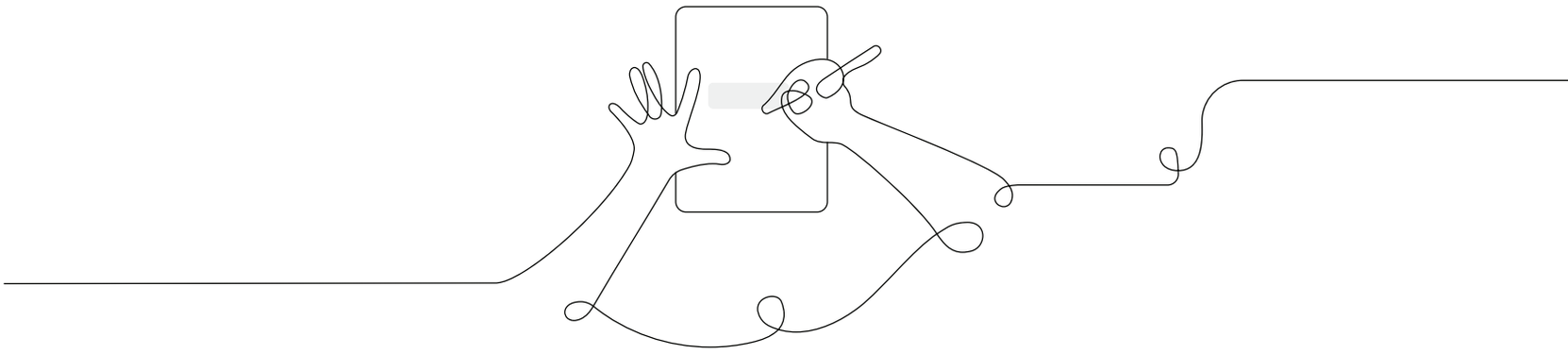
Amplify Science

Participant Notebook

Supporting Diverse Learner Needs
Grade 3: Inheritance and Traits

New York City Schools



Supporting Diverse Learners
Unit-specific workshop agenda

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

Demo account for your workshop:

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

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

Password: **AmplifyNumber1**

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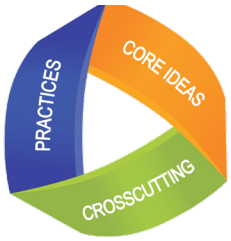
Three dimensions of NYSSLS reference



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**

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.

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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.

