

# 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

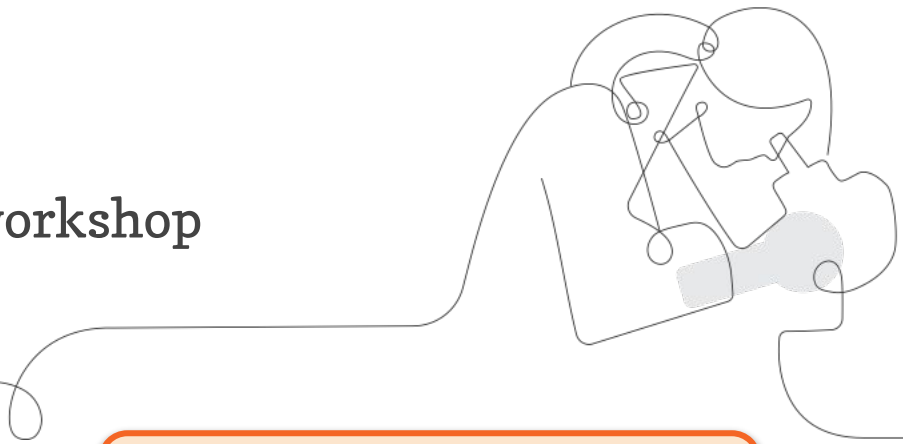
## Unit Internalization & Guided Planning

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

The diagram illustrates the setup for a two-window webinar. An inset shows a mouse cursor clicking the maximize button (the green circle) in the top-left corner of the first window's title bar.

**Window #1** displays a Google Meet session titled "Meet - Etiwanda Grade 7 N". The URL is [meet.google.com/hcs-dxpk-wrm?aut...](https://meet.google.com/hcs-dxpk-wrm?aut...). Below the video area, the Amplify Science curriculum page is visible, showing the "Plate Motion" section. The page includes text about Earth's layers and plate boundaries, a sidebar with resources like "Flexension Compilation" and "Investigation Notebook", and a "Getting Ready to Teach" section.

**Window #2** displays the Amplify Curriculum website at [apps.learning.amplify.com/curriculu...](https://apps.learning.amplify.com/curriculu...). The page title is "Lesson 1.2: Using Fossils to Understand Earth". The main content area features an illustration of a dinosaur in a prehistoric landscape. The sidebar on the right lists various resources, including "Lesson Brief (4 Activities)", "Warm-Up", "Teacher-Led Discussion", and "Digital Resources".

# 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.

e





# 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

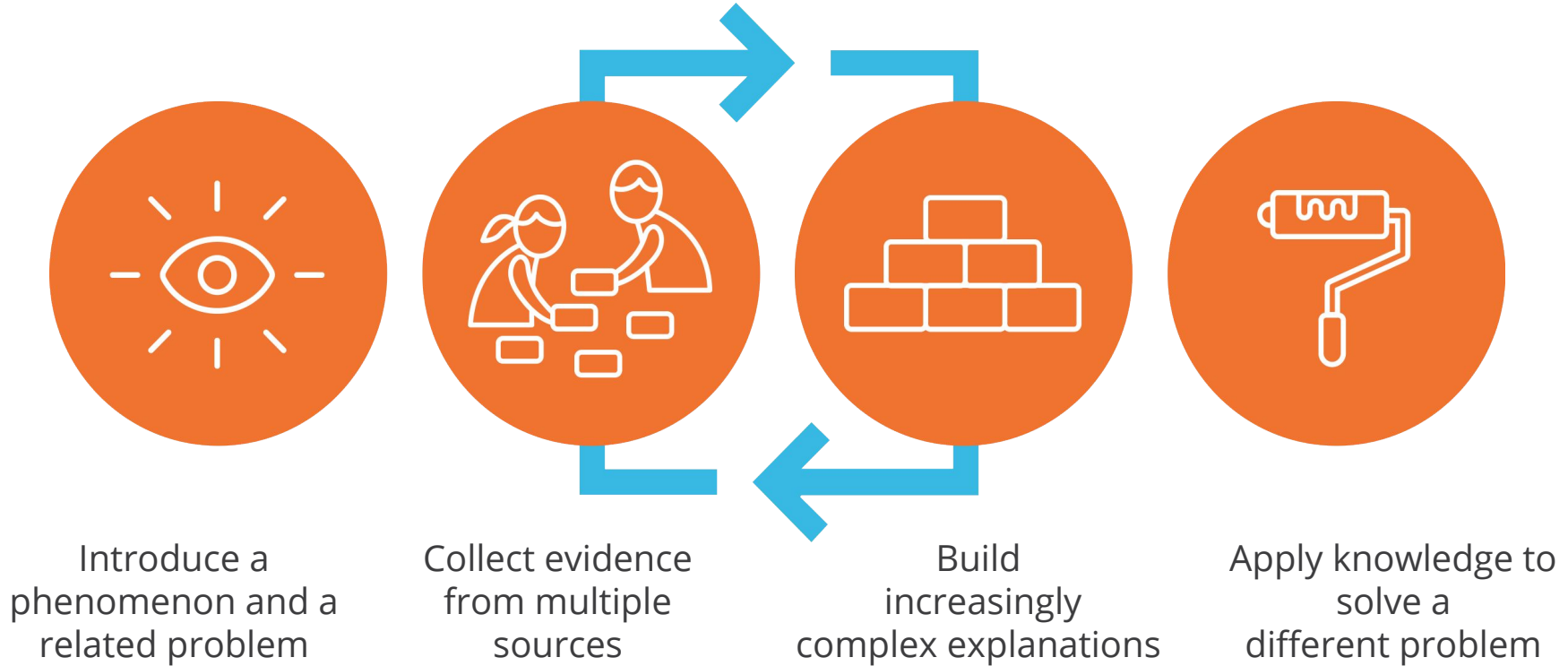
- **Framing the day**
  - **Welcome**
  - **Instructional Materials**
- Unit Internalization
- Planning to teach
  - Collecting evidence of student learning to meet diverse learner needs
- Reflection and closing

