Amplify Science

New York City Department of Education

Grade 7: Phase Change

Deep-Dive and Strengthening Workshop

Date
Presented by Your Name

Missing materials

- Contact the Core Curriculum Service Center
  Monday- Friday 8am-5pm

Email: curriculum@schools.nyc.gov

Phone: (718) 935-3334

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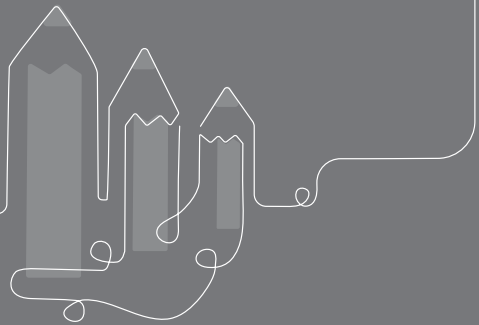
Workshop goal

- To deepen your understanding and ease of use with Amplify Science, and to prepare you to implement Phase Change in your classrooms.



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Objectives

By the end of today, you will be able to:

- Use program resources to understand unit content and plan for supporting student learning
- Reflect on experience with Amplify Science to identify and plan for opportunities for growth in teaching the program
- Explain what students will learn in the unit, and how their understanding will build through the unit
- Describe the content focus and coherence of the unit
- Leverage the Progress Build to gauge student understanding throughout the unit

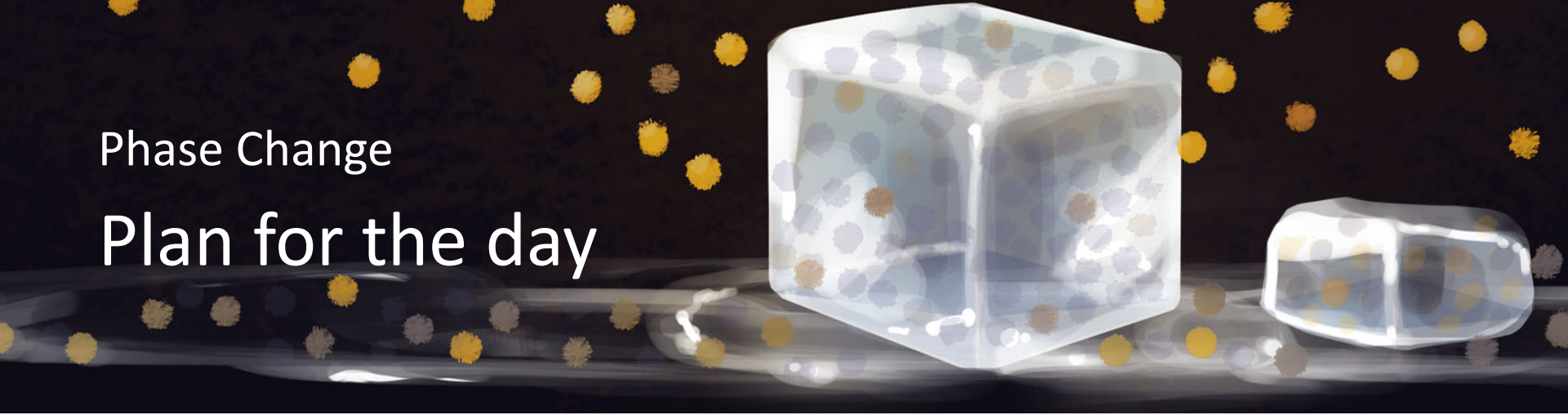
Norms: Establishing a culture of learners

Take risks: Ask any questions, provide any answers.

Participate: Share your thinking, participate in discussion and reflection.

Be fully present: Unplug and immerse yourself in the moment.

Physical needs: Stand up, get water, take breaks.



Phase Change

Plan for the day

- Framing and reflection
- Experiencing the unit
- Science Seminar
- Planning to teach
- Closing

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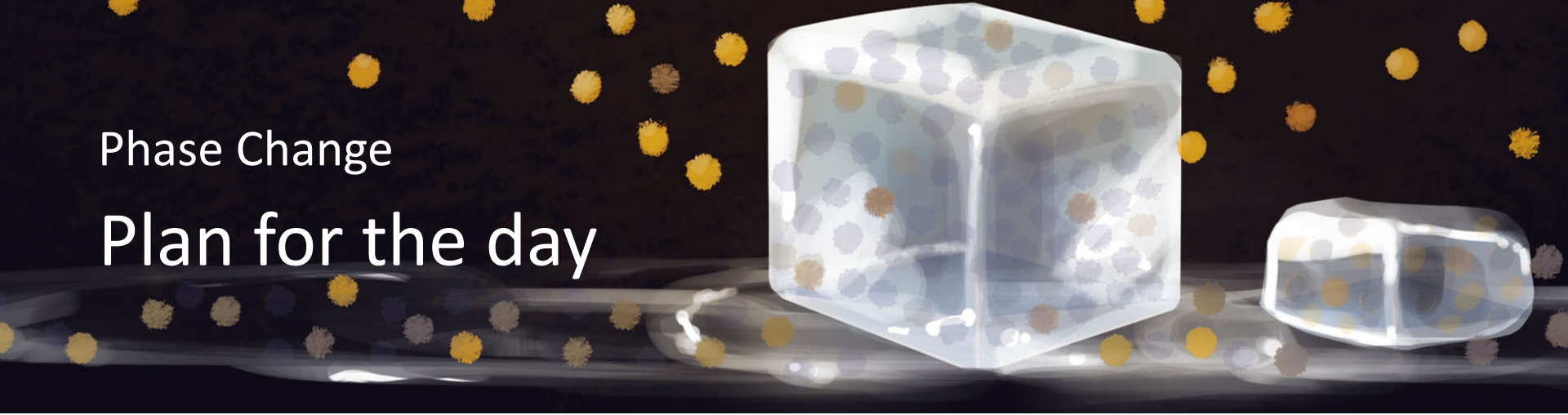

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Framing and reflection

The purpose of this part of the day is for you to:

- Share your experience implementing Amplify Science.
- Refresh your understanding of key program resources and Amplify's approach.
- Identify successes and areas of need in your classroom, which will frame your work throughout the day.

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Reflection roles

- Facilitator: Asks questions to ensure that there is equity of voice
- Timekeeper: Keeps team on time/task
- Recorder: Captures the information on paper as each person is presenting
- Summarizer: Shares highlights and summaries to the larger group

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Scenario 1

Ms. Lambertsen needs to refresh her content knowledge of her next unit. She has a few questions about the science content in the unit, and wants to be ready when her students ask questions, too.

To deepen her understanding of the science ideas in the unit, what resources would you recommend she use?

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Scenario 2

Mr. Garcia wants to plan what data he can collect on his students during an upcoming lesson and how he can then use the data to inform instruction to best support his students. He's also looking for some strategies to support students in his classroom that need more challenge.

What can he look at in the Teacher's Guide to support his planning?

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Scenario 3

To prepare to administer the End-of-Unit Assessment, Ms. Lucey wants to familiarize herself with how students with different levels of understanding might respond to the assessment. She's also looking for some insight into how to evaluate their responses.

Where can she look for information to support her preparation to administer the assessment?

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Scenario 4

Mr. Moore needs to identify the standards in his upcoming unit for his principal. Specifically, his principal wants to know how students engage with the three dimensions of NYSSLS to figure out the unit phenomenon/problem.

Where would Mr. Moore find out the answer to his principal's question? How do students engage in three-dimensional learning in this unit?

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Scenario 5

At back to school night, Mr. Patel is going to tell his students' families about the next unit his class will work with. He wants to describe how students develop ideas through Chapter 1.

How do you think he could explain this to his students' families? Where might he look to find information that will help him plan what to say?

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Scenario 6

Mrs. Doolittle is starting a new unit next week (the same one you are diving into today!). She's familiar with what students learn throughout the unit, but she's not sure where to start preparing to teach the first lesson.

What do you suggest she refer to as she prepares for her first lesson? What should she do or read first, and what should she do after that?

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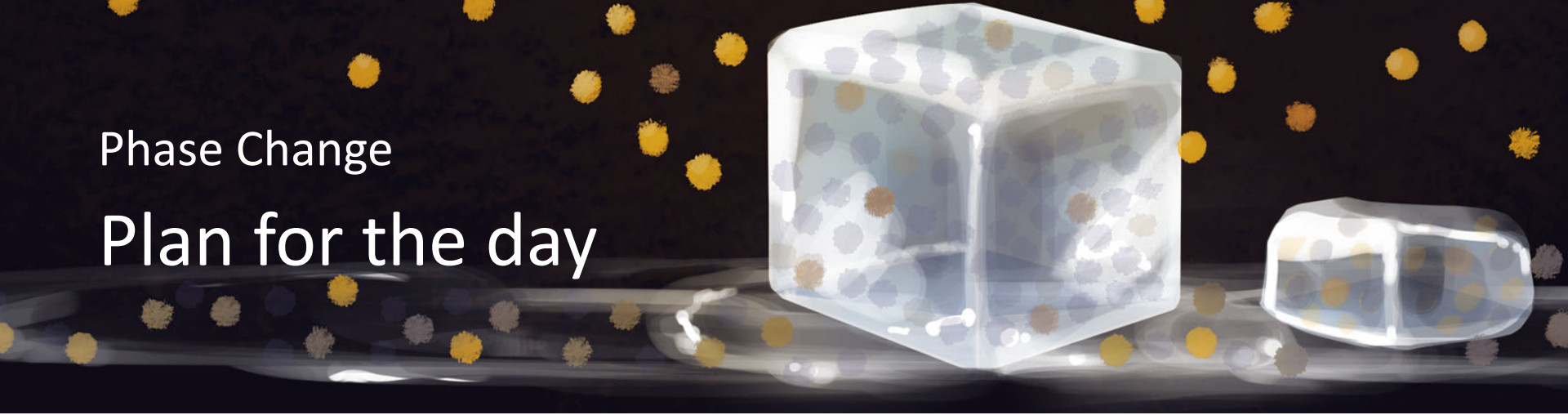

Phase Change

Plan for the day

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- Science Seminar
- Planning to teach
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Experiencing the unit

The purpose of this section is to help you:

- Understand how a phenomenon motivates student learning.
- Understand what students learn in the first chapter of Phase Change, and how they learn it.
- Describe the content focus and coherence of the unit.
- Leverage the Progress Build to gauge student understanding throughout the unit.

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Middle school course curriculum structure

Middle School Curriculum New York City Edition

Grade 6

- Launch: Harnessing Human Energy
- Thermal Energy
- Populations and Resources
- Matter and Energy in Ecosystems
- Weather Patterns
- Ocean, Atmosphere,and Climate
- Earth's Changing Climate

Grade 7

- Launch: Microbiome
- Metabolism
- Phase Change
- Chemical Reactions
- Plate Motion
- Engineering Internship: Plate Motion
- Rock Transformations
- Engineering Internship: Earth's Changing Climate

Grade 8

- Launch: Geology on Mars
- Earth, Moon, and Sun
- Force and Motion
- Engineering Internship: Force and Motion
- Magnetic Fields
- Light Waves
- Traits and Reproduction
- Natural Selection
- Evolutionary History

Problem-based deep dives

Students inhabit the role of scientists and engineers to explain or predict phenomena. They use what they figure out to solve real-world problems.

