Lesson 1.6
Making Sense of Variation
Lesson Overview

Students read sections of *Handbook of Traits*, participate in a structured peer-to-peer discussion, and model their ideas by using a digital app. Students use the text features of the reference book, *Handbook of Traits*, to help them locate information about traits that have variation within a species. Pairs choose organisms to read about and then record evidence about trait variation in their notebooks. Next, students participate in the Word Relationships routine in which they create sentences by using the vocabulary they have learned so far. At the end of the lesson, pairs work together to model variation in different traits by using the *Inheritance and Traits* Modeling Tool, an app that allows students to represent their ideas about the traits of various organisms over the course of the unit. The purpose of this lesson is for students to construct an understanding of how organisms in a species have many similar traits, but for each trait there can be variation within a species.

**Anchor Phenomenon:** A wolf at Graystone National Park does not have the same fur color as the rest of its pack.

**Everyday/Investigative Phenomenon:** Cats have similarities and differences.

**Students learn:**

- Text features in a reference book can help readers locate specific information.
- Organisms in a species have many of the same traits, but for some traits there can be variation.
- Evidence is information that supports an answer to a question.
Students read about organisms in *Handbook of Traits* in order to gather more information about variation of traits within a species.

### Instructional Guide

1. **Remind students of the Investigation Question.**

   How can we describe the traits of organisms in a species?

   Ask students to think about the Class Traits Poster Walk from the previous lesson and describe the traits they observed in the organisms in their class—the human species. Make sure students point out a few examples of ways in which the traits of humans vary even though they are the same species.

2. **Ask students to think about traits in other species.**

   The data we gathered on the traits in our class was evidence that traits can vary within humans. What do you think about other species? Do you think traits vary within other species, too?

   Accept all responses.

3. **Hold up *Handbook of Traits*.** Remind students that the last time they read this book they were not as familiar with traits. This time, they will read to find out more about how traits can vary.

   Many of you think that traits vary within species in organisms other than humans. Let’s read about some other organisms in *Handbook of Traits* to get more evidence for this idea.

4. **Introduce evidence.**

   Evidence is information that supports an answer to a question. In this case, we want to see if we have more evidence to support the answer that traits vary within many species, not just humans.
5. **Project and introduce notebook page.** Have students turn to page 16, Evidence About Trait Variation, in their notebooks. Review the directions. Explain that students will read about one plant and one animal and then write notes about the traits for those organisms that have variation.

6. **Model recording on the projected notebook page.** Read aloud pages 6–7 in *Handbook of Traits*.

   When I read the section about variation, I see that dolphins can have variation in size, color, beak size, fin size, and their whistles. I will record this in my notebook.

   In the first box of the projected notebook page, write “Bottlenose dolphins.” Then, write “size, color, beak size, fin size, and whistle.”

7. **Distribute copies of *Handbook of Traits*.** Distribute one copy of the book to each pair of students.

   Use the book to see if there is evidence to support the idea that traits can vary within many different species. Remember that organisms include plants and animals, so make sure you read about both.

8. **Pairs select organisms and complete the notebook page.** Circulate around the room asking questions about traits and variation. Remind students to read about both plants and animals.

9. **Students share evidence from the book.** Have a few volunteers share the evidence they gathered from the reference book. Encourage students to refer to specific page numbers and points in the text as they share.

10. **Discuss the evidence.** Lead a discussion of the evidence for trait variation within a species. As a class, determine whether the evidence from the book supports the idea that traits of organisms in many species can have variation.

11. Collect books.

### Teacher Support

**Instructional Suggestion**

**Providing More Experience: Today’s Daily Written Reflection**

*What did you notice about the traits in your class? Was there a lot of variation? How do you know?* This prompt (on page 14 in the Investigation Notebook) asks students to reflect on the idea of variation within their class. Encouraging students to respond to this prompt can help them begin to think about how organisms of the same species—in this case, humans—have variation in their traits. It can also serve as an anticipatory activity for reading about variation in organisms in *Handbook of Traits*.

**Instructional Suggestion**

**Literacy Note: Using a Reference Book**

Students have been introduced to the idea that reference books are not intended to be read cover to cover. Rather, people search for the information they need and then read the relevant sections carefully. In this lesson, responsibility for using the reference book is released to students. However, students may still require some guidance and assistance.
You may need to remind students of the location and use of the table of contents and index, and it may be helpful to remind them which organisms they should search for. Reading reference materials in this way is authentic to how scientists and engineers use reference materials, and it encourages students to read complex text both purposefully and carefully.

