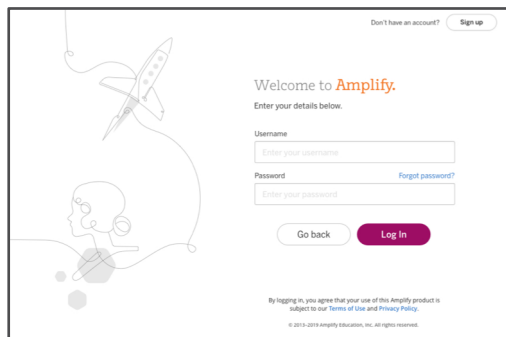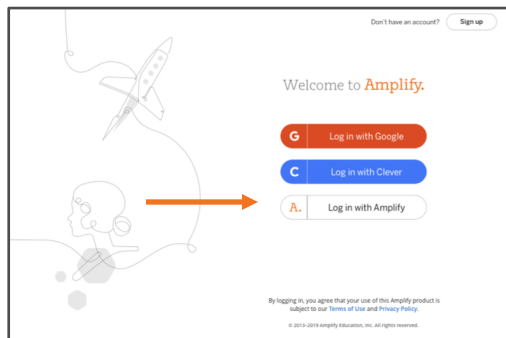# Welcome to Amplify Science!

Do now: Name tent and login
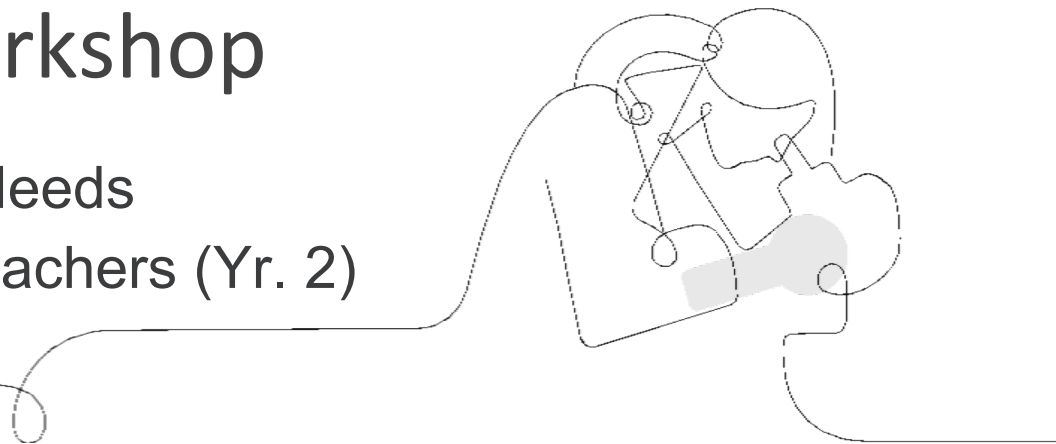

1. Make a name tent

2. Use the printed directions on your table to log in to your personal account

3. Explore as we wait to begin

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Amplify Science

Grade 3: Inheritance and Traits Implementation workshop

Supporting Diverse Learner Needs
New York City Elementary Teachers (Yr. 2)

NYC DOE
November 5, 2019
Presented by Laura Considine

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Reflecting on Unit 1:
Where are you on the implementation continuum?

- Reflect on the overall implementation of unit 1 and determine where you would rate your implementation on the continuum.

- On a sticky note, write why you chose that location on the continuum.

- Place your sticky note on the continuum chart.

**Implementation
Not Yet Started**

**Effective
Implementation**

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Sharing Ideals and Solutions

- Move to right side if you feel confident in the implementation area.

- Move to the left side if you feel less confident in the implementation area.

- On cue, form groups of two (confident / less confident ratings) to discuss the implementation area.

- Each rotation will be 1 minute.

Implementation Areas:

- Navigating platform and locating digital materials

- Multi-modal Instruction

- Managing print materials, kits and/or devices

- Utilizing Formative and/or Summative Assessments

- Planning and Pacing

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Plan for the day

- Reflections and Framing the Day

- Defining Diverse Learners

- Understanding Opportunities for Supporting Diverse Learners

- Analyzing Formative Assessment Data and Embedded Differentiation strategies

- Planning to Teach

- Closing

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Plan for the day

- **Reflections and Framing the Day**

- Defining Diverse Learners

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- Closing

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Elementary school course curriculum structure

Grade K

- Needs of Plants and Animals
- Pushes and Pulls
- Sunlight and Weather

Grade 1

- Animal and Plant Defenses
- Light and Sound
- Spinning Earth

Grade 2

- Plant and Animal Relationships
- Properties of Materials
- Changing Landforms

Grade 3

- Balancing Forces
- Inheritance and Traits
- Environments and Survival
- Weather and Climate

Grade 4

- Energy Conversions
- Vision and Light
- Earth's Features
- Waves, Energy, and Information

Grade 5

- Patterns of Earth and Sky
- Modeling Matter
- The Earth System
- Ecosystem Restoration

AmplifyScience

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

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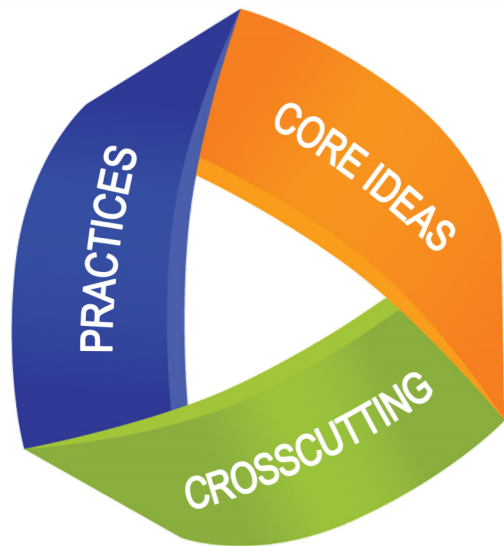
Standards as three-dimensional performance expectations that integrate **disciplinary core ideas**, **science and engineering practices**, and **crosscutting concepts**

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Amplify Science approach
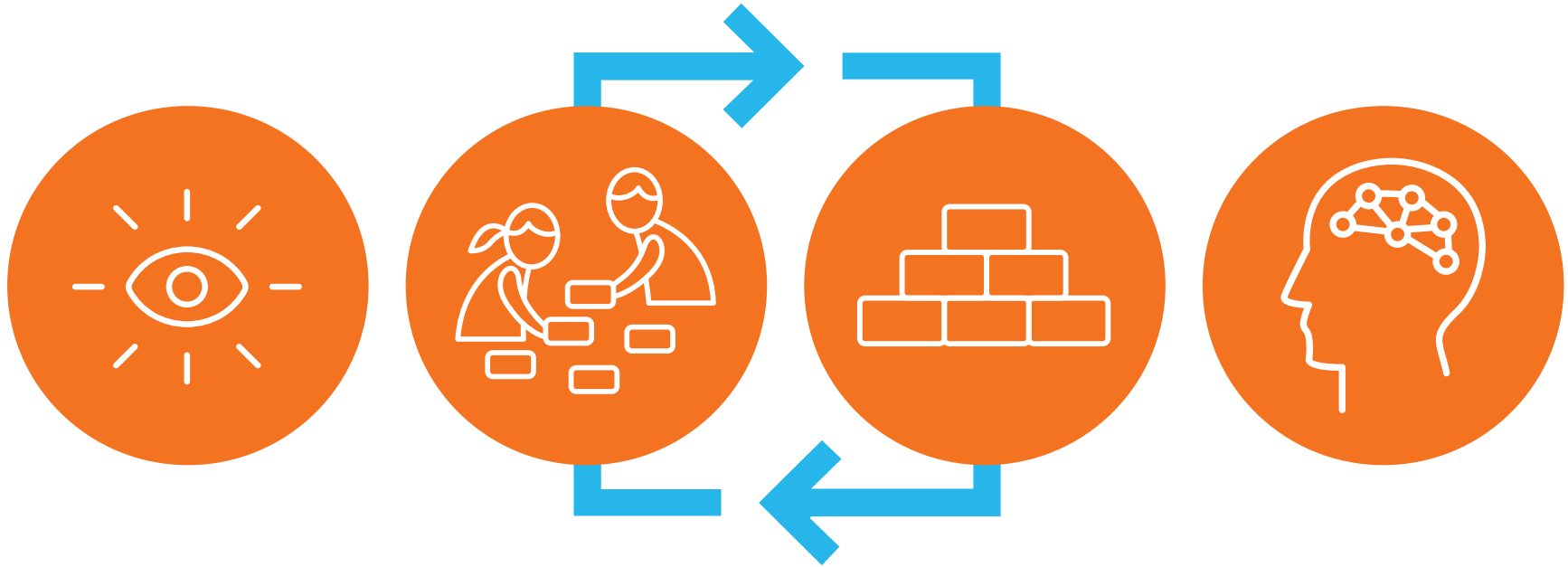
Introduce a phenomenon and a related problem