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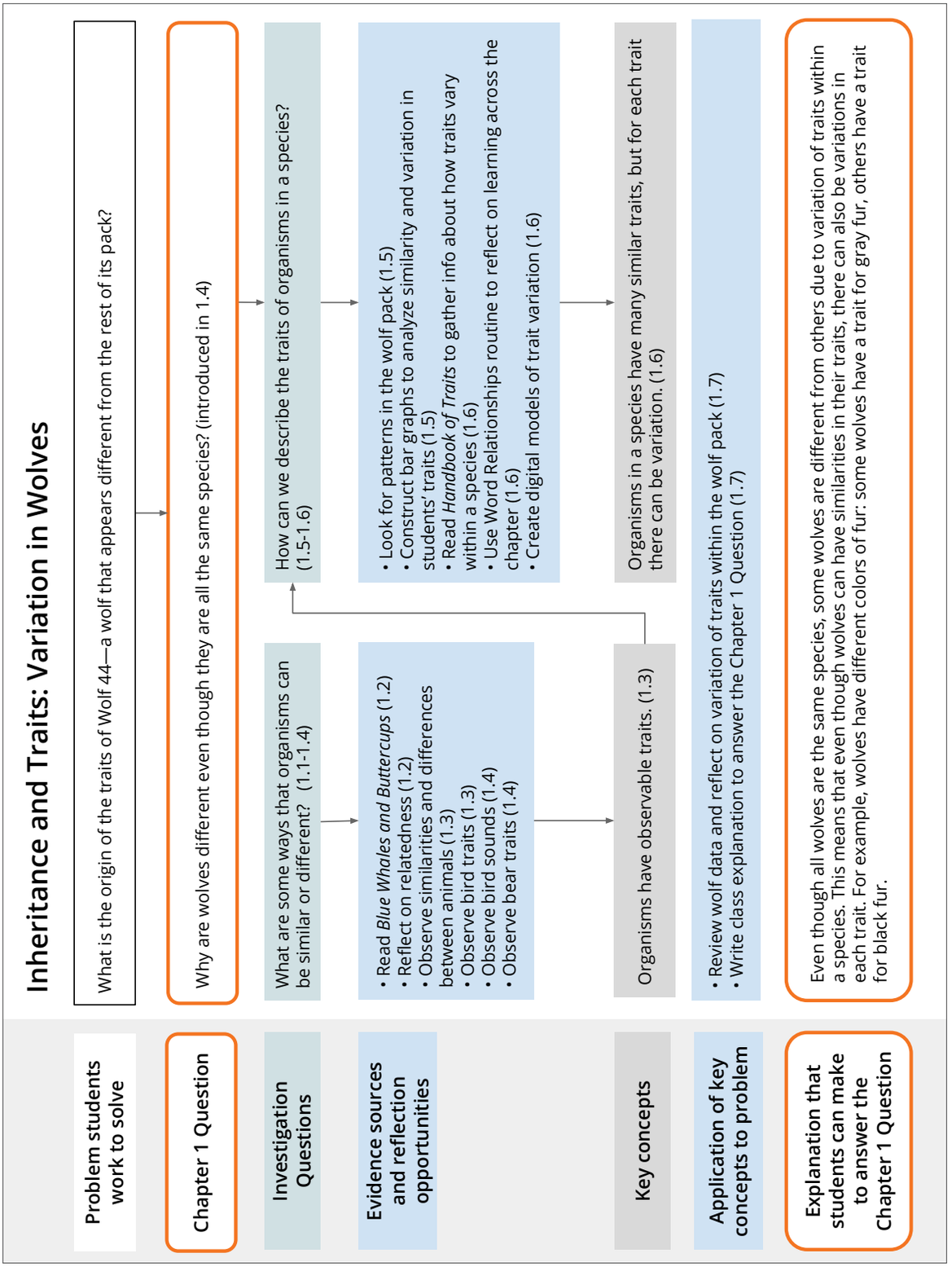
Inheritance and Traits Coherence Flowchart



