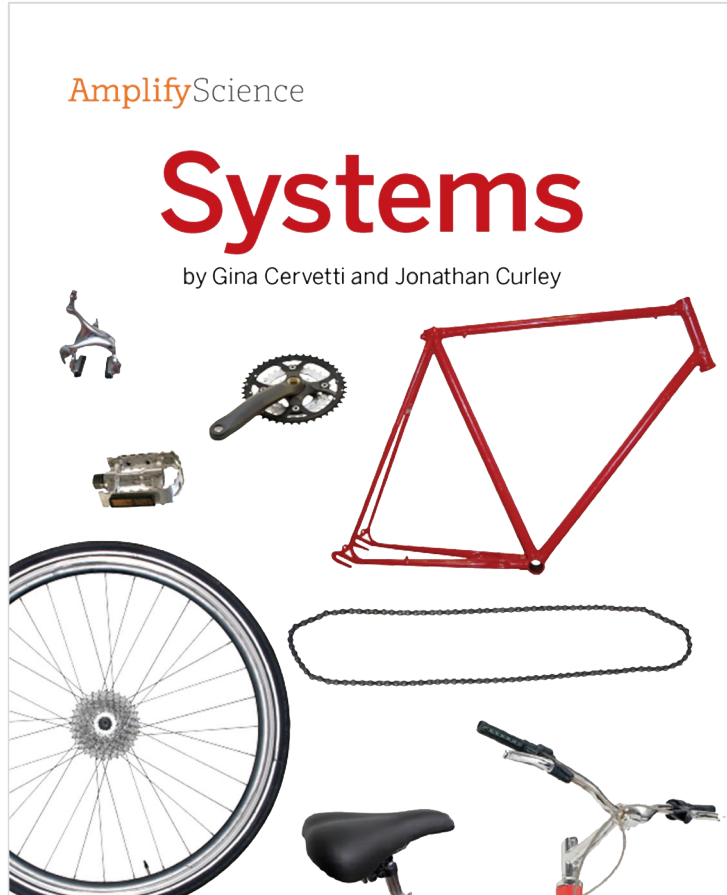


Students read the book *Systems* to obtain information about what a system is and how parts within a system interact (systems and system models).



Reading this book will help us answer the Investigation Question:

What is a system?



As we read, we will practice **making connections** between what we read and what we already know.

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.

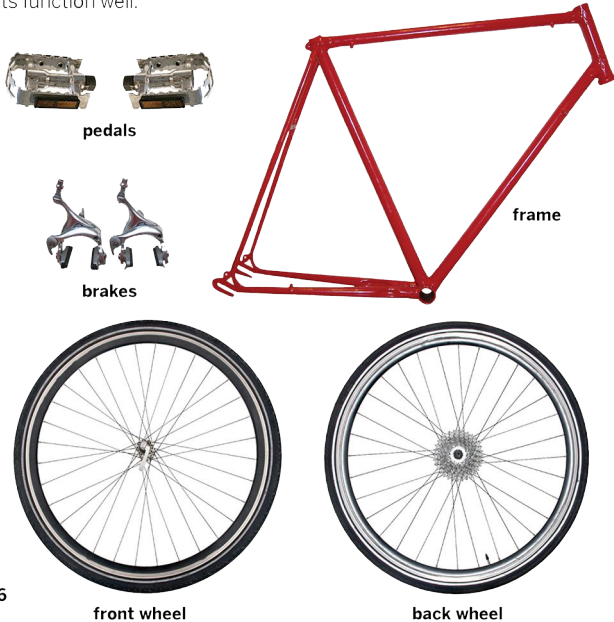
Turn to page 5.



Who would like to read this page aloud?

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.