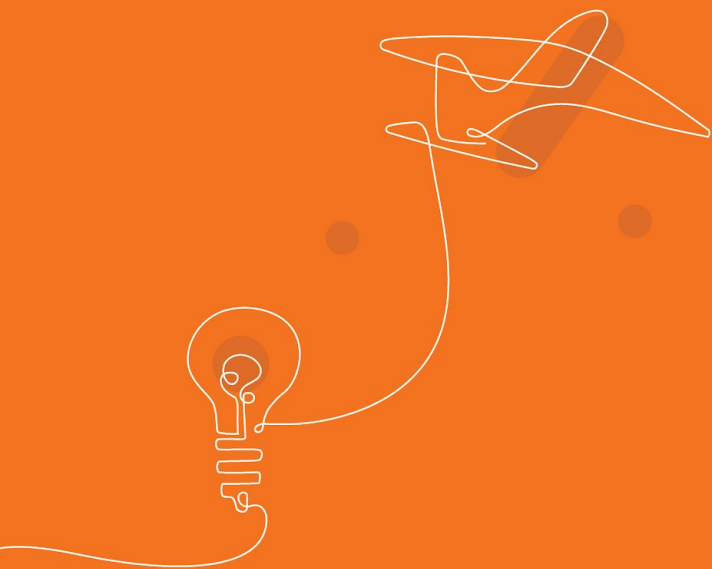




# Amplify Science Refresher

# Amplify Science Instructional Approach





# Instructional Materials

# Middle school course curriculum structure

## Integrated model\*

### Grade 6

- Launch: Microbiome
- Metabolism
- Engineering Internship: Metabolism
- Traits and Reproduction
- Thermal Energy
- Ocean, Atmosphere, and Climate
- Weather Patterns
- Earth's Changing Climate
- Engineering Internship: Earth's Changing Climate

### Grade 7

- Launch: Geology on Mars
- Plate Motion
- Engineering Internship: Plate Motion
- Rock Transformations
- Phase Change
- Engineering Internship: Phase Change
- Chemical Reactions
- Populations and Resources
- Matter and Energy in Ecosystems

### Grade 8

- Launch: Harnessing Human Energy
- Force and Motion
- Engineering Internship: Force and Motion
- Magnetic Fields
- Light Waves
- Earth, Moon, and Sun
- Natural Selection
- Engineering Internship: Natural Selection
- Evolutionary History

AmplifyScience

authored by



THE LAWRENCE  
HALL OF SCIENCE  
UNIVERSITY OF CALIFORNIA, BERKELEY

All curriculum materials ©2016 The Regents of the University of California.  
© 2018 Amplify Education, Inc. All trademarks and copyrights are the property of Amplify or its licensors.

## Launch unit

- First unit
- 11 lessons

## Core units

- Majority of units
- 19 lessons

## Engineering Internships

- Two per year
- 10 lessons

# Standard Amplify Science Curriculum



19 Lessons

# Thermal Energy



JUMP DOWN TO UNIT GUIDE

GENERATE PRINTABLE TEACHER'S GUIDE

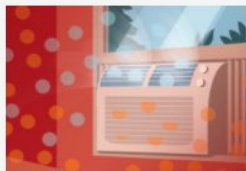
## Standard Amplify Science Curriculum

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



Chapter 1:  
Understanding  
Temperature

4 Lessons



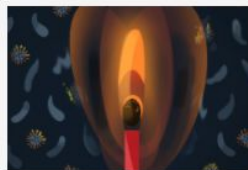
Chapter 2:  
Temperature and  
Energy

7 Lessons



Chapter 3: Changes  
in Temperature

4 Lessons



Chapter 4: Water  
Pasteurization

4 Lessons

Español

Skip slide if modeling live on the platform.

# 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.

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


Articles in This Unit


Apps in This Unit


Flexextensions in This Unit


Printable Resources


 Article Compilation


 Coherence Flowchart


 Copymaster Compilation

 Flexextension Compilation

 Investigation Notebook

 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.

Skip slide if modeling live on the platform.

# 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.

The screenshot shows the Amplify Science platform interface for Lesson 1.2: Investigating Hot and Cold. The top navigation bar includes the Amplify Science logo, "CALIFORNIA EDITION", and the breadcrumb trail: Thermal Energy > Chapter 1 > Lesson 1.2. The main header area features a dark background with colorful bokeh circles and the lesson title "Lesson 1.2: Investigating Hot and Cold". Below the header is a horizontal navigation bar with five tabs: Lesson Brief (4 Activities), 1 WARM-UP Warm-Up, T TEACHER VIDEO: A Tale of Two Heating Systems, 2 TEACHER-LED DISCUSSION Introducing the Unit, and 3 HANDS-ON Investigating Hot and Cold Things. The "Lesson Brief" tab is currently selected. Below the navigation bar, the interface is divided into three columns. The left column contains a sidebar with links: Overview, Materials & Preparation, Differentiation, Standards, Vocabulary, and Unplugged?. The middle column displays the "Overview" section, which includes a paragraph about students beginning the unit with an introduction to their role as thermal scientists. The right column shows "Digital Resources" with links to "Classroom Slides 1.2 | PowerPoint" and "Classroom Slides 1.2 | Google Slides". At the top right of the main content area, there are buttons for "RESET LESSON", "GENERATE PRINTABLE LESSON GUIDE", and "ASSIGN".

AmplifyScience CALIFORNIA EDITION > Thermal Energy > Chapter 1 > Lesson 1.2

## Lesson 1.2: Investigating Hot and Cold

Lesson Brief (4 Activities) < 1 WARM-UP Warm-Up T TEACHER VIDEO: A Tale of Two Heating Systems 2 TEACHER-LED DISCUSSION Introducing the Unit 3 HANDS-ON Investigating Hot and Cold Things 4 CLASS Reflecting on the Investigation >

RESET LESSON

### Overview

Students begin the unit with an introduction to their role as thermal scientists investigating how two types of heating systems will heat a school differently during the winter. To begin their research, students focus on the differences between the two heating systems. Students collect evidence by experimenting with food coloring in hot and cold water, and find that the food coloring disperses more quickly in warmer water. The purpose of this lesson is for students to begin to build an understanding that temperature is related to motion, a stepping stone to understanding temperature in terms of molecular motion.

### Digital Resources

- Classroom Slides 1.2 | PowerPoint
- Classroom Slides 1.2 | Google Slides

GENERATE PRINTABLE LESSON GUIDE @ ASSIGN

Skip slide if modeling live on the platform.

