Amplify.

Welcome to Amplify Science!

This site contains supporting resources designed for the Los Angeles Unified School District Amplify Science adoption for grades TK–8.

All LAUSD schools have access to Amplify Science resources at this time.

Click here for Remote Learning Resources for Amplify Science

Click here to go back to the LAUSD homepage.

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

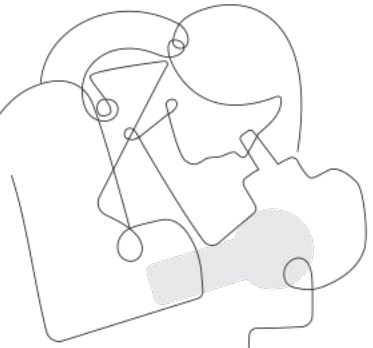
https://amplify.com/lausd-science/

Do Now: *Use the link in the chat to add your best remote learning tips and tricks for teaching Amplify Science to the Jamboard.*

Amplify Science

Unit Internalization & Guided Planning

Deep-dive and strengthening workshop
Grade 6, Thermal Energy



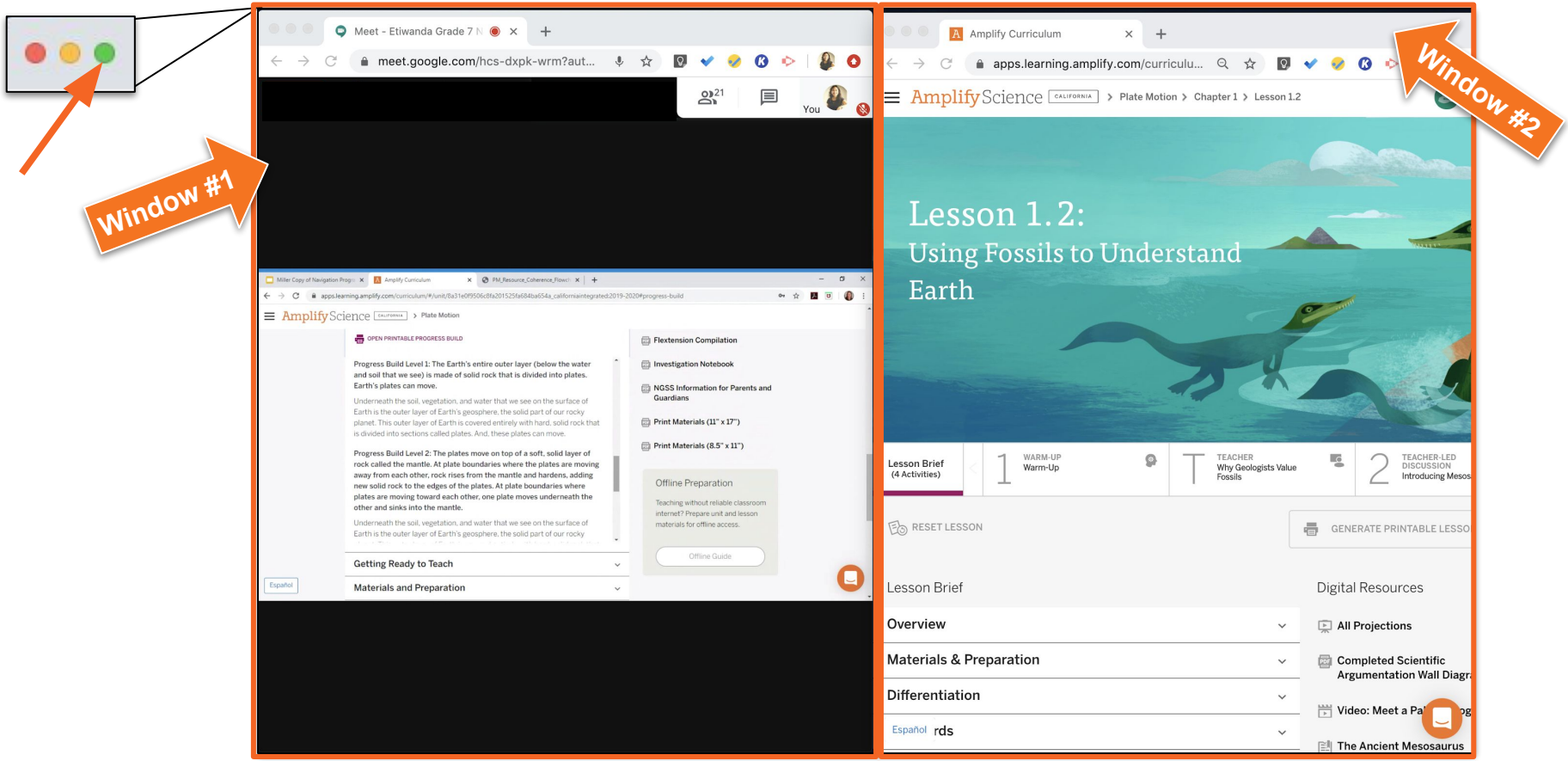
LAUSD

xx/xx/2021

Presented by Your Name

In a new tab, please log in to your Amplify Science account through Schoology.

Use two windows for today's webinar



Norms: Establishing a Culture of Learners

- Please keep your camera on, if possible.
- Take some time to orient yourself to the platform
  - *“where’s the chat box? what are these squares at the top of my screen?, where’s the mute button?”*

- Mute your microphone to reduce background noise unless sharing with the group

- The chat box is available for posting questions or responses to during the training

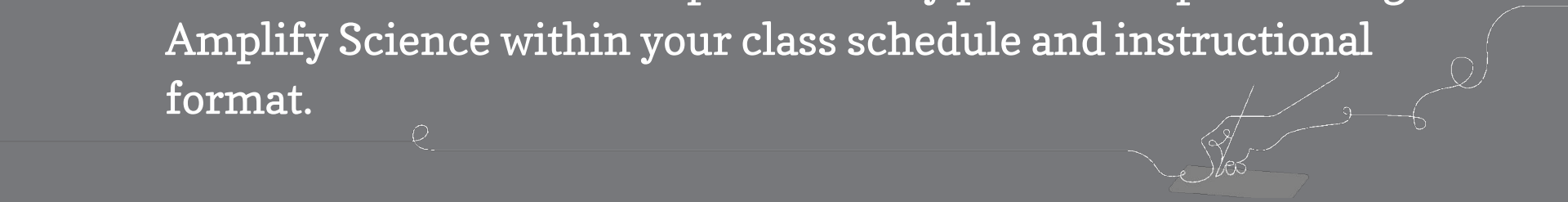
- Make sure you have a note-catcher present

- Be an active participant - chat, ask questions, discuss, share!

Workshop goals

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

- Internalize your upcoming unit.
- Plan for collecting **evidence of student learning** in order to make instructional decisions to **support diverse learner needs**.
- Gather resources to develop a multi-day plan for implementing Amplify Science within your class schedule and instructional format.



Plan for the day

- Framing the day
  - Welcome
  - Instructional Materials
- Unit Internalization
- Planning to teach
  - Collecting evidence of student learning to meet diverse learner needs
- Reflection and closing

Plan for the day

- **Framing the day**
  - **Welcome**
  - **Instructional Materials**
- Unit Internalization
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  - Collecting evidence of student learning to meet diverse learner needs
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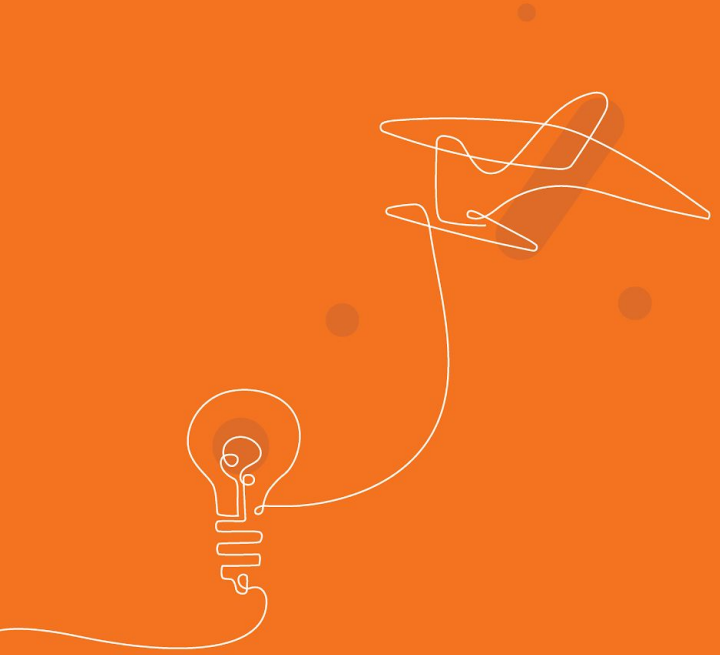

Amplify Science Refresher

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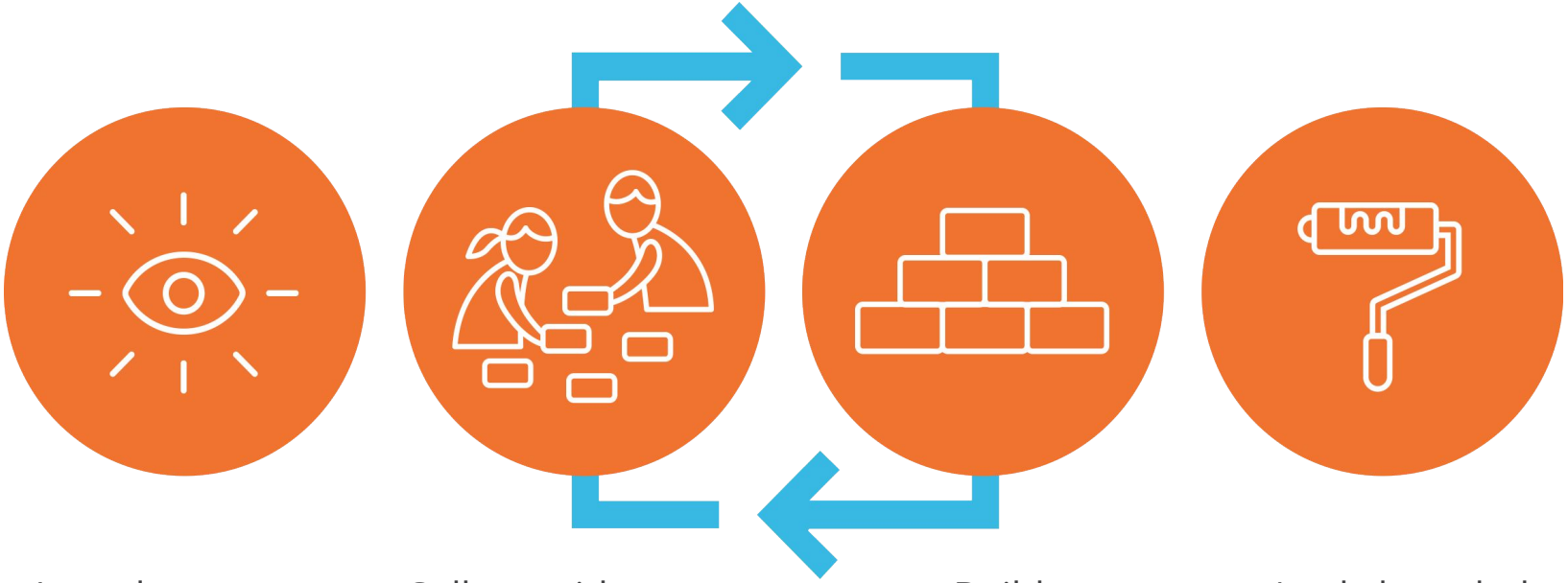
Amplify Science Instructional Approach

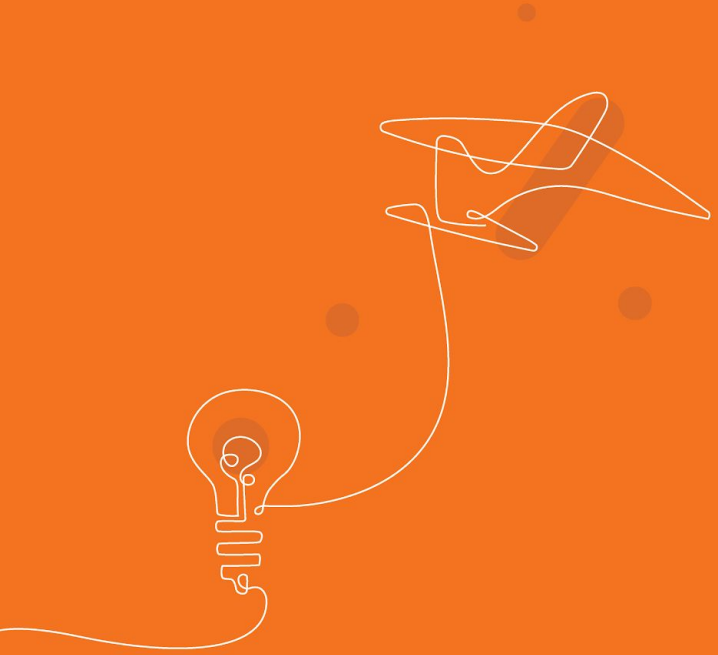


Introduce a phenomenon and a related problem

Collect evidence from multiple sources

Build increasingly complex explanations

Apply knowledge to solve a different problem



Instructional Materials

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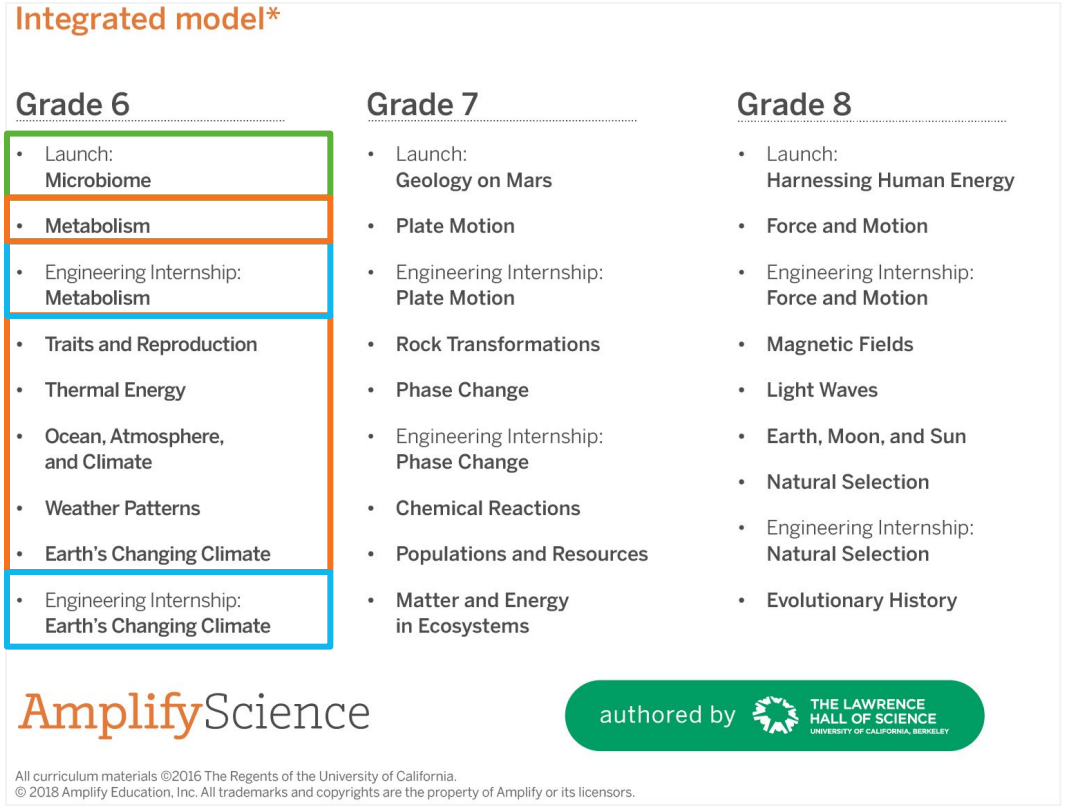
Middle school course curriculum structure