**Rationale**

*Literacy Note: Student Choice in the Reference Book*

All the organisms in *Handbook of Traits* contain information about traits and their variation; this activity is structured so students can choose what they read. Hopefully, this will help motivate students to read the reference book and search for information about organisms they find interesting. It is, however, important for students to remember that variation also exists in species of plants, so remind students to choose both plants and animals to read about.

**Background**

*Science Practices: About Evidence*

The concept of evidence and the idea that scientists must base their thinking on evidence are absolutely central to this unit—and to science itself. In science, evidence takes the form of data recorded from observations or measurements or of ideas drawn from texts that are trusted, often because they have their own roots in empirical data. In science, new ideas are only accepted if they can be supported by evidence. As appropriate, take every possible opportunity to reinforce this idea with your students and encourage them to ground their discussions—both in science inquiry lessons and during reading of informational text—in available evidence. Make sure students know that they can support their statements with evidence they observe directly with their senses or evidence they derive from books they have read. Various forms of the question *What is your evidence?* should become a regular refrain in the classroom.

**Possible Responses**

*Investigation Notebook*

*Evidence About Trait Variation* (page 16)

Answers will vary. Examples:

Ladybug: color and spots
Tomato: color, size, lumpiness, stripes
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.

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<tr>
<th>Organism:</th>
<th>Traits that have variation:</th>
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Students read about organisms in *Handbook of Traits* in order to gather more information about variation of traits within a species.

### Instructional Guide

1. **Remind students of the Investigation Question.**

   ¿Cómo podemos describir los rasgos de los organismos en una especie?

   Ask students to think about the Class Traits Poster Walk from the previous lesson and describe the traits they observed in the organisms in their class—the human species. Make sure students point out a few examples of ways in which the traits of humans vary even though they are the same species.

2. **Ask students to think about traits in other species.**

   Los datos que reunimos sobre los rasgos en nuestra clase fueron evidencia de que los rasgos pueden variar dentro de la especie humana. ¿Ustedes qué piensan sobre otras especies? ¿Piensan que los rasgos también varían dentro de otras especies?

   Accept all responses.

3. **Hold up *Handbook of Traits***. Remind students that the last time they read this book they were not as familiar with traits. This time, they will read to find out more about how traits can vary.

   Muchos de ustedes piensan que los rasgos varían dentro de las especies en organismos aparte de los humanos. Leamos acerca de otros organismos en el *Manual de rasgos* para obtener más evidencia para esta idea.

4. **Introduce evidence.**

   Evidencia es información que respalda una respuesta a una pregunta. En este caso, queremos ver si tenemos más evidencia para respaldar la respuesta de que los rasgos varían dentro de muchas especies, no solo los humanos.
5. **Project and introduce notebook page.** Have students turn to page 16, Evidence About Trait Variation, in their notebooks. Review the directions. Explain that students will read about one plant and one animal and then write notes about the traits for those organisms that have variation.

6. **Model recording on the projected notebook page.** Read aloud pages 6–7 in *Handbook of Traits*.

   Cuando leo la sección acerca de la variación, veo que los delfines pueden tener variación en tamaño, color, tamaño del pico, tamaño de las aletas y silbidos. Apuntaré esto en mi cuaderno.

   In the first box of the projected notebook page, write “Bottlenose dolphins.” Then, write “size, color, beak size, fin size, and whistle.”

7. **Distribute copies of *Handbook of Traits*.** Distribute one copy of the book to each pair of students.

   Usen el libro para ver si hay evidencia para respaldar la idea de que los rasgos pueden variar dentro de muchas especies diferentes. Recuerden que los organismos incluyen plantas y animales, así que asegúrense de leer sobre ambos.

8. **Pairs select organisms and complete the notebook page.** Circulate around the room asking questions about traits and variation. Remind students to read about both plants and animals.

9. **Students share evidence from the book.** Have a few volunteers share the evidence they gathered from the reference book. Encourage students to refer to specific page numbers and points in the text as they share.

10. **Discuss the evidence.** Lead a discussion of the evidence for trait variation within a species. As a class, determine whether the evidence from the book supports the idea that traits of organisms in many species can have variation.

11. **Collect books.**

### Teacher Support

#### Instructional Suggestion

**Providing More Experience: Today’s Daily Written Reflection**

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Possible Responses

Investigation Notebook

Evidence About Trait Variation (page 16)

Answers will vary. Examples:

Ladybug: color and spots
Tomato: color, size, lumpiness, stripes
Evidencia sobre variación de rasgos

Instrucciones:
1. Lee sobre al menos una planta y un animal en el Manual de rasgos.
2. En los cuadros debajo, apunta el nombre de una planta o un animal y enumera algunos de sus rasgos que tienen variación.

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