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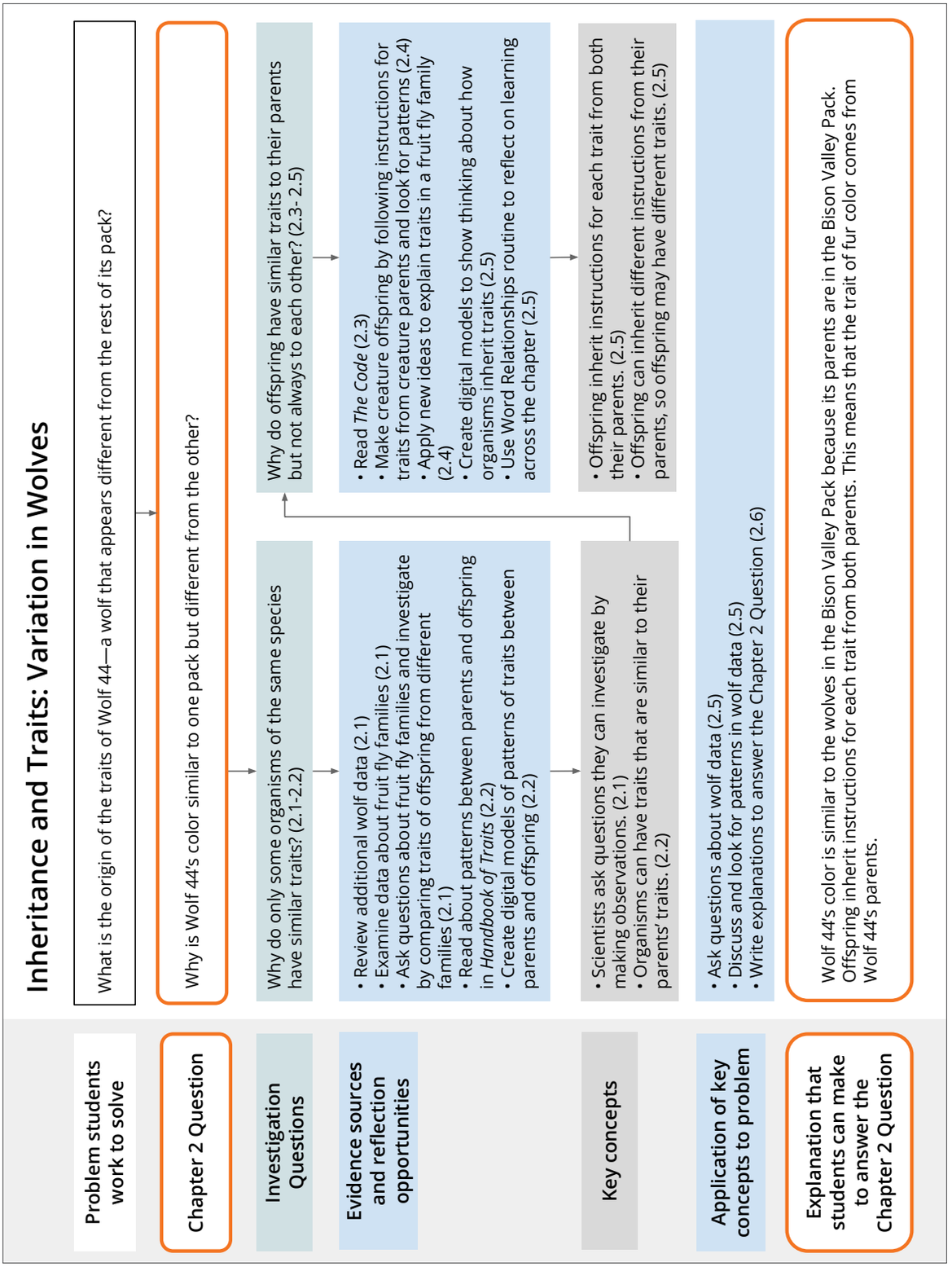