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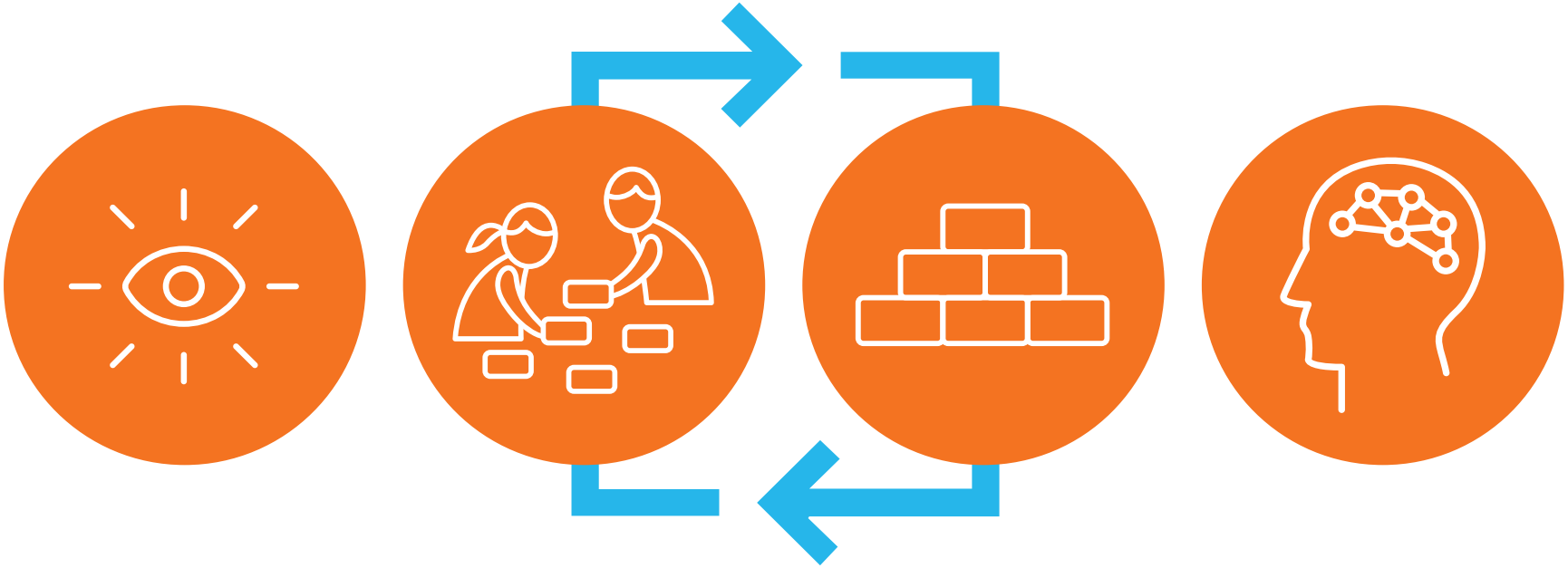
Amplify Science approach



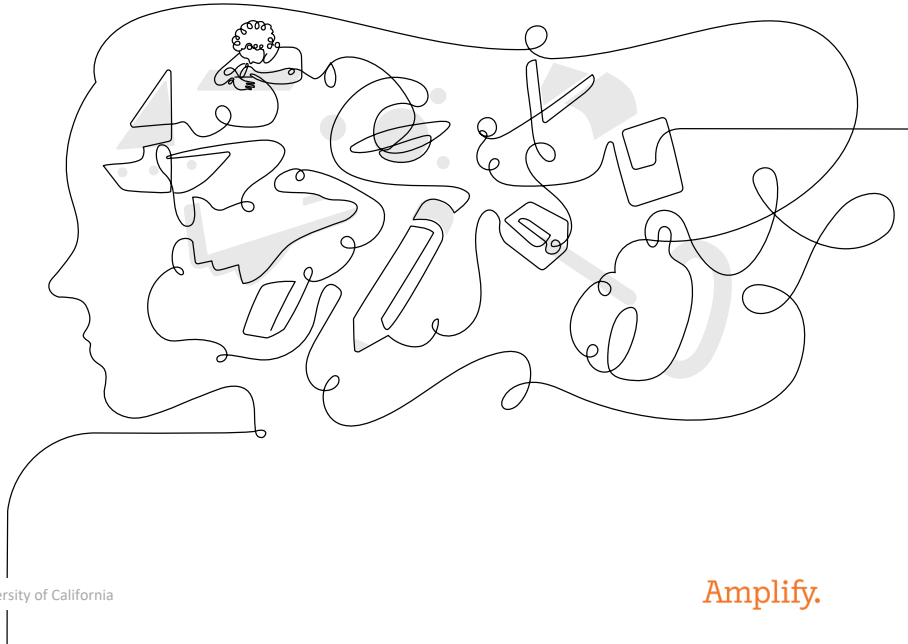
Introduce a phenomenon and a related problem

Collect evidence from multiple sources

Build increasingly complex explanations

Apply knowledge to solve a different problem

Figure out, not learn about



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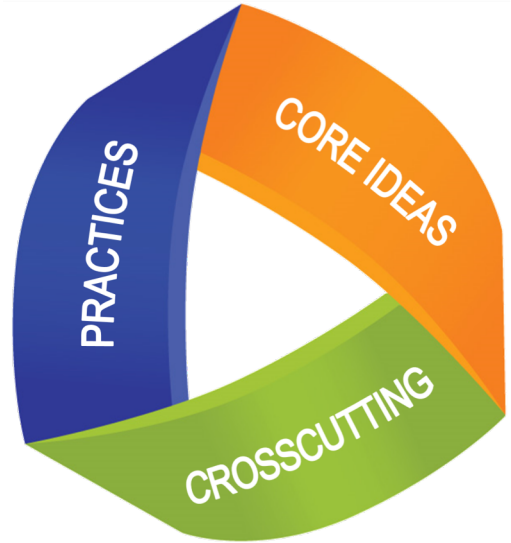

Standards as three-dimensional performance expectations that integrate disciplinary core ideas, science and engineering practices, and crosscutting concepts

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Unit 3-D Statement

Students investigate phase change at the macroscale and molecular scale (scale, proportion, and quantity) by using physical and digital models and hands-on experiences in order to construct explanations about how energy transfer and molecular attraction determine whether a substance will change phase (energy and matter).

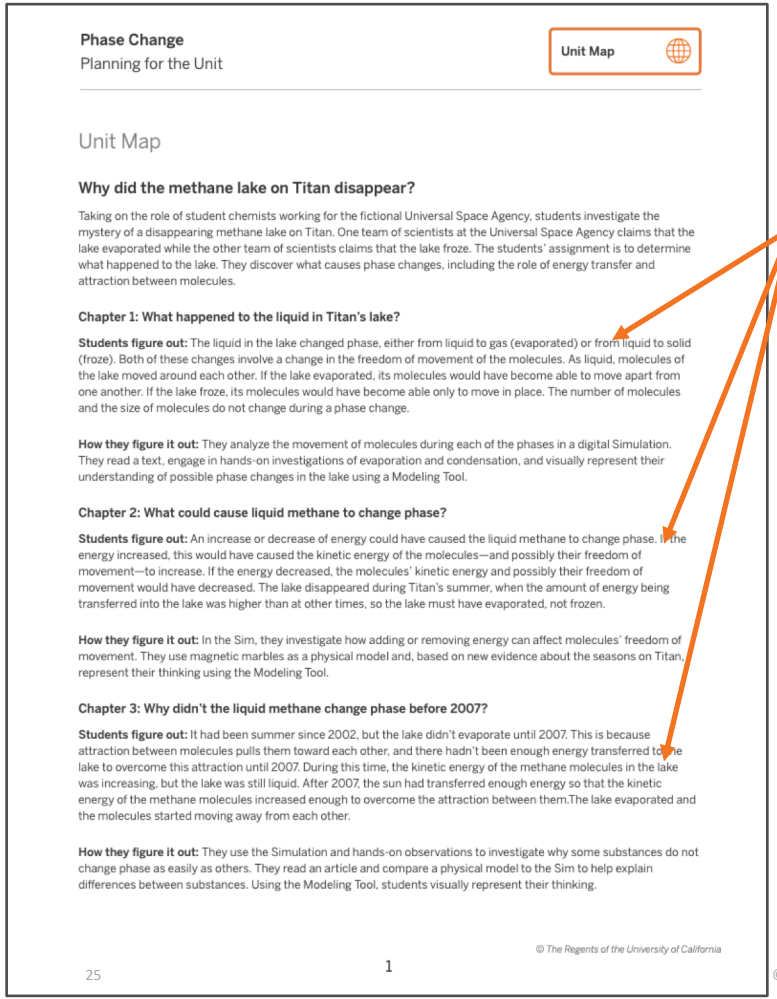
Unit 3-D Statement

Key

Practices **Disciplinary Core Ideas** **Crosscutting Concepts**

Unit Level

Students investigate phase change at the macroscale and molecular scale (scale, proportion, and quantity) by by using physical and digital models and hands-on experiences in order to construct explanations about how energy transfer and molecular attraction determine whether a substance will change phase (energy and matter).



Phase Change
Planning for the Unit

Unit Map

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 2: What could cause liquid methane to change phase?

Students figure out: An increase or decrease of energy could have caused the liquid methane to change phase. If the energy increased, this would have caused the kinetic energy of the molecules—and possibly their freedom of movement—to increase. If the energy decreased, the molecules' kinetic energy and possibly their freedom of movement would have decreased. The lake disappeared during Titan's summer, when the amount of energy being transferred into the lake was higher than at other times, so the lake must have evaporated, not frozen.

How they figure it out: In the Sim, they investigate how adding or removing energy can affect molecules' freedom of movement. They use magnetic marbles as a physical model and, based on new evidence about the seasons on Titan, represent their thinking using the Modeling Tool.

Chapter 3: Why didn't the liquid methane change phase before 2007?

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.

How they figure it out: They use the Simulation and hands-on observations to investigate why some substances do not change phase as easily as others. They read an article and compare a physical model to the Sim to help explain differences between substances. Using the Modeling Tool, students visually represent their thinking.

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Turn and Talk 1: What connections can you make between the **what students figure out** in the Unit Map and the science ideas we unpacked from the Unit 3-D Statement?

Key

Practices | Disciplinary Core Ideas | Crosscutting Concepts

Unit Level

Students investigate phase change at the macroscale and molecular scale (scale, proportion, and quantity) by by using physical and digital models and hands-on experiences in order to construct explanations about how energy transfer and molecular attraction determine whether a substance will change phase (energy and matter).

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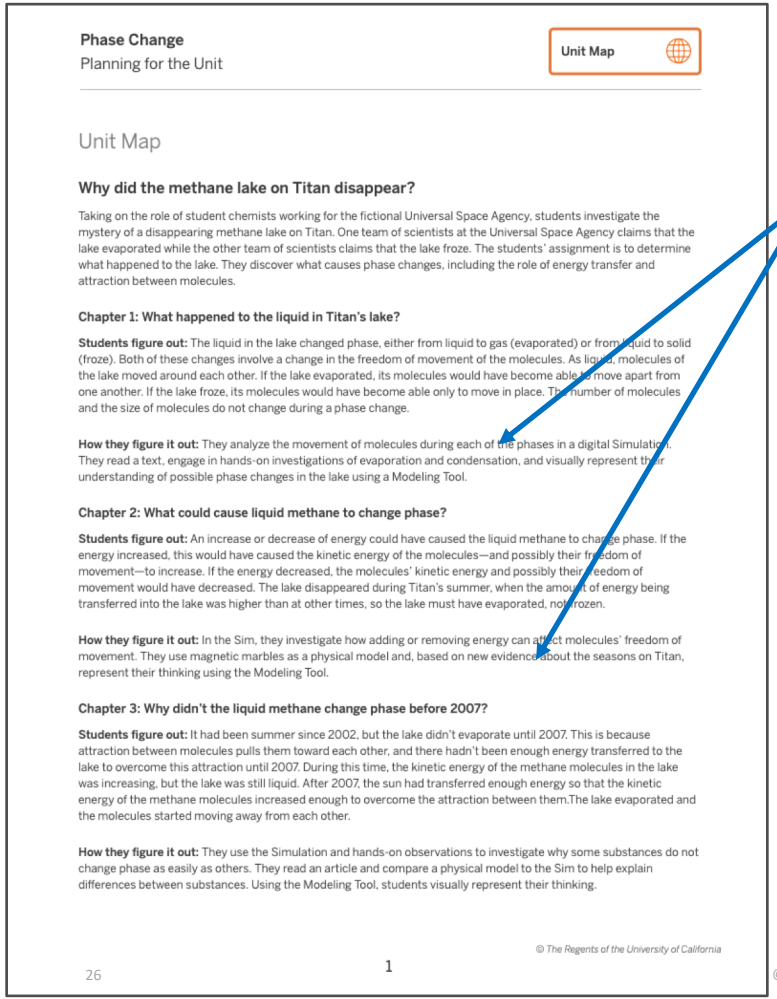

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Turn and Talk 2: What connections can you make between the **how students figure it out** in the Unit Map and the science practices and crosscutting concepts observed in the Unit 3-D Statement?

