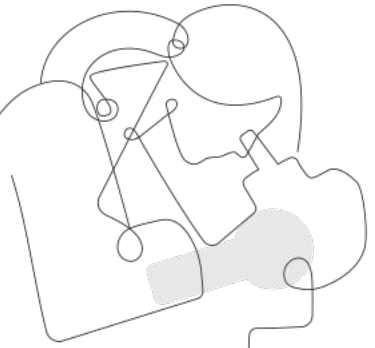
Do Now: *Use the link in the chat to add your best remote learning tips and tricks for teaching Amplify Science to the Jamboard.*

Amplify Science

Unit Internalization & Guided Planning

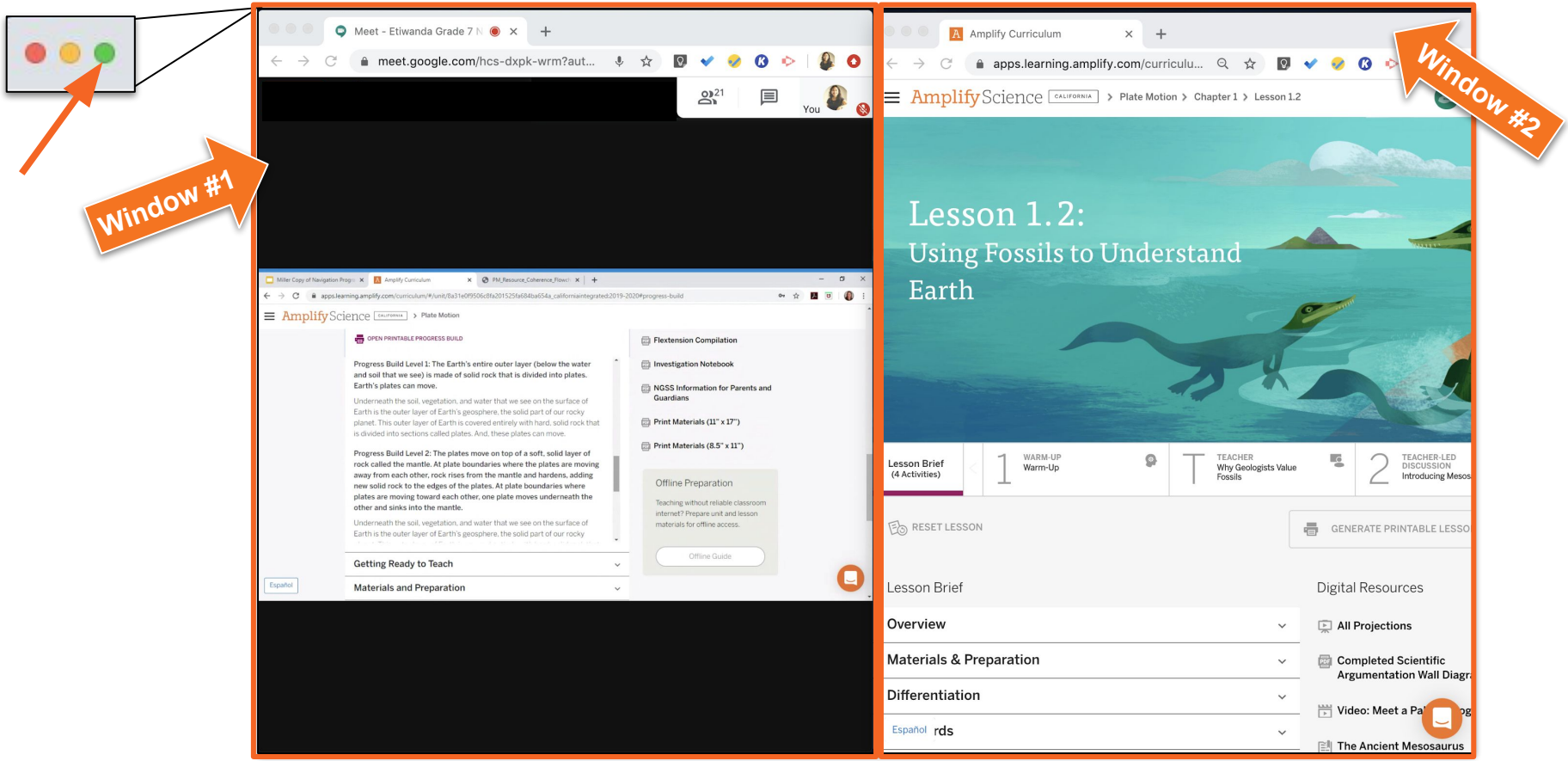
Deep-dive and strengthening workshop
Grade 7, Phase Change



LAUSD
3/6/2021
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

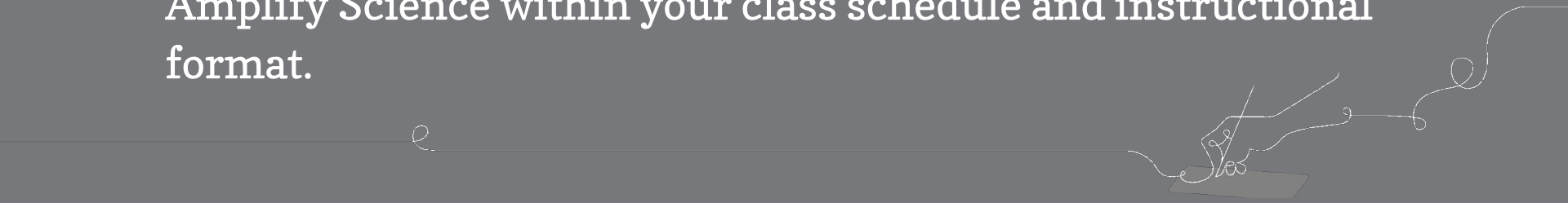
- Make sure you have a note-catcher present

- 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**
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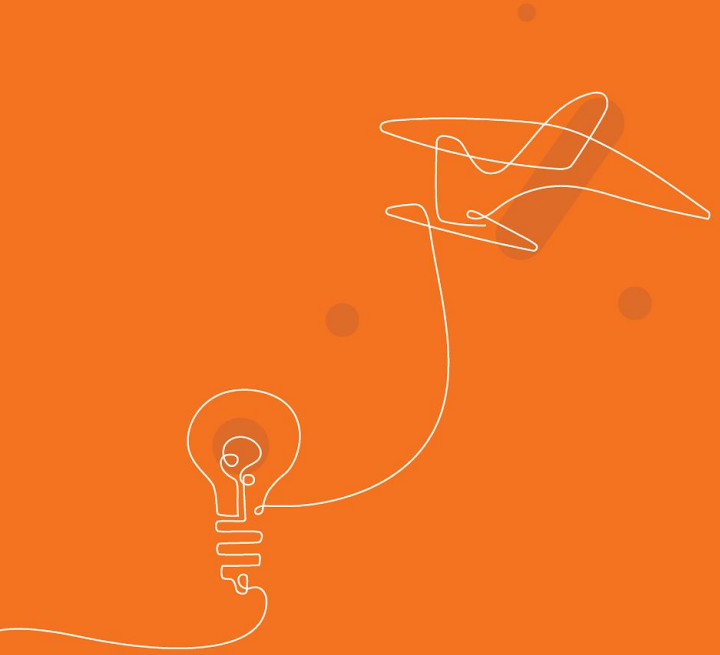
- Planning to teach
  - Collecting evidence of student learning to meet diverse learner needs
- Reflection and closing



Amplify Science Refresher

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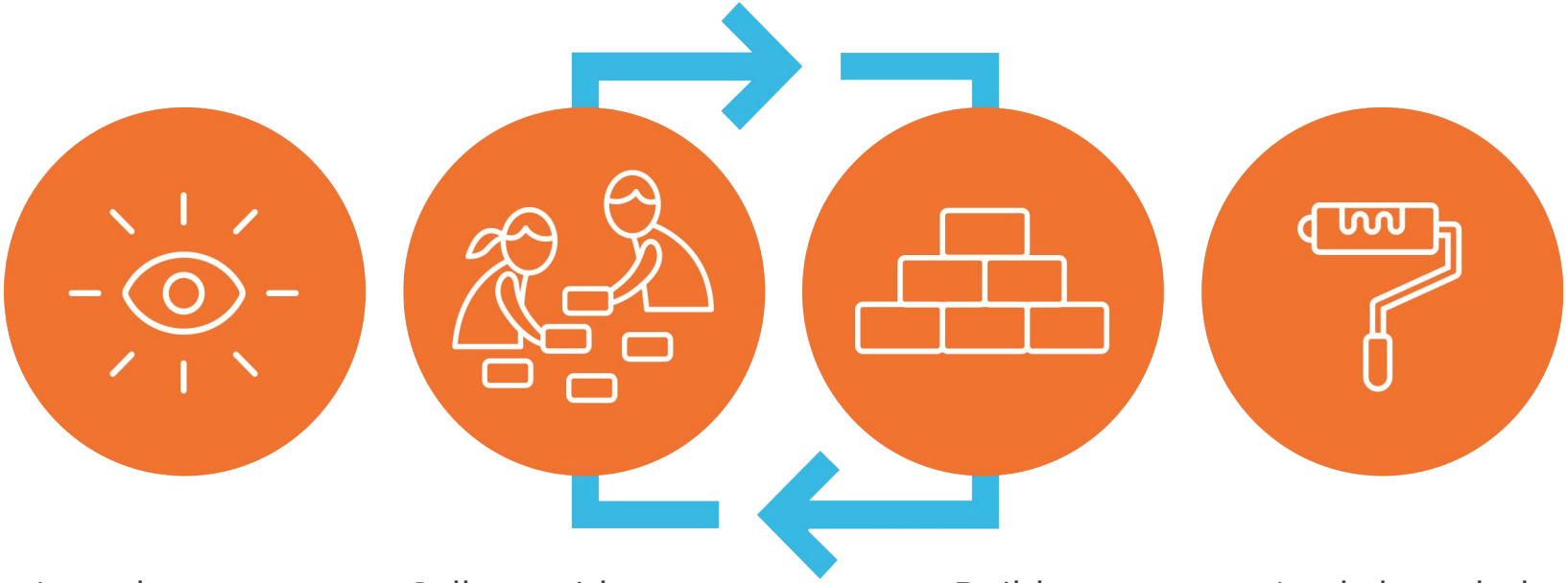
Amplify Science Instructional Approach

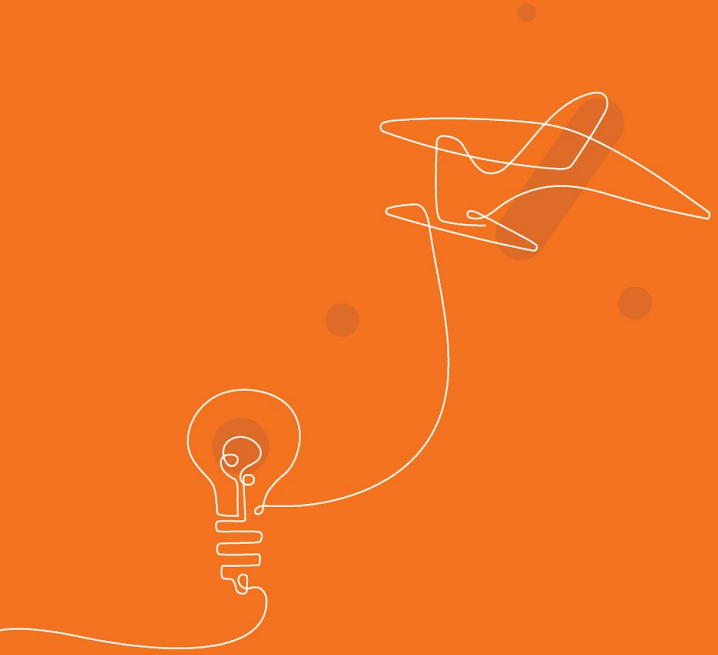


Introduce a phenomenon and a related problem

Collect evidence from multiple sources

Build increasingly complex explanations

Apply knowledge to solve a different problem



Instructional Materials

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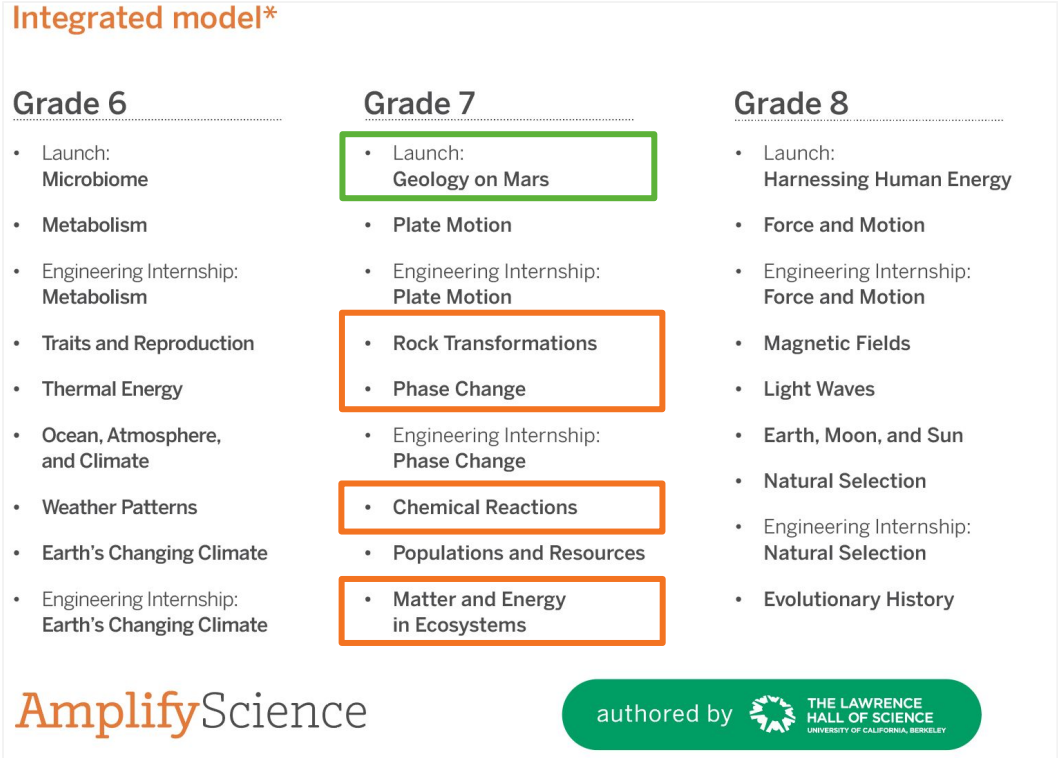
Middle school course curriculum structure



These are the prioritized units for 7th grade.