Launch unit

- First unit
- 11 lessons

Core units

- Majority of units
- 19 lessons

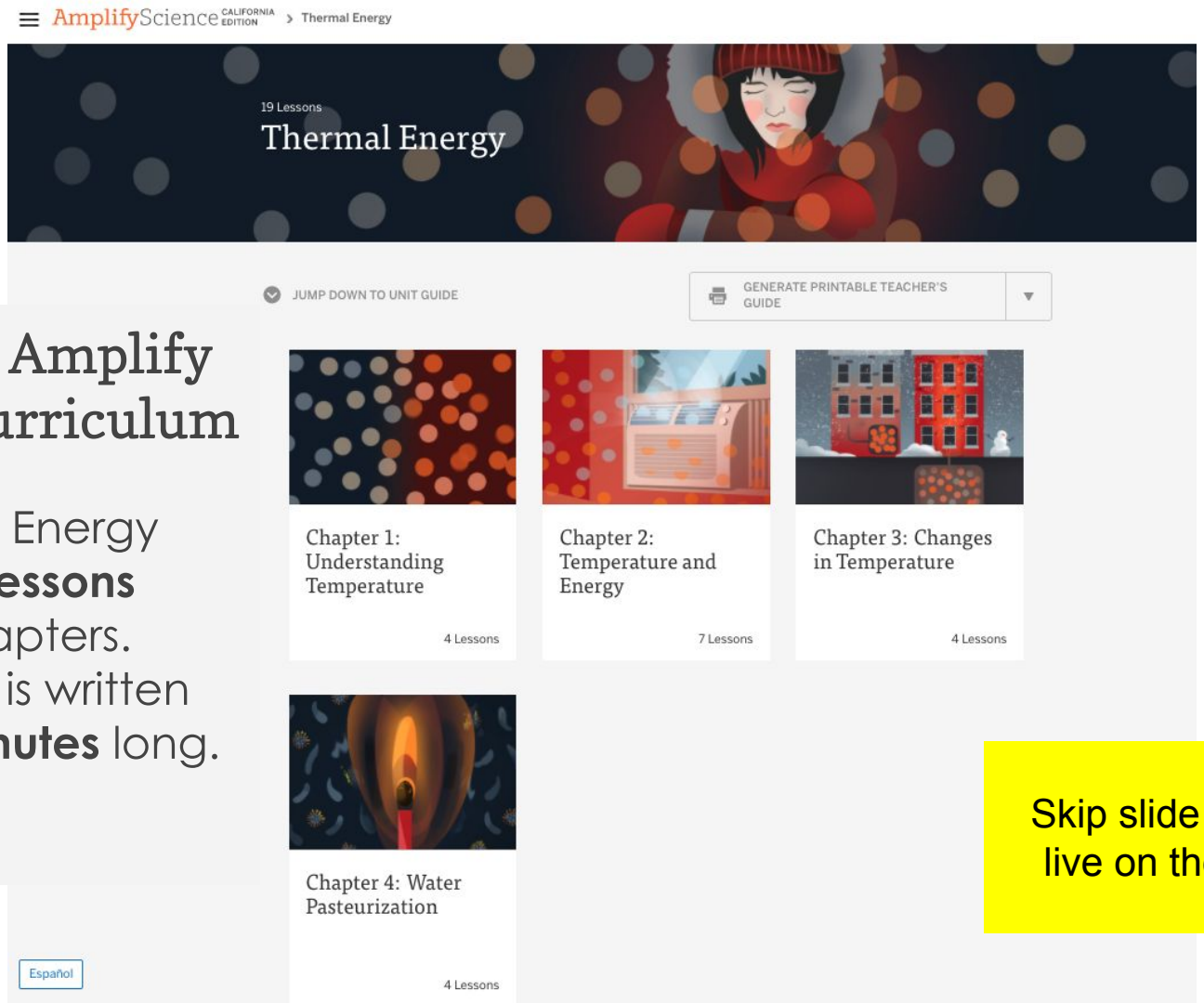
Engineering Internships

- Two per year
- 10 lessons

Standard Amplify Science Curriculum

Standard Amplify Science Curriculum

The Thermal Energy unit has **19 lessons** across 4 chapters. Each lesson is written to be **45 minutes** long.



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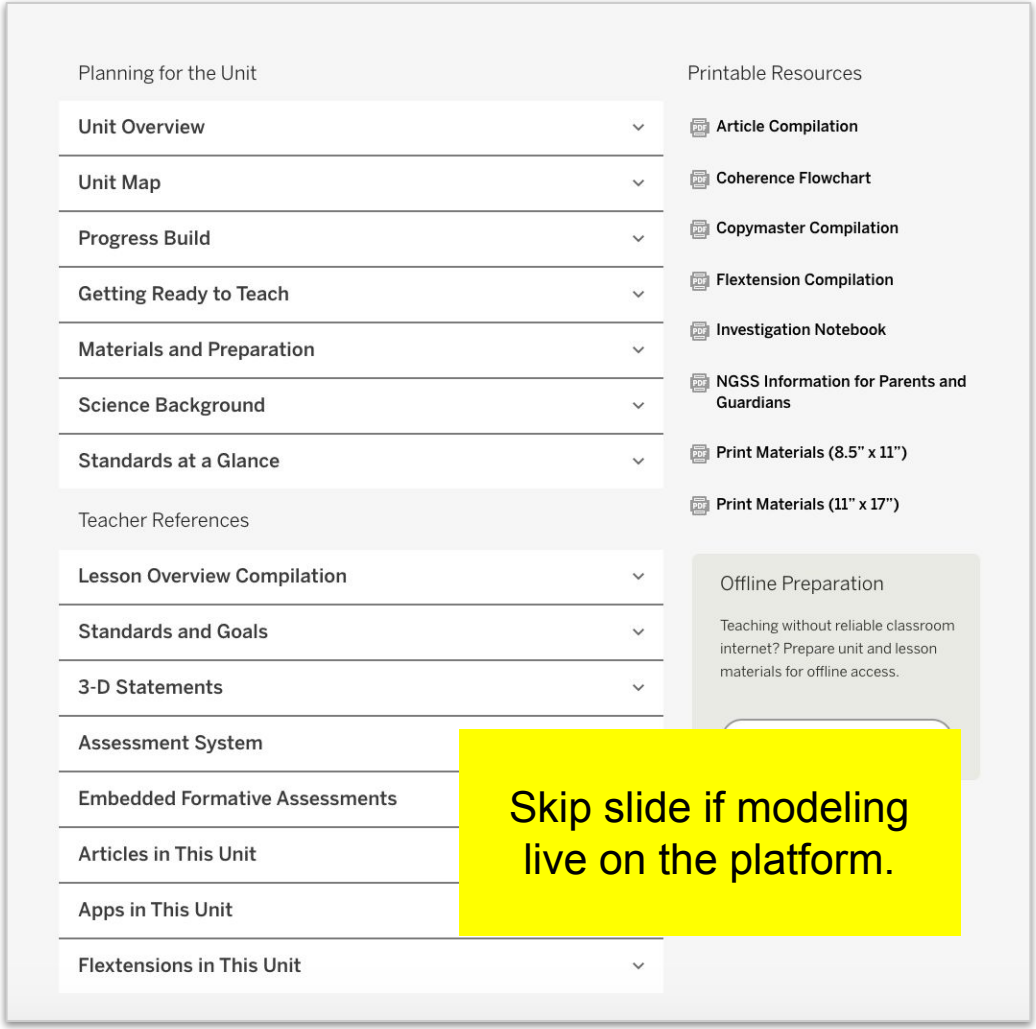
Standard Amplify Science Curriculum

On the standard Amplify Science platform you will find all of your key documents for planning for the unit.

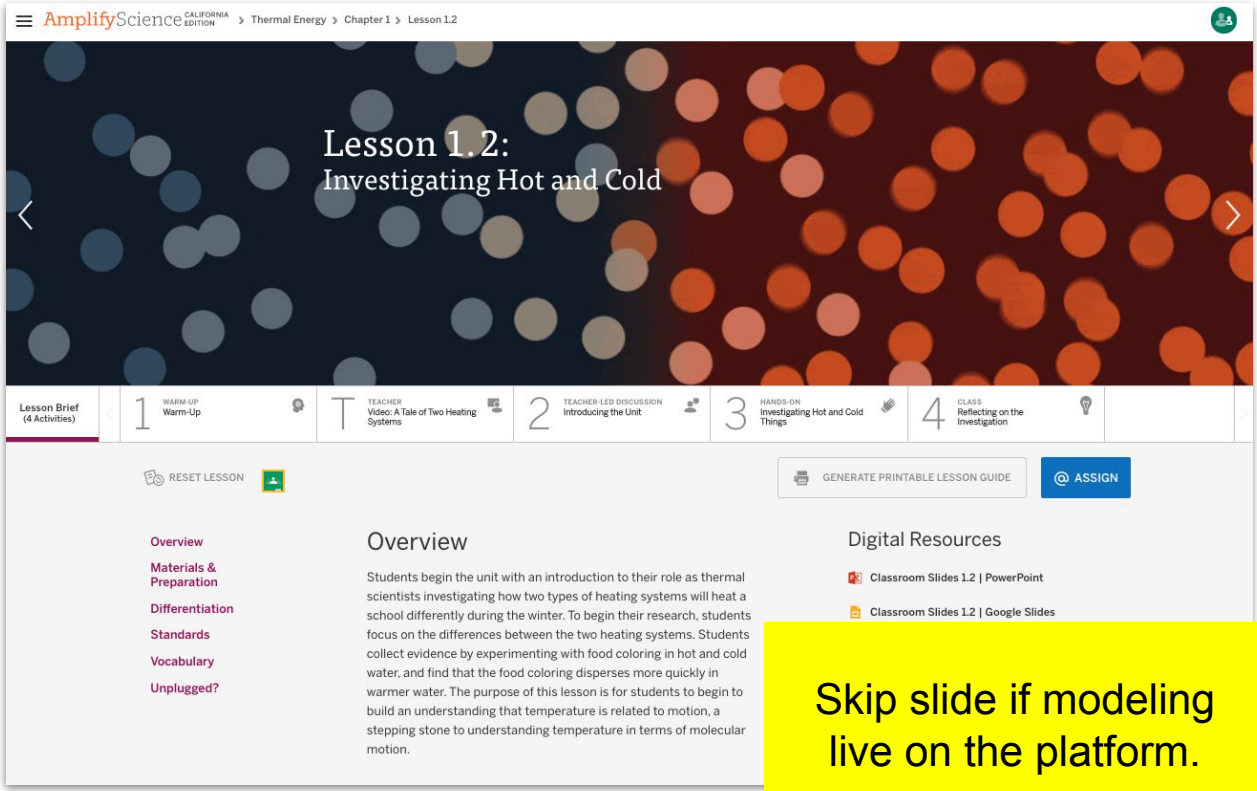
We will be using many of these in today's workshop.



Standard Amplify Science Curriculum

On the standard Amplify Science platform you will find key lesson level information.

We will be navigating to lessons during today's workshop in order to better plan for collecting evidence of student learning in order to plan to meet the needs of diverse learners.



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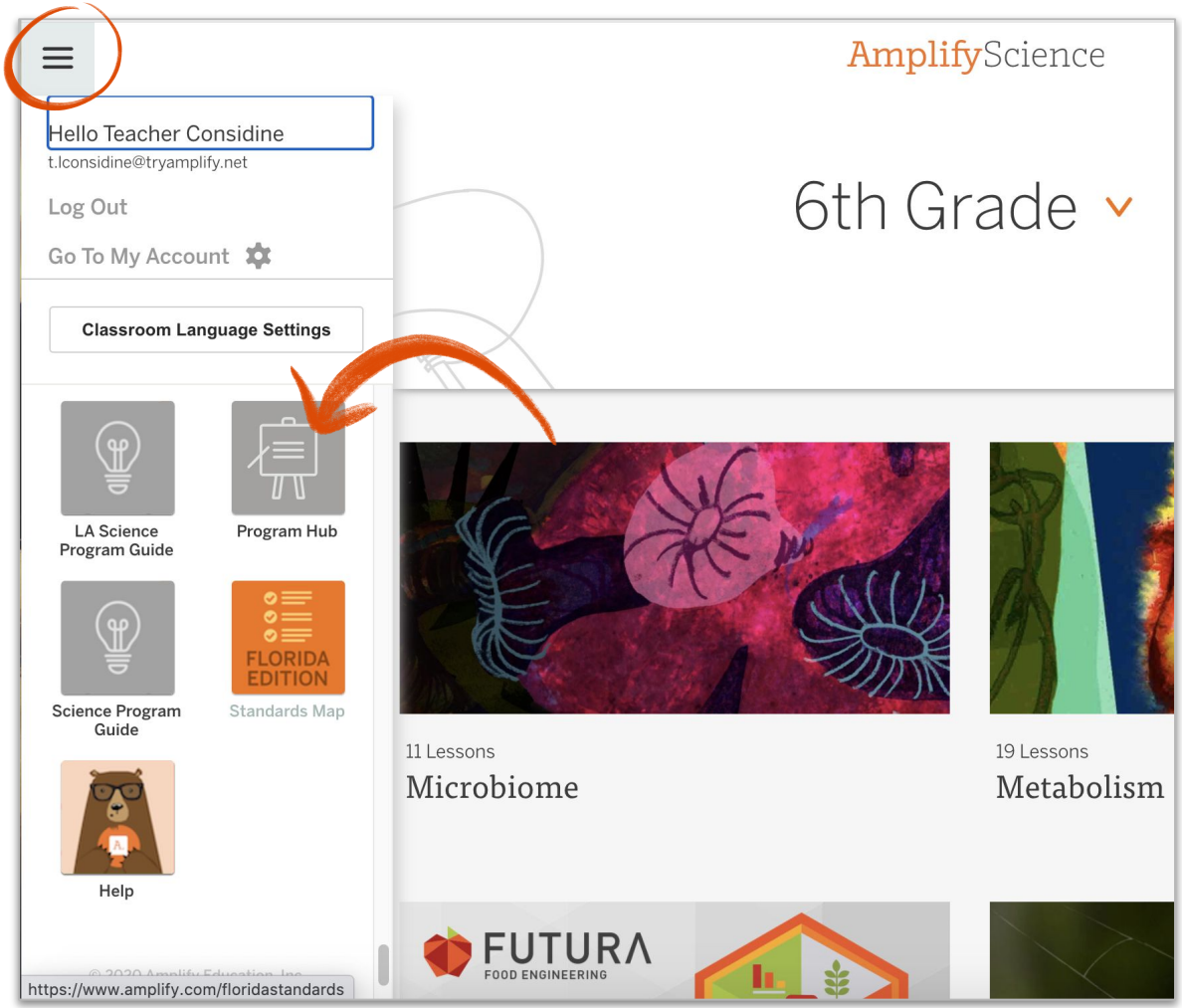
Amplify Science @Home Curriculum

Amplify Science @Home Curriculum

In addition to the standard Amplify Science curriculum, you also have access to Amplify Science @Home Curriculum on the Science Program Hub.



AmplifyScience@Home

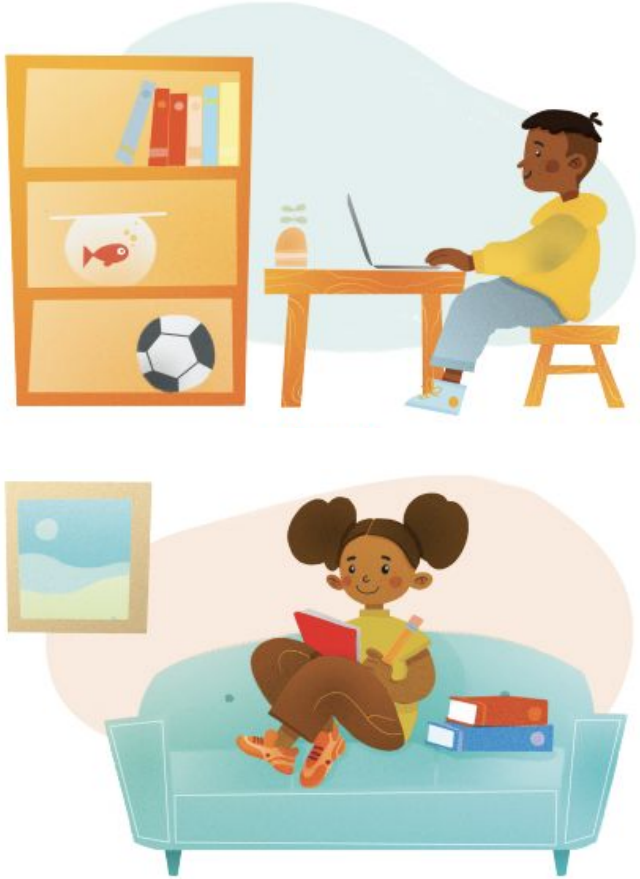
Two different options:

@Home Units

- Digital or print-based versions of Amplify Science units condensed by about 50%

@Home Videos

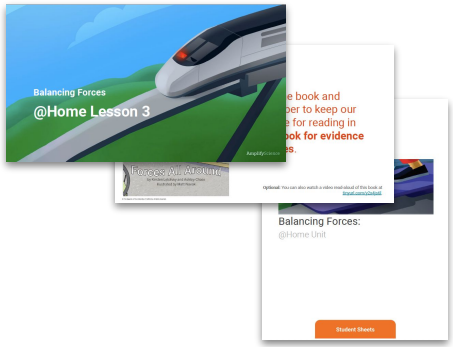
- Video playlists of Amplify Science lessons, taught by real Amplify Science teachers



@Home Units

A shift in approach to respond to user feedback

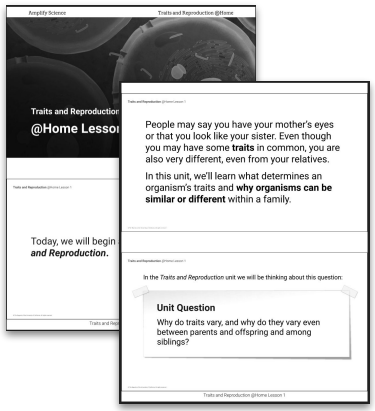
Original approach: two different resources