Key

Practices | Disciplinary Core Ideas | Crosscutting Concepts

Unit Level

Students investigate phase change at the macroscale and molecular scale (scale, proportion, and quantity) by by using physical and digital models and hands-on experiences in order to construct explanations about how energy transfer and molecular attraction determine whether a substance will change phase (energy and matter).

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Amplify.

End-of-Chapter 3 explanation

In 2007, the attraction between the molecules of methane in the lake was holding them together. When the sun transferred energy into the liquid methane, the molecules began to increase in kinetic energy, but this was still not enough to overcome the molecular attraction or change the molecules' freedom of movement. In 2009, the methane was invisible and floating in the atmosphere of Titan. The molecules could move away from one another. Sometime between 2007 and 2009, enough energy must have been transferred into the methane lake for the kinetic energy of the molecules to overcome the attraction holding them together.

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Coherence as a design principle

- Supports students in building a rich network of concepts
- Allows for increasingly complex explanations
- Supports students in integrating ideas
- Provides motivation to look more deeply at the phenomenon

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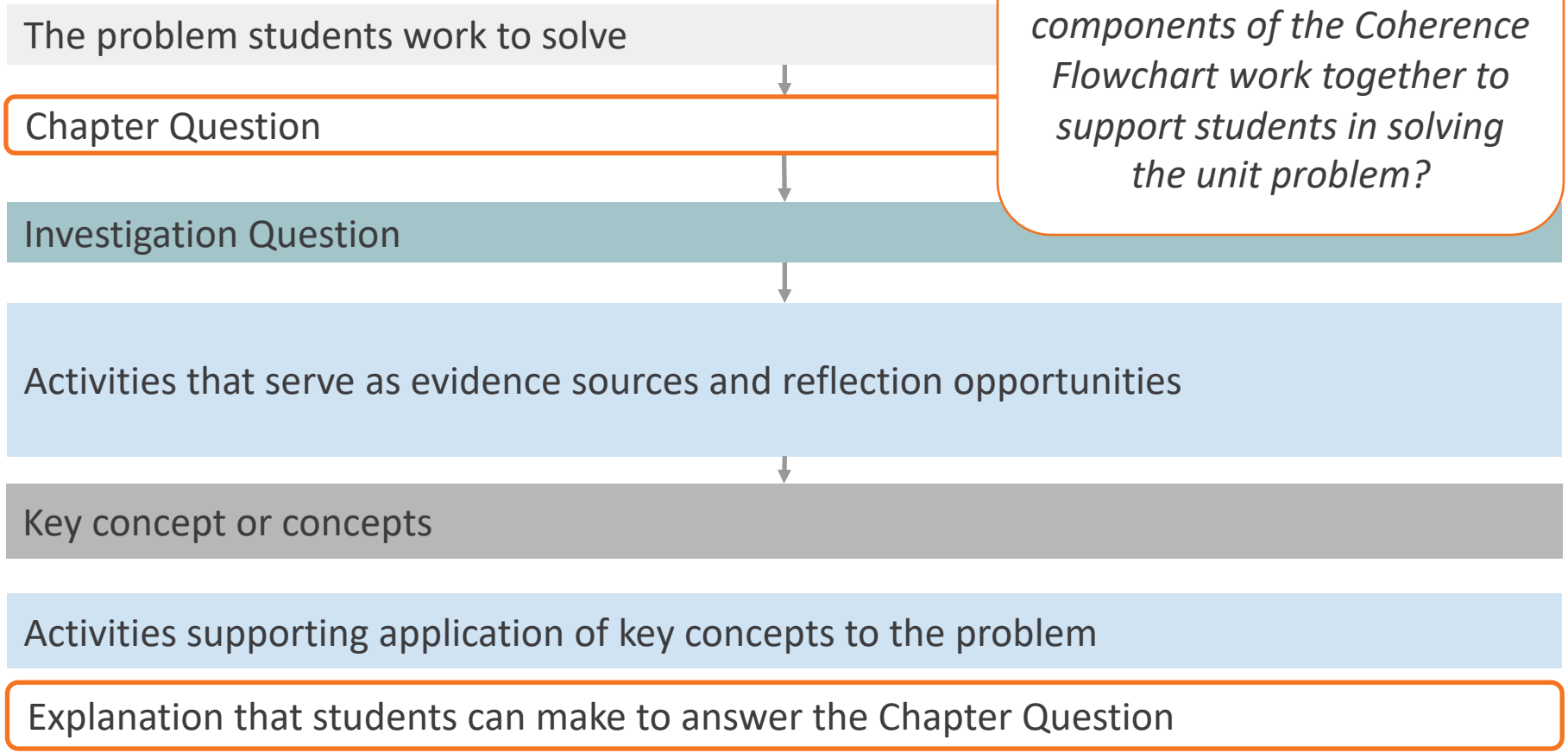
Coherence Flowchart structure



How do the specific components of the Coherence Flowchart work together to support students in solving the unit problem?

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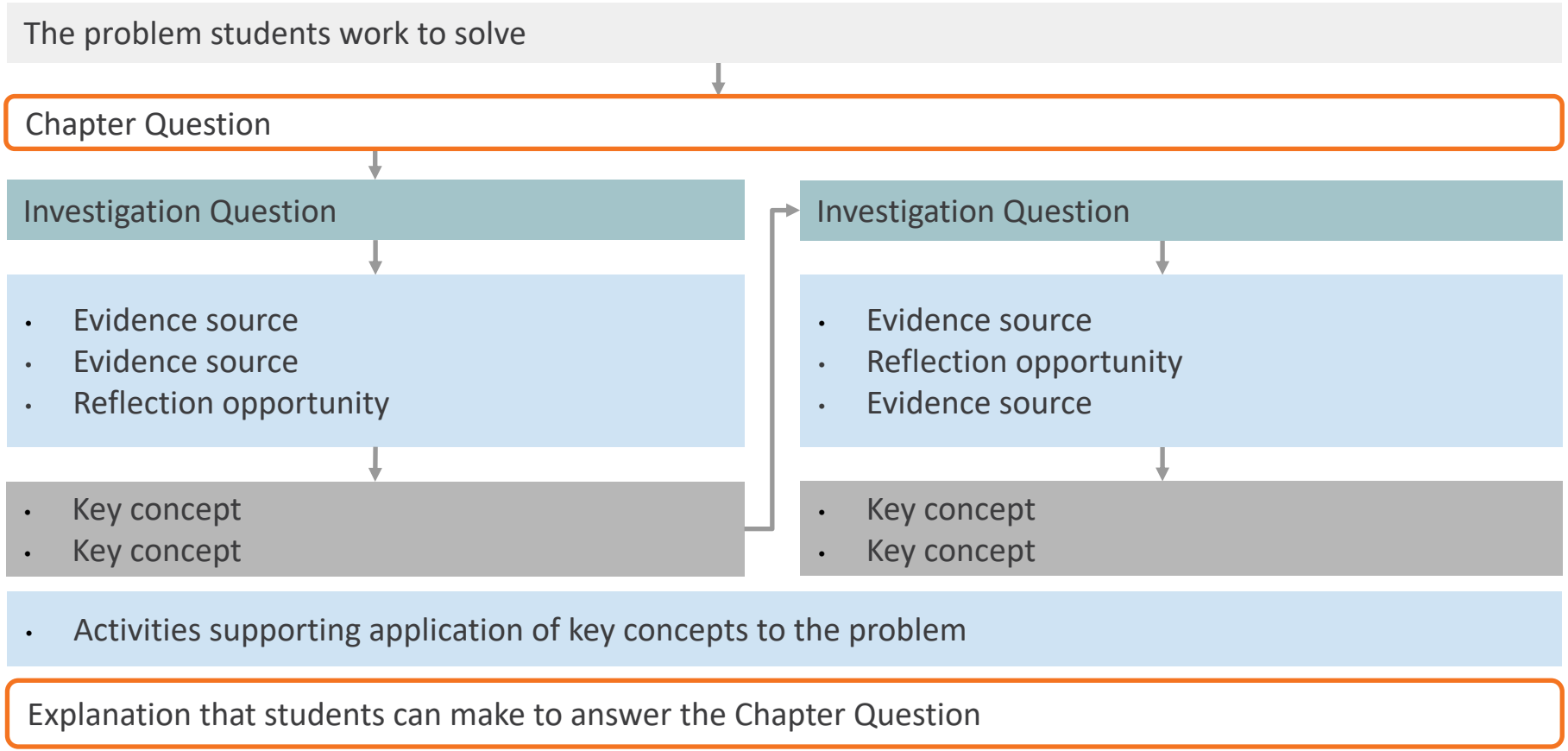
Coherence Flowchart structure



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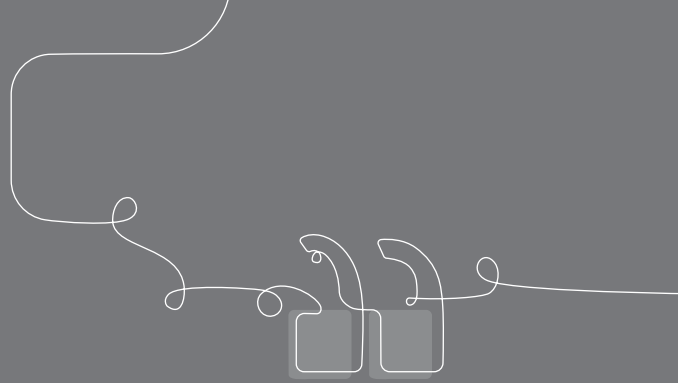
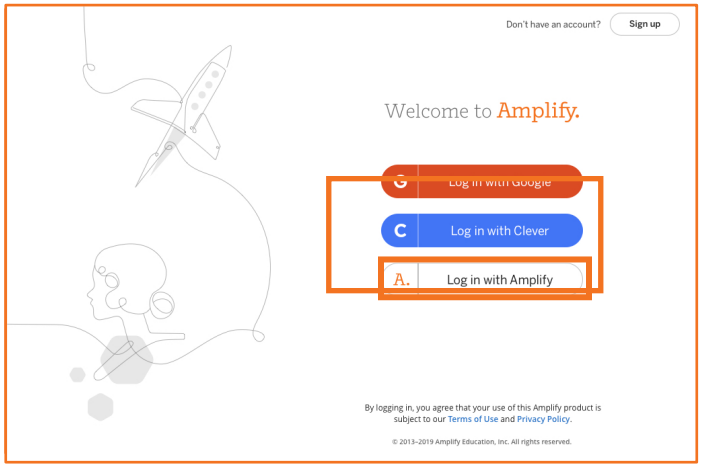
Questions?



Logging in as students (demo account)

Safari or Chrome



1. Go to learning.amplify.com
2. Select Log in with Amplify
3. Enter your student demo account credentials
   - XXXX@tryamplify.net
   - XXXX@tryamplify.net
   - XXXX@tryamplify.net
   - Password: AmplifyNumber1

Phase Change: Titan's Disappearing Lakes

Problem Students Work to Solve

Why did the methane lake on Titan disappear?

Chapter 1 Question

What happened to the liquid in Titan's lake?

Investigation Questions

How does the appearance of a substance change when it changes phase? (1.2)

What happens to the molecules of a substance when it changes phase? (1.3-1.6)

Evidence sources and reflection opportunities

- Observe phase change videos (1.2)
- Discuss the properties of substances in different phases using unit vocabulary (1.2)
- Read "Titan Fact Sheet" (1.2)

- Observe evaporation and condensation and draw predictions of what a solid, liquid, and gas looks like at the molecular scale (1.3)
- Use the Sim to investigate phase changes at the molecular scale (1.3)
- Read an article from Weird Water Events (1.4)
- …er Events (1.5)
- …at happens to an ice pop when it melts (1.5)

What are students figuring out?

