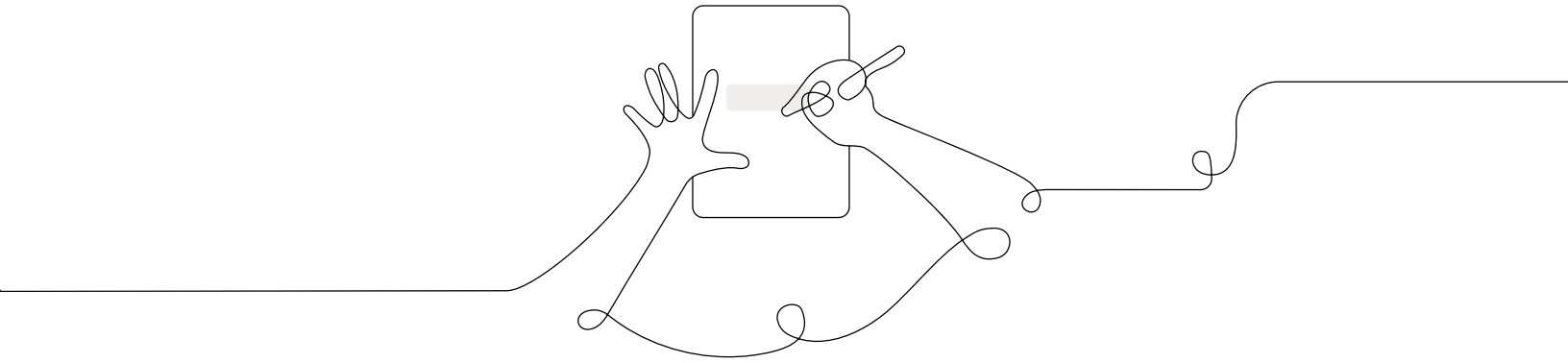
AmplifyScience

Participant Notebook

Grade 3, Inheritance and Traits Guided Unit
Internalization with @Home Resources



Unit Guide resources

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

Planning for the unit

Unit Overview	Describes what's in each unit, the rationale, and how students learn across chapters
Unit Map	Provides an overview of what students figure out in each chapter, and how they figure it out
Progress Build	Explains the learning progression of ideas students figure out in the unit
Getting Ready to Teach	Provides tips for effectively preparing to teach and teaching the unit in your classroom
Materials and Preparation	Lists materials included in the unit's kit, items to be provided by the teacher, and briefly outlines preparation requirements for each lesson
Science Background	Adult-level primer on the science content students figure out in the unit
Standards at a Glance	Lists Next Generation Science Standards (NGSS) (Performance Expectations, Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts), Common Core State Standards for English Language Arts, and Common Core State Standards for Mathematics

Teacher references

Lesson Overview Compilation	Lesson Overview of each lesson in the unit, including lesson summary, activity purposes, and timing
Standards and Goals	Lists NGSS (Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts) and CCSS (English Language Arts and Mathematics) in the unit, explains how the standards are reached
3-D Statements	Describes 3-D learning across the unit, chapters, and in individual lessons
Assessment System	Describes components of the Amplify Science Assessment System, identifies each 3-D assessment opportunity in the unit
Embedded Formative Assessments	Includes full text of formative assessments in the unit
Books in This Unit	Summarizes each unit text and explains how the text supports instruction
Apps in This Unit	Outlines functionality of digital tools and how students use them (in grades 2-5)

Printable resources

Copymaster Compilation	Compilation of all copymasters for the teacher to print and copy throughout the unit
Investigation Notebook	Digital version of the Investigation Notebook, for copying and projecting
Multi-Language Glossary	Glossary of unit vocabulary in multiple languages
Print Materials (8.5" x 11")	Digital compilation of printed cards (i.e. vocabulary cards, student card sets) provided in the kit
Print Materials (11" x 17")	Digital compilation of printed Unit Question, Chapter Questions, and Key Concepts provided in the kit

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.

Chapters at a Glance

Unit Question

How do organisms get their traits?

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

Chapter Question

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

Investigation Questions

- What are some ways that organisms can be similar or different? (1.1, 1.2, 1.3, 1.4)
- How can we describe the traits of organisms in a species? (1.5, 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)

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

Chapter 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, 2.4, 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)

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

Chapter Question

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

Investigation Questions

- Class generated (3.1, 3.2)
- Can the environment affect inherited traits? (3.3, 3.4, 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)

Chapter 4: How can scientists investigate questions about traits?

