EQuIP Rubric for Science

Animal & Plant Traits

How do the ways plants and animals look and act help them live and grow?

Curriculum Developer: OpenSciEd

GRADE 1 | FEBRUARY 2026

nsta
National Science Teaching Association

Category I Rating

A	B	C	D	E	F
Explaining Phenomena/ Designing Solutions	Three Dimensions	Integrating the Three Dimensions	Unit Coherence	Multiple Science Domains	Math and ELA
ADEQUATE	ADEQUATE	EXTENSIVE	EXTENSIVE	EXTENSIVE	EXTENSIVE

Score Category I: 2

Category II Rating

A	B	C	D	E	F	G
Relevance and Authenticity	Student Ideas	Building Progressions	Scientific Accuracy	Differentiated Instruction	Teacher Support for Unit Coherence	Scaffolded Differentiation Over Time
EXTENSIVE	EXTENSIVE	ADEQUATE	ADEQUATE	EXTENSIVE	EXTENSIVE	ADEQUATE

Score Category II: 3

Category III Rating

A	B	C	D	E	F
Monitoring 3D Student Performance	Formative	Scoring Guidance	Unbiased Tasks/Items	Coherent Assessment System	Opportunity to Learn
ADEQUATE	EXTENSIVE	EXTENSIVE	EXTENSIVE	ADEQUATE	ADEQUATE

Score Category III: 3

UNIT 1.4

Sum Categories	**8**
Rating	**E**

Overall Summary Comments

This unit is designed for the *Next Generation Science Standards* (*NGSS*), including clear and compelling evidence of the following criteria:

- **I.C Integrating the Three Dimensions:** The unit provides frequent opportunities that require students to use all three dimensions together to make sense of the phenomenon and design solutions.
- **II.A Relevance and Authenticity:** The materials provide meaningful connections between classroom learning and students' lives outside of school by intentionally linking instruction to plants and animals students encounter in their everyday lives.
- **II.B Student Ideas:** The unit consistently positions students' observations, questions, and developing explanations as drivers of instruction. It provides multiple opportunities for students to revisit, refine, and build on their ideas over time.
- **II.F Teacher Support for Unit Coherence:** The unit supports teachers in making connections across lessons through guidance that surfaces prior learning, anticipates student thinking, and leverages both to determine the goal of each lesson.

The unit was reviewed to "provide constructive criterion-based feedback and suggestions for improvement to developers" (EQuIP Rubric for Lessons & Units: Science (Version 3.1). Reviewers recommend focusing on the following criteria during revisions:

- **I.A Explaining Phenomena/Designing Solutions:** The unit is organized around making sense of a phenomenon and designing solutions, but the degree to which that phenomenon motivates the intended student questions varies.
- **I.B Disciplinary Core Ideas:** The unit develops parts of LS1.D, but opportunities to develop the full input-response relationship are limited.

Why are there two colors of text in this report?

Black text is used in this report to identify direct quotations or paraphrases of a lesson/unit (the evidence) and why/how this evidence indicates the criterion is being met (the reasoning). (EQuIP Rubric for Lessons & Units: Science (Version 3.1))

Black text is also used for evidence and reasoning that does not affect the rating of the criterion.

Purple text is used in this report to identify direct quotations or paraphrases of a lesson/unit (the evidence) and why/how this evidence indicates that the criterion is NOT being met (the reasoning). (EQuIP Rubric for Lessons & Units: Science (Version 3.1)) The exception to this is when a criterion is rated as "extensive." In those cases, purple is used as a visual cue to "*provide constructive criterion-based feedback and suggestions for improvement to developers*" (EQuIP Rubric for Lessons & Units: Science (Version 3.1)).

CATEGORY I
NGSS 3D Design

I.A. Explaining Phenomena / Designing Solutions

ADEQUATE

Making sense of phenomena and/or designing solutions to a problem drive student learning.

i. Student questions and prior experiences related to the phenomenon or problem motivate sense-making and/or problem solving.

ii. The focus of the lesson is to support students in making sense of phenomena and/or designing solutions to problems.

iii. When engineering is a learning focus, it is integrated with developing disciplinary core ideas from physical, life, and/or earth and space sciences.

The reviewers found **adequate** evidence that making sense of phenomena drives student learning. Materials are organized so that students are figuring out the central phenomenon: plants and animals have unique parts. Later in the unit, students design solutions to problems they identify, using ideas about plant and animal parts. Student questions and prior experiences related to the phenomenon or problem sometimes motivate sense-making and/or problem solving; other times, the materials require teachers to guide the focus of learning because observations of the phenomenon do not naturally elicit the targeted questions. When engineering is a learning focus, it is integrated with the development of life science disciplinary core ideas.

i. Student questions and prior experiences related to the phenomenon or problem motivate sense-making and/or problem-solving.

Student-centered focus on phenomena or problems

Reviewers found that, in most instances, there was a student-centered focus on phenomena and problems. However, there are other instances where the focus of the learning needed to be directed by the teacher or the learning was focused on acquiring science content knowledge rather than making sense of phenomena.