# 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

Hello Teacher Considine  
t.lconsidine@tryamplify.net

Log Out

Go To My Account ⚙️

Classroom Language Settings

LA Science Program Guide

Program Hub

Science Program Guide

Standards Map

Help

6th Grade ▾

11 Lessons  
Microbiome

19 Lessons  
Metabolism

FUTURA  
FOOD ENGINEERING

© 2020 Amplify Education, Inc.  
<https://www.amplify.com/floridastandards>

# AmplifyScience@Home

Two different options:

## @Home Units

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

## @Home Videos

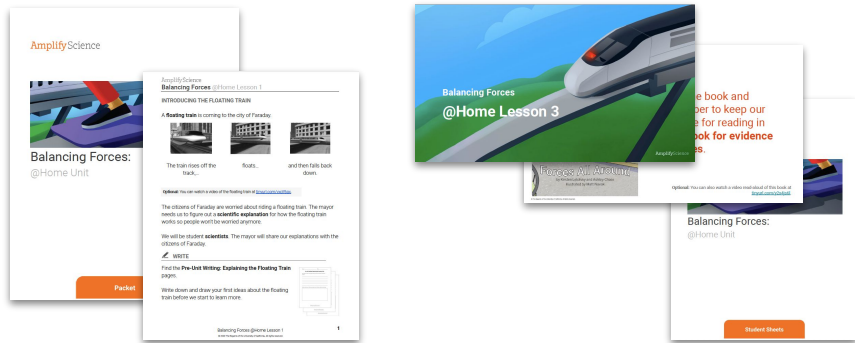
- Video playlists of Amplify Science lessons, taught by real Amplify Science teachers



# @Home Units

## A shift in approach to respond to user feedback

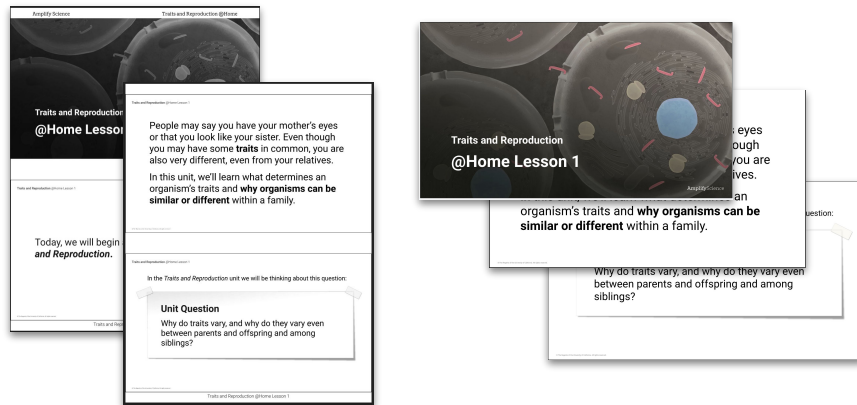
Original approach: two different resources



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.

Thermal Energy ▾

@Home unit to come December 16 (Eng.)/January 7 (Span.)

@Home Unit @Home Videos Hands-on investigations videos

@Home Unit English ▾

Instructions >

TE@Home Teacher Resources

TEACHER OVERVIEW

Google  
 PDF

LESSON INDEX

PDF

TE@Home Family Overview

Google  
 PDF

TE@Home Student Materials Compilations

ALL SLIDES  
 Google

ALL STUDENT SHEETS  
 Google

ALL PACKETS (INCL. STUDENT SHEETS)  
 PDF

TE@Home Lesson 1

Google  
 PDF

STUDENT SHEETS

Google  
 PDF

TE@Home Lesson 2

SLIDES

Google PDF  
 Google PDF

STUDENT SHEETS

Google PDF  
 Google PDF

TE@Home Lesson 3

SLIDES

Google  
 PDF

STUDENT SHEETS

Google  
 PDF

Paper option

Digital option



# 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.

Thermal Energy ▾

@Home unit to come December 16 (Eng.)/January 7 (Span.)

@Home Unit @Home Videos Hands-on investigations videos

@Home Videos

Instructions >

TE Lesson 1.2 TE Lesson 1.3 TE Lesson 1.4

TE Lesson 2.1

TE Lesson 2.4

TE Lesson 3.1

TE Lesson 3.4

TE Lesson 4.3

Activity 1  
Warm Up

PLAY ALL

Thermal Energy Chapter 1  
Lesson 1.2

5 videos • 2,700 views • Last updated on Oct 13, 2020

Unlisted

Amplify SUBSCRIBE

- 1 Thermal Energy Chapter 1 Lesson 1.2 Activity 1  
Amplify 1:42
- 2 Thermal Energy Chapter 1 Lesson 1.2 Activities T&2  
Amplify 5:44
- 3 Thermal Energy Chapter 1 Lesson 1.2 Activity 3  
Amplify 1:17
- 4 Thermal Energy Investigating Hot and Cold Things  
Amplify 1:42
- 5 Thermal Energy Chapter 1 Lesson 1.2 Activity 4  
Amplify 0:51



# 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

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
- Articles in This Unit
- Apps in This Unit
- Flextensions in This Unit

Printable Resources

- Article Compilation
- Coherence Flowchart
- Copymaster Compilation
- Flextension Compilation
- Investigation Notebook
- 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

## 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

# Unit Map

Pages 2-3

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

Articles in This Unit

Apps in This Unit

Flextensions in This Unit

Printable Resources

Article Compilation

Flextension Compilation

Investigation Notebook

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

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.

1

2

© The Regents of the University of California

© The Regents of the University of California

# Progress Build

Pages 4-5

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

Articles in This Unit

Apps in This Unit

Flextensions in This Unit

Printable Resources

Article Compilation

Coherence Flowchart

Flextension Compilation

Investigation Notebook

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

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.**

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

© The Regents of the University of California

Thermal Energy

Planning for the Unit

molecules of the hotter thing  
fer of kinetic energy causes  
all of the molecules are

y transfer between them and

the energy of the movement  
e kinetic energy. Colder things  
perature are the result of  
les of the hotter thing transfer  
energy causes faster-moving  
les are moving at about the  
stances where other factors,  
umber of molecules of a  
ed among all of the  
ules has more total kinetic  
more total kinetic energy  
of more molecules, more  
f kinetic energy, larger things

© The Regents of the University of California



# 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

Thermal Energy  
Planning for the Unit

Unit Map



Unit Map

Which heating system will best heat River

In their role as student thermal scientists, students work in order to help the school choose a new heating system. The one that uses a larger amount of cooler groundwater. Students explain by the movement of molecules, which facilitates they analyze the two heating system options, students like explain how energy will transfer from a warmer object to a reaches equilibrium.

Chapter 1: What is happening when the air in the sc

Students figure out: If the heating systems make the sch speed of the molecules of the school's air. Things are mad gets hotter, its molecules are moving faster. When a thing, measure of the average speed of the molecules of a thing.

How they figure it out: They investigate the movement of molecular movement and temperature in the Sim. They re showing the difference between a substance when it is a

Chapter 2: What causes the air molecules inside th

Students figure out: The air molecules inside the school gets hotter, its molecules are moving faster and have more moving slower and have less kinetic energy. When two things transfers from the faster-moving molecules to the slower. Therefore, as energy transfers, it increases in one part of molecules of a system will transfer energy until the system the molecules are moving at about the same speed. Both both have water that starts at a higher temperature than transfer to the air.