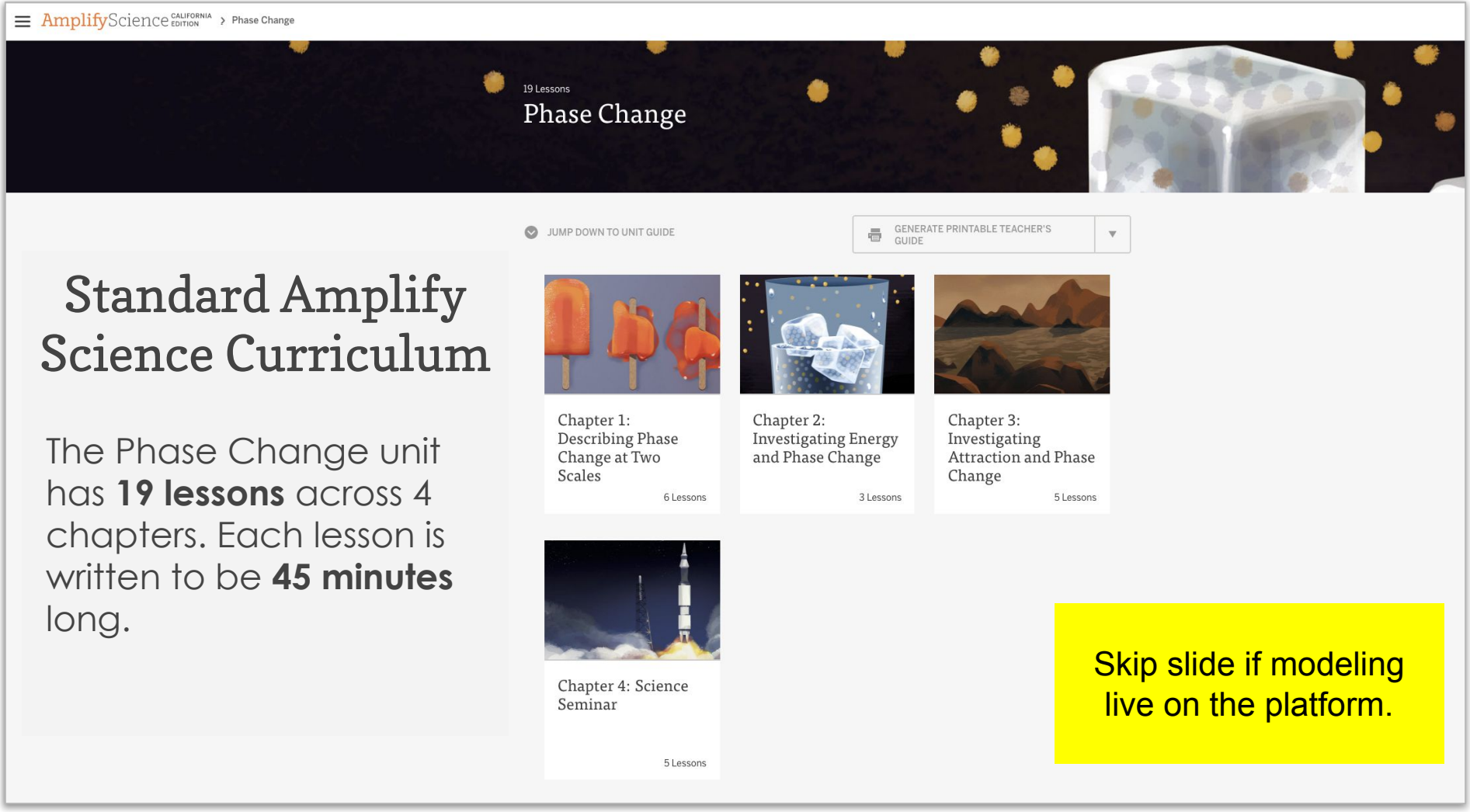
Launch units

- First unit
- 11 lessons

Core units

- Majority of units
- 19 lessons

Standard Amplify Science Curriculum



Standard Amplify Science Curriculum

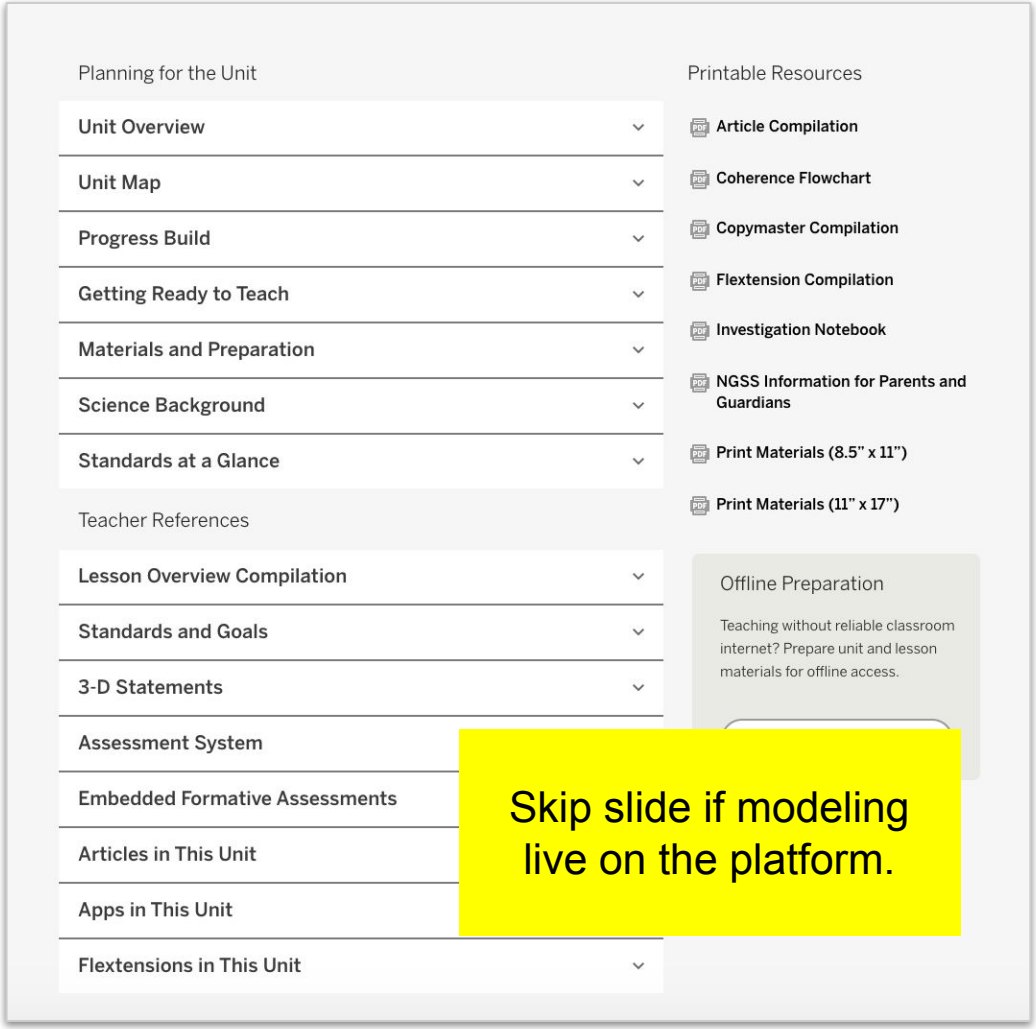
The Phase Change unit has **19 lessons** across 4 chapters. Each lesson is written to be **45 minutes** long.

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.

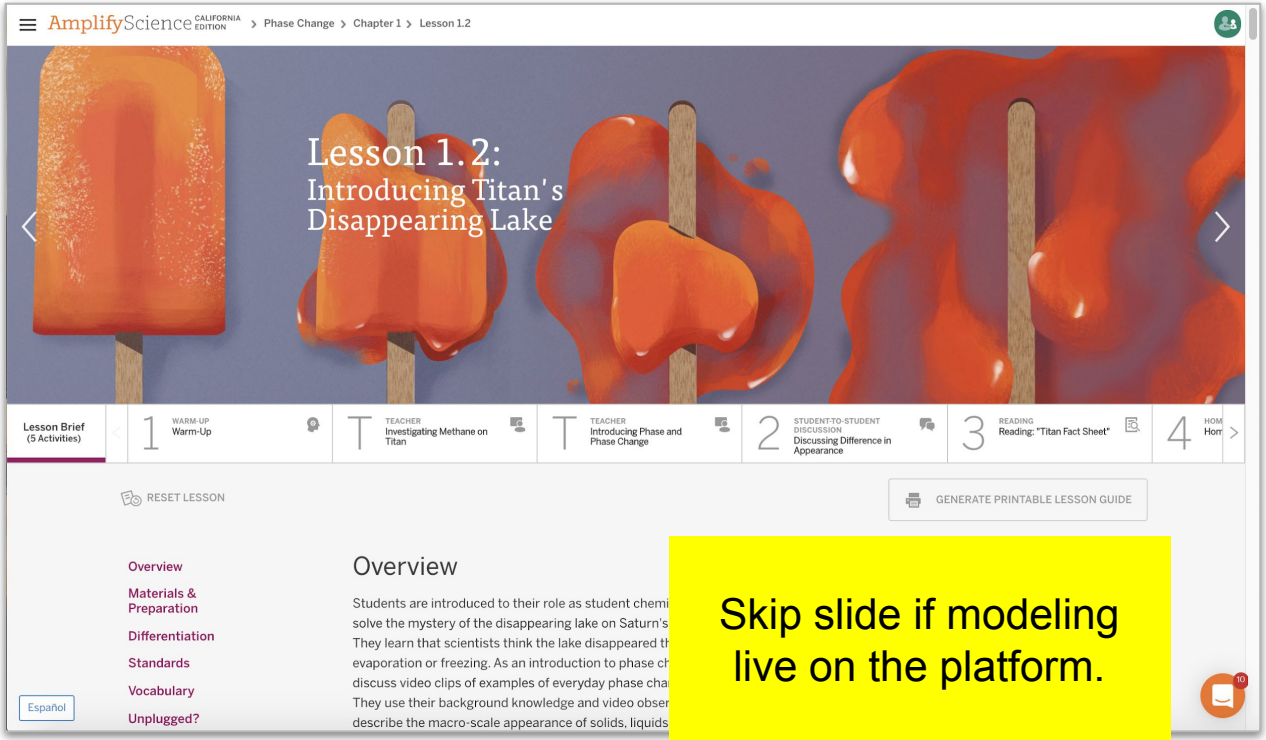
We will be using many of these in today's workshop.



Standard Amplify Science Curriculum

When you click into a lesson, 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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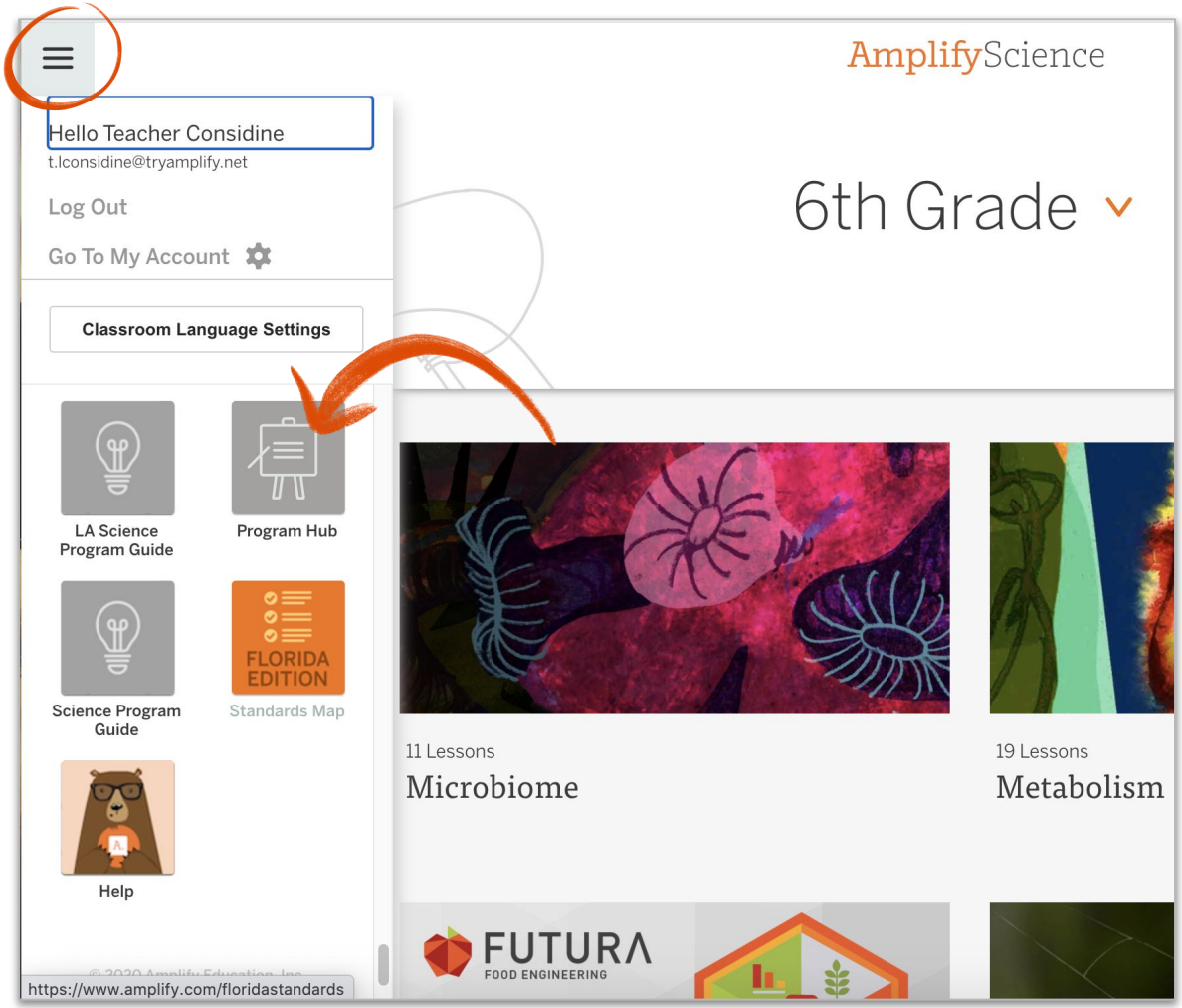
Amplify Science @Home Curriculum

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

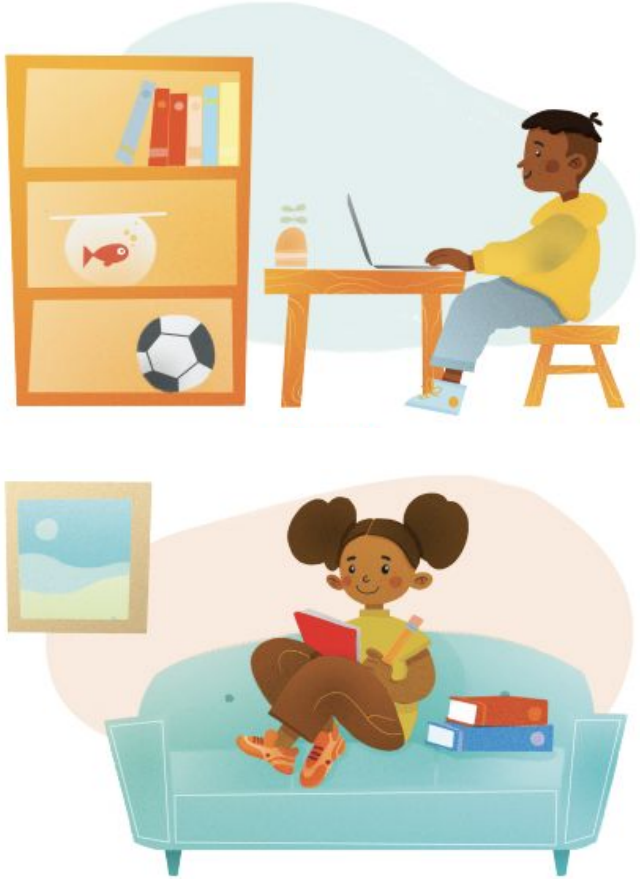
Two different options:

@Home Units

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

@Home Videos

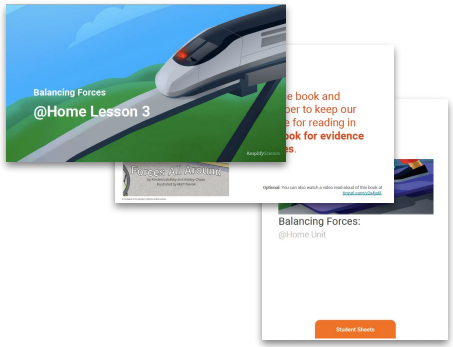
- Video playlists of Amplify Science lessons, taught by real Amplify Science teachers



@Home Units

A shift in approach to respond to user feedback

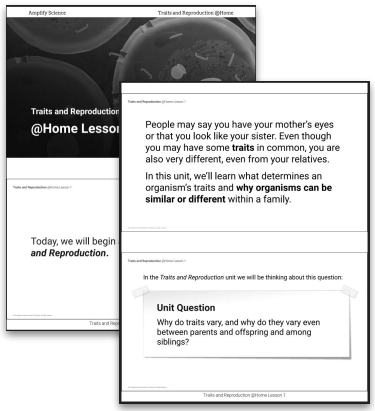
Original approach: two different resources

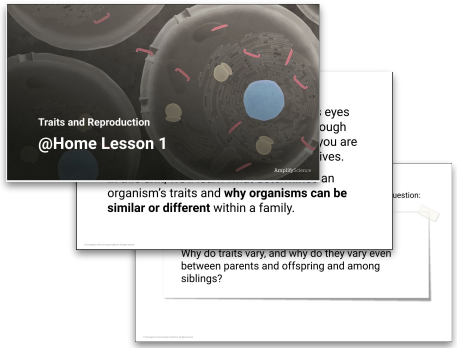


Print-based: @Home packets

Digital: @Home slides and student sheets

Updated approach: one resource, two formats





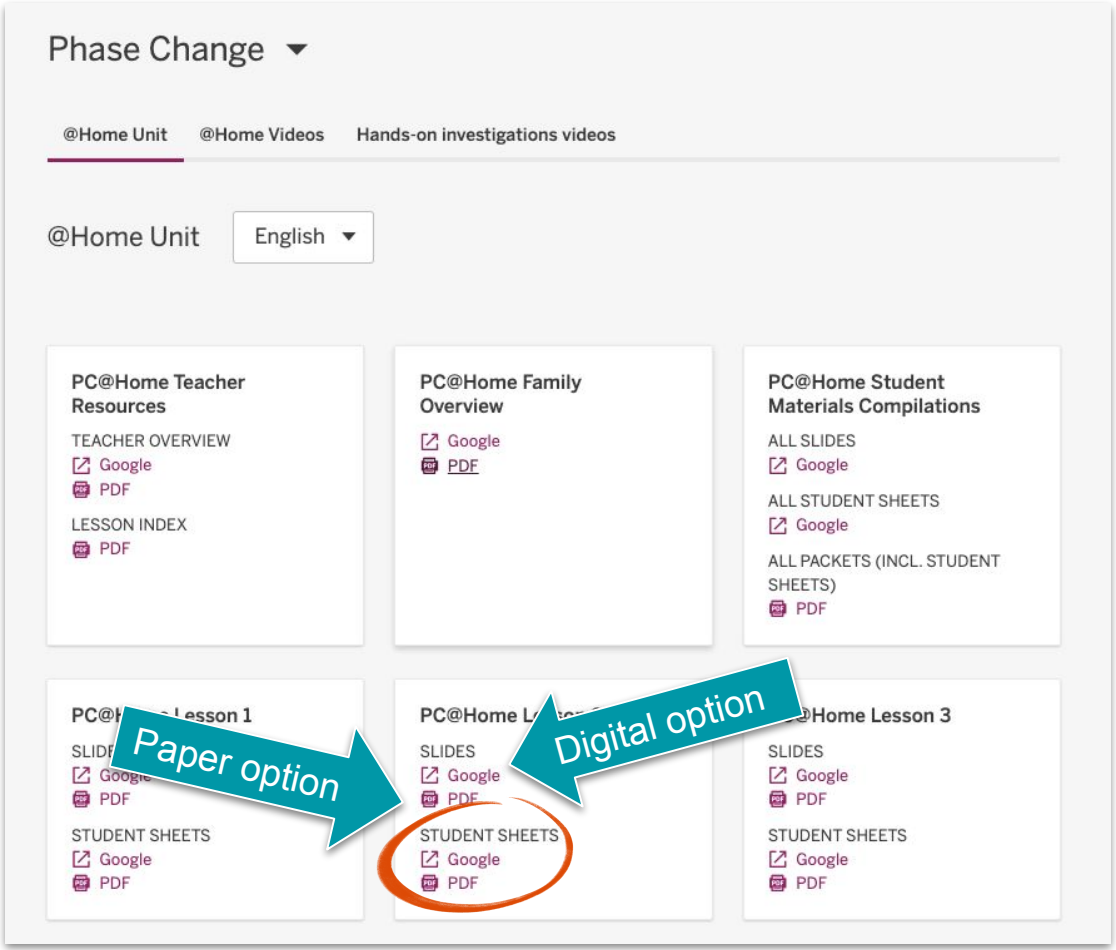
Print-based: PDFs of @Home Slides and student sheets

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

Amplify Science @Home Curriculum

You have access to the Phase Change @Home Unit.

