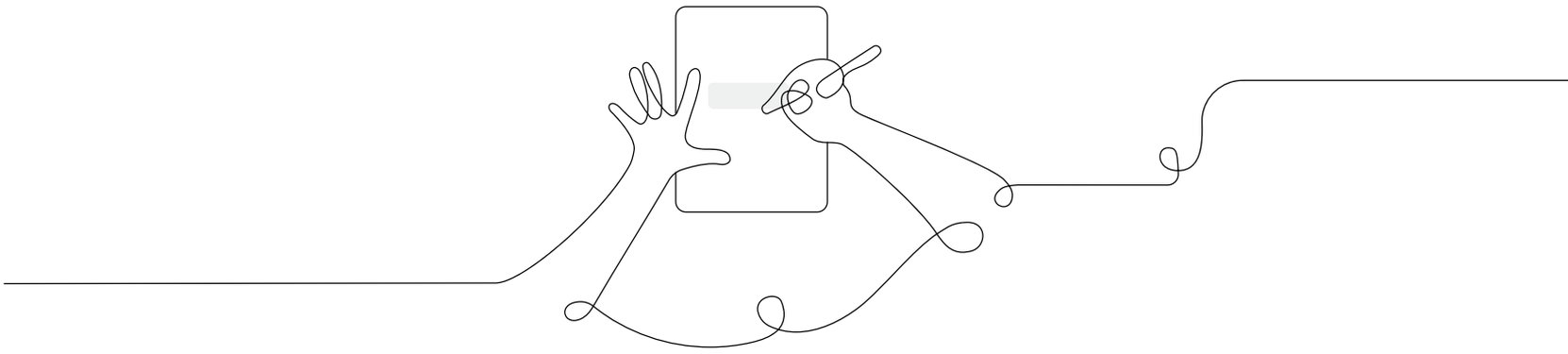
Amplify Science

Participant Notebook

Deep-dive and Strengthening Workshop
Inheritance and Traits

Grade 3



Welcome to the workshop

This Participant Notebook will serve as a resource during today's workshop.

Inheritance and Traits
Grade 3

Amplify Science

Unit-specific workshop agenda

Introductions

Framing the day

- Reflecting on our teaching
- Scenario challenge

Experiencing the unit

- Framing with a coherence lens
- Inheritance and Traits instructional sequence and embedded reflection

The story of the unit

- Key concepts and explanations
- Progression of ideas
- Progress Build and End-of-Unit Assessment

Targeted small group work time:

- Deepening content understanding and addressing preconceptions
- Coherent instruction
- Formative assessment and differentiation
- Preparing to teach

Closing

- Questions
- Survey

Demo account for your workshop:

URL: **learning.amplify.com** (Log in with Amplify)

Temporary account: _____**@tryamplify.net**

Password: **AmplifyNumber1**

Table of Contents

Notes

Notes

Reflecting on Amplify Science implementation

1. What was a positive moment from teaching your first unit(s)? What was particularly effective in your classroom?

2. What was a challenge you experienced in your first unit(s)? What was an "aha" moment you had while planning or teaching that helped you overcome that challenge?

3. Amplify Science uses a multimodal approach — students **do**, **talk**, **read**, **write**, and **visualize** as they construct explanations of phenomena. Describe a time when the multimodal approach helped a particular student or students in your classroom.

Self-assessment: How comfortable are you teaching Amplify Science?

Directions:

After each group shares the solution to their scenario, rank your comfort level with the scenario's category using the statements along the top of the table.

Scenario	I am starting to understand this	I can do this (with a little help)	I've got this! I feel confident	I can teach this to a peer
Scenario 1 Using program resources to deepen content knowledge and find information to answer content questions				
Scenario 2 Using formative assessment to inform instruction				
Scenario 3 Analyzing student work on the End-of-Unit Assessment				
Scenario 4 Understanding the 3-D nature of standards in the unit				
Scenario 5 Understanding how ideas build across a chapter and unit				
Scenario 6 Preparing to teach a lesson				

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.

Chapter 2: Why is Wolf 44's color similar to one pack but different from the other?

Students figure out: 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. This is why Wolf 44 has light-colored fur, similar to its parents.

How they figure it out: Students search for patterns in traits of parents and their offspring in wolf packs and fruit flies. They use a digital modeling tool to make sense of these relationships. They explore why offspring have similar traits to their parents, but not always to their siblings, as they read *The Code*. A lively classroom activity helps students apply the idea that parents pass instructions for traits. Students receive more information about the two wolf packs and then write a scientific explanation about Wolf 44's fur color.

Chapter 3: Why isn't Wolf 44 like the Bison Valley Pack in hunting style and size?

Students figure out: 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 inherited instructions and the environment it lives in. Its parents passed on instructions for being smaller in size, but Wolf 44 lives with the Elk Mountain Pack, which has access to a rich 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.