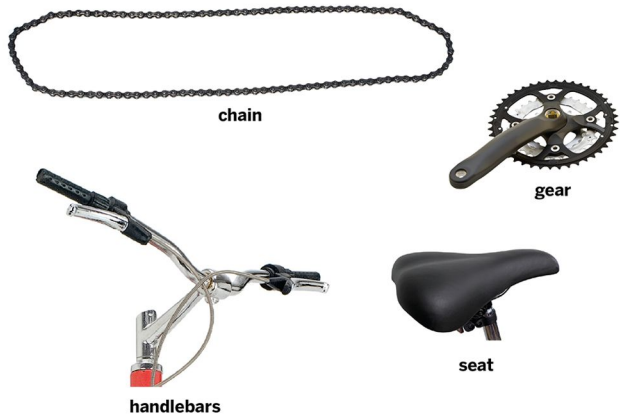
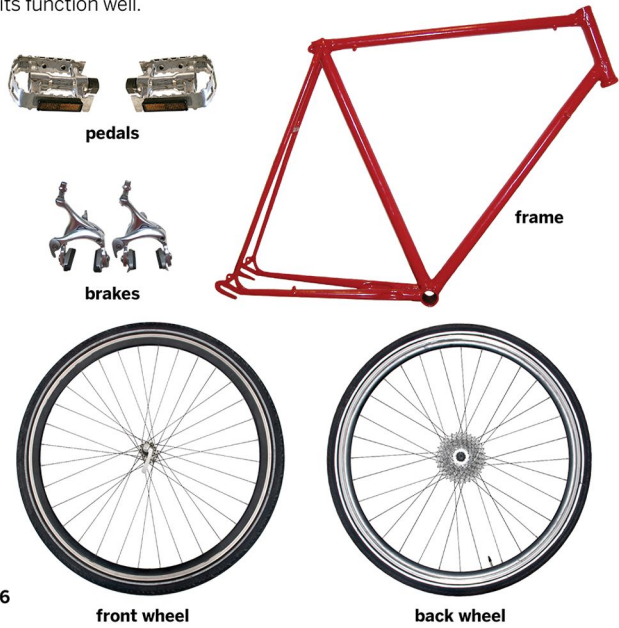
Turn to page 6.



Who would like to read this page aloud?

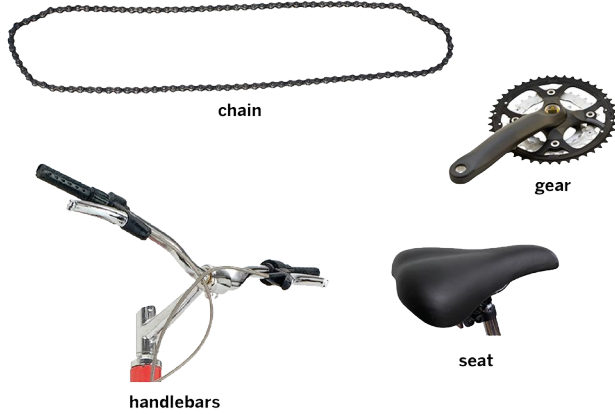
Bicycle Parts

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.



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	<i>What is the function of the pedal?</i>



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	<i>What is the function of the pedal?</i>

This **table** provides more information about the bicycle.

It lists bicycle **parts** and the **function** of each part.

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.



Turn to page 8.



Who would like to **read**
the first paragraph?

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.



A bicycle is a **system** and a cherry pitter is a **system**.