Key concepts

- A solid holds its shape and does not take the shape of its container. (1.2)
- A gas has no visible shape and fills its container. (1.2)
- A liquid flows and can take the shape of its container. (1.2)

- …ules only move in place, not around each other. (1.5)
- …es move around, not away from each other. (1.5)
- …because gas molecules can move away from each other.
- A phase change is when the molecules that make up a substance experience a change to their freedom of movement. This phase change involves a macro-scale change in appearance. (1.5)
- A change that can be observed at the macro-scale can be explained by a change at the molecular scale, which cannot be observed with the naked eye. (1.6)

Application of key concepts to problem

- Use the Modeling Tool to show what would happen if the lake on Titan froze or evaporated and write a short explanation to support each model (1.6)

Explanation that students can make to answer the Chapter 1 Question

The methane lake on Titan began as a liquid. The liquid methane could flow because the molecules can move around one another, but not apart from one another. If the lake froze, the liquid methane would become a solid. Solid methane would keep its shape because the molecules in a solid can only move in place, but they cannot move around one another or apart. If the lake evaporated, the liquid methane would have become a gas. Methane gas would not have a visible shape because gas molecules can move away from one another.

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Chapter 1: Describing Phase Change at Two Scales

JUMP DOWN TO CHAPTER OVERVIEW

Lesson 1.1:
Pre-Unit Assessment

SETTINGS

Lesson 1.2:
Introducing Titan's Disappearing Lake

Lesson 1.3:
Investigating the Molecular Scale

Lesson 1.4:
Weird Water Events

Lesson 1.5:
Investigating Evaporation and Freezing

Lesson 1.6:
Modeling the Molecular Scale

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- Use the Sim to investigate phase changes at the molecular scale (1.3)
- Read an article from Weird Water Events (1.4)
- Revisit an excerpt from Weird Water Events (1.5)
- Use the Modeling Tool to show what happens to an ice pop when it melts (1.5)

Key concepts

- A solid holds its shape and does not take the shape of its container. (1.2)
- A gas has no visible shape and fills its container. (1.2)
- A liquid flows and can take the shape of its container. (1.2)

Application of key concepts to problem

Explanation that students can make to answer the Chapter 1 Question

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Active Reading reflection

- What have you experienced as Active Reading successes in your classroom?
- What has been challenging? How have you overcome this?
- What is something that you would like to practice and improve upon?

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Discussing Annotations

#share	Carefully choose an interesting annotation (comment, question, connection, vocabulary word) you'd like to share with your partner and add #share to this annotation.
#discussed	Add #discussed to your annotation if you feel that you and your partner have resolved a question OR if your discussion gave you a deeper understanding about something in the article.
#present	Add #present to your annotation to mark any unresolved questions or ideas you would like to present to the class.

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Phase Change: Titan's Disappearing Lakes

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Investigation Questions

How does the appearance of a substance change when it changes phase? (1.2)

What happens to the molecules of a substance when it changes phase? (1.3-1.6)

Evidence sources and reflection opportunities

- **Observe evaporation and condensation and draw predictions of what a solid, liquid, and gas looks like at the molecular scale (1.3)**
- **Use the Sim to investigate phase changes at the molecular scale (1.3)**
- **Read an article from Weird Water Events (1.4)**
- **Revisit an excerpt from Weird Water Events (1.5)**
- **Use the Modeling Tool to show what happens to an ice pop when it melts (1.5)**

Why post these key concepts now?

Key concepts

- A gas has no visible shape and fills its container. (1.2)
- A liquid flows and can take the shape of its container. (1.2)

- **A solid keeps its shape because its molecules only move in place, not around each other. (1.5)**
- **A liquid can flow because its molecules move around, not away from each other. (1.5)**
- **A gas does not have a visible shape because gas molecules can move away from each other. (1.5)**
- A phase change is when the molecules that make up a substance experience a change to their freedom of movement. This phase change involves a macro-scale change in appearance. (1.5)
- A change that can be observed at the macro-scale can be explained by a change at the molecular scale, which cannot be observed with the naked eye. (1.6)

Application of key concepts to problem

- Use the Modeling Tool to show what would happen if the lake on Titan froze or evaporated and write a short explanation to support each model (1.6)

Explanation that students can make to answer the Chapter 1 Question

The methane lake on Titan began as a liquid. The liquid methane could flow because the molecules can move around one another, but not apart from one another. If the lake froze, the liquid methane would become a solid. Solid methane would keep its shape because the molecules in a solid can only move in place, but they cannot move around one another or apart. If the lake evaporated, the liquid methane would have become a gas. Methane gas would not have a visible shape because gas molecules can move away from one another.

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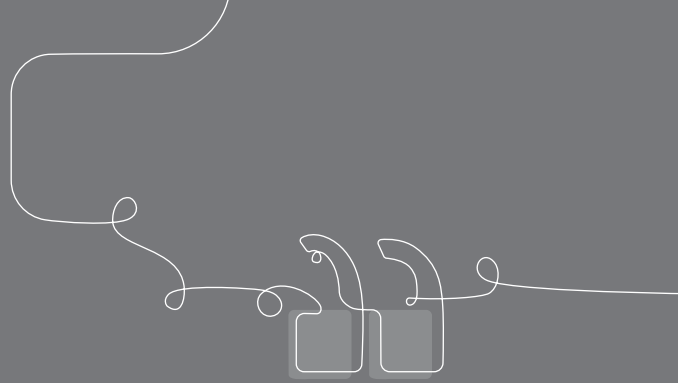

Turn and talk:

- Why do you think the key concept was posted at this point in the chapter?

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Engaging with ideas over multiple activities

- Supports all learners
- Supports making connections
- Provides different, related pieces of evidence
- Models what scientists do
- Situates concepts in a variety of contexts

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Break

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What happens to the molecules of a substance when it changes phase? (1.3-1.6)

What can we explain with these ideas?

Evidence sources and reflection opportunities

- Obs
- Dis in c voc
- Read Titan Fact Sheet (1.2)

erve evaporation and condensation and draw predictions of what a solid, liquid, and looks like at the molecular scale (1.3)
the Sim to investigate phase changes at the molecular scale (1.3)
d an article from Weird Water Events (1.4)
sit an excerpt from Weird Water Events (1.5)
the Modeling Tool to show what happens to an ice pop when it melts (1.5)

Key concepts

- **A solid holds its shape and does not take the shape of its container. (1.2)**
- **A gas has no visible shape and fills its container. (1.2)**
- **A liquid flows and can take the shape of its container. (1.2)**

- **A solid keeps its shape because its molecules only move in place, not around each other. (1.5)**
- **A liquid can flow because its molecules move around, not away from each other. (1.5)**
- **A gas does not have a visible shape because gas molecules can move away from each other. (1.5)**
- **A phase change is when the molecules that make up a substance experience a change to their freedom of movement. This phase change involves a macro-scale change in appearance. (1.5)**
- **A change that can be observed at the macro-scale can be explained by a change at the molecular scale, which cannot be observed with the naked eye. (1.6)**

Application of key concepts to problem

- Use the Modeling Tool to show what would happen if the lake on Titan froze or evaporated and write a short explanation to support each model (1.6)

Explanation that students can make to answer the Chapter 1 Question

The methane lake on Titan began as a liquid. The liquid methane could flow because the molecules can move around one another, but not apart from one another. If the lake froze, the liquid methane would become a solid. Solid methane would keep its shape because the molecules in a solid can only move in place, but they cannot move around one another or apart. If the lake evaporated, the liquid methane would have become a gas. Methane gas would not have a visible shape because gas molecules can move away from one another.

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Stop and Jot on your way to lunch

Rate your comfort with the following statement from 1-4 (4 being very comfortable):
I understand how activities within a lesson support students with building complex explanations.

Please also note any needs or wonderings for the afternoon!

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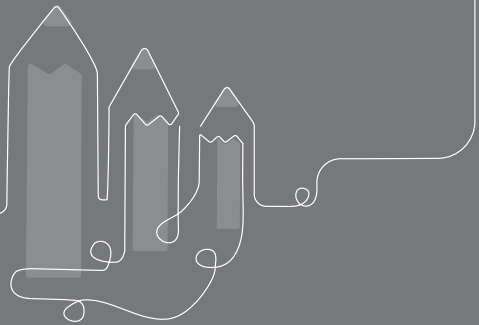
Lunch



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Questions from before lunch!

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Debrief: Unit Build

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19 Lessons

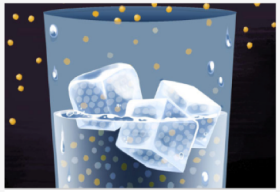
Phase Change

JUMP DOWN TO UNIT GUIDE

GENERATE PRINTABLE TEACHER'S GUIDE

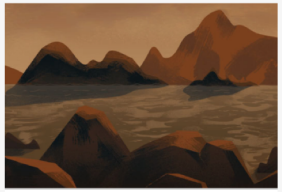
Chapter 1: Describing Phase Change at Two Scales

6 Lessons



Chapter 2: Investigating Energy and Phase Change

3 Lessons



Chapter 3: Investigating Attraction and Phase Change

5 Lessons

Chapter 4: Science Seminar

5 Lessons

Chapter 1 key concepts and explanation

What happened to the liquid in Titan's lake?

Ch	Key concepts	Explanation
1	• A solid holds its shape and does not take the shape of its container. (1.2) • A gas has no visible shape and fills its container. (1.2) • A liquid flows and can take the shape of its container. (1.2) • A solid keeps its shape because its molecules only move in place, not around each other. (1.5) • A liquid can flow because its molecules move around, not away from each other. (1.5) • A gas does not have a visible shape because gas molecules can move away from each other. (1.5) • A phase change is when the molecules that make up a substance experience a change to their freedom of movement. This phase change involves a macro-scale change in appearance. (1.5) • A change that can be observed at the macro-scale can be explained by a change at the molecular scale, which cannot be observed with the naked eye. (1.6)	The methane lake on Titan began as a liquid. The liquid methane could flow because the molecules can move around one another, but not apart from one another. If the lake froze, the liquid methane would become a solid. Solid methane would keep its shape because the molecules in a solid can only move in place, but they cannot move around one another or apart. If the lake evaporated, the liquid methane would have become a gas. Methane gas would not have a visible shape because gas molecules can move away from one another.

The lake underwent a phase change.

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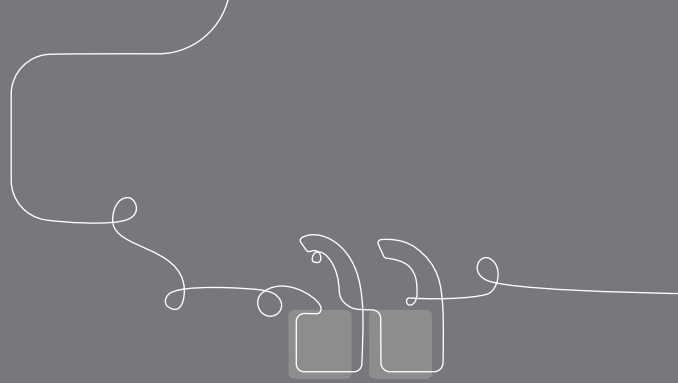

Turn and talk:

- How does formalizing conceptual understanding by posting key concepts support students in solving the unit problem?