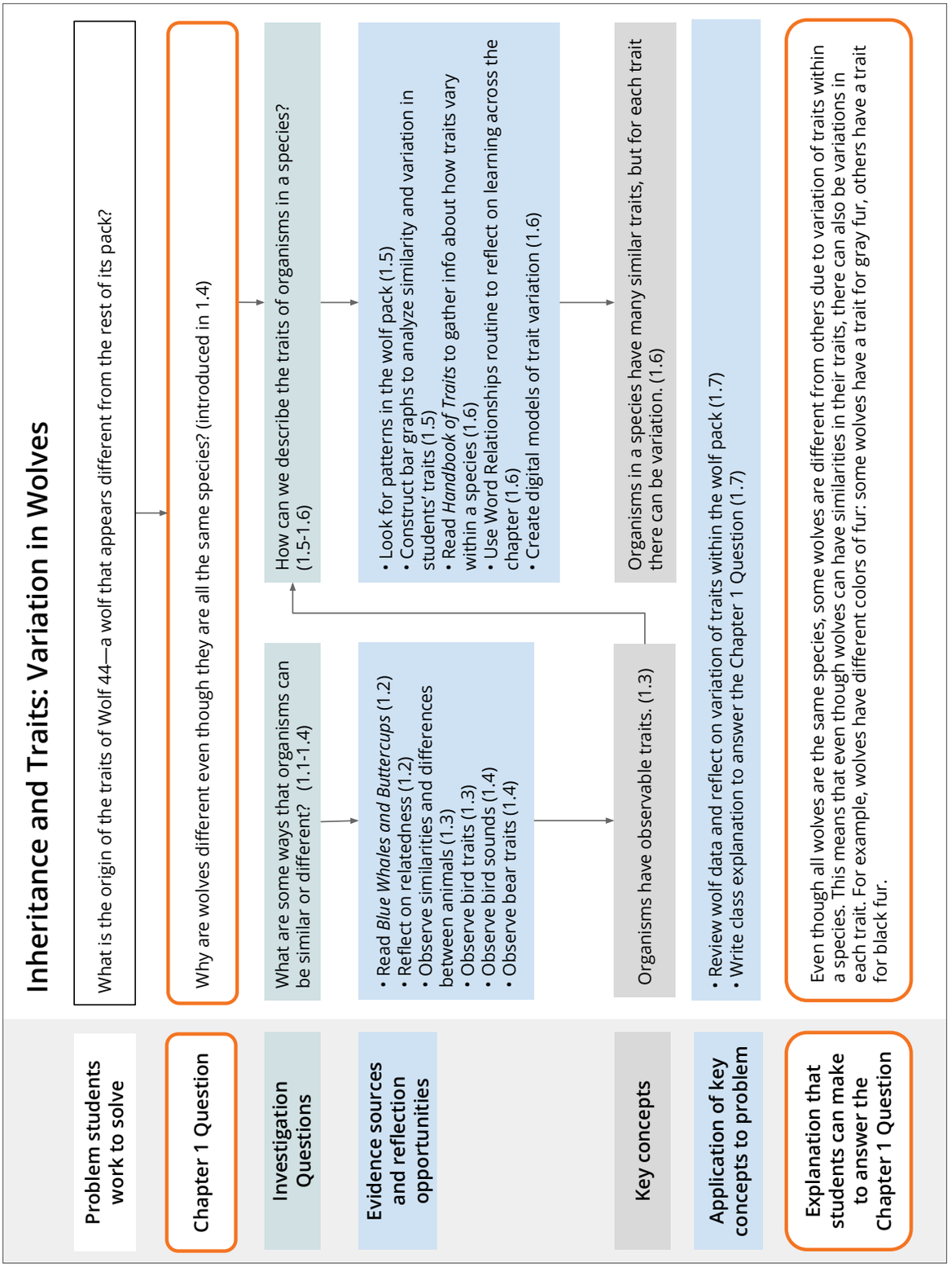
How they figure it out: Students get new evidence, ask questions, and investigate with a digital app to figure out that some traits result from interaction with the environment, including learning and diet. Students write an explanation of Wolf 44's traits and whether they were inherited from its parents or acquired from the environment.