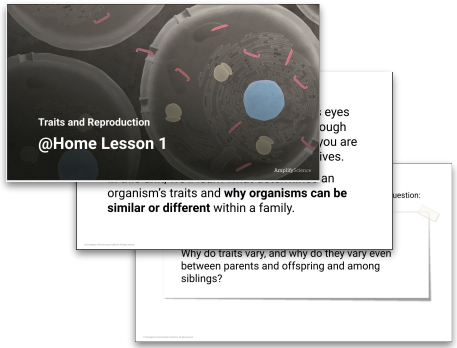


Print-based: @Home packets

Digital: @Home slides and student sheets

Updated approach: one resource, two formats





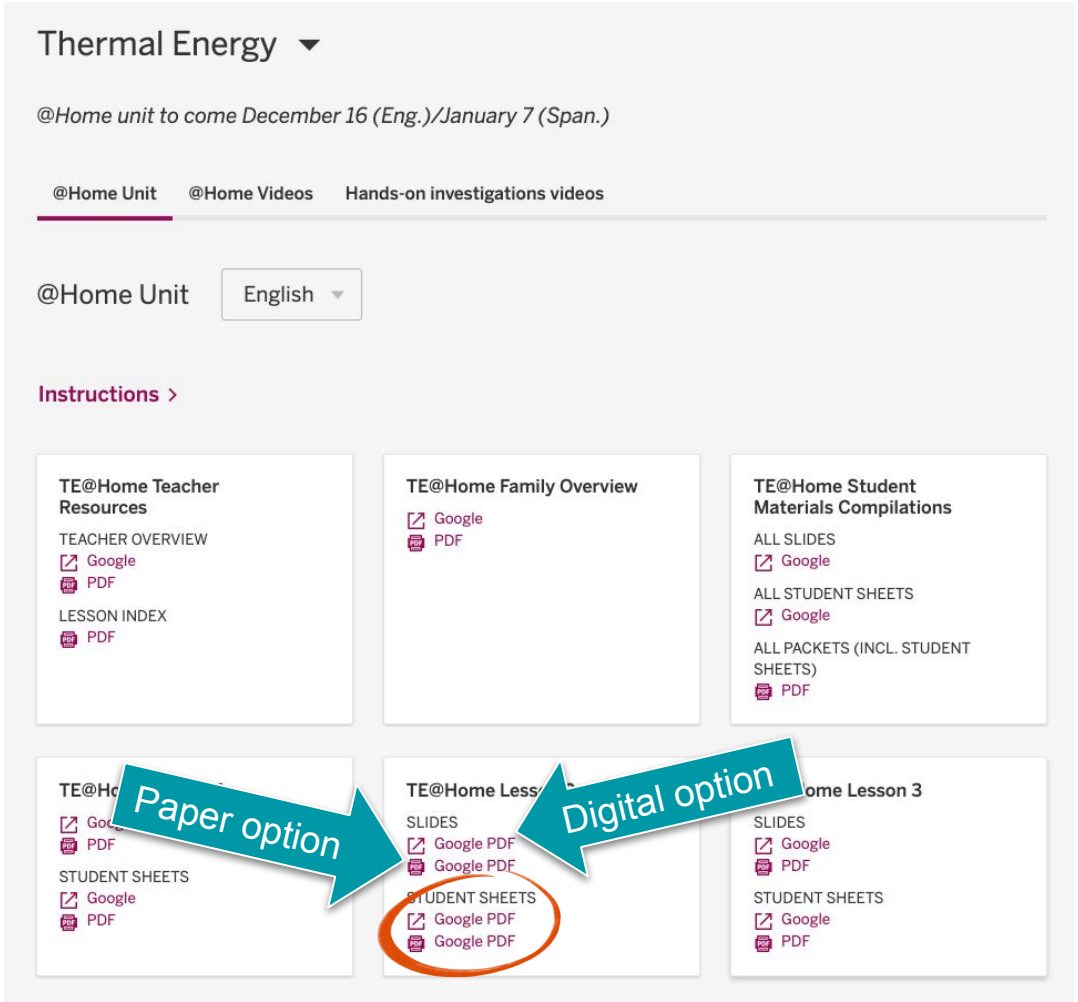
Print-based: PDFs of @Home Slides and student sheets

Digital: Google Slides @Home Slides and Google Doc student sheets

Amplify Science @Home Curriculum

You have access to the Thermal Energy @Home Unit.

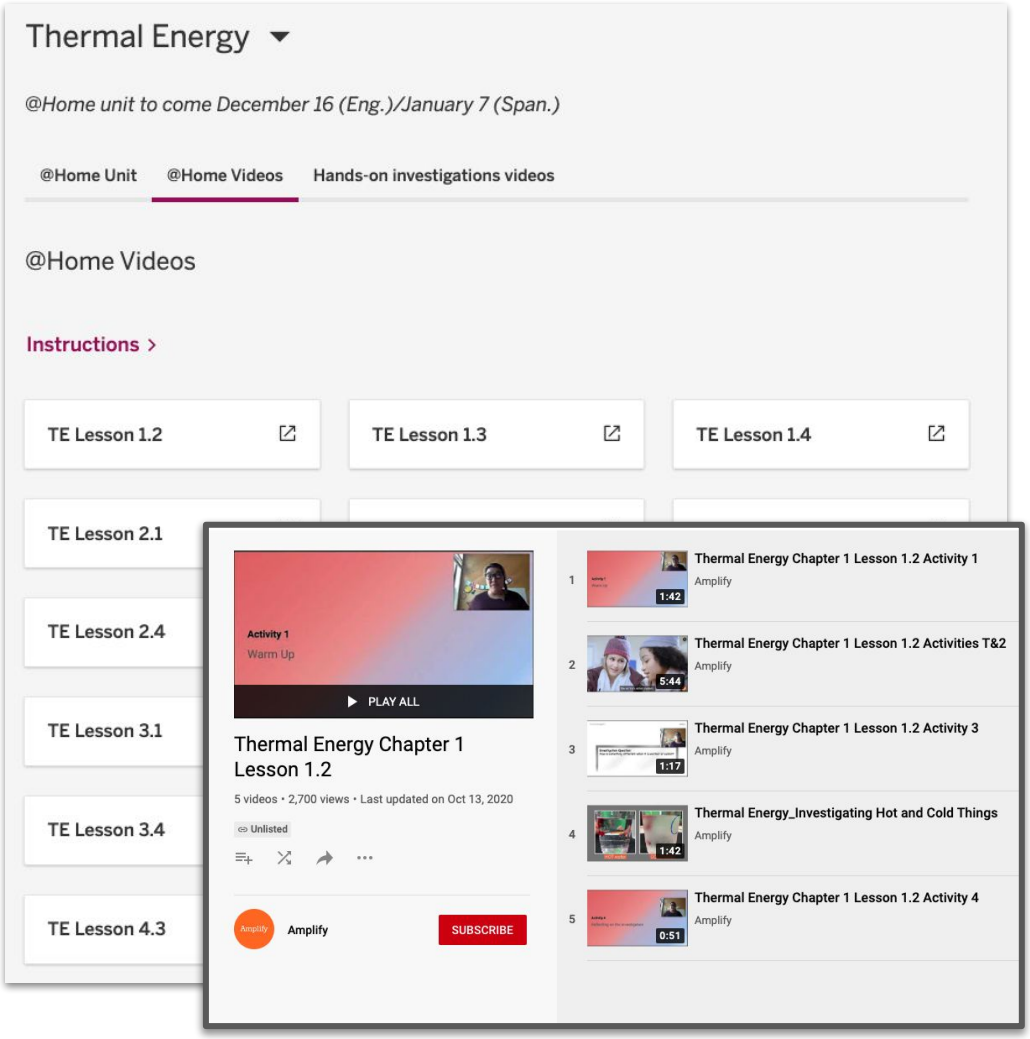
The Thermal Energy @Home Unit has **14 lessons.** Each lesson is written to be **30 minutes** long.

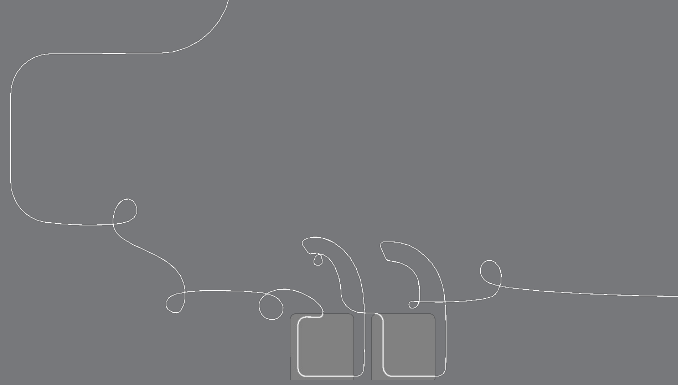


Amplify Science @Home Curriculum

You have access to the Thermal Energy @Home Videos.

There are 16 @Home Videos for the Light Waves unit. This covers all lessons expect for the assessment lessons (1.1, 2.6, and 4.4). The video playlists on YouTube teach the standard Amplify Science Lessons.



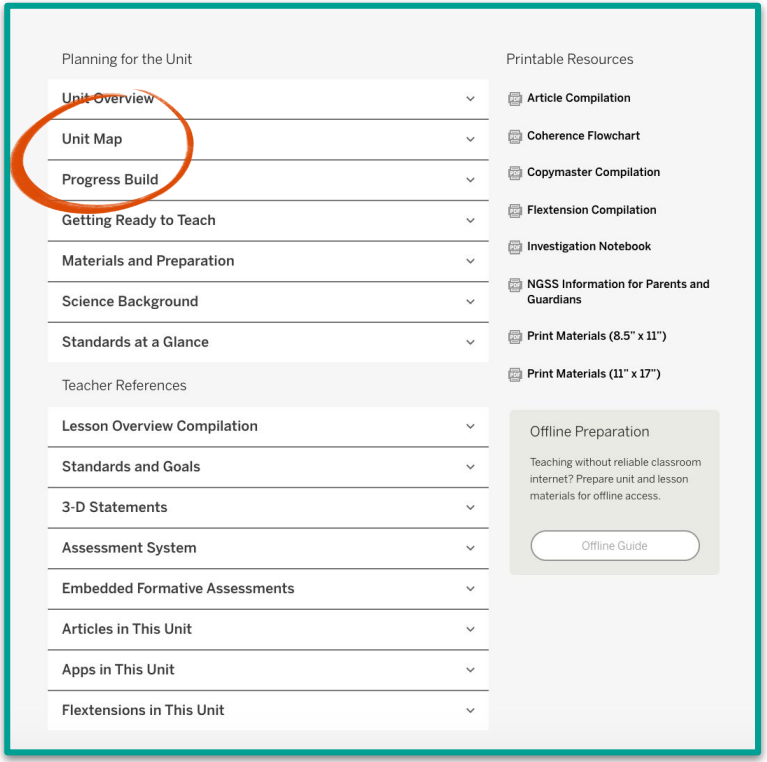


Questions?

Plan for the day

- Framing the day
  - Welcome
  - Instructional Materials
- **Unit Internalization**
- Planning to teach
  - Collecting evidence of student learning to meet diverse learner needs
- Reflection and closing

Unit Guide Resources



Page 1

Unit Guide resources

Once a unit is selected, select **JUMP DOWN TO UNIT GUIDE** in order to access all unit-level resources in an Amplify Science unit.

Planning for the unit	
Unit Overview	Describes what's in each unit, the rationale, and how students learn across chapters
Unit Map	Provides an overview of what students figure out in each chapter, and how they figure it out
Progress Build	Explains the learning progression of ideas students figure out in the unit
Getting Ready To Teach	Provides tips for effectively preparing to teach and teaching the unit in your classroom
Materials and Preparation	Lists materials included in the unit's kit, items to be provided by the teacher, and briefly outlines preparation requirements for each lesson
Science Background	Adult-level primer on the science content students figure out in the unit
Standards at a Glance	Lists NGSS Standards (Performance Expectations, Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts), Common Core State Standards for English Language Arts, and Common Core State Standards for Mathematics
Teacher references	
Lesson Overview Compilation	Lesson Overview of each lesson in the unit, including lesson summary, activity purposes, and timing
Standards and Goals	Lists NGSS (Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts) and CCSS (English Language Arts and Mathematics) standards in the unit, explains how the standards are reached
3-D Statements	Describes 3-D learning across the unit, chapters, and in individual lessons
Assessment System	Describes components of the Amplify Science assessment system, identifies each 3-D assessment opportunity in the unit
Embedded Formative Assessments	Includes full text of formative assessments in the unit
Articles in This Unit	Summarizes each unit text and explains how the text supports instruction
Apps in This Unit	Outlines functionality of digital tools and how students use them (in grades 6-8)
Flextensions in This Unit	Summarizes information about the Hands-On Flextension lesson(s) in the unit
Printable resources	
Coherence Flowcharts	Visual representation of the storyline of the unit
Copymaster Compilation	Compilation of all copymasters for the teacher to print and copy throughout the unit
Flextension Compilation	Compilation of all copymasters for Hands-on Flextension lessons throughout the unit
Investigation Notebook	Digital version of the Investigation Notebook, for copying and projecting
Multi-Language Glossary	Unit vocabulary words in 10 languages
NGSS Information for Parents and Guardians	Information for parents about the NGSS and the shifts for teaching and learning
Print Materials (8.5" x 11")	Digital compilation of printed cards (i.e. vocabulary cards, student card sets) provided in the kit
Print Materials (11" x 17")	Digital compilation of printed Chapter Questions and Key Concepts provided in the kit

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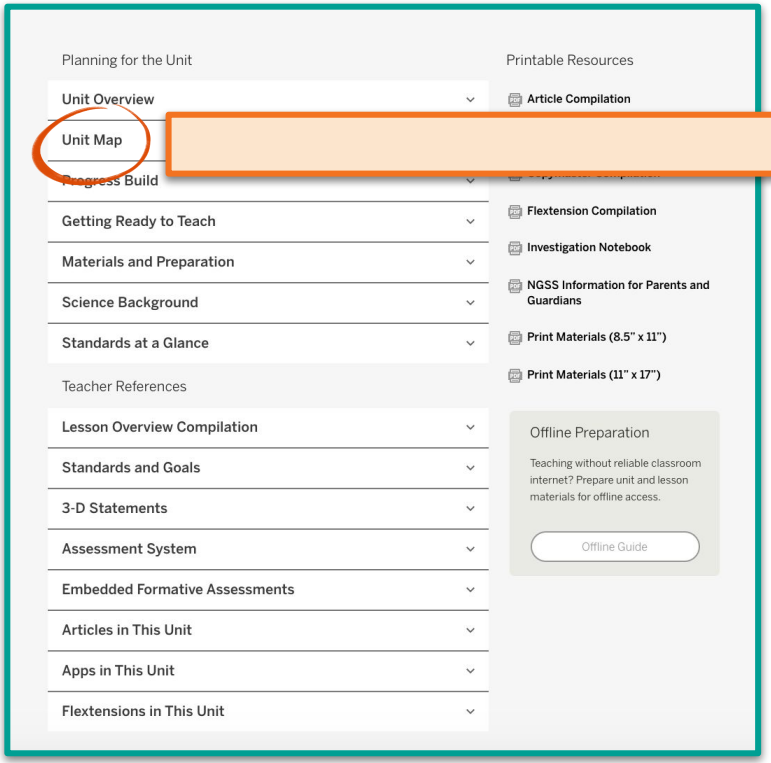
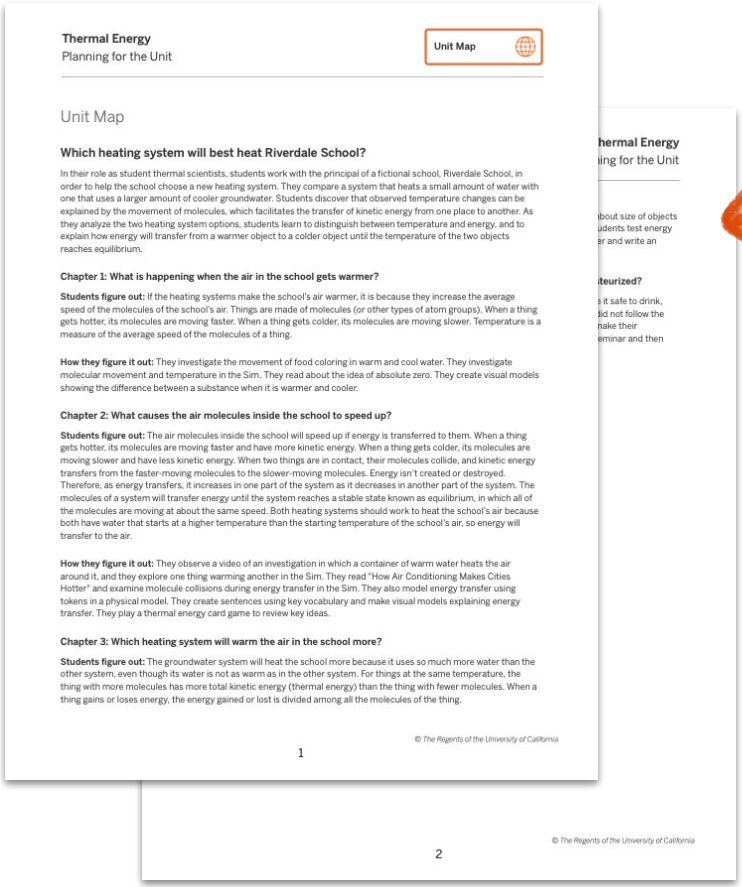
Unit Map

Pages 2-3





Thermal Energy
Planning for the Unit

Unit Map

Unit Map

Which heating system will best heat Riverdale School?

In their role as student thermal scientists, students work with the principal of a fictional school, Riverdale School, in order to help the school choose a new heating system. They compare a system that heats a small amount of water with one that uses a larger amount of cooler groundwater. Students discover that observed temperature changes can be explained by the movement of molecules, which facilitates the transfer of kinetic energy from one place to another. As they analyze the two heating system options, students learn to distinguish between temperature and energy, and to explain how energy will transfer from a warmer object to a colder object until the temperature of the two objects reaches equilibrium.

Chapter 1: What is happening when the air in the school gets warmer?