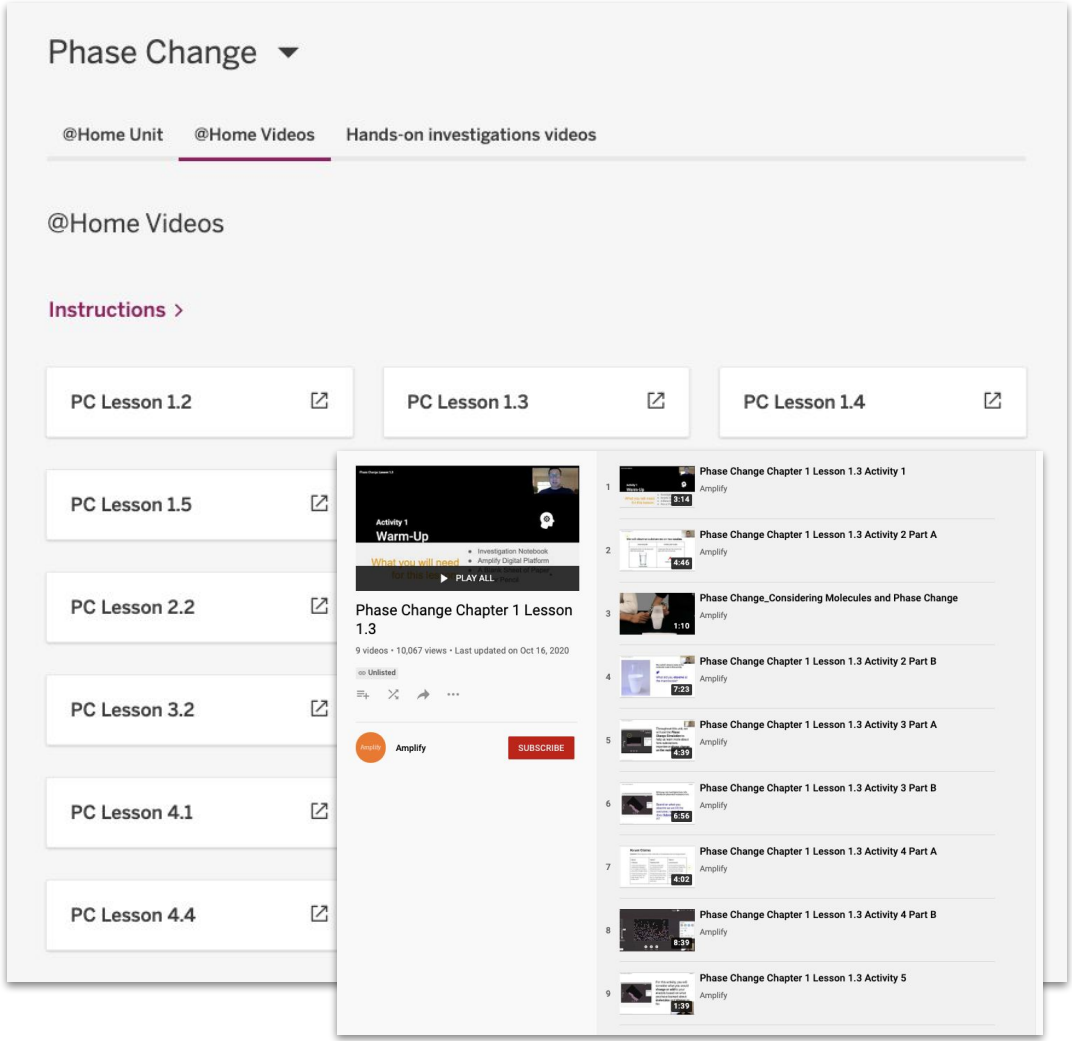
The Phase Change @Home Unit has **14 lessons.** Each lesson is written to be **30 minutes** long.

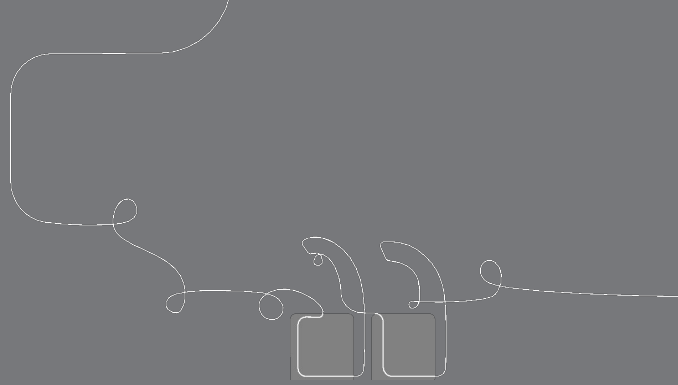


Amplify Science @Home Curriculum

You have access to the Phase Change @Home Videos.

There are 16 @Home Videos for the Phase Change unit. This covers all lessons expect for the assessment lessons (1.1, 3.4, and 4.5). The video playlists on YouTube teach the standard Amplify Science Lessons.





Questions?

Plan for the day

- Framing the day
  - Welcome
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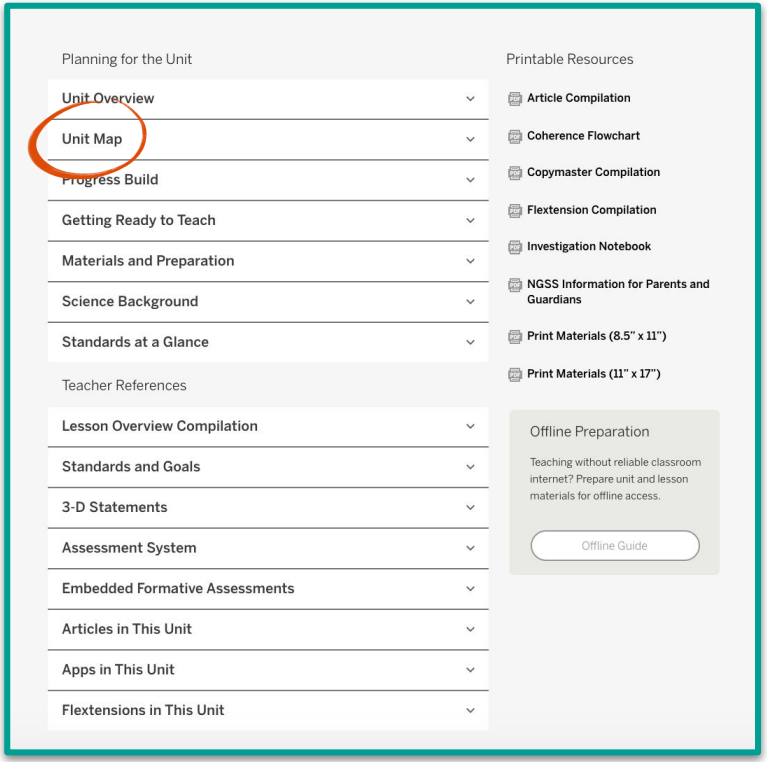
Unit Guide Resources



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 Next Generation Science Standards (NGSS) (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

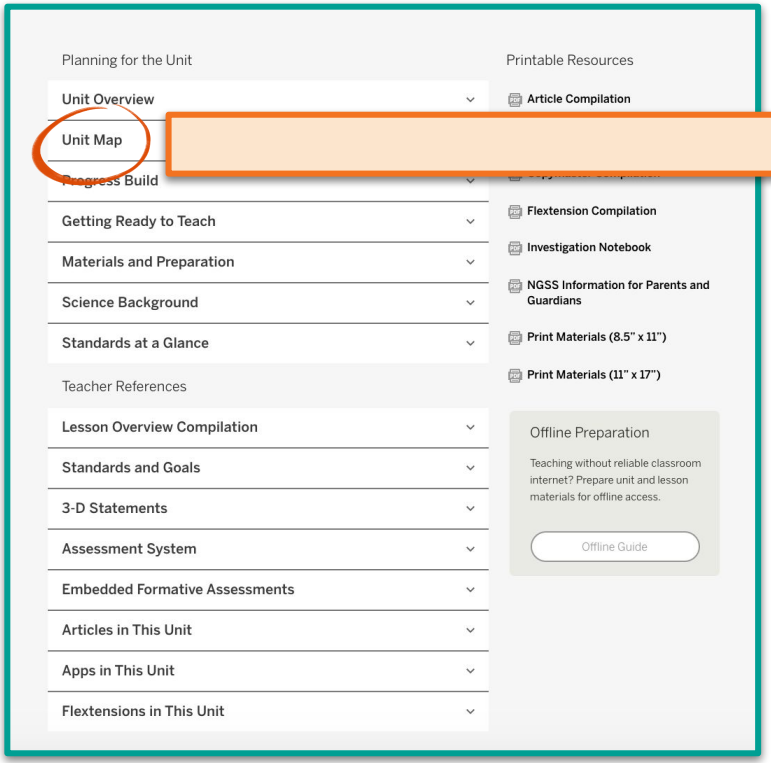
Lesson Overview Compilation	Lesson Overview of each lesson in the unit, including lesson summary, activity purposes, and timing
Standards and Goals	Lists NGSS (Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts) and CCSS (English Language Arts and Mathematics) in the 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
Books 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 2-5)

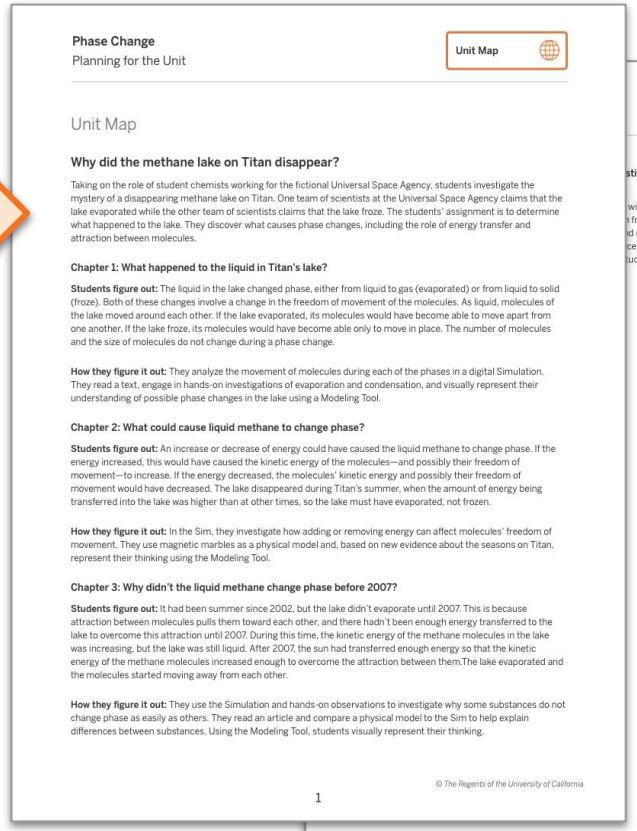
Printable resources

Copymaster Compilation	Compilation of all copymasters for the teacher to print and copy throughout the unit
Investigation Notebook	Digital version of the Investigation Notebook, for copying and projecting
Multi-Language Glossary	Glossary of unit vocabulary in multiple languages
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 Unit Question, Chapter Questions, and Key Concepts provided in the kit

Unit Map

Pages 2-3





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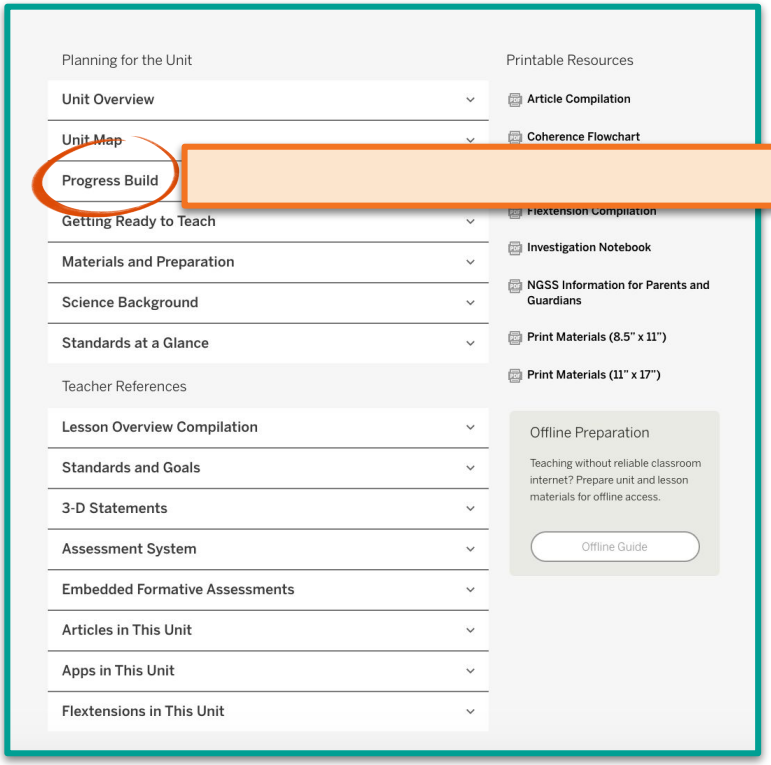
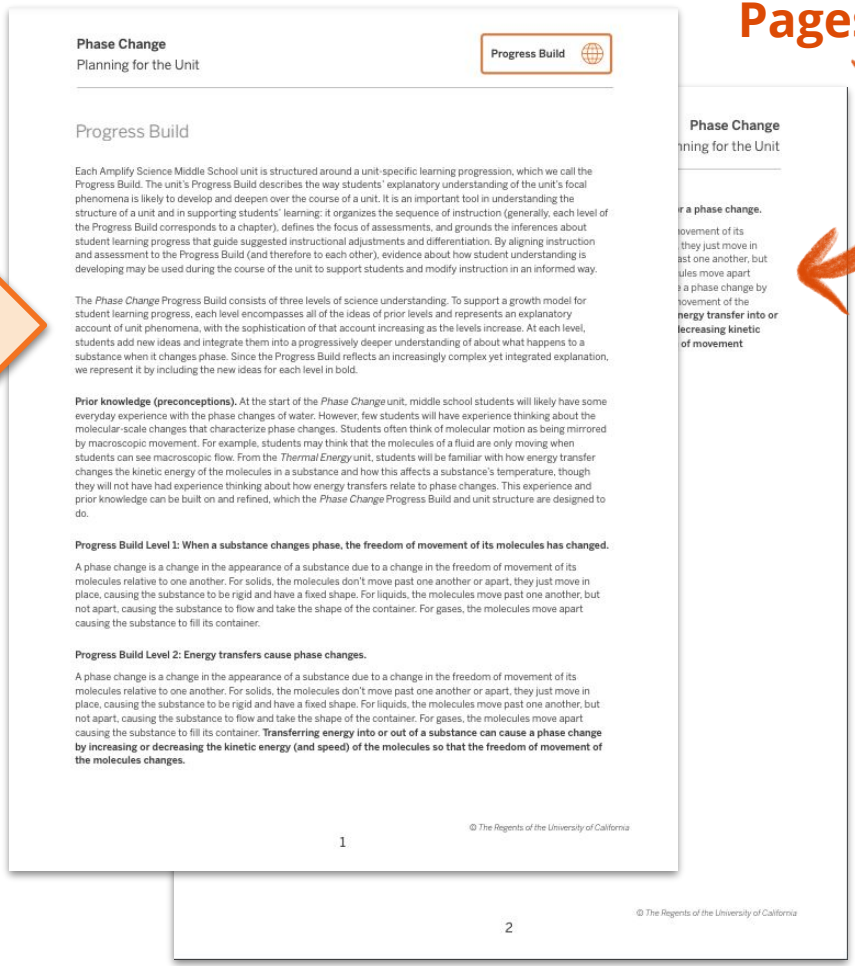
Progress Build

Pages 4-5





Phase Change
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 *Phase Change* 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 about what happens to a substance when it changes phase. 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 *Phase Change* unit, middle school students will likely have some everyday experience with the phase changes of water. However, few students will have experience thinking about the molecular-scale changes that characterize phase changes. Students often think of molecular motion as being mirrored by macroscopic movement. For example, students may think that the molecules of a fluid are only moving when students can see macroscopic flow. From the *Thermal Energy* unit, students will be familiar with how energy transfer changes the kinetic energy of the molecules in a substance and how this affects a substance's temperature, though they will not have had experience thinking about how energy transfers relate to phase changes. This experience and prior knowledge can be built on and refined, which the *Phase Change* Progress Build and unit structure are designed to do.

