

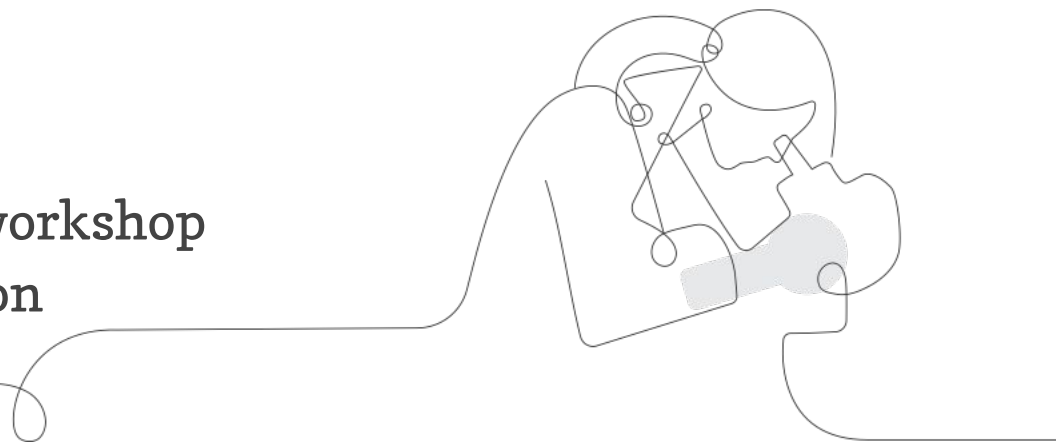
Amplify Science

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.

What resources do you use when planning for a unit?

Idea

Idea

Idea

Idea

Idea

Use two windows for today's webinar

The image illustrates a dual-window setup for a webinar. Two windows are shown side-by-side, each with an orange border and an arrow pointing to it from the left. The top-left window, labeled "Window #1", displays a Google Meet interface. The top-right window, labeled "Window #2", displays the Amplify Science curriculum page for Lesson 1.2: Using Fossils to Understand Earth. An inset in the top-left corner shows a mouse cursor clicking the maximize button in the window title bar.

Window #1: A Google Meet window titled "Meet - Etiwanda Grade 7 N". The URL is meet.google.com/hcs-dxpk-wrm?aut.... The interface shows a dark video area and a toolbar with icons for participants, chat, and video settings.

Window #2: An Amplify Science curriculum page titled "Lesson 1.2: Using Fossils to Understand Earth". The URL is apps.learning.amplify.com/curriculu.... The page features a large illustration of a dinosaur in a prehistoric landscape. Below the illustration, there are sections for "Lesson Brief (4 Activities)", "WARM-UP Warm-Up", "TEACHER-LED DISCUSSION Why Geologists Value Fossils", and "TEACHER-LED DISCUSSION Introducing Mesos". A sidebar on the right contains a "Lesson Brief" section with options for "Overview", "Materials & Preparation", "Differentiation", and "Español rds".

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



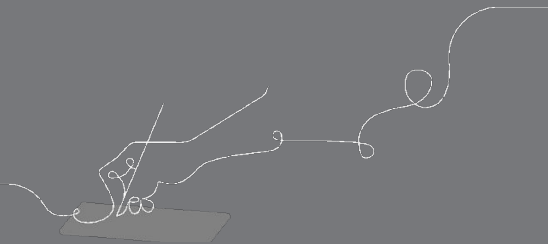
Engage at your comfort level - chat, ask questions, discuss, share!

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.

e





Plan for the day

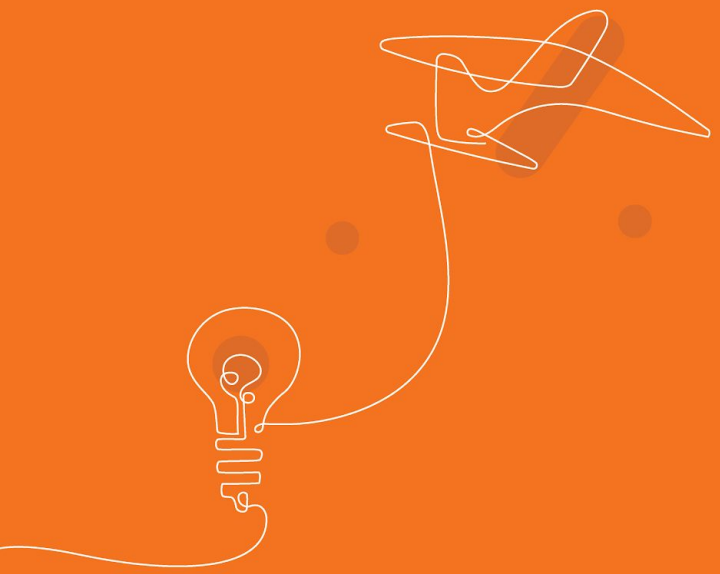
- Framing the day
 - Revisiting the Amplify Science Approach
 - Instructional Materials
- Unit Internalization
- Planning to teach
 - Collecting evidence of student learning to meet diverse learner needs
 - Planning to differentiate instruction
- Reflection and closing





Plan for the day

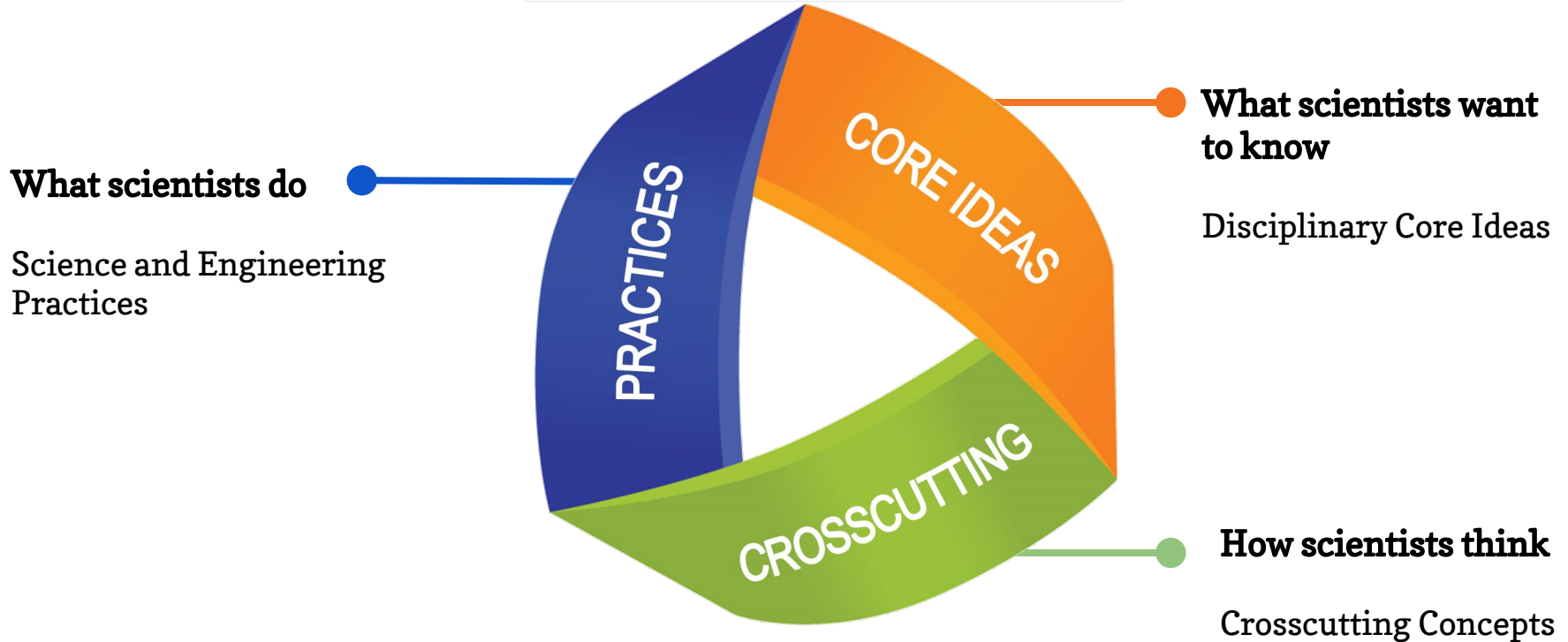
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Revisiting the Amplify Science Approach