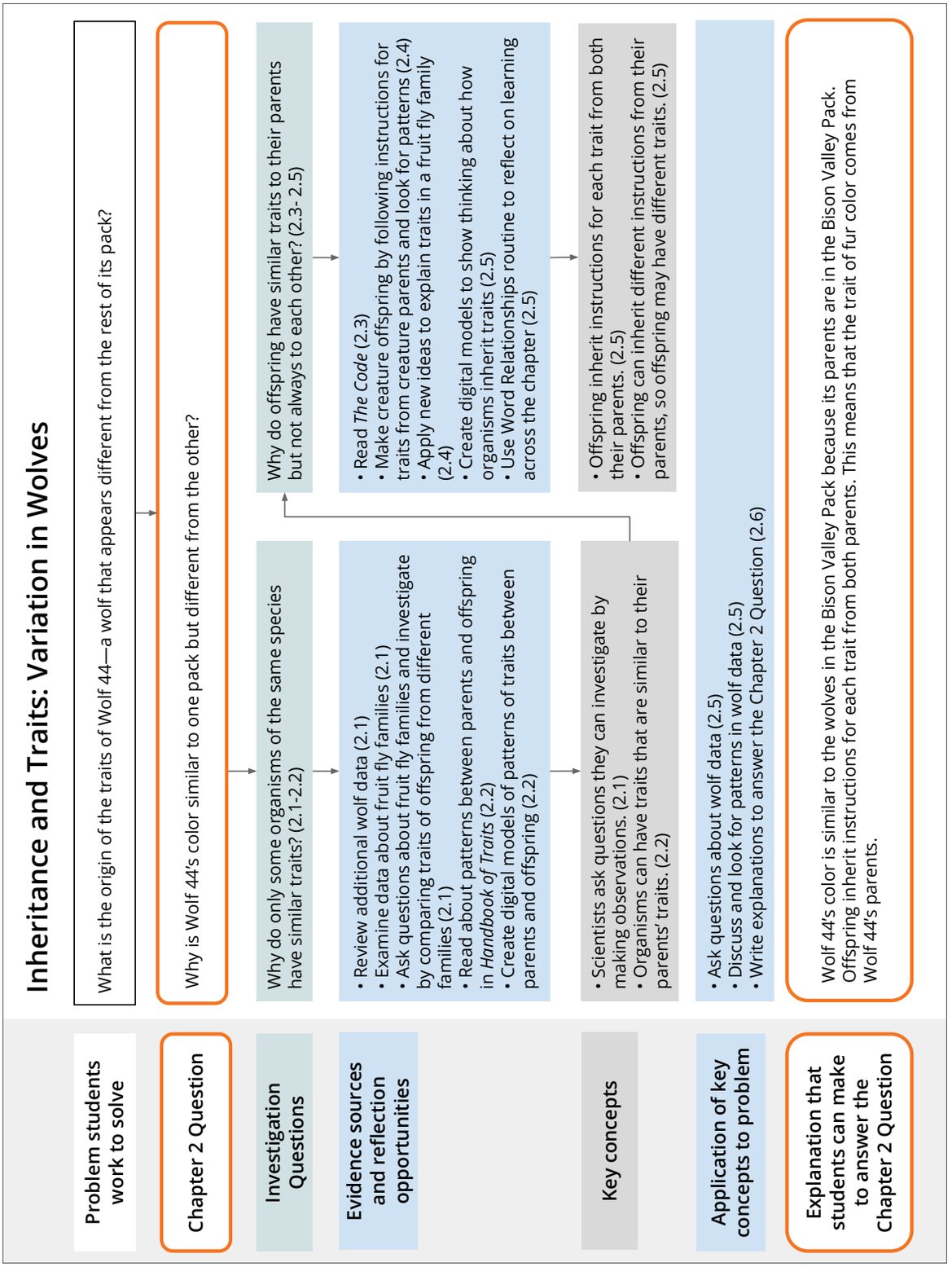
Chapter 4: How can scientists investigate questions about traits?

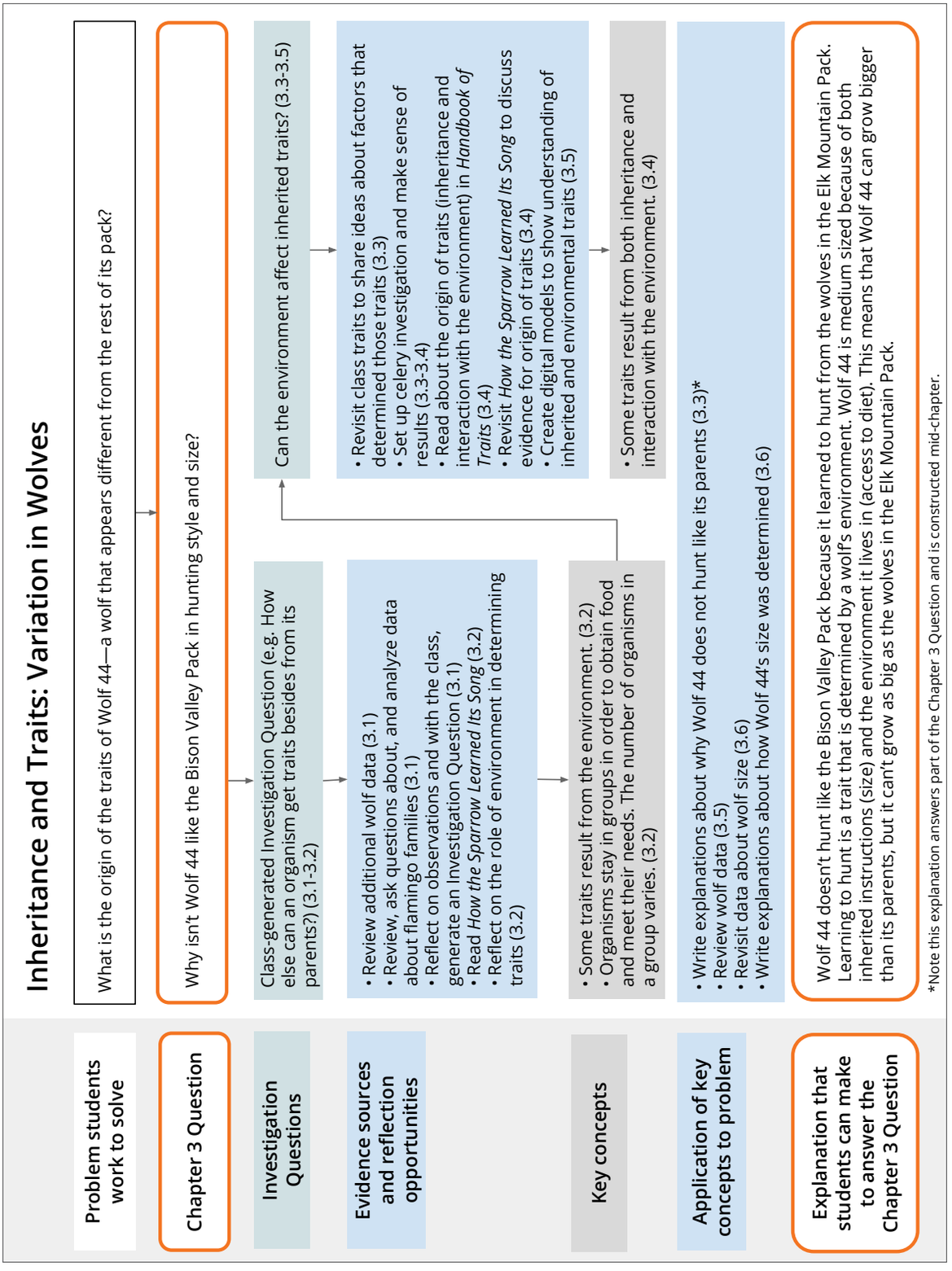
Students figure out: Scientists can investigate questions by looking for patterns in data. For example, data about sparrows shows that two parent sparrows have black stripes, so the offspring will probably have black stripes. The environment also affects which traits the offspring will have. The sparrow's song will be the same as other birds around it because song is a learned trait. The sparrow offspring may also be bigger than its parents because the environment has more food.