Progress Build Level 1: When a substance changes phase, the freedom of movement of its molecules has changed.

A phase change is a change in the appearance of a substance due to a change in the freedom of movement of its molecules relative to one another. For solids, the molecules don't move past one another or apart, they just move in place, causing the substance to be rigid and have a fixed shape. For liquids, the molecules move past one another, but not apart, causing the substance to flow and take the shape of the container. For gases, the molecules move apart causing the substance to fill its container.

Progress Build Level 2: Energy transfers cause phase changes.

A phase change is a change in the appearance of a substance due to a change in the freedom of movement of its molecules relative to one another. For solids, the molecules don't move past one another or apart, they just move in place, causing the substance to be rigid and have a fixed shape. For liquids, the molecules move past one another, but not apart, causing the substance to flow and take the shape of the container. For gases, the molecules move apart causing the substance to fill its container. **Transferring energy into or out of a substance can cause a phase change by increasing or decreasing the kinetic energy (and speed) of the molecules so that the freedom of movement of the molecules changes.**

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Unit Internalization Work Time

Guided Unit Internalization

Part 1: Unit-level internalization

Unit title:

What is the phenomenon students are investigating in your unit?

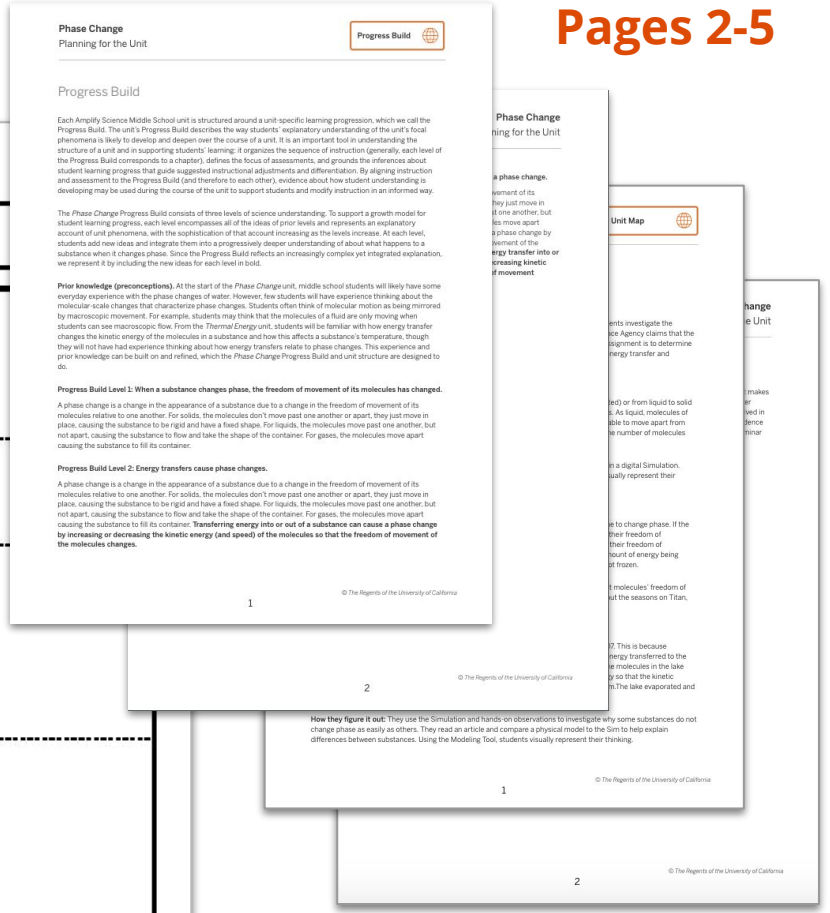
Unit Question:

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



Pages 2-5

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Unit Guide Document

Unit Map

Lesson Overview Compilation

Progress Buld

Guided Unit Internalization

Part 1: Unit-level internalization

Unit title: Phase Change

What is the phenomenon students are investigating in your unit?

Working for the Universal Space Agency, students investigate the mystery of a disappearing methane lake on Titan.

Unit Question:

How can the appearance of a substance change without it becoming a different substance?

Student role:

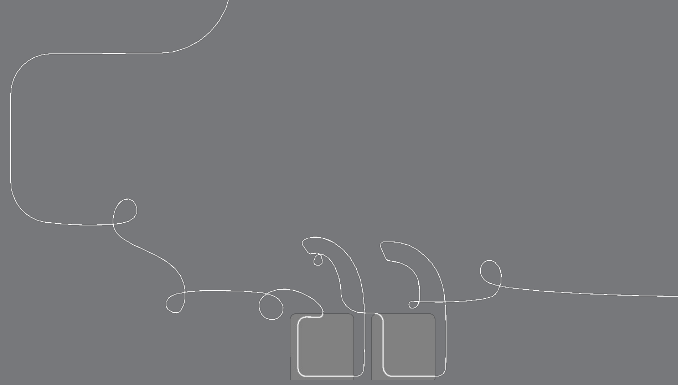
Student chemists

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

It had been summer since 2002, but the lake didn't evaporate until 2007. This is because attraction between molecules pulls them toward each other, and there hadn't been enough energy transferred to the lake to overcome this attraction until 2007. During this time, the kinetic energy of the methane molecules in the lake was increasing, but the lake was still liquid. After 2007, the sun had transferred enough energy so that the kinetic energy of the methane molecules increased enough to overcome the attraction between them. The lake evaporated and the molecules started moving away from each other.

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

When a substance changes phase, the freedom of movement of its molecules has changed. Energy transfers cause phase changes. Molecular attraction affects the amount of energy transfer required for a phase change.



Questions?

Plan for the day

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

Unit Map

Why did the methane lake on Titan disappear?

Taking on the role of student chemists working for the fictional Universal Space Agency, students investigate the mystery of a disappearing methane lake on Titan. One team of scientists at the Universal Space Agency claims that the lake evaporated while the other team of scientists claims that the lake froze. The students' assignment is to determine what happened to the lake. They discover what causes phase changes, including the role of energy transfer and attraction between molecules.

Chapter 1: What happened to the liquid in Titan's lake?

Students figure out: The liquid in the lake changed phase, either from liquid to gas (evaporated) or from liquid to solid (froze). Both of these changes involve a change in the freedom of movement of the molecules. As liquid, molecules of the lake moved around each other. If the lake evaporated, its molecules would have become able to move apart from one another. If the lake froze, its molecules would have become able only to move in place. The number of molecules and the size of molecules do not change during a phase change.

How they figure it out: They analyze the movement of molecules during each of the phases in a digital Simulation. They read a text, engage in hands-on investigations of evaporation and condensation, and visually represent their understanding of possible phase changes in the lake using a Modeling Tool.

Chapter 1: Describing Phase Change at Two Scales

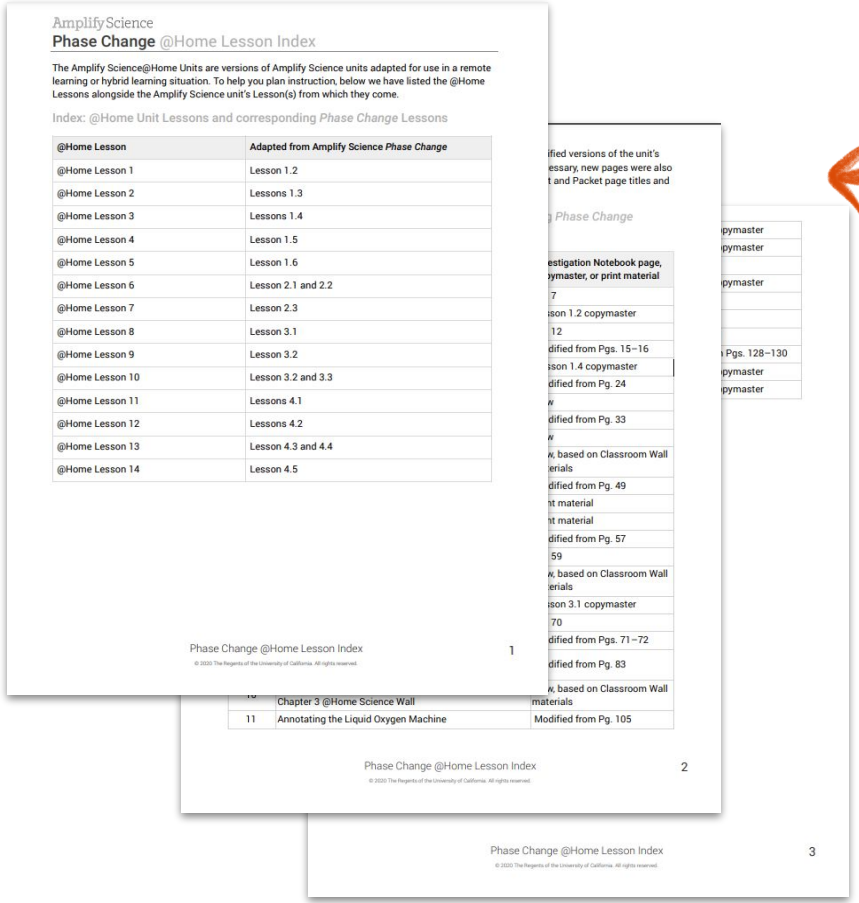
JUMP DOWN TO CHAPTER OVERVIEW

@Home Unit Lesson Index

Pages 8-10

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)



Amplify Science
Phase Change @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 *Phase Change* Lessons

@Home Lesson	Adapted from Amplify Science *Phase Change*
@Home Lesson 1	Lesson 1.2
@Home Lesson 2	Lessons 1.3
@Home Lesson 3	Lessons 1.4
@Home Lesson 4	Lesson 1.5
@Home Lesson 5	Lesson 1.6
@Home Lesson 6	Lesson 2.1 and 2.2
@Home Lesson 7	Lesson 2.3
@Home Lesson 8	Lesson 3.1
@Home Lesson 9	Lesson 3.2
@Home Lesson 10	Lesson 3.2 and 3.3
@Home Lesson 11	Lessons 4.1
@Home Lesson 12	Lessons 4.2
@Home Lesson 13	Lesson 4.3 and 4.4
@Home Lesson 14	Lesson 4.5

Phase Change @Home Lesson Index 1

	Chapter 3 @Home Science Wall	materials
11	Annotating the Liquid Oxygen Machine	Modified from Pg. 105

Phase Change @Home Lesson Index 2

Phase Change @Home Lesson Index 3

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@Home Lesson 1

Adapted from: Amplify Science *Phase Change* Lesson 1.2

Key activities

- **Introducing Titan's Disappearing Lake:** Students are introduced to the unit problem and their role as student chemists.
- **Observe:** Students observe four short videos showing everyday examples of phase change.
- **Read:** A short reading connects students back to the Titan context, providing them with additional background knowledge.

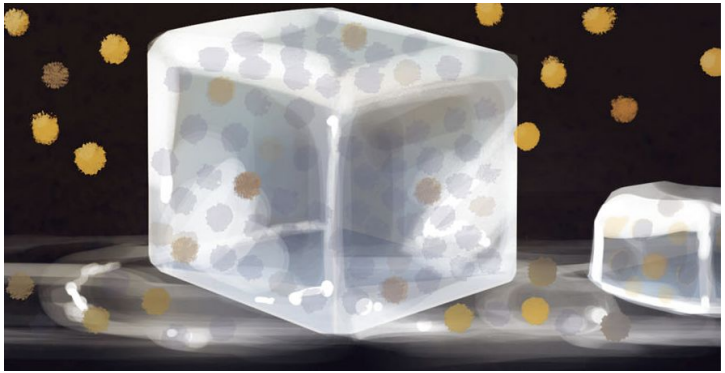
Ideas for synchronous or in-person instruction

While meeting, first introduce the unit, then have student pairs watch and discuss the four phase change videos. If meeting in person, provide the "Titan Fact Sheet" article and have students read and annotate it, then discuss what they read.

Phase Change

@Home Lesson 1

AmplifyScience



Today, we will begin a new unit called ***Phase Change*.**

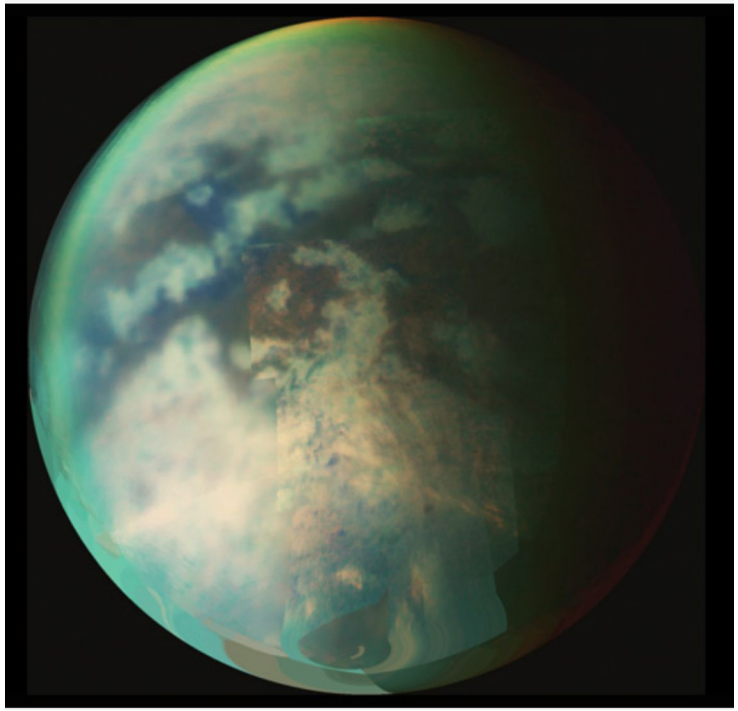
In this unit, you will be working as **student chemists** investigating a mystery on a moon called Titan.

This will be a central question guiding activities and content throughout the unit:

Unit Question

How can the appearance of a substance change without it becoming a different substance?

Earth is the only place in the universe where we have found evidence of **water in all three phases:** liquid water, solid water (or ice), and water vapor (or gas) in the air.



However, NASA recently found evidence that **Titan,** one of Saturn's moons, has lakes and seas on its surface.

We'll watch a video to learn more.

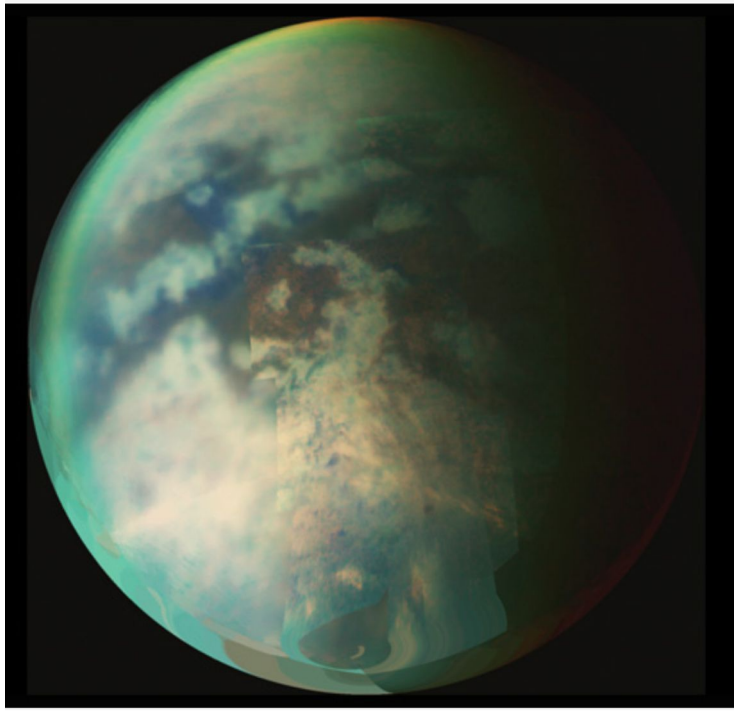
What questions about Titan are Dr. Mike Malaska and Dr. Alexander Hayes trying to answer through their research?

What evidence are they using to answer these questions?

In the video, we'll meet two **real-life scientists** investigating a lake on Titan.

As you watch, **listen for answers** to each of these questions.

Using the print version? Watch the video at tinyurl.com/AMPPC-08



What questions about Titan are the scientists trying to answer?

What evidence are they using to answer these questions?