Students figure out: If the heating systems make the school's air warmer, it is because they increase the average speed of the molecules of the school's air. Things are made of molecules (or other types of atom groups). When a thing gets hotter, its molecules are moving faster. When a thing gets colder, its molecules are moving slower. Temperature is a measure of the average speed of the molecules of a thing.

How they figure it out: They investigate the movement of food coloring in warm and cool water. They investigate molecular movement and temperature in the Sim. They read about the idea of absolute zero. They create visual models showing the difference between a substance when it is warmer and cooler.

Chapter 2: What causes the air molecules inside the school to speed up?

Students figure out: The air molecules inside the school will speed up if energy is transferred to them. When a thing gets hotter, its molecules are moving faster and have more kinetic energy. When a thing gets colder, its molecules are moving slower and have less kinetic energy. When two things are in contact, their molecules collide, and kinetic energy transfers from the faster-moving molecules to the slower-moving molecules. Energy isn't created or destroyed. Therefore, as energy transfers, it increases in one part of the system as it decreases in another part of the system. The molecules of a system will transfer energy until the system reaches a stable state known as equilibrium, in which all of the molecules are moving at about the same speed. Both heating systems should work to heat the school's air because both have water that starts at a higher temperature than the starting temperature of the school's air, so energy will transfer to the air.

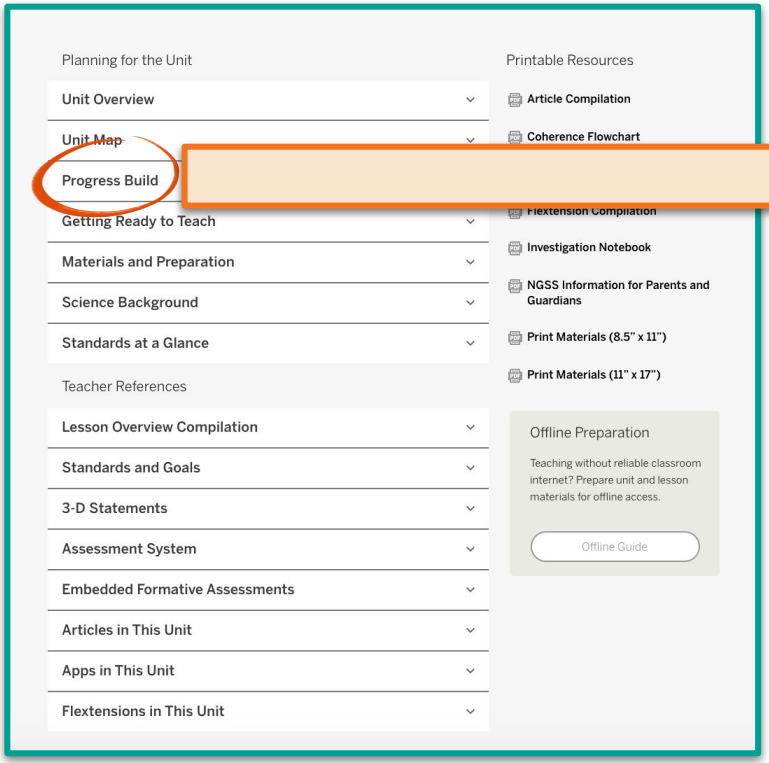
How they figure it out: They observe a video of an investigation in which a container of warm water heats the air around it, and they explore one thing warming another in the Sim. They read "How Air Conditioning Makes Cities Hotter" and examine molecule collisions during energy transfer in the Sim. They also model energy transfer using tokens in a physical model. They create sentences using key vocabulary and make visual models explaining energy transfer. They play a thermal energy card game to review key ideas.

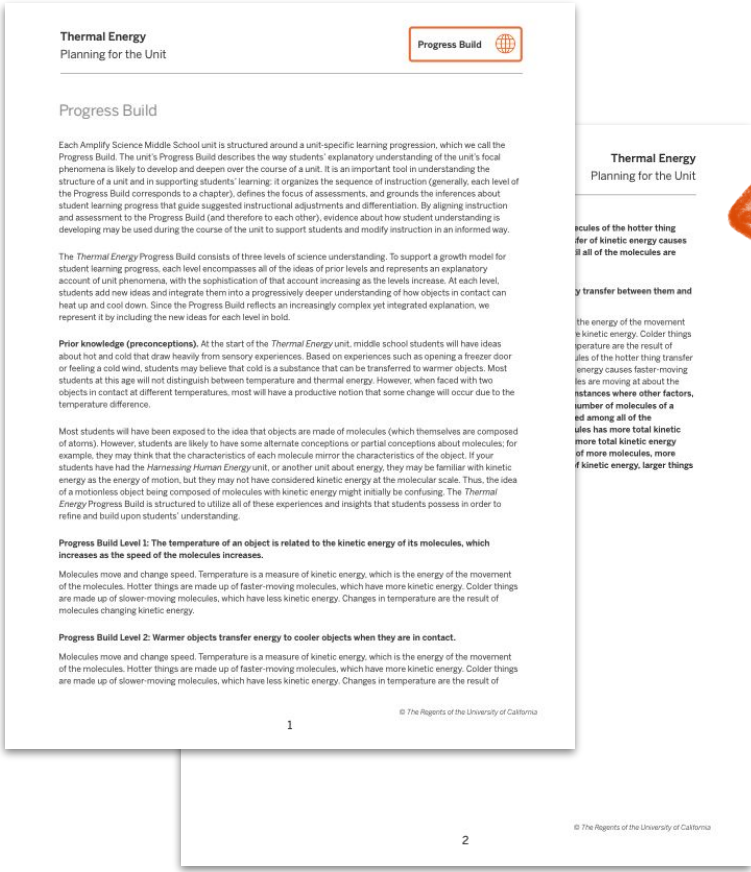
Chapter 3: Which heating system will warm the air in the school more?

Students figure out: The groundwater system will heat the school more because it uses so much more water than the other system, even though its water is not as warm as in the other system. For things at the same temperature, the thing with more molecules has more total kinetic energy (thermal energy) than the thing with fewer molecules. When a thing gains or loses energy, the energy gained or lost is divided among all the molecules of the thing.

Progress Build

Pages 4-5





Thermal Energy
Planning for the Unit

Progress Build

Progress Build

Each Amplify Science Middle School unit is structured around a unit-specific learning progression, which we call the Progress Build. The unit's Progress Build describes the way students' explanatory understanding of the unit's focal phenomena is likely to develop and deepen over the course of a unit. It is an important tool in understanding the structure of a unit and in supporting students' learning: it organizes the sequence of instruction (generally, each level of the Progress Build corresponds to a chapter), defines the focus of assessments, and grounds the inferences about student learning progress that guide suggested instructional adjustments and differentiation. By aligning instruction and assessment to the Progress Build (and therefore to each other), evidence about how student understanding is developing may be used during the course of the unit to support students and modify instruction in an informed way.

The *Thermal Energy* Progress Build consists of three levels of science understanding. To support a growth model for student learning progress, each level encompasses all of the ideas of prior levels and represents an explanatory account of unit phenomena, with the sophistication of that account increasing as the levels increase. At each level, students add new ideas and integrate them into a progressively deeper understanding of how objects in contact can heat up and cool down. Since the Progress Build reflects an increasingly complex yet integrated explanation, we represent it by including the new ideas for each level in bold.

Prior knowledge (preconceptions). At the start of the *Thermal Energy* unit, middle school students will have ideas about hot and cold that draw heavily from sensory experiences. Based on experiences such as opening a freezer door or feeling a cold wind, students may believe that cold is a substance that can be transferred to warmer objects. Most students at this age will not distinguish between temperature and thermal energy. However, when faced with two objects in contact at different temperatures, most will have a productive notion that some change will occur due to the temperature difference.

Most students will have been exposed to the idea that objects are made of molecules (which themselves are composed of atoms). However, students are likely to have some alternate conceptions or partial conceptions about molecules; for example, they may think that the characteristics of each molecule mirror the characteristics of the object. If your students have had the *Harnessing Human Energy* unit, or another unit about energy, they may be familiar with kinetic energy as the energy of motion, but they may not have considered kinetic energy at the molecular scale. Thus, the idea of a motionless object being composed of molecules with kinetic energy might initially be confusing. The *Thermal Energy* Progress Build is structured to utilize all of these experiences and insights that students possess in order to refine and build upon students' understanding.

Progress Build Level 1: The temperature of an object is related to the kinetic energy of its molecules, which increases as the speed of the molecules increases.

Molecules move and change speed. Temperature is a measure of kinetic energy, which is the energy of the movement of the molecules. Hotter things are made up of faster-moving molecules, which have more kinetic energy. Colder things are made up of slower-moving molecules, which have less kinetic energy. Changes in temperature are the result of molecules changing kinetic energy.

Progress Build Level 2: Warmer objects transfer energy to cooler objects when they are in contact.

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Thermal Energy
Planning for the Unit

Unit Internalization Work Time

Pages 2-5

Guided Unit Internalization

Part 1: Unit-level internalization

Unit title:

What is the phenomenon students are investigating in your unit?

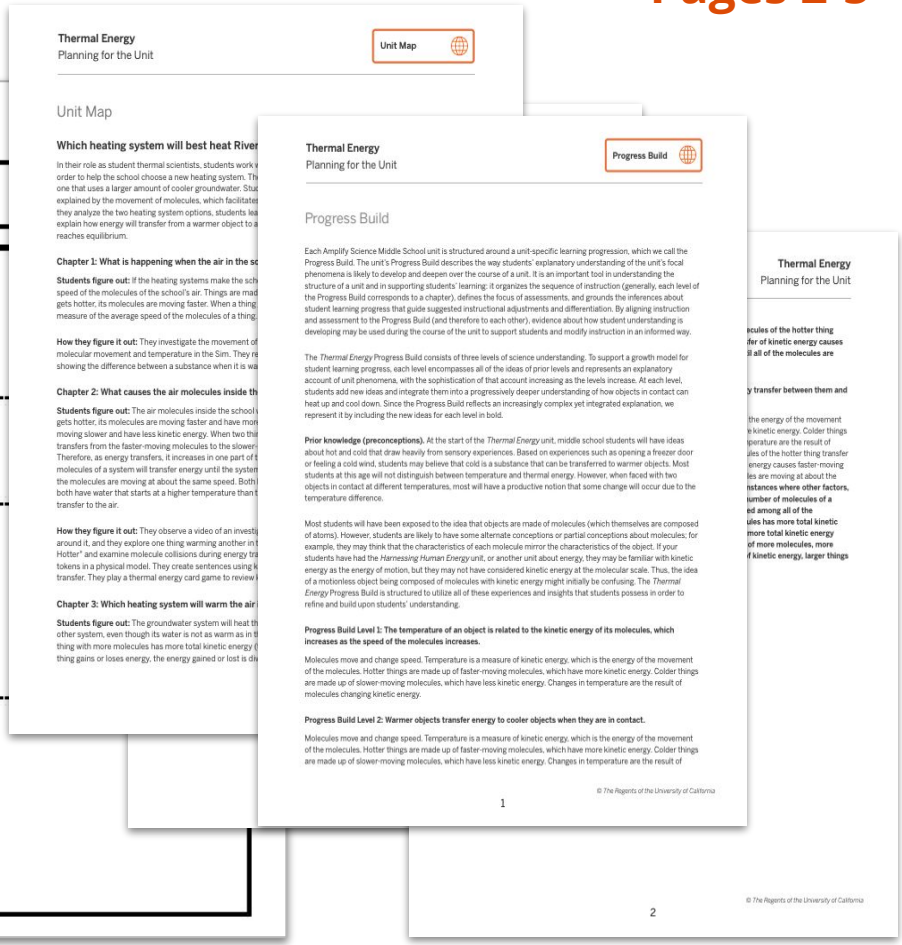
Unit Question:

Student role:

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

What science ideas do students need to figure out in order to explain the phenomenon?

Page 6



Unit Guide Document

Unit Map

Lesson Overview Compilation

Unit Map

Progress Buld

Guided Unit Internalization

Part 1: Unit-level internalization

Unit title: Thermal Energy

What is the phenomenon students are investigating in your unit?

Students work with the principal of Riverdale School, a fictional school, in order to help choose a new heater system.

Unit Question:

Why do things change temperature?

Student role:

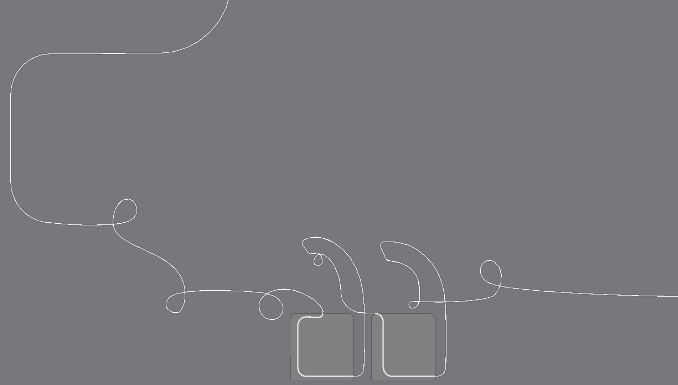
Student thermal scientists

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

The groundwater system will heat the school more because it uses so much more water than the other system, even though its water is not as warm as in the other system. For things at the same temperature, the thing with more molecules has more total kinetic energy (thermal energy) than the thing with fewer molecules. When a thing gains or loses energy, the energy gained or lost is divided among all the molecules of the thing.

What science ideas do students need to figure out in order to explain the phenomenon?

Temperature of an object is related to the kinetic energy of its molecules. Changes in temperature are the result of molecules changing in kinetic energy. When things are in contact, the faster-moving molecules of the hotter thing transfer kinetic energy to the slower-moving molecules of the colder thing. At any given molecular speed, an object made of more molecules has more total kinetic energy than similar object made of fewer molecules; therefore, larger objects have more total kinetic energy than smaller objects a the same temperature. In order to change the average speed of more molecules, more total kinetic energy must be transferred into or out of a system. So, for any given transfer of kinetic energy, larger things experience less change in temperature than smaller things.



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How they figure it out: They investigate the movement of food coloring in warm and cool water. They investigate molecular movement and temperature in the Sim. They read about the idea of absolute zero. They create visual models showing the difference between a substance when it is warmer and cooler.

Chapter 1: Understanding Temperature

JUMP DOWN TO CHAPTER OVERVIEW

Lesson 1.1:
Pre-Unit Assessment

Lesson 1.2:
Investigating Hot and Cold

Lesson 1.3:
Temperature and Motion

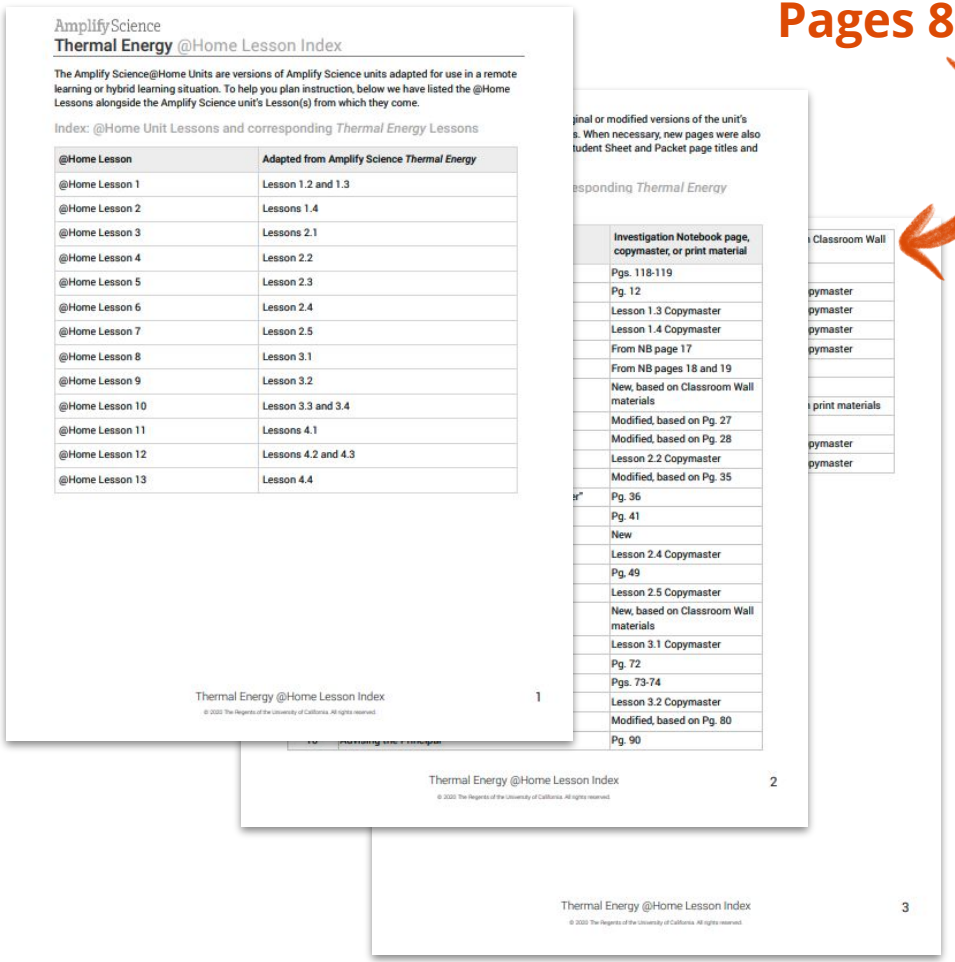
Lesson 1.4:
Molecules and Temperature

@Home Unit Lesson Index

This resource correlates lessons from the Standard Curriculum with @Home Unit Lessons.