- Front Matter, Unit Overview "The anchoring phenomenon for this unit is students' own observations that animals and plants have and use their unique parts. They have an opportunity in Lesson 1 to make and record observations of a set of 2 plants and 2 animals and ask questions about their parts, the way those parts look, and how those parts help the plants and animals do different things within their surroundings." (Front Matter)
- Lesson 1, Connect Section, Step 1 "Woah! They find a pumpkin up against the wall of a barn. Hannah and Chris take a closer look at the pumpkin and notice that part of the plant is growing up a ladder on the side of the wall. They follow the pumpkin plant along the side of the wall to find out how it is growing up the wall. Pumpkin plants are one kind of plant living and growing in our communities." (Lesson 1, Plants and Animals in our Community Book)
- Lesson 1, Connect Section, Step 1 "Wow! Lucy sees a green anole (uh-no-lee) sitting on the top of the bush. Lucy yells for Fiona and Michaela to come over and see it. The anole is the same color as the bush. The children have to look closely or they might not see it. The anole quickly dashes away. Lucy, Finn, and Michaela watch it climb under the leaves without falling off. Green anoles are one kind of animal living and growing in our communities." (Lesson 1, Plants and Animals in our Community Book)
- Lesson 1, Connect Section, Step 1 "Fascinating! A goose walks into the street and then five smaller ones follow it in a line. Their little tail feathers wiggle as the geese cross the road. Curtis and Paxton stare in surprise at the geese as they walk across the road and swim gracefully into the nearby pond. Geese are one kind of animal living and growing in our communities." (Lesson 1, Plants and Animals in our Community Book)

- Lesson 1, Connect Section, Step 1 "Amazing! They notice a prickly pear cactus with spiky points and flowers. Thad and Izzy wonder if birds or insects can land on top of a plant like that. Prickly pear cactus are one kind of plant living and growing in our communities." (Lesson 1, Plants and Animals in our Community Book)
- Lesson 1, Explore Section, Step 2 "Assign students to small groups and distribute the Plant and Animal Images. As students work in their small groups, circulate and consider asking questions like the following. What do you observe about the animals? What do you observe about the plants? What do you think the parts you circled do? How might those parts help the plant or animal live and grow? What do you notice that might help the plant or animal stay safe? How are these geese/cacti the same? How are they different? What might that tell us about how other geese/cacti might look? How are the plants and animals interacting with their surroundings? Why do you think that? What are you wondering about these plants and animals, their parts, or how does the way they look or act helps them live?"... Lesson 1, Synthesize Section, Step 3 "Use student ideas and questions added to the chart to co-construct the Unit Question. The question could be something similar to, *How do the ways plants and animals look and act help them live and grow*?" (Lesson 1, Teacher Guide) The teacher asks students to think about how plants and animals' parts contribute to how they live and grow, but none of the materials students observe would cause them to wonder how those parts relate to their growth and survival. The unit-driving question centers on targeted science ideas rather than questions that emerge from students' attempts to explain a phenomenon they observe.
- Lesson 1, Navigate Section, Step 4 "Point out how some images (Canada geese and prickly pear cacti) included more than one of that kind, while others had just one. Have students turn and talk and ask: Do you think other anoles would have similar parts to the anole in this image? Why or why not? Do you think other pumpkin plants would have similar parts to the pumpkin plant in this image? Why or why not? Invite a few student pairs to share with the whole class. Listen for ideas about the same kinds of plants and animals that look similar to each other, as well as the differences students notice." (Lesson 1, Teacher Guide)
- Lesson 3, Navigate, Step 1, "Display slide B with the images from Lesson 1 and continue the brief discussion to recall connections made to the unit phenomenon--different plants and animals have unique parts--to remind students of what we are still wondering related to how plants and animals look (refer to the Notice and Wonder chart as relevant to the class's discussion). Use students' ideas and questions about parents and babies to co-construct a lesson question that can be similar to *How do smaller plants and animals compare to bigger ones?* Display the class's version of the lesson question on slide C." (Lesson 3, Teacher Guide)
- Lesson 4, Navigate Section, Step 1 "Recall what we have figured out. Gather students in a Scientists Circle around Our Growing Ideas chart (refer to slide A) and use the following prompts for students to recall the patterns we figured out about plants and animals of the same kind and about parents and offspring. As students discuss what they have figured out, invite them to give specific examples from our anchoring phenomenon images of plants and animals (e.g., cactus, pumpkin plant, geese, anoles)." (Lesson 4, Teachers Edition)
- Lesson 6, Synthesize Section, Step 5 "Based on what we figured out today, how do you think the parts of the anole and geese help them live and grow?...Anole: Can camouflage to avoid predators. Sticky feet to climb to get food or escape predators. Eyes help them notice predators or food before using those parts...Geese: Webbed feet to swim where food is. Beak helps it eat food. Eyes help them see food or danger while swimming or walking." (Lesson 6, Teacher Guide)
- Lesson 7, Navigate Section, Step 1 "Remind students that during the last lesson, we figured out that animals use their body parts in different ways to help them survive. Ask them to recall what they figured out about how beaks, feet, and color help animals live and grow. Display the Notice and Wonder chart (refer to slide A) and circle students' questions about how offspring survive if they can not use their parts the same way as the parent, or wonderings about parents helping the offspring. Display slide B and ask students to share a wondering they had about what the parent and offspring geese are doing in the picture. After a few minutes, bring students together and ask them to share any new wonders they have. Add these wonders to the Notice and Wonder chart...Craft the lesson question. Summarize