Collect evidence from multiple sources

Build increasingly complex explanations

Apply knowledge to a different context

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Multi-modal learning

Discussions and writing

Books
Hands-on activities

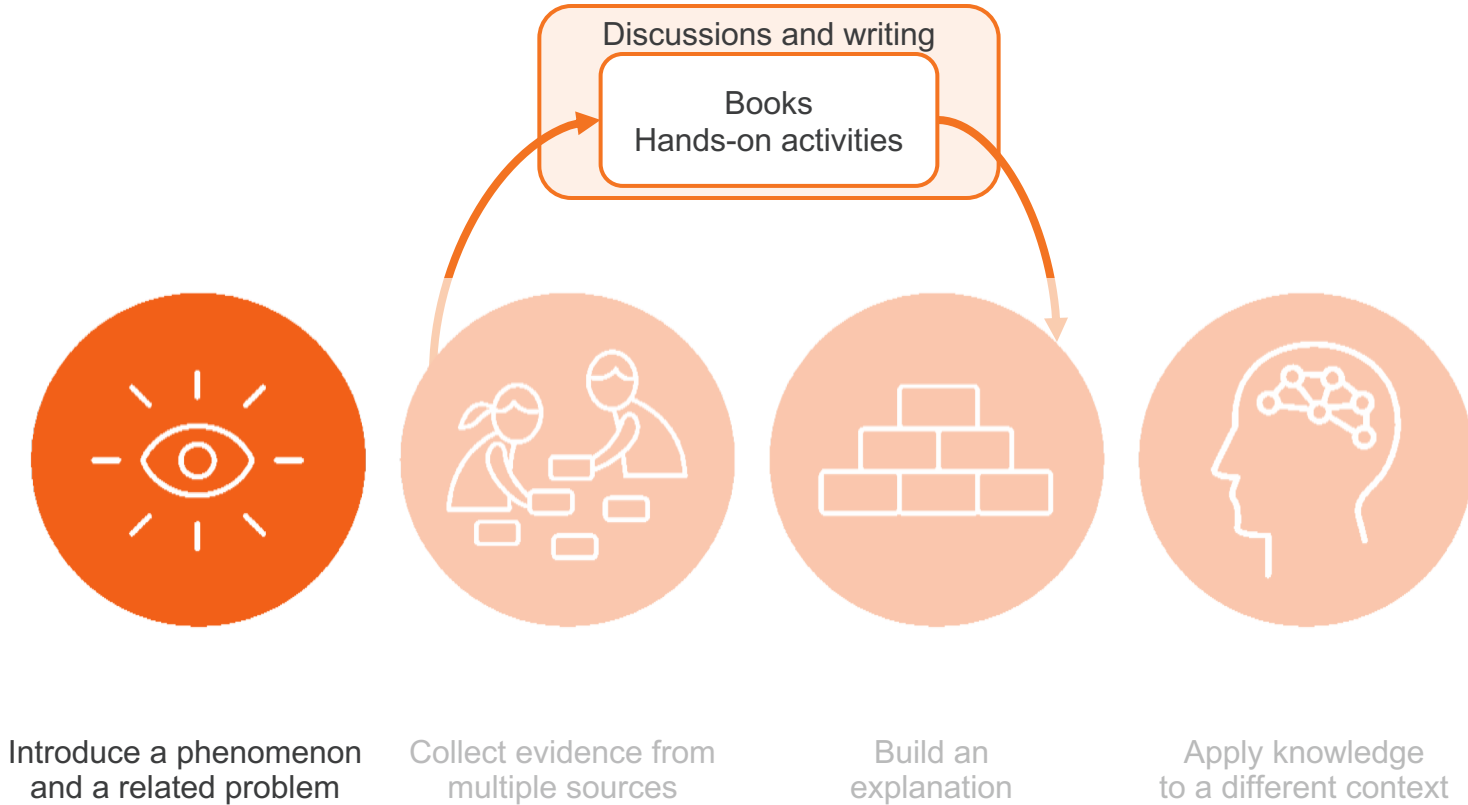**Introduce a phenomenon
and a related problem**

Collect evidence from
multiple sources

Build an
explanation

Apply knowledge
to a different context

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Workshop Title: Supporting Diverse Learner Needs

By the end of this session, K-5 participants will be able to...

- Identify embedded opportunities that support diverse learner needs within the unit of study

- Understand how to utilize the embedded multimodal curricular supports (do, talk, read, write, visualize) to help all students gather sources of evidence and argue like scientists

- Articulate the critical role that language and literacy play in developing scientific understanding

- Apply the End of Unit assessment rubric to understand student expectations

- Apply strategies that support diverse learner needs when planning instructional sequences

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Plan for the day

- Reflections and Framing the Day

- **Defining Diverse Learners**

- Understanding Opportunities for Supporting Diverse Learners

- Analyzing Formative Assessment Data and Embedded Differentiation strategies

- Planning to Teach

- Closing

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Who are our Diverse Learners?

"Diverse learning is not based on race or dependent on a deficit model. Students who are considered gifted are also diverse learners. All students are diverse and unique, in their own right. Let's agree that diverse learning recognizes that all students have unique learning needs and we educators must be prepared to provide multiple entry points for all learners to access the rigor of the goals and standards."

Anonymous Educator

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Charting Ideas from **your own** Teacher Toolkit

What intuitive teacher strategies would you add to this list?

Modalities	Strategies
● **Doing** and completing tasks	
● **Talking** and adding ideas	
● **Reading** for information	
● **Writing** to convey understanding	
● **Visualizing** ideas	

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Multimodal instruction

Do, Talk, Read, Write, Visualize

Do

Read

Talk

Do

Read

Write and Talk

Write

Visualize

Visualize

Science Concept
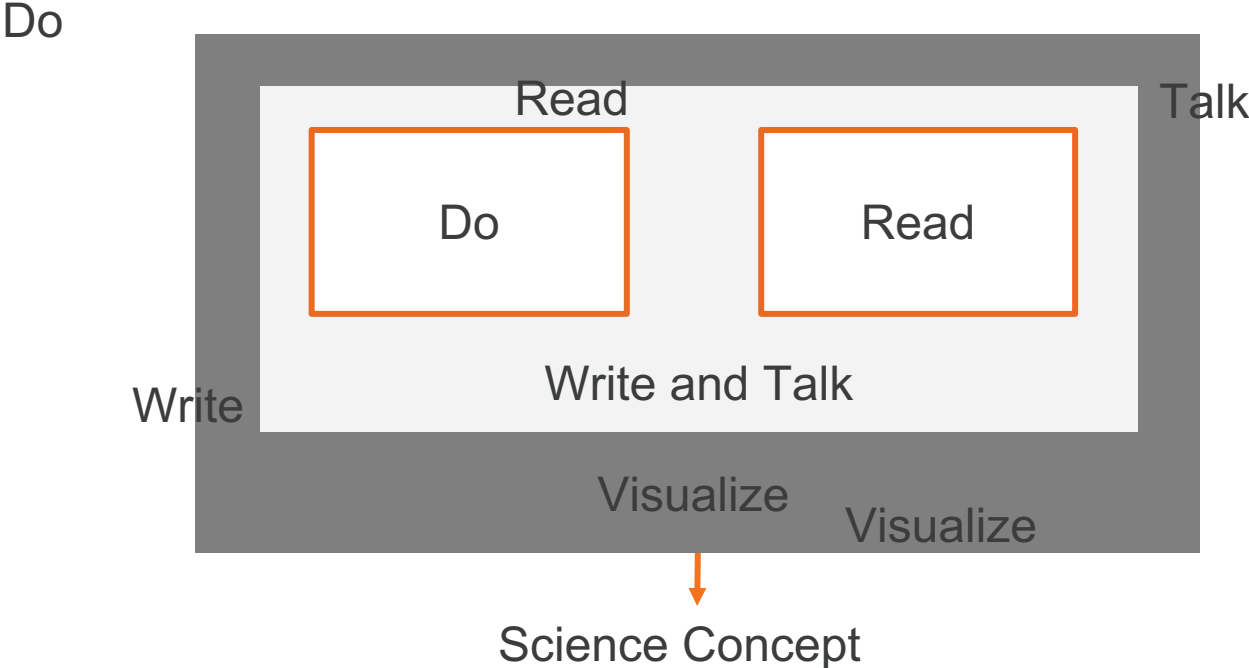
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The Amplify Science Curriculum was developed with Supporting Diverse Learning Needs In Mind.

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.**

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Universal Design for Learning Guidelines

http://www.cast.org/

| I. Provide Multiple Means of **Representation** | | II. Provide Multiple Means of **(Action & Expression)** | | III. Provide Multiple Means of **Engagement** | |

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

4: Provide options for physical action

4.1 Vary the methods for response and navigation

4.2 Optimize access to tools and assistive technologies

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

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 notation, and symbols

2.4 Promote understanding across languages

2.5 Illustrate through multiple media

5: Provide options for expression and communication

8: Provide options for sustaining effort and persistence

8.1 Heighten salience of goals and objectives

8.2 Vary demands and resources to optimize challenge

8.3 Foster collaboration and community

8.4 Increase mastery-oriented feedback

> **Round Robin:** Give an instructional strategy from each category that you've used in your classroom?

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

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

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

| **Resourceful, knowledgeable learners** | **Strategic, goal-directed learners** | **Purposeful, motivated learners** |

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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.
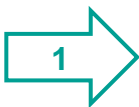
Culturally and linguistically responsive teaching

Turn and talk: 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: ＋

Differentiation Strategies

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English Learners

- **Principle 1:** Leverage and build students' informational background knowledge.

- **Principle 2:** Capitalize on students' knowledge of language.

- **Principle 3:** Provide explicit instruction about the language of science.

- **Principle 4:** Provide opportunities for scaffolded practice.

- **Principle 5:** Provide multimodal means of accessing science content and expressing science knowledge.

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Language supports for English Learners in Amplify

Embedded instructional design: Many **scaffolds are embedded** within the instructional plan and are presented to teachers through the digital teacher materials and to all students as activities within the unit. Throughout the process of designing the curriculum, these scaffolds and supports were **planned, tested, and refined** to provide **rigorous yet accessible science instruction.**

Additional support: **Additional activities** and **specific methods for supporting English learners** are provided for use **as needed**, especially in the **Teacher Support notes within the lessons.**

English Learners jigsaw

- **Principle 1:** Leverage and build students' informational background knowledge.