Next Generation Science Standards

Designed to help students build a cohesive understanding of science

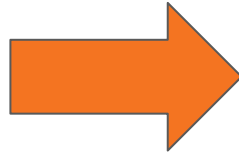


Comparing topics and phenomena

A shift in science instruction

from learning about

(like a student)

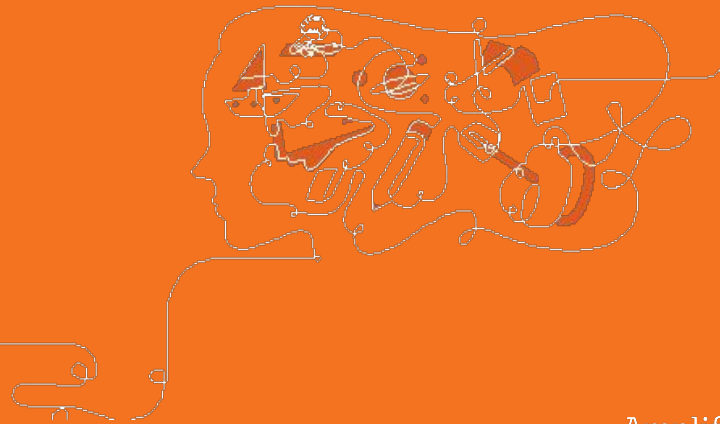


to figuring out

(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.



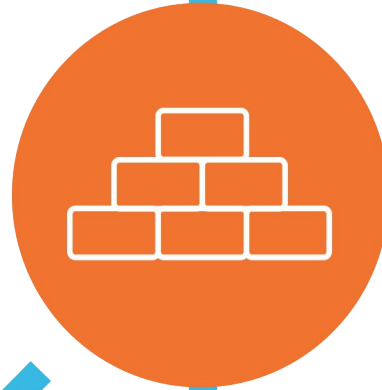
Amplify Science Instructional Approach



Introduce a phenomenon and a related problem



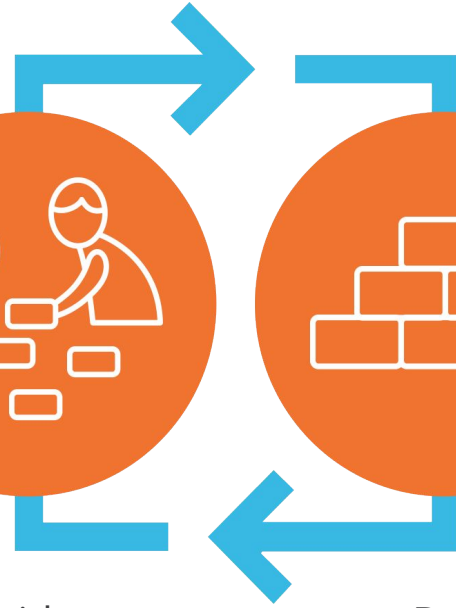
Collect evidence from multiple sources



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

C

Apply knowledge to
solve different
problem

B

Introduce a
Phenomenon and/or
real world 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

Integrated model*

Grade 6	Grade 7	Grade 8
<ul style="list-style-type: none">• Launch: Microbiome	<ul style="list-style-type: none">• Launch: Geology on Mars	<ul style="list-style-type: none">• Launch: Harnessing Human Energy
<ul style="list-style-type: none">• Metabolism	<ul style="list-style-type: none">• Plate Motion	<ul style="list-style-type: none">• Force and Motion
<ul style="list-style-type: none">• Engineering Internship: Metabolism	<ul style="list-style-type: none">• Engineering Internship: Plate Motion	<ul style="list-style-type: none">• Engineering Internship: Force and Motion
<ul style="list-style-type: none">• Traits and Reproduction• Thermal Energy• Ocean, Atmosphere, and Climate• Weather Patterns• Earth's Changing Climate	<ul style="list-style-type: none">• Rock Transformations• Phase Change• Engineering Internship: Phase Change• Chemical Reactions• Populations and Resources	<ul style="list-style-type: none">• Magnetic Fields• Light Waves• Earth, Moon, and Sun• Natural Selection
<ul style="list-style-type: none">• Engineering Internship: Earth's Changing Climate	<ul style="list-style-type: none">• Matter and Energy in Ecosystems	<ul style="list-style-type: none">• Engineering Internship: Natural Selection• Evolutionary History

AmplifyScience

authored by  THE LAWRENCE HALL OF SCIENCE
UNIVERSITY OF CALIFORNIA, BERKELEY

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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

Launch units

- First unit
- 11 lessons

Core units

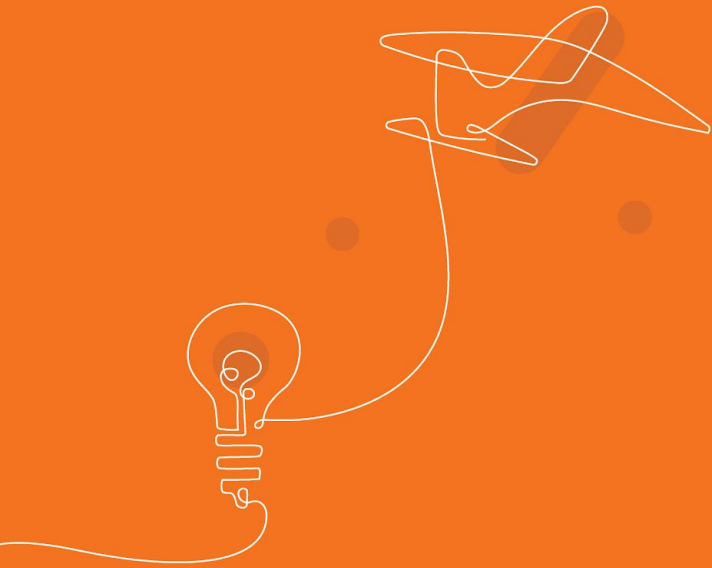
- Majority of units
- 19 lessons

Engineering Internships









- Two per year
- 10 lessons



Revisiting Resources



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

Planning for the Unit	Printable Resources
Unit Overview	 Article Compilation
Unit Map	 Coherence Flowchart
Progress Build	 Copymaster Compilation
Getting Ready to Teach	 Flexextension Compilation
Materials and Preparation	 Investigation Notebook
Science Background	 NGSS Information for Parents and Guardians
Standards at a Glance	 Print Materials (8.5" x 11")
Teacher References	 Print Materials (11" x 17")
Lesson Overview Compilation	Offline Preparation