that we have figured out a lot about how animals use their parts to survive, but it seems like we are wondering more about how offspring use their parts to survive and if they get help from their parents. Work with students to craft a lesson question like, *How do animal offspring survive with help from their parents?* Display slide C." (Lesson 7, Teacher Guide) The picture is of 3 geese offspring standing near an adult goose. This image will likely not prompt student questions about how the offspring's parts and parents help them survive

- Lesson 8, Navigate Section, Step 1 "Remind students of our Unit Question, How do the ways plants and animals look and act help them live and grow? Use the following prompts to motivate putting the pieces together of what we figured out about how plants and animals use their parts to survive...Point out that we had figured out a lot about how plants and animals look in Lessons 1-4, especially their parts, and now it sounds like we have evidence about how they act (do different things/use their parts/behave) to help them survive. Remind students that survive means to continue to live. Co-construct the lesson question. Build on students' idea, that living and growing is really about surviving, to co-create your class's version of the lesson question: How do plants use their parts and animals use their parts and behaviors to survive?" Students put pieces together to answer a question focused on science ideas rather than applying what they have learned to explain phenomena. Students do not use phenomena to motivate what they need to figure out in Lesson 8.

- Lesson 9, Navigate Section, Step 1 "Co-construct the lesson question. Use students' ideas and questions about plant and animal parts to mimic to co-construct a lesson question similar to, How can we find out about other plant and animal parts to help us design our solutions?" There is no phenomenon or problem to motivate student learning for this lesson. It is motivated by being told they need to use what they know about plant and animal parts to design a solution.

The learning is frequently student-driven, with students frequently being given opportunities to use their questions or prior experiences related to the phenomenon to guide the learning experience. Students have frequent opportunities to feel as if they are driving the learning sequence through their questions.

- Lesson 3, Navigate Section, Step 1, "Turn and talk about our experiences last time. Display slide A and Our Growing Ideas chart. Facilitate a brief turn and talk to remind students of their experiences observing multiple plants and animals of the same kind. What did we figure out last time while observing plants and animals? What was similar about 2 plants or 2 animals that were the same kind? What did we notice could be different? Connect to our unit phenomenon and remaining questions. Display slide B with the images from Lesson 1 and continue the brief discussion to recall connections made to the unit phenomenon--different plants and animals have unique parts--to remind students of what we are still wondering related to how plants and animals look (refer to the Notice and Wonder chart as relevant to the class's discussion)." Each lesson starts with a similar flow in which students reflect on what was done the past lesson and what they were still wondering, then use that connection to establish a lesson question. (Lesson 3, Teacher Guide)

- Lesson 4, Navigate Section, Step 6, "Elicit students' questions about plant and animal parts. If groups need more inspiration, return to the anchoring images from Lesson 1 and highlight a few close-up parts (e.g., cactus spines, pumpkin flower, anole legs, goose feet). Ask students what they notice and wonder about those parts. Then, display the Notice and Wonder chart (slide L) and have students turn and share with a partner 1 or 2 new questions they have about parts from their homes, communities, or the images. After a few minutes, invite students to share and add new wonders to the chart...What do you notice about this part? Can you turn your notice into a wonder about how parts can help plants and animals? Decide how to answer those questions. Highlight that many of the questions students shared were about plant and animal parts. Ask how they might figure out what those parts do and how they help the plant or animal live and grow. Listen for ideas like watching closely how plants or animals use their parts, comparing the same parts across different kinds, or reading to find out more. Let students know they will explore these questions further in the next few lessons." (Lesson 4, Teacher Edition)