- **Principle 2:** Capitalize on students' knowledge of language.

- **Principle 3:** Provide explicit instruction about the language of science.

- **Principle 4:** Provide opportunities for scaffolded practice.

- **Principle 5:** Provide multimodal means of accessing science content and expressing science knowledge.

DIRECTIONS

- Read your assigned principle

- Be ready to **share out how your principle appears in the Amplify curriculum**.

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Who are our Diverse Learners?

"Diverse learning is not based on race or dependent on a deficit model. Students who are considered gifted are also diverse learners. All students are diverse and unique, in their own right. Let's agree that diverse learning recognizes that all students have unique learning needs and we educators must be prepared to provide multiple entry points for all learners to access the rigor of the goals and standards."

Anonymous Educator

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Differentiation Strategies

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

Diverse Learners

- Think about your learner, which strategies would you use to support them?

Share:

- Summarize your learner

- Share strategies

Students with disabilities meet the criteria under one of the following categories:

- Autism

- Deafness

- Deaf-blindness

- Emotional disturbance

- Hearing impairment

- Intellectual disability

- Multiple disabilities

- Orthopedic impairment

- Other health impairment

- Specific learning disability

- Speech or language impairment

- Traumatic brain injury

- Visual impairment (including blindness)

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Standard English learners

Students who are Standard English Learners (SELs) are **ethnic minority students** and **primary English speakers who speak a dialect of English** in their home communities that is different from the "standard" dialect of English used in schools. **The goal for SELs** is to become bidialectal by **maintaining their home dialect of English while mastering standard English (SE) across the disciplines**, including science.

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Girls and young women

Historically, girls and young women have had **fewer opportunities** to participate in and benefit from **deep science and engineering learning**. To help combat this issue, Amplify Science aids teachers in **positioning girls and young women as powerful science and engineering learners**.

Advanced learners and gifted learners

Advanced learners and gifted learners, who **may be formally or informally identified,** show the **capacity for performance that is significantly higher than their age peers**. This group of students require their teachers to **focus on adding depth and complexity** in the science topics under study (as opposed to merely adding more work, additional topics, or skipping content or grade levels).

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

Children and youth who experience **disruptions to their education** or are **living in potentially stressful situations lack equal access to quality science and engineering learning experiences**, and are **disproportionately negatively impacted in science academic outcomes**.

Plan for the day

- Reflections and Framing the Day

- Defining Diverse Learners

- **Understanding Opportunities for Supporting Diverse Learners**

- Analyzing Formative Assessment Data and Embedded

  Differentiation strategies

- Planning to Teach

- Closing

Grade 3:
Inheritance and Traits

Anchor phenomenon: Students work to help a class of students near the fictional Graystone National Park to solve the mystery of Wolf 44—a wolf they have observed to be different from the rest of its pack.

Role of the Student: Wildlife biologists

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Introduce a phenomenon
and a related problem

Grade 3 | Inheritance and Traits

Introducing the unit phenomenon

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We're about to begin a new science unit.

You will take on the role of **wildlife biologists**. You will investigate many of the things that scientists like wildlife biologists do.

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Take a moment to look at these pictures of wildlife biologists.

✊

What do you think **wildlife biologists** study?

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Let's look at more pictures of wildlife biologists.

Where do you think **wildlife biologists** work?

As wildlife biologists, you will study **wolves** in Graystone National Park.

There is a mystery about one particular wolf that you will work to solve.

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Wolves live in a **pack**, or group of many wolves.

Being part of a group often helps animals survive.

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Student preconceptions in this unit

JUMP DOWN TO UNIT GUIDE

Read to find out about expected preconceptions.

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	⌄
	⌄
	⌄
	⌄
	⌄
Books in This Unit	⌄
Apps in This Unit	⌄

Printable Resources

- 📄 Coherence Flowcharts
- 📄 Copymaster Compilation
- 📄 Investigation Notebook
- 📄 Multi-Language Glossary
- 📄 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

Share: What preconceptions do you expect students to come in with? How will you address them throughout the unit?

40

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Unit Level 3-D Statement

Key

| Practices | Disciplinary Core Ideas | Crosscutting Concepts |

Unit Level

Students investigate the variation between similar organisms (patterns) and how traits that depict parents and offspring are determined (cause and effect).

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Grade 3 | Inheritance and Traits

Chapter 1 Summary

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Unit Map

What is the origin of the traits of Wolf 44—a wolf that appears to be different from the rest of its pack?

Students play the role of wildlife biologists working in Graystone National Park. They study two wolf packs and are challenged to figure out why Wolf 44, an adopted wolf, has certain traits. Students observe variation between and within different species, investigate inherited traits and those that result from the environment, and explain how Wolf 44 acquired certain traits.

Chapter 1: Why are wolves different from each other even though they are all the same species?

Students figure out: Even though all wolves are the same species, some wolves are different from others due to variation of traits within a species. This means that even though wolves can have similarities in their traits, there can also be variations in each trait. For example, wolves have different colors of fur: some wolves have a trait for gray fur, others have a trait for black fur.

How they figure it out: Students investigate similarities and differences between a broad array of organisms, including plants and animals. They focus on exploring patterns of similarities and differences of traits between animals, and finally narrow in on similarities and differences in organisms of the same species. By chapter's end, the class constructs an explanation about why wolves are different even though they are all the same species.

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Inheritance and Traits: Variation in Wolves

Problem students work to solve	What is the origin of the traits of Wolf 44—a wolf that appears different from the rest of its pack?
Chapter 1 Question	Why are wolves different even though they are all the same species? (introduced in 1.4)
Investigation Questions	What are some ways that organisms can be similar or different? (1.1-1.4) — How can we describe the traits of organisms in a species? (1.5-1.6)
Evidence sources and reflection opportunities	• Read *Blue Whales and Buttercups* (1.2) • Reflect on relatedness (1.2) • Observe similarities and differences between animals (1.3) • Observe bird traits (1.3) • Observe bird sounds (1.4) • Observe bear traits (1.4) — • Look for patterns in the wolf pack (1.5) • Construct bar graphs to analyze similarity and variation in students' traits (1.5) • Read *Handbook of Traits* to gather info about how traits vary within a species (1.6) • Use Word Relationships routine to reflect on learning across the chapter (1.6) • Create digital models of trait variation (1.6)
Key concepts	Organisms have observable traits. (1.3) — Organisms in a species have many similar traits, but for each trait there can be variation. (1.6)
Application of key concepts to problem	• Review wolf data and reflect on variation of traits within the wolf pack (1.7) • Write class explanation to answer the Chapter 1 Question (1.7)
Explanation that students can make to answer the Chapter 1 Question	Even though all wolves are the same species, some wolves are different from others due to variation of traits within a species. This means that even though wolves can have similarities in their traits, there can also be variations in each trait. For example, wolves have different colors of fur: some wolves have a trait for gray fur, others have a trait for black fur.

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Chapter 1: Why are wolves different even though they are all the same species?

JUMP DOWN TO CHAPTER OVERVIEW

Lesson 1.1:
Pre-Unit Assessment

Lesson 1.2:
Blue Whales and Buttercups

Lesson 1.3:
Observing Similarities and Differences

Lesson 1.4:
Introducing Species

Lesson 1.5:
Variation in a Species

Lesson 1.6:
Making Sense of Variation

Lesson 1.7:
Explaining Variation

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Lessons 1.2 & 1.3

Key Concept

Organisms have observable traits.

There is a lot of evidence that these animals are all closely related to one another. Can you observe any traits they have in common?

wild dog

14

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Chapter 1: Why are wolves different even though they are all the same species?

Lesson 1.1:
Pre-Unit Assessment

Lesson 1.2:
Blue Whales and Buttercups

Lesson 1.3:
Observing Similarities and Differences

Lesson 1.4:
Introducing Species

Lesson 1.5:
Variation in a Species

Lesson 1.6:
Making Sense of Variation

Lesson 1.7:
Explaining Variation

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Lessons 1.4 & 1.5

Identifying Songbirds by Sound

Step 1

When I play the sounds **listen carefully to the sounds the bird makes.** Think about whether its sound is like a song with many notes.

Step 2

Stand up if you think this bird is a songbird. If you think this bird is not a songbird, stay sitting down.
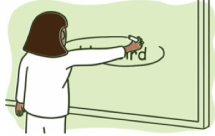
Step 3

If most of the class stands up, I will **circle the name of the bird** on our list.

Class Traits Poster Walk

Step 1

Visit a poster with your group. Decide which trait on the poster is the closest match to you.
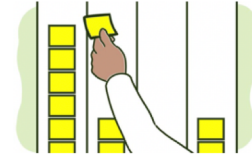
Step 2

Place a sticky note above the trait that is your closest match. If there are already sticky notes, put your sticky note at the top.

Step 3

When you hear the signal, move with your group to the next poster.

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Plan for the day

- Reflections and Framing the Day

- Defining Diverse Learners

- Understanding Opportunities for Supporting Diverse Learners

- **Analyzing Formative Assessment Data and Embedded Differentiation strategies**

- Planning to Teach

- Closing

Unpack and Analyze the Embedded Formative Assessment Data

What do you notice about each diverse learner's needs?

What connections can you make to each learner's profile?

How would you use the **Now What** strategies to support each learner?