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Ch	Key concepts	Explanation
1	• A solid holds its shape and does not take the shape of its container. (1.2) • A gas has no visible shape and fills its container. (1.2) • A liquid flows and can take the shape of its container. (1.2) • A solid keeps its shape because its molecules only move in place, not around each other. (1.5) • A liquid can flow because its molecules move around, not away from each other. (1.5) • A gas does not have a visible shape because gas molecules can move away from each other. (1.5) • A phase change is when the molecules that make up a substance experience a change to their freedom of movement. This phase change involves a macro-scale change in appearance. (1.5) • A change that can be observed at the macro-scale can be explained by a change at the molecular scale, which cannot be observed with the naked eye. (1.6)	The methane lake on Titan began as a liquid. The liquid methane could flow because the molecules can move around one another, but not apart from one another. If the lake froze, the liquid methane would become a solid. Solid methane would keep its shape because the molecules in a solid can only move in place, but they cannot move around one another or apart. If the lake evaporated, the liquid methane would have become a gas. Methane gas would not have a visible shape because gas molecules can move away from one another.
2	• When energy is transferred to or from a substance, it can change the molecules' freedom of movement. (2.1) • Temperature is a measure of the average kinetic energy of the molecules of a substance. (2.2) • Transferring energy to a substance increases the kinetic energy of that substance's molecules. Transferring energy from a substance decreases the kinetic energy of that substance's molecules. (2.2)	If the lake on Titan evaporated, energy would have to have been transferred into the methane. This would increase the kinetic energy of the methane molecules. Eventually this could increase the molecules' freedom of movement and the methane could change from a liquid to a gas. If the lake on Titan froze, energy would have to have been transferred out of the methane. This would decrease the kinetic energy of the methane molecules. Eventually this could decrease the molecules' freedom of movement and the methane could change from a liquid to a solid.

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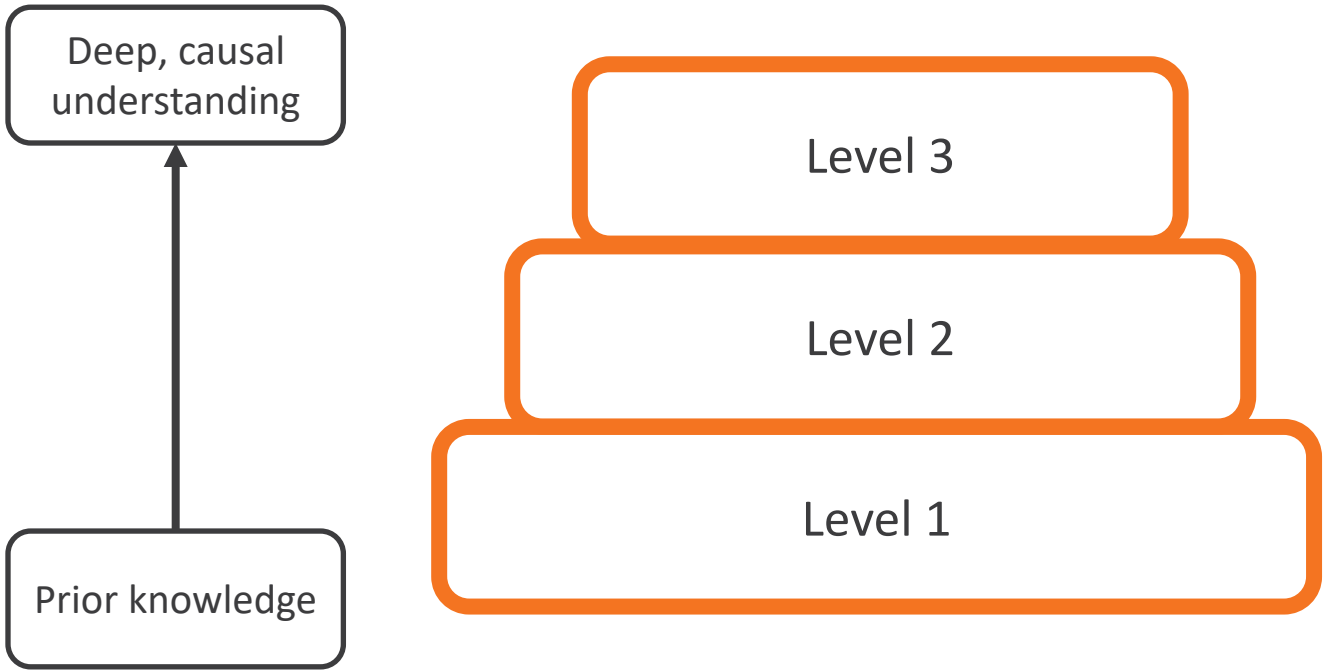
Progress Build: A unit-specific learning progression



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In your group take turns sharing…

- Which ideas are revisited over multiple chapters? (started as foundational but built upon throughout your model?)
- What new ideas are added in each level of your build? (how did you represent new ideas in your model?)

Listening group:

-Listen for what is the same or different about the other group's visual to your own so you can add onto or confirm when you present.

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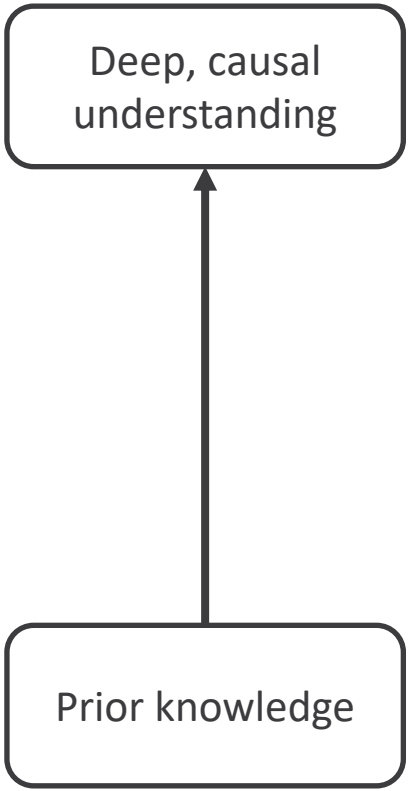
Phase Change Progress Build



Level 3: Molecular attraction affects the amount of energy transfer required for a phase change.

Level 2: Energy transfers cause phase changes.

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

Phase Change

Plan for the day

- Framing and reflection
- Experiencing the unit
- Science Seminar
- Planning to teach
- Closing

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Science Seminar

The purpose of this section is to help you:

- To experience, first-hand, the Phase Change Science Seminar content and format.
- To use a three-dimensional lens when experiencing and reflecting on the culminating unit experience.

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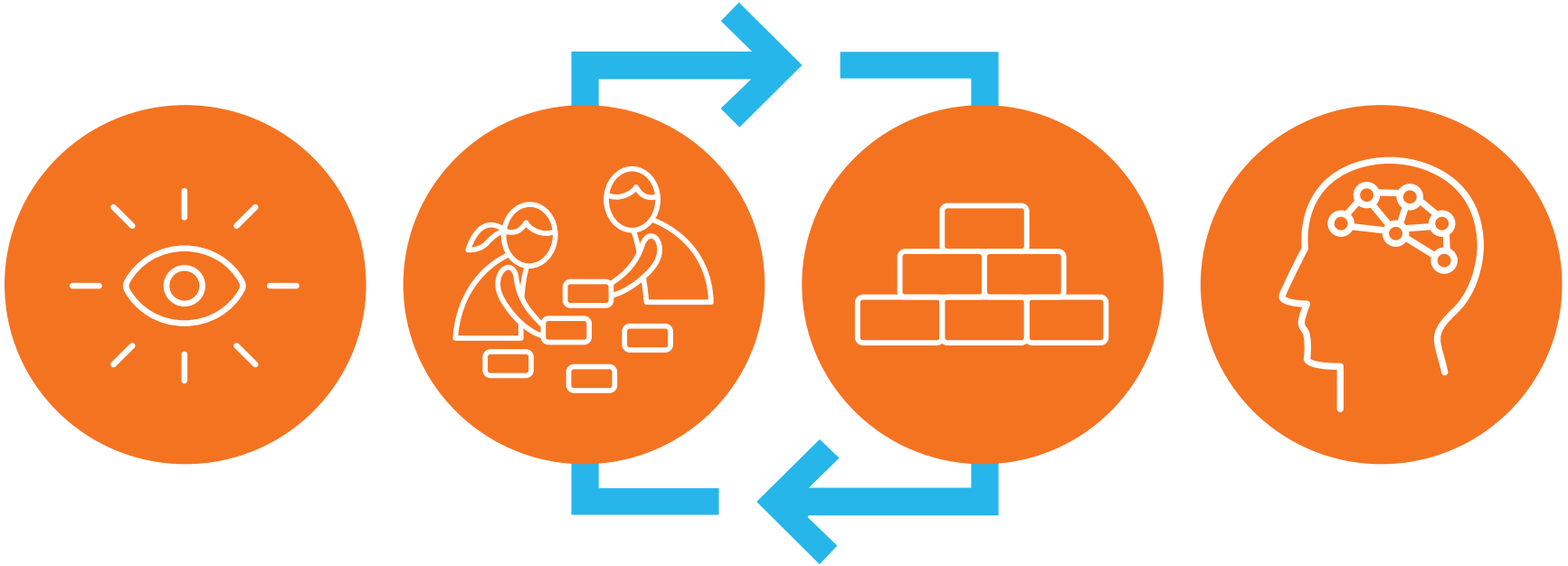
Amplify Science approach



Introduce a phenomenon and a related problem

Collect evidence from multiple sources

Build increasingly complex explanations

Apply knowledge to solve a different problem

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Science Seminar sequence

Considering claims and evidence

Participating in the Science Seminar

Writing an argument

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Goals for the Science Seminar sequence

- Apply content knowledge (DCI's and CCC's) gained throughout the unit to address a new scientific problem
- Highlight practices: making arguments from evidence, constructing explanations, analyzing data, communicating information
- Three-dimensional assessment opportunity
- Engagement: student-centered, open-ended, novel context
- Nature of science: questions with no clear answer

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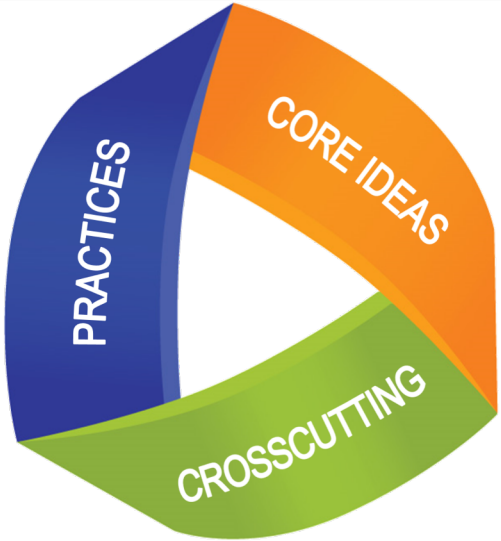
Science Seminar: Thinking three-dimensionally



Disciplinary Core Ideas

- Apply key concepts from previous chapters

Science and Engineering Practices

- Argumentation

Crosscutting Concepts

- Structure and Function

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Science Seminar Question and Claims

Why is the liquid oxygen machine producing less liquid oxygen than normal?

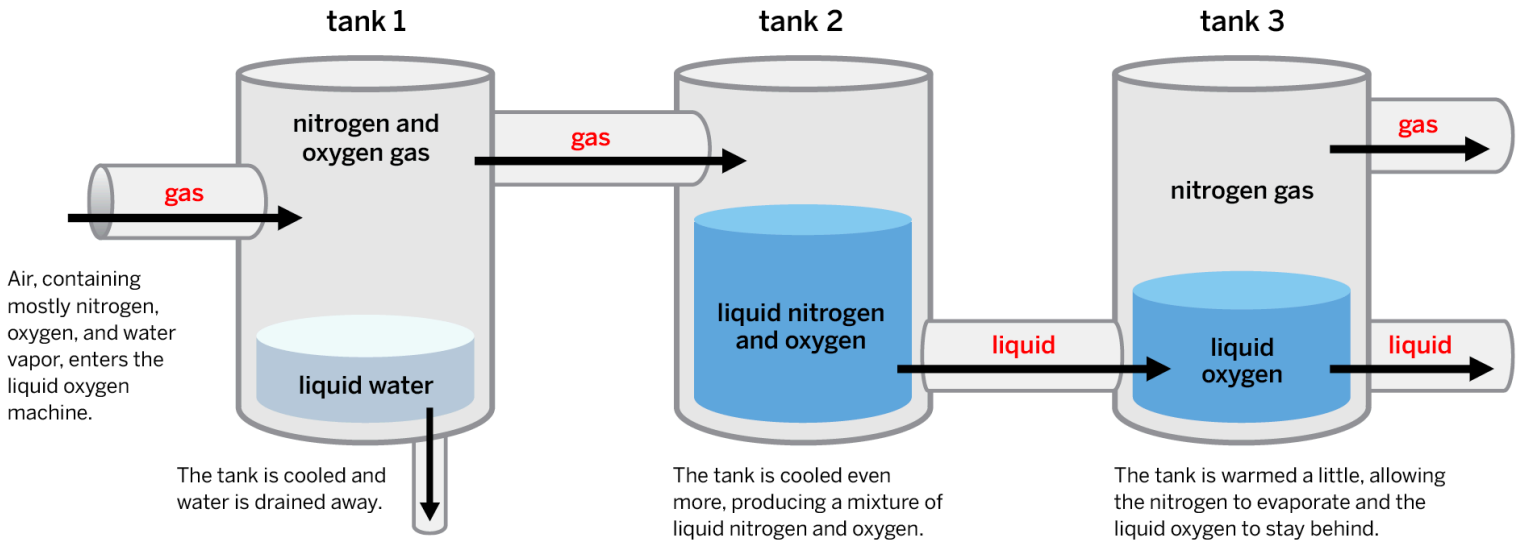
Claim 1: There is frozen water in tank 2, which is blocking some of the oxygen from going into tank 3.