- Lesson 5, Navigate Section, Step 1 "Think about other plants you've seen at home, in your community, or in the grocery store. What parts do those plants have? What do you wonder about what those parts do?..Co-construct the lesson question. Highlight that students have many questions about different plant parts and what they do. Together, co-construct a lesson question such as, How do roots, stems, leaves, flowers, and fruit help a plant live and grow?" (Lesson 5, Teacher Guide)
- Lesson 6, Navigate Section, Step 1 " Remind students that in the last lesson, they figured out how plant parts help plants. Use the following prompts to recall the questions they had about animals and their parts, and add any new questions they may have about animals and their parts. Circle or star questions about animal parts and how they help the animals...Point to the anchor animals (geese and anole). What parts do these animals have?...What wonders do you have about these parts, and if they help the animal live and grow?"
- Lesson 8, Navigate, Step 6, "Display the Notice and Wonder chart. Display slide I and remind students that we can act like engineers and design solutions by using plant and animal parts, but we may have some questions to figure out how to do that. Use the following prompts to guide discussion and listen for the types of student questions that will motivate the next investigations. Extend the Unit Question. Display the Our Growing Ideas chart and point out the Unit Question: *How do the ways plants and animals look and act help them live and grow?* Point out that we can add to our Unit Question to figure out more. Co-construct with the class an extended version of the question. The question could be something similar to: *How do the ways plants and animals look and act help them live and grow, and how can we use those ideas to solve challenges people have?* Display this extended question on slide J and record it on the Our Growing Ideas chart." (Lesson 8, Teacher Guide)

The phenomenon and problem in the unit are clearly connected to each other in a logical way from the students' perspective. Although students are told to design a solution using plant and animal parts instead of being motivated by a problem that necessitates a solution, the materials help teachers logically connect the phenomenon and the problem by centering both on the functions of plant and animal parts.

- Lesson 8, Synthesize Section, Step 4 "Celebrate students' work as scientists to figure out and explain how plants and animals look, use their parts, and act to survive! Remind students that they can also be engineers who plan, test, and build things to solve a problem or challenge. Point out that engineers can use science ideas like the ones we've figured out about plants and animals to solve challenges that humans have. Prompt students for questions and highlight uncertainties to motivate investigating more...Do you think engineers could use ideas about plant and animal parts to solve challenges that people have?..What ideas or questions do you have about plant or animal parts helping people? Transition to reading a book. Summarize that we are not yet sure how engineers can use ideas about plant or animal parts to help humans solve challenges, but it sounds exciting. Ask students how we might find out more about engineers who do this kind of work. Accept all responses. Look for students to suggest we read more about them and what they do." (Lesson 8, Teacher Guide)
- Lesson 8, Connect Section, Step 5 "Recall that biomimicry is to make a design that copies a plant or animal in some way. Point out the parts of the word "bio" and "mimic." Ask students to recall what the word mimic means. Look for them to say it means to copy. Ask students to consider our definition of biomimicry and ask students to consider what "bio" might mean. Look for students to suggest living things like plants and animals. Provide students with an opportunity to practice saying the word out loud a few times. Remind students that Galit used biomimicry to help develop prosthetics for people... Briefly invite students to share examples of items they have seen or used that copy plant or animal parts, such as helmets (like turtle shells), flippers (like whale tails), or camouflage clothing (like animals that blend into their surroundings). This helps students connect structure and function to familiar experiences and increases relevance." (Lesson 8, Teacher Guide)

- Lesson 8, Navigate Section, Step 6 "Display the Our Growing Ideas chart and point out the Unit Question: How do the ways plants and animals look and act help them live and grow? Point out that we can add to our Unit Question to figure out more. Co-construct with the class an extended version of the question. The question could be something similar to: How do the ways plants and animals look and act help them live and grow, and how can we use those ideas to solve challenges people have?" (Lesson 8, Teacher Guide)

ii. The focus of the unit is to support students in making sense of phenomena and/or designing solutions to problems.

Almost all of the student learning in the three dimensions targeted by the materials is in service of students making sense of phenomena or designing solutions to a problem.

- Lesson 2: **Make observations of plants and animals to use as evidence to describe patterns in the similarities and differences in individuals of the same kind.**
- Explore, Step 2, "Make observations in small groups. Distribute one plant or animal card from the Plant Animal Cards handout to each group (it is OK if a plant or animal is repeated with more than one group). Each page is one card featuring images of one kind of plant or one kind of animal. As groups make their observations, circulate and ask questions similar to the following: Can you show me what parts you notice all the plants/animals in these images have? What similarities do you notice between the plants/animals in these images? Does your group agree? Are you noticing anything different between the plants/animals? Does your group agree? How does the color compare between the plants or animals in the images? What about size? Are any parts different shapes?" (Lesson 2, Teacher Guide)
  - Connect, Step 3, "Define patterns. Notice aloud how over and over again, we raised our hands to confirm that the plants and animals of each kind that we observed and read about were similar. If students have already completed Unit 1.2: How can we communicate using objects that make sound? and Unit 1.3: What patterns of the Sun, Moon, and stars can we observe, describe, and predict?, they may already be familiar with patterns. Have them recall that when *something happens over and over again*, scientists call it a pattern. We figured out a pattern that plants and animals of the same kind are similar; they are mostly the same as each other, but can be a little bit different." (Lesson 2, Teacher Guide)
- Lesson 5: **Obtain information from texts and media to gather evidence about how different parts of plants (structure) help plants survive and grow (function).**
  - Connect Section, Step 4 "Display slide K and guide students through a think–pair–share as they obtain and communicate information from the book and videos about how each plant part helps the plant live and grow. First, have students think quietly about one new idea they found in the book or noticed in a video or investigation. Then, have them share with a partner to compare what they noticed. Finally, invite pairs to contribute their ideas to the class Parts and Functions chart, connecting information from the book, videos, and the investigation. Students can act, draw, or write to show their observations about each plant part. This supported routine helps students develop the practice of obtaining and communicating information before applying it independently in later lessons...Prompts to use...What new information did we find out about roots?...What new information did we find out about stems?...What new information did we find out about leaves?...What new information did we find out about flowers?...What new information did we find out about fruit?" (Lesson 5, Teacher Guide)
- Lesson 6: **Use information from a text as evidence for how the shape of animals' external parts relates to their functions for survival and growth.**
  - Connect, Step 4, "Read aloud about each animal. Pause after each section to ask what parts the animal has and how those parts help it survive. As needed, point to illustrations and gesture parts or act out their function to