Vocabulary



synthesize

to put together multiple pieces of information in order to understand something

Activity 4

Reading: Systems

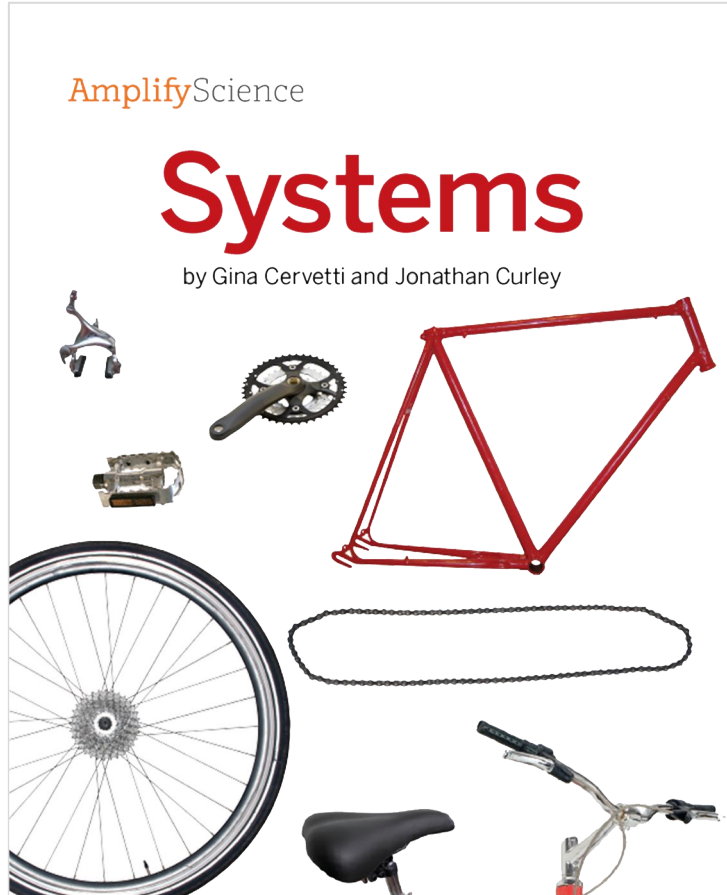


Students read the book *Systems* to obtain information about what a system is and how parts within a system interact (systems and system models).

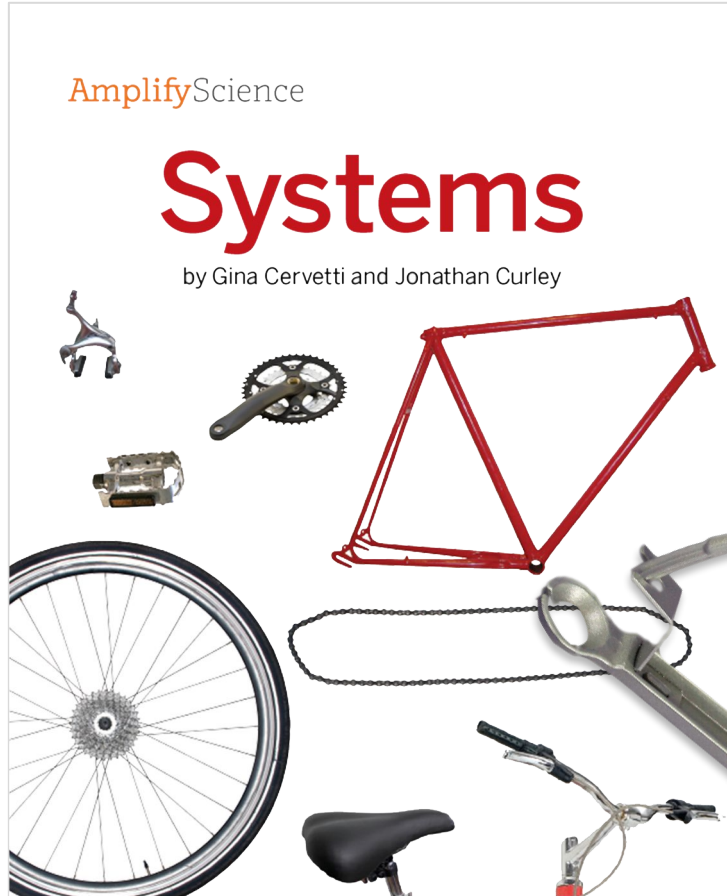
Additional SEP: Obtaining, evaluating, and communicating information

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.



As you read, **make connections** and discuss your new ideas about systems with your partners.



You have just observed a cherry pitter system and read about systems.



What new understandings do you have about systems?

End of Lesson



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Science & Engineering Practices

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

Chapter 1: By obtaining information by reading and using a digital model

Chapter 1: Explain

Lesson 1.1

NA

Lesson 1.1

What - Write their initial explanations

How - Pre-Unit Assessment

Lesson 1.2

What - Obtain information

How - Observe a system (Cherry Pitter) and read *Systems*

Lesson 1.2

What - Use sense making strategy of synthesizing & explain

How - Synthesize information from *Systems* and explain new understandings.



Plan for the day

- Framing and Review
- Introducing the Unit
- Unit Internalization
- Identifying the Science and Engineering Practices at the unit and chapter level
- Science and Engineering Practices within a lesson
- Lesson Planning
- Closing

3D Statements Lesson Work time

1. Identify **what** Science and Engineering Practices are addressed in each lesson in Chapter One.

2. Identify **how** the Science and Engineering Practices are addressed

Energy Conversions
Teacher References

3-D Statements

Key
Practices Disciplinary Core Ideas Crosscutting Concepts

Unit Level

Students investigate—through firsthand experiences, a digital model, and by obtaining information by reading—how electrical systems convert and transfer energy (systems and system models, energy and matter). They use what they learn to design, test, and evaluate improvements to **cause the electrical system to be more reliable, even during natural hazards** and to make arguments based on evidence for the best improvements (cause and effect).