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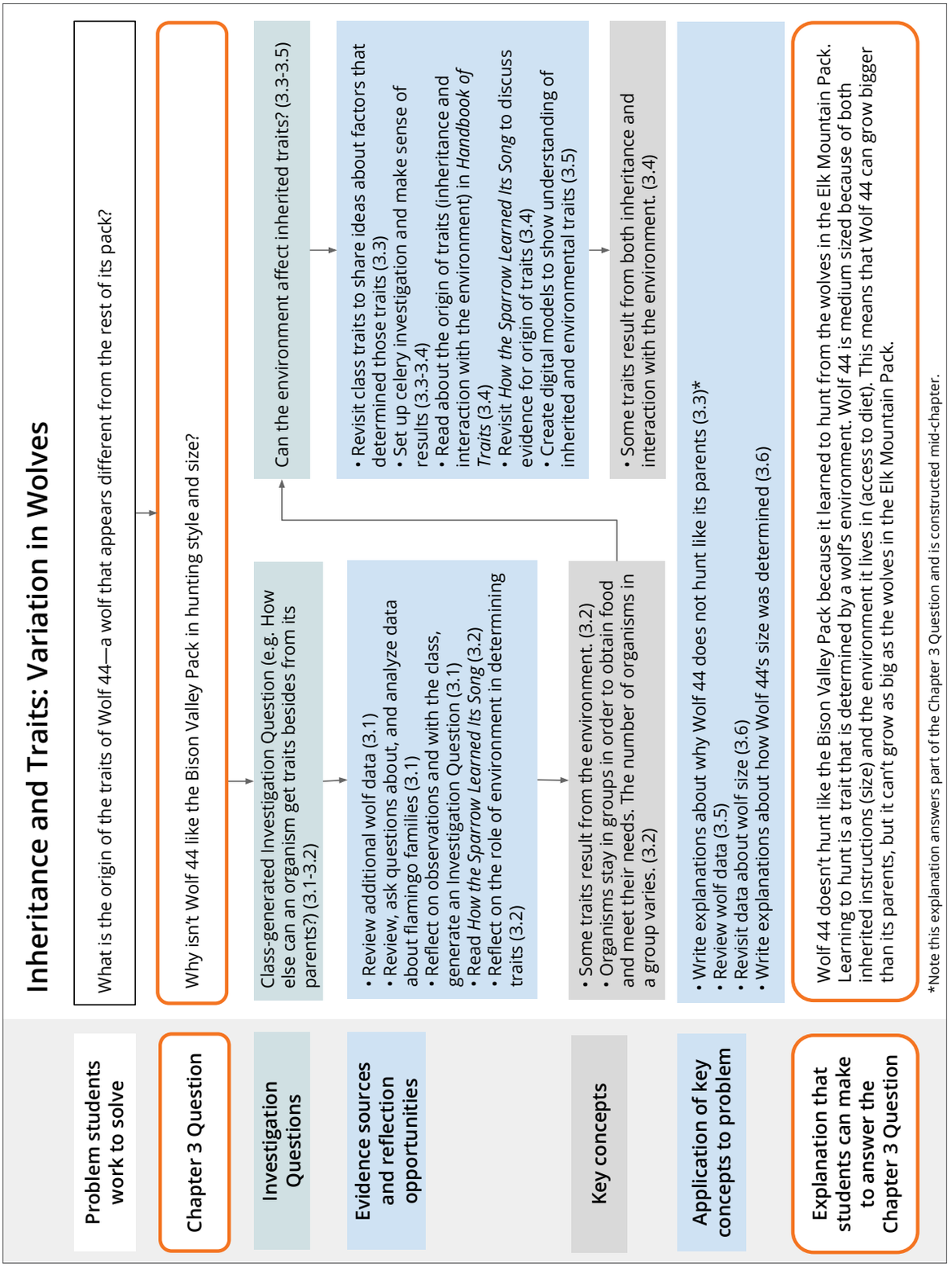