How they figure it out: They observe a video of an investy around it, and they explore one thing warming another in hotter" and examine molecule collisions during energy the tokens in a physical model. They create sentences using k transfer. They play a thermal energy card game to review

Chapter 3: Which heating system will warm the air

Students figure out: The groundwater system will heat th other system, even though its water is not as warm as in thing with more molecules has more total kinetic energy ( thing gains or loses energy, the energy gained or lost is di

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 local 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. Cooler 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.**

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. Cooler things are made up of slower-moving molecules, which have less kinetic energy. Changes in temperature are the result of

Thermal Energy  
Planning for the Unit

olecules of the hotter thing  
fer of kinetic energy causes  
f all of the molecules are

y transfer between them and

the energy of the movement  
kinetic energy. Cooler things  
perature are the result of  
ies of the hotter thing transfer  
energy causes faster-moving  
ies are moving at about the  
stances where other factors,  
umber of molecules of a  
id among all of the  
les has more total kinetic  
more total kinetic energy  
of more molecules, more  
f kinetic energy, larger things

# Unit Guide Document

## Guided Unit Internalization

### Part 1: Unit-level internalization

Page 7

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 at 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.

Unit Map

Lesson Overview  
Compilation

Unit Map

Progress Buld





# 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 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 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)

AmplifyScience  
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  
© 2020 The Regents of the University of California. All rights reserved.

1

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

copymaster

copymaster

copymaster

copymaster

print materials

copymaster

copymaster


Thermal Energy @Home Lesson Index  
© 2020 The Regents of the University of California. All rights reserved.

2

Thermal Energy @Home Lesson Index  
© 2020 The Regents of the University of California. All rights reserved.

3

Pages 8-10





### 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

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](https://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

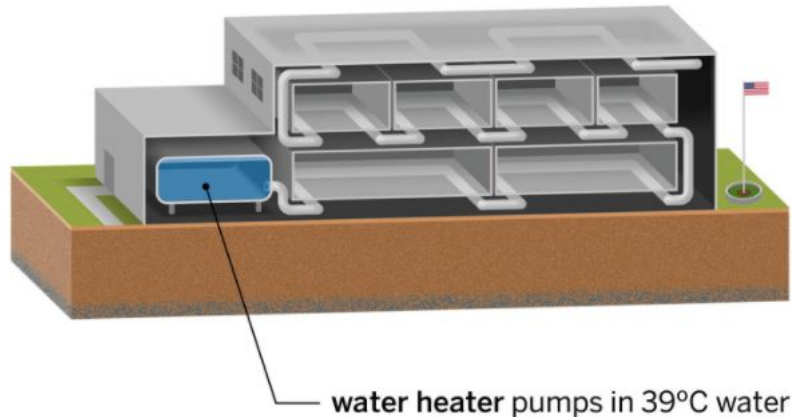
What is happening when the air in the school gets warmer?

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.

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.

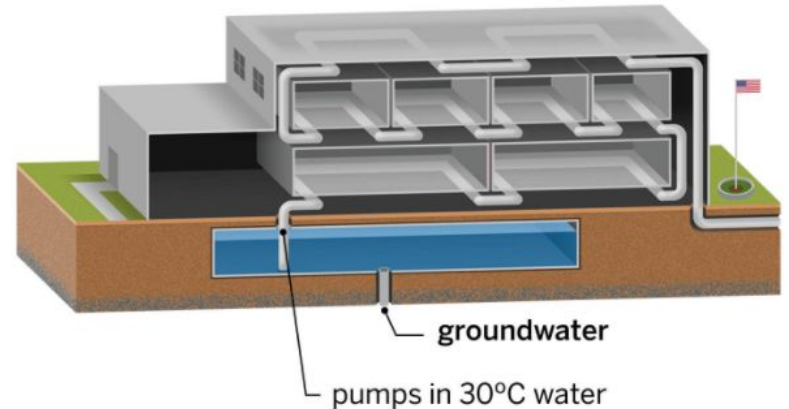
**Proposal #1:  
Water Heater System**

morning air temperature:  $11^{\circ}\text{C}$



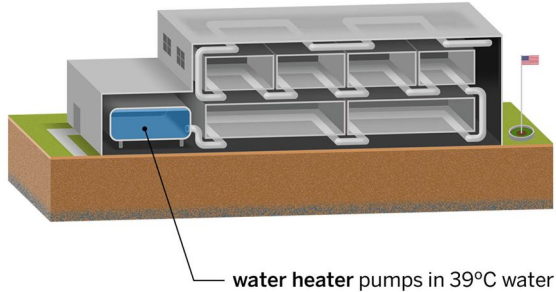
**Proposal #2:  
Groundwater System**

morning air temperature:  $11^{\circ}\text{C}$



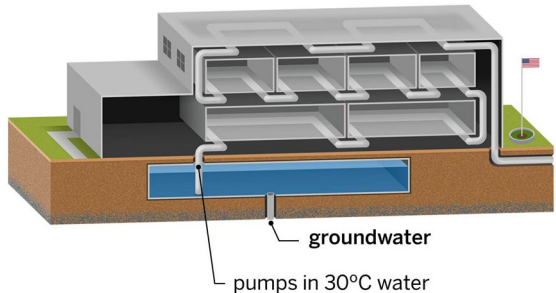
Proposal #1:  
**Water Heater System**

morning air temperature: 11°C



Proposal #2:  
**Groundwater System**

morning air temperature: 11°C



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?



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**?

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.



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.