Chapter Level

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

Students obtain information about electrical systems and the different forms of input and output energy (systems and system models, energy and matter) by reading and by using a digital model. They then apply what they have learned about systems and energy (systems and system models, energy and matter) to explain **what might have caused the problem with the electrical system** (cause and effect).

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

Students read, use a digital model, and analyze data to figure out that there are **many ways that energy can be converted from one form to another** (systems and system models, energy and matter). They then construct arguments to support a claim about one **solution for reducing blackouts** (cause and effect) in Ergstown.

Chapter 3: Where does the electrical energy for the devices in Ergstown come from?

Students obtain information by reading and using a digital model to figure out that **the energy for an electrical system must come from a source and that source energy is converted to electrical energy by a converter** (such as a fuel-burning power plant, solar panel, or wind turbine) (systems and system models, energy and matter). They figure out that each energy source has different impacts on natural resources (cause and effect). At the end of the chapter, students design, make, and test their own **wind converters**.

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

Students investigate, obtain, and evaluate information about **the electrical grid—the wires that connect the other parts of the electrical system** (systems and system models, energy and matter, structure and function). They then argue for the best solution for **improving the electrical grid to reduce blackouts** (cause and effect).

Lesson Level

Lesson 1.1: Pre-Unit Assessment

Students are presented with a simple illustration of a town, and they **write initial explanations about what might cause a lamp to not turn on** (cause and effect).

1

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Planning for the Unit

Unit Overview	▼
Unit Map	▼
Progress Build	▼
Getting Ready to Teach	▼
Materials and Preparation	▼
Science Background	▼
Standards at a Glance	▼

Teacher References

Lesson Overview Compilation	▼
Standards and Goals	▼
3-D Statements	▼
Assessment System	▼
Embedded Formative Assessments	▼
Books in This Unit	▼
Apps in This Unit	▼
Flexextensions in This Unit	▼

Printable Resources

PDF Coherence Flowcharts
PDF Copymaster Compilation
PDF Flexextension Compilation
PDF Investigation Notebook
PDF Multi-Language Glossary
PDF NGSS Information for Parents and Guardians
PDF Print Materials (8.5" x 11")
PDF Print Materials (11" x 17")

Offline Preparation

Teaching without reliable classroom internet? Prepare unit and lesson materials for offline access.

Offline Guide

4 Easy Steps to Teaching an Amplify Lesson

Step 1: Download the Classroom Slides

Step 2: Read the Overview Section

Step 3: Read the Materials & Preparation Section

Step 4: Read the Differentiation Section

The screenshot shows the Amplify lesson interface. At the top, there are three tabs: 1. WRITING: Students Write Initial Explanations, 2. TEACHER-LED DISCUSSION: Introducing the Problem, and 3. TEACHER-LED DISCUSSION: Introducing Investigation Notebooks. Below the tabs, there is a sidebar on the left with a 'RESET LESSON' button and a list of sections: Overview, Materials & Preparation, Differentiation, Standards, Vocabulary, and Unplugged?. Four orange arrows with numbers 1, 2, 3, and 4 point to these sections respectively. The main content area is titled 'Overview' and contains the text 'Students' Initial Explanations'. On the right side, there is a 'DIGITAL RESOURCES' section with a list of resources: Classroom Slides 1.1 | PowerPoint, Classroom Slides 1.1 | Google Slides, All Projections, Pre-Unit Writing: Explaining Why The Lamp Won't Turn On copymaster, Assessment Guide: Interpreting Students' Pre-Unit Explanations About Why the Lamp Won't Turn On, Energy Conversions Investigation Notebook, Questioning Strategies for Grades 2–5, and Energy Conversions Family Connections Homework. An orange arrow points to the 'Classroom Slides 1.1 | Google Slides' resource.

1 WRITING
Students Write Initial Explanations

2 TEACHER-LED DISCUSSION
Introducing the Problem

3 TEACHER-LED DISCUSSION
Introducing Investigation Notebooks

RESET LESSON

Overview

Materials & Preparation

Differentiation

Standards

Vocabulary

Unplugged?