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)

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)

Key concepts

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



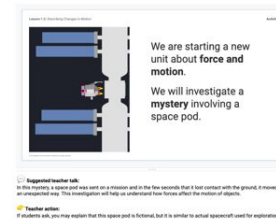
Investigation
Notebooks or digital
student experience



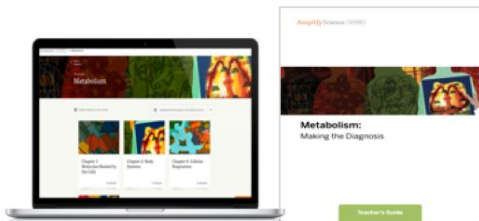
Articles
(digital or print)



Simulations and other
digital tools



Classroom Slides



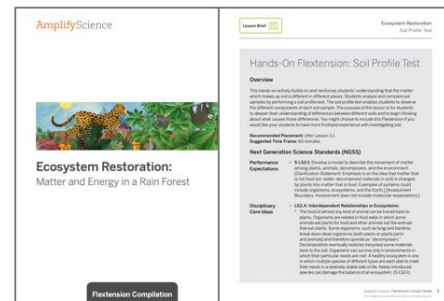
Teacher's Guide
(digital or print)

ACTIVITIES	LEVELS
25/06 5:28 PM Wed. 0/100%	0
25/06 5:00 PM Wed. 0/100%	2 missing
25/06 4:57 PM Wed. 0/100%	0
25/06 3:42 PM Thu. 0/100%	0

Assessments and
Reporting



Hands-on and print
materials



Hands-on Flexextensions

Middle School Online Component

Lesson 1.2: Introducing Spider Silk Research

Lesson 1.2 Activities

1 WARM-UP
Warm-Up

T TEACHER
Video: Studying Spider Silk

2 STUDENT-TO-STUDENT
DISCUSSION
Introducing Darwin's Bark
Spiders

3 SIM
Exploring in the Simulation

4 HOMEWORK
Homework

5 HOMEWORK
Family Homework
Experience

RESET LESSON



Assign in Google Classroom

GENERATE PRINTABLE LESSON GUIDE

ASSIGN



Assign work to students in the Amplify Science platform

Overview

Materials & Preparation

Differentiation

Standards

Vocabulary

Unplugged?

Overview

Students learn that Darwin's bark spiders, a newly discovered spider species, have the strongest spider silk on Earth. When bred for optimal silk flexibility, their silk may have important medical applications. For example, Darwin's bark spiders' silk may be used to repair human tendons one day. Unfortunately, not all Darwin's bark spiders have the same silk flexibility. In order to help genetic researchers at Bay Medical Company breed spiders with optimal silk flexibility, students are asked to investigate why spiders in the same family can have different silk flexibility traits. Students watch a short video about a real scientist who studies spider traits. Students then use their background knowledge and video observations to identify examples of variation among traits. They finish the lesson by exploring in the Traits and Reproduction Simulation, an important tool they will use in their research throughout the unit. After an initial exploration, students use the Sim to further examine variation in silk flexibility among spiders. The purpose of this lesson is to introduce students to the unit topic, to the question they will be investigating, and to the ideas that traits vary between parents and offspring and among siblings.

Anchor Phenomenon: Darwin's bark spider offspring have different silk flexibility traits, even though they have the same parents.
Everyday phenomenon: Individuals of the same species or even family look different from one another.

Students learn:

- Traits vary between parents and offspring and among siblings.
- Differences among features (such as eye color) are called traits.
- People from different social, cultural, and ethnic backgrounds work as scientists and engineers.

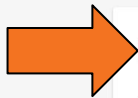
Digital Resources

- Classroom Slides 1.2 | PowerPoint
- Classroom Slides 1.2 | Google Slides
- All Projections
- Classroom Videos 1.2 | Zip
- Video: Studying Spider Silk
- Completed Scientific Argumentation Wall Diagram
- Traits and Reproduction Investigation Notebook, pages 5-10
- Optional: Family Homework Experience: Exploring Traits at Home copymaster
- Printable Traits and Reproduction Glossary
- Printable Traits and Reproduction Multi-Language Glossary
- Traits and Reproduction Glossary
- Traits and Reproduction Multi-Language Glossary

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

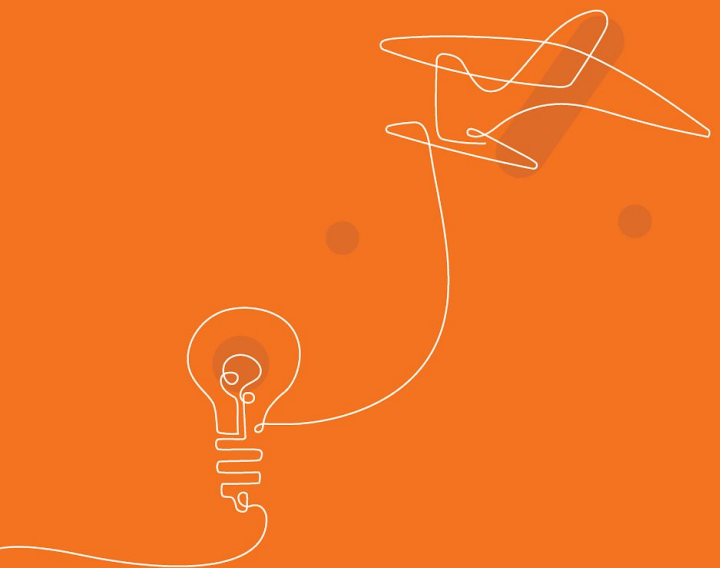
Let's get started!



Additional Unit Materials

Additional resources to complement the units you're teaching.





Instructional Materials

Standard Amplify Science Curriculum

19 Lessons

Traits and Reproduction



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

NCSS Information for Parents and Guardians



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.

The screenshot displays the Amplify Science platform interface. On the left is a navigation menu with sections: 'Planning for the Unit' (containing Unit Overview, Unit Map, Progress Build, Getting Ready to Teach, Materials and Preparation, Science Background, Standards at a Glance), 'Teacher References' (containing Lesson Overview Compilation, Standards and Goals, 3-D Statements), 'Assessment System' (containing Embedded Formative Assessments), 'Articles in This Unit', 'Apps in This Unit', and 'Flexensions in This Unit'. On the right is a 'Printable Resources' section with items like Article Compilation, Coherence Flowchart, Copymaster Compilation, Flexension Compilation, Investigation Notebook, NGSS Information for Parents and Guardians, and Print Materials (8.5" x 11" and 11" x 17"). Below this is an 'Offline Preparation' box with text about preparing materials for offline access. A large yellow callout box at the bottom right contains the text: '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	▼
Standards at a Glance	▼

Teacher References	
Lesson Overview Compilation	▼
Standards and Goals	▼
3-D Statements	▼

Assessment System	
Embedded Formative Assessments	
Articles in This Unit	
Apps in This Unit	
Flexensions in This Unit	▼

Printable Resources	
Article Compilation	PDF
Coherence Flowchart	PDF
Copymaster Compilation	PDF
Flexension Compilation	PDF
Investigation Notebook	PDF
NGSS Information for Parents and Guardians	PDF
Print Materials (8.5" x 11")	PDF
Print Materials (11" x 17")	PDF

Offline Preparation

Teaching without reliable classroom internet? Prepare unit and lesson materials for offline access.