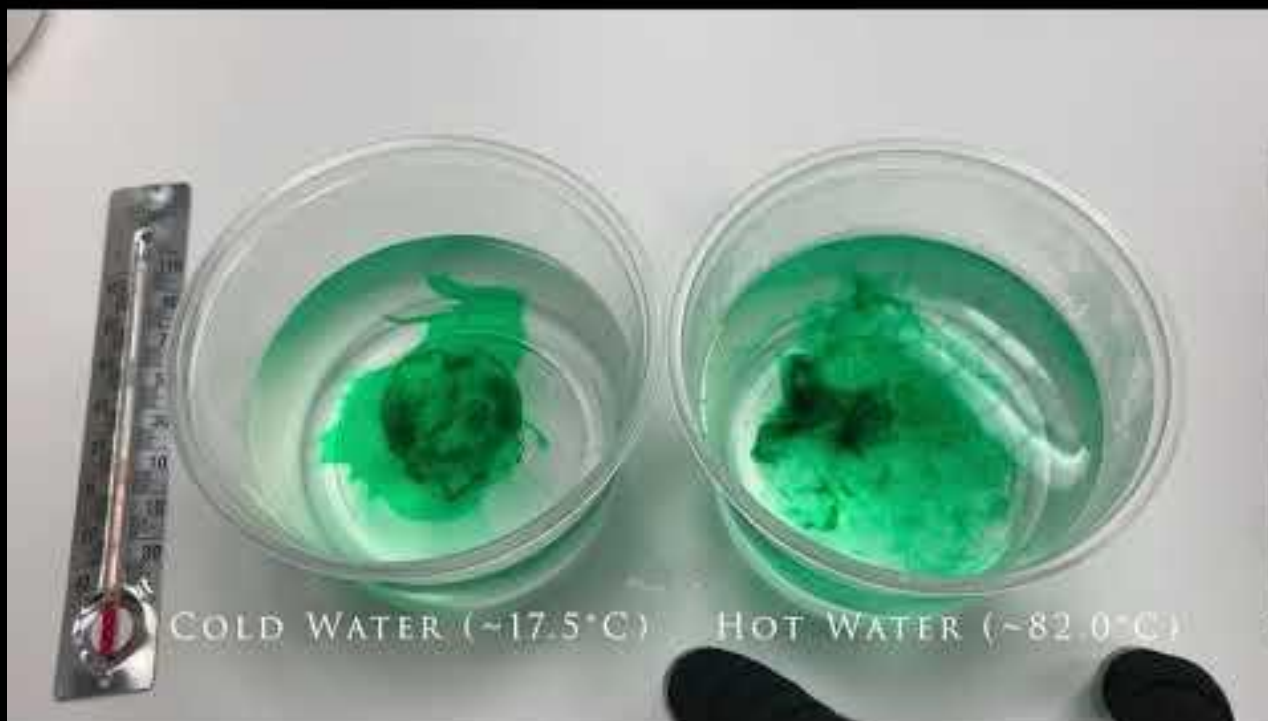




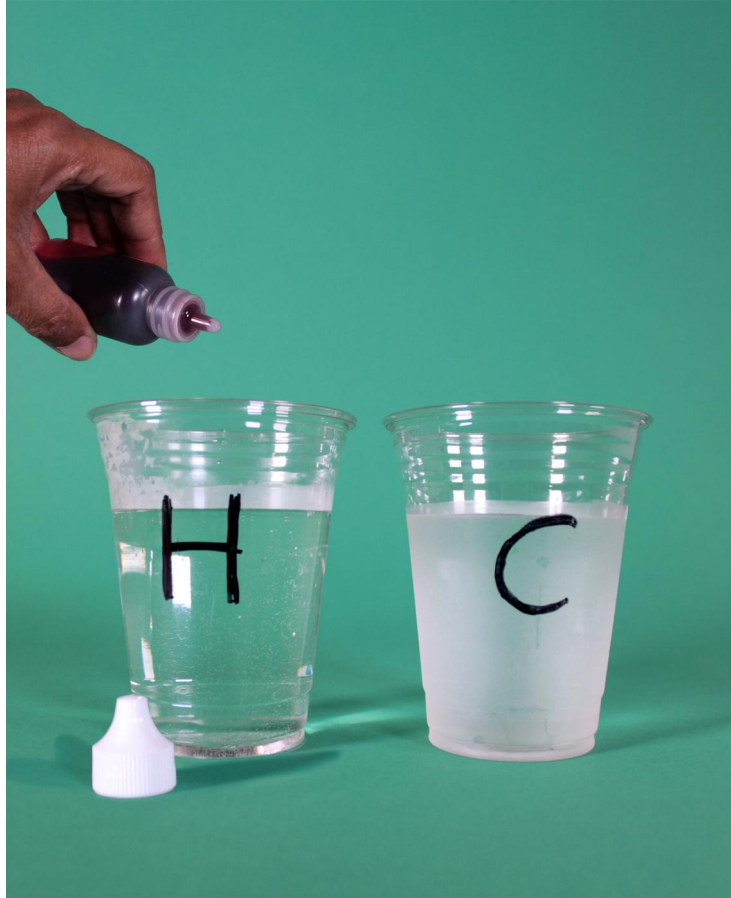
If you do this activity at home, be sure to allow the water to settle before adding the food coloring. Try **not to move** the cups once you begin the activity.



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](https://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

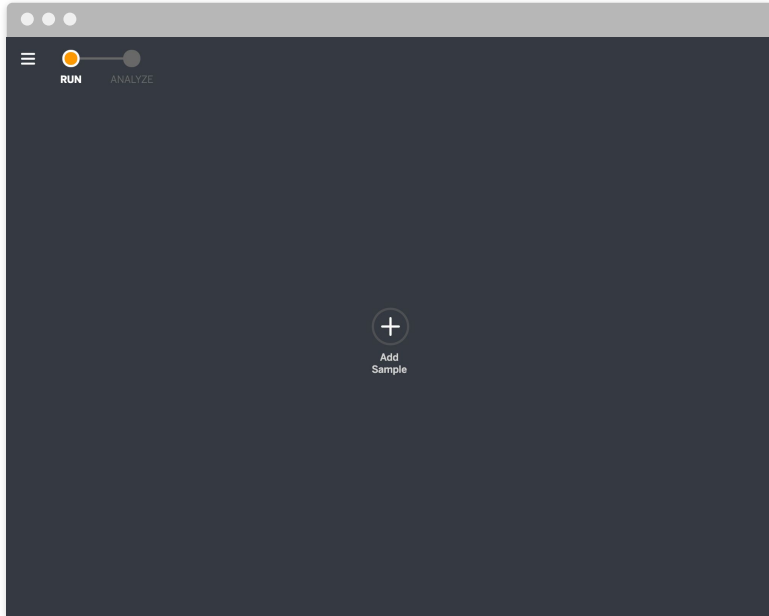
- **Introducing the Unit:** Students are introduced to the unit problem and their role as student thermal scientists.
- **Observe:** Students observe that food coloring spreads faster in warmer water than it does in colder water, and see the connection between temperature and movement.
- **Do:** Students 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.