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[On-The- Fly Status of the Class Data Organization Tool]

Teacher: Mr. Saturn   **Grade Level** : 3   **Date:** 8 /2018
Unit Name: Inheritance and Traits   **Chapter:** 1   **Lesson:** 1.5, Act. 1

A.) Determine the "Look For's" for the On the Fly Assessment
On-the-Fly Assessment 3: Patterns in Wolf Traits

B.) Rate the Look -Fors
'3' if student demonstrates a **strong understanding**
'2' if student demonstrates **some understanding**
'1'- if student demonstrates **no understanding**

Look Fors	Learner A	Learner B	Learner C	Learner D
Look For #1: Student participants in task to investigate traits of wolves and records observational data.	3	3	2	2
Look For #2: Student is able to identify simple similarities / patterns (pointy ears, dark fur, four legs, have eyes, long nose)	3	1	2	2
Look For #3: Student appropriately uses unit vocabulary to respond to the assessment questions: (data, investigate, observe, organism, pattern, species, trait, variation)	1	1	1	1
Look For #4: Student is able to identify variations (one wolf has fur that is a lighter color; some lighter-color fur in places; some have thicker, longer fur)	3	1	2	2

C.) After data are collected for the OTF, analyze the student needs and refer to the **NOW WHAT** section for ideas on how to respond to your students' needs.

Sample Classroom Profile

Learner A: Enjoys science and math. Loves to tell stories about her many travels and enjoys figuring out phenomena presented. While she finds verbal explanations to be sufficient, she does not find it necessary to elaborate on her ideas through written explanation or written argument. She often shuts down when pushed to provide supporting details in writing.

Learner B: Enjoys reading and writing. When provided a written assignment, he is anxious to provide lengthy written and verbal explanations. Although, this learner enjoys reading, writing and speaking he is challenged by sentence structure, spelling and staying on topic.

Learner C: This new student enjoys expressing himself through art and drawings. He is not a strong reader, yet, as English is his second language. This student has strong comprehension skills and has adapted to using the classroom artifacts to help him construct written explanations.

Learner D: Enjoys solving critical thinking problems and has rich science vocabulary. She works best when provided independent tasks and does not work well in collaborative group settings. She relies on step by step teacher validation and is not likely to complete a task without making sure her answer affirmed by an adult in the room.

Let's see what students will need to know and be able to do in the upcoming lesson.

Lesson 1.6
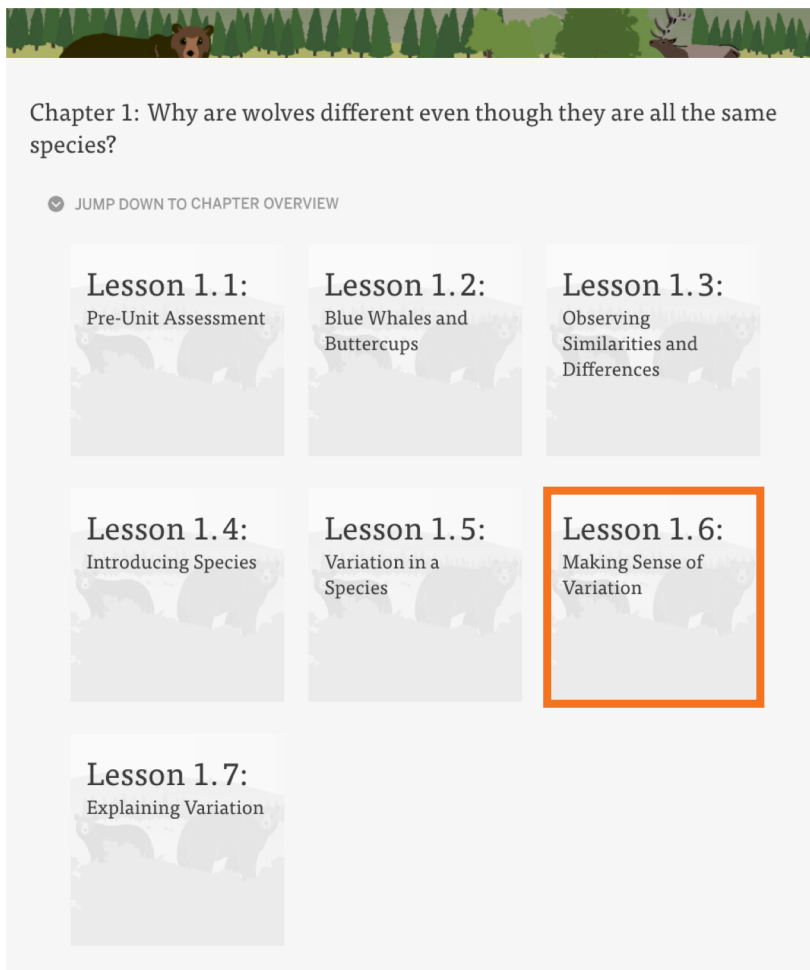
Key Concept

Organisms in a species have many similar traits, but for each trait there can be variation.

Reference Book

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Turn and Talk

If the preconceptions, misconceptions and/or academic behaviors are not addressed in lesson 1.5 what challenges might the teacher anticipate in lesson 1.6?

Chapter 1: Why are wolves different even though they are all the same species?

⌄ JUMP DOWN TO CHAPTER OVERVIEW

Lesson 1.1:
Pre-Unit Assessment

Lesson 1.2:
Blue Whales and Buttercups

Lesson 1.3:
Observing Similarities and Differences

Lesson 1.4:
Introducing Species

Lesson 1.5:
Variation in a Species

Lesson 1.6:
Making Sense of Variation

Lesson 1.7:
Explaining Variation

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Inheritance and Traits: Variation in Wolves

How do previous lessons prepare students to apply key concepts to a problem?

Problem students work to solve	What is the origin of the traits of Wolf 44—a wolf that appears different from [...]
Chapter 1 Question	Why are wolves different even though they are all the same species? (introduced in 1.1)

Investigation Questions	What are some ways that organisms can be similar or different? (1.1-1.4)	How can we describe the traits of organisms in a species? (1.5-1.6)
Evidence sources and reflection opportunities	• Read *Blue Whales and Buttercups* (1.2) • Reflect on relatedness (1.2) • Observe similarities and differences between animals (1.3) • Observe bird traits (1.3) • Observe bird sounds (1.4) • Observe bear traits (1.4)	• Look for patterns in the wolf pack (1.5) • Construct bar graphs to analyze similarity and variation in students' traits (1.5) • Read *Handbook of Traits* to gather info about how traits vary within a species (1.6) • Use Word Relationships routine to reflect on learning across the chapter (1.6) • Create digital models of trait variation (1.6)
Key concepts	Organisms have observable traits. (1.3)	Organisms in a species have many similar traits, but for each trait there can be variation. (1.6)
Application of key concepts to problem	• Review wolf data and reflect on variation of traits within the wolf pack (1.7) • Write class explanation to answer the Chapter 1 Question (1.7)	
Explanation that students can make to answer the Chapter 1 Question	Even though all wolves are the same species, some wolves are different from others due to variation of traits within a species. This means that even though wolves can have similarities in their traits, there can also be variations in each trait. For example, wolves have different colors of fur: some wolves have a trait for gray fur, others have a trait for black fur.	

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Chapter 1: Why are wolves different even though they are all the same species?

Lesson 1.1:
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Making Sense of Variation

Lesson 1.7:
Explaining Variation

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Lesson 1.7

Blue Whales and Buttercups
by Megan Goss, Jonathan Curley, and Ashley Chase

AmplifyScience

Handbook of Traits
by Chloë Delafield and Jonathan Braidman

Reference Book

Elk Mountain Pack

Wolf 43
male

Name: _____ Date: _____

Gathering Information About Wolves

Directions:
1. With your group, use data from the Elk Mountain Pack Data Cards and information from the books to help you answer the questions on the next page.
2. You can use the scientific language below to help you talk about the data from the cards and ideas from the books.

Scientific language to use when gathering data:

- I observed on the data ca...
- I read in *Handbook of Tra*...
- I read in *Blue Whales an*...

Name: _____ Date: _____

Gathering Information About Wolves (continued)

Part 1
What variation did you observe in the photographs of the wolves on the data cards?

Part 2
What did you learn about differences in species? Give examples from *Blue Whales and Buttercups* and *Handbook of Traits.*

Part 3
What science words will you use to share your ideas about differences in wolves?

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Coherence Flowcharts

Reviewing coherence (5 mins):

- Review the Coherence Flowcharts for Chapters 2 & 3. CFs can be found on **pages 6 & 7** of the Participant Notebook.
  - Partner A will review Ch. 2
  - Partner B will review Ch.3
- Partners will make connections between the application of key concepts section and the differentiation Brief for their chapter. Each partner will jot down key strategies for supporting Diverse Learners.

Pair share (5 mins):

- Partner A will take up to 1 minute to share connections for Ch. 2. Then Partner B will paraphrase what he/she heard the partner share.
- Then, Partner B will take up to 1 minute to share connections for Ch. 3. Then Partner A will paraphrase what he/she heard the partner share.

Amplify.

Inheritance and Traits: Variation in Wolves

Problem students work to solve	What is the origin of the traits of Wolf 44—a wolf that appears different from the rest of its pack?
Chapter 2 Question	Why is Wolf 44's color similar to one pack but different from the other?