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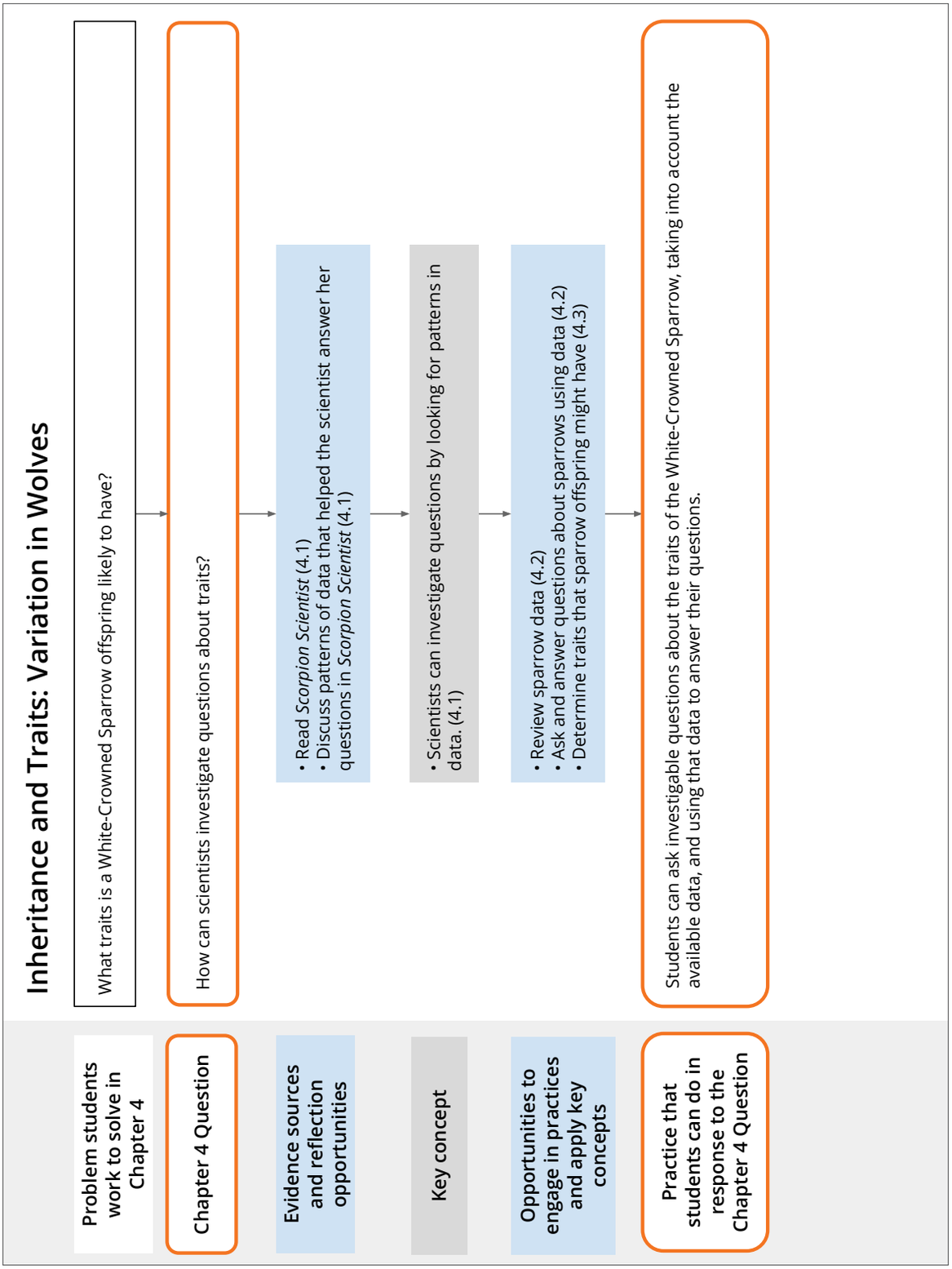

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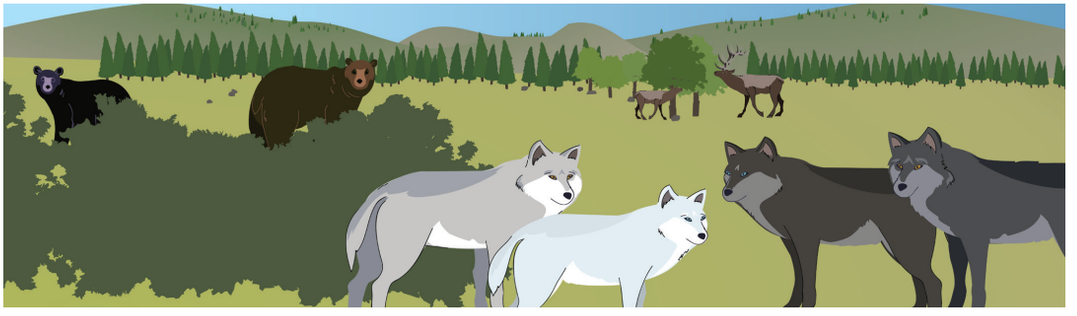
AmplifyScience



Inheritance and Traits:

Variation in Wolves

Investigation Notebook

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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?

_____

_____

_____

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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: _____

_____

_____

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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.

Learner Profiles

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.

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:

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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. _____

_____

_____

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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 _____.