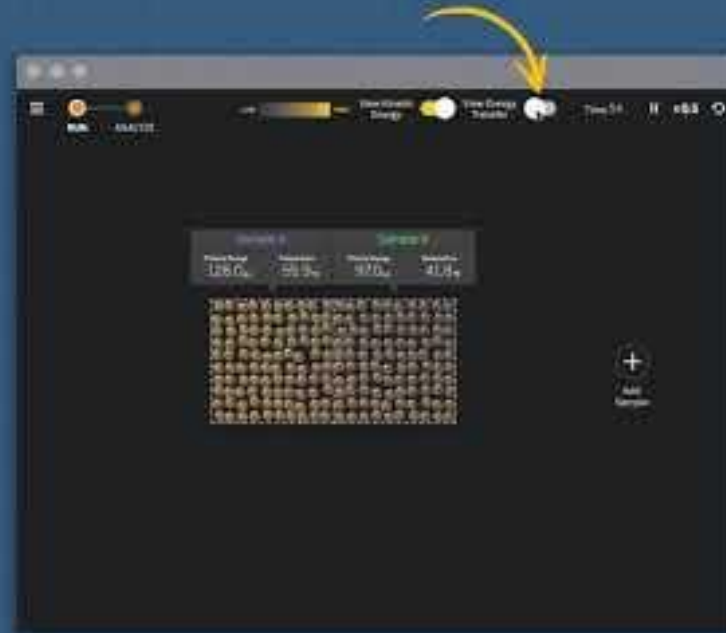
Check with your teacher about how you will access Sims and other digital tools in this @Home Unit.



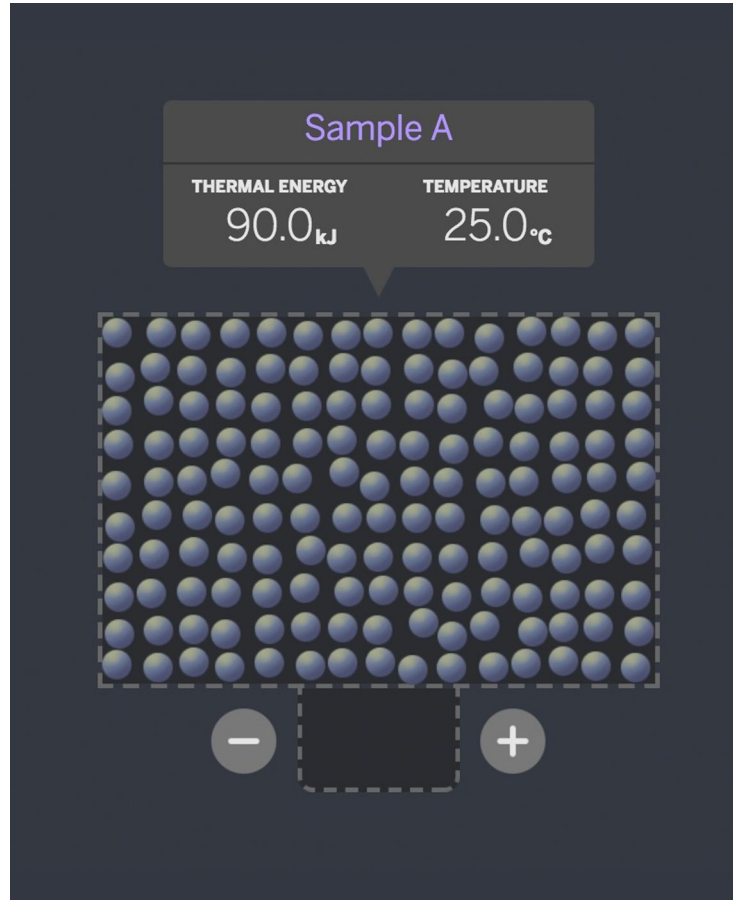
The *Thermal Energy* Sim is a **digital model** that will help us learn about how temperature can change.

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](https://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

**Chapter 1 Question**

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

**Key Concepts**

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

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

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

4. Temperature is a measure of the average speed of the molecules of a thing.

**Vocabulary**

molecule

average

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 parte*

**stability:** when something is stable  
*estabilidad: cuando algo es estable*

**system:** a set of interacting parts  
*sistema: un conjunto de partes interactuantes*

**temperature:** a measure of how hot or cold something is  
*temperatura: una medida de lo caliente o frío que es algo*

**thermal energy:** the total energy of a system  
*energía térmica: la energía total de un sistema*

**transfer:** to move from one place to another  
*transferir: mover de un lugar a otro*

**water heater:** a heating device for water  
*calentador de agua: un dispositivo para calentar agua*

**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*

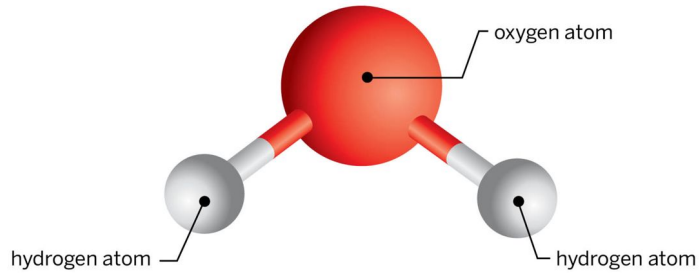
**kinetic energy:** the energy that an object has because it is moving  
*energía cinética: la energía que tiene un objeto porque se está moviendo*

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

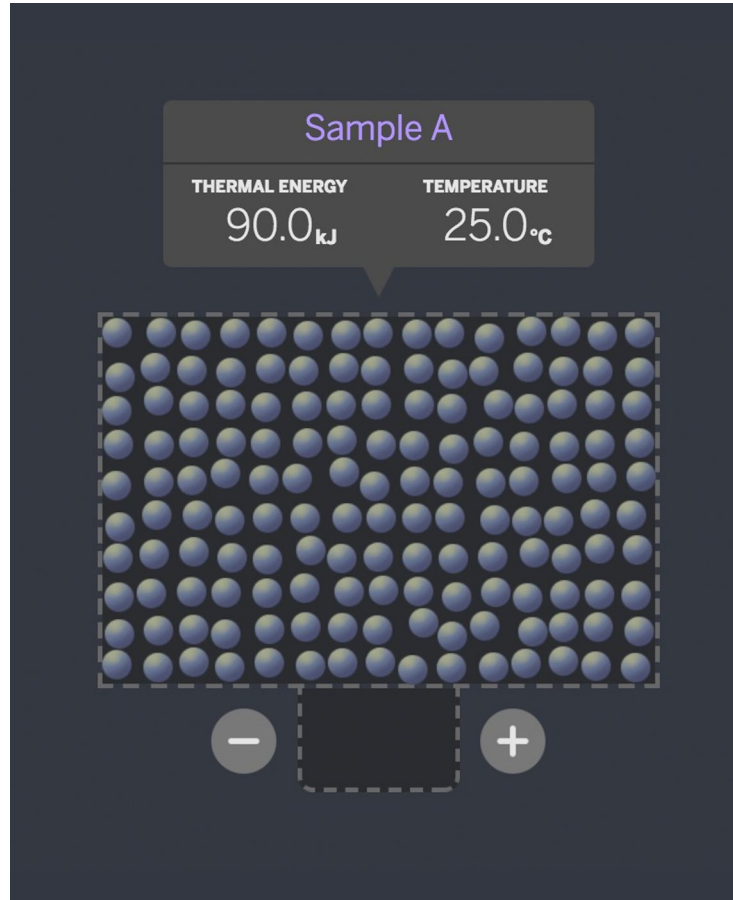
**molecule:** a group of atoms joined together in a particular way  
*molécula: un grupo de átomos unidos de una manera particular*

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.