Investigation Questions	Why do only some organisms of the same species have similar traits? (2.1-2.2)	Why do offspring have similar traits to their parents but not always to each other? (2.3- 2.5)
Evidence sources and reflection opportunities	• Review additional wolf data (2.1) • Examine data about fruit fly families (2.1) • Ask questions about fruit fly families and investigate by comparing traits of offspring from different families (2.1) • Read about patterns between parents and offspring in *Handbook of Traits* (2.2) • Create digital models of patterns of traits between parents and offspring (2.2)	• Read *The Code* (2.3) • Make creature offspring by following instructions for traits from creature parents and look for patterns (2.4) • Apply new ideas to explain traits in a fruit fly family (2.4) • Create digital models to show thinking about how organisms inherit traits (2.5) • Use Word Relationships routine to reflect on learning across the chapter (2.5)
Key concepts	• Scientists ask questions they can investigate by making observations. (2.1) • Organisms can have traits that are similar to their parents' traits. (2.2)	• Offspring inherit instructions for each trait from both their parents. (2.5) • Offspring can inherit different instructions from their parents, so offspring may have different traits. (2.5)
Application of key concepts to problem	• Ask questions about wolf data (2.5) • Discuss and look for patterns in wolf data (2.5) • Write explanations to answer the Chapter 2 Question (2.6)	
Explanation that students can make to answer the Chapter 2 Question	Wolf 44's color is similar to the wolves in the Bison Valley Pack because its parents are in the Bison Valley Pack. Offspring inherit instructions for each trait from both parents. This means that the trait of fur color comes from Wolf 44's parents.	

Amplify.

Inheritance and Traits: Variation in Wolves

Problem students work to solve	What is the origin of the traits of Wolf 44—a wolf that appears different from the rest of its pack?

Chapter 3 Question

Why isn't Wolf 44 like the Bison Valley Pack in hunting style and size?

Investigation Questions

Class-generated Investigation Question (e.g. How else can an organism get traits besides from its parents?) (3.1-3.2)

Can the environment affect inherited traits? (3.3-3.5)

Evidence sources and reflection opportunities

• Review additional wolf data (3.1)
• Review, ask questions about, and analyze data about flamingo families (3.1)
• Reflect on observations and with the class, generate an Investigation Question (3.1)
• Read *How the Sparrow Learned Its Song* (3.2)
• Reflect on the role of environment in determining traits (3.2)

• Revisit class traits to share ideas about factors that determined those traits (3.3)
• Set up celery investigation and make sense of results (3.3-3.4)
• Read about the origin of traits (inheritance and interaction with the environment) in *Handbook of Traits* (3.4)
• Revisit *How the Sparrow Learned Its Song* to discuss evidence for origin of traits (3.4)
• Create digital models to show understanding of inherited and environmental traits (3.5)

Key concepts

• Some traits result from the environment. (3.2)
• Organisms stay in groups in order to obtain food and meet their needs. The number of organisms in a group varies. (3.2)

• Some traits result from both inheritance and interaction with the environment. (3.4)

Application of key concepts to problem

• Write explanations about why Wolf 44 does not hunt like its parents (3.3)*
• Review wolf data (3.5)
• Revisit data about wolf size (3.6)
• Write explanations about how Wolf 44's size was determined (3.6)

Explanation that students can make to answer the Chapter 3 Question

Wolf 44 doesn't hunt like the Bison Valley Pack because it learned to hunt from the wolves in the Elk Mountain Pack. Learning to hunt is a trait that is determined by a wolf's environment. Wolf 44 is medium sized because of both inherited instructions (size) and the environment it lives in (access to diet). This means that Wolf 44 can grow bigger than its parents, but it can't grow as big as the wolves in the Elk Mountain Pack.

*Note this explanation answers part of the Chapter 3 Question and is constructed mid-chapter.

Amplify.

A Model Lesson Experience

Amplify.

Grade 3 | Inheritance and Traits

Lesson 3.5: Making Sense of Traits

Walk and Talk:

- Which learner profile would you like to focus on during the model lesson?

- What types of modifications do you think would be beneficial to this learner's needs?

Pg. 13

Learner A: Enjoys science and math. Loves to tell stories about her many travels and enjoys figuring out phenomena presented. While she finds verbal explanations to be sufficient, she does not find it necessary to elaborate on her ideas through written explanation or written argument. She often shuts down when pushed to provide supporting details in writing.

Learner B: Enjoys reading and writing. When provided a written assignment, he is anxious to provide lengthy written and verbal explanations. Although, this learner enjoys reading, writing and speaking he is challenged by sentence structure, spelling and staying on topic.

Learner C: This new student enjoys expressing himself through art and drawings. He is not a strong reader, yet, as English is his second language. This student has strong comprehension skills and has adapted to using the classroom artifacts to help him construct written explanations.

Learner D: Enjoys solving critical thinking problems and has rich science vocabulary. She works best when provided independent tasks and does not work well in collaborative group settings. She relies on step by step teacher validation and is not likely to complete a task without making sure her answer affirmed by an adult in the room.

Amplify.

As you experience the Lesson…

- Stay in the role of the student

- Jot down thoughts or questions on the "Keeping Diverse Learner Needs in Mind" note-catcher (you will have time to add more thoughts to this document after experiencing the lesson)

Activity 1

Modeling How the Environment Affects Traits

As wildlife biologists, we've been looking for **patterns** to help us understand how organisms get their traits.

Now, we'll get to use these patterns to **figure out what traits we think offspring will have**.

Amplify.
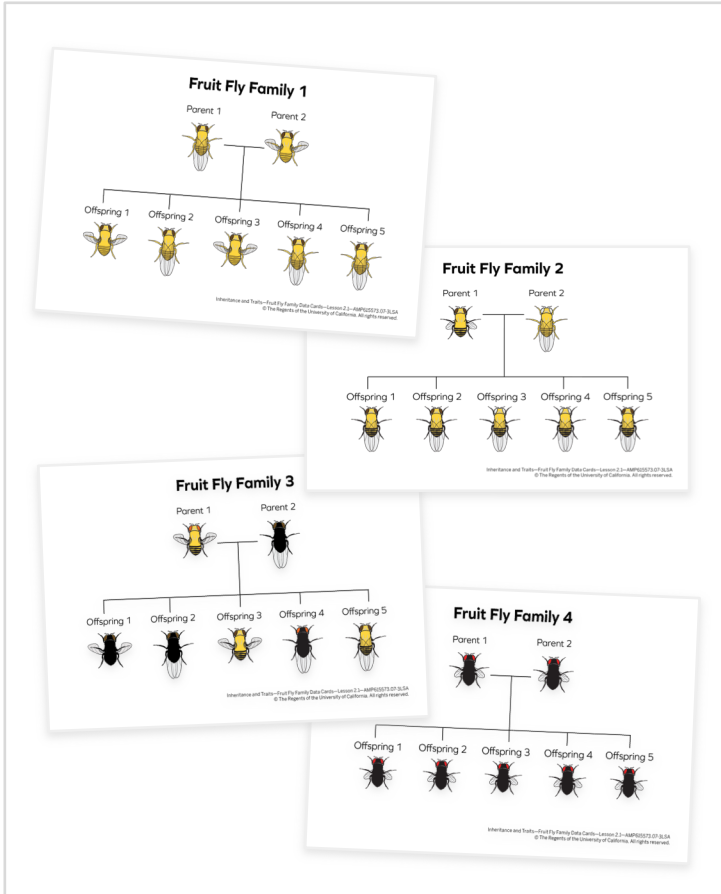
Based on your observations, what **patterns** have you noticed about **inheritance**?
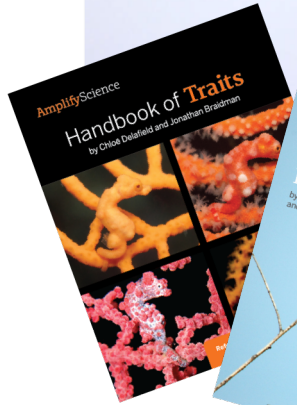
Based on your observations and reading, what **patterns** have you noticed about **traits and the environment**?

Amplify.
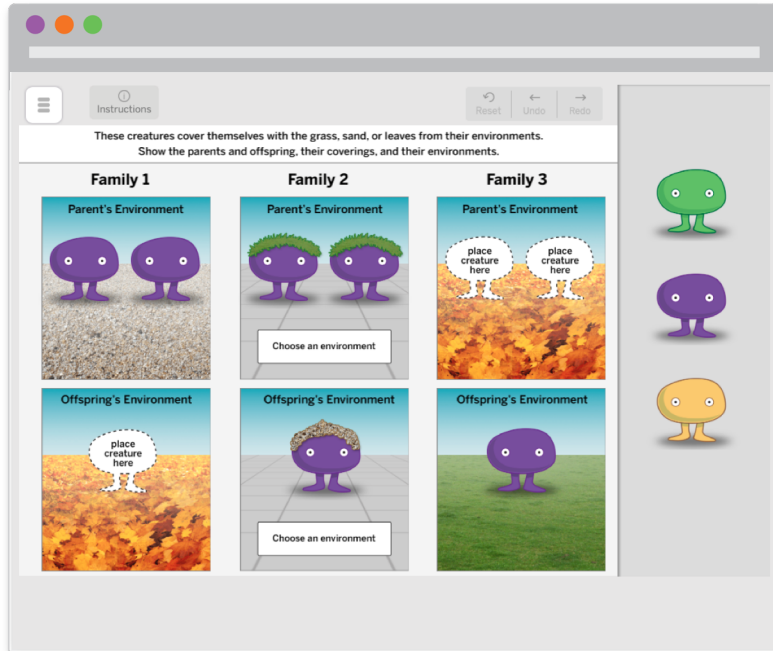
You will work with this model to **show your ideas** about the **environment and traits**.

Amplify.

Open the Modeling Tool

Step 1

Click on the **Student Apps Page** in your bookmarks.

Step 2

Scroll down and click on the *Inheritance and Traits* unit.

Step 3

Click on the **blue box with a 4** to access the Modeling Tool.