Claim 2: Some of the liquid oxygen evaporated in tank 3.

Claim 3: Some of the oxygen didn't condense in tank 2.

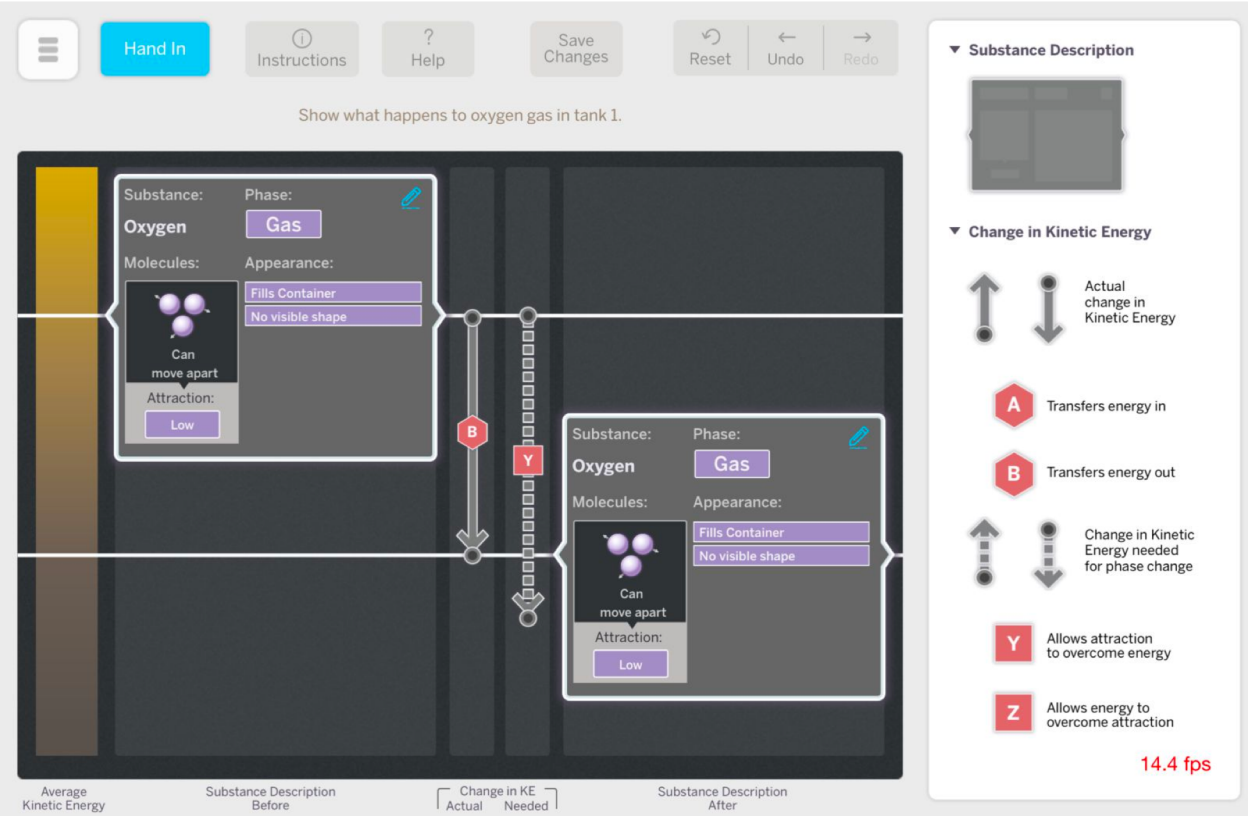
lify.

Liquid Oxygen Machine



lify.

Tank 1



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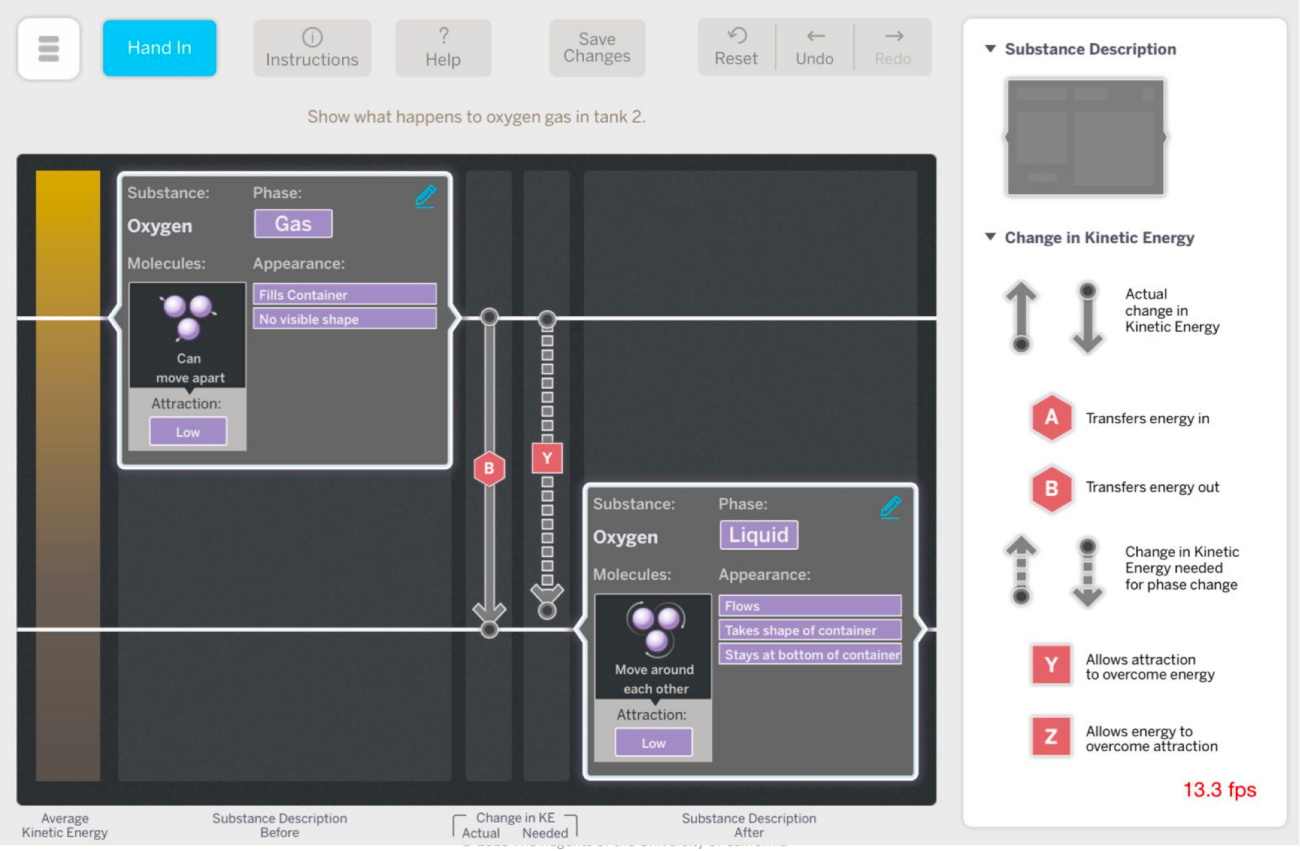
Tank 2



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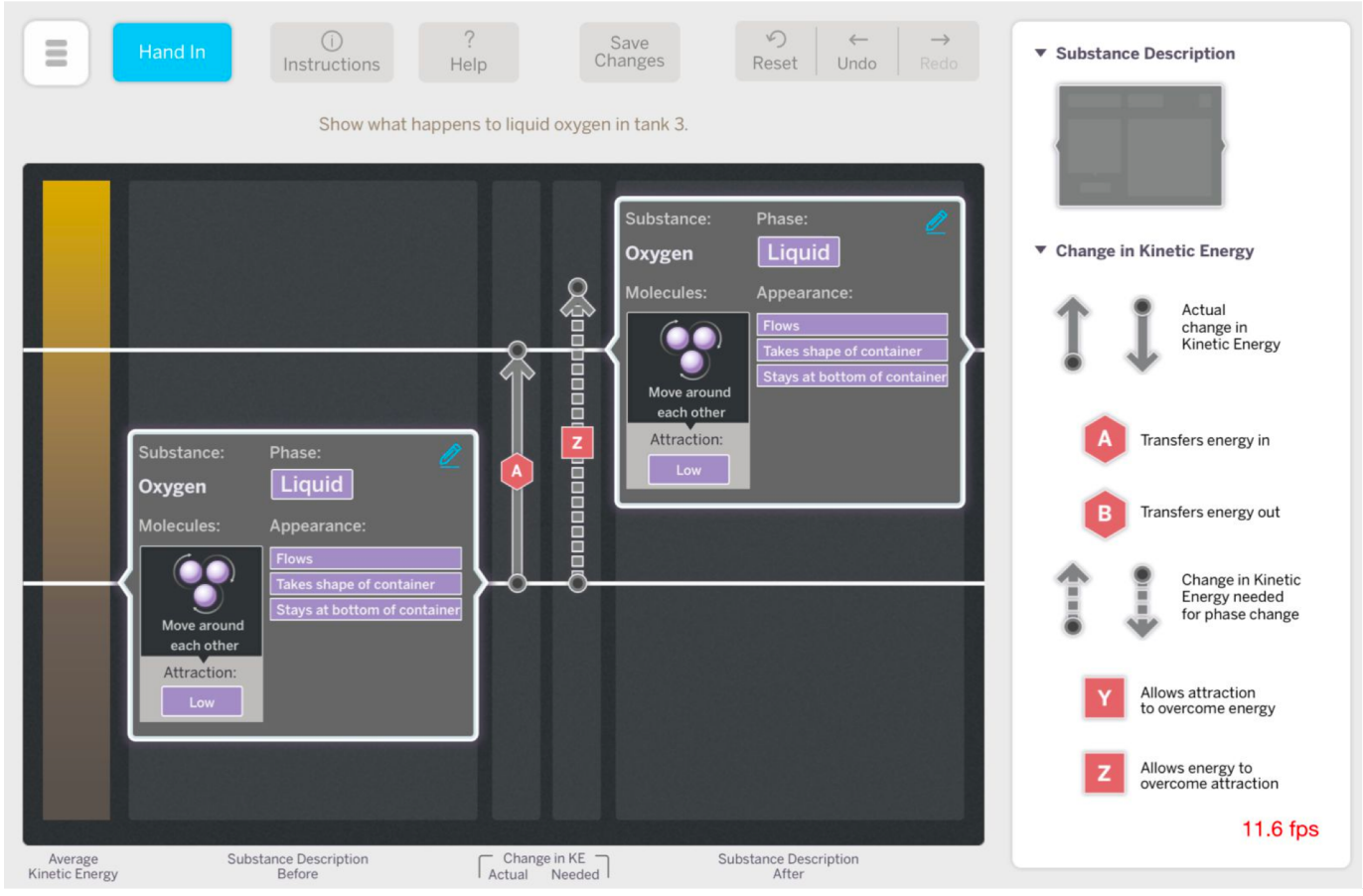
Tank 3



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Science Seminar Question and Claims

Why is the liquid oxygen machine producing less liquid oxygen than normal?