**water molecule: H<sub>2</sub>O**



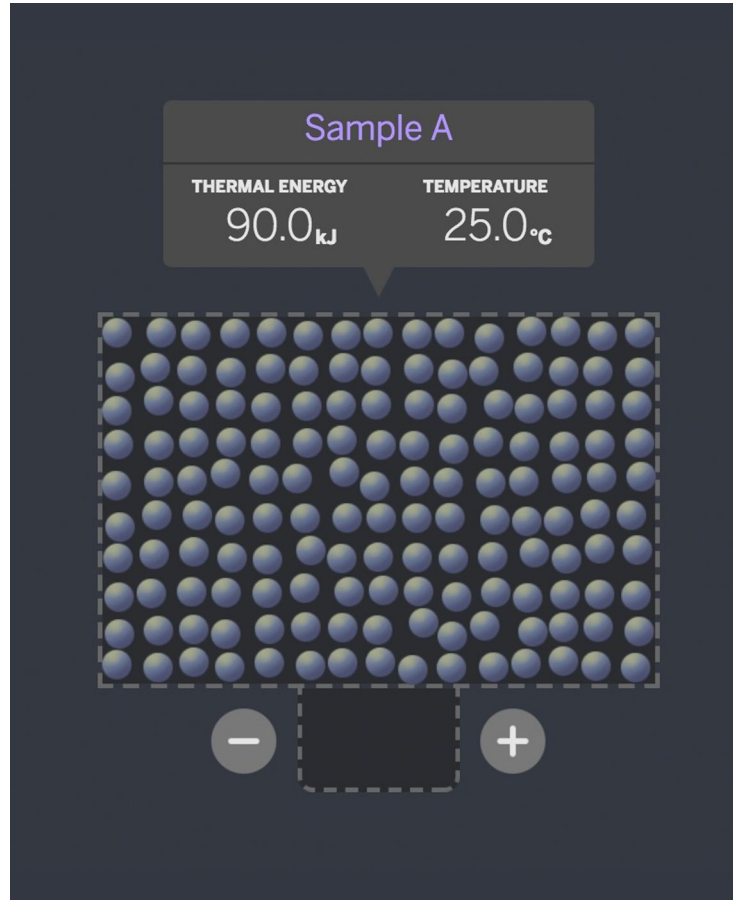
In this unit, we will describe the smaller pieces that make up stuff by using the word **molecule**.



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/AMPTF-04](https://tinyurl.com/AMPTF-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.

---

---

---

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.



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

Amplify.

Published and Distributed by Amplify. [www.amplify.com](http://www.amplify.com)

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.

# 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.





# Reflection: Teaching @Home Lesson 1

How would you teach this lesson?



Day @Home Lesson 1

Minutes for science: 15 min.

Instructional format:

- ☒ Asynchronous
- ☐ Synchronous

Lesson or part of lesson:

Introducing the unit (slides 1-10)

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...

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.

Teacher will...

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
- ☒ 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...

Day @Home Lesson 1

Minutes for science: 15 min.

Instructional format:

- ☒ Asynchronous
- ☐ Synchronous

Lesson or part of lesson:

Introducing the unit (slides 1-10)

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...

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.

Teacher will...

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
- ☒ Synchronous

Lesson or part of lesson:

Observe and Do activities (slides 11-43)

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...

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).

Teacher will...

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

Some Types of Written Work in Amplify Science	
<ul style="list-style-type: none"><li>• Daily written reflections</li><li>• Homework tasks</li><li>• Investigation notebook pages</li><li>• Written explanations (typically at the end of a chapter)</li><li>• Diagrams</li><li>• Recording pages for Sim uses, investigations, etc</li></ul>	

Completing Written Work	Submitting Written Work
<ul style="list-style-type: none"><li>• Plain paper and pencil (videos include prompts)</li></ul>	<ul style="list-style-type: none"><li>• Take a picture with a smartphone and email or teacher-created notebook (model) or materials pick-up button on platform (in the left menu.)</li></ul>

**Differentiation**

Embedded Supports for Diverse Learners

Accessing prior knowledge about thermal energy. This introductory lesson is intended to pique students' interests about the specific content of the unit. It contains opportunities for students to think independently and to discuss their initial thinking with partners. Students will come into this unit with varying experiences and understandings, so providing frequent opportunities for student discussion allows students to learn from one another. Middle school students learn from, and are motivated by, frequent student discussion, and this strategy is especially effective when students have a range of background knowledge. As students share, listen for any alternate conceptions and make a plan for handling these later on step in and intervene on the spot.

Potential Challenges in This Lesson

Group work: cooperation and focus. This lesson requires extensive partner work in which students must discuss and connect their ideas about temperature with a hands-on activity and come to conclusions together. You may want to emphasize partner norms and behavior during today's lesson.

**Digital Resources**

- Classroom Slides 1.2 | PowerPoint
- Classroom Slides 1.2 | Google Slides
- Video: A Tale of Two Heating Systems
- Thermal Energy Investigation Notebook
- Completed Scientific Argumentation Work Diagram
- Printable Thermal Energy Glossary
- Printable Thermal Energy Multi-Language Glossary
- Thermal Energy Glossary
- Thermal Energy Multi-Language Glossary



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.

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.

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.)

### 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

### 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

# Planning Resource

pages 13-14

Day 2: _____		Day 2: _____	
Minutes for science: _____		Minutes for science: _____	
<b>Instructional format:</b> <input type="checkbox"/> Asynchronous <input type="checkbox"/> Synchronous		<b>Instructional format:</b> <input type="checkbox"/> Asynchronous <input type="checkbox"/> Synchronous	
Lesson or part of lesson:		Lesson or part of lesson:	
<b>Mode of instruction:</b> <input type="checkbox"/> Preview <input type="checkbox"/> Review <input type="checkbox"/> Teach full lesson live <input type="checkbox"/> Teach using synchronous suggestions <input type="checkbox"/> Students work independently using: <input type="checkbox"/> @Home Packet <input type="checkbox"/> @Home Slides and @Home Student Sheets <input type="checkbox"/> @Home Videos		<b>Mode of instruction:</b> <input type="checkbox"/> Preview <input type="checkbox"/> Review <input type="checkbox"/> Teach full lesson live <input type="checkbox"/> Teach using synchronous suggestions <input type="checkbox"/> Students work independently using: <input type="checkbox"/> @Home Packet <input type="checkbox"/> @Home Slides and @Home Student Sheets <input type="checkbox"/> @Home Videos	
Students will...	Teacher will...	Students will...	Teacher will...