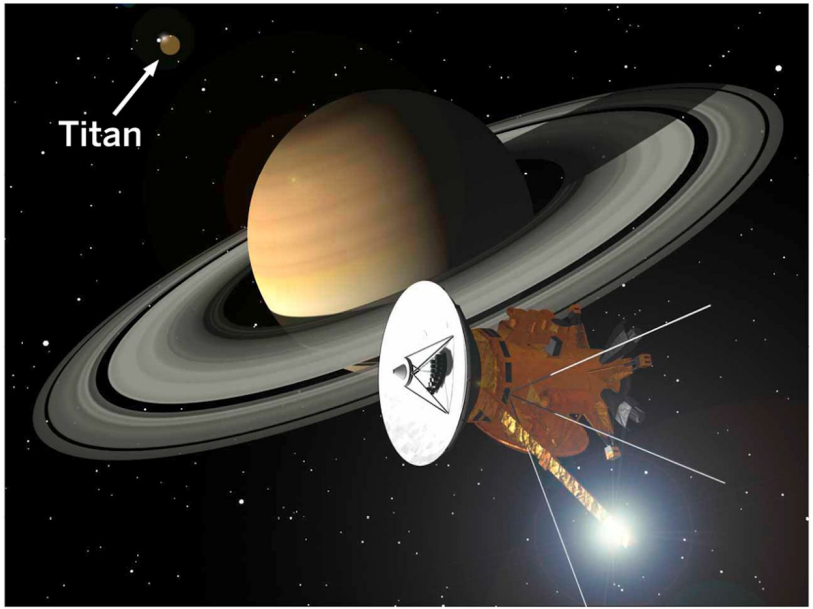
As Dr. Hayes and Dr. Malaska mentioned, there are many lakes on Titan.

In this unit, we are going to focus on **one particularly mysterious lake** made primarily of **methane.**

The methane found on Titan is the subject of much research.

Dr. Flores, a **lead chemist** at the Universal Space Agency, has sent a message with information about the mystery of Titan’s missing lake.

Read her message on the next slide.



To: Student Chemists
From: Dr. Daniela Flores, Lead Chemist at the Universal Space Agency
Subject: Missing Lake on Titan

UNIVERSAL SPACE AGENCY

Dear Student Chemists,

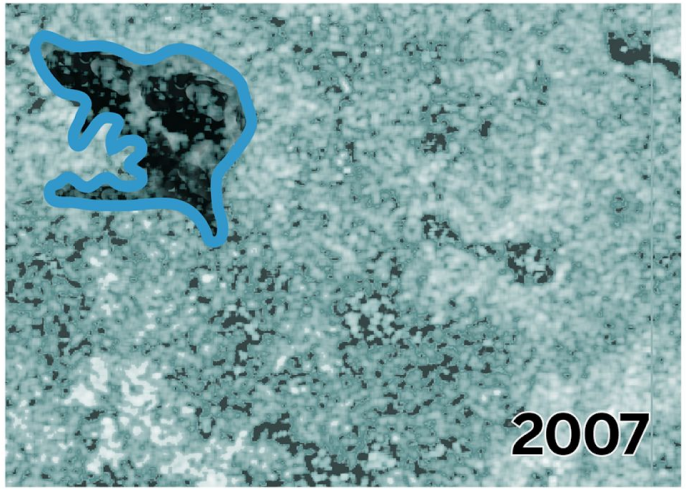
Scientists at the Universal Space Agency are investigating what happened to one of the methane lakes on Titan. The following slides depict the same location at two different times. As you will see, the location looks very different in the two pictures. As student chemists, we ask for your help in determining what happened to this missing lake.

Thanks,
Dr. Flores

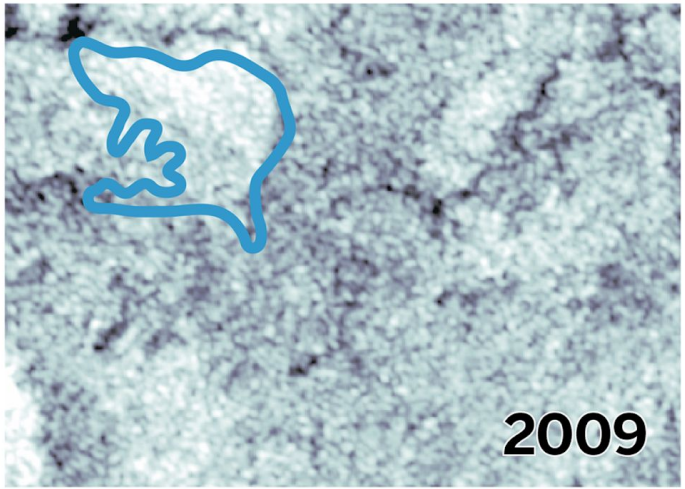
The next slide shows **two photographs** of the lake. These photos were taken **two years apart.**

Read the information on the slide and **carefully examine** each photograph.

What Happened to the Lake?



Scientists note a dark area in photos from a NASA probe in 2007. The area outlined in blue is a liquid lake.



Two years later, the area outlined in blue is now much lighter. What happened to the lake?

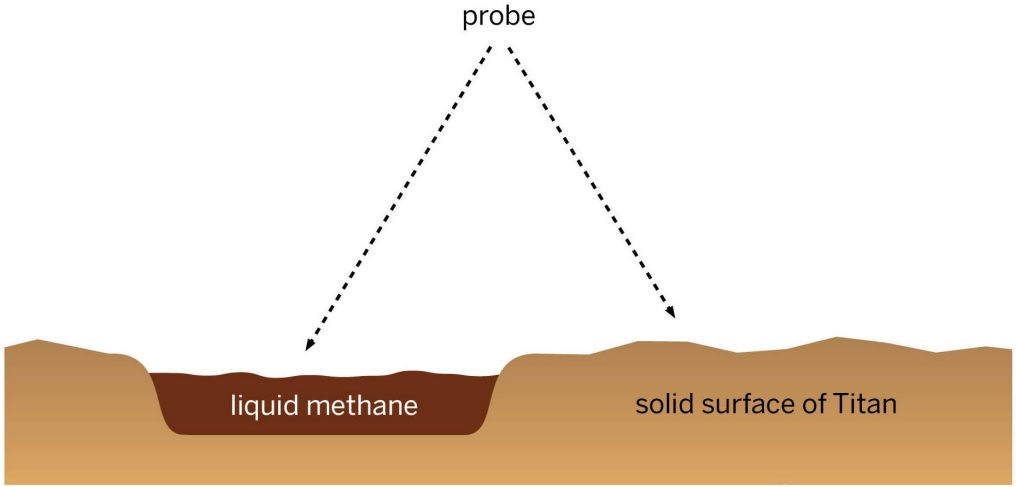
Source: National Aeronautics and Space Administration (NASA)

This question will guide our first few lessons:

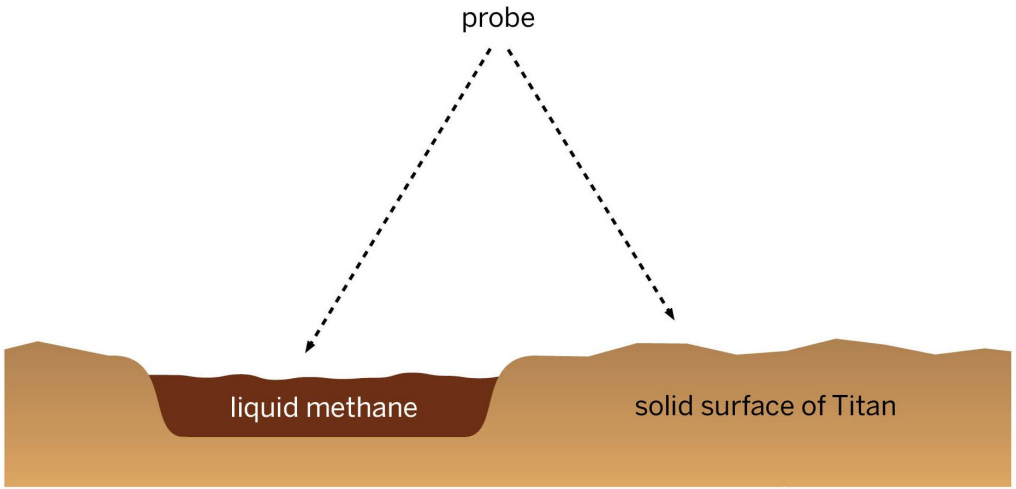
Chapter 1 Question

What happened to the liquid in Titan's lake?

Scientists know the lake was there in 2007 because it was a different color than the surrounding area.



What do you think happened to the lake?



Scientists at the Universal Space Agency have developed **two claims** about what could have happened to the lake.

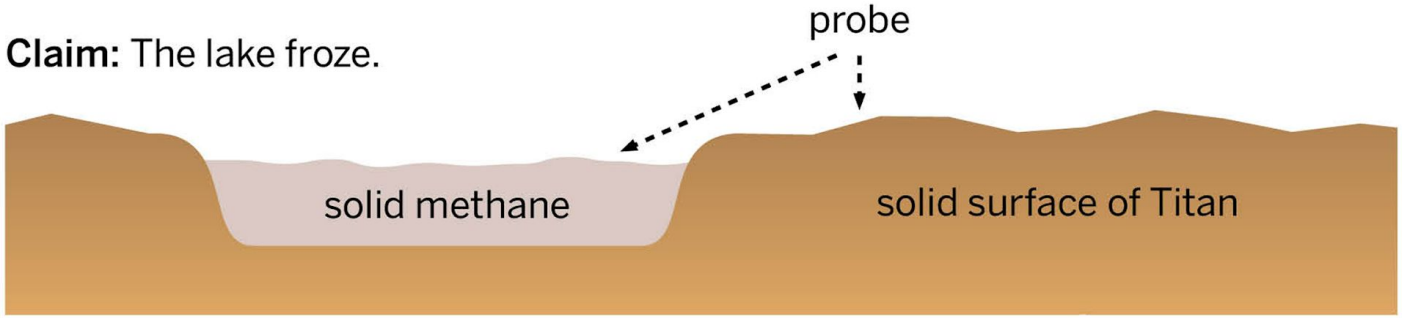
The **diagrams** of these claims on the next slide show what might have happened if the **lake froze or if it evaporated**.

Carefully examine both of these claims.

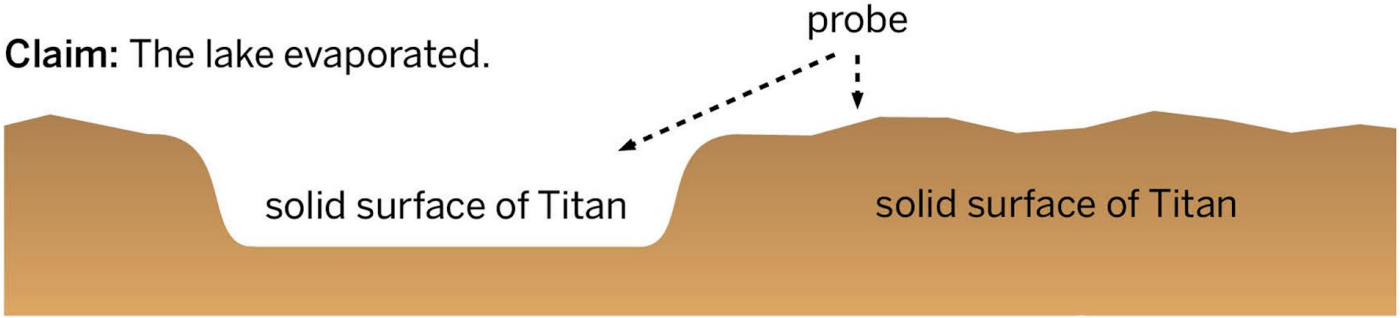
Freezing and Evaporation Claims

The lake area in 2009

Claim: The lake froze.



Claim: The lake evaporated.

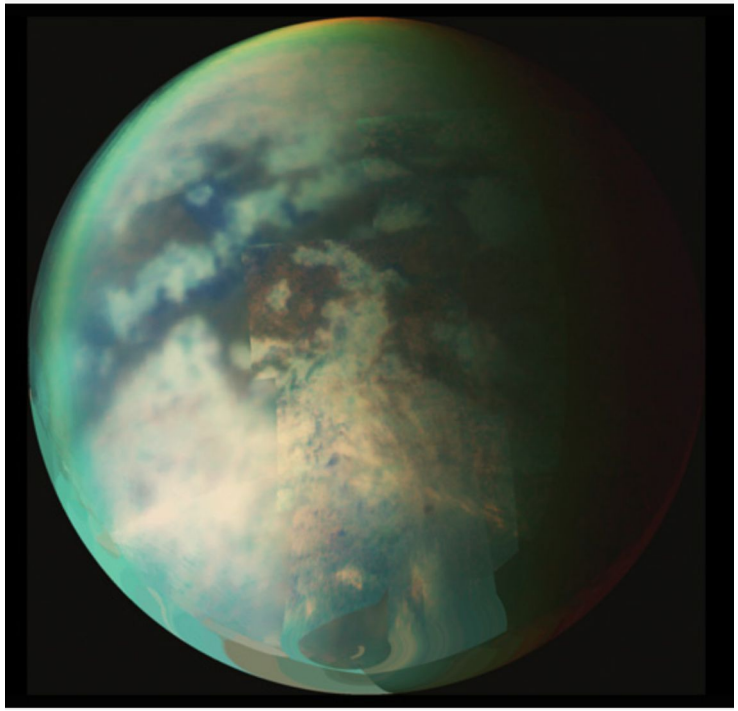


In this unit, you'll use your understanding of chemistry to explain **what happened to the lake on Titan.**

As we read in the message, the two claims for what happened to the lake are both examples of **phase changes:** the methane in the lake either evaporated or froze.

This question will help us figure out if the methane lake on Titan froze or evaporated.

Investigation Question:
How does the appearance of a substance change when it changes phase?



We cannot directly study phase changes on Titan. Instead, we will study **videos of phase changes** on Earth to help us understand what is happening on Titan.

Adapted from: Amplify Science *Phase Change* Lesson 1.2

Key activities

- **Introducing Titan's Disappearing Lake:** Students are introduced to the unit problem and their role as student chemists.
- **Observe:** Students observe four short videos showing everyday examples of phase change.
- **Read:** A short reading connects students back to the Titan context, providing them with additional background knowledge.

Ideas for synchronous or in-person instruction

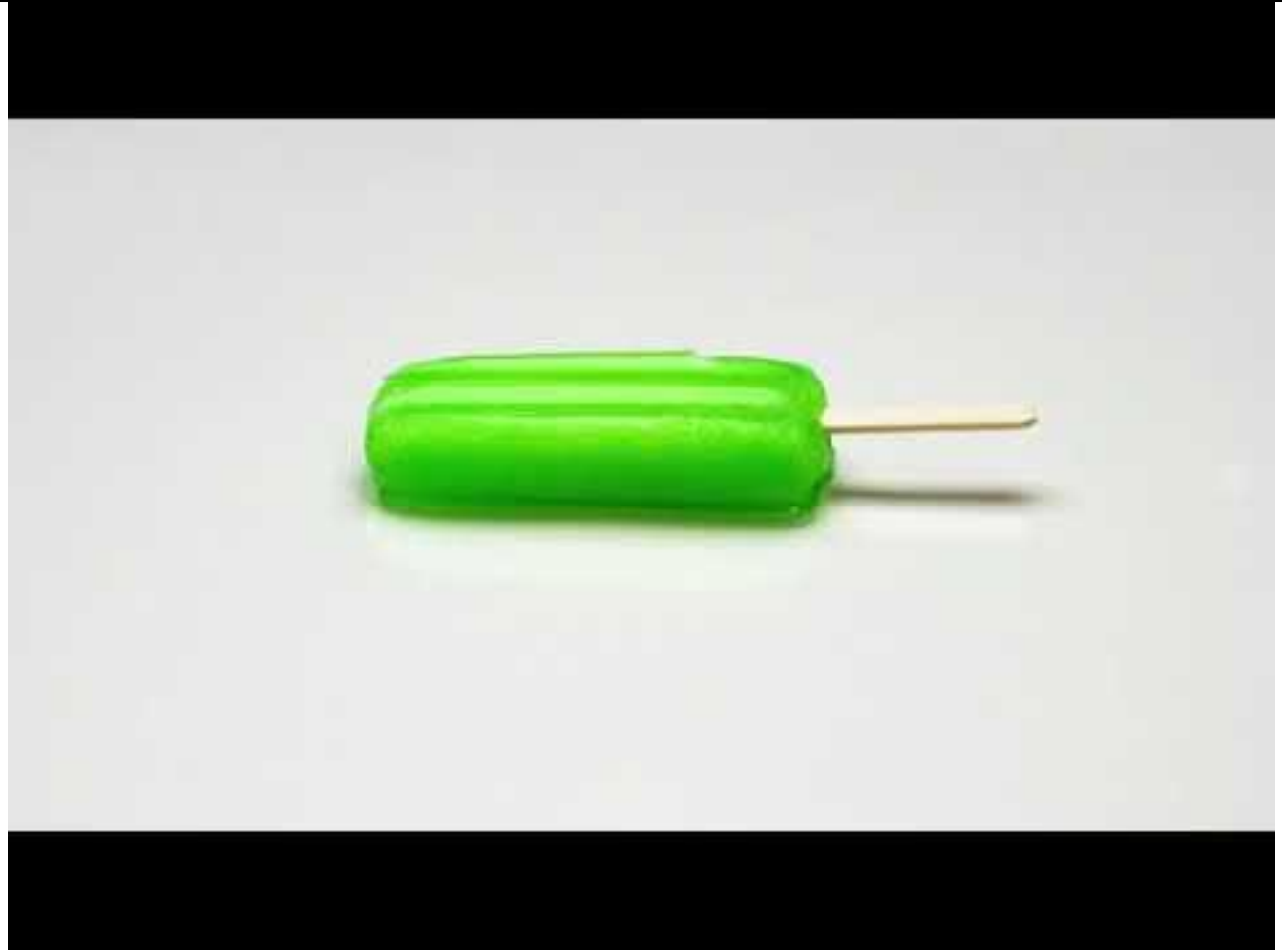
While meeting, first introduce the unit, then have student pairs watch and discuss the four phase change videos. If meeting in person, provide the "Titan Fact Sheet" article and have students read and annotate it, then discuss what they read.