Skip slide if modeling live on the platform.

Standard Amplify Science Curriculum

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

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

Skip slide if modeling live on the platform.

The screenshot shows the Amplify Science platform interface for Lesson 1.2: Introducing Spider Silk Research. The top navigation bar includes the Amplify Science logo and the path: Trails and Reproduction > Chapter 1 > Lesson 1.2. The main content area features a large image of a spider silk structure with the lesson title "Lesson 1.2: Introducing Spider Silk Research" overlaid. Below the image is a navigation bar with five numbered tabs: 1. WARM UP, 2. STUDENT PROXIMITY, 3. EXPLORE IN THE SIMULATION, 4. HOMEWORK, and 5. FAMILY NETWORK EXPERIENCE. The current view is the "Overview" page, which includes a "RESET LESSON" button, a "GENERATE PRINTABLE LESSON GUIDE" button, and an "ASSIGN" button. The "Overview" section contains text about Darwin's bark spiders and their silk flexibility, an anchor phenomenon, an everyday phenomenon, and student learning objectives. A "Digital Resources" sidebar on the right lists various materials like Classroom Slides, Classroom Videos, and Investigation Notebooks.

AmplifyScience > Trails and Reproduction > Chapter 1 > Lesson 1.2

Lesson 1.2:
Introducing Spider Silk Research

Lesson Brief (5 Activities)

1 WARM UP

2 STUDENT PROXIMITY
Video: Studying Spider Silk

3 EXPLORE IN THE SIMULATION

4 HOMEWORK

5 FAMILY NETWORK EXPERIENCE

RESET LESSON

GENERATE PRINTABLE LESSON GUIDE

ASSIGN

Overview

Digital Resources

- Classroom Slides 1.2 | PowerPoint
- Classroom Slides 1.2 | Google Slides
- All Projections
- Classroom Videos 1.2 | Zip
- Video: Studying Spider Silk
- Completed Scientific Argumentation Wall Diagram
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- Trails and Reproduction Glossary
- Trails and Reproduction Multi-Language Glossary

Overview

Students learn that Darwin's bark spiders, a newly discovered spider species, have the strongest spider silk on Earth. When bred for optimal silk flexibility, their silk may have important medical applications. For example, Darwin's bark spiders' silk may be used to repair human tendons one day. Unfortunately, not all Darwin's bark spiders have the same silk flexibility. In order to help genetic researchers at Bay Medical Company breed spiders with optimal silk flexibility, students are asked to investigate why spiders in the same family can have different silk flexibility traits. Students watch a short video about a real scientist who studies spider traits. Students then use their background knowledge and video observations to identify examples of variation among traits. They finish the lesson by exploring in the Trails and Reproduction Simulation, an important tool they will use in their research throughout the unit. After an initial exploration, students use the Sim to further examine variation in silk flexibility among spiders. The purpose of this lesson is to introduce students to the unit topic, to the question they will be investigating, and to the idea that traits vary between parents and offspring and among siblings.

Anchor Phenomenon: Darwin's bark spider offspring have different silk flexibility traits, even though they have the same parents.

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Students learn:

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- Differences among features (such as eye color) are called traits.
- People from different social, cultural, and ethnic backgrounds work as scientists and engineers.

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.

Amplify Science @Home Curriculum interface showing the 'Traits and Reproduction' unit. The page displays 19 lessons and a sidebar with navigation options. The main content area shows four chapters: Chapter 1: Exploring Variation in Spider Silk (5 Lessons), Chapter 2: Examining Spider Genes (4 Lessons), Chapter 3: Investigating Spider Inheritance (6 Lessons), and Chapter 4: Explaining Variation in Running Ability (4 Lessons). The bottom right section lists 'Planning for the Unit' and 'Printable Resources'.

URL: <https://apps.learning.amplify.com/assessments>

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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.



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

	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

Digital option

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.

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

The screenshot shows a YouTube playlist interface. The main video player displays a video titled 'Traits and Reproduction Chapter 1 Lesson 1.2' with a duration of 4:51. Below the player, the playlist title is repeated, followed by '8 videos • 6,594 views • Last updated on Sep 14, 2020'. The playlist items are listed on the right side of the screen:

- 1 Traits and Reproduction Chapter 1 Lesson 1.2 Activity 1 (4:51)
- 2 Traits and Reproduction Chapter 1 Lesson 1.2 Activity T (4:39)
- 3 Traits and Reproduction Chapter 1 Lesson 1.2 Activity 2 (8:23)
- 4 Traits and Reproduction Chapter 1 Lesson 1.2 Activity 3 Part A (1:52)

Each item is followed by the 'Amplify' logo. The video player interface includes standard YouTube controls like 'Unlisted', 'Add to playlist', 'Share', and 'More options'.

@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
<ul style="list-style-type: none">● Discourse routines● Class discussions● Hands-on investigations (option for teacher demo)● Physical modeling activities	<ul style="list-style-type: none">● 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?



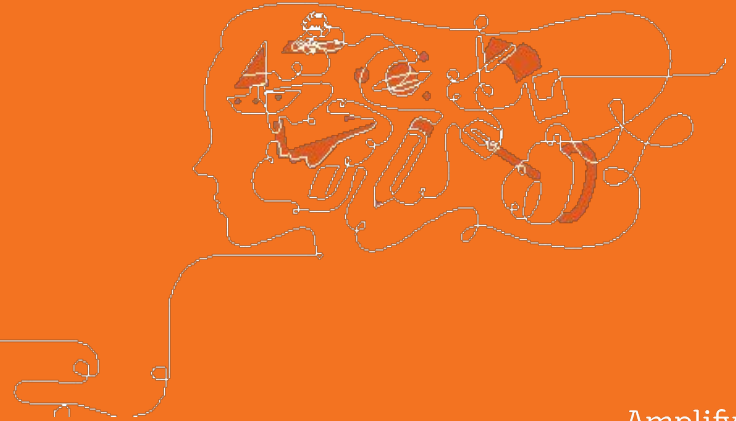


Plan for the day

- 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



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
- Flexextension 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?