Overview

Students' Initial Explanations

In this unit, students investigate what might cause an electrical system to fail, and they design solutions to improve the electrical system in order to reduce blackouts. In this Pre-Unit Assessment, students are presented with a simple illustration of a town and asked to explain why they think a lamp in one of the houses will not turn on. The explanations they provide in this lesson serve as a Pre-Unit Assessment for formative purposes, designed to reveal students' initial understanding of the unit's core content, both unit-specific science concepts and the crosscutting concept of Systems and System Models, prior to instruction. As such, students' explanations offer a baseline from which to measure growth of understanding over the course of the unit. These explanations can also provide the teacher with insight into students' thinking as they begin this unit of instruction. This three-dimensional assessment will allow the teacher to draw connections to students' experiences and to watch for preconceptions that might get in the way of students' understanding.

GENERATE PRINTABLE LESSON GUIDE

Digital Resources

- Classroom Slides 1.1 | PowerPoint
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- Energy Conversions Investigation Notebook
- Questioning Strategies for Grades 2–5
- Energy Conversions Family Connections Homework

Welcome to Classroom Slides


Amplify Science Classroom Slides are designed to make it easier for teachers to prepare for and present lessons. The slides provide a convenient option for presenting student instructions, student prompts, and other text and visuals and are fully editable so that you can customize them for your own classroom. Your classroom license allows you to use and modify the slides for your own personal use. The unauthorized copying, sharing, or distribution of copyrighted material is strictly prohibited. For more information about how to use Classroom Slides go to amplify.com/classroom-slides.

Grade 4 | Energy Conversions Lesson 1.1: Pre-Unit Assessment

Activity 1 Students Write Initial Explanations

Lesson 1.1: Pre-Unit Assessment


Activity 1



We are beginning a new unit about energy and the electrical system.

Lesson 1.1: Pre-Unit Assessment


Activity 1



There is one page for the **question**, one page where you can make a **drawing**, and one page with the **picture** you saw.

Lesson 1.1: Pre-Unit Assessment

Activity 1



Write and draw your ideas about why the lamp won't turn on.

Lesson 1.1: Pre-Unit Assessment

Activity 2

Introducing the Problem

Lesson 1.1: Pre-Unit Assessment


Activity 2

The unit we're beginning is called *Energy Conversions: Blackout in Ergstown*.

In this unit, you will **investigate why blackouts occur** and **come up with solutions to prevent them**.

Lesson 1.1: Pre-Unit Assessment

Activity 2




This picture shows a town we'll call Ergstown.

What do you see in the picture?

Lesson 1.1: Pre-Unit Assessment

Activity 2




This is an image of the same town just a few moments later.

How is this picture different?

What do you think is going on in the picture?

Lesson 1.1: Pre-Unit Assessment

Activity 2



What do you notice in this picture?

Lesson 1.1: Pre-Unit Assessment

Activity 2

Have you ever been in a blackout? What was it like?

Materials Management

3.5	4	x		Prep Prior: • 1 tray with wind turbine designs and materials from Lesson 3.4
4.1	2	x		Prep Prior: For each group of 3-5 students: 1 self-sealing, plastic bag, 1 solar panel, 1 motor with fan blades attached • 2 cables with alligator clips
4.2	2			Teacher will do the system improvement demonstration: • 1 spool of two-conductor wire, 1 wire cutter, 1 motor with fan attachment, 1 solar panel, 4 wires with clip leads, 1 clamp lamp with lightbulb. • Set the motor with fan 3–7.5 meters (10–25 feet) from the light source (lamp or sunlight). • Clip two of the short wires to the fan. • Clip the other end of each short wire to one of the two wires at one end of the long two-conductor wire. • Stretch the long two-conductor wire to where the bright light is shining. • Use the two additional short wires to connect the other two ends of the long wire to the two connections on the solar cell. • Hold the solar panel in the bright light. The fan at the other end of the long 2-conductor wire should function. If you plan to use the clamp lamp, you may have to hold the solar panel within a few inches of the light source. Be careful if the lamp is hot. (IMPORTANT NOTE: The clips from different wires must not touch each other. If they do, the system will not function.)
	4.2	2		within a few inches of the light source. Be careful if the lamp is hot. (IMPORTANT NOTE: The clips from different wires must not touch each other. If they do, the system will not function.)

3D Statements Share Out

Share the **what and how** of the **Science and Engineering Practices** addressed in each lesson.