Next, you will watch **four videos** showing everyday examples of phase changes on Earth to better understand how the appearance of a substance changes when it changes phase.

You will watch each video independently, and you should watch each video twice.

Using the print version? Watch the video at **tinyurl.com/AMPPC-09**

Using the print version? Watch the video at **tinyurl.com/AMPPC-11**



Using the print version? Watch the video at **tinyurl.com/AMPPC-12**

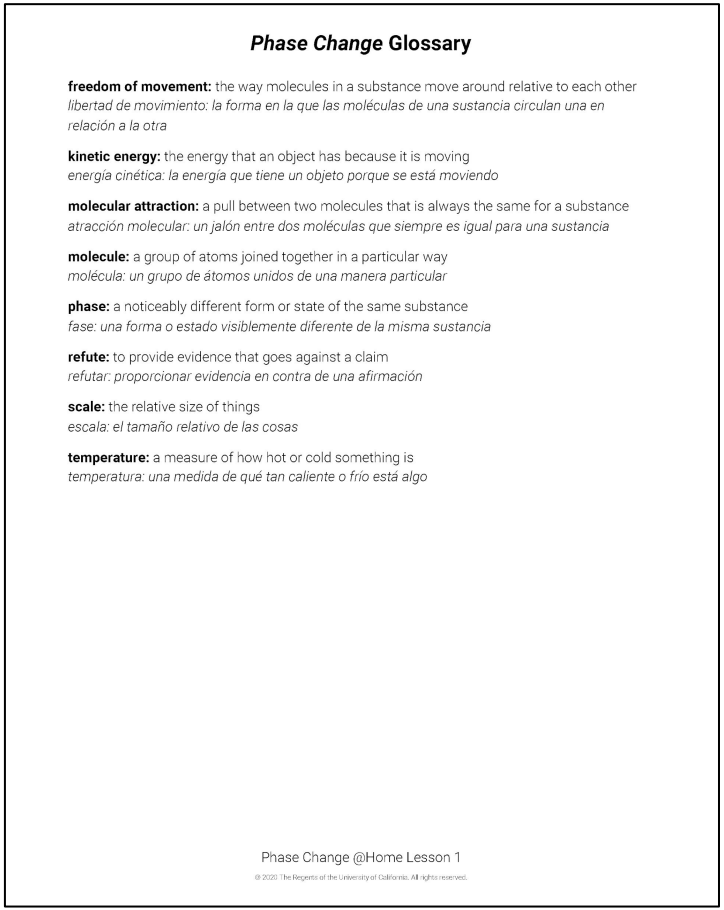
Using the print version? Watch the video at **tinyurl.com/AMPPC-13**

Here is an important word for the *Phase Change* unit, along with its definition:

phase

a noticeably different form or state of the same substance

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.



***Phase Change* Glossary**

freedom of movement: the way molecules in a substance move around relative to each other
libertad de movimiento: la forma en la que las moléculas de una sustancia circulan una en relación a la otra

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

molecular attraction: a pull between two molecules that is always the same for a substance
atracción molecular: un jalón entre dos moléculas que siempre es igual para una sustancia

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

phase: a noticeably different form or state of the same substance
fase: una forma o estado visiblemente diferente de la misma sustancia

refute: to provide evidence that goes against a claim
refutar: proporcionar evidencia en contra de una afirmación

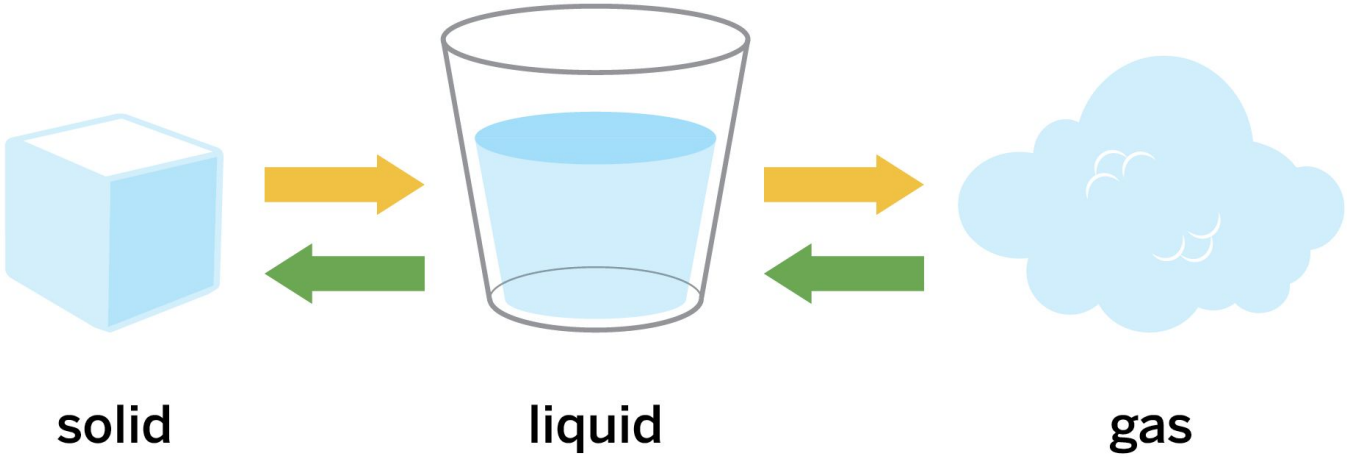
scale: the relative size of things
escala: el tamaño relativo de las cosas

temperature: a measure of how hot or cold something is
temperatura: una medida de qué tan caliente o frío está algo

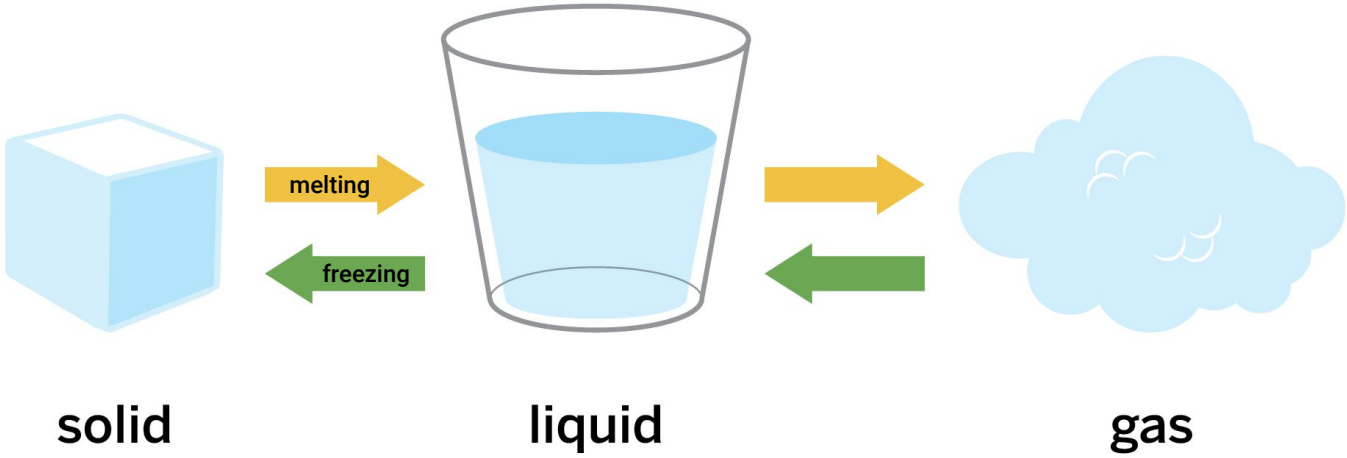
Phase Change @Home Lesson 1

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

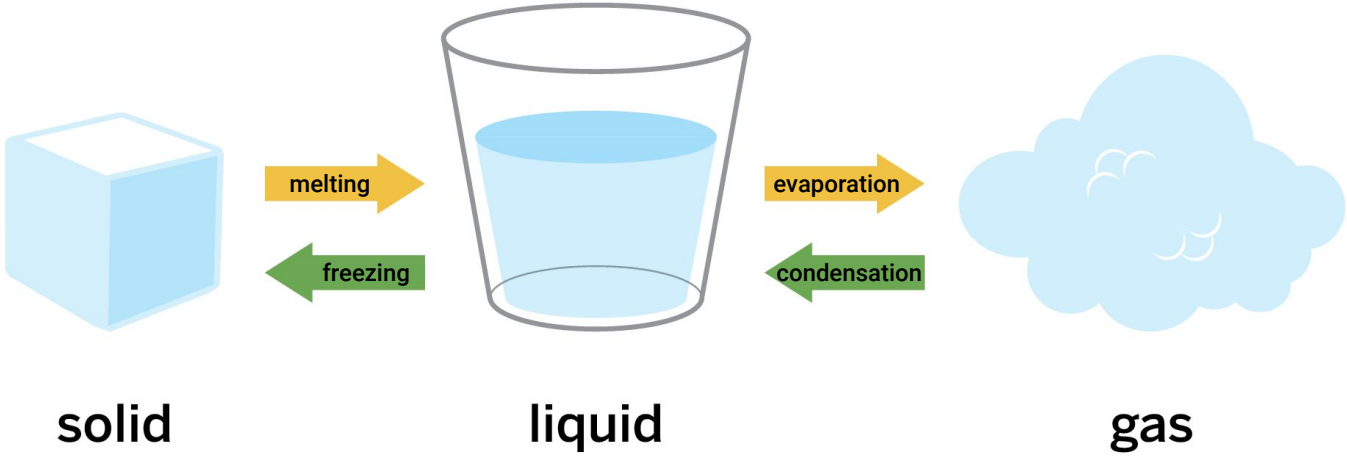
How do you think matter can change from one phase to the other?



A solid turning to liquid is called **melting**.
A liquid turning to solid is called **freezing**.



A liquid turning to gas is called **evaporation**.
A gas turning to liquid is called **condensation**.



In this activity, and for many other activities in the *Phase Change* @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.

With a partner, you'll now **choose one video** and try to more precisely describe **how the substance changes** in that video.

Name: _____ Date: _____

Discussing Difference in Appearance

Discuss the phase change videos with your partner. Pick one of the videos and answer the questions about it below. Include terms from the word bank in your responses.

- *Condensation on a Cup* tinyurl.com/AMPPC-09
- *Evaporating Mud Puddle* tinyurl.com/AMPPC-11
- *Melting Ice Pop Timelapse* tinyurl.com/AMPPC-12
- *Ice Forming on Tree Branches* tinyurl.com/AMPPC-13

Word Bank

condensation	does not flow	evaporation	flows
freezing	gas	has its own shape	invisible
liquid	melting	phase change	solid
takes the shape of its container	visible		

1. How would you describe the appearance of the substance before the phase change?

_____

_____

_____

2. How would you describe the appearance of the substance after the phase change?

_____

_____

_____

3. Based on your description, choose which phase change you think occurred in your video. Circle the name of the video you discussed and the phase change you think occurred.

Video	**Phase change that occurred**
Condensation on a Cup	freezing (liquid to solid)
Evaporating Mud Puddle	melting (solid to liquid)
Melting Ice Pop Timelapse	evaporation (liquid to gas)
Ice Forming on Tree Branches	condensation (gas to liquid)

Phase Change @Home Lesson 1

Go to the Discussing Difference in Appearances activity.

Complete the activity with your partner. You may need to rewatch the video.

Discussing Differences in Appearance page or Lesson 1.2, Activity 2

At this point, how would you answer the Investigation Question?

Investigation Question:
How does the appearance of a substance change when it changes phase?

This is the end of partner work for this lesson

The next three slides show three **key concepts** for this unit that you may have discussed with your partner.

Key Concept

1. A solid holds its shape and does not take the shape of its container.

Key Concept

2. A gas has no visible shape and fills its container.

Key Concept

3. A liquid flows and can take the shape of its container.

Adapted from: Amplify Science *Phase Change* Lesson 1.2

Key activities

- **Introducing Titan's Disappearing Lake:** Students are introduced to the unit problem and their role as student chemists.
- **Observe:** Students observe four short videos showing everyday examples of phase change.
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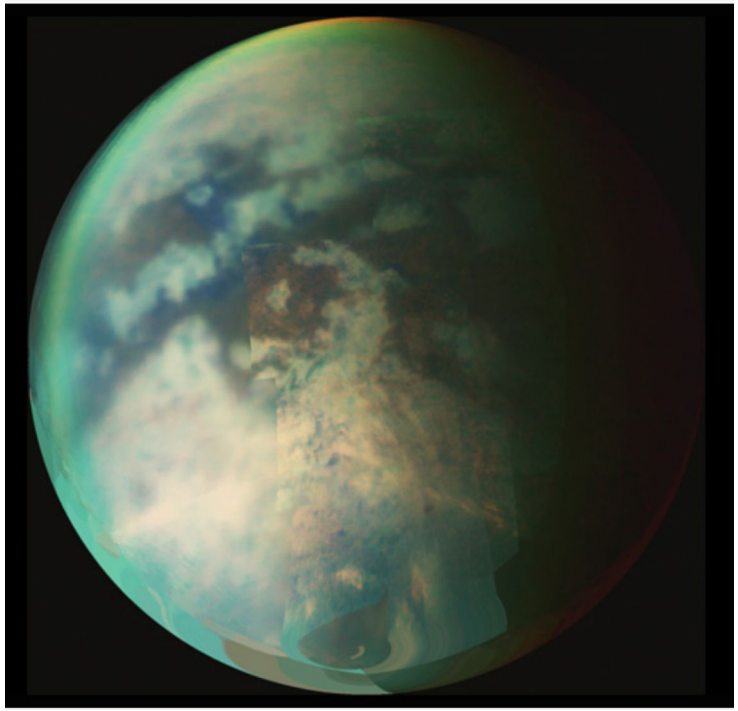
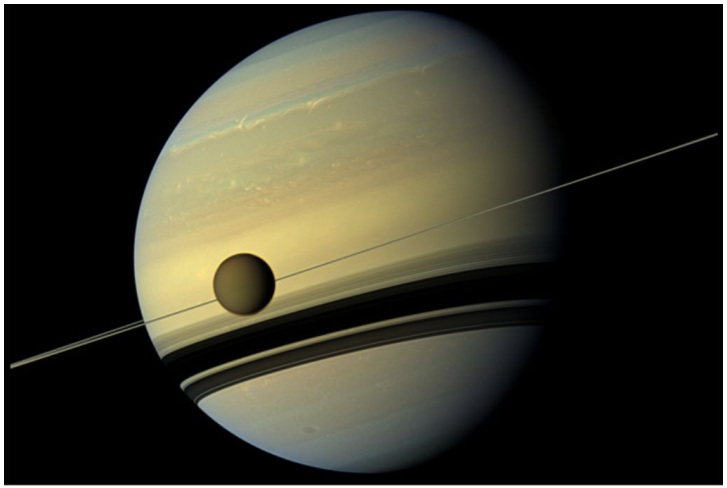
Ideas for synchronous or in-person instruction

While meeting, first introduce the unit, then have student pairs watch and discuss the four phase change videos. If meeting in person, provide the "Titan Fact Sheet" article and have students read and annotate it, then discuss what they read.



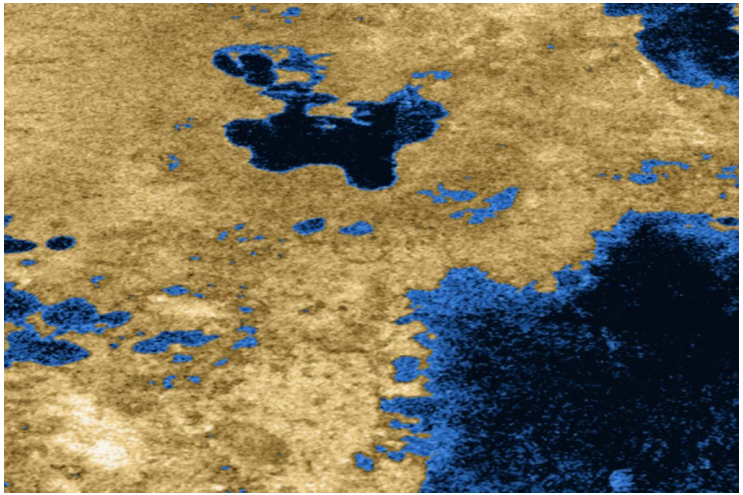
We will end this lesson by learning a little more about **Titan**.

Read each slide and think about how these **Titan Facts** can help you understand what happened to Titan's lake.

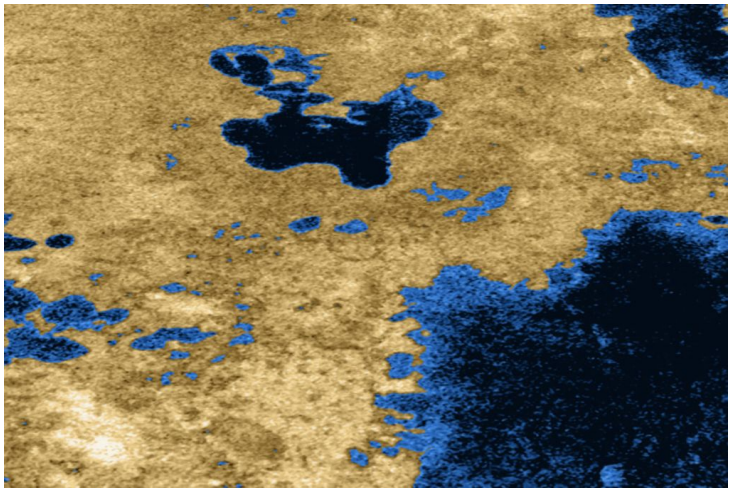


Titan is a large moon that orbits the planet Saturn.