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



Flexextension Compilation



Investigation Notebook



NGSS Information for Parents and Guardians



Print Materials (8.5" x 11")



Print Materials (11" x 17")

Offline Preparation

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

Guided Unit Internalization
Part 1: Unit-level internalization

Unit title:	
What is the phenomenon students are investigating in your unit?	
Unit Questions:	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
- Flexextension Compilation
- Investigation Notebook
- NGSS Information for Parents and Guardians
- Print Materials (8.5" x 11")
- Print Materials (11" x 17")

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	Printable Resources
Unit Overview	Article Compilation
Unit Map	Coherence Flowchart
Progress Build	Copymaster Compilation
Getting Ready to Teach	Flexextension Compilation
Materials and Preparation	Investigation Notebook
Science Background	NGSS Information for Parents and Guardians
Standards at a Glance	Print Materials (8.5" x 11")
Teacher References	Print Materials (11" x 17")
Lesson Overview Compilation	Offline Preparation

Unit Guide Resources

Planning for the Unit

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

Teacher References

- Lesson Overview Compilation
- Standards and Goals
- 3-D Statements
- Assessment System
- Embedded Formative Assessments
- Articles in This Unit
- Apps in This Unit
- Flextensions in This Unit

Printable Resources

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

Offline Preparation

Teaching without reliable classroom internet? Prepare unit and lesson materials for offline access.

Offline Guide

Unit Guide resources

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

Planning for the unit

Unit Overview	Describes what's in each unit, the rationale, and how students learn across chapters
Unit Map	Provides an overview of what students figure out in each chapter, and how they figure it out
Progress Build	Explains the learning progression of ideas students figure out in the unit
Getting Ready to Teach	Provides tips for effectively preparing to teach and teaching the unit in your classroom
Materials and Preparation	Lists materials included in the unit's kit, items to be provided by the teacher, and briefly outlines preparation requirements for each lesson
Science Background	Adult-level primer on the science content students figure out in the unit
Standards at a Glance	Lists 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?

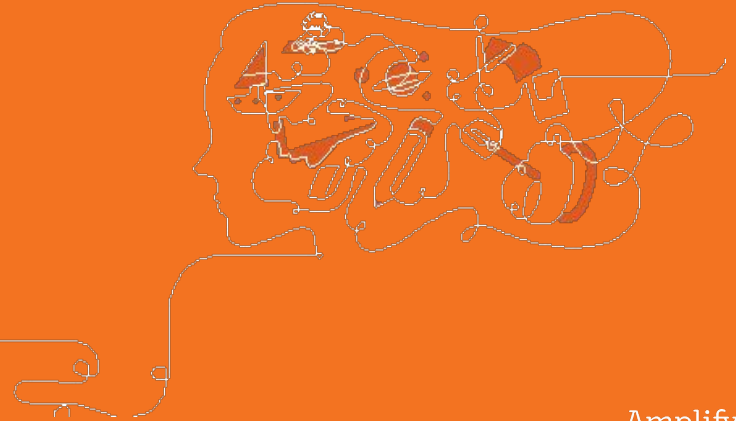




Plan for the day

- 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

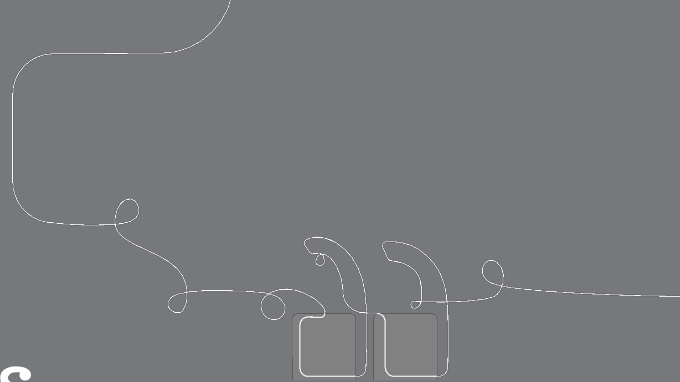
- **Introducing Spider Silk Research:** Students are introduced to the unit problem and their role as student researchers.
- **Talk:** Students are introduced to the Darwin's Bark spider family tree and discuss with a partner their observations about the differences in silk flexibility traits among the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



A detailed illustration of plant cells. The central cell is shown in cross-section, revealing various organelles. A large blue nucleus is positioned in the center, surrounded by a network of white, wavy lines representing the endoplasmic reticulum. Several yellow, oval-shaped chloroplasts are scattered throughout the cytoplasm. Red, rod-shaped mitochondria are also visible. The cell wall is depicted as a thick, grey outer boundary. Other cells are partially visible in the background, some showing similar internal structures.

Traits and Reproduction @Home Lesson 1

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

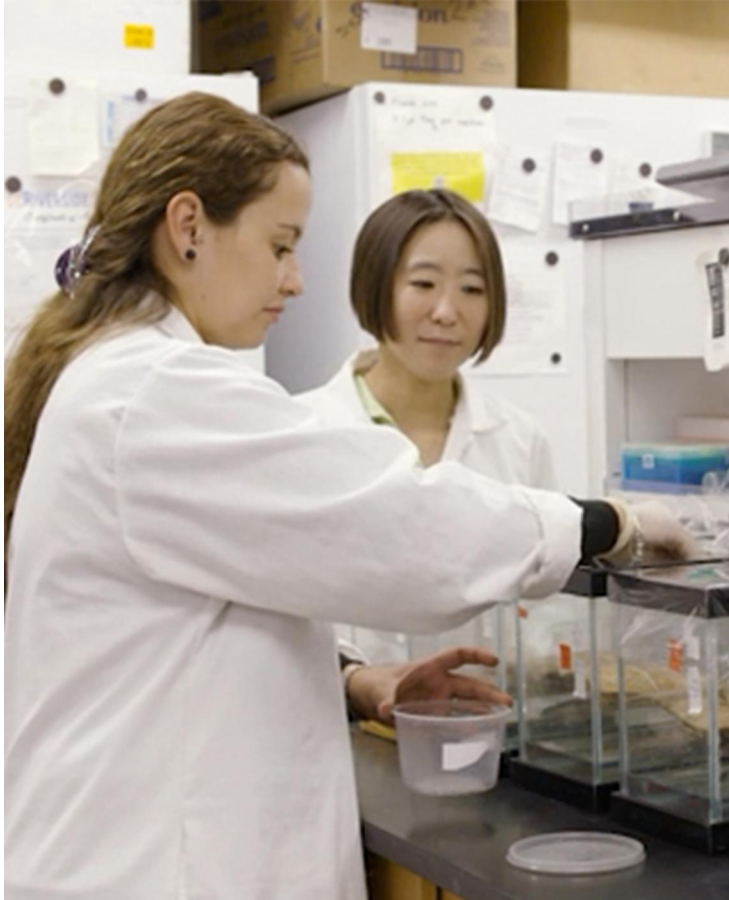
People may say you have your mother's eyes or that you look like your sister. Even though you may have some **traits** in common, you are also very different, even from your relatives.

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



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.

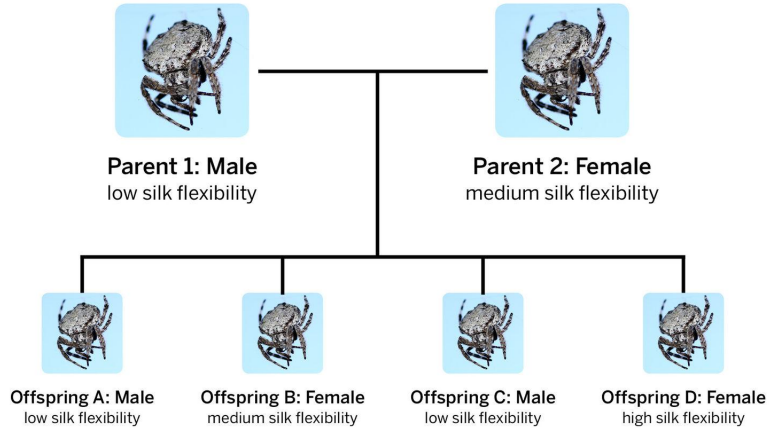
Darwin's bark spiders are a real, recently discovered species.