Energy Conversions
Teacher References

3-D Statements

3-D Statements

Key
Practices Disciplinary Core Ideas Crosscutting Concepts

Unit Level

Students investigate—through firsthand experiences, a digital model, and by obtaining information by reading—how electrical systems convert and transfer energy (systems and system models, energy and matter). They use what they learn to design, test, and evaluate improvements to cause the electrical system to be more reliable, even during natural hazards and to make arguments based on evidence for the best improvements (cause and effect).

Chapter Level

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

Students obtain information about electrical systems and the different forms of input and output energy (systems and system models, energy and matter) by reading and by using a digital model. They then apply what they have learned about systems and energy (systems and system models, energy and matter) to explain what might have caused the problem with the electrical system (cause and effect).

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

Students read, use a digital model, and analyze data to figure out that there are many ways that energy can be converted from one form to another (systems and system models, energy and matter). They then construct arguments to support a claim about one solution for reducing blackouts (cause and effect) in Ergstown.

Chapter 3: Where does the electrical energy for the devices in Ergstown come from?

Students obtain information by reading and using a digital model to figure out that the energy for an electrical system must come from a source and that source energy is converted to electrical energy by a converter (such as a fuel-burning power plant, solar panel, or wind turbine) (systems and system models, energy and matter). They figure out that each energy source has different impacts on natural resources (cause and effect). At the end of the chapter, students design, make, and test their own wind converters.

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

Students investigate, obtain, and evaluate information about the electrical grid—the wires that connect the other parts of the electrical system (systems and system models, energy and matter, structure and function). They then argue for the best solution for improving the electrical grid to reduce blackouts (cause and effect).

Lesson Level

Lesson 1.1: Pre-Unit Assessment

Students are presented with a simple illustration of a town, and they write initial explanations about what might cause a lamp to not turn on (cause and effect).

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Science & Engineering Practices

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

Chapter 1: By obtaining information by reading and using a digital model

Lesson 1.1

NA

Lesson 1.2

What - Obtain information

How - Observe a system (Cherry Pitter) and read *Systems*

Lesson 1.3

What - design and make simple solar-powered electrical systems

How - Create a solar powered electrical system with a motor, fan blade and solar panel.

Chapter 1: Explain

Lesson 1.1

What - Write their initial explanations

How - Pre-Unit Assessment

Lesson 1.2

What - Use sense making strategy of synthesizing & explain

How - Synthesize information from *Systems* and explain new understandings.

Lesson 1.3

What - Explain

How - Students will reread *Systems and record and explain different systems*

Science & Engineering Practices

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

Chapter 1: By obtaining information by reading and using a digital model

Lesson 1.4

What - use a digital model to investigate

How - Use the sim to build an energy system.

Lesson 1.5

What - Design and make energy systems

How - Use the simulation to build an energy system

Lesson 1.6

NA

Chapter 1: Explain

Lesson 1.4

What - Gather evidence

How - Gather and explain forms of energy with evidence

Lesson 1.5

What - Communicate through discussion

How - Synthesize information from *Systems* and explain new understandings.

Lesson 1.6

What - make arguments, orally and in writing, based on evidence

How - Use Shared Listening Routine and then write to different claims to use evidence

Standards at a Glance



Planning for the Unit

- Unit Overview
- Unit Map
- Progress Build
- Getting Ready to Teach
- Materials and Preparation
- Science Background
- Standards at a Glance

Teacher References

- Lesson Overview Compilation
- Standards and Goals
- 3-D Statements
- Assessment System
- Embedded Formative Assessments
- Books in This Unit
- Apps in This Unit
- Flextensions in This Unit

Printable Resources

- Coherence Flowcharts
- Copymaster Compilation
- Flextension Compilation
- Investigation Notebook
- Multi-Language Glossary
- NGSS Information for Parents and Guardians
- Print Materials (8.5" x 11")
- Print Materials (11" x 17")

Offline Preparation

Teaching without reliable classroom internet? Prepare unit and lesson materials for offline access.