make meaning clear beyond words. Encourage students to notice both the images and the text as they gather ideas, since informational texts use both to communicate meaning. Add these ideas to the Parts and Functions chart that began in the Explore. Ask students to share other terms for these parts or stories of their previous experience with them. As students gather more information about animals with similar parts and functions, consider adding the animal names next to the parts. Remind students that this chart is evidence they will return to in later lessons when they explain how parts help animals survive." (Lesson 6, Teacher Guide)

  - Synthesize, Step 5, "Facilitate a discussion about students' claims. Remind students of the lesson question we have been figuring out: *How do animals' parts help them live and grow?* Explain that they should make a claim that answers the lesson question. Remind students that a claim is *an answer to a science question*. As students share ideas, add them to the column titled, "What did we figure out? Continue the discussion about students' evidence. Remind students that in science, we always use evidence to support our claims. Evidence is *the observations, data, or information that help answer the scientific question*. Point to each claim that students made and ask students what evidence we have that supports that claim. As students share, continue to support them in responding to and building off of one another's ideas. Then, add photos and artifacts, including the class model, to the column titled, "How did we figure it out? Continue the discussion about students' ideas that connect to the Unit Question. Remind students of the Unit Question: *How do the ways animals and plants look and act help them live and grow?* Ask students to turn and talk about how their exploration, using investigations and the book to understand the function of different animal parts, relates to the Unit Question. Highlight that these parts help animals do things like see, hear, hold onto things, protect themselves, move, and find food and water. Then, ask students to share their ideas with our class." (Lesson 6, Teacher Guide)

- Lesson 10. **Use materials to design and communicate a solution** device that mimics **the function** of **external parts of plants or animals** (**structure**) **to solve a human problem**.
  - Synthesize Section, Step 2, "Design solutions. Distribute to each student their completed Design Ideas handout from Lesson 9 and encourage students to refer to their drawings as they build. As students build, circulate, and use the following prompts based on the Gotta-Have-It Checklist to provide guidance. Prompts to use: How is the part you built shaped or made like the plant or animal part it mimics? How does that shape help it work? What challenge does your solution solve? How does mimicking that plant/animal part help solve the challenge?" (Lesson 10, Teacher Edition)

iii. When engineering is a learning focus, it is integrated with developing disciplinary core ideas from physical science, life, and/or earth and space sciences.

Students use grade-appropriate science ideas from life science to design solutions.

- Lesson 8, Connect Section, Step 7, "Introduce the handout. Display slide K and give each group one page from the How Parts Help handout along with a set of sticky notes. Point out that each page shows 1 plant and 2 animals with examples of how their parts help them. Explain that in their groups, students will look at the parts and discuss how they help plants and animals. Then they will brainstorm challenges humans may have that can be solved by using ideas from those parts. Each challenge should be recorded on a separate sticky note." (Lesson 8, Teacher Edition)
- Lesson 9, Connect Section, Step 2 "Use the box below to draw or write about the challenge you will be solving...In the table below, draw or write about parts plants or animals use that could be helpful to mimic to help you solve your challenge." (Lesson 9, Teacher Guide)
- Lesson 10, Synthesize Section, Step 2 "Remind students to use the materials available to construct a device that mimics a plant or animal part to help solve a problem related to movement, protection, getting food, or getting water and sunlight." (Lesson 9, Teacher Guide)

Criterion-Based Suggestions for Improvement

- Ensure that "[S]tudents have frequent opportunities to feel as if they are driving the learning sequence through their questions and emerging understanding." (Detailed Guidance, p. 7)
  - Ensure that students' observations of the phenomenon naturally lead them to ask questions aligned to the targeted learning.

I.B. Three Dimensions

(All 3 dimensions must be rated at least "adequate" to mark "adequate" overall)

ADEQUATE

Builds understanding of multiple grade-appropriate elements of the science and engineering practices (SEPs), disciplinary core ideas (DCIs), and crosscutting concepts (CCCs) *that are deliberately selected to aid student sense-making of phenomena and/or designing of solutions.*

Document evidence and reasoning, and evaluate whether or not there is sufficient evidence of quality for each dimension separately.