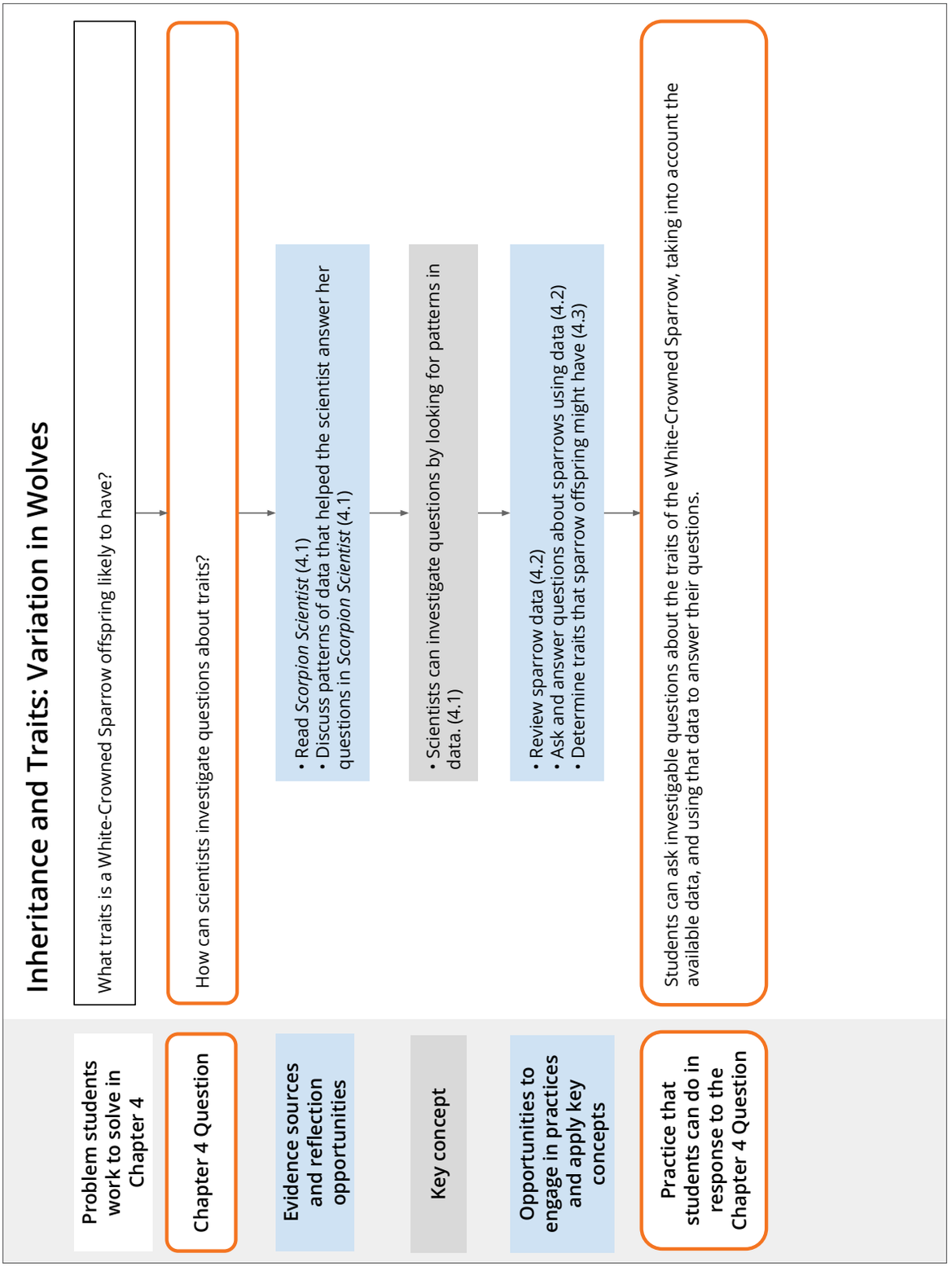
How they figure it out: Students are presented with a prediction about the possible offspring of a family of white-crowned sparrows, another organism common in Graystone National Park. Students ask their own questions and review evidence about environmental conditions, the traits of sparrow parents, and patterns and variations in a population. They analyze data from the sparrow families and discuss what they predict the offspring will look like, making claims that are supported with evidence.