Offline Guide

JUMP DOWN TO UNIT GUIDE

GENERATE PRINTABLE TEACHER'S GUIDE

Planning for the Unit

- Unit Overview
- Unit Map
- Progress Build
- Getting Ready to Teach
- Materials and Preparation
- Science Background
- Standards at a Glance

Teacher References

- Lesson Overview Compilation
- Standards and Goals
- 3-D Statements
- Assessment System
- Embedded Formative Assessments
- Books in This Unit
- Apps in This Unit
- Opportunities for Unit Extensions
- Flextensions in This Unit

Printable Resources

- 3-D Assessment Objectives
- Coherence Flowcharts
- Copymaster Compilation
- Crosscutting Concept Tracker
- Eliciting and Leveraging Students' Prior Knowledge, Personal Experiences, and Cultural Backgrounds
- Flextension Compilation
- Investigation Notebook
- Multi-Language Glossary
- NGSS Information for Parents and Guardians
- Print Materials (8.5" x 11")
- Print Materials (11" x 17")

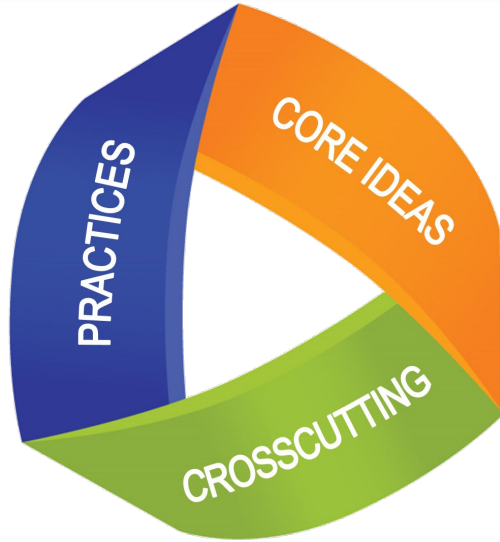
Offline Preparation

Teaching without reliable classroom internet? Prepare unit and lesson materials for offline access.

Offline Guide

Next Generation Science Standards

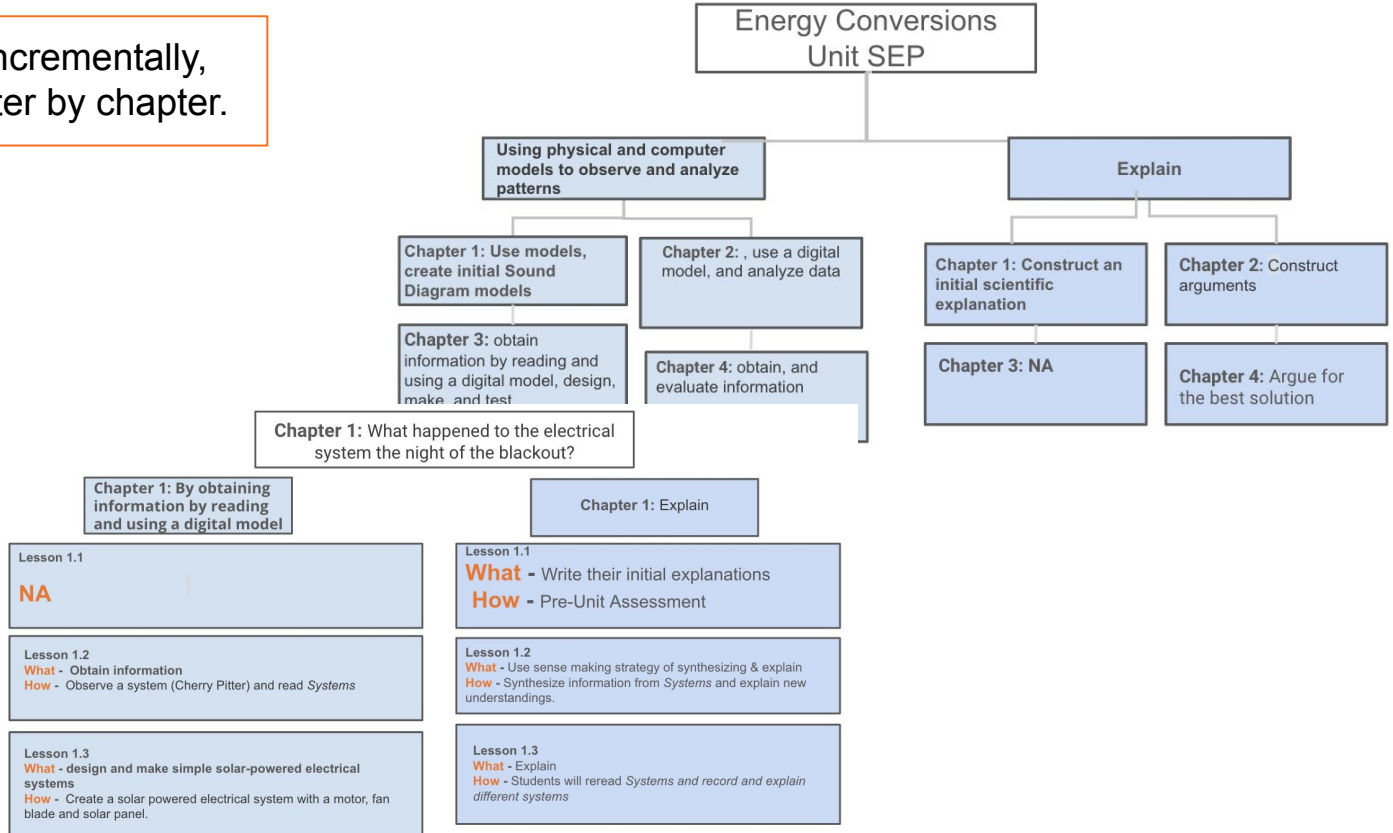
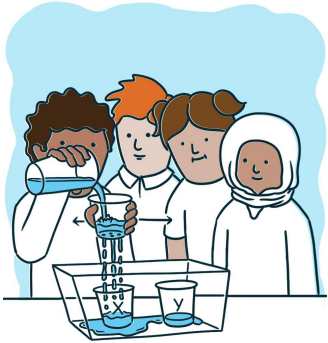
Science and Engineering Practices