It also lists the @Home Unit Student Sheets with information about where they came from (i.e. Student Investigation Notebook, copymaster, or new for the @Home Unit)

Pages 8-10



Amplify Science
Thermal Energy @Home Lesson Index

The Amplify Science@Home Units are versions of Amplify Science units adapted for use in a remote learning or hybrid learning situation. To help you plan instruction, below we have listed the @Home Lessons alongside the Amplify Science unit's Lesson(s) from which they come.

Index: @Home Unit Lessons and corresponding *Thermal Energy* Lessons

@Home Lesson	Adapted from Amplify Science *Thermal Energy*
@Home Lesson 1	Lesson 1.2 and 1.3
@Home Lesson 2	Lessons 1.4
@Home Lesson 3	Lessons 2.1
@Home Lesson 4	Lesson 2.2
@Home Lesson 5	Lesson 2.3
@Home Lesson 6	Lesson 2.4
@Home Lesson 7	Lesson 2.5
@Home Lesson 8	Lesson 3.1
@Home Lesson 9	Lesson 3.2
@Home Lesson 10	Lesson 3.3 and 3.4
@Home Lesson 11	Lessons 4.1
@Home Lesson 12	Lessons 4.2 and 4.3
@Home Lesson 13	Lesson 4.4

Thermal Energy @Home Lesson Index 1

...inal or modified versions of the unit's ...s. When necessary, new pages were also ...tudent Sheet and Packet page titles and

...esponding *Thermal Energy*

	Investigation Notebook page, copymaster, or print material
	Pgs. 118-119
	Pg. 12
	Lesson 1.3 Copymaster
	Lesson 1.4 Copymaster
	From NB page 17
	From NB pages 18 and 19
	New, based on Classroom Wall materials
	Modified, based on Pg. 27
	Modified, based on Pg. 28
	Lesson 2.2 Copymaster
	Modified, based on Pg. 35
	Pg. 36
	Pg. 41
	New
	Lesson 2.4 Copymaster
	Pg. 49
	Lesson 2.5 Copymaster
	New, based on Classroom Wall materials
	Lesson 3.1 Copymaster
	Pg. 72
	Pgs. 73-74
	Lesson 3.2 Copymaster
	Modified, based on Pg. 80
	Pg. 90

...Classroom Wall
...opymaster
...opymaster
...opymaster
...opymaster
...print materials
...opymaster
...opymaster

Thermal Energy @Home Lesson Index 2

Thermal Energy @Home Lesson Index 3

Amplify.

Key activities

- **Introducing the Unit:** Students are introduced to the unit problem and their role as student thermal scientists.
- **Observe:** Students observe that food coloring spreads faster in warmer water than it does in colder water, and see the connection between temperature and movement.
- **Do:** Students use the *Thermal Energy* Sim, or watch a video of the Sim investigation, to discover that molecules are moving faster in warmer samples than in colder samples.

Ideas for synchronous or in-person instruction

Before meeting, have students watch the introductory video. While meeting, have students share their initial ideas about the heating systems in the school. If you have access to kit materials, you could have students do the hands-on investigation with cold and hot water as in *Thermal Energy* Lesson 1.2 Activity 3. After meeting, students could complete the Sim investigation.

@Home Lesson 1

Thermal Energy

AmplifyScience

Today, we will begin a new unit called *Thermal Energy*. In this unit, we are going to investigate the answer to this question.

Unit Question

Why do things change temperature?

To help us understand this question, we'll take on the role of **student thermal scientists** and work to solve a problem with the heating systems in a school.

First, we'll watch a video message that will help clarify your role and the heating system problem.

Note: all videos in this @Home Unit can be viewed on a smartphone, or any other connected device.

How are the heating systems similar and how are they different?
What questions do you have about how the heating systems work?
Which heating system do you think will warm the school more during the winter? Why?

As you watch the video, keep these **guiding questions** in mind. After, you will discuss them with a partner.

Using the print version? Watch the video here: tinyurl.com/AMPTE-01

Even though the school and characters you saw in the video are fictional, the problems that you will be investigating and the proposed heating systems are based on real-life situations.

Our Chapter 1 Question is the first question you will need to answer in order to prepare a recommendation for the school board.

Chapter 1 Question

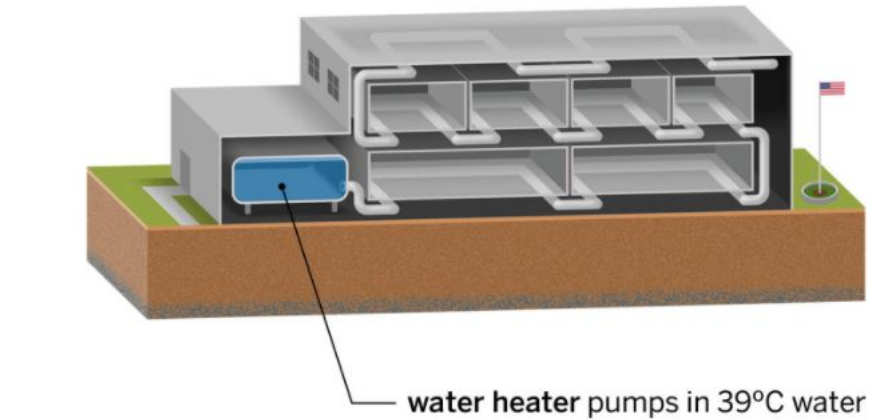
What is happening when the air in the school gets warmer?

In this lesson and many others in the *Thermal Energy* @Home Unit you will need to **talk with a partner.** Check with your teacher about how you will work with partners in this @Home Unit.

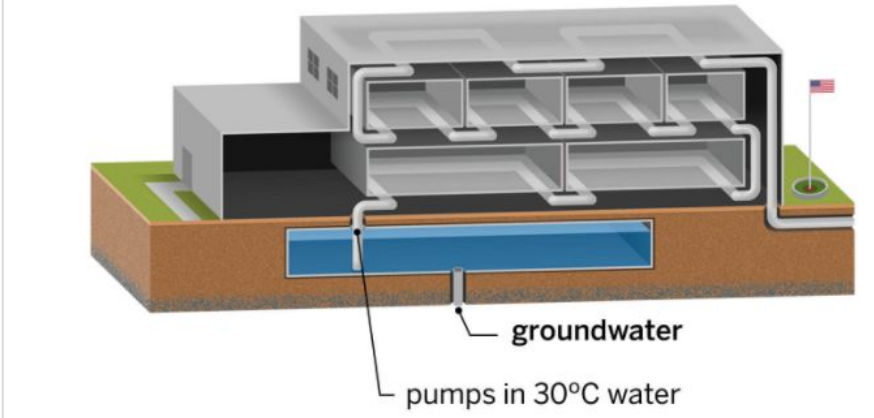
Your partner could be a classmate on the phone or someone at home with you.

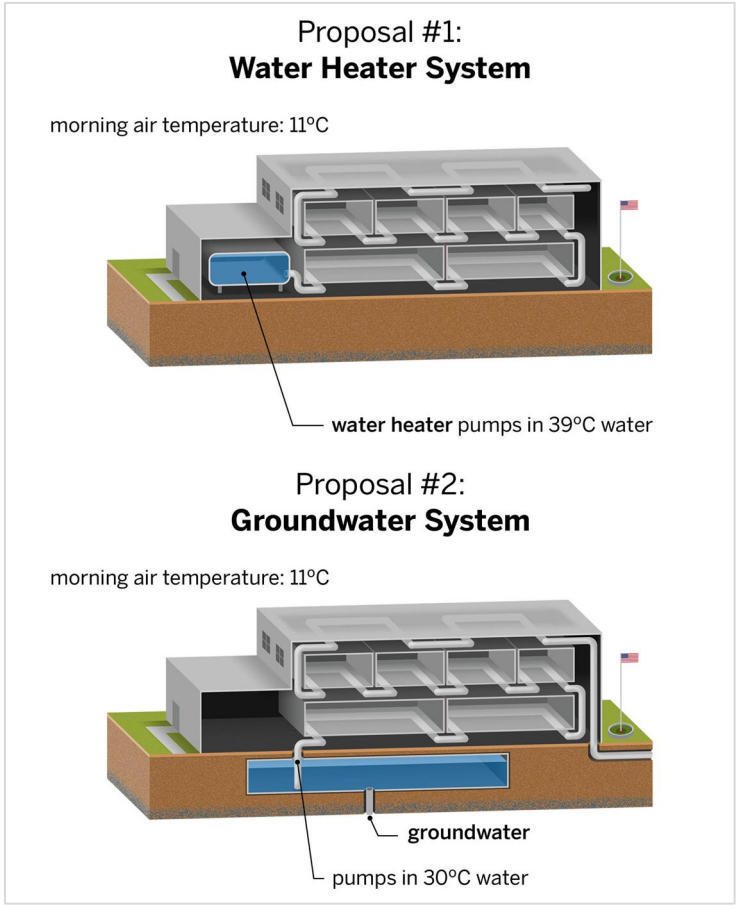
We will begin our investigation by thinking about and discussing the school heating systems you learned about in the video. Look closely at the two diagrams below.

Proposal #1:
Water Heater System



Proposal #2:
Groundwater System





How are the heating systems similar and how are they different?
What questions do you have about how the heating systems work?
Which heating system do you think will warm the school more during the winter? Why?

Your partner could be a classmate on the phone or someone at home with you.

We will begin by investigating this question:

Investigation Question:
How is something different when it is warmer or cooler?

Before we can recommend a heating system, we need to learn more about how warming or cooling can change the properties of things.

When you've just taken a stick of butter out of the fridge, what is it like? What are some of its **properties?**

What about after you've let the butter sit at room temperature for 20 minutes and get **warmer?**

What are some other examples and ideas about how things are **different** when they are **warmer** or **cooler?**

This is the end of the partner work in this lesson.

The Investigation Question asks how something is different when it is **warmer** or **cooler** because you'll be testing out and thinking about how different things **change temperature.** In this unit, you'll also start to think about what is happening to something's **molecules** when it gets warmer or colder.

Key activities

- **Introducing the Unit:** Students are introduced to the unit problem and their role as student thermal scientists.
- **Observe:** Students observe that food coloring spreads faster in warmer water than it does in colder water, and see the connection between temperature and movement.
- **Do:** Students use the *Thermal Energy* Sim, or watch a video of the Sim investigation, to discover that molecules are moving faster in warmer samples than in colder samples.

Ideas for synchronous or in-person instruction

Before meeting, have students watch the introductory video. While meeting, have students share their initial ideas about the heating systems in the school. If you have access to kit materials, you could have students do the hands-on investigation with cold and hot water as in *Thermal Energy* Lesson 1.2 Activity 3. After meeting, students could complete the Sim investigation.

Today, you will watch a video to **investigate** how warm water is different from cold water. You'll observe what happens when you add food coloring to a cup of hot water and a cup of cold water.

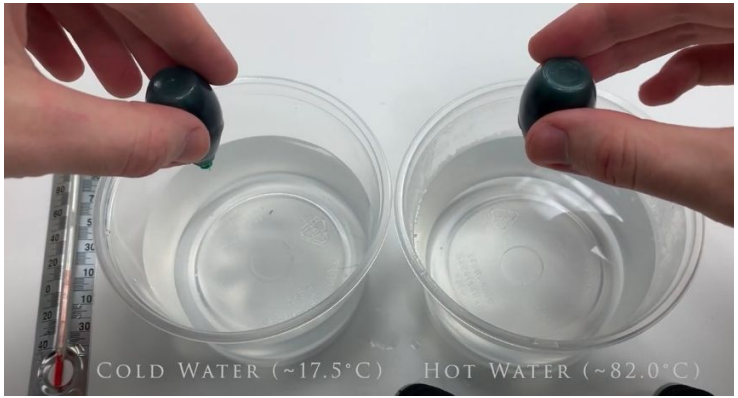
Make sure the water is not hot enough to burn. Don't fill hot water to the top of the cup.
Be careful around the hot water.

Optional: If you have one cup of **hot water**, one cup of **cold water,** and **food coloring,** you can follow along with this investigation at home. Be sure to follow the safety guidelines on the next slide.

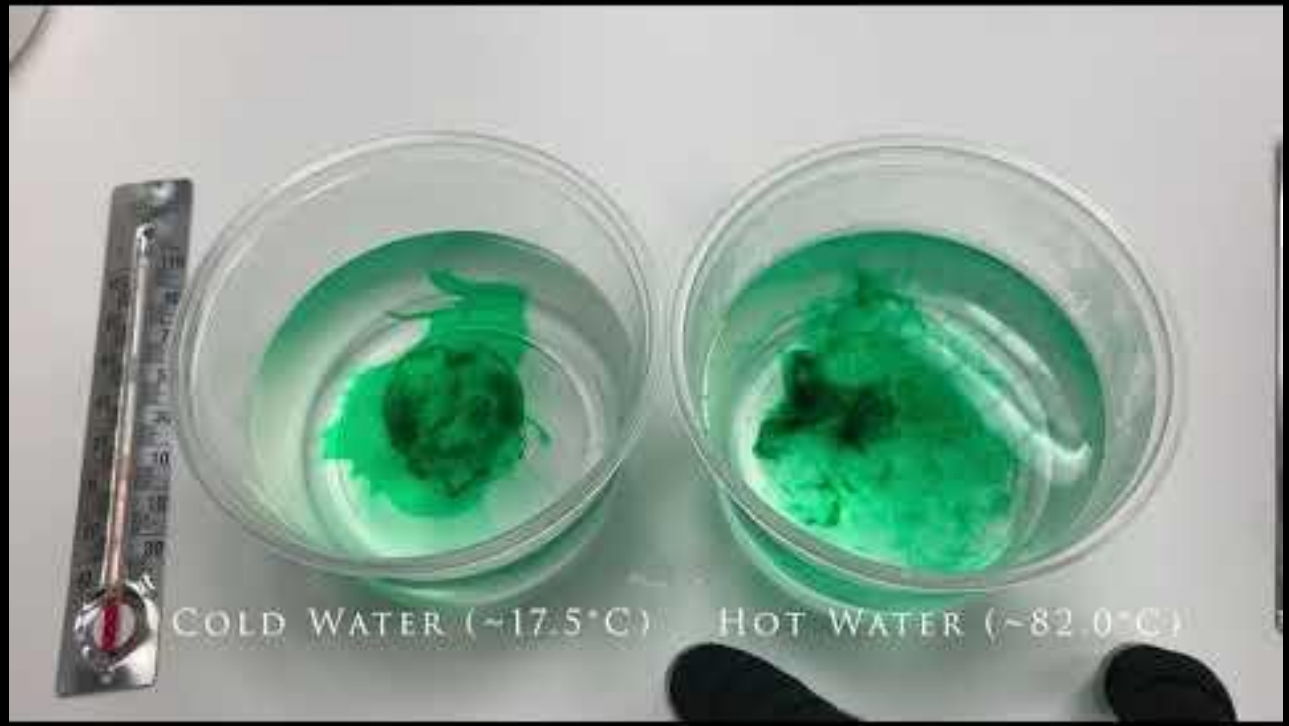
Safety Guidelines for Science Investigations

1. Follow instructions.
2. Don’t taste things.
3. Smell substances like a chemist.
4. Protect your eyes.
5. Protect your hands.
6. Keep your hands away from your face.
7. Tell your teacher if you have allergies.
8. Be calm and careful.
9. Report all spills, accidents, and injuries to your teacher or an adult at home.
10. Avoid anything that could cause a burn.
11. Wash your hands after class.

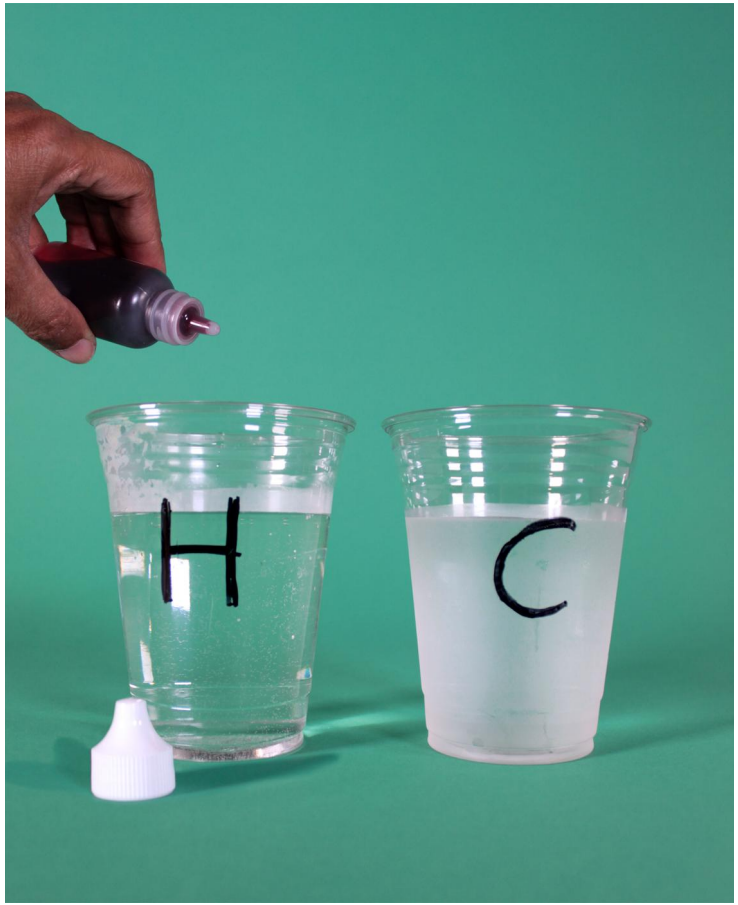
If you do this activity at home, be sure to allow the water to settle before adding the food coloring. Try **not to move** the cups once you begin the activity.