Inheritance and Traits Coherence Flowchart









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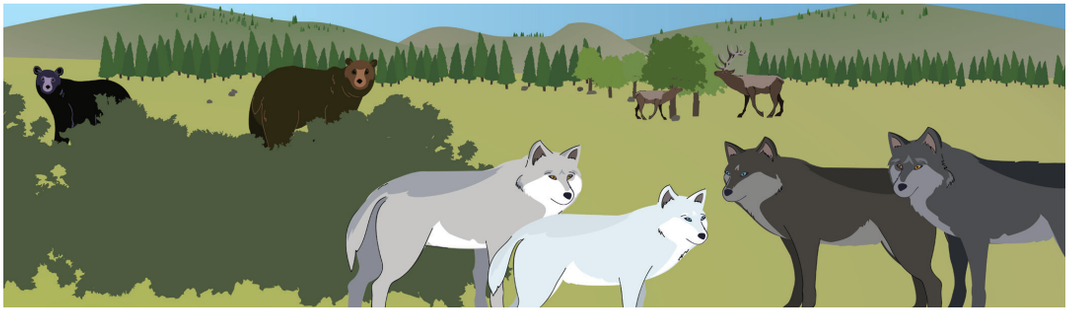

Inheritance and Traits:

Variation in Wolves

Investigation Notebook

Name: _____ Date: _____

Similarities and Variations: Elk Mountain Pack

Directions:

1. Record the similarities and the variations you observe as you discuss the data about wolves.
2. Answer the question at the bottom of the page.

Similarities	Variations

What patterns do you notice?

_____

_____

_____

Name: _____ Date: _____

Asking Science Questions

With your partner, record at least three science questions you have about Wolf 44 or the other wolves in the pack.

Question 1: _____

_____

_____

Question 2: _____

_____

_____

Question 3: _____

_____

_____

Question 4: _____

_____

_____

Question 5: _____

_____

_____

Name: _____ Date: _____

Evidence About Trait Variation

Directions:

1. Read about at least one plant and one animal in *Handbook of Traits*.
2. In the boxes below, record the name of a plant or an animal and list some of the traits that have variation.

Organism: Traits that have variation:
Organism: Traits that have variation:
Organism: Traits that have variation:
Organism: Traits that have variation:

Name: _____ Date: _____

Word Relationships

Directions:

1. Work with your group to create sentences that use at least two of the word cards in each sentence.
2. Create some sentences that explain what you have been learning about traits.
3. Record a few of the sentences you created.
4. With your group, choose one sentence to share with the class.

variation trait organism species

1. _____

_____

_____

2. _____

_____

_____

3. _____

_____

_____

4. _____

_____

_____

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 cards that _____.
- I read in *Handbook of Traits* that _____.
- I read in *Blue Whales and Buttercups* that _____.

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?

Connecting key concepts to chapter explanations

Inheritance and Traits

Directions:

1. For each chapter, read the key concepts, then the explanation.
2. With a partner, discuss how the key concepts connect to the explanation.
3. Make annotations about the connections.

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) Offspring can inherit different instructions from their parents, so offspring may have different traits. (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.
3	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)	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.

Reflecting on the progression of ideas

Directions:

Part 1: Reflecting on the progression

1. Using the key concepts and explanations, reflect on how ideas build throughout the unit.
2. With your group, discuss the following questions:
   - Which ideas are revisited over multiple chapters?
   - What new ideas are added in each chapter?
3. Make notes about the progression of ideas in the space below.

Part 2: Creating a visual

1. With your group, use the provided materials to create a visual to represent your ideas. You can use words or pictures, or a mix of both. The following questions may help you plan your visual:
   - How can you represent the new information that is added throughout the progression?
   - How can you represent foundational ideas that are revisited throughout the unit?

Progress Build

A Progress Build describes the way in which students' explanations of the central phenomenon should develop and deepen over the course of a unit. It is an important tool in understanding the design of the unit and in supporting students' learning. A Progress Build organizes the sequence of instruction, defines the focus of the assessments, and grounds inferences about students' understanding of the content, specifically at each of the Critical Juncture Assessments found throughout the unit. A Critical Juncture Assessment guides the instruction designed to address specific gaps in students' understanding. This document will serve as an overview of the *Inheritance and Traits* Progress Build. Since the Progress Build is an increasingly complex yet integrated explanation, we represent it below by including the new ideas for each level in bold.

In the *Inheritance and Traits* unit, students will learn to construct scientific explanations about why Wolf 44 has some traits that are more similar to the Bison Valley Pack (its birth pack) and some traits that are more similar to the Elk Mountain Pack (its adopted pack).

Prior knowledge (preconceptions): Students are expected to have had many everyday experiences thinking about the traits and characteristics of organisms. Students are likely to understand (and to have experienced) that individuals in a family tend to share similarities, although it is not expected that students have formal ideas about inheritance. While these ideas are not necessary for students to participate fully in the unit, having exposure to these ideas will prepare students well for what they will be learning.