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
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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
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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](#).



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.



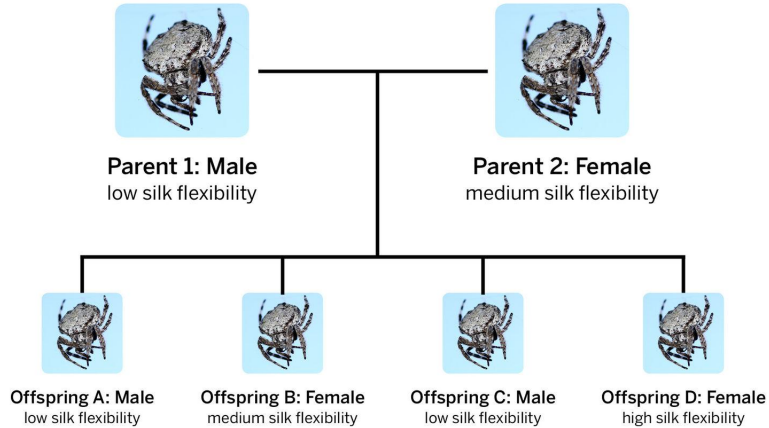
What are some **traits** you have that are different from your friends and family members?

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?

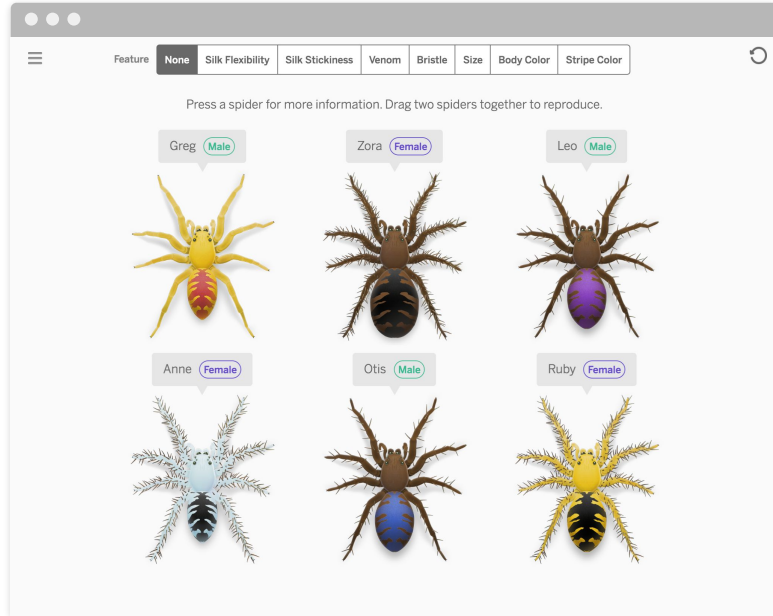
Claim 1: The offspring have mutations that affect their traits.

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.

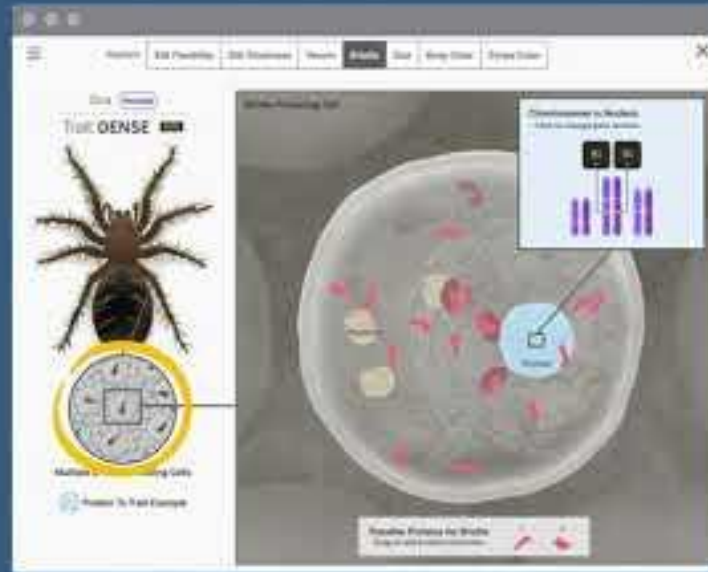
We'll return to these claims as we learn more about traits in this unit.



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.

Under the spider you will see a group of cells.



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**?

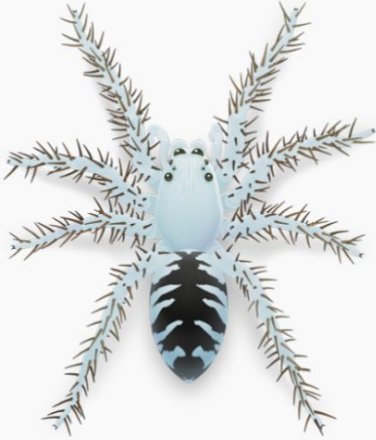
What differences do you observe in the spiders' **traits**?

Are all spiders the same? Explain your answer.

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



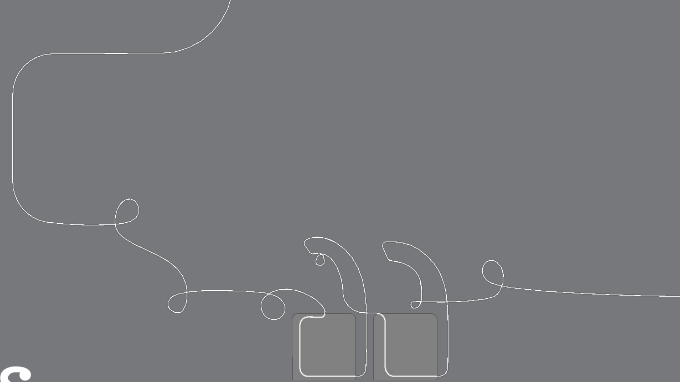
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HALL OF SCIENCE
UNIVERSITY OF CALIFORNIA, BERKELEY

Amplify.

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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.





Day 1: @Home Lesson 1

Minutes for science: 15 min

Instructional format:

- Asynchronous
- Synchronous

Lesson or part of lesson:

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

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...

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.

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...