As you watch the video, focus your observations on how the **food coloring moves** in the cold and hot water.



Using the print version? Watch the video here: tinyurl.com/AMPTE-02



What did you **observe** about how the food coloring moves in the water?

You probably noticed that food coloring spreads out faster in warmer water. Although the water does not look like it is moving, the spread of the food coloring indicates that there is some movement happening in the water.

You just worked on collecting evidence to answer the Investigation Question: *How is something different when it is warmer or cooler?*

How did the experiment with the cold and warm water change your thinking about the Investigation Question?

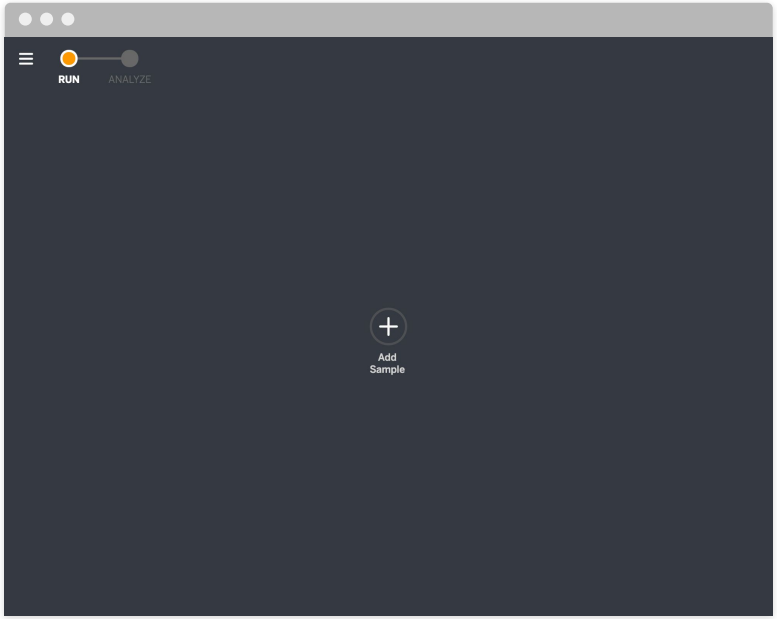
Key activities

- **Introducing the Unit:** Students are introduced to the unit problem and their role as student thermal scientists.
- **Observe:** Students observe that food coloring spreads faster in warmer water than it does in colder water, and see the connection between temperature and movement.
- **Do:** Students use the *Thermal Energy* Sim, or watch a video of the Sim investigation, to discover that molecules are moving faster in warmer samples than in colder samples.

Ideas for synchronous or in-person instruction

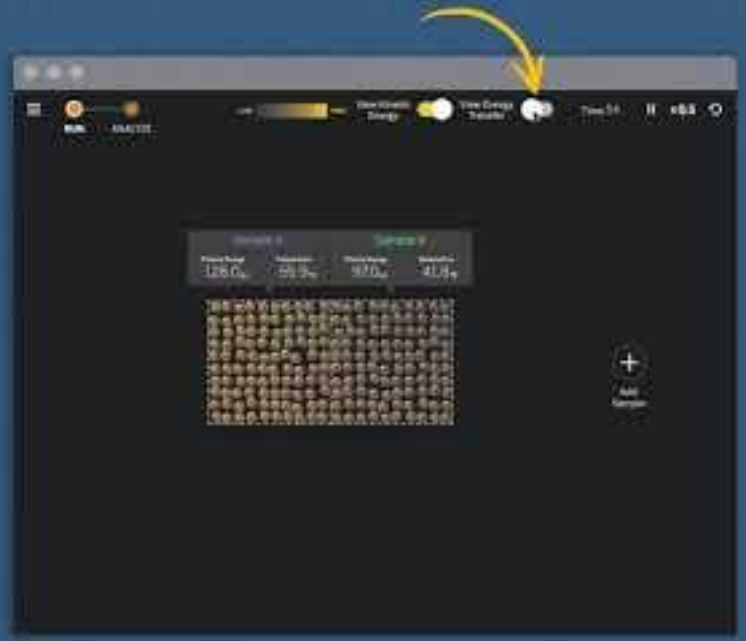
Before meeting, have students watch the introductory video. While meeting, have students share their initial ideas about the heating systems in the school. If you have access to kit materials, you could have students do the hands-on investigation with cold and hot water as in *Thermal Energy* Lesson 1.2 Activity 3. After meeting, students could complete the Sim investigation.

In this lesson and many others in the *Thermal Energy* @Home unit, you will use the *Thermal Energy* Simulation or watch a video of a Sim investigation.
Check with your teacher about how you will access Sims and other digital tools in this @Home Unit.

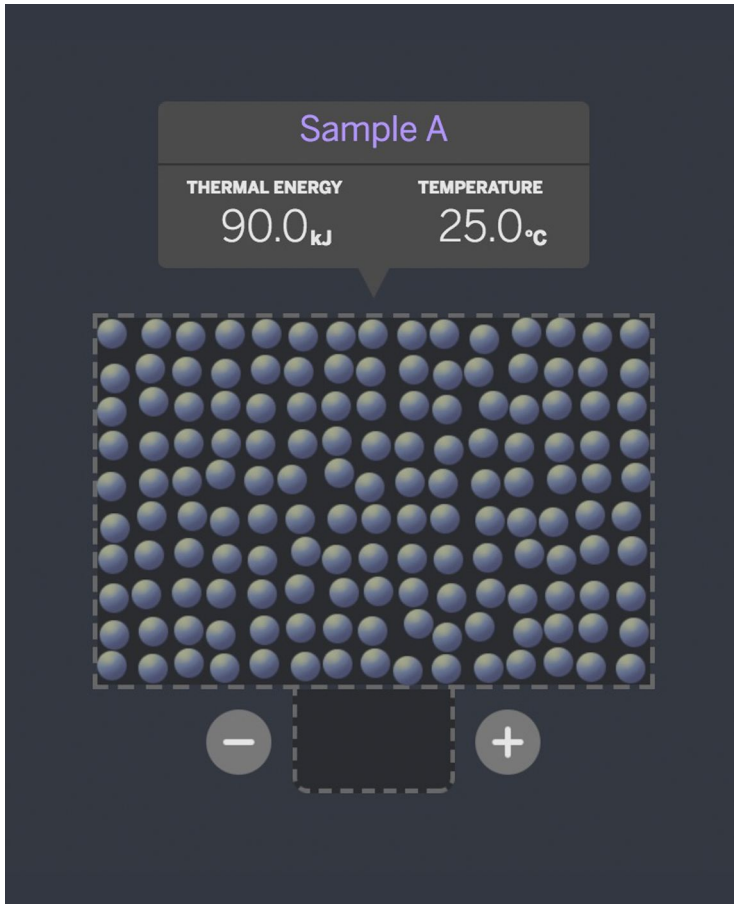


The *Thermal Energy* Sim is a **digital model** that will help us learn about how temperature can change.
Next, let's watch a video showing you some of the features of the *Thermal Energy* Sim.

When you put two samples together, you can turn on the **View Energy Transfer** toggle to see the transfer of energy between them.



Using the print version? Watch the video here: tinyurl.com/AMPTE-03



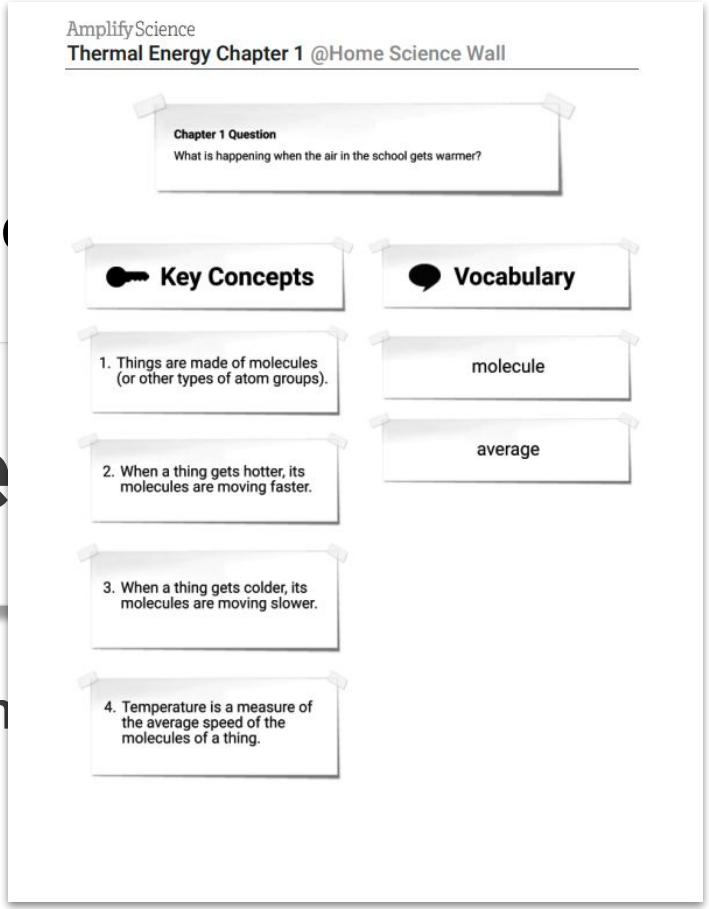
The Sim is a model of the real world that helps us understand thermal energy.

What do you think the **small circles** in the Sim represent?

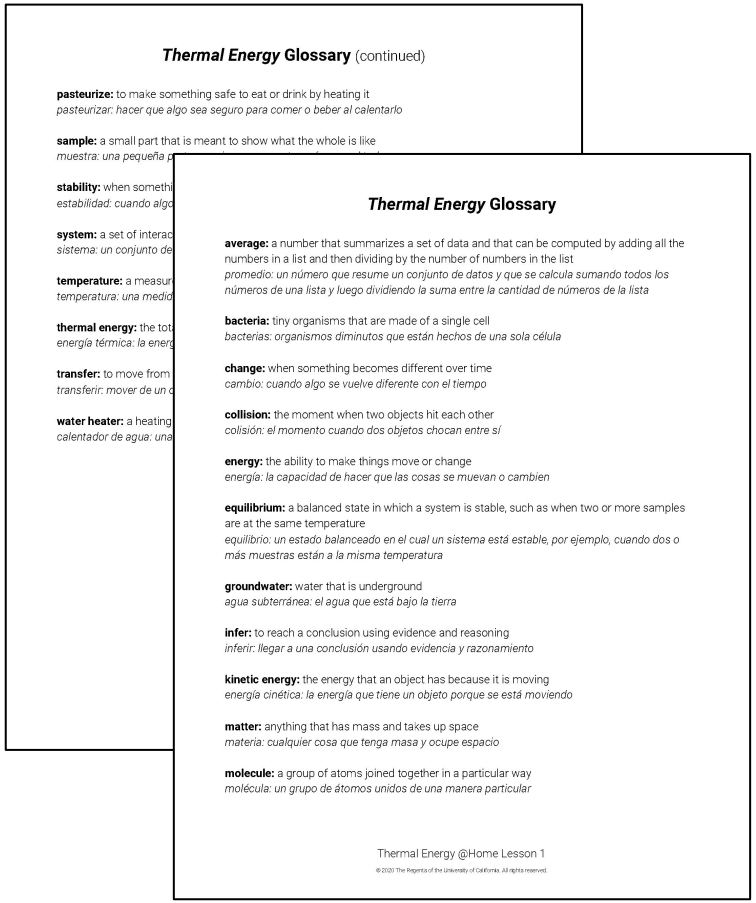
In the Sim, each circle represents

molecule

a group of atoms joined together in



In this lesson and throughout the unit you will need to **access different pages** such as the glossary on the next slide. Check with your teacher about how you will access materials and complete and submit work in this @Home Unit.



***Thermal Energy* Glossary** (continued)

pasteurize: to make something safe to eat or drink by heating it
pasteurizar: hacer que algo sea seguro para comer o beber al calentarlo

sample: a small part that is meant to show what the whole is like
muestra: una pequeña p

stability: when somethi
estabilidad: cuando algo

system: a set of interac
sistema: un conjunto de

temperature: a measur
temperatura: una medid

thermal energy: the tot
energía térmica: la energ

transfer: to move from
transferir: mover de un o

water heater: a heating
calentador de agua: una

***Thermal Energy* Glossary**

average: a number that summarizes a set of data and that can be computed by adding all the numbers in a list and then dividing by the number of numbers in the list
promedio: un número que resume un conjunto de datos y que se calcula sumando todos los números de una lista y luego dividiendo la suma entre la cantidad de números de la lista

bacteria: tiny organisms that are made of a single cell
bacterias: organismos diminutos que están hechos de una sola célula

change: when something becomes different over time
cambio: cuando algo se vuelve diferente con el tiempo

collision: the moment when two objects hit each other
colisión: el momento cuando dos objetos chocan entre sí

energy: the ability to make things move or change
energía: la capacidad de hacer que las cosas se muevan o cambien

equilibrium: a balanced state in which a system is stable, such as when two or more samples are at the same temperature
equilibrio: un estado balanceado en el cual un sistema está estable, por ejemplo, cuando dos o más muestras están a la misma temperatura

groundwater: water that is underground
agua subterránea: el agua que está bajo la tierra

infer: to reach a conclusion using evidence and reasoning
inferir: llegar a una conclusión usando evidencia y razonamiento

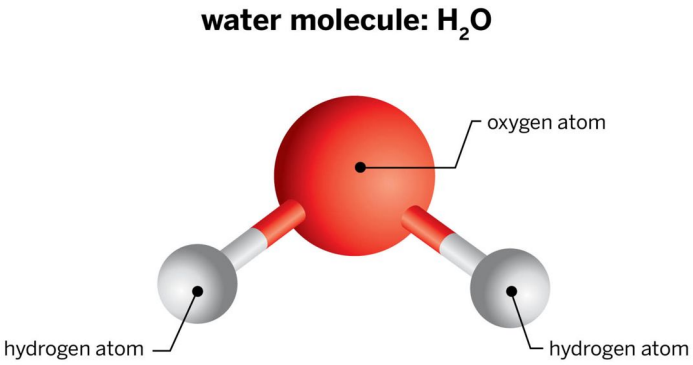
kinetic energy: the energy that an object has because it is moving
energía cinética: la energía que tiene un objeto porque se está moviendo

matter: anything that has mass and takes up space
materia: cualquier cosa que tenga masa y ocupe espacio

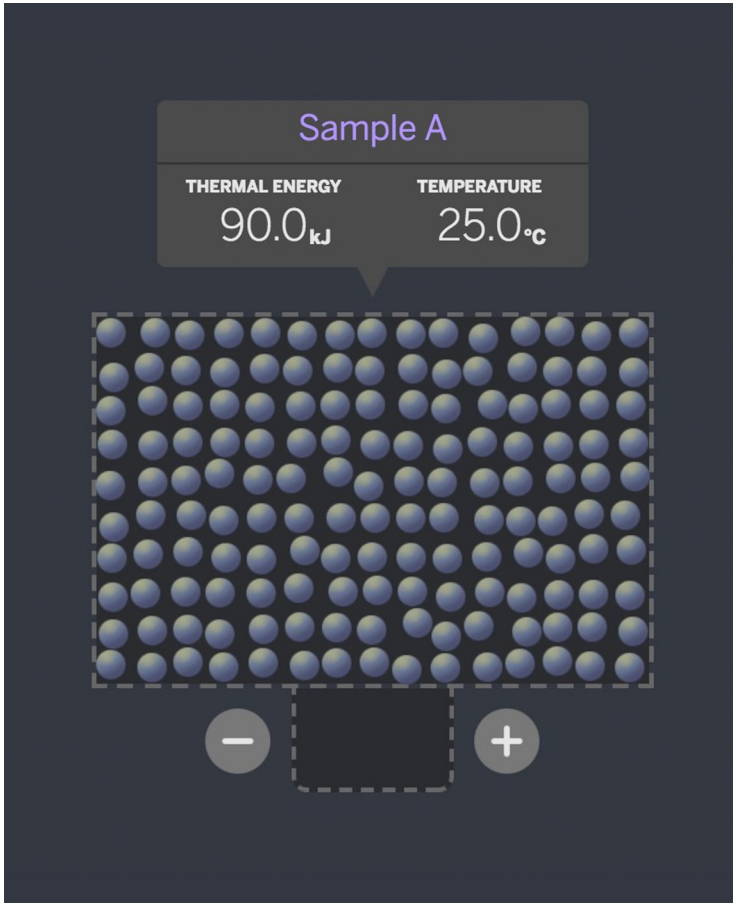
molecule: a group of atoms joined together in a particular way
molécula: un grupo de átomos unidos de una manera particular

Throughout the year, you can look up vocabulary words in the **glossary** to help you understand what they mean. You can find the glossary in your student pages or in the Amplify Library.