Progress Build Level 1: Traits vary within a species.

There is a lot of variation in traits. Organisms in a species have many similar traits, but the traits they have vary within the species.

Progress Build Level 2: Organisms get instructions for traits from their parents.

There is a lot of variation in traits. Organisms in a species have many similar traits, but the traits they have vary within the species. **Organisms get instructions for traits from their two parents. This is why organisms have similar traits to their parents.**

Progress Build Level 3: Traits can be determined by inheritance, the environment, or both.

There is a lot of variation in traits. Organisms in a species have many similar traits, but the traits they have vary within the species. Organisms get instructions for traits from their two parents. This is why organisms have similar traits to their parents. **Traits can also be determined by the environment, and sometimes traits can be determined by both the environment and inheritance.**

Progress Build and End-of-Unit Assessment

Inheritance and Traits

Directions:

1. Read through the End-of-Unit Assessment.
2. Use the table on the next page to describe your ideas about what a student at each level of the Progress Build would write on this assessment.

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?

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____.

Progress Build and End-of-Unit Assessment cont.

Summary of Progress Build level*	Describe how a student would respond to the writing prompt
Traits vary within a species.	
Organisms get instructions for traits from their parents.	
Traits can be determined by inheritance, the environment, or both.	

*For a more detailed description of each Progress Build level, refer to the Inheritance and Traits Progress Build in your Participant Notebook, or digitally in the Unit Guide.

Self-inventory: Choosing an area of focus

Directions:

Use the statements to help guide your areas of strength and support.

Statements		**I don't**	**I try**	**I do**
i. Understanding of content	1) I can identify my own gaps in content knowledge before teaching a unit.			
	2) I can explain what students will learn and how they will learn throughout the unit.			
	3) I can explain how students will demonstrate understanding of science content along the Progress Build.			
ii. Coherence	4) I can identify the variety of modalities students engage in to collect evidence from multiple sources.			
	5) I support students in my class, through my instruction and classroom setup, to understand how the activities they engage in help them answer questions and solve the unit problem.			
	6) I can pace activities to move students toward meeting the goal(s) of the lesson.			
iii. Formative assessment and differentiation	7) I use Amplify Science assessments to monitor students' progress along the Progress Build.			
	8) I utilize differentiation information in the Lesson Brief to plan for lesson modifications.			
	9) I adjust instruction in response to learners' needs, styles, and interests.			
iv. Preparing to teach a lesson	10) I use the Materials and Preparation tab in the Lesson Brief as I am planning and preparing for my lessons.			
	11) I know how to access student-facing resources to plan my lessons and how to display them for students during instruction (Investigation Notebook pages; additional copymasters, digital resources).			
	12) I can identify common student challenges and prepare to address those challenges.			

Targeted small group work time

i. Deepening content understanding and addressing preconceptions
ii. Coherent instruction
iii. Formative assessment and differentiation
iv. Preparing to teach

Deepening content understanding and addressing preconceptions

Goal: Deepen understanding of unit content as it relates to student alternative conceptions. Plan to leverage your deep content understanding to address student preconceptions during the unit.

Step 1: Getting ready

Self-reflection: You've engaged with your unit's content deeply during today's workshop. Use the space below to record any new science concepts you learned today, and to list any questions you still have related to the concepts you've worked with today.

Anticipating student need: Thinking about the concepts students will learn in this unit, reflect on what you think will be particularly challenging or confusing for students. Consider what preconceptions or alternate conceptions you think students might have related to this content, and ideas you think are particularly abstract or complex. Use the space below to record your ideas.

Step 2: Deepening understanding of unit content

Why develop content understanding?

Teachers who have a deep understanding of the content they're teaching are more effective at addressing student preconceptions and alternate conceptions, and effectively support student learning with accurate explanations and precise language (Brown & Borko, 1992; Cohen, 1988; Roth, Anderson, & Smith, 1986).

Directions:

1. Locate the Science Background document in your unit's Unit Guide.
2. Read the document. If you'd like, you can assign different sections to different members of the group, and have group members summarize their section to the group.
3. Use the space below to make notes.

Step 3: Reflecting on student alternate conceptions

How do I find information about preconceptions and alternate conceptions?*

The Assessment Guide that accompanies the Pre-Unit Assessment lists common preconceptions students at your grade level have related to your unit's content. This information was gathered through review of academic literature, cognitive labs with students, and field tests of the units. Note that in the Amplify Science program, "preconceptions" and "alternate conceptions" are used interchangeably.

*In some units, there is also information about preconceptions in the Science Background document.

Directions:

1. Navigate to your unit's Pre-Unit Assessment lesson (Lesson 1.1).
2. Download the Assessment Guide from Digital Resources. Read this document.
3. Focus on the "Common preconceptions, contrasted with accepted science understandings" section at the end of the document. Reflect on which preconceptions seem most relevant to you and your students.
4. List 2-3 of these preconceptions in Table 1 below. Then, go back to the Science Background document. Use the space in the table to record ideas from the science background that address the preconceptions you chose.

Table 1: Reflecting on student alternate conceptions

Preconception (from Assessment Guide)	Information from science background that addresses the preconception

Step 4: Planning to teach

Now what do I do?