Claim 1: There is frozen water in tank 2, which is blocking some of the oxygen from going into tank 3.

Claim 2: Some of the liquid oxygen evaporated in tank 3.

Claim 3: Some of the oxygen didn't condense in tank 2.

lify.

Sentence starters

- I think this evidence supports this claim because . . .
- I don’t think this evidence supports this claim because . .
- I agree because . . .
- I disagree because . . .

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Discussing claims and evidence

- Did any of the evidence refute any of the claims? If so, which ones?
- Based on the evidence, can we eliminate any of the claims?

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Science Seminar expectations

Students are expected to:

- Run the conversation.
- Use evidence to support ideas.
- Explain their thinking.
- Listen to one another.
- Respond to one another.
- Be open to changing their minds.

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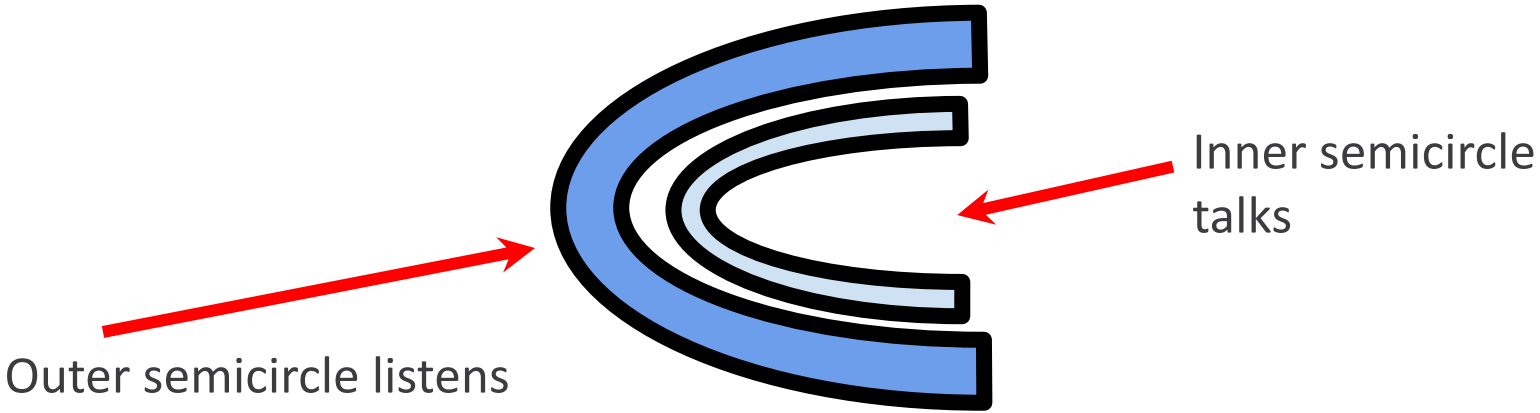
Science Seminar seating

Class arrangement:

- Half the class sits in the inner semicircle.
- The other half of the class sits in the outer semicircle.



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Science Seminar Observations

Write a check mark in the right-hand column every time you hear one of your peers say or do something listed in the left-hand column. If you hear an interesting idea, write it in the last row of the table.

OBSERVATIONS DURING THE SEMINAR	CHECK MARKS
I heard a student use evidence to support a claim.	
I heard a student respectfully disagree with someone else's thinking.	
I heard a student explain how her evidence is connected to her claim.	
I heard a student evaluate the quality of evidence.	
I heard an idea that makes me better understand one of the claims. That idea is: _____ _____	

plify.

Scaffolding talk

Add a new idea with evidence:

- I think _____ because…
- My evidence is…

Agree/Disagree and use evidence:

- I agree/disagree with _____ because...
- I am now convinced that ___ because...

Ask a question

- What is your evidence?
- Given this evidence, how sure are you? How could you be more sure?
- Do you agree or disagree with what _____ said?
- I have a question for _____ about…
- Could you say more about that?
- Could you give us an example?
- I wonder…

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Domino Discover

- Questions to discuss:
  - What challenges might exist for diverse learners in your classrooms in participating in the science seminar sequence?
  - What are some instructional moves you could incorporate to support access, equity of voice and participation?

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Domino Discover

- Criteria for response:
  - Must haves: Explains challenges with details/evidence from past classroom experience.
  - Amazing: Include a strategy you have used or heard others using to solve for the challenge identified.

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Domino Discover

- Directions:
  1. 3 minutes to independently respond to the questions.
  2. First person to share has a birthday closest to today then sharing continues clockwise around the group.
  3. Each person speaks for 30sec. Others listen with no commentary until all have shared.
  4. Rules for sharing: “Add or repeat”- participants can add new ideas or repeat back/confirm another’s response before them.

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Domino Discover- group discussion

- Directions:
  - With your group, take 3 min to identify trends in the challenges identified.
  - Select 1 trend to develop a solution around to be shared out whole group.

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Science Seminar sequence

Considering claims and evidence

Participating in the Science Seminar

Writing an argument

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Reasoning Tool

Did the methane lake on Titan evaporate or freeze before the second photo was taken?

Evidence	Why does this evidence matter?	Therefore, . . .
Evidence Card C stated it had been summer for seven years when the second photo was taken.	Evidence Card C shows that the lake had been exposed to warmer temperatures for seven years.	The lake evaporated.
Evidence Card D stated that more energy is transferred to the lake in the summer than in other seasons.	Evidence Card D connects to the Sim where we observed that transferring energy into a substance causes it to evaporate.	

lify.

Preparing to Write

Before writing your final argument to the Universal Space Agency, answer the questions below. You may want to refer to your completed Reasoning Tool by navigating back to the previous activity.

What is your most convincing piece of evidence?

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Name: _____ Date: _____

Writing a Scientific Argument

When you write your scientific argument to Dr. Flores:

1. Remember to explain how your evidence supports or refutes the claim you selected and why your evidence is significant.
2. Review your Reasoning Tool and annotations on the Liquid Oxygen Machine Diagram on page 105.
3. Use the sentence starters below to help explain your thinking.

Question: *Why is the liquid oxygen machine producing less liquid oxygen than normal?*

Claim 1: There is frozen water in tank 2, which is blocking some of the oxygen from going into tank 3.

Claim 2: Some of the liquid oxygen evaporated in tank 3.

Claim 3: Some of the oxygen didn't condense in tank 2.

Reference information from the "Liquid Oxygen" article:

- Water has a stronger attraction between molecules than oxygen or nitrogen.
- Oxygen has a stronger attraction than nitrogen.

Scientific Argument Sentence Starters

Describing evidence	Explaining how the evidence supports the claim
The evidence that supports (or refutes) my claim is . . .	If_____, then . . .
My first piece of evidence is . . .	This is important because . . .
Another piece of evidence is . . .	Since, . . .
Scientists found . . .	Based on the evidence, I conclude that . . .
	This claim is stronger (or weaker) because . . .

Word Bank

energy	evaporation	freedom of movement	freezing
kinetic energy	molecule	phase change	temperature

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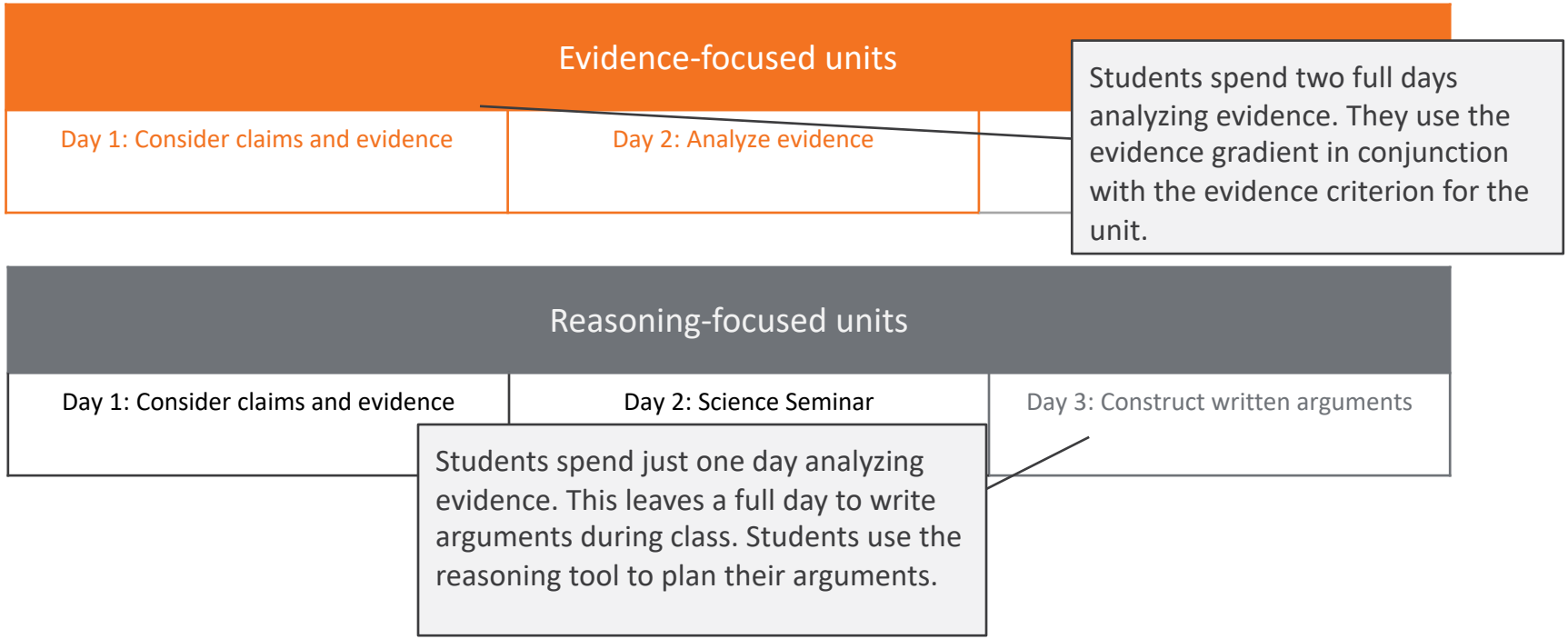
Science Seminar sequence:

Evaluating evidence focus vs. reasoning focus



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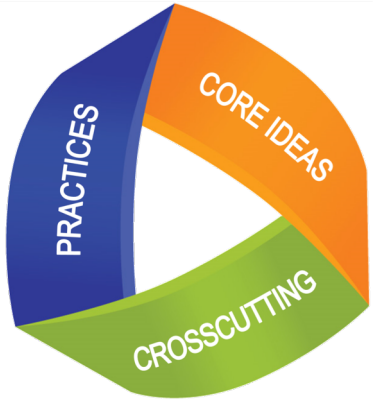
Three-dimensional assessment



Disciplinary Core Ideas

- What science content was there evidence of in the Science Seminar sequence? 1

Science and Engineering Practices

- What components of a strong argument were evident in the Science Seminar sequence? 2

Crosscutting Concepts

- How was the crosscutting concept of Structure and Function referred to in the Science Seminar sequence? 3

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Moving jigsaw

1. Find someone with your same number post-it and compare what you wrote.
2. Look at the appropriate section in the rubric and discuss.

#1s: Disciplinary Core Ideas - page 2

- Read and discuss rubric

#2s: Science and Engineering Practices - page 4

- Read and discuss first page of rubric

#3s: Crosscutting Concepts - page 3

- Read and discuss rubric

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Break

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Phase Change

Plan for the day

- Framing and reflection
- Experiencing the unit
- Science Seminar
- Planning to teach
- Closing

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Planning to teach

The purpose of this part of the day is for you to:

- Reflect on implementing Amplify Science in your classroom to select an area of growth.
- Engage in targeted small group practice in your area of growth.