Amplify.
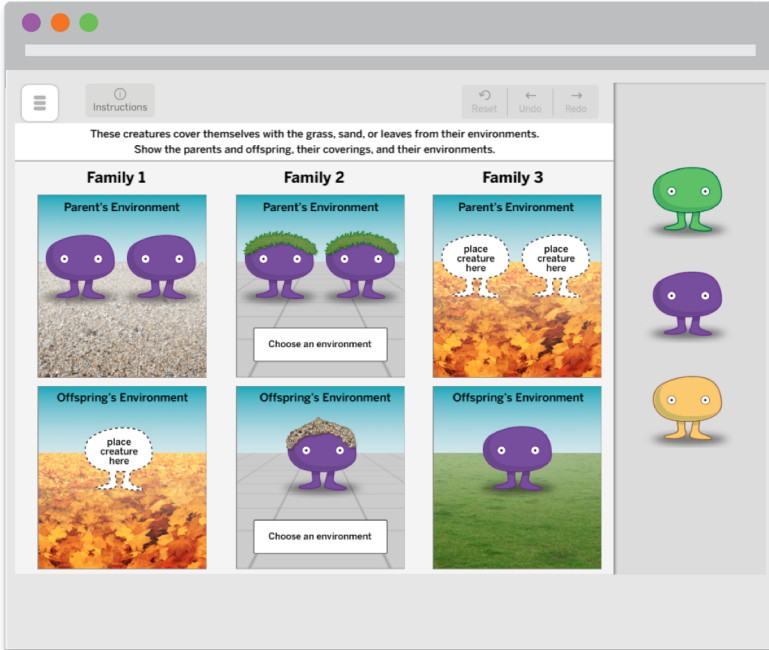
Add the missing **parents**, **offspring**, **coverings**, or **environments** for each family.

Now, we will work on a **different model** with the same fictional creatures.

Amplify.

In the Environment and Inheritance Modeling Tool, you will work with the same fictional creatures to complete the missing information for each family.

Name: _____ Date: _____

Modeling How the Environment Affects Traits

Directions:
1. Complete the digital Environment and Inheritance Model.
2. Answer the questions on this and the next page.

In Family 1, what environment did you choose for the offspring?

_____

Why did you choose t_____

_____

_____

_____

Describe the traits of_____

_____

Why did you choose t_____

_____

_____

_____

_____

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Name: _____ Date: _____

Modeling How the Environment Affects Traits (continued)

In Family 3, what traits for size and color did you choose for the parents?

_____

_____

Why did you choose those traits for the parents?

_____

_____

_____

Turn to pages 68–69 in your notebooks.

You will complete these notebook pages after you have finished working on your models.
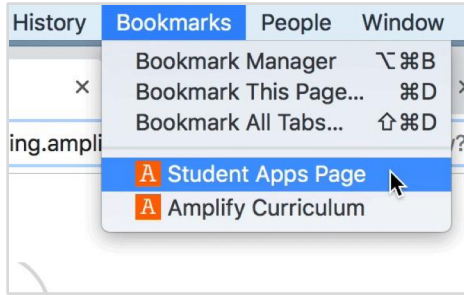
Amplify.

Open the Modeling Tool

Step 1

Click on the **Student Apps Page** in your bookmarks.
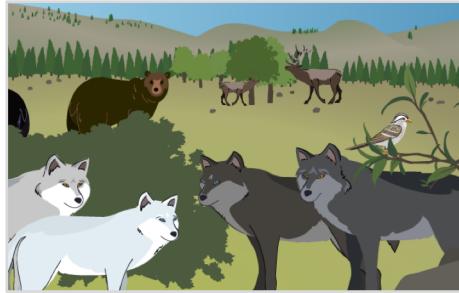
Step 2

Scroll down and click on the *Inheritance and Traits* unit.

Step 3

Click on the **blue box with a 5** to access the Modeling Tool.

Amplify.

Complete the model.

Name: _____ Date: _____

Modeling How the Environment Affects Traits

Directions:
1. Complete the digital Environment and Inheritance Model.
2. Answer the questions on this and the next page.

In Family 1, what environment did you choose for the offspring?

_____

Why did you choose t

_____
_____
_____

Describe the traits of

_____
_____

Why did you choose t

_____
_____
_____
_____

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Name: _____ Date: _____

Modeling How the Environment Affects Traits (continued)

In Family 3, what traits for size and color did you choose for the parents?

_____
_____

Why did you choose those traits for the parents?

_____
_____
_____

Discuss the questions and then **record** your answers.

Amplify.

How did you complete the model?

How did you choose which parents, offspring, and environments to add?

Amplify.

Activity 2

Critical Juncture: Reviewing Wolf Data

Chapter 3 Question

Why isn't Wolf 44 like the Bison Valley Pack in hunting style and size?

Amplify.

Wolf 44
Hunts elk in small groups (up to 4 wolves).

You already wrote explanations about Wolf 44's hunting style.

🙋

How did Wolf 44 get the trait of hunting the way it does?

Amplify.

Turn to pages 70–71, Data About Wolf Size, in your notebooks.

You have seen most of this data before. You will also review the Wolf Family Data Cards and two books.

Name: _____ Date: _____

Data About Wolf Size

Bison Valley Pack

Wolf number	Weight
Wolf 60 (male)	46 kg (102 lbs.)
Wolf 61 (female)	39 kg (87 lbs.)
Wolf 62 (male)	
Wolf 63 (female)	
Wolf 64 (female)	
Wolf 65 (male)	
Wolf 66 (female)	
Wolf 67 (male)	
Wolf 68 (female)	

Elk Mountain Pack

Wolf number
Wolf 40 (female)
Wolf 41 (female)
Wolf 42 (male)
Wolf 43 (male)
Wolf 44 (male)
Wolf 45 (male)
Wolf 46 (female)
Wolf 47 (female)
Wolf 48 (male)

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Name: _____ Date: _____

Data About Wolf Size (continued)

Wolf Weights in Both Packs

Kilograms of Food Eaten Per Day

Elk Mountain Pack	4 kg (8 lbs.) of food per day
Bison Valley Pack	2 kg (5 lbs.) of food per day
Wolf 44	4 kg (8 lbs.) pounds of food per day

Amplify.

Name: _____ Date: _____

Data About Wolf Size (continued)

Wolf Weights in Both Packs

Bison Valley Pack	Elk Mountain Pack

63 (f) 61 (f) 68 (f) 66 (f)   46 (f) 47 (f) 41 (f)   40 (f)

35 kg (77 lbs.)   40 kg (88 lbs.)   45 kg (100 lbs.)   50 kg (110 lbs.)   55 kg (121 lbs.)   60 kg (132 lbs.)

65 (m) 62 (m) 67 (m) 60 (m)   44 (m)   45 (m) 43 (m)   48 (m)

Kilograms of Food Eaten Per Day

Elk Mountain Pack	4 kg (8 lbs.) of food per day
Bison Valley Pack	2 kg (5 lbs.) of food per day
Wolf 44	4 kg (8 lbs.) pounds of food per day

Graystone National Park sent us some new data about the wolves.

Think about what the **new data** might mean.

Amplify.

Review and discuss the data on the notebook pages, the cards, and the information in the books.

Amplify.

Wolf 44

Bison Valley Pack

You will prepare to answer the rest of the question from the students at Graystone Elementary School: **Why isn't Wolf 44 more like the Bison Valley Pack in size?**

Amplify.

Name: _____ Date: _____

Discussing Data About Traits

Directions:
1. With your group, use data from the Wolf Family Data Cards, data from pages 70–71 in your notebook, and information from the books to help you answer the questions on the next page.
2. You can use the scientific language below to help you talk about the data about wolves and

Scientific language t

• The data shows
• This means that
• I read in *How th*
• I read in *Handb*

Name: _____ Date: _____

Discussing Data About Traits (continued)

Part 1
What did you learn about Wolf 44's size from the Wolf Family Data Cards and the data on pages 70–71 in your notebook?

Part 2
What new information did you learn about where traits come from? Give examples from *How the Sparrow Learned Its Song* and *Handbook of Traits*.

Part 3
What science words will you use when writing about where traits can come from?

Part 4
Based on the information you gathered, why isn't Wolf 44 more like the Bison Valley pack in size?

Turn to pages 72–73, Discussing Data About Traits, in your notebooks.

Let's go over the **directions for each part** of this activity.

Discuss the data.

Talk about how you might answer each of the questions on page 73 of your notebooks.

Amplify.

Name: _____ Date: _____

Discussing Data About Traits (continued)

Part 1

What did you learn about Wolf 44's size from the Wolf Family Data Cards and the data on pages 70–71 in your notebook?

Part 2

What new information did you learn about where traits come from? Give examples from *How the Sparrow Learned Its Song* and *Handbook of Traits.*

Part 3

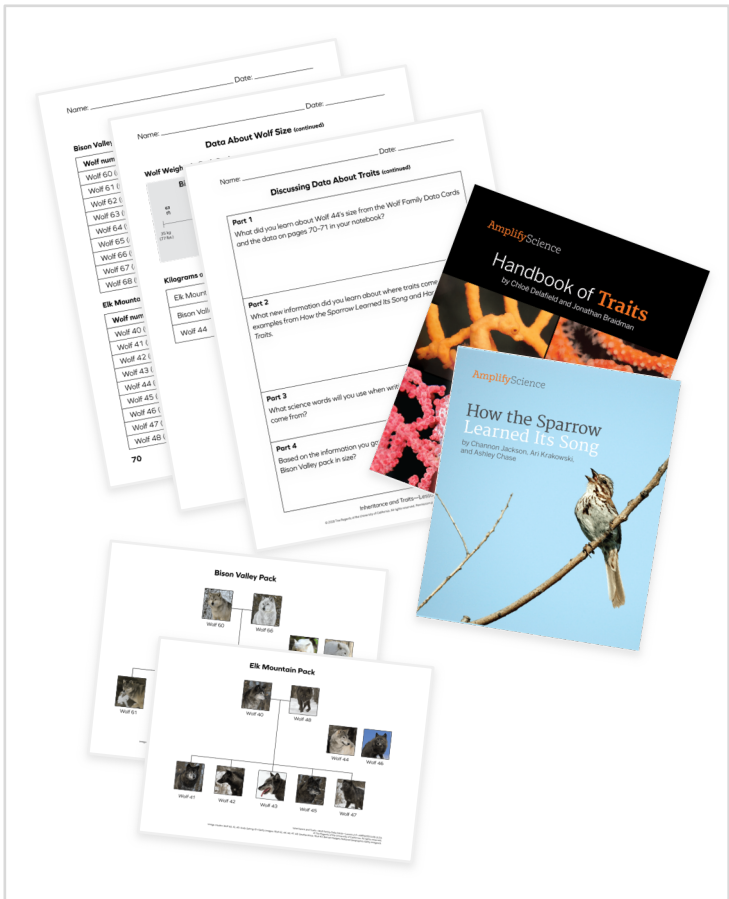What science words will you use when writing about where traits can come from?