***Thermal Energy* Glossary** pages or Amplify Library

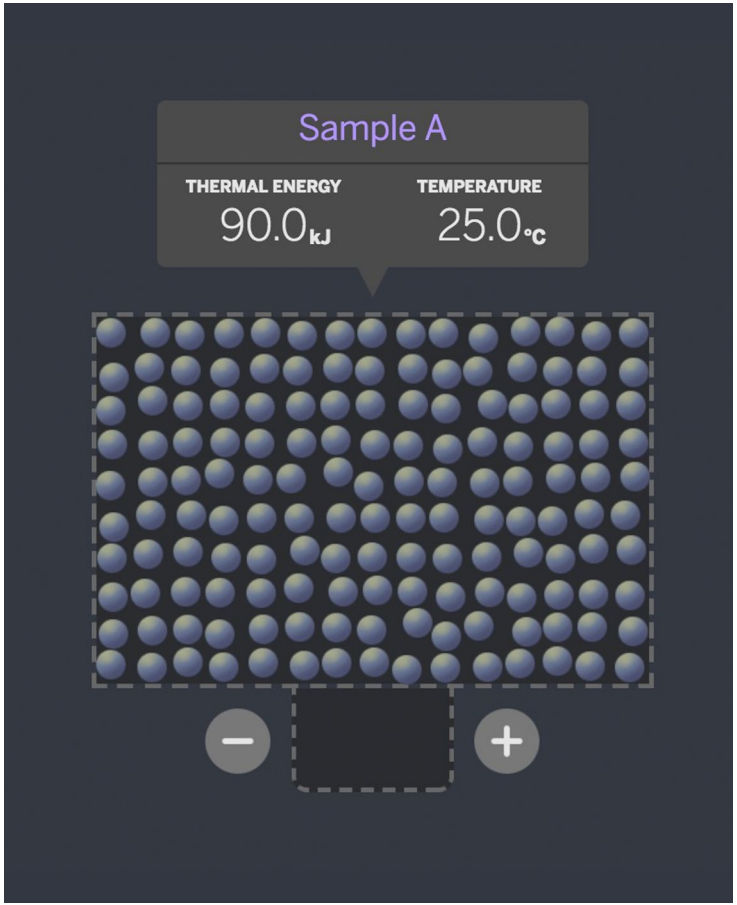


In this unit, we will describe the smaller pieces that make up stuff by using the word **molecule.**



In the Sim, each circle represents one molecule. The Sim portrays molecules on a much **larger scale** than their size in real life.

Molecules are so small that scientists can only see them using powerful microscopes. Molecules are made up of even smaller pieces called atoms, but we are only focusing on molecules in this unit.
Sometimes you will hear the word **molecular** used in the unit. That's just a way to describe anything related to molecules.



The Sim shows a small number of molecules so we can easily observe what is happening to them. The things around us—even very small things—are made up of **billions of molecules.**

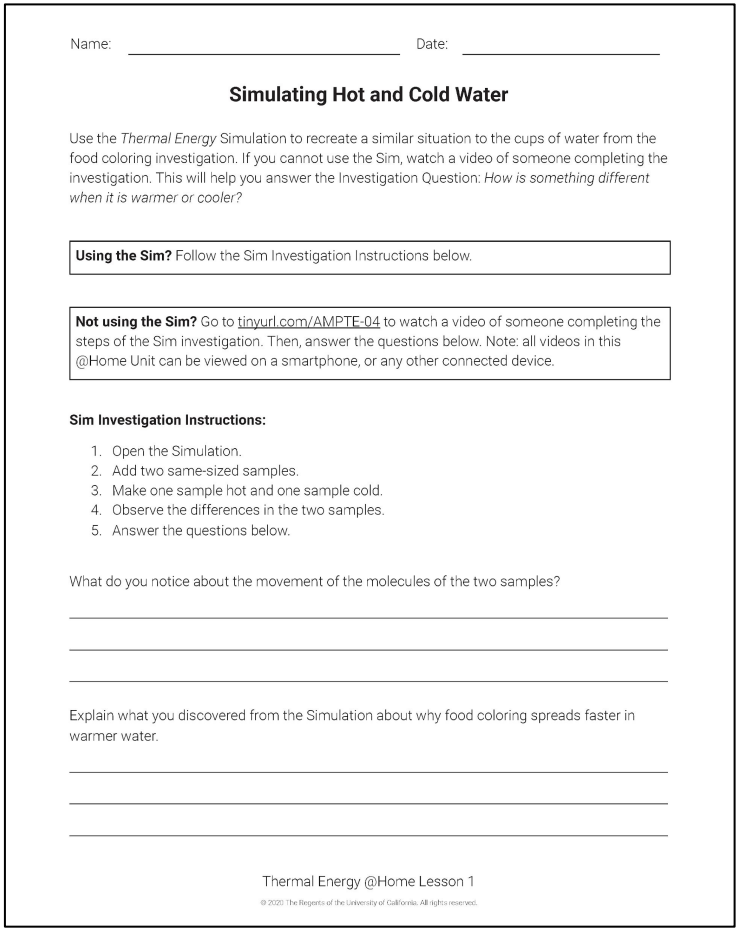
Even things that might not seem to be made of anything, like air, are also made of atoms and molecules.

1. Things are made of molecules (or other types of atom groups).

You observed that food coloring spreads out faster in warmer water than in colder water. Water is made of molecules.

How do you think the molecules of the hot water might be different from the molecules of the cold water?

The Sim allows us to **visualize** what is happening to the molecules of a thing. Now, you'll use the Sim to model the cups of water from the food coloring investigation. You will gather evidence to explain why the food coloring spread out differently in the two water samples.



Name: _____ Date: _____

Simulating Hot and Cold Water

Use the *Thermal Energy* Simulation to recreate a similar situation to the cups of water from the food coloring investigation. If you cannot use the Sim, watch a video of someone completing the investigation. This will help you answer the Investigation Question: *How is something different when it is warmer or cooler?*

Using the Sim? Follow the Sim Investigation Instructions below.

Not using the Sim? Go to tinyurl.com/AMPTE-04 to watch a video of someone completing the steps of the Sim investigation. Then, answer the questions below. Note: all videos in this @Home Unit can be viewed on a smartphone, or any other connected device.

Sim Investigation Instructions:

1. Open the Simulation.
2. Add two same-sized samples.
3. Make one sample hot and one sample cold.
4. Observe the differences in the two samples.
5. Answer the questions below.

What do you notice about the movement of the molecules of the two samples?

_____

_____

_____

Explain what you discovered from the Simulation about why food coloring spreads faster in warmer water.

_____

_____

_____

Thermal Energy @Home Lesson 1

Go to the **Simulating Hot and Cold Water** activity. Use the Sim or watch a video of this Sim investigation.

Use the Sim to recreate the cups of water from the food coloring investigation.

Simulating Hot and Cold Water page or Lesson 1.3, Activity 2.

Use the evidence from the Sim to try to answer our question.

Investigation Question:
How is something different when it is warmer or cooler?

Let's revisit our question from the hands-on investigation with a more complete explanation of what's happening to the water molecules.

After using the Sim, why do you think the food coloring spread **faster** in the **hot water?**

Today you saw evidence of this **key concept**.

2. When a thing gets hotter, its molecules are moving faster.

Today you saw evidence of this **key concept**.

3. When a thing gets colder, its molecules are moving slower.

End of @Home Lesson

THE LAWRENCE HALL OF SCIENCE
UNIVERSITY OF CALIFORNIA, BERKELEY

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Adapted from: Amplify Science *Thermal Energy* Lesson 1.2 and 1.3

Key activities

- **Introducing the Unit:** Students are introduced to the unit problem and their role as student thermal scientists.
- **Observe:** Students observe that food coloring spreads faster in warmer water than it does in colder water, and see the connection between temperature and movement.
- **Do:** Students use the *Thermal Energy* Sim, or watch a video of the Sim investigation, to discover that molecules are moving faster in warmer samples than in colder samples.

Ideas for synchronous or in-person instruction

Before meeting, have students watch the introductory video. While meeting, have students share their initial ideas about the heating systems in the school. If you have access to kit materials, you could have students do the hands-on investigation with cold and hot water as in *Thermal Energy* Lesson 1.2 Activity 3. After meeting, students could complete the Sim investigation.

Suggestions for Online Synchronous Time

Online synchronous time
Online discussions: It's worthwhile to establish norms and routines for online discussions in science to ensure equity of voice, turn-taking, etc.
Digital tool demonstrations: You can share your screen and demonstrate, or invite your students to share their screen and think-aloud as they use a Simulation or other digital tool.
Interactive read-alouds: Screen share a digital book or article, and pause to ask questions and invite discussion as you would in the classroom.
Shared Writing: This is a great opportunity for a collaborative document that all your students can contribute to.
Co-constructed class charts: You can create digital charts, or create physical charts in your home with student input.

page 15

Reflection: Teaching @Home Lesson 1

How would you teach this lesson?

Multi-day planning, including planning for differentiation and evidence of student work

Day @Home Lesson 1

Minutes for science: 15 min.

Instructional format:
- [x] Asynchronous
- [ ] Synchronous

Lesson or part of lesson:
Introducing the unit (slides 1-10)

Mode of instruction:
- [x] Preview
- [ ] Review
- [ ] Teach full lesson live
- [ ] Teach using synchronous suggestions
- [x] Students work independently using:
  - [ ] Printed @Home Slides
  - [x] Digital @Home Slides
  - [ ] @Home Videos

Students will...	Teacher will...
View the video that introduces students to their role and the problem a fictional school is having about heating systems. Jot down initial ideas about the two heating systems.	Assign slides 1-10 in Schoology and provide direction for students to jot down their ideas about the unit problem to share when the class meets together.

Minutes for science: _____

Instructional format:
- [ ] Asynchronous
- [x] Synchronous

Lesson or part of lesson:

Mode of instruction:
- [ ] Preview
- [ ] Review
- [ ] Teach full lesson live
- [ ] Teach using synchronous suggestions
- [ ] Students work independently using:
  - [ ] Printed @Home Slides
  - [ ] Digital @Home Slides
  - [ ] @Home Videos

Students will...	Teacher will...

Multi-day planning, including planning for differentiation and evidence of student work

Day @Home Lesson 1

Minutes for science: 15 min.

Instructional format:
- [x] Asynchronous
- [ ] Synchronous

Lesson or part of lesson:
Introducing the unit (slides 1-10)

Mode of instruction:
- [x] Preview
- [ ] Review
- [ ] Teach full lesson live
- [ ] Teach using synchronous suggestions
- [x] Students work independently using:
  - [ ] Printed @Home Slides
  - [x] Digital @Home Slides
  - [ ] @Home Videos

Students will...	Teacher will...
View the video that introduces students to their role and the problem a fictional school is having about heating systems. Jot down initial ideas about the two heating systems.	Assign slides 1-10 in Schoology and provide direction for students to jot down their ideas about the unit problem to share when the class meets together.

Minutes for science: 30 min

Instructional format:
- [ ] Asynchronous
- [x] Synchronous

Lesson or part of lesson:
Observe and Do activities (slides 11-43)

Mode of instruction:
- [ ] Preview
- [ ] Review
- [ ] Teach full lesson live
- [x] Teach using synchronous suggestions
- [ ] Students work independently using:
  - [ ] Printed @Home Slides
  - [ ] Digital @Home Slides
  - [ ] @Home Videos

Students will...	Teacher will...
Pause for pair discussion prompts on slides 10, 12, and 13. Observe food coloring video to see the connection between temperature and movement. Watch Sim model, and complete Student Sheet (slide 38).	Lead students through the lesson activities using slides 11-43,, pausing for partner discussion. Model Sim and lead class discussion about the relationship between temperature and water molecules.

Breakout groups

page 12

Discussion prompts

Planning:

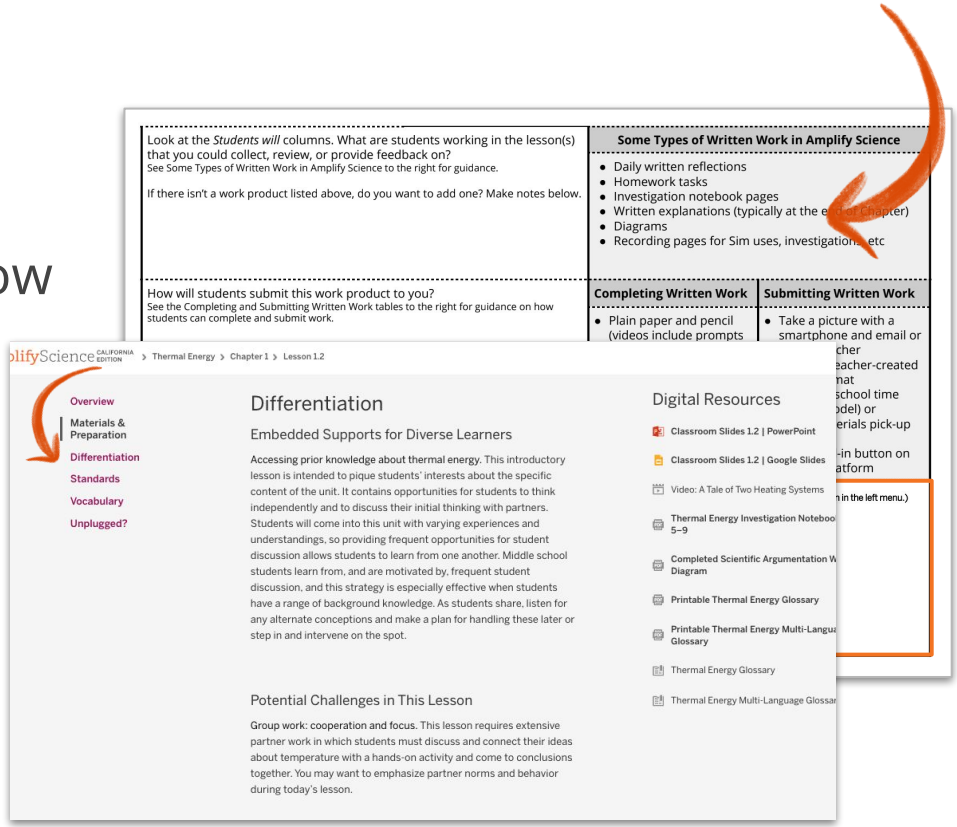
- Share additional ideas for how you plan to lead Lesson 1

Student work:

- Discuss how you can collect evidence of student work

Differentiation:

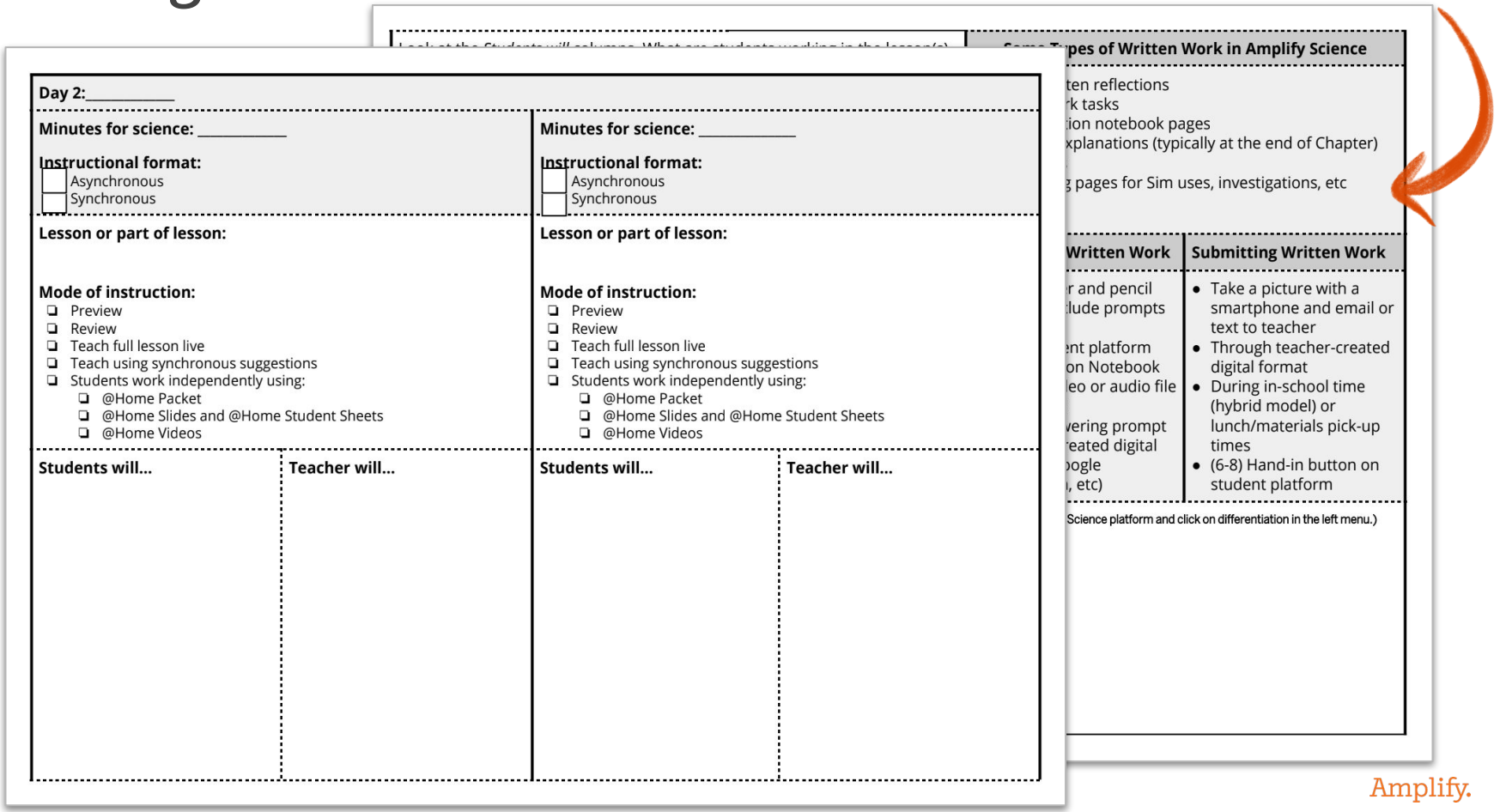
- Consider how you might differentiate this lesson



Look at the *Students will* columns. What are students working in the lesson(s) that you could collect, review, or provide feedback on? See Some Types of Written Work in Amplify Science to the right for guidance. If there isn't a work product listed above, do you want to add one? Make notes below.	**Some Types of Written Work in Amplify Science** • Daily written reflections • Homework tasks • Investigation notebook pages • Written explanations (typically at the end of Chapter) • Diagrams • Recording pages for Sim uses, investigations, etc
How will students submit this work product to you? See the Completing and Submitting Written Work tables to the right for guidance on how students can complete and submit work.	**Completing Written Work** • Plain paper and pencil (videos include prompts for setup) • (6-8) Student platform • Investigation Notebook • Record video or audio file describing work/answering prompt • Teacher-created digital format (Google Classroom, etc) **Submitting Written Work** • Take a picture with a smartphone and email or text to teacher • Through teacher-created digital format • During in-school time (hybrid model) or lunch/materials pick-up times • (6-8) Hand-in button on student platform
How will you differentiate this lesson for diverse learners? (Navigate to the lesson level on the standard Amplify Science platform and click on differentiation in the left menu.)	