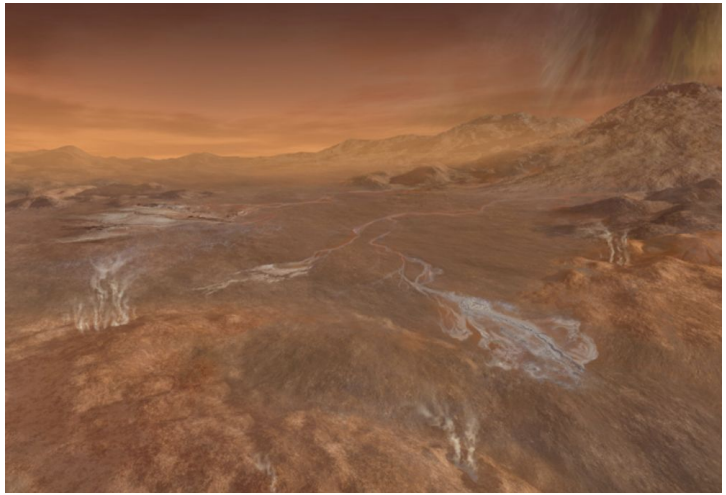
Saturn is about 866 million miles from the sun.



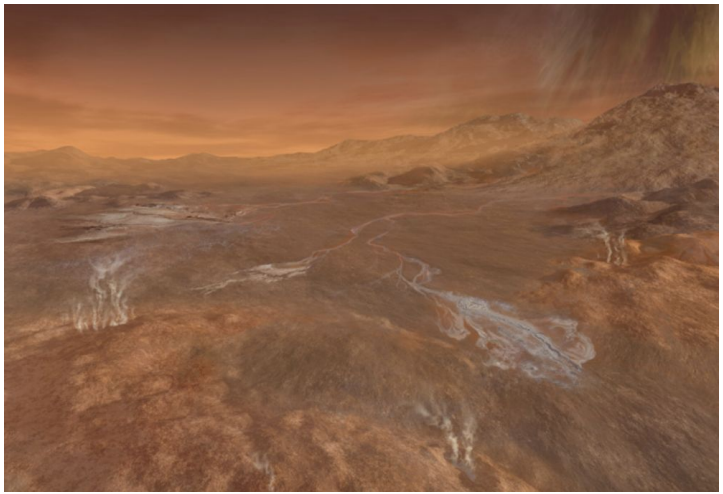
The surface of Titan is **hidden by a thick, hazy atmosphere,** but in the past few years spacecraft have managed to **collect images** and other data that tell us about what lies beneath the haze.



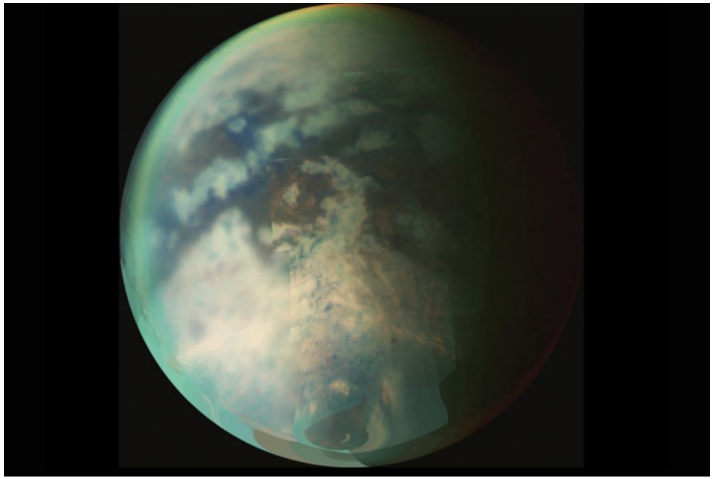
They found something that’s common on Earth but very unusual in the rest of the solar system: **lakes and seas!**



Besides Earth, Titan is the only body in our solar system with **enough liquid on its surface** to fill lakes and seas.



Titan’s lakes and seas are filled mainly with thick, tar-like substances, such as **methane and ethane.** Titan also has **methane gas** in its atmosphere, just as Earth has water vapor in its atmosphere.



Titan has summer and winter seasons when its surface becomes warmer and colder. However, because it is so far from the sun, even in summer Titan is very cold. Its average surface temperature is about −179°C (−290°F)!

Did you read anything about Titan that might help you explain what happened to the lake on Titan?

We will keep thinking about this in our next lesson.

End of @Home Lesson

THE LAWRENCE HALL OF SCIENCE
UNIVERSITY OF CALIFORNIA, BERKELEY

Amplify.

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Adapted from: Amplify Science *Phase Change* Lesson 1.2

Key activities

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Ideas for synchronous or in-person instruction

While meeting, first introduce the unit, then have student pairs watch and discuss the four phase change videos. If meeting in person, provide the "Titan Fact Sheet" article and have students read and annotate it, then discuss what they read.

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.

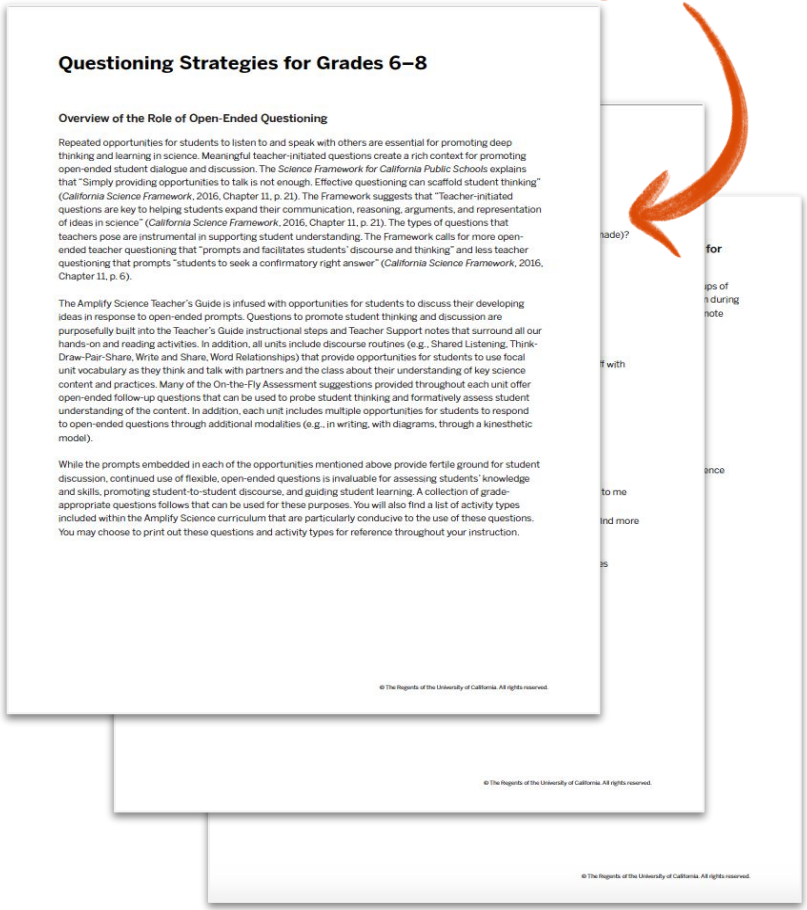
page 18

Questioning Strategies

Pages 19-21

Open-Ended Questions to Facilitate Student Thinking & Discourse

- Questions to assess students' knowledge and skills
- Questions to promote student-to-student discourse
- Questions to guide student learning



Questioning Strategies for Grades 6–8

Overview of the Role of Open-Ended Questioning

Repeated opportunities for students to listen to and speak with others are essential for promoting deep thinking and learning in science. Meaningful teacher-initiated questions create a rich context for promoting open-ended student dialogue and discussion. The *Science Framework for California Public Schools* explains that "Simply providing opportunities to talk is not enough. Effective questioning can scaffold student thinking" (*California Science Framework*, 2016, Chapter 11, p. 21). The Framework suggests that "Teacher-initiated questions are key to helping students expand their communication, reasoning, arguments, and representation of ideas in science" (*California Science Framework*, 2016, Chapter 11, p. 21). The types of questions that teachers pose are instrumental in supporting student understanding. The Framework calls for more open-ended teacher questioning that "prompts and facilitates students' discourse and thinking" and less teacher questioning that prompts "students to seek a confirmatory right answer" (*California Science Framework*, 2016, Chapter 11, p. 6).

The Amplify Science Teacher's Guide is infused with opportunities for students to discuss their developing ideas in response to open-ended prompts. Questions to promote student thinking and discussion are purposefully built into the Teacher's Guide instructional steps and Teacher Support notes that surround all our hands-on and reading activities. In addition, all units include discourse routines (e.g., Shared Listening, Think-Draw-Pair-Share, Write and Share, Word Relationships) that provide opportunities for students to use focal unit vocabulary as they think and talk with partners and the class about their understanding of key science content and practices. Many of the On-the-Fly Assessment suggestions provided throughout each unit offer open-ended follow-up questions that can be used to probe student thinking and formatively assess student understanding of the content. In addition, each unit includes multiple opportunities for students to respond to open-ended questions through additional modalities (e.g., in writing, with diagrams, through a kinesthetic model).

While the prompts embedded in each of the opportunities mentioned above provide fertile ground for student discussion, continued use of flexible, open-ended questions is invaluable for assessing students' knowledge and skills, promoting student-to-student discourse, and guiding student learning. A collection of grade-appropriate questions follows that can be used for these purposes. You will also find a list of activity types included within the Amplify Science curriculum that are particularly conducive to the use of these questions. You may choose to print out these questions and activity types for reference throughout your instruction.

Reflection: Teaching @Home Lesson 1

How would you teach this lesson?

How might you include suggestions for online synchronous time and/or questioning strategies?

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 Titan's Disappearing Lakes (slides 1-16), Observe (slides 23-26)

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 slides and the video that introduces students to the unit. Jot down initial ideas about their reactions to the video. Preview the phase change videos on slides 23-26.	Assign slides 1-16 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 Titan's Disappearing Lakes (slides 1-16), Observe (slides 23-26)

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...
View slides and the video that introduces students to the unit. Jot down initial ideas about their reactions to the video. Preview the phase change videos on slides 23-26.

Teacher will...
Assign slides 1-16 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:
Discuss claims, discuss videos and Read (slides 9-49)

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...
Consider the claims introduced on slide 18. Discuss and record their observations of one of the phase change videos, read about Titan and reflect on learning.

Teacher will...
lead students through the lesson activities using slides 9-49 allowing students time to collaborate as they discuss their phase change observations, and read to learn more about Titan.

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.

Asynchronous: students jot down their initial ideas

Synchronous: record observations of phase changes

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

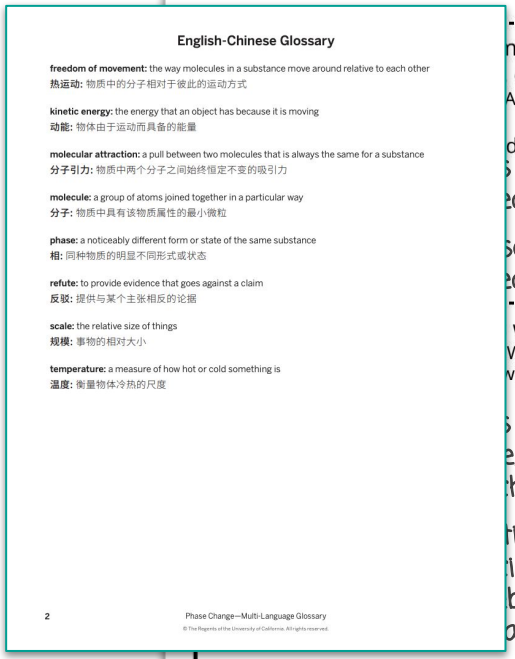
How will students submit this work product to you?
See the Completing and Submitting Written Work tables to the right for guidance on how students can complete and submit work.

Asynchronous: students jot initial ideas on paper or digitally to bring with them to the asynchronous lesson

Synchronous: Students will use the student sheets to record their observations of the phase change video(s) and submit through Schoology

Completing Written Work	Submitting 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)	• 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.)



English-Chinese Glossary

freedom of movement: the way molecules in a substance move around relative to each other
热运动: 物质中的分子相对于彼此的运动方式

kinetic energy: the energy that an object has because it is moving
动能: 物体由于运动而具备的能量

molecular attraction: a pull between two molecules that is always the same for a substance
分子引力: 物质中两个分子之间始终恒定不变的吸引力

molecule: a group of atoms joined together in a particular way
分子: 物质中具有该物质属性的最小微粒

phase: a noticeably different form or state of the same substance
相: 同种物质的明显不同形式或状态

refute: to provide evidence that goes against a claim
反驳: 提供与某个主张相反的论据

scale: the relative size of things
规模: 事物的相对大小

temperature: a measure of how hot or cold something is
温度: 衡量物体冷热的尺度

2 Phase Change—Multi-Language Glossary

nns. What are students working in the lesson(s)
or provide feedback on?
Amplify Science to the right for guidance.

d above, do you want to add one? Make notes below.
s complete the warm-up activity and
eas

- I notice/observe . . .
- I think this is important because . . .
- I wonder . . .

e, and jot initial ideas on paper to bring
hronous lesson

tivity 2, Students will submit their
ience site OR by taking a picture of
book page and emailing it, activity 3
annotate digitally or on paper

Some Types of Written Work in Amplify Science	
• Daily written reflections • Homework tasks • Investigation notebook pages • Written explanations (typically at the end of Chapter)	
pages for Sim uses, investigations, etc	
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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.)

Supports:
- Provide students with the Multi-Language Glossary where appropriate
- Provide sentence starters
- Leverage primary language for discussions

Extension:
- Have students write questions about the unit phenomenon.

Teacher Overview - Chapter 1

Overview of @Home Lessons 2-5

@Home Lesson 2: GROUP 1

- Students watch a video to observe phase change, then describe what they observe. Students are introduced to the Phase Change Simulation, then use the Sim to investigate the molecular scale of phase changes.

@Home Lesson 3: GROUP 2

- Students read and annotate an article from the article set, *Weird Water Events* to learn about water in different phases on Earth. Students share their questions and ideas about the article they read in the *Weird Water Events* article series.

@Home Lesson 4: GROUP 3

- Students reread the Introduction to the article set Weird Water Events to gather evidence about what happens on the molecular level when water changes phase. Students create models to show what happens when a substance changes phase.

@Home Lesson 5: GROUP 4

- Students watch one of the four phase change videos, then write what they think is happening at the molecular scale using unit vocabulary. Students share with a partner what they wrote about what is happening at the molecular scale in the video they watched. Students create models showing the lake on Titan evaporating.

Breakout groups

pages 13-14

Discussion prompts

Planning:

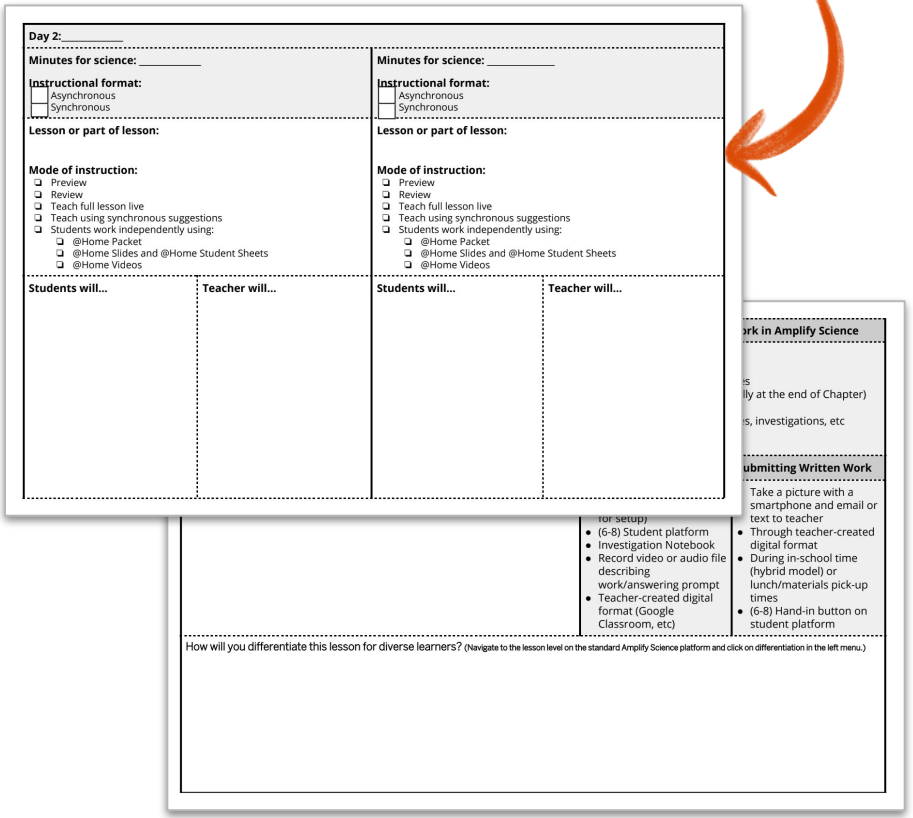
- Dig into the @Home Resources for your assigned lesson.