Part 4

Based on the information you gathered, why isn't Wolf 44 more like the Bison Valley pack in size?

Complete page 73 of your notebooks independently.

Name: _____ Date: _____

Discussing Data About Traits (continued)

Part 1

What did you learn about Wolf 44's size from the Wolf Family Data Cards and the data on pages 70–71 in your notebook?

Part 2

What new information did you learn about where traits come from? Give examples from *How the Sparrow Learned Its Song* and *Handbook of Traits.*

Part 3

What science words will you use when writing about where traits can come from?

Part 4

Based on the information you gathered, why isn't Wolf 44 more like the Bison Valley pack in size?

Share your **responses** to the questions and the **evidence** you found to support your answers.

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Chapter 3 Question

Why isn't Wolf 44 like the Bison Valley Pack in hunting style and size?

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End of Lesson

Amplify.

Lunch

(60 minutes)

Amplify.

Reflection Part 1

Solo Time (5 minutes)

- Navigate to the model lesson:

    Chapter 3 Lesson 5

- Review the differentiation brief and jot down notes on the note-catcher "Keeping Diverse Learner Needs in Mind" to describe the supports you think would would best support your diverse learner

Keeping Diverse Learner Needs in Mind
Reflection Tool

Unit Name: _____ Chapter #: _____ Lesson #: _____

Cirlce the Selected Learner Profile: A   B   C   D

Directions: Reflect on each lesson activity and jot down strategies to support the student you selected from the Learner Profile.

Lesson Activity	My Student May be Challenged by...	Suggestions from the Differentiation Brief	Suggestions from my own Teacher Toolkit
1			
2			
3			
4			
5			

Take a Moment: How will this activity influence your planning practices?

Keeping Diverse Learner Needs in Mind
Reflection Tool

Unit Name: _____ Chapter #: _____ Lesson #: _____

Cirlce the Selected Learner Profile: A   B   C   D

Directions: Reflect on each lesson activity and jot down strategies to support the student you selected from the Learner Profile.

| Lesson Activity	My Student May be Challenged by...	Suggestions from the Differentiation Brief	Suggestions from my own Teacher Toolkit
1			
2			
3			
4			
5			

Take a Moment: How will this activity influence your planning practices?

Reflection Part 2

Collaborative Group (20 minutes)

- Form Groups A - D to represent each learner profile

- Share and synthesize your reflections on chart paper

- Choose 1 person from your group to synthesize your groups thinking
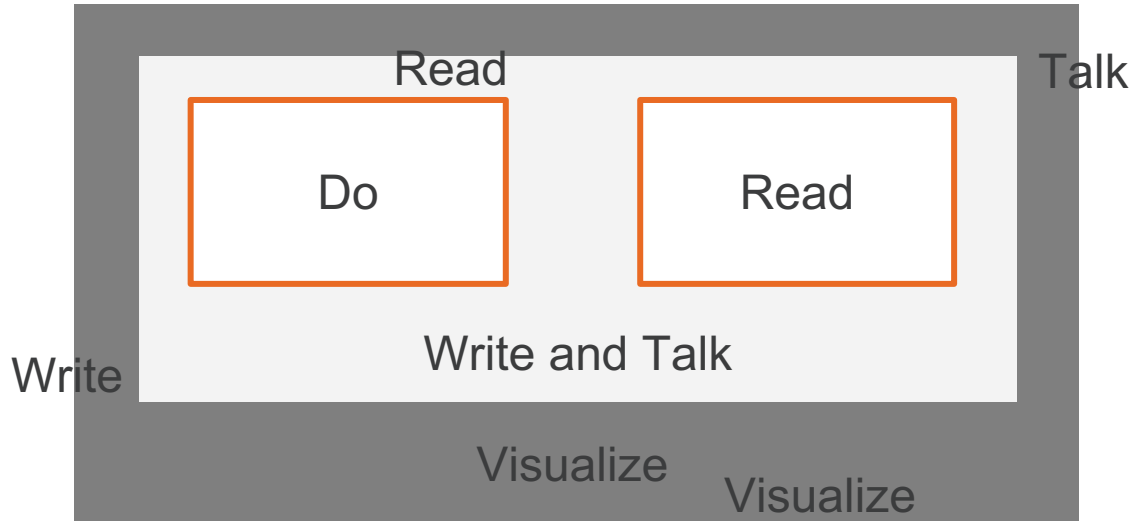
Questions?

Amplify.
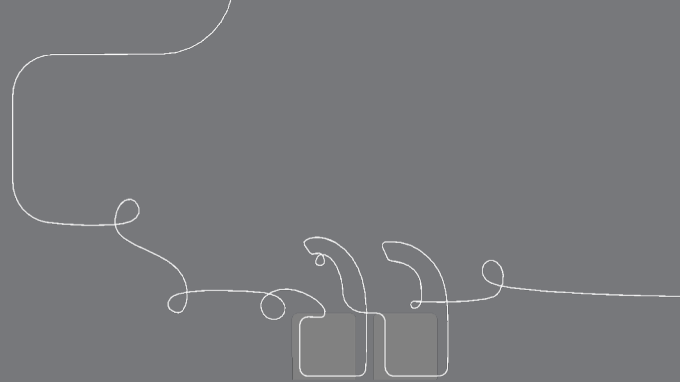
Multimodal instruction

Do, Talk, Read, Write, Visualize

What role does language and literacy play in developing scientific understanding?

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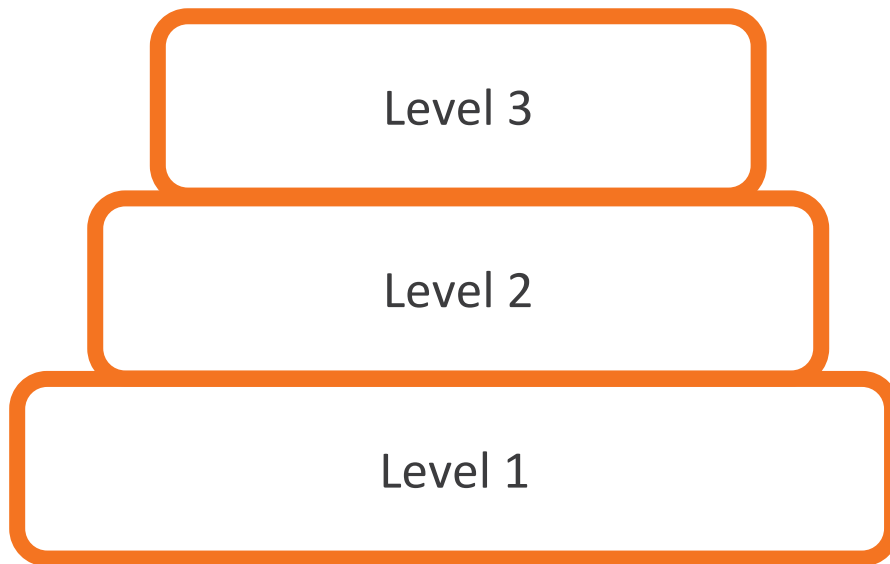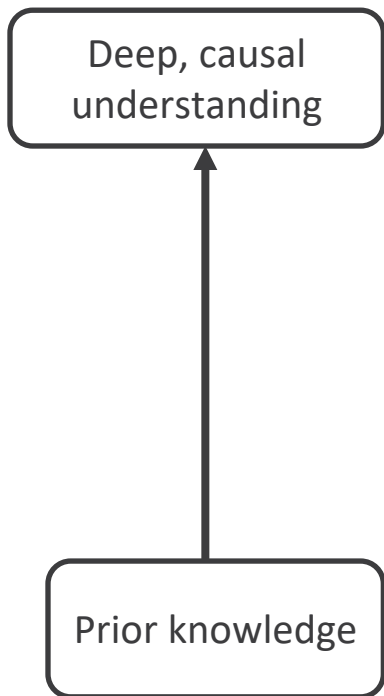
Amplify.

Turn and talk:

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

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Building Complex Explanations Across the Unit

Coherence and Progress Builds

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Progress Build: A unit-specific learning progression

Deep, causal understanding

↑

Prior knowledge

Level 3

Level 2

Level 1

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Inheritance and Traits Progress Build

Deep, causal understanding

Prior knowledge

Traits can be determined by inheritance, the environment, or both.

Organisms get instructions for their traits from their parents.

Traits vary within a species.