Evidence needs to be at the *element level* of the dimensions (see rubric introduction for a description of what is meant by "element")

The reviewers found **adequate** evidence that the materials give students opportunities to build understanding of grade-appropriate elements of the three dimensions.Students regularly engage in elements of all three dimensions in order to make sense of the anchoring or lesson-level phenomenon.

The unit centers on students using targeted elements of the three dimensions that are clearly identified and addressed throughout the unit to explain that plants and animals have unique parts, and designing solutions similar to plant and animal parts.

Rating for Criterion: SEP

EXTENSIVE

i. Provides opportunities to *develop and use* specific elements of the SEP(s).

The reviewers found **extensive** evidence that the materials provide opportunities to develop and use specific elements of the SEPs:

- Claimed Element: **CEDS-P1: Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.**
- Claimed Element: **CEDS-P2: Use tools and/or materials to design and/or build a device that solves a specific problem or a solution to a specific problem.**
- Claimed Element: **INFO-P1 Read grade-appropriate texts and/or use media to obtain scientific and/or technical information to determine patterns in and/or evidence about the natural and designed world(s).**

- Claimed Element: **CEDS-P3: Generate and/or compare multiple solutions to a problem.**
- Claimed Element: **INFO-P2 Describe how specific images (e.g., a diagram showing how a machine works) support a scientific or engineering idea.**
- Claimed Element: **INFO-P3 Obtain information using various texts, text features (e.g., headings, tables of contents, glossaries, electronic menus, icons), and other media that will be useful in answering a scientific question and/or supporting a scientific claim.**
- Claimed Element: **INFO-P4 Communicate information or design ideas and/or solutions with others in oral and/or written forms using models, drawings, writing, or numbers that provide detail about scientific ideas, practices, and/or design ideas.**
- Claimed Element: **AQDP-P1 Ask questions based on observations to find more information about the natural and/or designed world(s).**
- Claimed Element: **AQDP-P2 Ask and/or identify questions that can be answered by an investigation.**
- Claimed Element: **AQDP-P3 Define a simple problem that can be solved through the development of a new or improved object or tool.**
- Claimed Element: **MOD-P3 Develop and/or use a model to represent amounts, relationships, relative scales (bigger, smaller), and/or patterns in the natural and designed world(s). (MOD-P3)**
- Claimed Element: **MOD-P4 Develop a simple model based on evidence to represent a proposed object or tool.**
- Claimed Element: **INV-P4 Make observations (firsthand or from media) to collect data that can be used to make comparisons. (INV-P4)**
- Claimed Element: **MATH-P2 Use counting and numbers to identify and describe patterns in the natural and designed world(s).**

The following SEP elements are claimed as intentionally developed:

CEDS: Constructing Explanations and Designing Solutions

Claimed Element: **CEDS-P1: Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.**

Claimed in Lessons 1, 2, 4, and 8. Evidence was found in all, examples include:

- Lesson 1, Explore Section, Step 2, "Give directions for making observations. Display slide F. Explain that students will be making observations of these plants and animals, focusing on how they look and what they are doing. Remind students that observations are *details we notice by watching, listening, and feeling*. Explain that they can use dry-erase markers to circle what they notice about the plants and animals or write ideas about what the plants and animals are doing. Consider inviting students to make an observation about one of the images to demonstrate how to circle a part or write an idea on a class copy of one of the images." (Lesson 1, Teacher Guide)
- Lesson 2, Explore Section, Step 2, "Give directions for making observations in small groups. Display slide E and share that they will be doing something similar for one type of plant or one type of animal with a small group. Explain how some of the plants and animals are the ones we looked at in Lesson 1, but some will be new since we want to find out about a lot of different plants and animals. Each group will be an expert on their plant or animal. First, students

will circle the parts that the plants or animals in the images have in common and Xs next to parts that look different. Then, they will write or draw what is similar and what is different on the Plant or Animal Comparisons handout. Demonstrate how there is space to do this on a class copy of the handout or the image of the handout on slide E." (Lesson 2, Teacher Guide)