Planning Resource

pages 13-14



Day 2:_____

Minutes for science: _____ **Instructional format:** ☐ Asynchronous ☐ Synchronous	**Minutes for science:** _____ **Instructional format:** ☐ Asynchronous ☐ Synchronous
Lesson or part of lesson: **Mode of instruction:** ❑ Preview ❑ Review ❑ Teach full lesson live ❑ Teach using synchronous suggestions ❑ Students work independently using: ❑ @Home Packet ❑ @Home Slides and @Home Student Sheets ❑ @Home Videos	**Lesson or part of lesson:** **Mode of instruction:** ❑ Preview ❑ Review ❑ Teach full lesson live ❑ Teach using synchronous suggestions ❑ Students work independently using: ❑ @Home Packet ❑ @Home Slides and @Home Student Sheets ❑ @Home Videos
Students will... / **Teacher will...**	**Students will...** / **Teacher will...**

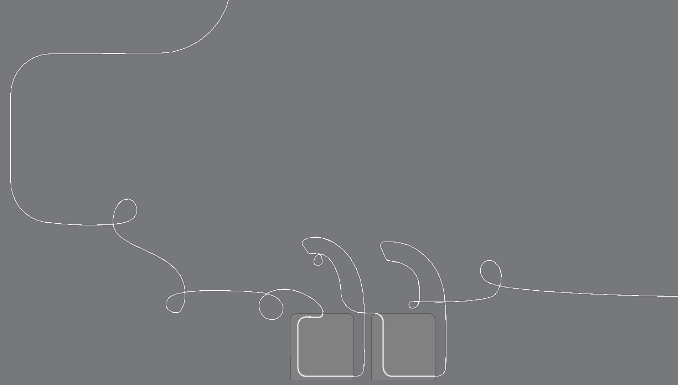
pes of Written Work in Amplify Science

ten reflections
k tasks
ion notebook pages
xplanations (typically at the end of Chapter)

g pages for Sim uses, investigations, etc

Written Work	Submitting Written Work
r and pencil lude prompts nt platform on Notebook eo or audio file vering prompt eated digital oogle , etc)	• Take a picture with a smartphone and email or text to teacher • Through teacher-created digital format • During in-school time (hybrid model) or lunch/materials pick-up times • (6-8) Hand-in button on student platform

Science platform and click on differentiation in the left menu.)



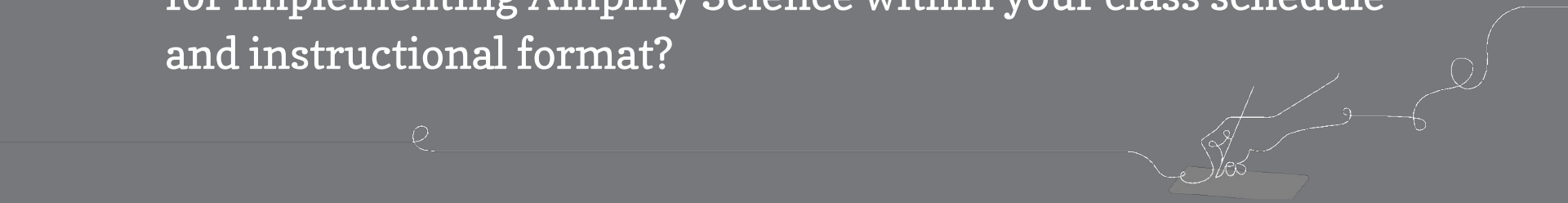
Questions?

Plan for the day

- Framing the day
  - Welcome
  - Instructional Materials
- Unit Internalization
- Planning to teach
  - Collecting evidence of student learning to meet diverse learner needs
- **Reflection and closing**

During this workshop did we meet our objectives?

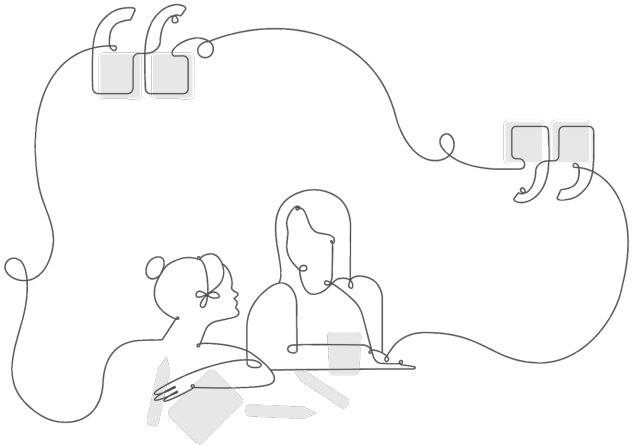
- Were you able to internalize your upcoming unit?
- Do you know how to plan for **collecting evidence of student learning** in order to make instructional decisions to **support diverse learner needs**?
- Do you have the resources you need to develop a multi-day plan for implementing Amplify Science within your class schedule and instructional format?



Upcoming LAUSD Office Hours

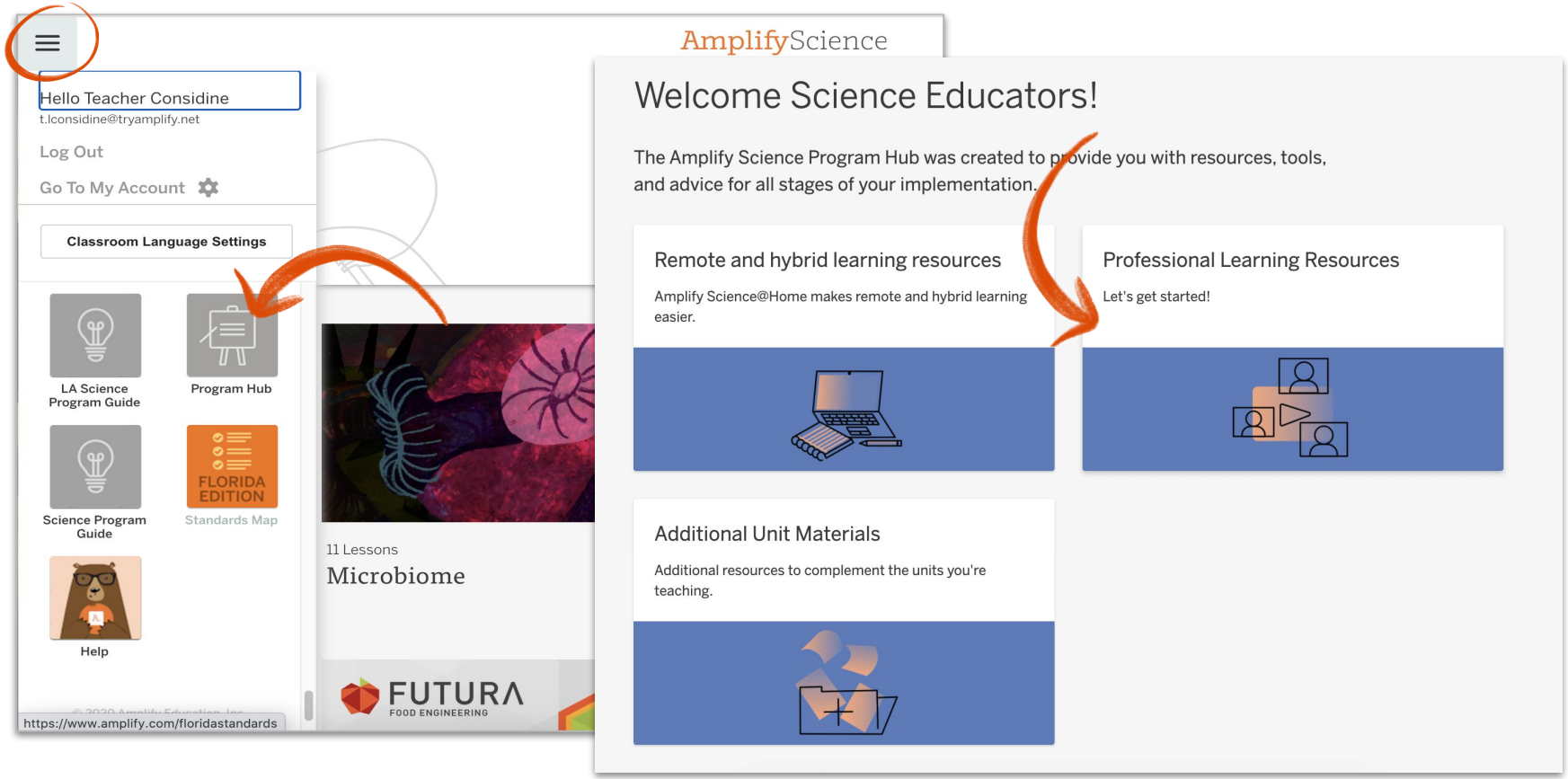
Twice Monthly

- Thursday, 2/11 (3-4pm)
- Thursday, 2/25 (3-4pm)
- Thursday, 3/11 (3-4pm)
- Thursday, 3/25 (3-4pm)

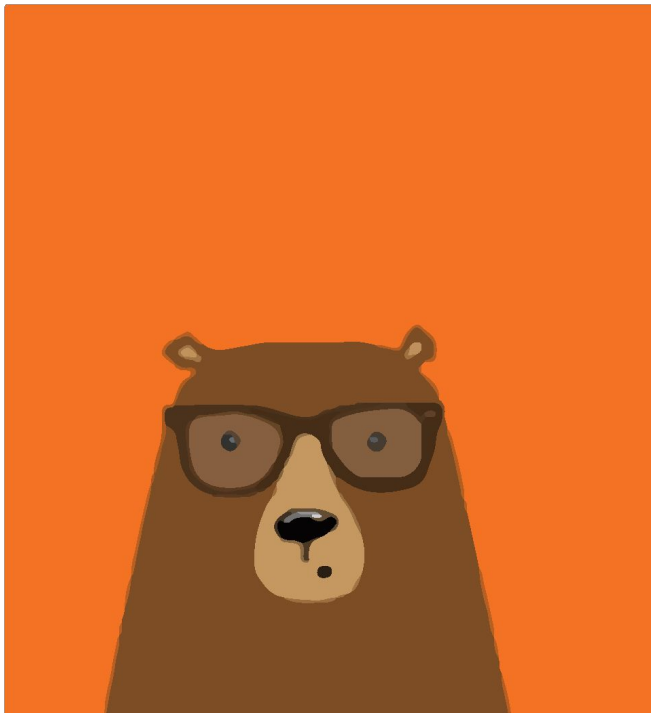


http://bit.ly/LAUSDMSOfficeHours

Program Hub: Self Study Resources



Back to school national webinar series

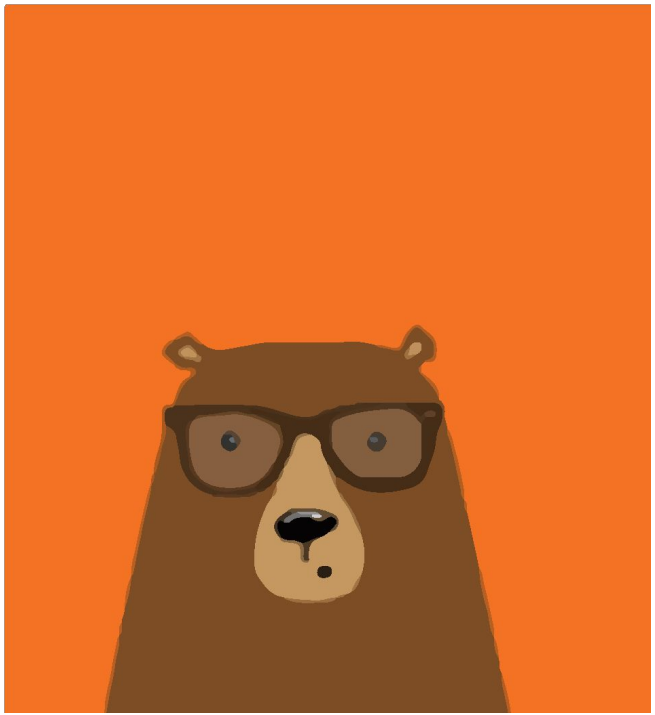


Topics included:

- Remote and hybrid learning support
- Navigation support
- What's new for 2020-2021
- Planning support
- Curriculum overview

bit.ly/BTSwebinars

Additional Amplify resources

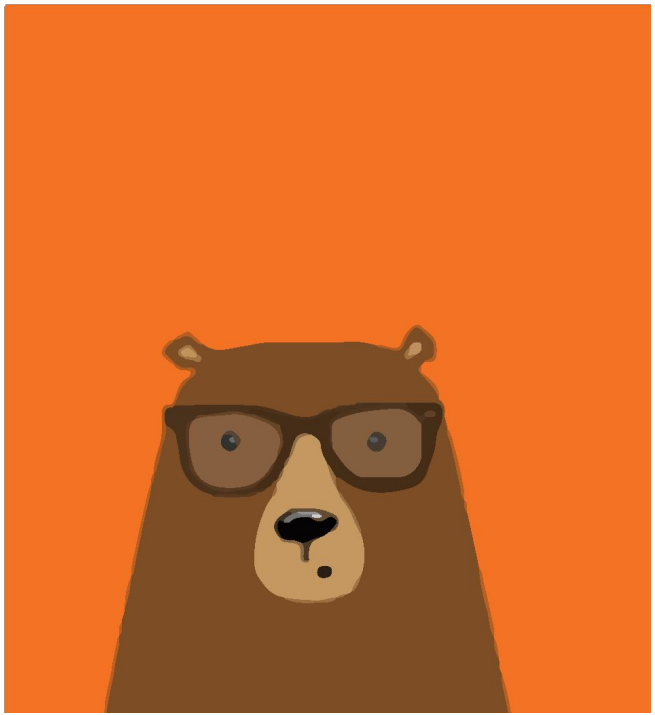


Caregivers site

Provide your students' families information about Amplify Science and what students are learning

amplify.com/amplify-science-family-resource-intro/

Additional Amplify resources



Program Guide

Glean additional insight into the program's structure, intent, philosophies, supports, and flexibility.

http://amplify.com/science/california/review

Amplify Help

Find lots of advice and answers from the Amplify team.

my.amplify.com/help

Additional Amplify Support

Customer Care

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

scihelp@amplify.com

800-823-1969

Amplify Chat

When contacting the customer care team:

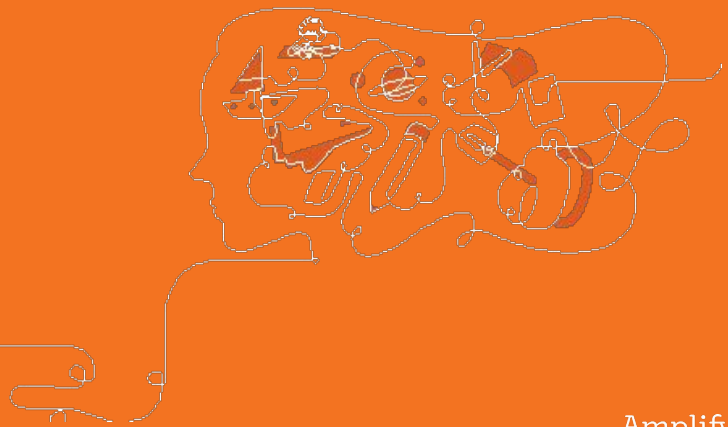
- Identify yourself as an Amplify Science user.
- Note the unit you are teaching.
- Note the type of device you are using (Chromebook, iPad, Windows, laptop).
- Note the web browser you are using (Chrome or Safari).
- Include a screenshot of the problem, if possible.
- Copy your district or site IT contact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

Please provide us feedback!

URL: https://www.surveymonkey.com/r/AmplifyLAUSDMS

Presenter names:

Date: xx



Creating Assignments in Schoology

- Click Add Materials.
- Select Add Assignment.
- Fill out the Create Assignment form.
- Options. Use Options to turn on/off the following features: Use Individually Assign to only display the assignment to a specific member of the course or a grading group.
- Click Create to complete