Chapter Question

How can scientists investigate questions about traits?

Key Concepts

- Scientists can investigate questions by looking for patterns in data. (4.1)

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.**

Guided Unit Internalization Planner

Part 1: Unit-level internalization

Unit title:

What is the phenomenon students are investigating in your unit?	
Unit Question:	**Student role:**
By the end of the unit, students figure out ...	
What science ideas do students need to figure out in order to explain the phenomenon?	

Part 2: Chapter-level internalization

Chapter Question:	
What key concepts do students construct in this chapter?	**How do students apply the key concepts to answer the Chapter Question? To solve the phenomenon?**

Part 3: Lesson-level Internalization

Day _____

Minutes for science: _____ **Instructional format:** ☐ Asynchronous ☐ Synchronous	**Minutes for science: _____** **Instructional format:** ☐ Asynchronous ☐ Synchronous

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

Students will…	**Teacher will…**	**Students will…**	**Teacher will…**

Look at the *Students will* columns. What are students working in the lesson(s) that you could collect, review, or provide feedback on?
See Some Types of Written Work in Amplify Science to the right for guidance.

If there isn't a work product listed above, do you want to add one? Make notes below.

Some Types of Written Work in Amplify Science

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

How will students submit this work product to you?
See the Completing and Submitting Written Work tables to the right for guidance on how students can complete and submit work.

Completing Written Work	**Submitting Written Work**
• Plain paper and pencil (videos include prompts for setup) • (6-8) Student platform • Investigation Notebook • Record video or audio file describing work/answering prompt • Teacher-created digital format (Google Classroom, etc)	• Take a picture with a smartphone and email or text to teacher • Through teacher-created digital format • During in-school time (hybrid model) or lunch/materials pick-up times • (6-8) Hand-in button on student platform

How will you differentiate this lesson for diverse learners? (Navigate to the lesson level on the standard Amplify Science platform and click on differentiation in the left menu.)

Day _____

Minutes for science: _____

Instructional format:
- ☐ Asynchronous
- ☐ Synchronous

Lesson or part of lesson:

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

Students will…	Teacher will…

Minutes for science: _____

Instructional format:
- ☐ Asynchronous
- ☐ Synchronous

Lesson or part of lesson:

Mode of instruction:
- ❏ Preview
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How will you differentiate this lesson for diverse learners? (Navigate to the lesson level on the standard Amplify Science platform and click on differentiation in the left menu.)

Suggestions for synchronous time

The following are some ideas for making the most of synchronous time with your students. As a general rule, the best way to use your synchronous time is to provide students opportunities to talk to one another, or to observe or visualize things they could not do independently.

Online synchronous time	Notes
Online discussions: It's worthwhile to establish norms and routines for online discussions in science to ensure equity of voice, turn-taking, etc. **Digital tool demonstrations:** You can share your screen and demonstrate, or invite your students to share their screen and think-aloud as they use a Simulation or other digital tool. **Interactive read-alouds**: Screen share a digital book or article, and pause to ask questions and invite discussion as you would in the classroom. **Shared Writing:** This is a great opportunity for a collaborative document that all your students can contribute to. **Co-constructed class charts:** You can create digital charts, or create physical charts in your home with student input.	

@Home Resources Scavenger Hunt

Directions: Use this scavenger hunt to practice navigating the Program Hub and decide which @Home Resources best supports your current instructional needs.

Part 1: @Home Units Task	**Notes**
Navigate to the @Home Unit resources. ● Select Remote learning: Amplify Science @Home ● Select Grade-level resources → Grade-level → Unit	
How long is each @Home lesson? Hint: Teacher Overview	
Which types of activities are recommended for synchronous and in-person learning? Hint: Teacher Overview	
How many @Home lessons are in Chapter 1 of your unit? Hint: Teacher Overview	
In which lesson is your unit's phenomenon introduced? Hint: Teacher Overview	
How does the @Home Packet for Lesson 1 differ from the @Home Slides for that same lesson? Hint: Student Materials	
When would you use @Home Student Sheets? Hint: Teacher Overview	
How does the @Home Family Overview support caregivers? Hint: Family Overview	

Part 2: @Home Videos Task	**Notes**
Navigate to the @Home Unit resources. ● Select Remote learning: Amplify Science @Home ● Select Grade-level resources → Grade-level → Unit ● Scroll down to the @Home Video Playlist ● Select the lesson in which the problem or phenomenon is introduced	
Describe the phenomenon (or observable event, something that students can see or experience) in your unit.	

Notes