Having a strong content understanding is an important first step to tackling preconceptions and alternate conceptions in your students. Planning for moments in the unit where students might get confused is a helpful next step.

Directions:

1. Select one of the preconceptions from the table above to focus more deeply on. Summarize it in the Preconception row of Table 2 below.
2. Use your unit's Coherence Flowchart to find an activity in the unit where student learning seems to relate to the preconception.
   Tip: Investigation Questions and key concepts may help you locate an activity.
3. In the Teacher's Guide, navigate to this activity's lesson. Read the lesson.
4. Use the space below to make notes about what you'll listen for during the lesson, and how you might support students holding that preconception to gather evidence that refines their understanding.
5. If you have extra time, find another lesson related to the preconception you chose, and complete the next row of Table 2.

Table 2. Preparing to teach

Preconception:		
Lesson	**What you'll listen for**	**How you might support students**

Coherent instruction

Goal: Gain confidence in using a Coherence Flowchart as a tool to see how ideas build across a chapter.

1. **As a group, use the Coherence Flowchart for Chapter __ to:**
    a. **Discuss the Chapter __ Question.** How does it connect to the unit problem and to what students figure out in Chapter __?

    b. **Discuss the first Investigation Question.** How does this question help students answer the Chapter Question?

2. **Individually, use the Coherence Flowchart and Teacher's Guide to:**
    a. **Consider evidence sources and reflection opportunities:**
        - **Each group member, choose an activity from the first evidence source/reflection opportunity box in the Coherence Flowchart.** It is okay if some group members choose the same activity, but make sure that there are a variety of activities chosen. Place a star next to the activity you chose on your Coherence Flowchart.
        - **In the Teacher's Guide, navigate to the lesson listed next to your chosen activity and read the Lesson Overview.** What is the purpose of the activity you chose to consider?

        - **Navigate to the activity and then read the steps.** What do students do in the activity? How does this activity help students figure out or reflect upon the Investigation Question?

        - **Check the Teacher Support notes (if applicable).** Do any of the notes help you further understand the purpose of the activity? Are there suggestions for deepening students' experience with the activity or providing more support?

3. **As a group, refer to responses in step 2 and to the Coherence Flowchart for Chapter __ to:**

   a. **Discuss evidence sources and reflection opportunities.**

   - Each group member, share a brief description of the activity you considered and its purpose.
   - How do the activities you discussed build on each other and fit together?

   - How do the activities support the students in answering the Investigation Question?

   b. **Discuss the transition to the next question:**

   - Based on what students figured out, what will they be motivated to wonder next?

   - How does this connect to the next question (Investigation Question or Chapter Question) they work with?

Goal: Gain confidence in using a Coherence Flowchart as a tool to see how ideas build across a chapter.

1. **As a group, use the Coherence Flowchart for Chapter __ to:**
    a. **Discuss the Chapter __ Question.** How does it connect to the unit problem and to what students figure out in Chapter __?

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        - **Navigate to the activity and then read the steps.** What do students do in the activity? How does this activity help students figure out or reflect upon the Investigation Question?

        - **Check the Teacher Support notes (if applicable).** Do any of the notes help you further understand the purpose of the activity? Are there suggestions for deepening students' experience with the activity or providing more support?

3. **As a group, refer to responses in step 2 and to the Coherence Flowchart for Chapter __ to:**

   a. **Discuss evidence sources and reflection opportunities.**

   - Each group member, share a brief description of the activity you considered and its purpose.
   - How do the activities you discussed build on each other and fit together?
   - How do the activities support the students in answering the Investigation Question?

   b. **Discuss the transition to the next question:**

   - Based on what students figured out, what will they be motivated to wonder next?
   - How does this connect to the next question (Investigation Question or Chapter Question) they work with?

Formative assessment and differentiation

Inheritance and Traits

Goal: Examine embedded formative assessment opportunities in order to plan for differentiated instruction.

Step 1: How do we assess learning?

In Amplify Science, students can demonstrate what they've learned through embedded formative assessments (e.g., On-the-Fly Assessments, Critical Juncture Assessments, Student Self-Assessments). These assessments represent the most opportune moments for a glimpse into students' developing conceptual understanding and their facility with the practices.

First, let's analyze an embedded assessment opportunity we experienced earlier in the day. During our Inheritance and Traits deep dive sequence, you reviewed data about some of the wolves from Graystone National Park to detect patterns in the similarities and variations in wolf traits. Follow the steps below to navigate to the On-the-Fly Assessment in Lesson 1.5.

- Navigate to Inheritance and Traits → Chapter 1 → Lesson 1.5 → Activity 1
- Select Embedded Formative Assessment
- Select On-the-Fly Assessment 3: Patterns in Wolf Traits
- Read the Look for and Now what? sections and then complete the table below.

Inheritance and Traits Lesson 1.5, Activity 1	
Which disciplinary core ideas, science and engineering practices, and/or crosscutting concepts are being assessed?	
What data can be collected from this assessment opportunity?	
How could you collect data?	
What will this formative assessment opportunity tell you about student understanding?	