Types of Written Work in Amplify Science	
ten reflections rk tasks ion notebook pages explanations (typically at the end of Chapter) g pages for Sim uses, investigations, etc	
Written Work	Submitting Written Work
r and pencil lude prompts ent platform on Notebook leo or audio file vering prompt eated digital oogle y, etc)	<ul style="list-style-type: none"> <li>Take a picture with a smartphone and email or text to teacher</li> <li>Through teacher-created digital format</li> <li>During in-school time (hybrid model) or lunch/materials pick-up times</li> <li>(6-8) Hand-in button on student platform</li> </ul>
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**

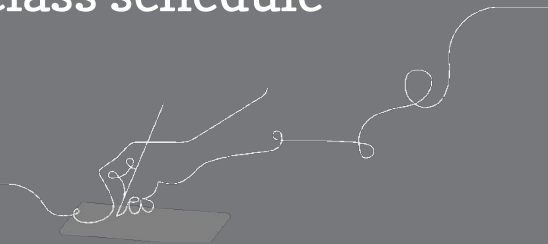




# During this workshop did we meet our objectives?

- 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?

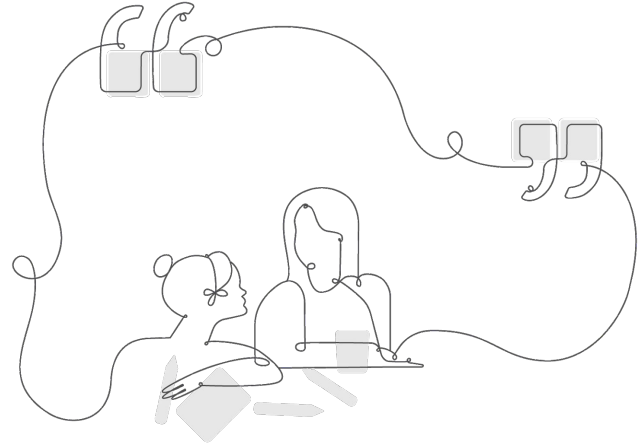
e



# 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

The image shows a composite of three overlapping screenshots of the Amplify Science Program Hub website. The leftmost screenshot shows the user interface with a hamburger menu icon circled in red. Below the menu, there are links for 'Hello Teacher Considine', 'Log Out', and 'Go To My Account'. A 'Classroom Language Settings' button is also visible. A grid of icons includes 'LA Science Program Guide', 'Program Hub' (highlighted with a red arrow), 'Science Program Guide', 'FLORIDA EDITION Standards Map', and 'Help'. The middle screenshot shows a 'Microbiome' unit page with '11 Lessons' and a 'FUTURA FOOD ENGINEERING' logo. The rightmost screenshot shows the 'Welcome Science Educators!' page with a red arrow pointing to the 'Remote and hybrid learning resources' section.

**AmplifyScience**

## Welcome Science Educators!

The Amplify Science Program Hub was created to provide you with resources, tools, and advice for all stages of your implementation.

### Remote and hybrid learning resources

Amplify Science@Home makes remote and hybrid learning easier.

### Professional Learning Resources

Let's get started!

### Additional Unit Materials

Additional resources to complement the units you're teaching.

© 2020 Amplify Education, Inc.  
<https://www.amplify.com/floridastandards>

# 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](https://bit.ly/BTSwebinars)**

# Additional Amplify resources

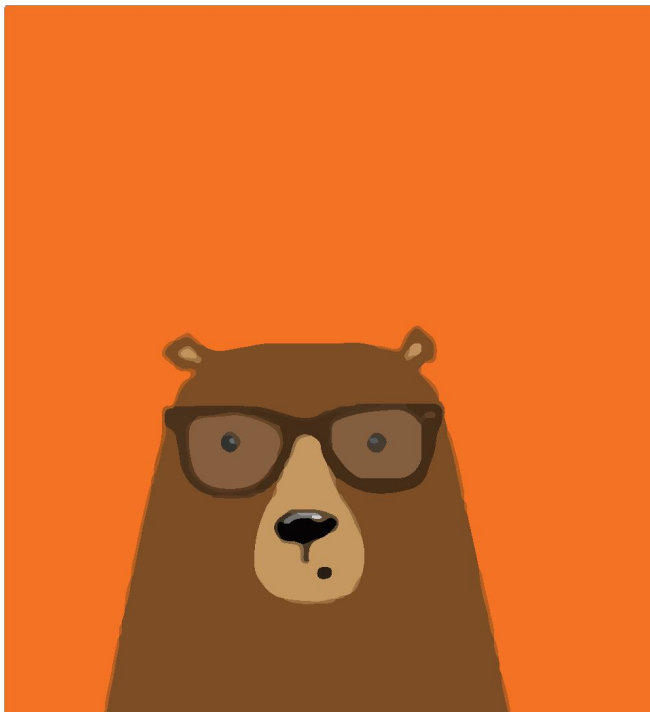


## Caregivers site

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

**[amplify.com/amplify-science-family-resource-intro/](https://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](http://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:

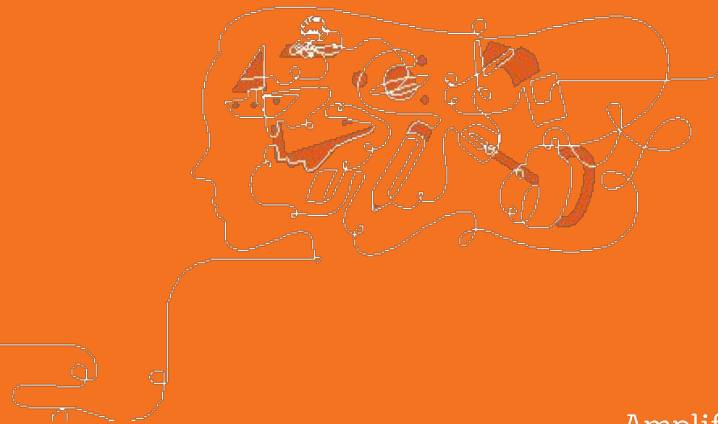
- Identify yourself as an Amplify Science user.
- Note the unit you are teaching.
- Note the type of device you are using (Chromebook, iPad, Windows, laptop).
- Note the web browser you are using (Chrome or Safari).
- Include a screenshot of the problem, if possible.
- Copy your district or site IT contact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