- Lesson 2, Synthesize Section, Step 4 "Continue the discussion about students' evidence. Explain that in science, we always use evidence to support our claims. Evidence is the observations, data, or information that helps answer the scientific question. As students share ideas, add them to the column titled "How did we figure it out?"...What did you do to help you figure out that the 2 animals were the same?...We compared images of plants and animals by observing their parts and noticing details about the size, shape, and color of the parts and of the animals." (Lesson 2, Teacher Guide)
- Lesson 4, Synthesize Section, Step 2 " Display slide G and explain to students that we are returning to the tree and turtle images from earlier to make observations and use patterns as evidence to figure out which could be the offspring. Show the Parent and Offspring Explanations student assessment and point out how students will: circle the possible offspring, add checks to show similarities and X's to show differences, and then write a sentence explaining their choice with evidence. Emphasize that in science, claims about parents and offspring must always be supported with evidence." (Lesson 4, Teacher Guide)
- Lesson 8, Synthesize Section, Step 2 " Display slide D and play the Eagle Caring For Their Young video. Have the students make observations about the adult eagle and its baby. Use the following prompts to support students in developing their explanations. Choose one parent part that helps its baby survive. Circle the animal's part. How does it help the baby? Circle the function of that part. Highlight that there is space for them to write in something if they want to include a function not on the list." (Lesson 8, Teacher Guide)
- Lesson 8, Synthesize Section, Step 2 "Point out the plant images on slide E that correspond with the plant images on their Parts and Survival Explanation assessment. Use the following prompts to support students in developing their explanations. Choose one plant and a part of that plant. Circle the plant's part. What function does that part help the plant do? Circle the function of that part." (Lesson 8, Teacher Guide)

Claimed Element: **CEDS-P2: Use tools and/or materials to design and/or build a device that solves a specific problem or a solution to a specific problem.**

Claimed in Lessons 8, 9, and 10. Evidence was found in 9 and 10, examples include:

- This element was claimed in Lesson 8 in the 1.4 Animal & Plant Traits SEP-DCI-CCC-ELA-Math-Matrix. Reviewers found no evidence that students engage with the element in the lesson.
- Lesson 9, Explore Section, Step 3 "Gather students in a Scientists Circle and reiterate that we will be designing solutions inspired by the ways the plants and animals we just gathered information about use their parts to survive. Show students the bin of available classroom materials they will be able to use for their designs (e.g., paper, cardboard, tape, string, straws, foil, craft sticks, etc.). Explain that they will not be building yet; they will be looking at the materials helps engineers plan what they might use and how they could use it. Give students a few moments to observe the materials and discuss what each one could be used for." (Lesson 9, Teacher Guide)
- Lesson 10, Synthesize Section, Step 2 "Remind students to use the materials available to construct a device that mimics a plant or animal part to help solve a problem related to movement, protection, getting food, or getting water and sunlight." (Lesson 9, Teacher Guide)

INFO: Obtaining, Evaluating, and Communicating Information

Claimed Element: **INFO-P1 Read grade-appropriate texts and/or use media to obtain scientific and/or technical information to determine patterns in and/or evidence about the natural and designed world(s).**

Claimed in Lessons 2, 3, 5, 6, 7, 8, and 9. Evidence was found in all, examples include:

- Lesson 2, Connect Section, Step 3 "Introduce the Plant and Animal Parts: Putting the Pieces Together book. Display slide F and introduce the Plant and Animal Parts: Putting the Pieces Together book and explain that in the book, they will read about different plants and animals and about their unique parts...Prompts to use...Page 33: How do animals and plants of the same kind look similar?...Page 33: How can animals and plants of the same kind look different?" (Lesson 2, Teacher Guide)
- Lesson 2, Explore Section, Step 3 "Share that we will watch the video again as we keep investigating how parents and offspring are similar and different." (Lesson 3, Teacher Guide)
- Lesson 3, Connect Section, Step 4, "Watch a video. Play the Meet the Animal Families! video with the audio muted from 00:00-00:50 and have students notice the various animals. Make a list of animals from the video. After playing once through, ask students what animals they observed. Make a list of the different animals in a visible space (cows, kangaroos, elephants, wild boar, monkeys). Consider playing the video through again and naming the animals if there were ones the class was not collectively familiar with. Give directions for making additional observations. Share that we will watch the video again as we keep investigating how parents and offspring are similar and different. Explain that to help us observe closely, we can divide up the animals so we have scientists in the room focusing on each animal. Then, name animals one by one and have students volunteer for which animal they will watch closely for what is similar and different between the parent and the offspring. Make sure there are at least 2 students for every animal listed." (Lesson 3, Teacher Guide)
- Lesson 5, Connect Section, Step 2 "Introduce the time-lapse videos. Display slide C. Share with students that plants usually grow very slowly, making it hard to see changes. Explain that a time-lapse video speeds up this process, allowing us to watch what would typically take days or weeks in a matter of seconds. Watching in this way will help us notice when different parts appear and begin to think about what those parts do...Watch and discuss the Seed Germination and Early Growth video. Continue to display slide C, using it to show students the segment of a seed germination and beginning to grow into a seedling. After the video, use the following prompts to support students in sharing ideas about what they noticed growing first, how the plants changed as they grew, and the directions different parts grew...Watch and discuss the Flower to Fruit video. Display slide D and play the video showing a strawberry plant growing, first as a whole plant, then zoomed in from flower to fruit, and finally a close-up of the strawberry seeds. Continue the discussion using the following prompts to help students notice flowers, fruit, and seeds.Watch and discuss the Tendril Growth and Support video. Display slide E and play the video. Then use the following prompts to continue the discussion about parts of the plant and what they help the plant do." (Lesson 5, Teacher Guide)
- Lesson 6, Connect Section, Step 4, "Read aloud about each animal. Pause after each section to ask what parts the animal has and how those parts help it survive. As needed, point to illustrations and gesture parts or act out their function to make meaning clear beyond words. Encourage students to notice both the images and the text as they gather ideas, since informational texts use both to communicate meaning. Add these ideas to the Parts and Functions chart that began in the Explore." (Lesson 6, Teacher Guide)
- Lesson 7, Connect, Step 3, "Observe more animals with a partner. Have students continue to observe animals with a partner. As students observe the animals in the videos, circulate to listen for student ideas and pose the following questions, helping students to think more deeply about the purpose of the animals' behaviors and the parts that allow them to notice and respond. See the Sample Student Offspring and Parent Observations teacher reference for possible observations that students could make." (Lesson 7, Teacher Guide)