Step 2: Reflecting on differentiated instruction

Based on student responses to embedded formative assessments, you may need to differentiate instruction in the next activity or lesson. Differentiated instruction is a powerful classroom practice that recognizes that students bring a wide variety of skills, talents, and needs to their daily learning. When you differentiate instruction, it enables you to address varying degrees of proficiency and skill while also meeting identifiable differences in learning styles and interests. There are various ways to differentiate instruction—what you teach, how you teach, and/or how students demonstrate their learning.

How do you currently respond to students' needs, styles, or interests in your classroom?

Step 3a: Determine strategies to differentiate instruction

First, let's read about the variety of differentiation strategies which are embedded in the Amplify Science curriculum. Follow the steps below to access the Program Guide:

- Navigate to the Science Program Guide using the Global Navigation Bar.
- Select Access and Equity.
- Choose Differentiation Strategies.
- Explore the description and associated strategies for the student groups listed.
- Use the space below to record strategies you could use to differentiate instruction for each group of students.

Student population	Strategies for support
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	

Step 3b: Review Lesson Brief

Navigate to the 1.5 Lesson Brief and select the drop-down arrow to expand the Differentiation section. Read the Embedded Supports for Diverse Learners. Are there any additional strategies noted in this brief that you would like to capture in the table above?

Step 4: Preparing to differentiate

Now it's time to draft a plan to implement differentiated instruction.

What is one strategy you just reviewed and/or recorded which you feel most comfortable implementing after the next embedded formative assessment opportunity?

How will you prepare your students for the implementation of this new strategy?
(Ex: Expected student behavior for group work, step-by-step directions)

How will you prepare your classroom for the implementation of this new strategy?
(Ex: Classroom arrangement, organizing materials)

Preparing to teach

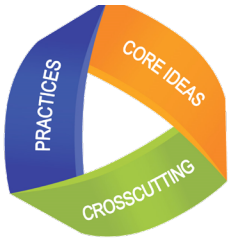
Directions:

1. Navigate to the Chapter 1 landing page in the Teacher's Guide and read the Chapter Overview.
2. Navigate to Lesson 1.1 and use the table below to guide your planning.

Consider	Read
Lesson Purpose • What is the purpose of the lesson? • How do the activities in this lesson fit together to support students in achieving this purpose?	**Lesson Brief:** • Overview • Standards
Preparing • What materials do you need to prepare? • Is there anything you will need to project? • Will students need digital devices? • Are there partner or grouping structures you need to plan for? • Are there activities you need to practice before showing students? • Are there space considerations to think about (e.g., outside observation, projections, whole-group floor space)? • Are there documents in Digital Resources that you need to review (e.g., Assessment Guide)?	**Lesson Brief:** • Materials and Preparation • Unplugged • Digital Resources
Timing • How will teaching this lesson fit into your class schedule? • Will you need to break the lesson into activities over several days? **Teaching the Lesson** • Are there specific steps you have questions about? • What challenges might you encounter in teaching this lesson, and how might you address these challenges?	**Lesson Brief:** • Lesson at a Glance **Instructional Guide:** • Step-by-Step tab • Teacher Support tab
Supports and Challenges • What might be challenging for your students? • What additional supports can you plan for individual students?	**Lesson Brief:** • Differentiation **Instructional Guide:** • Teacher Support tab

**If you have additional time, continue planning with Lesson 1.2.*

Three dimensions of NYSSLS reference



3-D learning engages students in using scientific and engineering practices and applying crosscutting concepts as tools to develop understanding of and solve challenging problems related to disciplinary core ideas.

Science and Engineering Practices

1. **Asking Questions and Defining Problems**
2. **Developing and Using Models**
3. **Planning and Carrying Out Investigations**
4. **Analyzing and Interpreting Data**
5. **Using Mathematics and Computational Thinking**
6. **Constructing Explanations and Designing Solutions**
7. **Engaging in Argument from Evidence**
8. **Obtaining, Evaluating, and Communicating Information**

Disciplinary Core Ideas

Earth and Space Sciences:
ESS1: Earth's Place in the Universe
ESS2: Earth's Systems
ESS3: Earth and Human Activity

Life Sciences:
LS1: From Molecules to Organisms
LS2: Ecosystems
LS3: Heredity
LS4: Biological Evolution

Physical Sciences:
PS1: Matter and its Interactions
PS2: Motion and Stability
PS3: Energy
PS4: Waves and their Applications

Engineering, Technology and the Applications of Science:
ETS1: Engineering Design
ETS2: Links among Engineering Technology, Science and Society

Crosscutting Concepts

1. **Patterns**
2. **Cause and Effect**
3. **Scale, Proportion, and Quantity**
4. **Systems and System Models**
5. **Energy and Matter**
6. **Structure and Function**
7. **Stability and Change**

Amplify Support

Program Guide

Glean additional insight into the program's structure, intent, philosophies, supports, and flexibility.
my.amplify.com/programguide

Amplify Help

Find lots of advice and answers from the Amplify team.
my.amplify.com/help

Customer care

Seek information specific to enrollment and rosters, technical support, materials and kits, and teaching support, weekdays 7AM-7PM EST.

800-823-1969

scihelp@amplify.com

Amplify Chat

When contacting customer care, be sure to:

- 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, etc.).
- Note the web browser you are using (Chrome or Safari).
- Include a screenshot of the problem, if possible.
- Cc: your district or site IT contact.

Notes

Notes