<p>Day 1: @Home Lesson 1</p>	
<p>Minutes for science: <u>15 min</u></p>	<p>Minutes for science: <u>30 min</u></p>
<p>Instructional format:</p> <p><input checked="" type="checkbox"/> Asynchronous <input type="checkbox"/> Synchronous</p>	<p>Instructional format:</p> <p><input type="checkbox"/> Asynchronous <input checked="" type="checkbox"/> Synchronous</p>
<p>Lesson or part of lesson:</p> <p>@Home Lesson 1, video (slides 1-4)</p>	<p>Lesson or part of lesson:</p> <p>@Home Lesson 1, discussion and simulation (slides 4-28)</p>
<p>Mode of instruction:</p> <p><input checked="" type="checkbox"/> Preview <input type="checkbox"/> Review <input type="checkbox"/> Teach full lesson live <input type="checkbox"/> Teach using synchronous suggestions <input checked="" type="checkbox"/> Students work independently using: <input type="checkbox"/> @Home Packet <input checked="" type="checkbox"/> @Home Slides and @Home Student Sheets <input type="checkbox"/> @Home Videos</p>	<p>Mode of instruction:</p> <p><input type="checkbox"/> Preview <input type="checkbox"/> Review <input type="checkbox"/> Teach full lesson live <input checked="" type="checkbox"/> Teach using synchronous suggestions <input type="checkbox"/> Students work independently using: <input type="checkbox"/> @Home Packet <input type="checkbox"/> @Home Slides and @Home Student Sheets <input type="checkbox"/> @Home Videos</p>
<p>Students will...</p> <p>be introduced to the problem they will be investigating. They watch a video about a real researcher who is studying spider silk.</p>	<p>Teacher will...</p> <p>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.</p>
<p>Students will...</p> <p>engage in a discussion about their initial ideas, be introduced to the claims they will investigate, explore the simulation, and reflect on learning.</p>	<p>Teacher will...</p> <p>lead students through the lesson activities using slides 4-28.</p>



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

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

Some Types of Written Work in Amplify Science

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

Completing Written Work

- Plain paper and pencil (videos include prompts for setup)
- (6-8) Student platform
- Investigation Notebook
- Record video or audio file describing work/answering prompt
- Teacher-created digital format (Google Classroom, etc)

Submitting Written Work

- Take a picture with a smartphone and email or text to teacher
- Through teacher-created digital format
- During in-school time (hybrid model) or lunch/materials pick-up times
- (6-8) Hand-in button on student platform

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 do? See Some Types of

If there isn't a word, Asynchronous about how an

Synchronous claims after

How will students see the Completing students can complete

Asynchronous synchronous

Synchronous in Schoology their learning

AmplifyScience
Metabolism Chapter 1 @Home Science Wall

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

● Key Concepts

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

● Vocabulary

trait

feature

variation

structure

function

e.
Make notes below.
all ideas for

out the

dance on how

ties to the
discuss

worksheet
to reflect on

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

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

- Teacher-created digital format (Google Classroom, etc)
- (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.)

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

<p>Day 2: _____</p> <p>Minutes for science: _____</p> <p>Instructional format: <input type="checkbox"/> Asynchronous <input type="checkbox"/> Synchronous</p> <p>Lesson or part of lesson:</p> <p>Mode of instruction:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Preview <input type="checkbox"/> Review <input type="checkbox"/> Teach full lesson live <input type="checkbox"/> Teach using synchronous suggestions <input type="checkbox"/> Students work independently using: <ul style="list-style-type: none"> <input type="checkbox"/> @Home Packet <input type="checkbox"/> @Home Slides and @Home Student Sheets <input type="checkbox"/> @Home Videos 		<p>Minutes for science: _____</p> <p>Instructional format: <input type="checkbox"/> Asynchronous <input type="checkbox"/> Synchronous</p> <p>Lesson or part of lesson:</p> <p>Mode of instruction:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Preview <input type="checkbox"/> Review <input type="checkbox"/> Teach full lesson live <input type="checkbox"/> Teach using synchronous suggestions <input type="checkbox"/> Students work independently using: <ul style="list-style-type: none"> <input type="checkbox"/> @Home Packet <input type="checkbox"/> @Home Slides and @Home Student Sheets <input type="checkbox"/> @Home Videos 	
<p>Students will...</p>	<p>Teacher will...</p>	<p>Students will...</p>	<p>Teacher will...</p>

Types of Written Work in Amplify Science

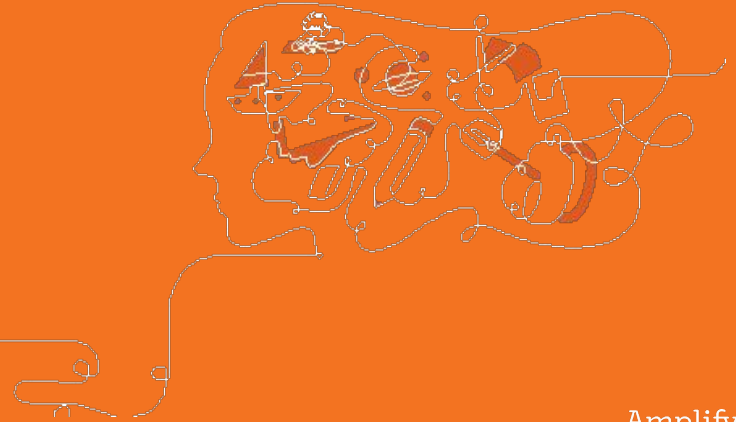
ten reflections
 work tasks
 tion notebook pages
 explanations (typically at the end of Chapter)
 g pages for Sim uses, investigations, etc

Written Work	Submitting Written Work
er and pencil lude prompts ent platform on Notebook leo or audio file vering prompt eated digital oogle , etc)	<ul style="list-style-type: none"> • 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.)



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

t.rsinha-das@tryamplify.net

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Classroom Language Settings

LEA Resources

LA Science Program Guide

Science Program Guide

Help

Interim Assessments

Program Hub

FLORIDA

Map

AmplifyScience

Amplify Science

Welcome

Program developers

Designed for the NGSS

Program components

Scope and Sequence

Phenomena, standards, and progressions

Assessments

Science and literacy

Access and equity

Resources

Access and equity

Universal Design for Learning

Culturally and linguistically responsive

Differentiation strategies

– English learners

– Students with disabilities

– Standard English learners

– Girls and young women

– Advanced learners and gifted learners

– Students living in poverty, foster children and youth, and migrant students

Lesson-level differentiation

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

I. Provide Multiple Means Representation

1: Provide options for perception

- 1.1 Offer ways of customizing the display of information
- 1.2 Offer alternatives for auditory information
- 1.3 Offer alternatives for visual information

2: Provide options for language, mathematical expressions, and symbols

- 2.1 Clarify vocabulary and symbols
- 2.2 Clarify syntax and structure
- 2.3 Support decoding of text, mathematical expressions, and symbols
- 2.4 Promote understanding across languages and symbols
- 2.5 Illustrate through multiple media

3: Provide options for comprehension

- 3.1 Activate or supply background knowledge
- 3.2 Highlight patterns, critical features, big ideas, and relationships
- 3.3 Guide information processing, visualization, and manipulation
- 3.4 Maximize transfer and generalization

<http://www.cast.org/>

4: Provide options for physical action

- 4.1 Vary the methods for response and navigation
- 4.2 Optimize access to tools and assistive technologies

5: Provide options for expression and communication

6: Provide options for executive functions

- 6.1 Guide appropriate goal-setting
- 6.2 Support planning and strategy development
- 6.3 Facilitate managing information and resources
- 6.4 Enhance capacity for monitoring progress

Provide Multiple Means of Engagement

7: Provide options for recruiting interest

- 7.1 Optimize individual choice and autonomy
- 7.2 Optimize relevance, value, and authenticity
- 7.3 Minimize threats and distractions

8: Provide options for sustaining effort and persistence

- 8.1 Optimize challenge and experience of goals and objectives
- 8.2 Optimize resources to optimize challenge
- 8.3 Optimize collaboration and community
- 8.4 Optimize feedback, including mastery-oriented feedback

9: Provide options for self-regulation

- 9.1 Promote expectations and beliefs that optimize motivation
- 9.2 Facilitate personal coping skills and strategies
- 9.3 Develop self-assessment and reflection

Virtual round robin: Give an instructional strategy from each category that you've used in your classroom.