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Targeted small group work focus areas

- Deepening understanding of content
- Analyzing the End-of-Unit Assessment
- Formative assessment and differentiation
- Internalizing the upcoming unit

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Choosing a focus area

Pg. 5

- While thinking about what to focus on, ask yourself:
  - For which category (1, 2, or 3) did I mark myself as “least comfortable”?
  - Did that change over the course of today’s workshop?
  - Is there a newly illuminated challenge area that I would rather focus on?
  - What would be most helpful to examine collaboratively in this space?

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Setting up your targeted group work

- Determine your group's focus or goal.
- Be prepared to:
  - Share what you chose to focus on.
  - What you learned.
  - Any remaining questions you have.

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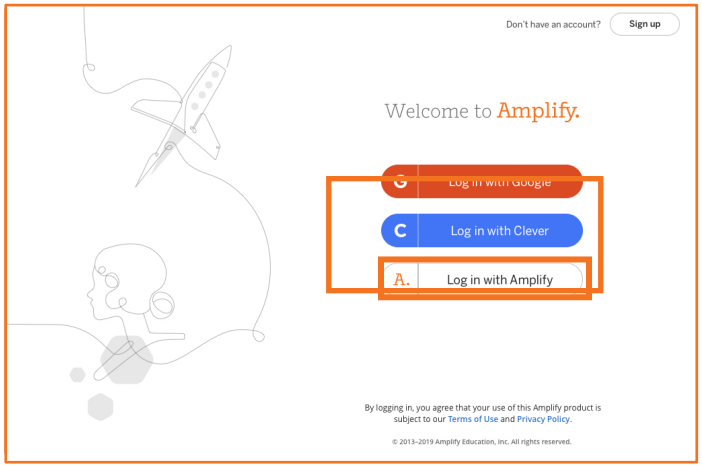
Logging in as teachers (demo account)

Safari or Chrome



1. Navigate to Global Navigation (top left)
2. Select Log out of student account
3. Select Log in with Amplify
4. Enter your teacher demo account credentials
   - XXXX@tryamplify.net
   - Password: AmplifyNumber1

Focus area reflection

Each group select a representative to:

- Share what you chose to focus on.
- What you learned.
- Any remaining questions you have.

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Phase Change

Plan for the day

- Framing and reflection
- Experiencing the unit
- Science Seminar
- Planning to teach
- Closing

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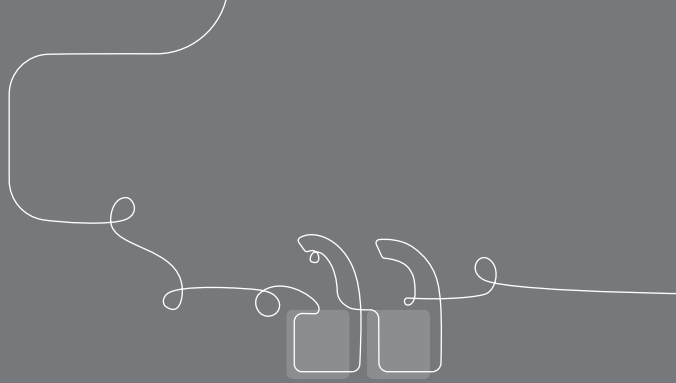
Questions?



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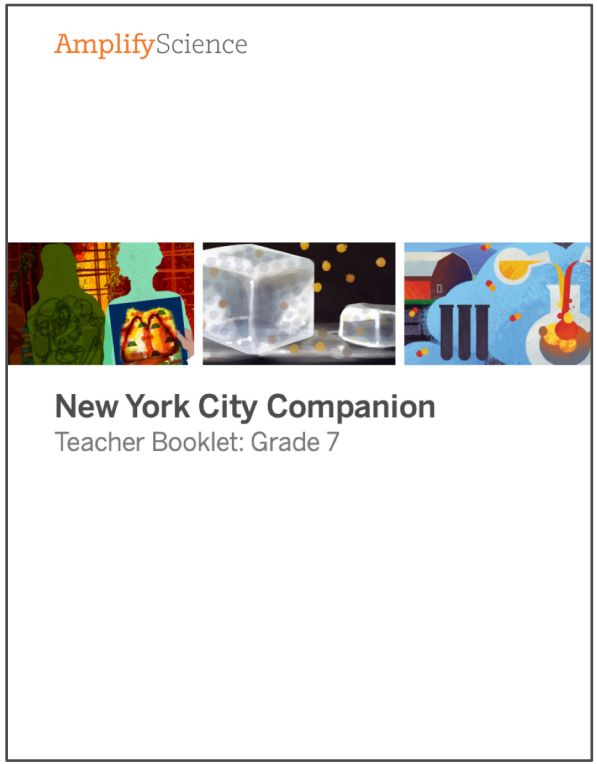
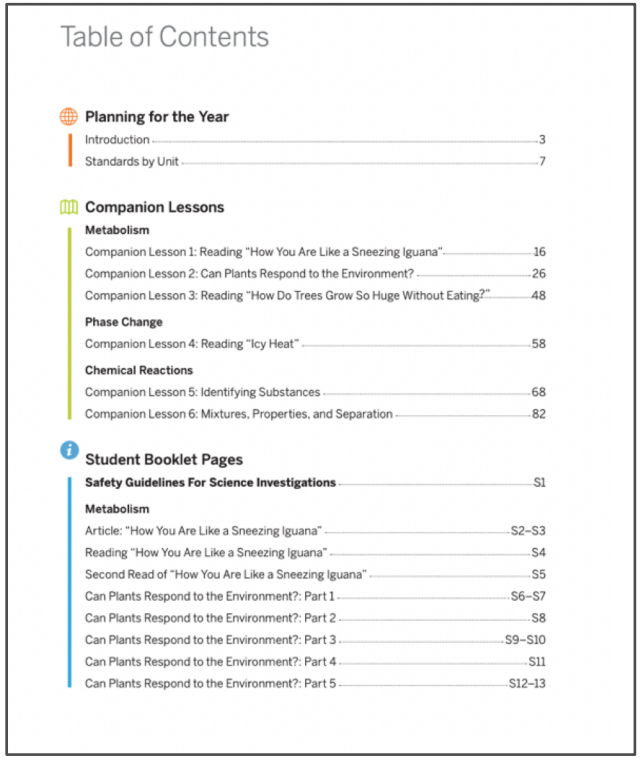
New York City Companions

amplify.com/science/nycresources





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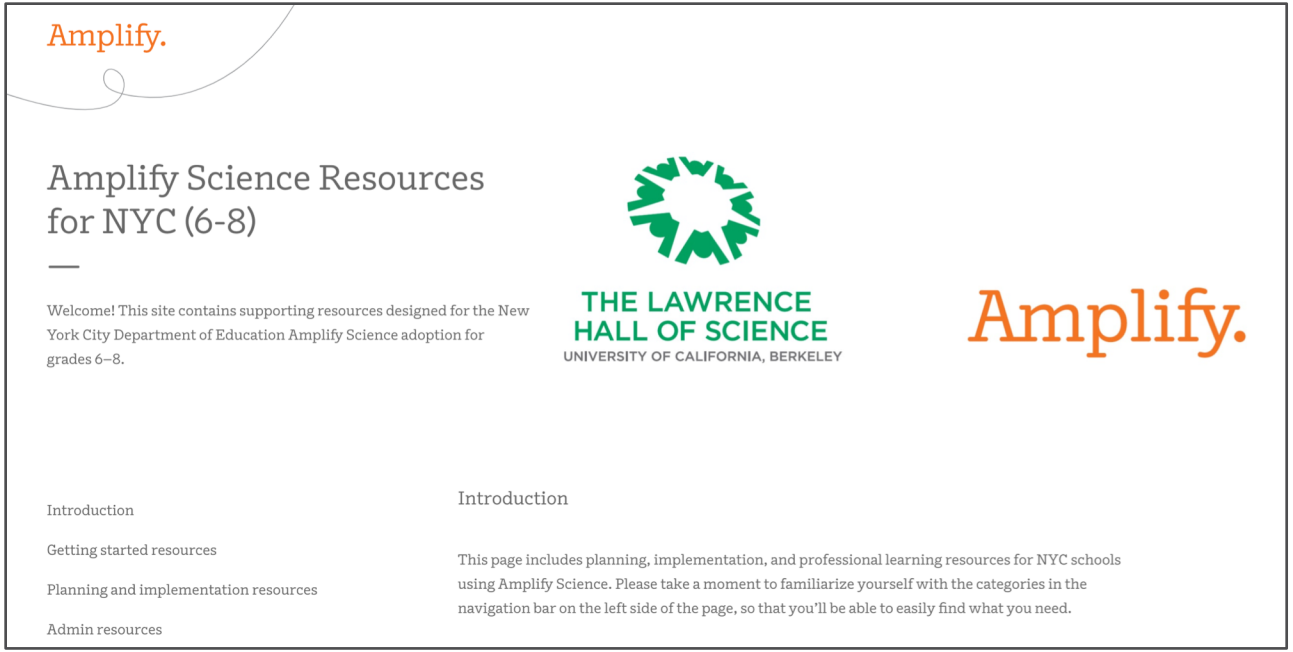
NYC resources site

- amplify.com/science/nycresources



Additional Amplify resources

Program Guide

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

my.amplify.com/programguide

Amplify Help

Find lots of advice and answers from the Amplify team.

my.amplify.com/help

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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

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Additional Amplify support cont.

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.

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Objectives

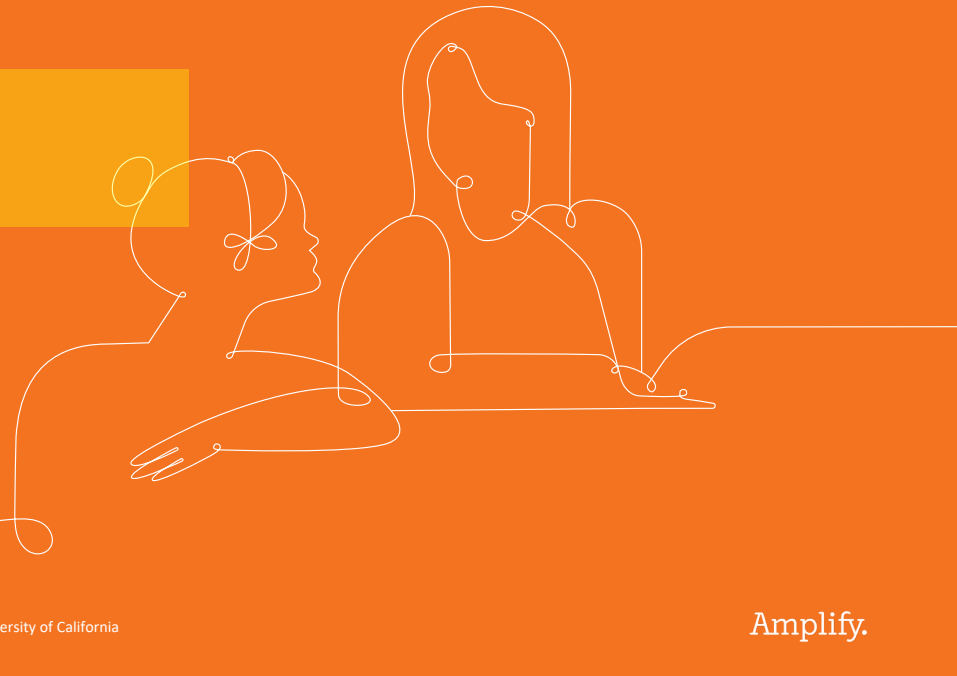
By the end of today, you will be able to:

- Use program resources to understand unit content and plan for supporting student learning
- Reflect on experience with Amplify Science to identify and plan for opportunities for growth in teaching the program
- Explain what students will learn in the unit, and how their understanding will build through the unit
- Describe the content focus and coherence of the unit
- Leverage the Progress Build to gauge student understanding throughout the unit

Thank you for your feedback!

Insert Survey URL

Presenter Name:
Workshop Title:



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Amplify.