Amplify.
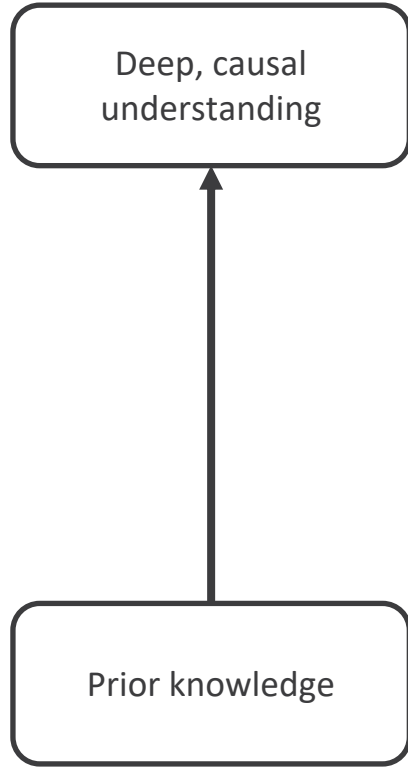
Chapter 1 key concepts and explanation

Why are wolves different even though they are the same species?

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Ch	Key concepts	Explanation
1	Organisms have observable traits. (1.3) Organisms in a species have many similar traits, but for each trait there can be variation. (1.6)	Even though all wolves are the same species, some wolves are different from others due to variation of traits within a species. This means that even though wolves can have similarities in their traits, there can also be variations in each trait. For example, wolves have different colors of fur, some wolves have a trait for gray fur, others have a trait for black fur.

There are variations in the color of fur in the wolf species.

Amplify.

Ch	Key concepts	Explanation
1	Organisms have observable traits. (1.3) Organisms in a species have many similar traits, but for each trait there can be variation. (1.6)	Even though all wolves are the same species, some wolves are different from others due to variation of traits within a species. This means that even though wolves can have similarities in their traits, there can also be variations in each trait. For example, wolves have different colors of fur: some wolves have a trait for gray fur, others have a trait for black fur.
2	Organisms can have traits that are similar to their parents' traits. (2.2) Offspring inherit instructions for each trait from both their parents. (2.5)	Wolf 44's color is similar to the wolves in the Bison Valley Pack because its parents are in the Bison Valley Pack. Offspring inherit instructions for each trait from both parents. This means that the trait of fur color comes from Wolf 44's parents.

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Engaging with ideas over multiple activities

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

Amplify.
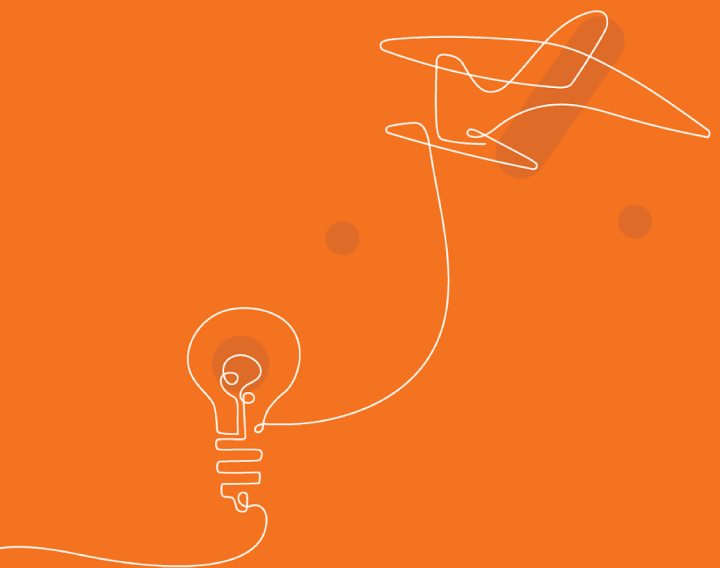
End of Unit Assessment

Supporting the Diverse Learners

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Inheritance and Traits: Variation in Wolves

Problem students work to solve	What is the origin of the traits of Wolf 44—a wolf that appears different from the rest of its pack?
Chapter 3 Question	Why isn't Wolf 44 like the Bison Valley Pack in hunting style and size?

Investigation Questions	Class-generated Investigation Question (e.g. How else can an organism get traits besides from its parents?) (3.1-3.2)	Can the environment affect inherited traits? (3.3-3.5)
Evidence sources and reflection opportunities	• Review additional wolf data (3.1) • Review, ask questions about, and analyze data about flamingo families (3.1) • Reflect on observations and with the class, generate an Investigation Question (3.1) • Read *How the Sparrow Learned Its Song* (3.2) • Reflect on the role of environment in determining traits (3.2)	• Revisit class traits to share ideas about factors that determined those traits (3.3) • Set up celery investigation and make sense of results (3.3-3.4) • Read about the origin of traits (inheritance and interaction with the environment) in *Handbook of Traits* (3.4) • Revisit *How the Sparrow Learned Its Song* to discuss evidence for origin of traits (3.4) • Create digital models to show understanding of inherited and environmental traits (3.5)
Key concepts	• Some traits result from the environment. (3.2) • Organisms stay in groups in order to obtain food and meet their needs. The number of organisms in a group varies. (3.2)	• Some traits result from both inheritance and interaction with the environment. (3.4)
Application of key concepts to problem	• Write explanations about why Wolf 44 does not hunt like its parents (3.3)* • Review wolf data (3.5) • Revisit data about wolf size (3.6) • Write explanations about how Wolf 44's size was determined (3.6)	
Explanation that students can make to answer the Chapter 3 Question	Wolf 44 doesn't hunt like the Bison Valley Pack because it learned to hunt from the wolves in the Elk Mountain Pack. Learning to hunt is a trait that is determined by a wolf's environment. Wolf 44 is medium sized because of both inherited instructions (size) and the environment it lives in (access to diet). This means that Wolf 44 can grow bigger than its parents, but it can't grow as big as the wolves in the Elk Mountain Pack.	

*Note this explanation answers part of the Chapter 3 Question and is constructed mid-chapter.

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Name: _____ Date: _____

End-of-Unit Writing: Explaining Wolf 44's Size

Directions:
1. Write a scientific explanation that answers the question below.
2. Your audience is the students of Graystone Elementary School.

Question: What makes Wolf 44 medium size?

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____.

Inheritance and Traits—Lesson 3.6 (Version A)

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Analyzing the End of Unit Assessment

- Annotate the End of Unit Assessment (3 minutes)

  Pg. 27

    - Jot down important **vocabulary**
    - Considering the diverse learners in your classroom, **jot down potential challenges**
    - **Ask questions in the left margin**
    - **Write DCI** to represent a Disciplinary Core Idea, jot them down **(reference on page 2)**
    - **Write SEP** to represent a Science and Engineering Practice, jot them down **(page 2)**
    - **Write CCC** to represent a Crosscutting Concept, jot them down **(page 2)**

- What kind of data could you gather from this EOU Assessment?

- What connections can you make between this EOU Assessment and the Coherence Flowcharts?

- What connections can you make between this EOU Assessment and to the unit's progress build?

Analyzing the End of Unit Assessment

- Complete the End of Unit Assessment by providing

  the best possible solution (3 minutes)

- Use the 3-part rubric to score and revise your work (7 minutes)

Pg. 27

Pg. 28

Turn and Talk: How did you use the rubric to score and revise your work?

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Plan for the day

- Reflections and Framing the Day

- Defining Diverse Learners

- Understanding Opportunities for Supporting Diverse Learners

- Analyzing Formative Assessment Data and Embedded Differentiation

  strategies

- **Planning to Teach**

- Closing

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Planning to teach

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

- Reflect on implementing Amplify Science in your classroom to select an area of growth.
- Apply learning from the session.

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Planning to Teach
Teacher's Choice (20 mins)

Option # 1 Anticipating Preconceptions	Option # 2 Organizing Formative Assessment Data	Option #3 Classroom Artifacts	Option #4 Student Facing Rubrics	Option #5 End of Unit Assessment Analysis for Unit 1
Download the classroom slides for the upcoming lesson and include strategies from the Differentiation brief or your own teacher toolkit to address possible diverse learners needs.	Organize the look-fors for the the upcoming formative assessment using the Formative Assessment template (K-1, use the clipboard assessment for support)	Devise a strategy to enhance the classroom wall experience that supports diverse learner needs	Devise a **student facing rubric** combining the 3-dimensional rubrics from the Assessment Guide for unit 1 or 2	Devise teacher and student facing rubrics combining the 3-dimensional rubrics from the Assessment Guide

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Reflecting on your plan

- With your group, share which option you chose.

- Be prepared to share what you focused on, what you learned, and any remaining questions for the presenter.

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Plan for the day

- Reflections and Framing the Day

- Defining Diverse Learners

- Understanding Opportunities for Supporting Diverse Learners

- Analyzing Formative Assessment Data and Embedded Differentiation strategies

- Planning to Teach

- **Closing**

Workshop Title: Supporting Diverse Learner Needs

By the end of this session, K-5 participants will be able to...

Did we meet the outcomes of this session?

- Identify embedded opportunities that support diverse learner needs within the unit of study

- Understand how to utilize the embedded multimodal curricular supports (do, talk, read, write, visualize) to help all students gather sources of evidence and argue like scientists

- Articulate the critical role that language and literacy play in developing scientific understanding

- Apply the End of Unit assessment rubric to understand student expectations

- Apply strategies that support diverse learner needs when planning instructional sequences

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Closing

❑ Share 1 thing, from this session, that is "Sticking with You."
(I can apply)

❑ Share 1 thing, from this session, you are "Stuck On."
(I still need more support before I can apply)

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Questions?

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NYC Resource Site

https://www.amplify.com/amplify-science-nyc-doe-resources/

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Introduction

Getting started resources

Planning and implementation resources

Admin resources

Parent resources

Professional learning resources

Questions

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Planning your year

Overview: Amplify Science K-5 course structure

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Missing Materials

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

  Email: curriculum@schools.nyc.gov

  Phone: (718) 935-3334

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Thank you for your feedback!

Presenter Name:
Workshop Title: