Amplify Science

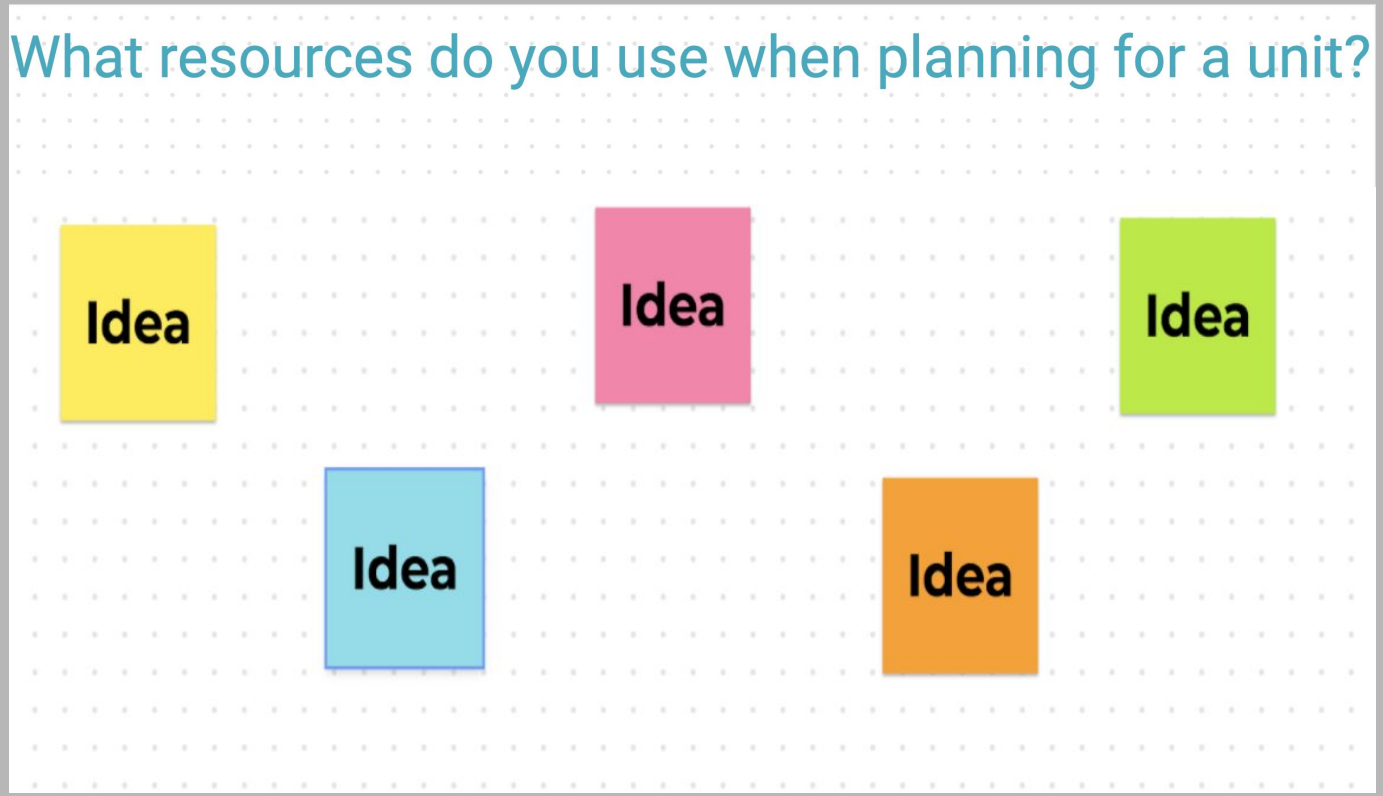
Unit Internalization & Guided Planning

Deep-dive and strengthening workshop
Grade 8, Traits and Reproduction

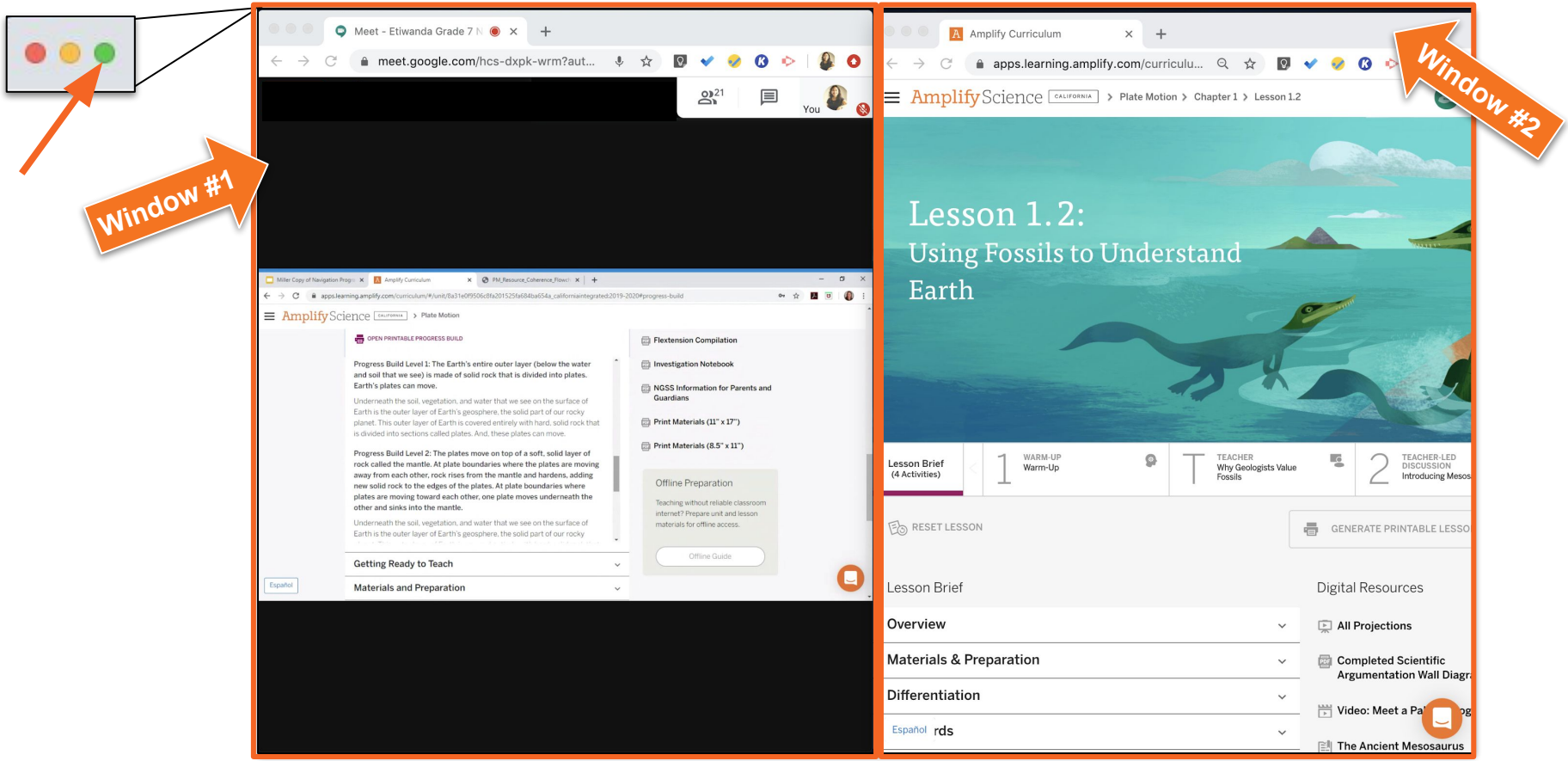
NYCDOE
March 2021
Presented by Your Name

Planning Brainstorm

Click on the Jamboard link and share the resources you use when planning for an upcoming unit.



Use two windows for today's webinar



Remote Professional Learning Norms

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

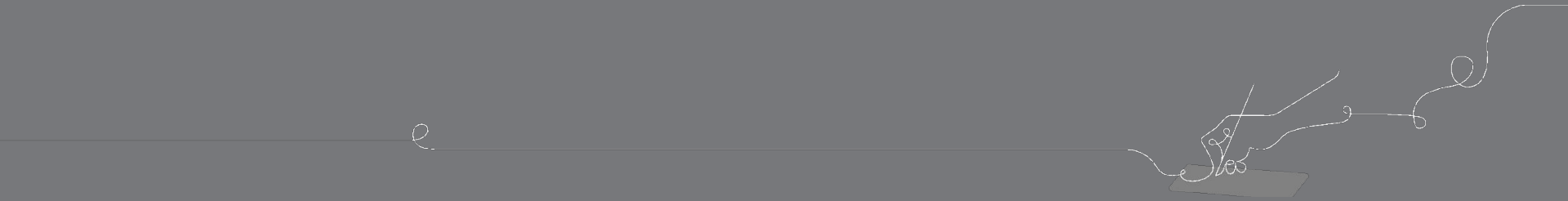
Make sure you have a note-catcher present

Engage at your comfort level - chat, ask questions, discuss, share!

Workshop goals

By the end of this workshop, you will:

- Receive support from an Amplify Science professional learning specialist who will guide effective unit internalization and/ or lesson planning protocols.
- Effectively leverage the use of curriculum resources to address diverse learner needs.



Plan for the day

- Framing the day
  - Revisiting the Amplify Science Approach
  - Instructional Materials
- Unit Internalization
- Planning to teach
  - Collecting evidence of student learning to meet diverse learner needs
  - Planning to differentiate instruction
- Reflection and closing

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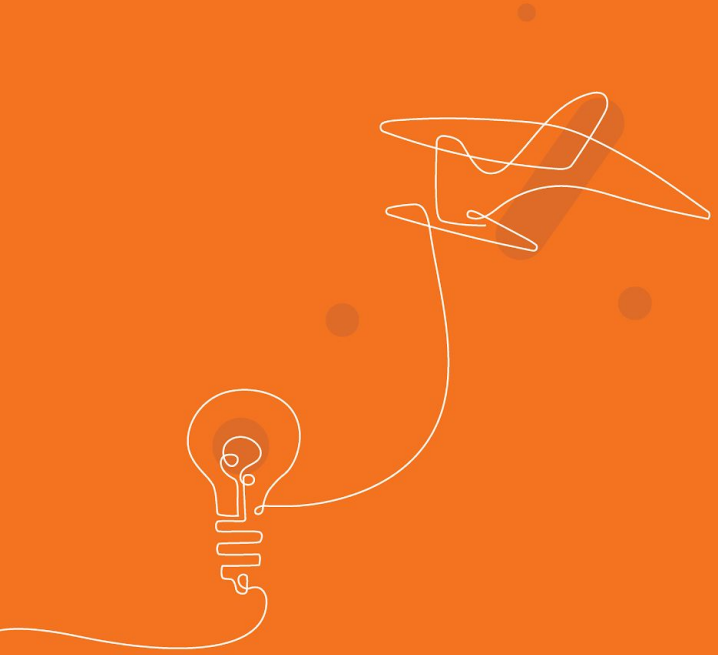


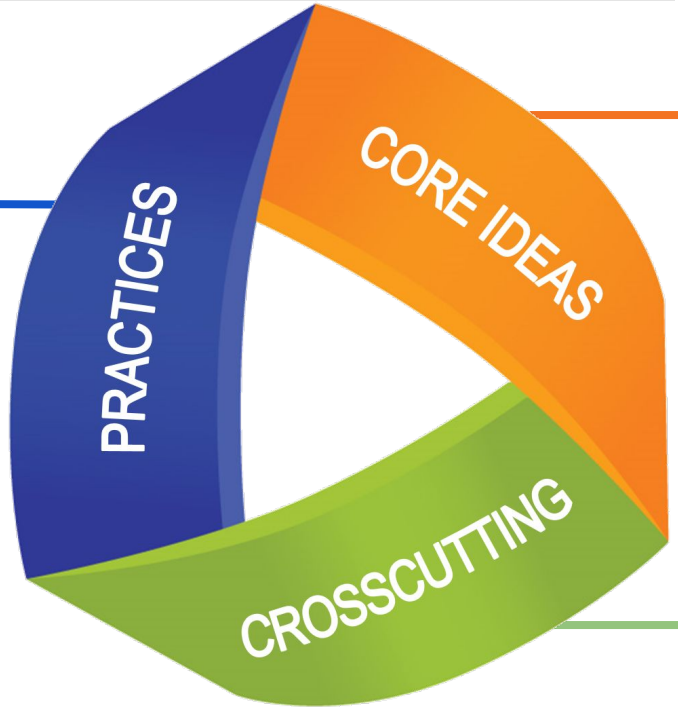
Revisiting the Amplify Science Approach

Next Generation Science Standards

Designed to help students build a cohesive understanding of science

What scientists do

Science and Engineering Practices



What scientists want to know

Disciplinary Core Ideas

How scientists think

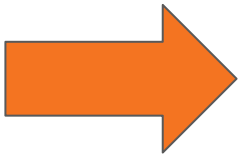
Crosscutting Concepts

Comparing topics and phenomena

A shift in science instruction

from learning about

(like a student)

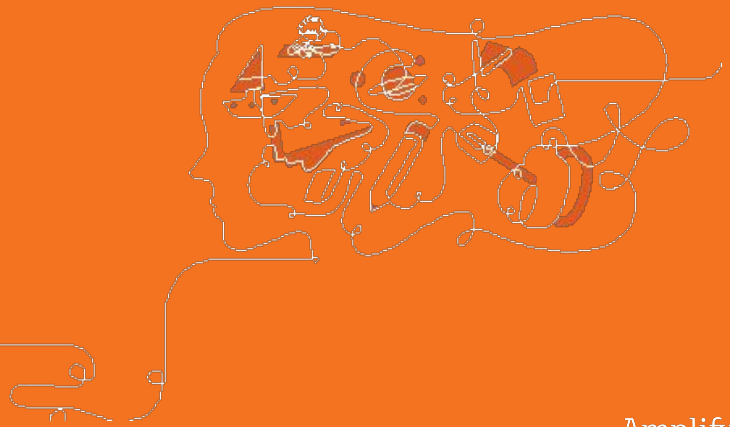


to figuring out

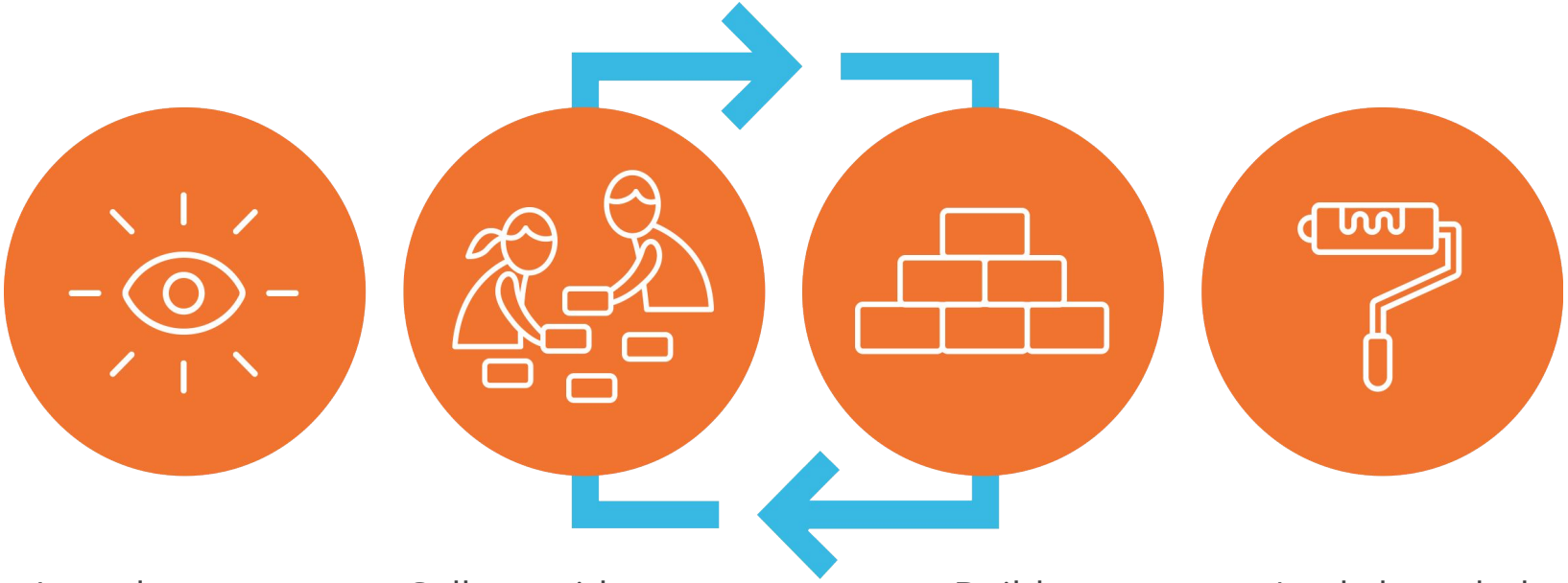
(like a scientist)

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.



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

Do

Talk

Read

Write

Visualize

What is the first step to the Amplify Science Approach?

A Collect evidence from multiple sources

B Introduce a Phenomenon and/or real world problem

C Apply knowledge to solve different problem

D Build an increasingly complex explanation

What are the multiple modalities?

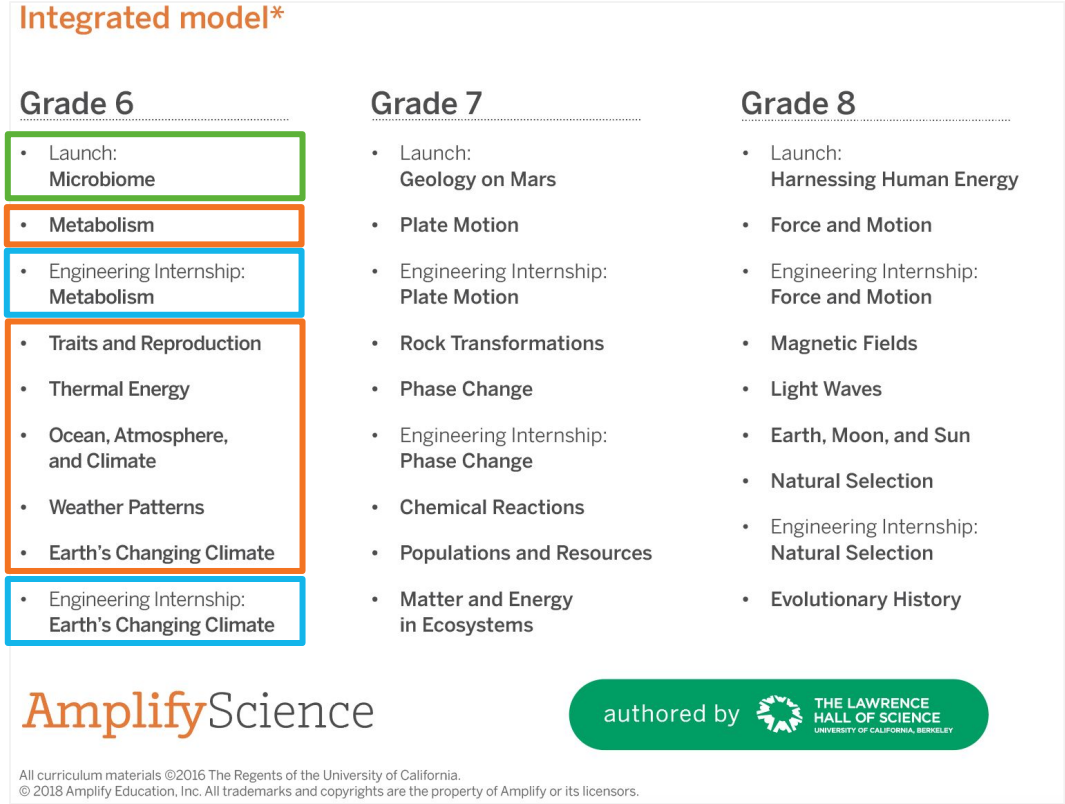
A Do, talk, read, write, visualize

C Do, visualize, hands-on projects

B Read, write, google search

D Reading, writing, math

Middle school course curriculum structure



Launch units

- First unit
- 11 lessons

Core units

- Majority of units
- 19 lessons

Engineering Internships

- Two per year
- 10 lessons

Middle School Curriculum New York City Edition

Grade 6

- Launch: * Harnessing Human Energy
- Thermal Energy
- Ocean, Atmosphere,and Climate
- Weather Patterns
- Populations and Resources
- Matter and Energy in Ecosystems
- 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
- Force and Motion
- Engineering Internship: Force and Motion
- Earth, Moon, and Sun
- Magnetic Fields
- Light Waves
- Traits and Reproduction
- Natural Selection
- Evolutionary History

AmplifyScience

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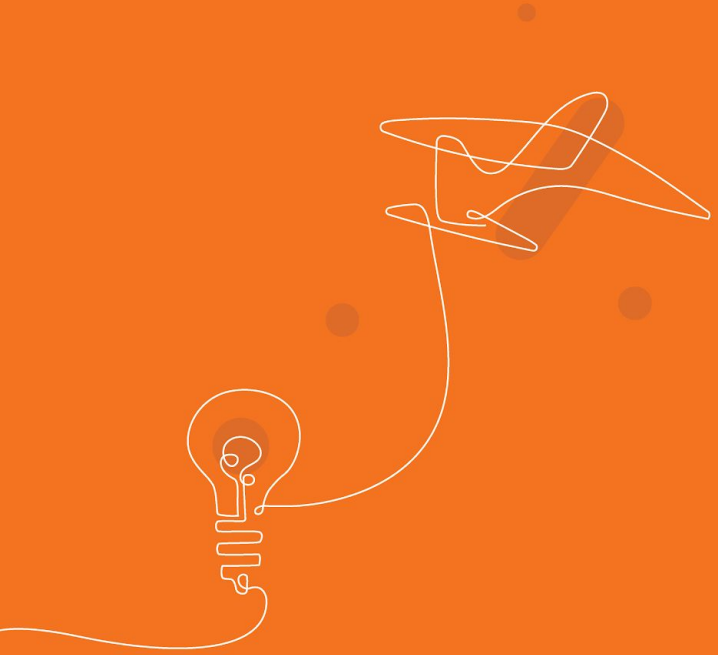
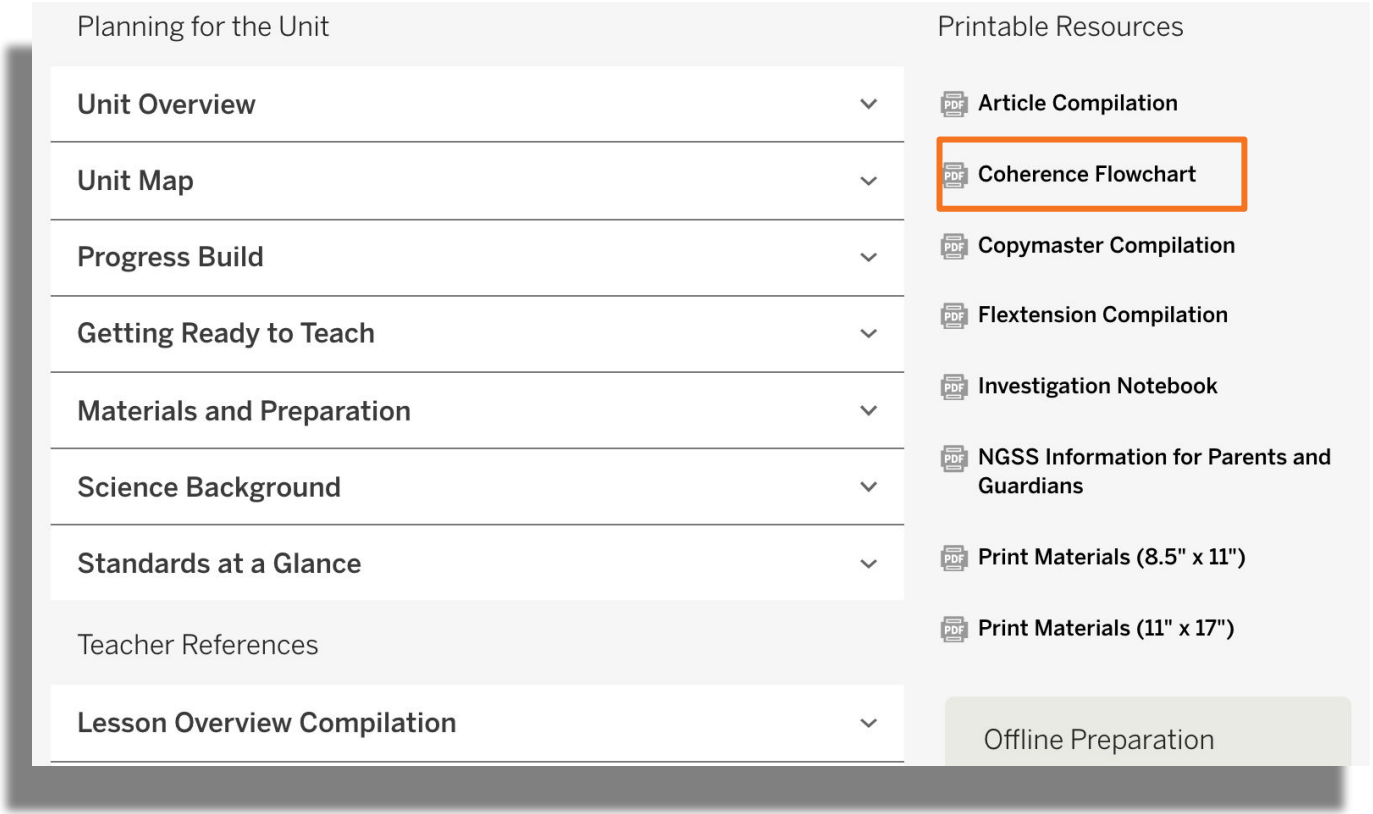
Amplify.



Revisiting Resources

Where do you find all of the Unit Phenomena listed with Unit questions?



Traits and Reproduction: The Genetics of Spider Silk

Problem students work to solve

Why do Darwin's bark spider offspring have different silk flexibility traits even though they have the same parents?

Chapter 1 Question

Why do traits for silk flexibility vary within this family of Darwin's bark spiders?

Investigation Question

What determines an organism's traits at the molecular scale? (1.3-1.5)

Evidence sources and reflection opportunities

- Compare spider traits in the Sim (1.2)
- Read "Surprising Spider Silk" (1.3)
- Build physical models of spider silk protein molecules (1.3)
- Use the Sim to observe protein molecules of spiders with different traits for silk flexibility (1.4)

Key concepts

The function of a protein molecule depends on its structure and how it interacts with other protein molecules. (1.3)

Differences in the structure of protein molecules affect how they connect to other protein molecules. This can result in different traits. (1.4)

Organisms can have different proteins in their cells for a particular feature. (1.5)

Application of key concepts to problem

- Model what determines silk flexibility using the paper Modeling Tool (1.4)
- Use the Sim to make and test predictions about the effects of changing protein shapes (1.5)
- Discuss new evidence and claims (1.5)

Explanation that students can make to answer the Chapter 1 Question

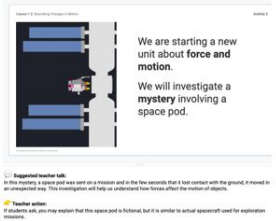
The spiders in this family must have different proteins for silk flexibility in their cells. Variation in traits can be caused by variation in protein molecules within individuals' cells. Protein molecules' structures affect their function and the way they connect to other molecules. Spider silk is made of proteins, and connections between these molecules affect silk flexibility.

Middle school unit resources

Investigation Notebooks or digital student experience

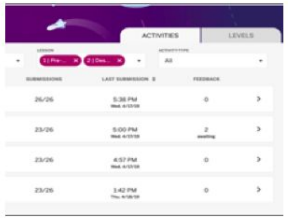
Articles (digital or print)

Simulations and other digital tools



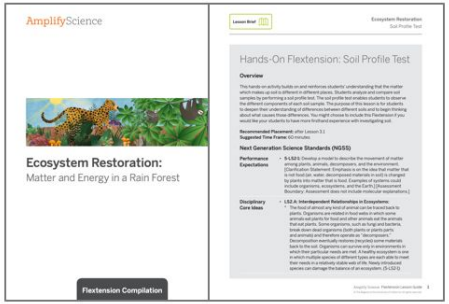
Classroom Slides

Teacher's Guide (digital or print)



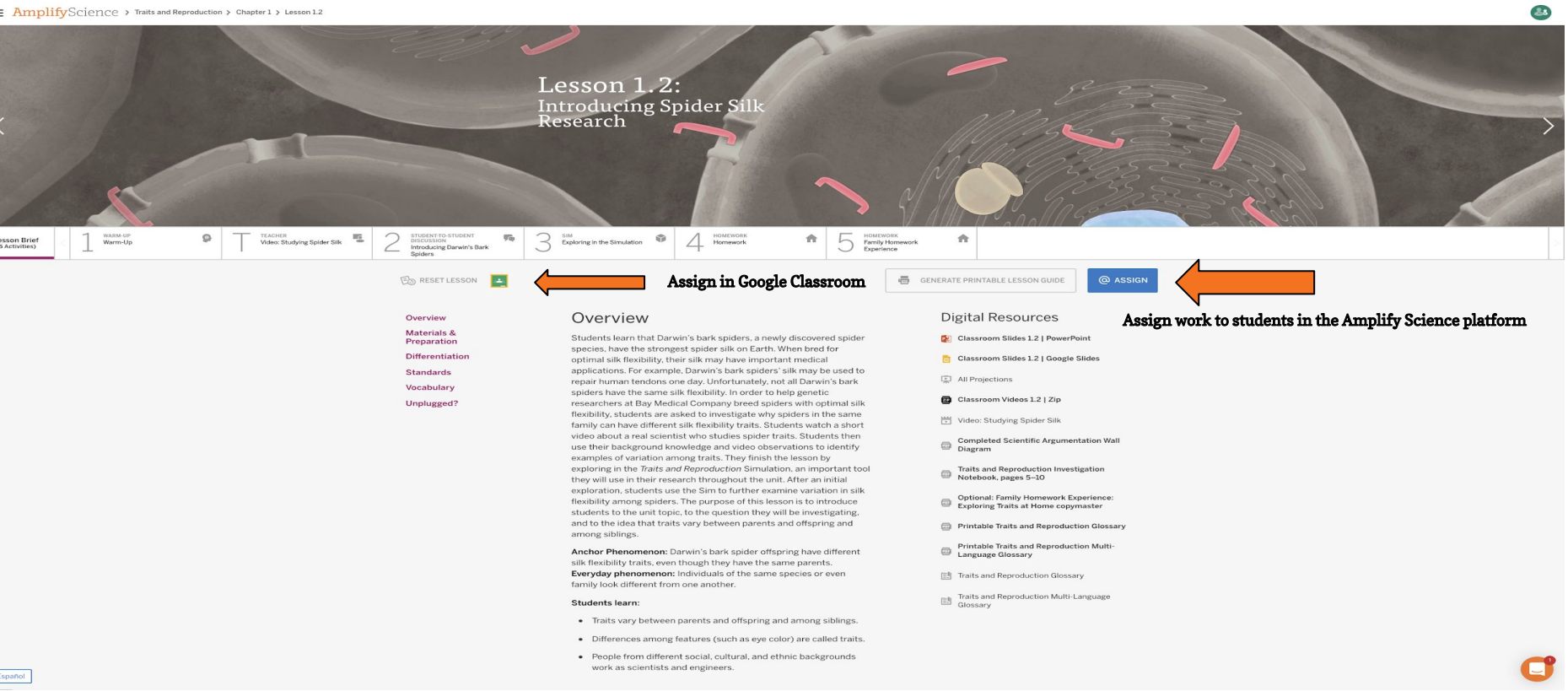
Assessments and Reporting

Hands-on and print materials



Hands-on Flextensions

Middle School Online Component



Welcome Science Educators!

The Amplify Science Program Hub was created to provide you with resources, tools, and advice for all stages of your implementation. Want a tour? Click here!

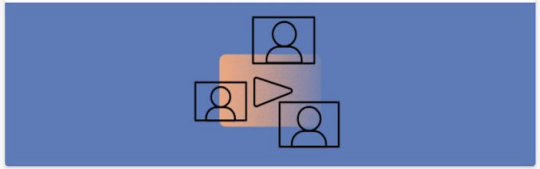
Amplify Science @Home resources

Remote and hybrid learning resources

Amplify Science@Home makes remote and hybrid learning easier.

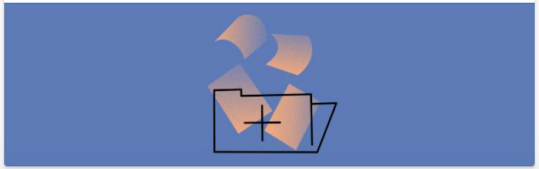
Professional Learning Resources

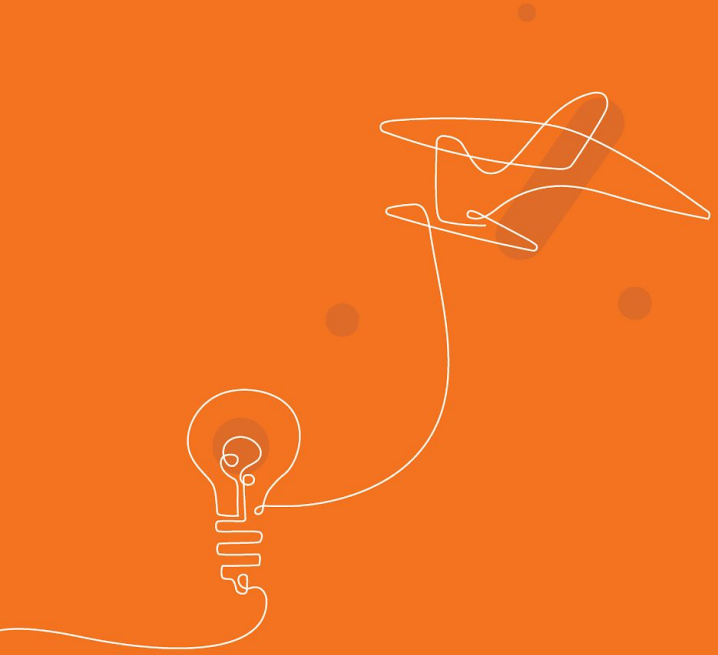
Let's get started!



Additional Unit Materials

Additional resources to complement the units you're teaching.





Instructional Materials

Amplify.

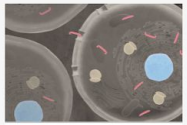
Standard Amplify Science Curriculum

The Traits and Reproduction unit has **19 lessons** across 4 chapters. Each lesson is written to be **45 minutes** long.

Standard Amplify Science Curriculum

JUMP DOWN TO UNIT GUIDE

GENERATE PRINTABLE TEACHER'S GUIDE



Chapter 1: Exploring Variation in Spider Silk

5 Lessons

Chapter 2: Examining Spider Genes

4 Lessons

Chapter 3: Investigating Spider Inheritance

6 Lessons

Chapter 4: Explaining Variation in Running Ability

4 Lessons

Skip slide if modeling live on the platform.

Planning for the Unit

- Unit Overview
- Unit Map
- Progress Build
- Getting Ready to Teach
- Materials and Preparation
- Science Background

Printable Resources

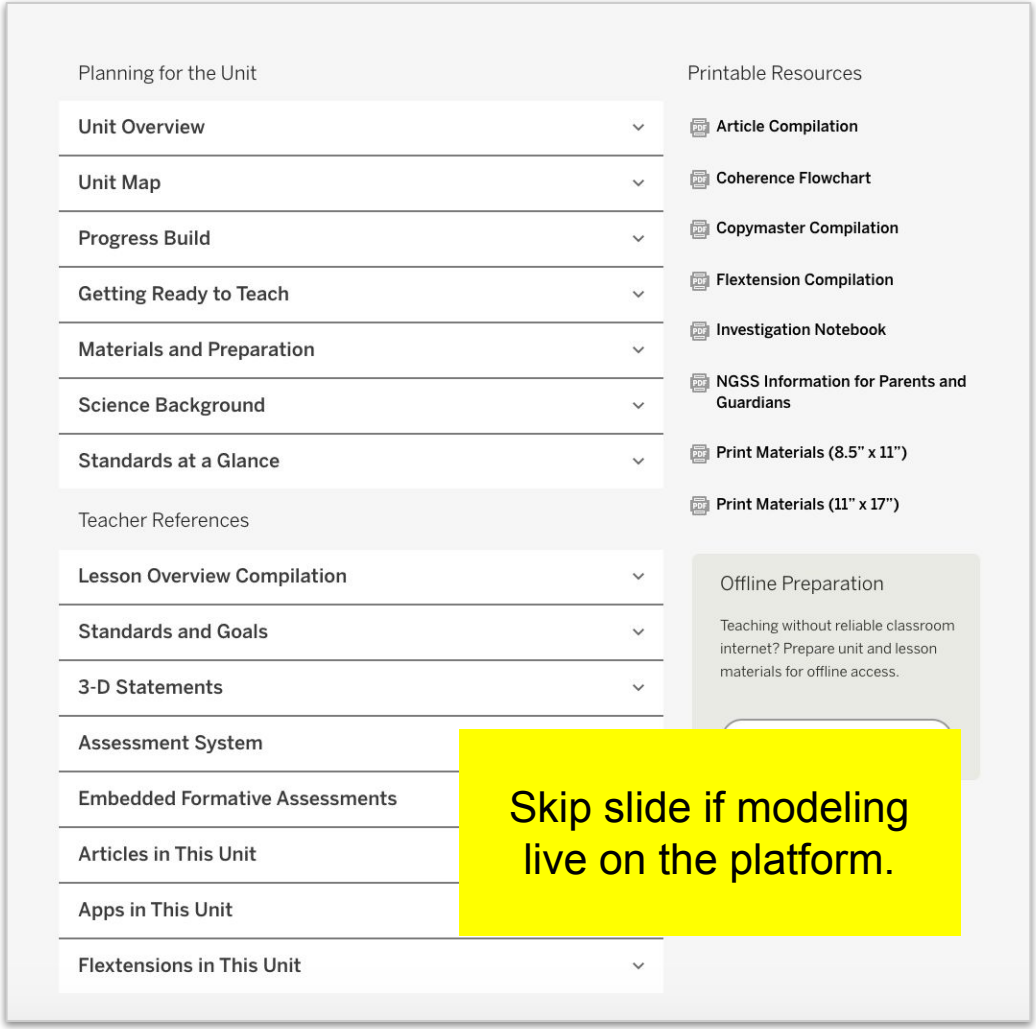
- Article Compilation
- Coherence Flowchart
- Copymaster Compilation
- Flextension Compilation
- Investigation Notebook
- NGSS Information for Parents and Guardians

Español

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.

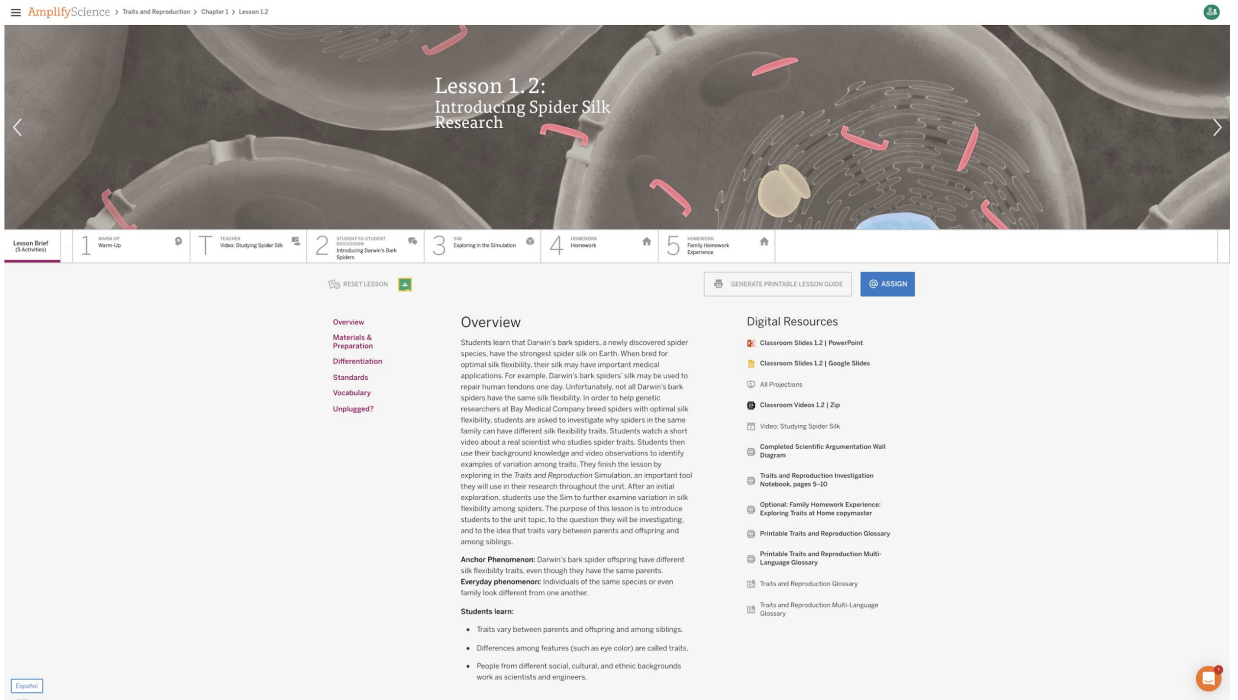


Standard Amplify Science Curriculum

Skip slide if modeling live on the platform.

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

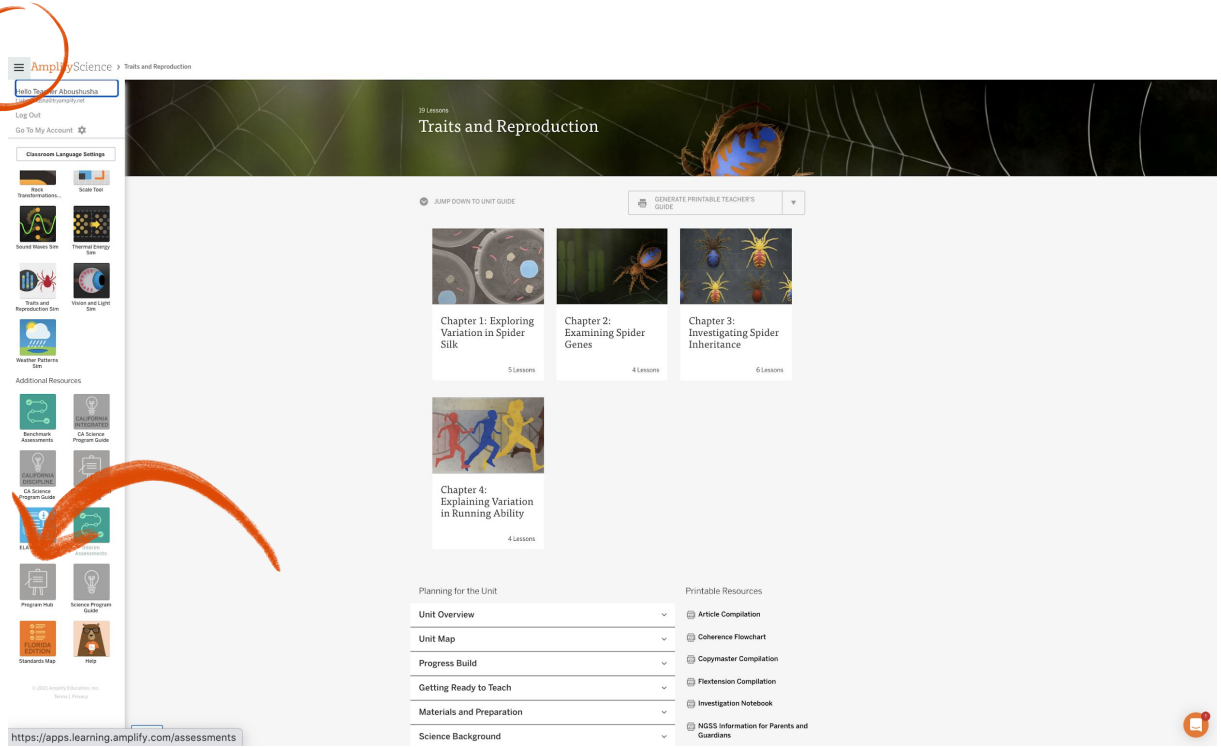
We will be navigating to lessons during today's workshop in order to better plan for collecting evidence of student learning in order to plan to meet the needs of diverse learners.



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.



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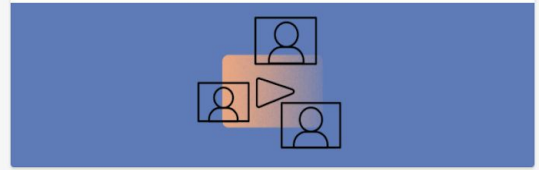

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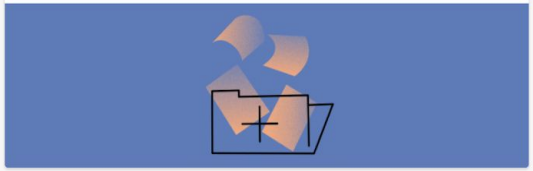


AmplifyScience@Home

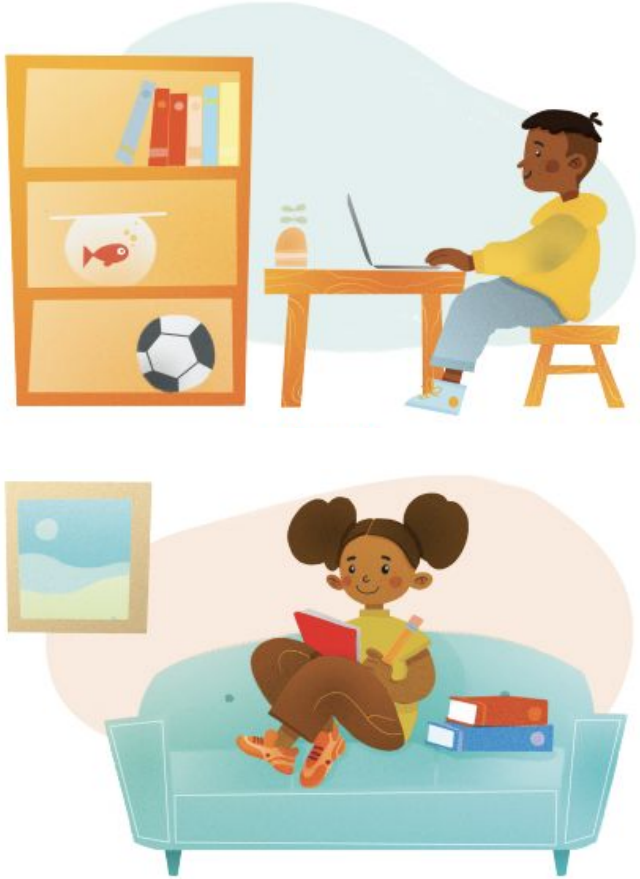
Two different options:

@Home Units

- Packet or slide deck versions of Amplify Science units condensed by about 50%

@Home Videos

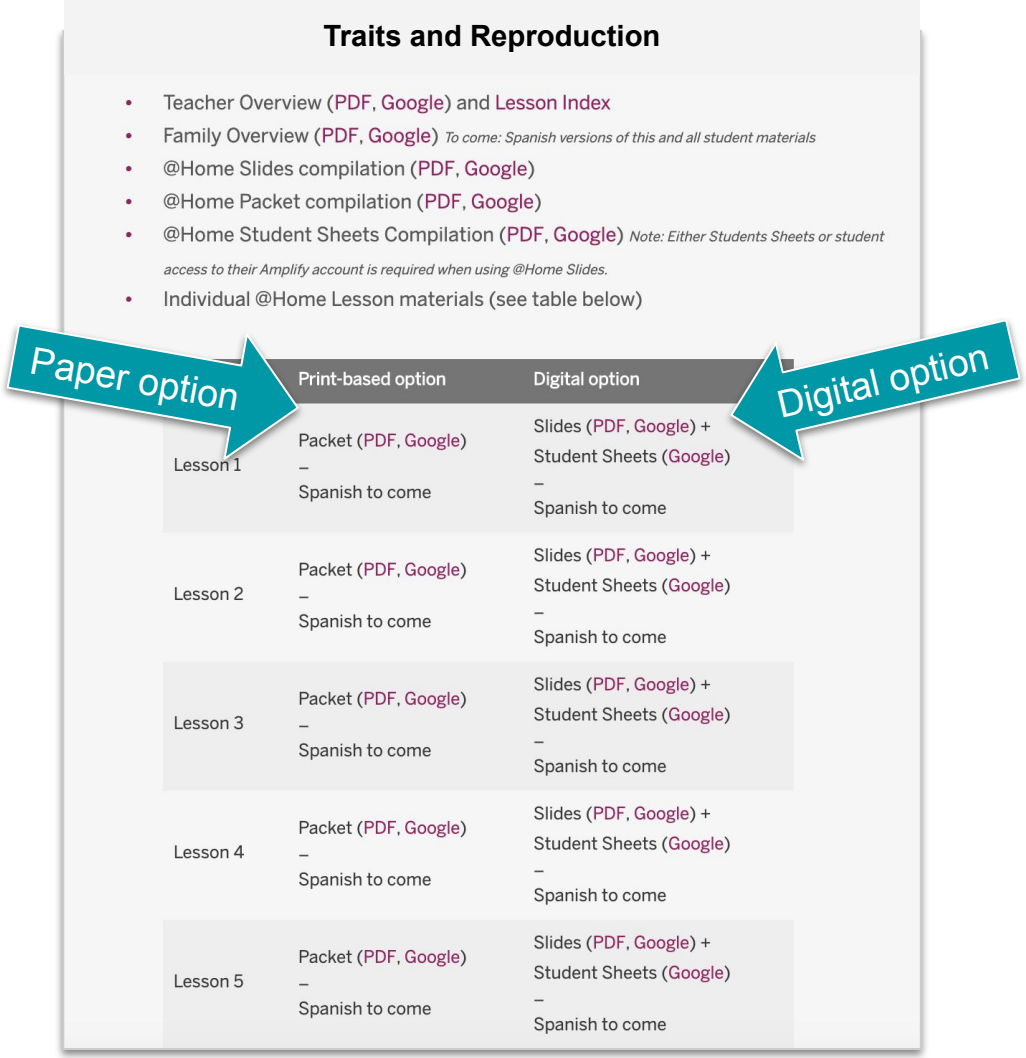
- Video playlists of Amplify Science lessons, taught by real Amplify Science teachers



Amplify Science @Home Curriculum

You will have access to the Traits and Reproduction @Home Unit.

The Traits and Reproduction @Home Unit comes with the option of a packets or slides and student sheets. Each lesson is written to be **30 minutes** long.



Traits and Reproduction

- Teacher Overview (PDF, Google) and Lesson Index
- Family Overview (PDF, Google) *To come: Spanish versions of this and all student materials*
- @Home Slides compilation (PDF, Google)
- @Home Packet compilation (PDF, Google)
- @Home Student Sheets Compilation (PDF, Google) *Note: Either Students Sheets or student access to their Amplify account is required when using @Home Slides.*
- Individual @Home Lesson materials (see table below)

Paper option

Digital option

	Print-based option	Digital option
Lesson 1	Packet (PDF, Google) – Spanish to come	Slides (PDF, Google) + Student Sheets (Google) – Spanish to come
Lesson 2	Packet (PDF, Google) – Spanish to come	Slides (PDF, Google) + Student Sheets (Google) – Spanish to come
Lesson 3	Packet (PDF, Google) – Spanish to come	Slides (PDF, Google) + Student Sheets (Google) – Spanish to come
Lesson 4	Packet (PDF, Google) – Spanish to come	Slides (PDF, Google) + Student Sheets (Google) – Spanish to come
Lesson 5	Packet (PDF, Google) – Spanish to come	Slides (PDF, Google) + Student Sheets (Google) – Spanish to come

Amplify Science @Home Curriculum

You will have access to the Traits and Reproduction@Home Videos.
The @Home Videos cover all lessons except for the assessment lessons. The video playlists on YouTube teach the standard Amplify Science Lessons.

Traits and Reproduction

Note: Assessment lessons are not included. Spanish videos to come.

Instructions:

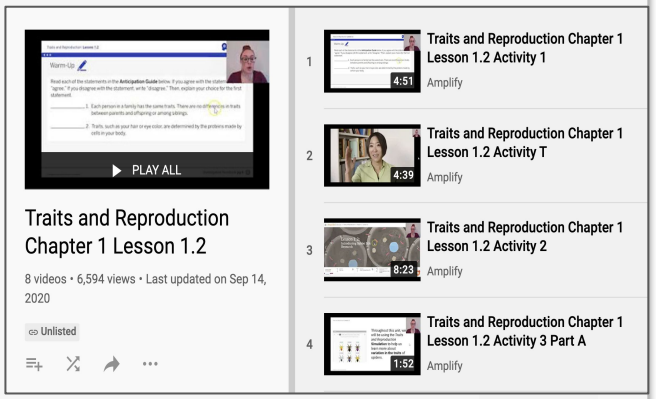
- The @Home Videos are separate from the @Home Units. The lessons listed below correspond with the lessons in the full version of Amplify Science. Each lesson is linked to a playlist of recorded versions of the activities that make up that lesson, which you can share with your students

Chapter 1
- Lesson 1.2
- Lesson 1.3

Chapter 2
- Lesson 2.1
- Lesson 2.2
- Lesson 2.3
- Lesson 2.4
- Lesson 2.6
- Lesson 2.7

Chapter 3
- Lesson 3.1
- Lesson 3.2
- Lesson 3.3
- Lesson 3.4
- Lesson 3.5

Chapter 4
- Lesson 4.1
- Lesson 4.2
- Lesson 4.3



@Home Unit resources

All resources are fully editable and customizable

- **Family Overview**
  - Provides context for families
- **Teacher Overview**
  - Outlines the unit and summarizes each lesson
  - Suggestions for adapting for different scenarios
- **Student materials**
  - ~30-minute lessons (slide decks or packets) featuring prioritized activities from Amplify Science curriculum

@Home Videos

Using the resources

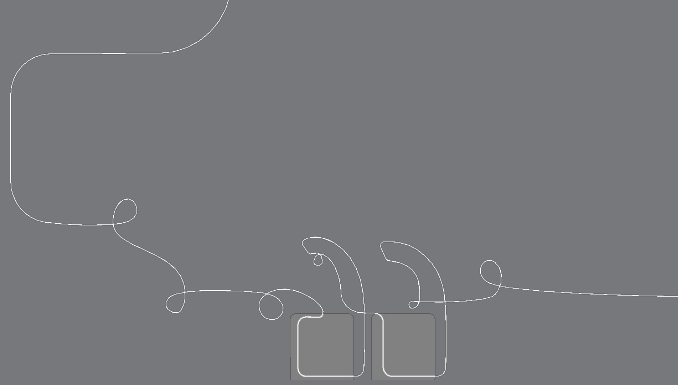
- Assign videos for students to watch during remote, asynchronous time
- Leverage synchronous time for live teaching
  - Lots of time? Teach full lessons
  - Less time? Revisit and preview (see table)

Synchronous time	
In-person	**Online class**
• Discourse routines • Class discussions • Hands-on investigations (option for teacher demo) • Physical modeling activities	• Online discussions • Sim demonstrations • Interactive read-alouds • Shared Writing • Co-constructed class charts

Resource Poll

Which of these resources have you been using?

- ❑ Standard Amplify Science Curriculum
- ❑ @Home Units
- ❑ @Home Videos



Questions?

Plan for the day

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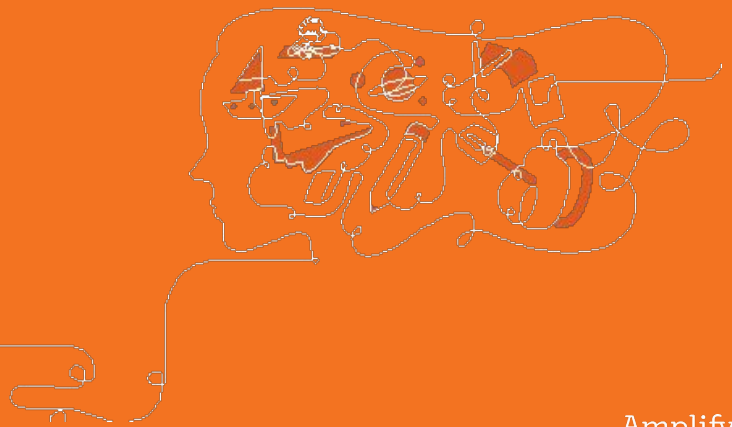
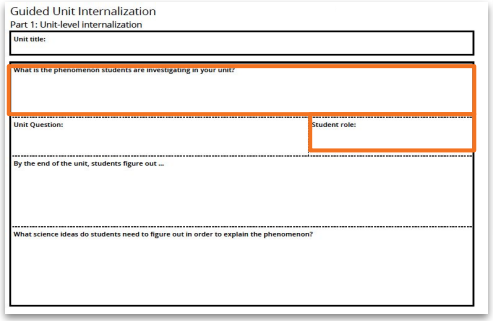
Unit Internalization



What is the student role? What will students figure out in Chapter 1?


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?

Planning for the Unit

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

Teacher References

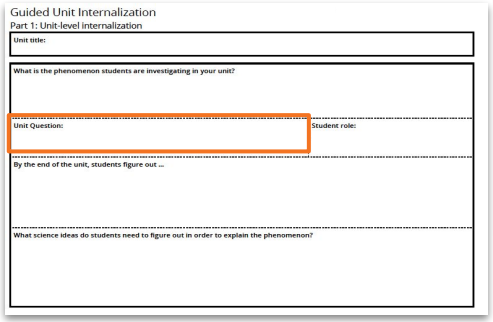
- Lesson Overview Compilation

Printable Resources

- Article Compilation
- Coherence Flowchart
- Copymaster Compilation
- Flextension Compilation
- Investigation Notebook
- NGSS Information for Parents and Guardians
- Print Materials (8.5" x 11")
- Print Materials (11" x 17")

Offline Preparation

What are the Unit and Chapter Questions unit two?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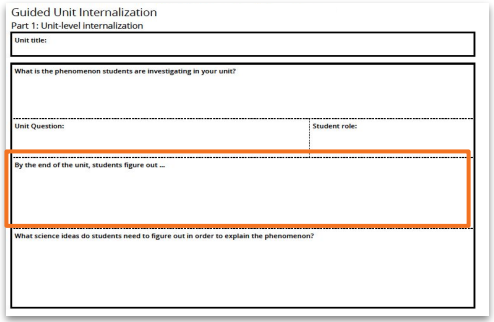
Offline Preparation

By the end of the unit what will the students figure out?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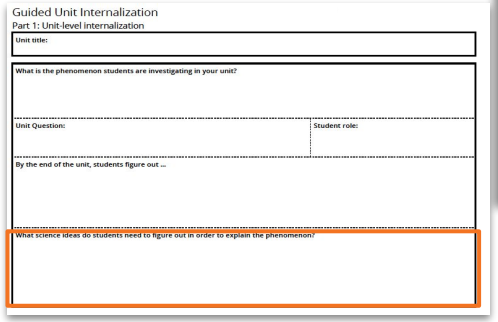
Offline Preparation

What science concepts do students need to figure out in order to build an explanation of the unit phenomena?


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?

Planning for the Unit

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

Teacher References

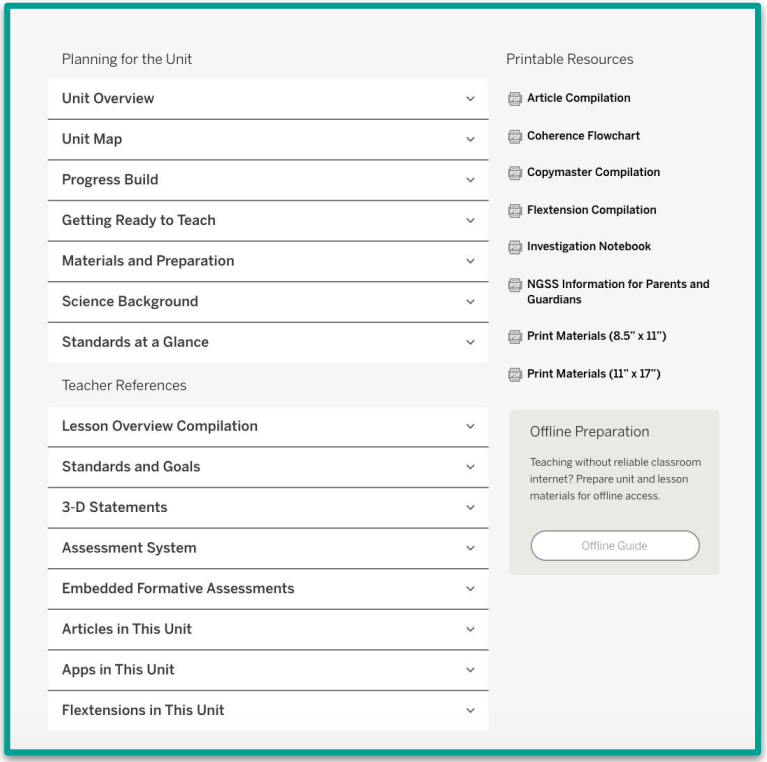
- Lesson Overview Compilation

Printable Resources

- Article Compilation
- Coherence Flowchart
- Copymaster Compilation
- Flextension Compilation
- Investigation Notebook
- NGSS Information for Parents and Guardians
- Print Materials (8.5" x 11")
- Print Materials (11" x 17")

Offline Preparation

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

Guided Unit Internalization

Part 1: Unit-level internalization

Unit title: Traits and Reproduction

What is the phenomenon students are investigating in your unit?

Why do Darwin's bark spider offspring have different silk flexibility traits even though they have the same parents?

Unit Question:
Why do traits vary and why do they vary even between parents and offspring and among siblings?

Student role:
Student Geneticists

By the end of the unit, students figure out ...
JAckie has different traits than her parents. They construct arguments about whether Jackie's unique trait is due to differences in experience, a mutation in Jackie's genes, or just the combination of genes passed on by her parents. They consider evidence about the family's ACTN3 proteins, levels of ACTN3 proteins in Olympic sprinters and long-distance runners, and family members' experience and training. They engage in oral argumentation in a student-led discourse routine called a Science Seminar and then write final arguments.

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

The traits of an organism are determined by the structure of protein molecules and the interactions of those protein molecules in cells. Genes are instructions for producing proteins. Through sexual reproduction, an organism inherits a random combination of gene versions from its parents.

Guided Unit Internalization

Part 1: Unit-level internalization

Unit title:

What is the phenomenon students are investigating in your unit?

Unit Overview

Unit Question:

Lesson Overview Compilation

Student role:

Unit Overview

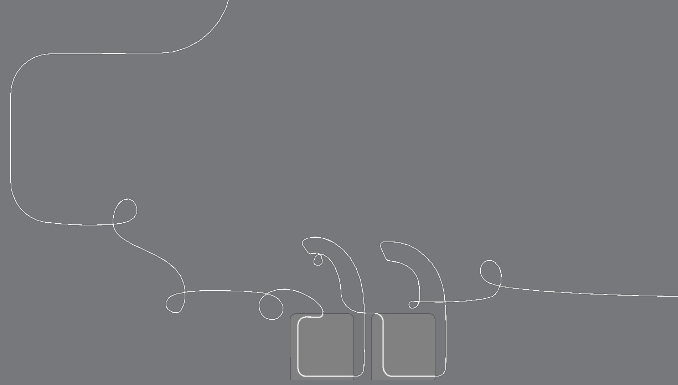
By the end of the unit, students figure out ...

Unit Map, See also Progress Build

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

Unit Map, Progress Build, Science Background Document

Where to Look!

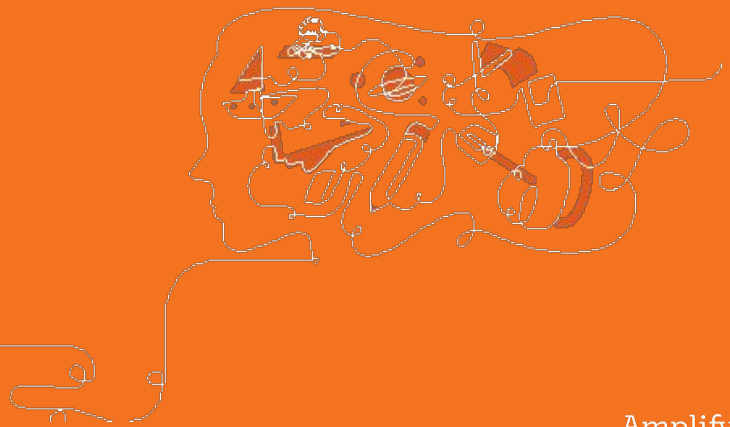


Questions?

Plan for the day

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

Collecting Evidence of Student Learning



Unit Map

Why do Darwin's bark spider offspring have different silk flexibility traits even though they have the same parents?

Scientists and engineers are investigating possible ways spider silk can be used for medical purposes, such as for artificial tendons. Students act as student geneticists to investigate what causes variation in spider silk traits. Specifically, they explain why parent spiders have offspring with widely varied silk flexibility traits. They uncover the roles of proteins and genes and the way that genes are inherited.

Chapter 1: Why do traits for silk flexibility vary within this family of Darwin's bark spiders?

Students figure out: The spiders in this family must have different proteins for silk flexibility in their cells. Variation in traits can be caused by variation in protein molecules within individuals' cells. Protein molecules' structures affect their function and the way they connect to other molecules. Spider silk is made of proteins, and connections between these molecules affect the silk flexibility.

How they figure it out: Students explore traits and proteins in the Sim and test the effect of changing protein molecules. They read short articles about different kinds of spiders and how their silk traits are related to the protein molecules that make up the silk. They build physical models of connected protein molecules to make silk with different levels of flexibility.

Chapter 1: Exploring Variation in Spider Silk

JUMP DOWN TO CHAPTER OVERVIEW

Lesson 1.1:
Pre-Unit Assessment

SETTINGS

Lesson 1.2:
Introducing Spider Silk Research

Lesson 1.3:
Surprising Spider Silk

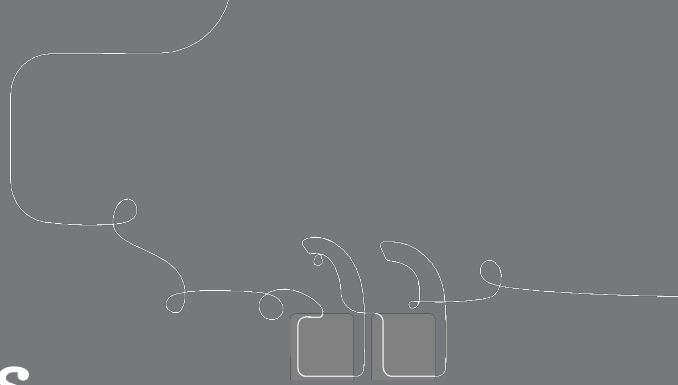
Key Activities

- **Introducing Spider Silk Research:** Students are introduced to the unit problem and their role as student researchers.
- **Talk:** Students are introduced to the Darwin's Bark spider family tree and discuss with a partner their observations about the differences in silk flexibility traits among the spider family.
- **Observe:** Students are introduced to the *Traits and Reproduction* Simulation and make observations of spiders.

Ideas for synchronous or in-person instruction

Before meeting, have students watch the introductory video and read the message from Bay Medical Company. While meeting, introduce the spider family and the vocabulary words *feature* and *trait*. Have students share their initial ideas about the Chapter 1 Question. You can either have students complete the Sim investigation individually, then share observations as a class, or have students observe and record their observations as you show the Sim. If you are meeting in person with students who don't have digital access at home, take the opportunity to have them complete the Sim investigation in class (as in *Traits and Reproduction*, Lesson 1.2, Activity 3).

Reflect and Share:



What are the opportunities within this lesson for teachers to collect evidence of student learning?

Traits and Reproduction

@Home Lesson 1

AmplifyScience

Today, we will begin a new unit called ***Traits and Reproduction*.**

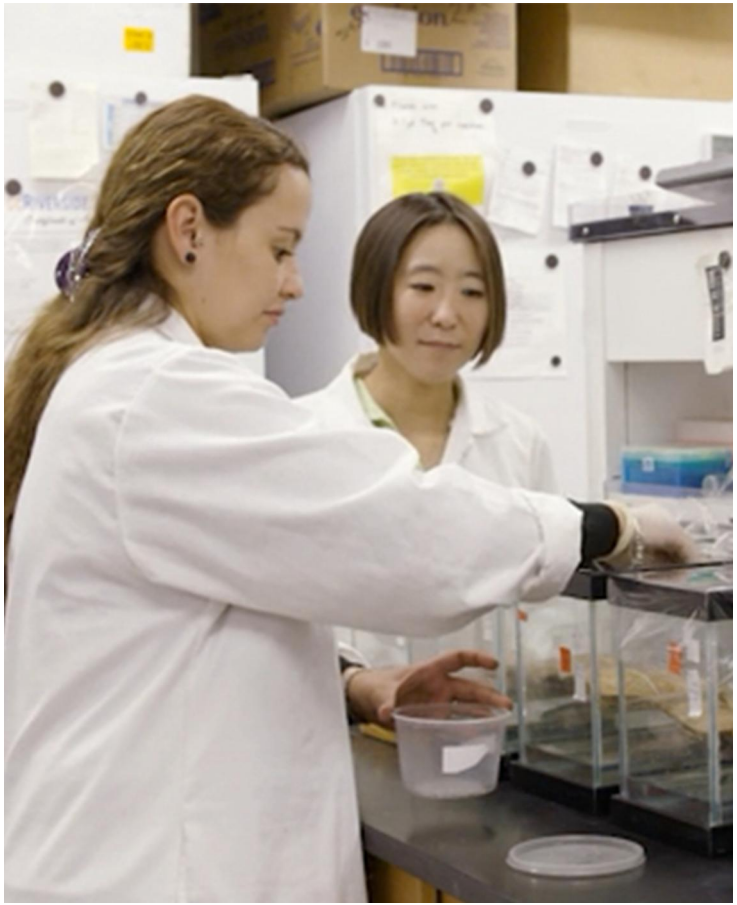
People may say you have your mother's eyes or that you look like your sister. Even though you may have some **traits** in common, you are also very different, even from your relatives.

In this unit, we'll learn what determines an organism's traits and **why organisms can be similar or different** within a family.

In the *Traits and Reproduction* unit we will be thinking about this question:

Unit Question

Why do traits vary, and why do they vary even between parents and offspring and among siblings?



You will now watch a video about a scientist who is researching **traits in spiders.** She is interested in the different kinds of spider silk. We will focus on these traits throughout the unit.

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

As you watch the video, think about this question.

Why are scientists interested in spider silk?

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

In this unit, we will do work that is like the scientists in the video. You will take on the role of **student genetic researchers** at Bay Medical Company, researching spider silk in Darwin's bark spiders.

Next, you will read a memo that describes what you will be investigating about spiders.

To: Student Researchers
From: Dr. Ada Sattari, Lead Scientist at Bay Medical Company
Subject: Spider Silk Research

BAY MEDICAL COMPANY

I lead the Spider Silk Research Team, a group of genetic researchers. We are working on medical treatments that use silk from the Darwin's bark spider, a newly discovered spider species. These spiders produce very strong silk. We want to see if their silk can be used to make tendons and stitches for humans. For this to work, the silk must be both strong and flexible. A medium level of flexibility is optimum.

Unfortunately, we have discovered that not all Darwin's bark spiders are the same. Some spiders, even those in the same family, make more flexible silk than others. As student researchers, you will work to explain why traits such as silk flexibility can vary within a family of Darwin's bark spiders.

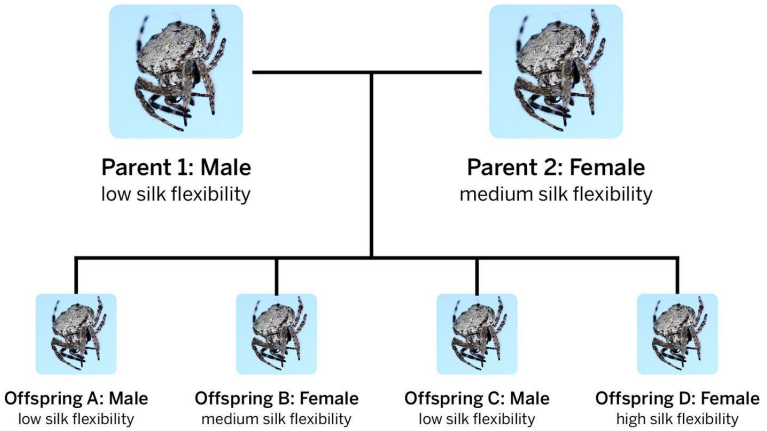
Darwin’s bark spiders are a real, recently discovered species.

Dr. Sattari and Bay Medical Research are not real but our work in this unit will be similar to the research actual scientists are doing with spider silk.

In this lesson and many others in the *Traits and Reproduction* @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.

Darwin's Bark Spider Family Tree



This is the spider family you will be investigating. Observe the spider family and discuss this question with a partner.

What do you notice about the differences in **silk flexibility** traits among the spider family?

You probably noticed that the spiders have different **traits** for silk flexibility even though they are in the same family. In this unit, you will investigate why.

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

One feature you will be investigating is silk flexibility.

feature

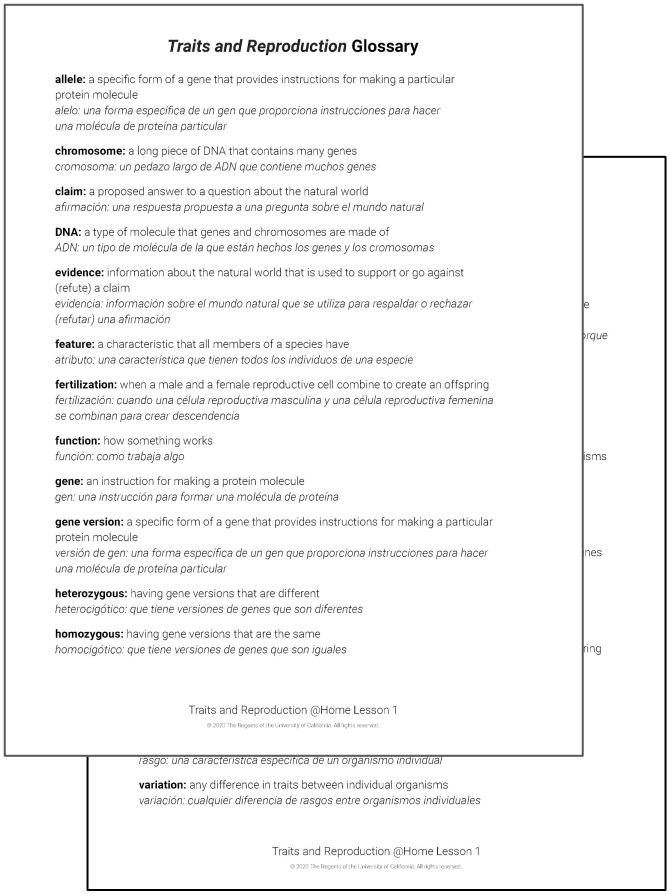
a characteristic that all members of a species have

High and low silk flexibility are examples of traits.

trait

a specific characteristic of an individual organism

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.



***Traits and Reproduction* Glossary**

allele: a specific form of a gene that provides instructions for making a particular protein molecule
alelo: una forma específica de un gen que proporciona instrucciones para hacer una molécula de proteína particular

chromosome: a long piece of DNA that contains many genes
cromosoma: un pedazo largo de ADN que contiene muchos genes

claim: a proposed answer to a question about the natural world
afirmación: una respuesta propuesta a una pregunta sobre el mundo natural

DNA: a type of molecule that genes and chromosomes are made of
ADN: un tipo de molécula de la que están hechos los genes y los cromosomas

evidence: information about the natural world that is used to support or go against (refute) a claim
evidencia: información sobre el mundo natural que se utiliza para respaldar o rechazar (refutar) una afirmación

feature: a characteristic that all members of a species have
atributo: una característica que tienen todos los individuos de una especie

fertilization: when a male and a female reproductive cell combine to create an offspring
fertilización: cuando una célula reproductiva masculina y una célula reproductiva femenina se combinan para crear descendencia

function: how something works
función: como trabaja algo

gene: an instruction for making a protein molecule
gen: una instrucción para formar una molécula de proteína

gene version: a specific form of a gene that provides instructions for making a particular protein molecule
versión de gen: una forma específica de un gen que proporciona instrucciones para hacer una molécula de proteína particular

heterozygous: having gene versions that are different
heterocigótico: que tiene versiones de genes que son diferentes

homozygous: having gene versions that are the same
homocigótico: que tiene versiones de genes que son iguales

Traits and Reproduction @Home Lesson 1

rasgo: una característica específica de un organismo individual

variation: any difference in traits between individual organisms
variación: cualquier diferencia de rasgos entre organismos individuales

Traits and Reproduction @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 sheets or in the Amplify Library.

***Traits and Reproduction* Glossary** pages or Amplify Library

Eye color is a **feature.**

People have different **traits** for eye color.

For example, they could have blue, brown, or green eyes.

example of a feature = body color

trait = yellow body color

trait = brown body color

Body color is an example of a **feature** in this species of spider.

Yellow and brown body colors are different **traits** of this species of spider.

Silk flexibility is also a **feature**. All of the Darwin’s bark spiders have this feature, but some spiders make silk that is more flexible than other spiders' silk.

High, medium, and low silk flexibility are different **traits** for the silk flexibility feature.

Think about this question.

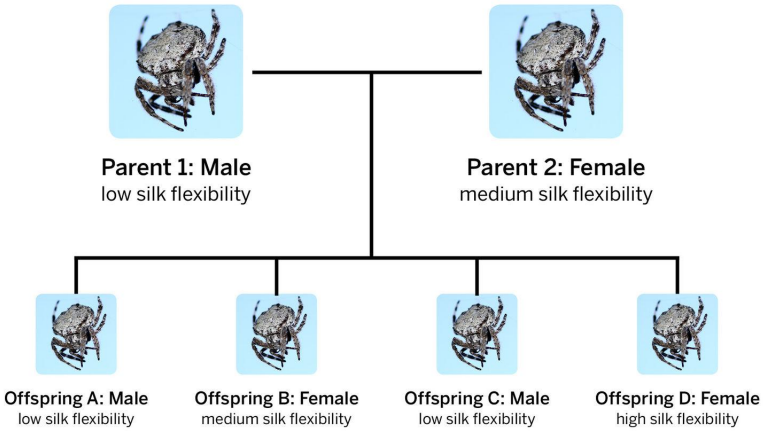
What are some **traits** you have that are different from your friends and family members?

To start the unit, we will investigate this Chapter Question.

Chapter 1 Question

Why do traits for silk flexibility vary within this family of Darwin's bark spiders?

Darwin's Bark Spider Family Tree



Think about your initial ideas about the Chapter 1 Question.

Why do traits for silk flexibility vary within this family of Darwin's bark spiders?

Darwin's Bark Spider Claims

Question: Why do traits for silk flexibility vary within this family of Darwin's bark spiders?

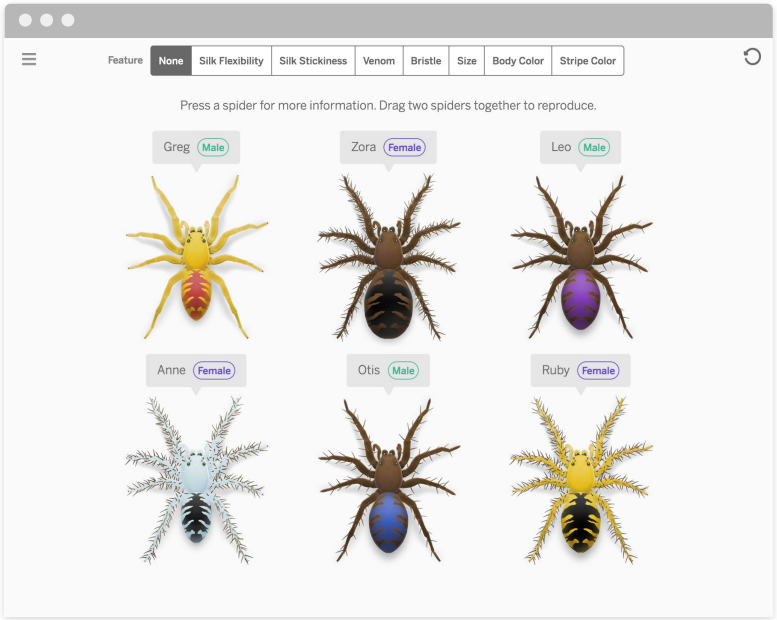
Claim 1: The offspring have mutations that affect their traits.

Claim 2: The offspring's traits depend on which parent the offspring received more traits from.

Claim 3: The offspring received different combinations of traits from their parents.

These are **claims** about why the trait for silk flexibility varies within the spider family.

We'll return to these claims as we learn more about traits in this unit.



Throughout this unit, we will be using the *Traits and Reproduction* **Simulation** to help us learn more about **variation in the traits** of spiders.

Next, you will watch a video about how to use the Sim.

Using the print version? Watch the video here: tinyurl.com/AMPTR-022

Next, you will make observations of spiders from the Sim. You will record similarities and differences in their **traits**.

Name: _____ Date: _____

Observing Spiders from the Sim

Observe the image of spiders from the Sim and record your observations below.

What similarities do you observe in the spiders' **traits**?

_____

_____

_____

What differences do you observe in the spiders' **traits**?

_____

_____

_____

Are all spiders the same? Explain your answer.

_____

_____

_____

Traits and Reproduction @Home Lesson 1

Go to the **Observing Spiders from the Sim** page.

Observe the image of spiders from the Sim on the next slide. **Record** similarities and differences in their traits.

You probably noticed that all of the spiders are not the same. Some were different colors, some had bigger or smaller bodies, some had more or less bristle (the hair on their bodies).

We know that humans can have different **traits**, but it can be more challenging to see these differences in other species, such as spiders.

Just like humans, spiders have variation.

variation

any difference in traits between individual organisms

End of @Home Lesson

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UNIVERSITY OF CALIFORNIA, BERKELEY

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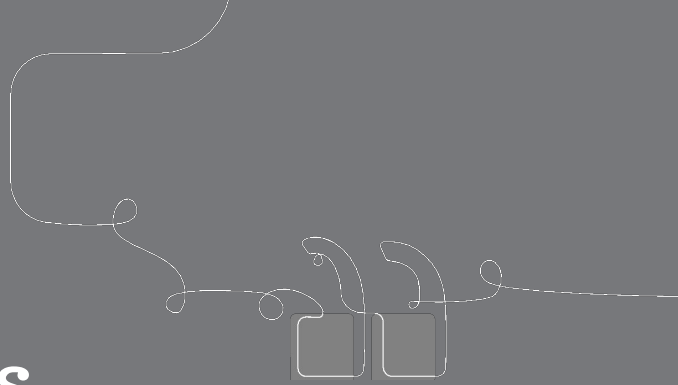
Reflect and Share:



What are the opportunities within this lesson for teachers to collect evidence of student learning?

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 9

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

Day 1: @Home Lesson 1

Minutes for science: 15 min.

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

Lesson or part of lesson:

@Home Lesson 1, video (slides 1-4)

Mode of instruction:
- [X] Preview
- [ ] Review
- [ ] Teach full lesson live
- [ ] Teach using synchronous suggestions
- [X] Students work independently using:
  - [ ] @Home Packet
  - [X] @Home Slides and @Home Student Sheets
  - [ ] @Home Videos

Students will...	Teacher will...
be introduced to the problem they will be investigating. They watch a video about a real researcher who is studying spider silk.	assign slides 1-4 in Schoology and provide direction for students to jot down their ideas when they get to slide 4 to share during the next lesson.

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:
  - ❑ @Home Packet
  - ❑ @Home Slides and @Home Student Sheets
  - ❑ @Home Videos

Students will...	Teacher will...

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

Day 1: @Home Lesson 1

Minutes for science: 15 min	**Minutes for science:** 30 min
Instructional format: [X] Asynchronous [ ] Synchronous	**Instructional format:** [ ] Asynchronous [X] Synchronous
Lesson or part of lesson: @Home Lesson 1, video (slides 1-4) **Mode of instruction:** [X] Preview [ ] Review [ ] Teach full lesson live [ ] Teach using synchronous suggestions [X] Students work independently using: [ ] @Home Packet [X] @Home Slides and @Home Student Sheets [ ] @Home Videos	**Lesson or part of lesson:** @Home Lesson 1, discussion and simulation (slides 4-28) **Mode of instruction:** [ ] Preview [ ] Review [ ] Teach full lesson live [X] Teach using synchronous suggestions [ ] Students work independently using: [ ] @Home Packet [ ] @Home Slides and @Home Student Sheets [ ] @Home Videos
Students will... be introduced to the problem they will be investigating. They watch a video about a real researcher who is studying spider silk.	**Teacher will...** assign slides 1-4 in Schoology and provide direction for students to jot down their ideas when they get to slide 4 to share during the next lesson.
Students will... engage in a discussion about their initial ideas, be introduced to the claims they will investigate, explore the simulation, and reflect on learning.	**Teacher will...** lead students through the lesson activities using slides 4-28.

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 notes about their initial ideas for why and how traits vary.

Synchronous: record observations
jot new ideas about the claims after using the sim

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 will bring handwritten notes to the synchronous lesson to share on a Jamboard and discuss

Synchronous: students will turn in the simulation worksheet in Schoology, and add new ideas to the Jamboard to reflect on their learning

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.)

Look at the *Students will* columns. What are students working in the lesson(s) that you could c
See Some Types of

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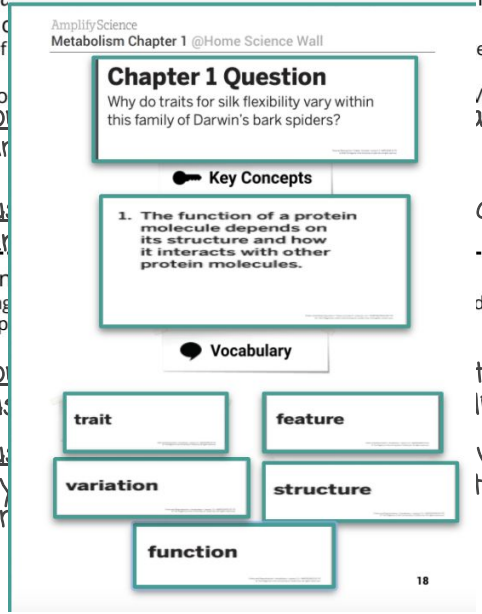

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Some Types of Written Work in Amplify Science

- Daily written reflections
- Homework tasks
- Investigation notebook pages
- Written explanations (typically at the end of Chapter)
- Diagrams
- Recording pages for Sim uses, investigations, etc

Completing Written Work	Submitting Written Work
format (Google Classroom, etc)	• (6-8) Hand-in button on student platform

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

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:

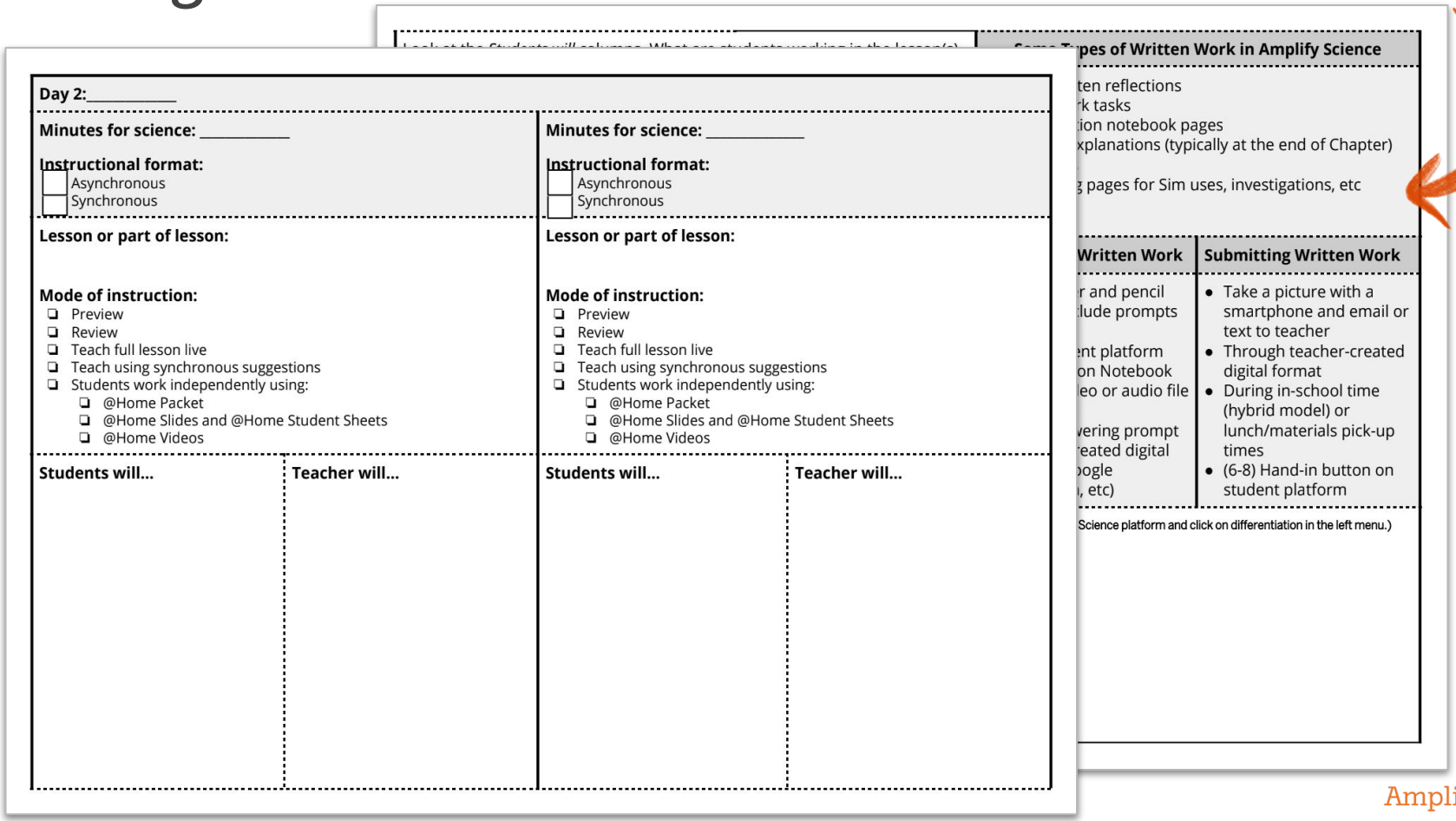
- Make available the @Home Classroom Wall found in the @Home Student Packets to support discussions and writing. Students can add pictures to go with the vocabulary/key concepts to help them make meaning.
- Provide sentence starters for use in discussion and writing.

Extension:

- Write a critique of the simulation as a model of the human body.

Planning Resource

pages 7 & 8



Day 2:_____

Minutes for science: _____

Instructional format:
- ☐ Asynchronous
- ☐ Synchronous

Lesson or part of lesson:

Mode of instruction:
- ❑ Preview
- ❑ Review
- ❑ Teach full lesson live
- ❑ Teach using synchronous suggestions
- ❑ Students work independently using:
  - ❑ @Home Packet
  - ❑ @Home Slides and @Home Student Sheets
  - ❑ @Home Videos

Students will...	Teacher will...

Minutes for science: _____

Instructional format:
- ☐ Asynchronous
- ☐ Synchronous

Lesson or part of lesson:

Mode of instruction:
- ❑ Preview
- ❑ Review
- ❑ Teach full lesson live
- ❑ Teach using synchronous suggestions
- ❑ Students work independently using:
  - ❑ @Home Packet
  - ❑ @Home Slides and @Home Student Sheets
  - ❑ @Home Videos

Students will...	Teacher will...

pes of Written Work in Amplify Science

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

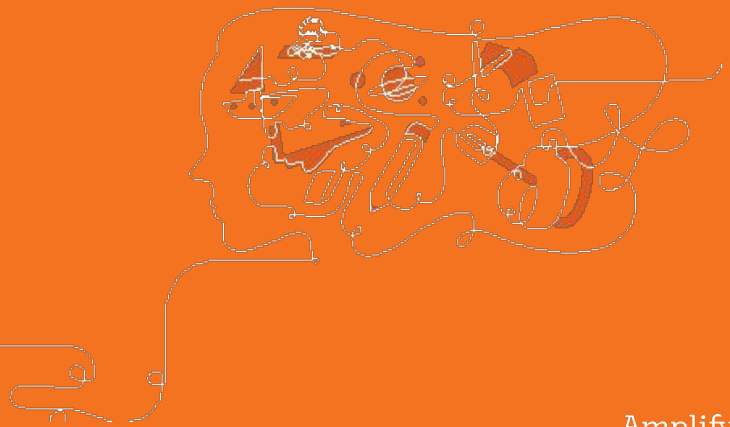
g pages for Sim uses, investigations, etc

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

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

Amplify.

Planning to Differentiate Instruction

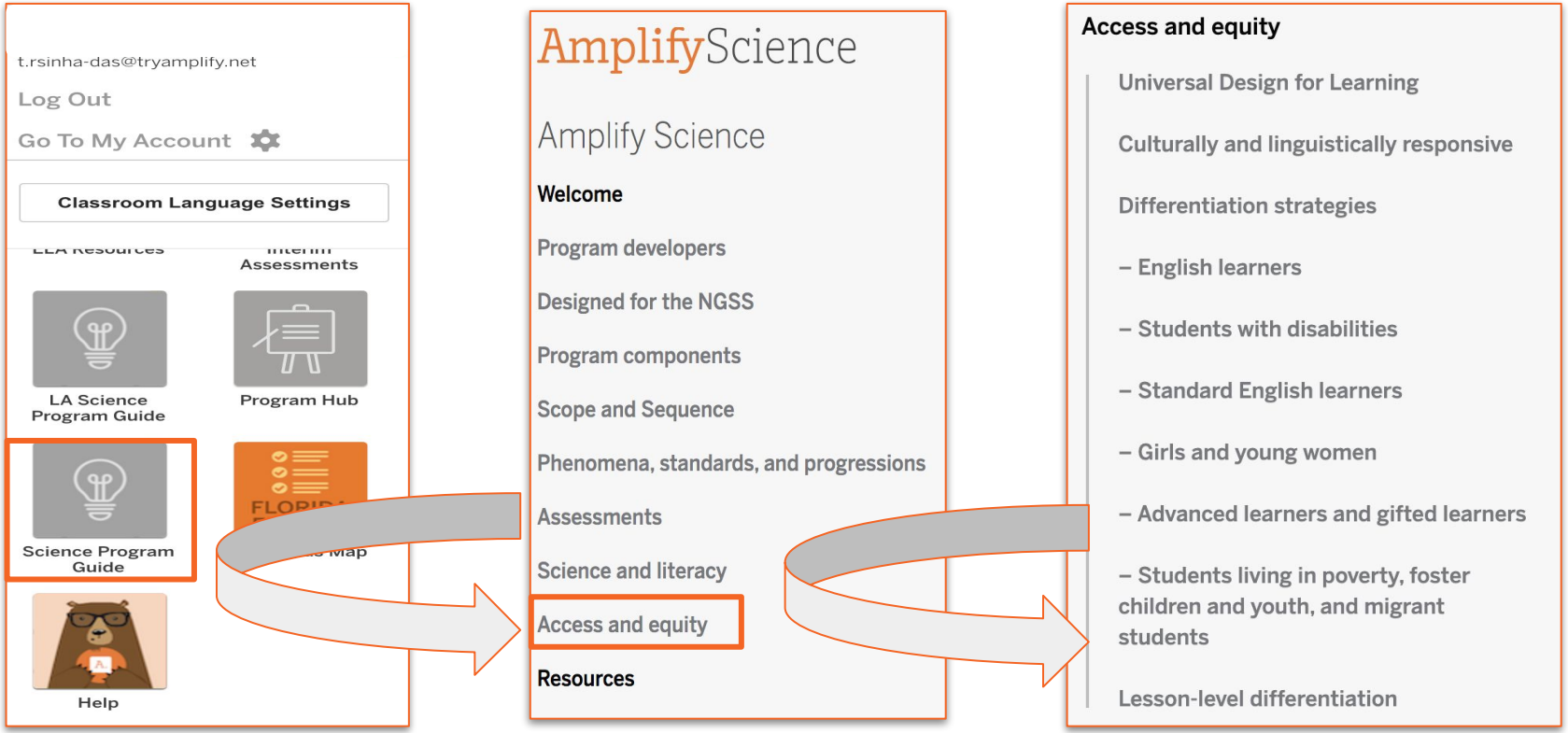


The Amplify Science curriculum was developed with supporting diverse learning needs in mind.

Two overarching conceptual frameworks informed Amplify Science's approach to ensuring access and equity for all students:

Universal Design for Learning & Culturally Linguistically Responsive Teaching.

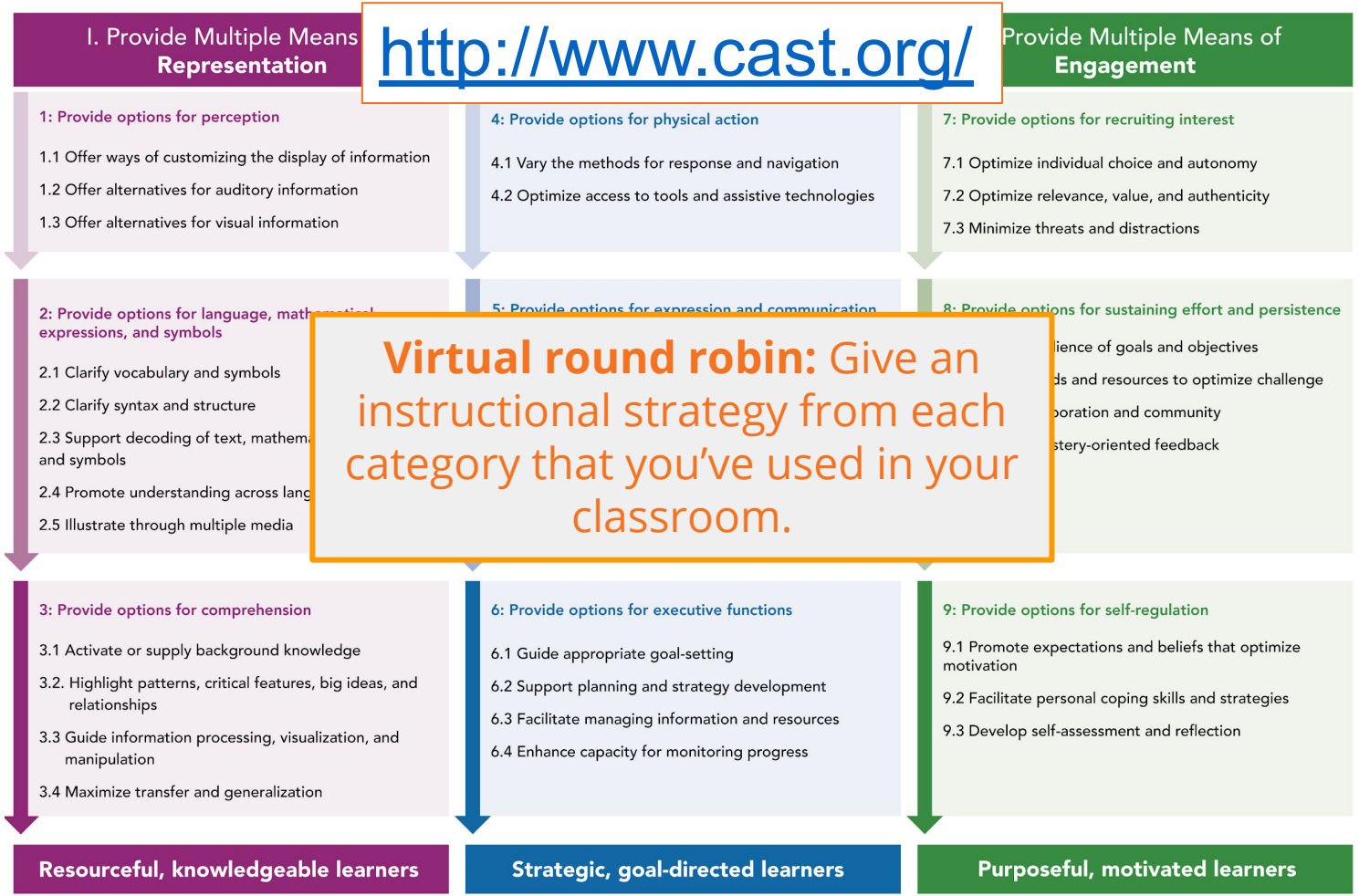
Differentiation strategies to support ALL students



Universal Design for Learning

Universal Design for Learning (UDL) is a **research-based framework** for improving student learning experiences and outcomes by **focusing on careful instructional planning to meet the varied needs of students.** UDL is **NOT a special-education initiative**. Through the UDL framework, the **needs of ALL learners are considered** and planned for at the point of first teaching, thereby **reducing the need to reteach concepts.**

Universal Design for Learning Guidelines



Culturally and linguistically responsive teaching

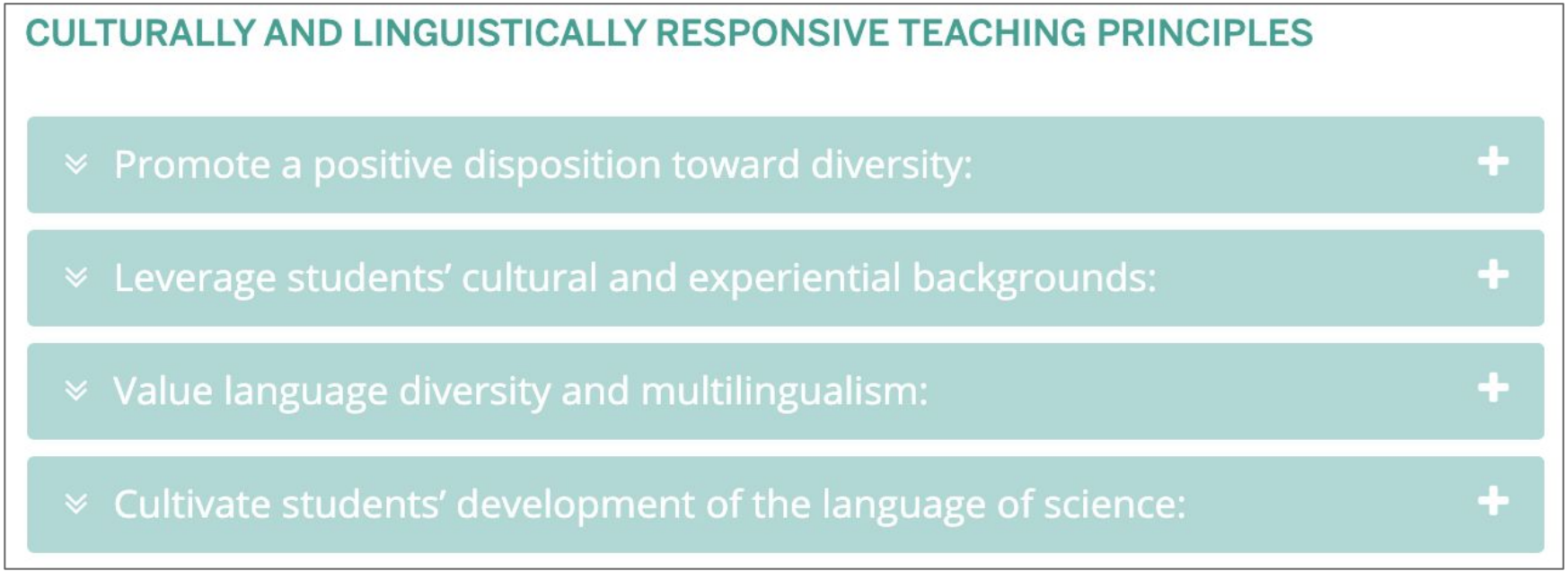
Culturally and linguistically responsive teaching (CLRT) principles **emphasize validating and valuing students' cultural and linguistic heritage** and **creating positive and nurturing learning environments** so that learning is more effective.

Source: (l): Aaron Yaazie; (um): Kyle Spradley/ University of Missouri; (lm) Dr. Grace O'Connell; (ur) Jane Rigby; (lr) Tina Shelton/ John A. Burns/ University of Hawaii at Manoa

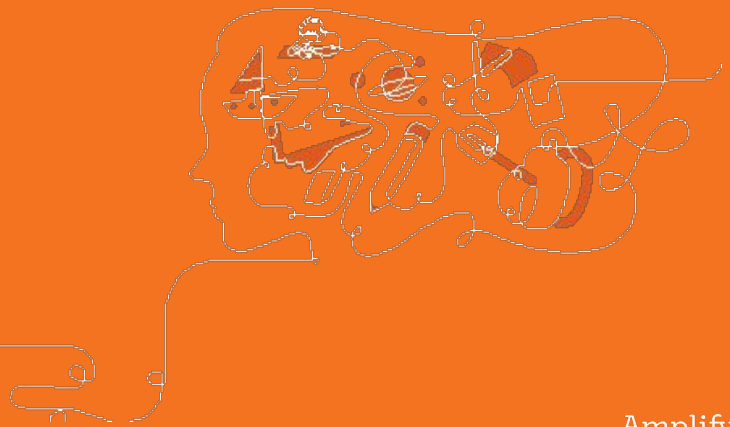
Access and Equity

Culturally and linguistically responsive teaching

Think, type, chat: What have you leveraged from the Amplify curriculum to support culturally and linguistically responsive teaching?



Discourse Routines



Amplify Science discourse routines

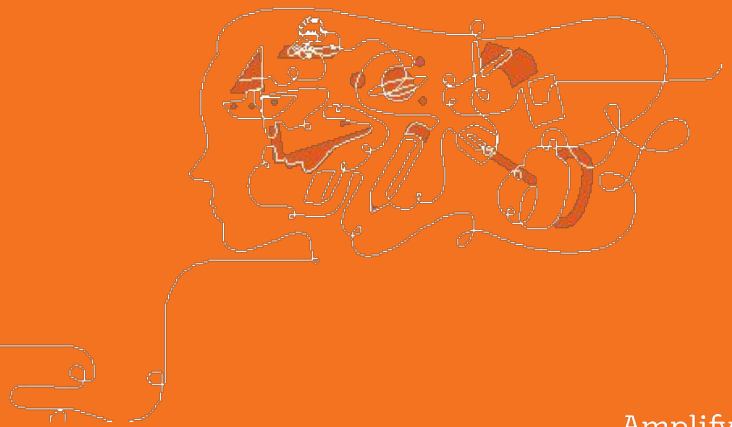
- Oral Composition and/or Drawings as teacher captures words (K-1)
- Explanation Language Frames
- Shared Listening
- Partner Reading
- Thought Swap
- Think-Pair-Share
- Word Relationships
- Questioning Strategies [K-8]
    - Do you agree/disagree?

Additional support considerations

Modifying the instructional suggestions for my students

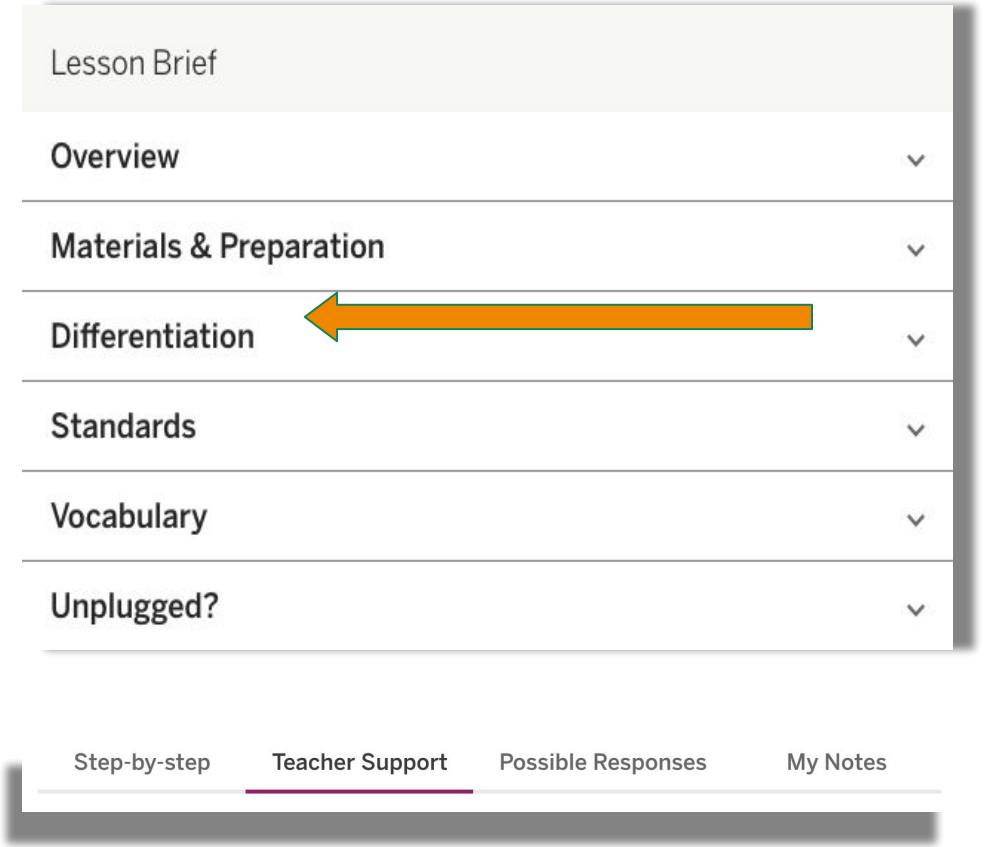
- Additional practice time
- Strategic grouping
- Additional resources (multilingual glossary, word banks, other environmental print)
- Increased support for gradual release of responsibility
- Alternative response options

Differentiation Resources



Differentiation Briefs

- Embedded supports for diverse learners
- Potential challenges in this lesson
- Specific differentiation strategies for English learners
- Specific differentiation strategies for students who need more support
- Specific differentiation strategies for students who need more challenge



Differentiation briefs

Categories of differentiation briefs

- Embedded supports for diverse learners
- Potential challenges in this lesson
- Specific differentiation strategies for English learners
- Specific differentiation strategies for students who need more support
- Specific differentiation strategies for students who need more challenge

Lesson 1.2 Specific Differentiation

Embedded Supports for Diverse Learners

Accessing prior knowledge about variation. This introductory lesson is intended to pique students' interests about the specific content of the unit. During the Warm-Up and again during partner discussions, students consider what they already know about traits and why they vary. Having students consider and discuss what they already know about a topic helps prepare them to learn new ideas and connect those new ideas to their own experiences.

Paired and whole-class discussion. Paired discussions are implemented so that students can support and learn from interacting with each other. The class then comes together to share their thinking, offering another opportunity for students to hear and learn from one another.

Potential Challenges in This Lesson

Discussion-focused. Because discussion is central to today's lesson, you might want to consider how you can support participation of students who are not as confident in their ability to communicate orally or who have difficulties with this type of communication.

Specific Differentiation Strategies for Students Who Need More Support

Refer to specific strategies for English learners. Throughout this unit, the strategies listed in the Specific Differentiation Strategies for English Learners section are often good for a variety of learners. Students who need more support for reading, writing, talking, and using academic language will often benefit from these suggestions as well.

Strategically choose partners for students who need support. Creating positive and supportive student partnerships is a crucial first step in developing a classroom culture where students feel confident and comfortable sharing their thinking. This unit provides many opportunities for student learning to occur through paired discussion. Creating good working partnerships will be an essential component to the success of these types of lessons. You may want to offer support for students who are less comfortable speaking in class by providing the following prompts as scaffolds and by encouraging students to use them as needed:

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

Encouraging discussion. Students will regularly engage in discussion throughout the unit. At the beginning of the unit you may want to work with your class to create a set of class norms for discussions. This will help to ensure that all students understand how to include their peers and respect their contributions during the learning tasks.

Support for academic discussion. To support English learners in this and all other discussion-oriented lessons, consider making more time for discussion. It is important that students have ample time to share their initial ideas about energy. English learners can benefit from extended, structured discussion time. Promoting inclusion in discussions is critical for English learners to develop critical science knowledge and the language of science. Some English learners may be hesitant to contribute to class or small-group discussions because they lack experience or confidence in participating in small or large group discussions. There are several steps you can take to support English learners to fully engage in discussions and to feel that their contributions are valued.

- Ahead of time, create in collaboration with the class (and frequently refer to) norms for discussions to ensure that all students understand how to include their peers and respect their contributions.
- Students should be encouraged to express themselves in the language in which they are most comfortable and to increasingly integrate accurate science terms and phrasing in English into their discussions. Students can refer to the classroom wall, where resources such as Key Concepts and Unit Vocabulary words are posted, or the Argumentation Wall, where resources related to the practice of argumentation are placed.
- Invite students to read the prompts to their partners during discussions. Hearing and seeing a prompt before responding can help students prepare to share their ideas.
- Once an activity is complete, ask students reflect on their level of participation and what helped them to be an active participant in the discussions.

Cognates. Many of the academic language that students will be learning over the course of this lesson and unit are Spanish cognates. Cognates are words in two or more different languages that sound and/or look the same or very nearly the same and that have similar or identical meanings. Cognates are especially rich linguistic resources to exploit for academic English language development and for biliteracy development. In the activities where a new vocabulary word is introduced, if the word has a cognate in Spanish and is called out in the *Traits and Reproduction* Glossary, introduce the cognate and give the definition in Spanish also.

Specific Differentiation Strategies for Students Who Need More Challenge

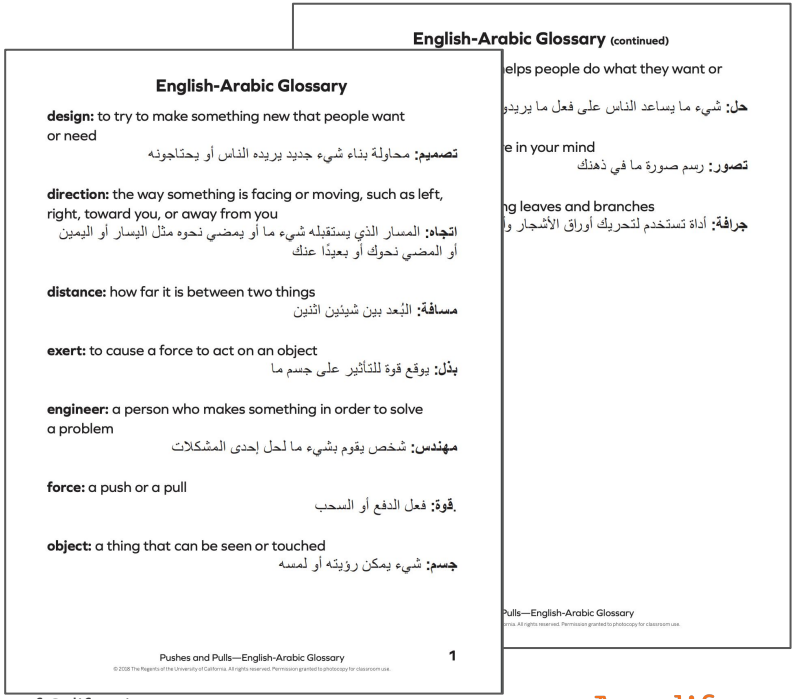
Generating questions about Darwin's bark spiders. To provide an additional challenge, invite students to generate science questions about Darwin's bark spider traits, including spider silk flexibility. You may want to explain that you (or any scientist) may not have the answers to students' questions as this is a new and cutting-edge area of research. You could frame this challenge by asking: "If you were helping design a project in Dr. Hayashi's lab, what questions would you try to answer?"

Embedded instructional design

- Modeling Active Reading/ Active Reading
- Anticipation Guides
- Science/ Everyday Word Chart
- Word Relationships Activities
- Graphic Organizers
- Reflective writing with language frames/ sentence starters
- Practice Tools
- Physical and digital models

Additional supports

- Cognates
- Multilingual Glossary
- Word Banks
- Multiple-Meaning Words
- Extended Modeling
- Additional Visual Representations
- Optional Graphic Organizers
- Response Option



English-Arabic Glossary

design: to try to make something new that people want or need
تصميم: محاولة بناء شيء جديد يريده الناس أو يحتاجونه

direction: the way something is facing or moving, such as left, right, toward you, or away from you
اتجاه: المسار الذي يستقبله شيء ما أو يمضي نحوه مثل اليسار أو اليمين أو المضي نحوك أو بعيدًا عنك

distance: how far it is between two things
مسافة: البُعد بين شيئين اثنين

exert: to cause a force to act on an object
بذل: يوقع قوة للتأثير على جسم ما

engineer: a person who makes something in order to solve a problem
مهندس: شخص يقوم بشيء ما لحل إحدى المشكلات

force: a push or a pull
قوة: فعل الدفع أو السحب.

object: a thing that can be seen or touched
جسم: شيء يمكن رؤيته أو لمسه

Pushes and Pulls—English-Arabic Glossary 1

English-Arabic Glossary (continued)

elps people do what they want or

حل: شيء ما يساعد الناس على فعل ما يريدو

e in your mind
تصور: رسم صورة ما في ذهنك

g leaves and branches
جرافة: أداة تستخدم لتحريك أوراق الأشجار و

Pulls—English-Arabic Glossary

Resources for Diverse Learners

- Optional investigation notebook pages
- Digital copy of vocabulary words
- Access to lesson level powerpoints (editable)
- Remote learning access for students (via Program Hub)
  - Student readers (English/Spanish)
  - Modeling tools/Sims/Practice tools
  - Videos with calls to action (English/Spanish)
  - Student slides, packets, and sheets (editable)

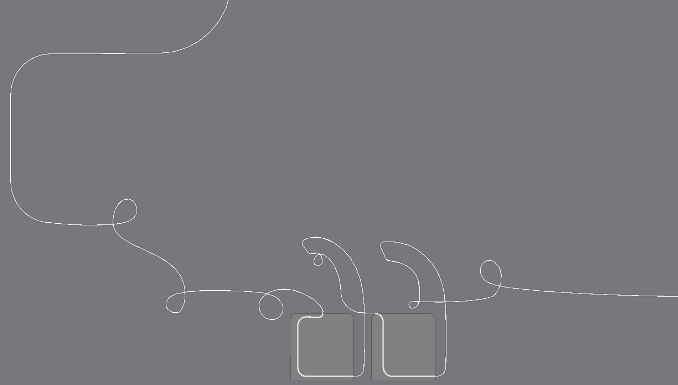
Group Planning

Diverse Learner needs

- In groups, choose a diverse student population. **(ex: ELL's, students that need more support)**
- Navigate to the Matter and Energy in Ecosystems unit
- Choose a lesson and look at the differentiation section
- Jot down strategies to support your diverse learner. You can also use the **Program Guide** & those from your **own practice**.

Lesson __ Activity ___

Diverse Learner of Choice	Support from lesson Differentiation	Support from the Program Guide	Support from my own toolkit

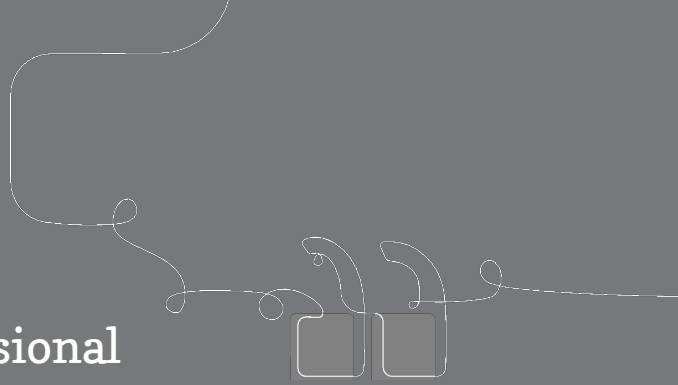


Questions?

Plan for the day

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

Revisiting Our Objectives:



- Receive support from an Amplify Science professional learning specialist who will guide effective unit internalization and/ or lesson planning protocols.

- Effectively leverage the use of curriculum resources to address diverse learner needs.

Revisiting our objectives

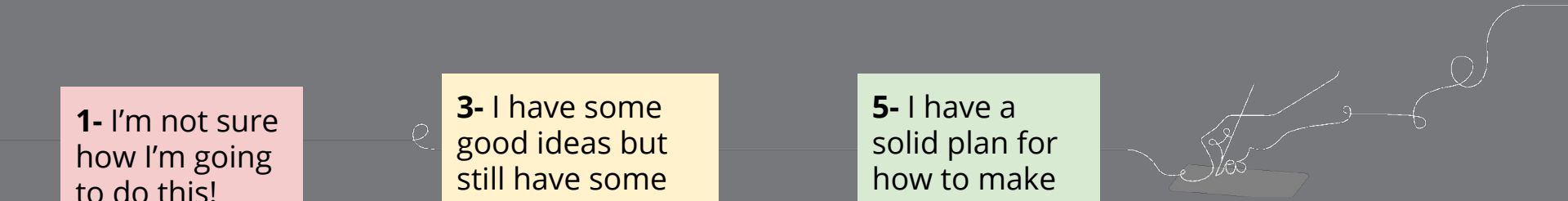
Do you feel ready to...

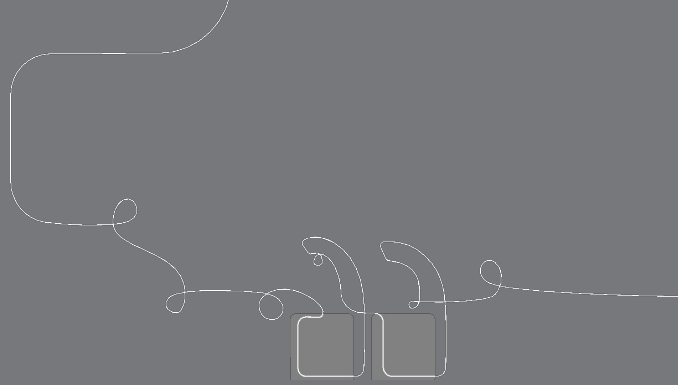
- Were you able to internalization the unit and/or lesson planning protocols?
- Can you effectively leverage the use of curriculum resources to address diverse learner needs?

1- I'm not sure how I'm going to do this!

3- I have some good ideas but still have some questions.

5- I have a solid plan for how to make this work!



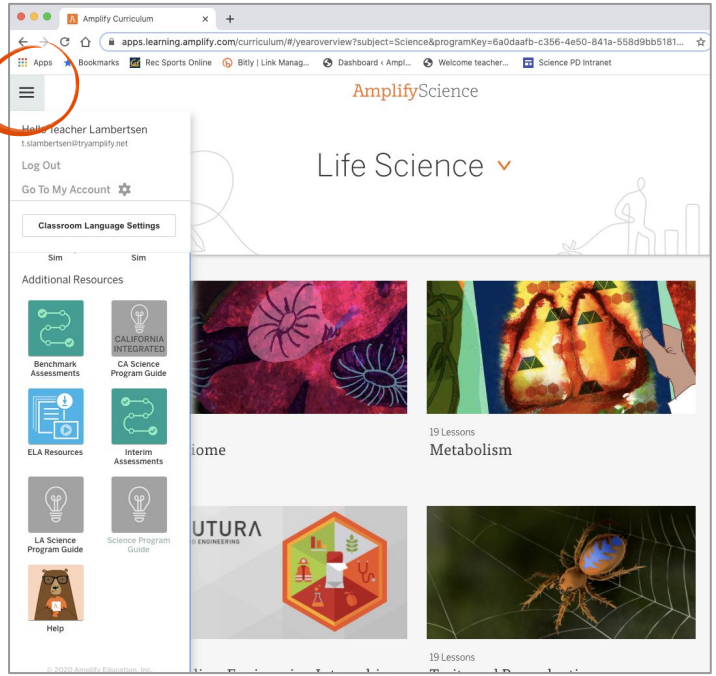


Questions?

Amplify Science Program Hub

A new hub for Amplify Science resources

- **Videos and resources to continue getting ready to teach**
- Amplify@Home resources
- Keep checking back for updates



science.amplify.com/programhub

New York City Resources Site

https://amplify.com/resources-page-for-nyc-6-8/

Amplify.

Amplify Science Resources for NYC (6-8)

—

Welcome! This site contains supporting resources designed for the New York City Department of Education Amplify Science adoption for grades 6–8.

THE LAWRENCE HALL OF SCIENCE
UNIVERSITY OF CALIFORNIA, BERKELEY

Educator Spotlight Submission

20-21 Login Update

Professional learning opportunities

Introduction

Getting started resources

Contact Us

Educator Spotlight Submission

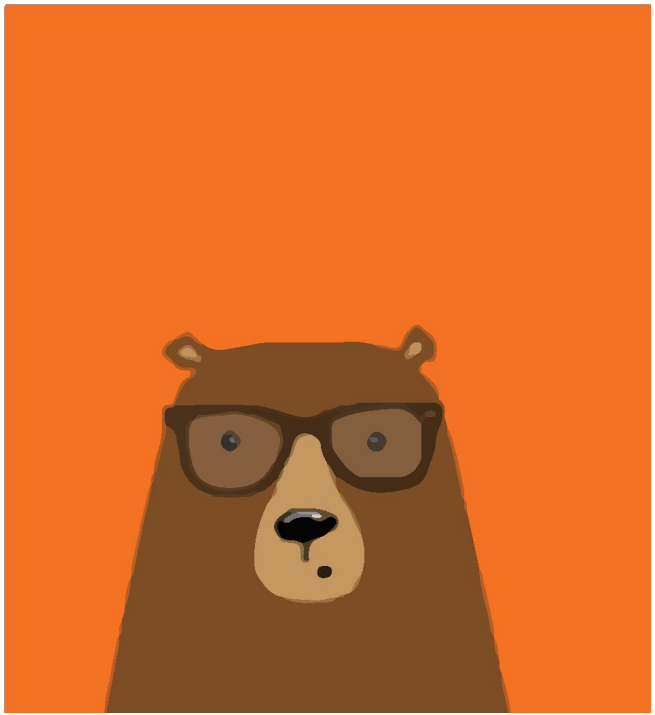
Calling all NYC DOE educators! Do you know an educator who has gone above and beyond? Would you like to highlight your teaching experience for others? Submit nominations here to see them featured as a spotlight in a future edition of our monthly newsletter and on our Instagram pages!

Site Resources

- Login information
- Pacing guides
- Getting started guide
- NYC Companion Lessons
- **Resources from PD sessions**
- And much more!

Amplify.

Additional Amplify resources



Program Guide

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

https://my.amplify.com/programguide/content/national/welcome/science/

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.

Upcoming Amplify Science Sessions

Date	Grade	Session	Audience	Time
March 4th	4	**Unit 4:** Focusing on Evidence of Learning	New Teachers	3:00-4:30
March 9th	4	**Unit 4:** Focusing on Evidence of Learning	Returning Teachers	3:00-4:30
March 9th	6	Guided Planning	All Teachers	3:00-5:00
March 9th	8	Guided Planning	All Teachers	3:00-5:00
March 9th	7	Unpacking the Engineering Internship	All Teachers	3:00-5:00
March 11th	5	**Unit 4:** Focusing on Evidence of Learning	New Teachers	3:00-4:30
March 16th	5	**Unit 4:** Focusing on Evidence of Learning	Returning Teachers	3:00-4:30