Student work:

- Discuss how you can collect evidence of student work

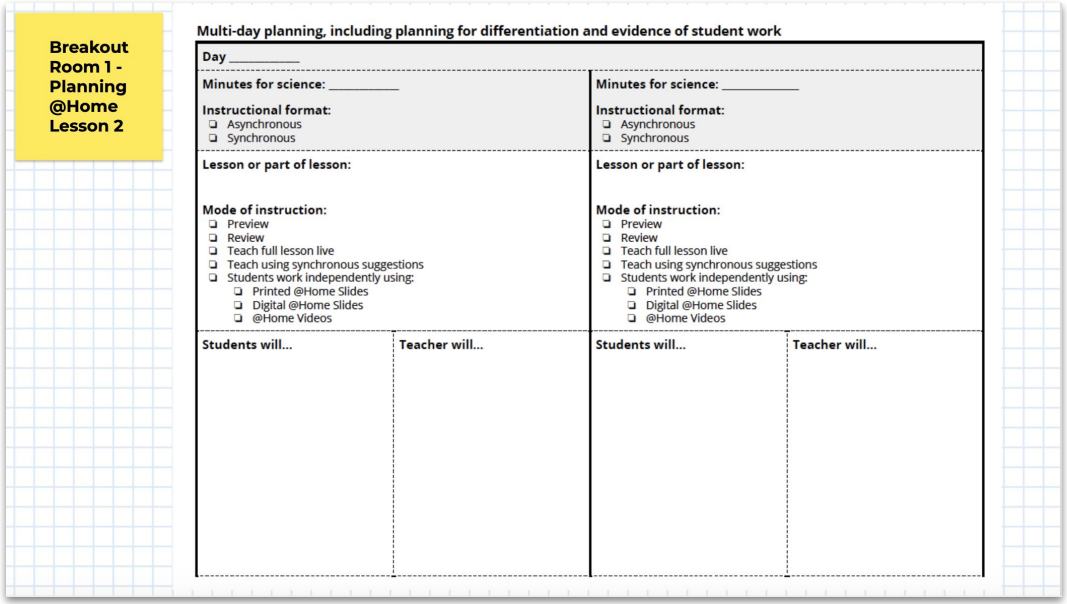
Differentiation:

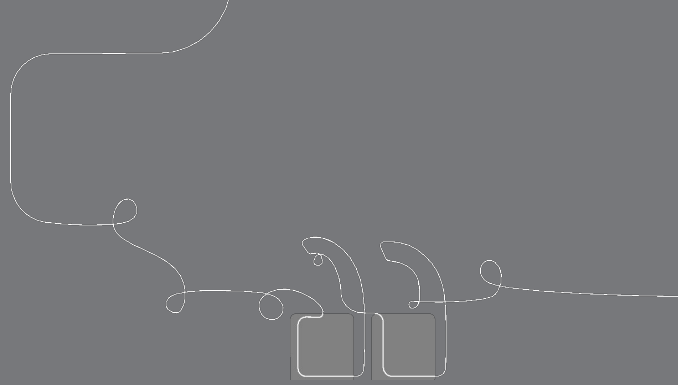
- Consider how you might differentiate your lesson



Planning Share Out

- What are your key takeaways from planning?
- Which lesson parts did you plan for synchronous vs. asynchronous time?





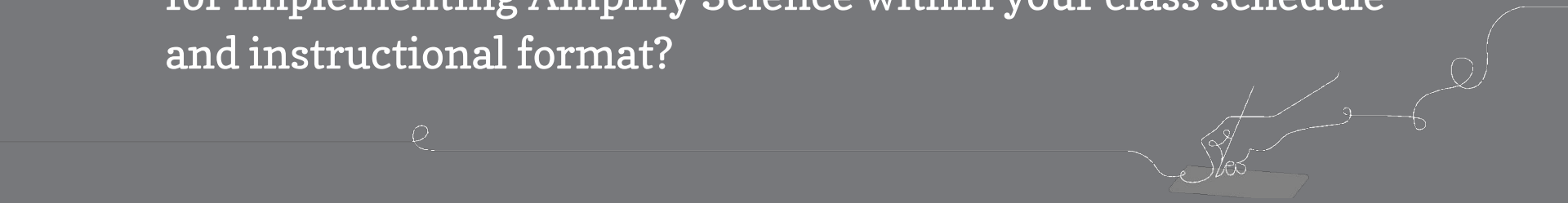
Questions?

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?

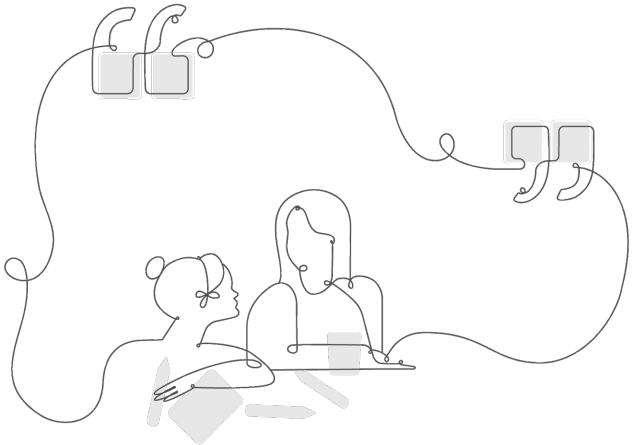
- Were you able to internalize your upcoming unit?
- Do you know how to plan for **collecting evidence of student learning** in order to make instructional decisions to **support diverse learner needs**?
- Do you have the resources you need to develop a multi-day plan for implementing Amplify Science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



Upcoming LAUSD MS Office Hours

Bi-weekly from 3-4pm

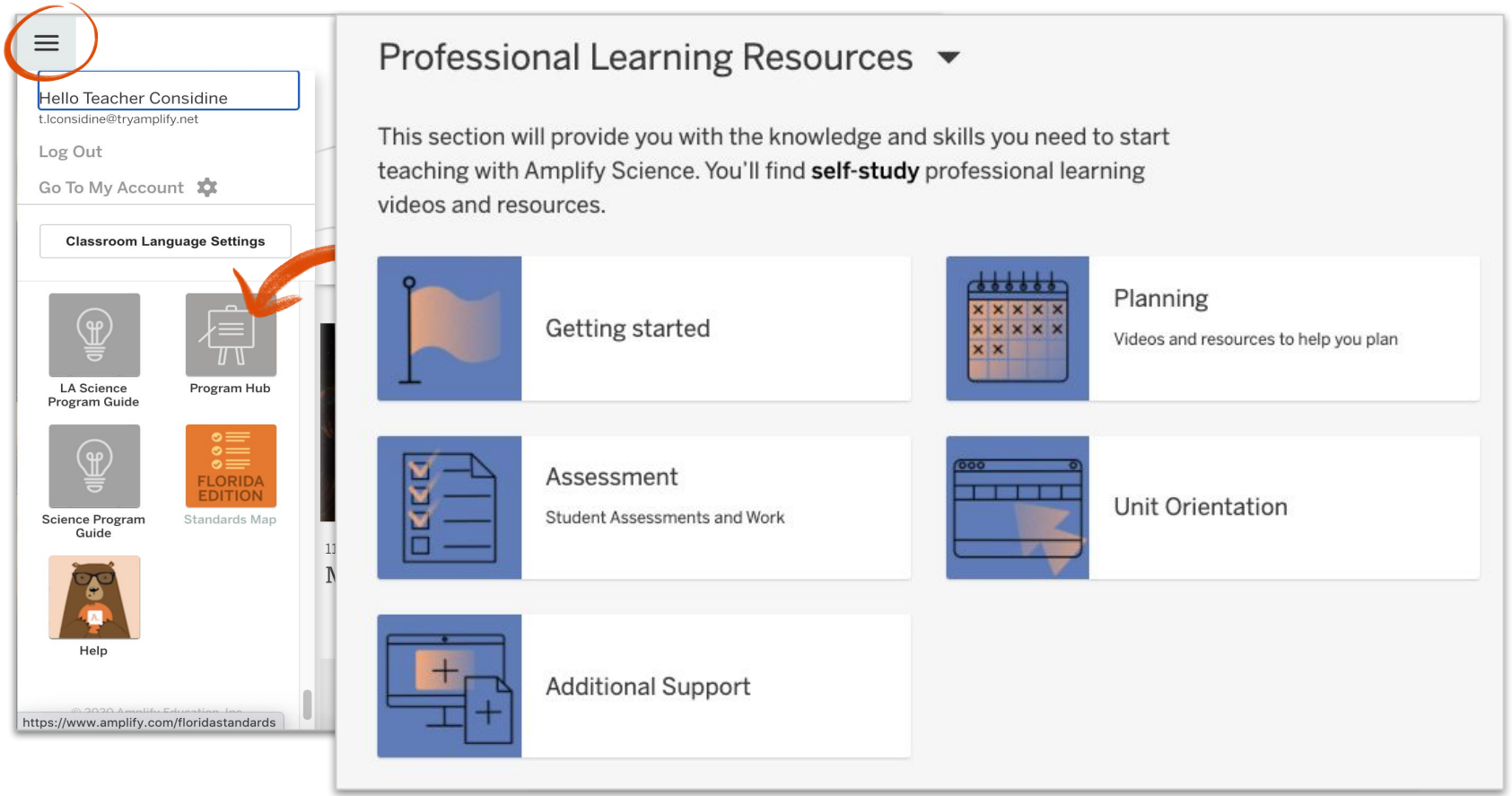
- Thursday, 3/11
- Thursday, 3/25
- Thursday, 4/8
- Thursday, 4/22
- Thursday, 5/13
- Thursday, 5/27



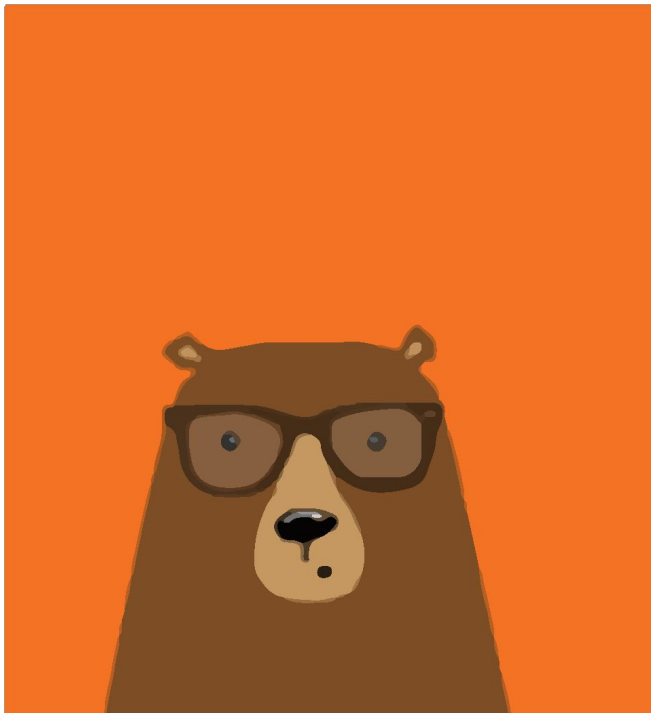
https://tinyurl.com/6-8OfficeHours

Additional Amplify resources

Program Hub: Professional Learning Resources



Additional Amplify resources

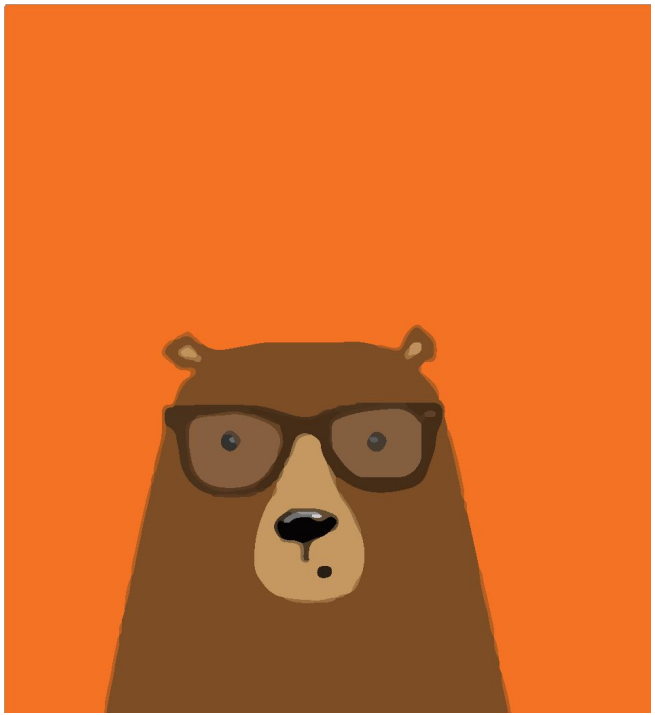


Caregivers site

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.

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.

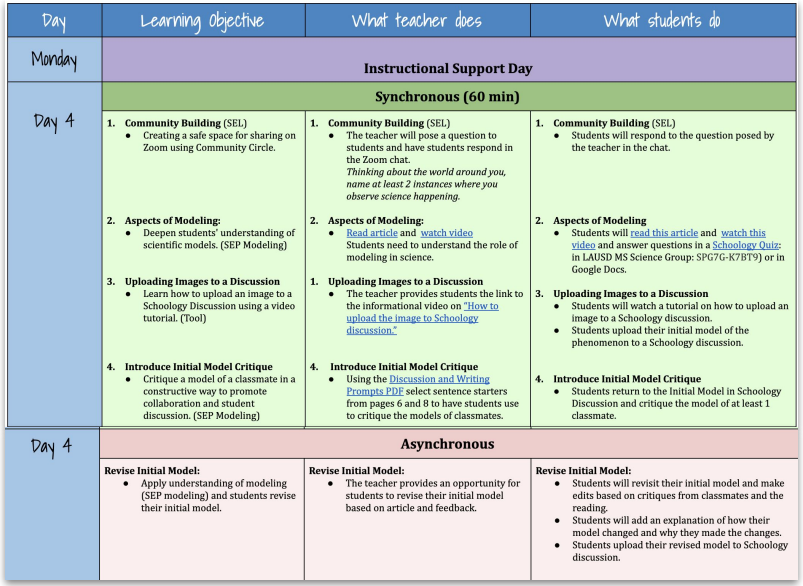
Click the button below to preview the digital Teacher's Guide, and check back for exciting updates to this site!

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

Smart Start Plans

Middle School Science Schoology Group

- Access code to join the Schoology Group: **SPG7G-K7BT9**
- Once in the group, you will find the Smart Start Plans under *resources*.



Day	Learning Objective	What teacher does	What students do
Monday	**Instructional Support Day**		
Day 4	**Synchronous (60 min)**		
	1. Community Building (SEL) • Creating a safe space for sharing on Zoom using Community Circle.	**1. Community Building** (SEL) • The teacher will pose a question to students and have students respond in the Zoom chat. *Thinking about the world around you, name at least 2 instances where you observe science happening.*	**1. Community Building** (SEL) • Students will respond to the question posed by the teacher in the chat.
	2. Aspects of Modeling: • Deepen students' understanding of scientific models. (SEP Modeling)	**2. Aspects of Modeling:** • Read article and watch video Students need to understand the role of modeling in science.	**2. Aspects of Modeling** • Students will read this article and watch this video and answer questions in a Schoology Quiz: in LAUSD MS Science Group: SPG7G-K7BT9) or in Google Docs.
	3. Uploading Images to a Discussion • Learn how to upload an image to a Schoology Discussion using a video tutorial. (Tool)	**1. Uploading Images to a Discussion** • The teacher provides students the link to the informational video on "How to upload the image to Schoology discussion."	**3. Uploading Images to a Discussion** • Students will watch a tutorial on how to upload an image to a Schoology discussion. • Students upload their initial model of the phenomenon to a Schoology discussion.
	4. Introduce Initial Model Critique • Critique a model of a classmate in a constructive way to promote collaboration and student discussion. (SEP Modeling)	**4. Introduce Initial Model Critique** • Using the Discussion and Writing Prompts PDF select sentence starters from pages 6 and 8 to have students use to critique the models of classmates.	**4. Introduce Initial Model Critique** • Students return to the Initial Model in Schoology Discussion and critique the model of at least 1 classmate.
Day 4	**Asynchronous**		
	Revise Initial Model: • Apply understanding of modeling (SEP modeling) and students revise their initial model.	**Revise Initial Model:** • The teacher provides an opportunity for students to revise their initial model based on article and feedback.	**Revise Initial Model:** • Students will revisit their initial model and make edits based on critiques from classmates and the reading. • Students will add an explanation of how their model changed and why they made the changes. • Students upload their revised model to Schoology discussion.

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

LAUSD Shared Logins

AmplifyScience

Go to: my.amplify.com

A. Log In with Amplify

District Shared Logins		
Grade	**Username**	**Password**
Kindergarten	LAUSDscienceK	LAUSD1234
1	LAUSDscience1	LAUSD1234
2	LAUSDscience2	LAUSD1234
3	LAUSDscience3	LAUSD1234
4	LAUSDscience4	LAUSD1234
5	LAUSDscience5	LAUSD1234
6	LAUSDscience6	LAUSD1234
7	LAUSDscience7	LAUSD1234
8	LAUSDscience8	LAUSD1234

Elementary Student Apps Shared Logins

English
- Username: ampsci123
- Password: ampsci123

Spanish
- Username: ampsci123sp
- Password: ampsci123sp