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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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Name: _____ Date: _____

Daily Written Reflection

Write about one organism you read about in *Handbook of Traits* that had an interesting trait. How did the organism get that trait?

_____

_____

_____

_____

_____

_____

Make a drawing if it helps you explain your thinking. Label your drawing.

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 that environment?

_____

_____

_____

Describe the traits of the offspring you chose for Family 2.

_____

_____

Why did you choose those traits for the offspring?

_____

_____

_____

_____

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?

_____

_____

_____

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)	44 kg (97 lbs.)
Wolf 63 (female)	36 kg (80 lbs.)
Wolf 64 (female)	—
Wolf 65 (male)	43 kg (95 lbs.)
Wolf 66 (female)	42 kg (93 lbs.)
Wolf 67 (male)	45 kg (100 lbs.)
Wolf 68 (female)	41 kg (91 lbs.)

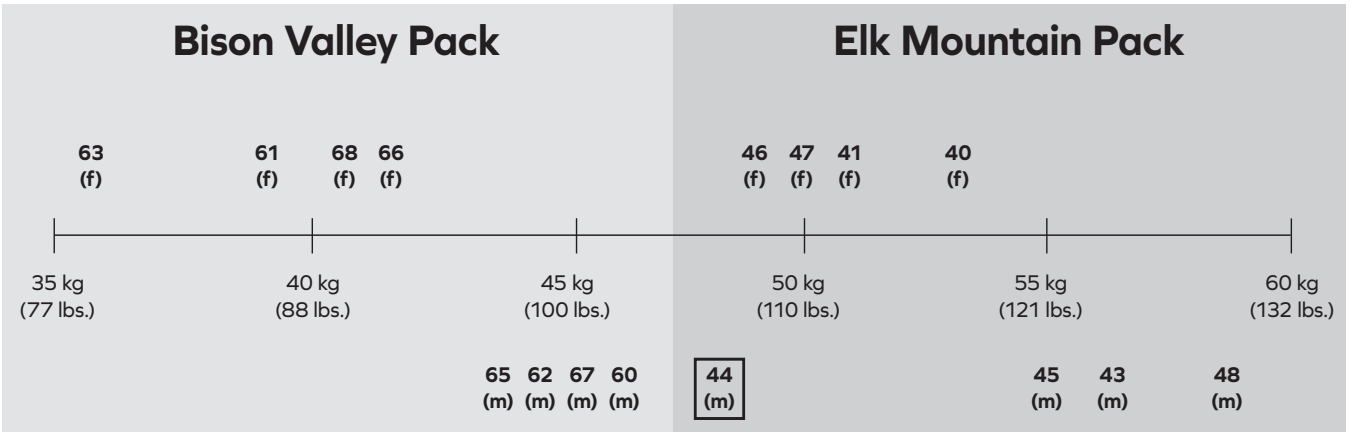
Elk Mountain Pack

Wolf number	Weight
Wolf 40 (female)	53 kg (116 lbs.)
Wolf 41 (female)	51 kg (113 lbs.)
Wolf 42 (male)	—
Wolf 43 (male)	57 kg (127 lbs.)
Wolf 44 (male)	49 kg (108 lbs)
Wolf 45 (male)	55 kg (122 lbs.)
Wolf 46 (female)	49 kg (108 lbs.)
Wolf 47 (female)	50 kg (110 lbs.)
Wolf 48 (male)	59 kg (130 lbs.)

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

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 ideas from the books.

Scientific language to use when discussing data:

- The data shows that _____.
- This means that _____.
- I read in *How the Sparrow Learned Its Song* that _____.
- I read in *Handbook of Traits* that _____.

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?

Keeping Diverse Learner Needs in Mind

Reflection Tool

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

Circle 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?

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.

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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?

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____.