Resourceful, knowledgeable learners

Strategic, goal-directed learners

Purposeful, motivated learners

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

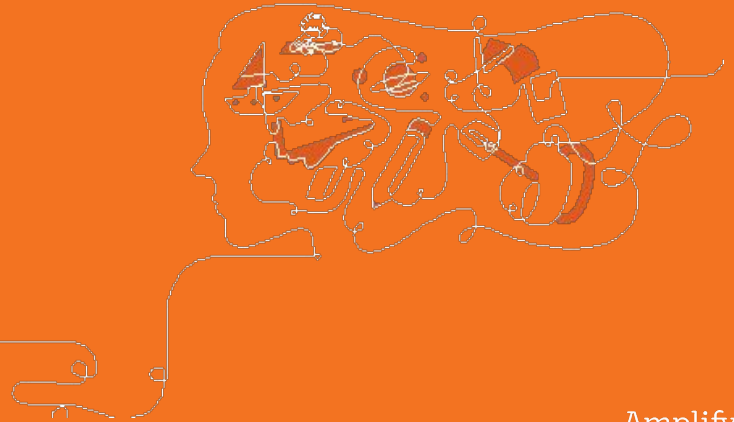
Culturally and linguistically responsive teaching

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

CULTURALLY AND LINGUISTICALLY RESPONSIVE TEACHING PRINCIPLES

- ∨ Promote a positive disposition toward diversity: +
- ∨ Leverage students' cultural and experiential backgrounds: +
- ∨ Value language diversity and multilingualism: +
- ∨ Cultivate students' development of the language of science: +

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?

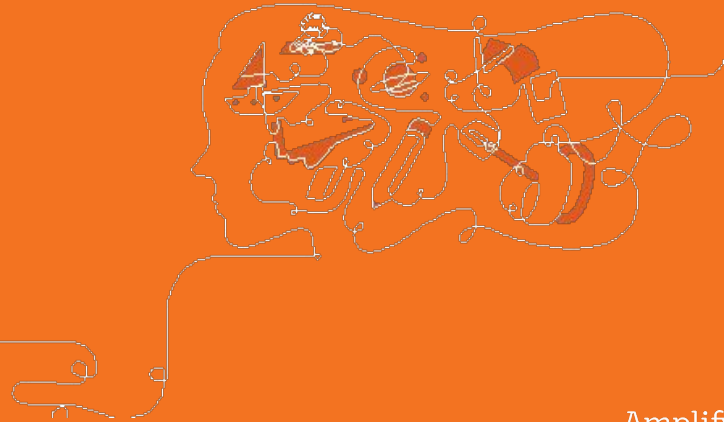


Additional support considerations

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

The screenshot shows a lesson brief interface. At the top, there is a light green header labeled "Lesson Brief". Below it is a vertical navigation menu with the following items: "Overview", "Materials & Preparation", "Differentiation", "Standards", "Vocabulary", and "Unplugged?". Each item has a downward-pointing chevron icon to its right. A large orange arrow points from the right towards the "Differentiation" item, which is highlighted with a light orange background. At the bottom of the interface is a horizontal navigation bar with four tabs: "Step-by-step", "Teacher Support", "Possible Responses", and "My Notes". The "Teacher Support" tab is currently selected, indicated by a purple underline.

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 (continued)

English-Arabic Glossary	
design: to try to make something new that people want or need	حل: شيء ما يساعد الناس على فعل ما يريدون تصميم: محاولة بناء شيء جديد يريدونه 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 تحرك أو بعيدًا عنك
distance: how far it is between two things	مسافة: البعد 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

Pulls—English-Arabic Glossary
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Pushes and Pulls—English-Arabic Glossary **1**

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

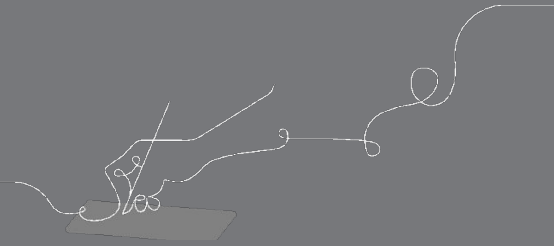
Do you feel ready to...

- 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!

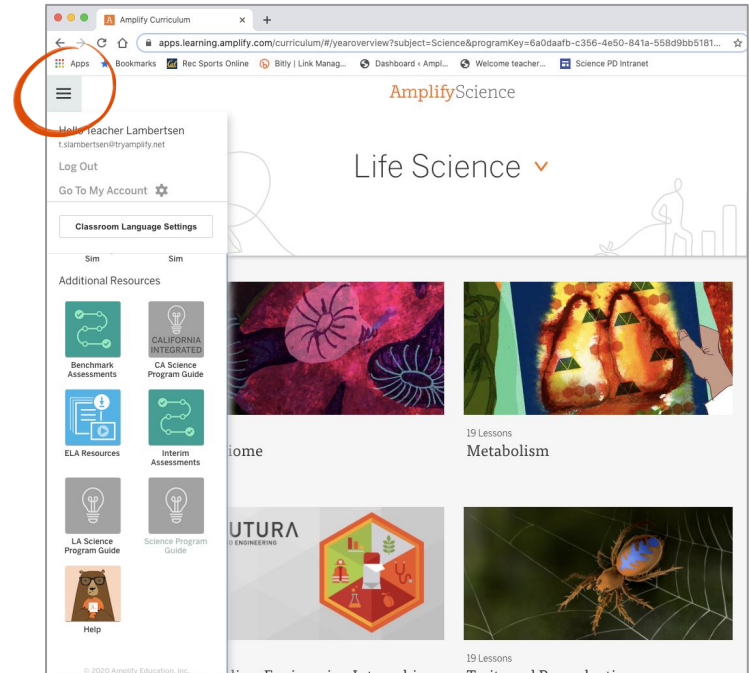


Amplify Science Program Hub

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)



THE LAWRENCE
HALL OF SCIENCE
UNIVERSITY OF CALIFORNIA, BERKELEY

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

[Educator Spotlight Submission](#)

[20-21 Login Update](#)

[Professional learning opportunities](#)

[Introduction](#)



Contact Us

119

Getting started resources

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	<u>Unit 4:</u> Focusing on Evidence of Learning	New Teachers	3:00-4:30
March 9th	4	<u>Unit 4:</u> 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	<u>Unit 4:</u> Focusing on Evidence of Learning	New Teachers	3:00-4:30
March 16th	5	<u>Unit 4:</u> Focusing on Evidence of Learning	Returning Teachers	3:00-4:30