- ①. Asking questions (for science) and defining problems (for engineering) Ch. 1, 3, 4
- ②. Developing and using models Ch. 1-4
- ③. Planning and carrying out investigations Ch. 1
- ④. Analyzing and interpreting data Ch. 1-4
- ⑤. Using mathematics and computational thinking Ch. 2-4
- ⑥. Constructing explanations (for science) and designing solutions (for engineering) Ch. 1-4
- ⑦. Engaging in argument from evidence Ch. 1-4
- ⑧. Obtaining, evaluating, and communicating information Ch. 1- 4

Science & Engineering Practices:

Building the practices incrementally,
lesson by lesson, chapter by chapter.



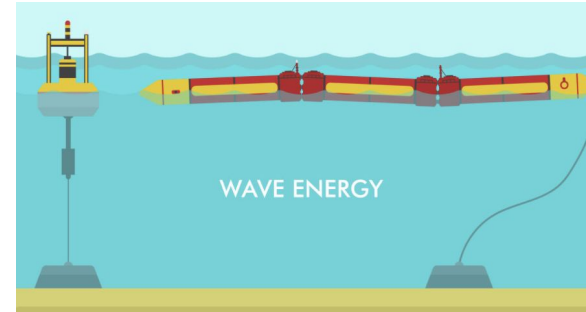
Questions?



Unit Extensions

Videos of

- Dams <https://www.youtube.com/watch?v=W1pTtcE5NN8>
- Wind Turbines <https://www.energy.gov/eere/wind/how-do-wind-turbines-work>
- Solar Panels <https://www.youtube.com/watch?v=xKxrkht7CpY>
- Virtual Field Trip Renewable Energy <https://www.youtube.com/watch?v=CKZaBg1xkxs>





Plan for the day

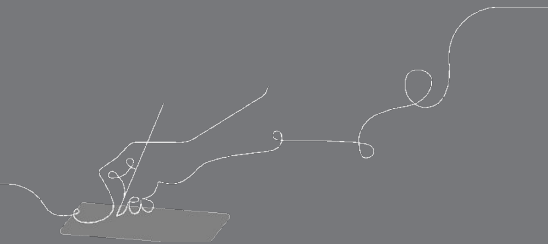
- Framing
- Introducing the Unit
- Unit Internalization
- Identifying the Science and Engineering Practices at the unit and chapter level
- Science and Engineering Practices within a lesson
- Lesson Planning
- Closing

Overarching goals

By the end of this workshop, you will be able to:

- ❑ Identify the Science and Engineering Practices within a lesson and how they are taught.
- ❑ Apply this knowledge to prepare to teach.

e



Closing reflection

Based on our work today, share:

Head: something you'll keep in mind

Heart: something you're feeling

Feet: something you're planning to do

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!

Additional resources and ongoing support

Customer Care

Seek information specific to enrollment and rosters, technical support, materials and kits, and teaching support, weekdays 7AM-10PM EST and weekends 10AM-6PM EST.



help@amplify.com



800-823-1969



Amplify Chat