Grade 3: Unit 2 - Inheritance and Traits

Sample Rubric Compilation & Scoring Guide for the End of Unit Assessment (Lesson 3.6)

Criteria	0	1	2	3	4
Causal and Explanatory Does the explanation go beyond, or add to ,what can be observed to explain the size of Wolf 44?	No or inaccurate explanation	The explanation **does not** go beyond, or add to what was observed to explain why Wolf 44 is medium size.	The explanation **somewhat** goes beyond or adds to describing or adds to that Wolf 44 is medium size relative to the two packs to propose: why it is smaller than the wolves in the Elk mountain Pack **or** why it is bigger than the wolves in the Bison Valley Pack.	The explanation **goes beyond** or adds to describing that Wolf 44 is medium size relative to the two packs to propose: why it is smaller than the wolves in the Elk Mountain Pack **and** why it is bigger than the wolves in the Bison Valley Pack.	The explanation **goes beyond and adds to** describing that Wolf 44 is medium size relative to the two packs to propose: why it is smaller than the wolves in the Elk Mountain Pack **and** why it is bigger than the wolves in the Bison Valley Pack. Provides additional example.
Clear and Well Organized Is the explanation written in a way that will allow the audience to understand it?	No or inaccurate explanation	The explanation **is not** structured in a way that will allow the audience to understand it	The explanation is structured in a way that will **somewhat** allow the audience to understand it	The explanation is structured in a way that will **clearly** allow the audience to understand it	The explanation is structured in a way that the audience can clearly understand **and** includes science appropriate vocabulary
Grounded in Evidence Is the explanation consistent with the relevant science ideas that students have experienced so far?	No or inaccurate explanation	Explanation **is not** consistent with the understanding that traits can be determined by: both inheritance and traits, traits are influenced by inheritance, or traits are influenced by the environment. Address only one criteria.	Explanation is **somewhat** consistent with the understanding that traits can be determined by: both inheritance and traits, traits are influenced by inheritance, or traits are influenced by the environment. Addresses two criteria.	Explanation **shows understanding** that traits can be determined by: both inheritance and traits, traits are influenced by inheritance, **and** traits are influenced by the environment. Addresses all three criteria.	Explanation **shows** understanding that traits can be determined by: both inheritance and traits, traits are influenced by inheritance, **and** traits are influenced by the environment. Addresses all three criteria **and** cites classroom examples or data to support the explanations.
Grounded in Evidence Does the explanation use patterns as evidence to support the explanation?	No or inaccurate explanation	Explanation **does not** show understanding of the pattern that offspring have similar traits to their parents or the amount of food in the environment affects the growth of the Pack.	Explanation **somewhat** shows understanding of patterns by stating offspring have similar traits to their parents **or** the amount of food in the environment affects the growth of the Pack.	Explanation **shows understanding** of patterns by stating offspring have similar traits to their parents **and** the amount of food in the environment affects the growth of the Pack.	Explanation **shows** clear understanding of patterns by stating offspring have similar traits to their parents **and** the amount of food in the environment affects the growth of the Pack and incorporates the crosscutting concept Cause and Effect.
EOU Part 2 Asking testable questions and describing what patterns in the data would help answer questions	No or inaccurate questions and description	Student **does not** ask testable questions that can be answered with the available data or describe how potential data patterns in the data could suggest answers to their questions.	Student asks **somewhat** testable questions that can be answered with the available data **or** describes how potential patterns in the data could suggest answers to their questions.	Student asks testable questions that can be answered with the available data **and** describes how potential patterns in the data could suggest answers to their questions.	Student asks testable questions that can be answered with the available data **and** describes how potential patterns in the data could suggest answers to their questions.

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.*

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Grade: _____ Unit Name:_____

Scoring Guide for the End of Unit Assessment (Template)

Criteria	0	1	2	3	4

[Status of the Class Data Collection and Organizational Tool]

Teacher: **Grade Level** : **Date:**
Unit Name: **Chapter:** **Lesson:**

A.) Determine the "Look For's" for the On the Fly Assessment
On-the-Fly Assessment # ____:

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

Students	Look For #1	Look For #2	Look For #3	Look For #4	Look For #5

Amplify Support

Program Guide

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

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Notes

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Notes

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