- Lesson 8, Synthesize Section, Step 2 " Display slide D and play the Eagle Caring For Their Young video. Have the students make observations about the adult eagle and its baby. Use the following prompts to support students in developing their explanations. Choose one parent part that helps its baby survive. Circle the animal's part. How does it help the baby? Circle the function of that part. Highlight that there is space for them to write in something if they want to include a function not on the list." (Lesson 8, Teacher Guide)
- Lesson 9, Connect Section, Step 2, "Gather information from media independently. Have each student work independently to gather information about plants and animals that could inspire their design ideas. While students are gathering information and filling out their Design Ideas handout, circulate to aid with any questions or confusion. While students are working, circulate and consider the following prompts: Can you tell me more about the problem you chose? What kind of things would your solution need to do in order to solve that problem? What animal or plant parts are you finding? What do the parts look like (structure)? What does that part do to help the plant or animal survive (function)? How could the way the plant/animal uses that part help you design something to solve the problem you chose?" (Lesson 9, Teacher Guide)

The following elements were described as being used periodically to support overall development of the practice:

CEDS: Constructing Explanations and Designing Solutions

Claimed Element: **CEDS-P3: Generate and/or compare multiple solutions to a problem.**

Claimed in Lessons 9 and 10. Evidence was found in both, examples include:

- Lesson 9, Explore section, Step 4, "Practice giving and receiving feedback. Invite students to help demonstrate how students should carry out a conversation with their peers using the prompts and sentence starters on slide J...Peer-to-peer discussion. Pair the students with a partner who is trying to solve a similar problem. Provide students with about 5 minutes to meet with their partner to gather feedback about their ideas as well as give feedback. Suggest that they circle areas that they might want to improve based on the feedback...Improve the designs. Once both partners have given and received feedback, suggest to students that they use that feedback to make decisions about how to improve their final design solution. Continue to connect to the Classroom Agreement, "We let our ideas change and grow," by explaining that students can make changes to their design. Allow students to update their drawings on the Design Ideas handout." (Lesson 9, Teacher Guide)
- Lesson 10, Synthesize, Step 4, "Turn and talk to compare similar designs. Have students find a partner who designed a solution to the same problem (movement, protection, getting food, or getting water & sunlight). Invite partners to turn and talk, using the following prompts to guide this brief discussion: What did you design to solve the problem? What plant or animal did it mimic? What was similar about how you both solved the problem? What was different?" (Lesson 10, Teacher Guide)

INFO: Obtaining, Evaluating, and Communicating Information

Claimed Element: **INFO-P2 Describe how specific images (e.g., a diagram showing how a machine works) support a scientific or engineering idea.**

- This element was claimed in the Front Matter, but not claimed in a lesson in the 1.4 Animal & Plant Traits SEP-DCI-CCC-ELA-Math-Matrix

Claimed Element: **INFO-P3 Obtain information using various texts, text features (e.g., headings, tables of contents, glossaries, electronic menus, icons), and other media that will be useful in answering a scientific question and/or supporting a scientific claim.**

Claimed in Lessons 7 and 9. Evidence was found in both, examples include:

- Lesson 7, Connect Section, Step 3, "Demonstrate accessing and navigating the website. Demonstrate to students how they will be accessing the How Plants and Animals Meet Their Needs Website using available classroom technology. Point out the various headings and menus they can choose from, reading these aloud before students use the website with their partners." (Lesson 7, Teacher Guide)
- Lesson 9, Connect Section, Step 2,"Demonstrate accessing and navigating the website. Demonstrate to students how they will be accessing the website using available classroom technology. Although students used the website in Lesson 7, it will be helpful to once again point out the various headings and menus they can choose from and read them aloud before students use the website with their partners. Emphasize that the "Parts with a Purpose" section of the website is organized into 4 categories: Movement, Protection, Getting Food, Gets Water & Sunlight. Students will be able to navigate directly to the section that matches their chosen problem. Use the prompts below to remind students how to navigate through the website purposefully to find the information they are looking for." (Lesson 9, Teacher Guide)

Claimed Element: **INFO-P4 Communicate information or design ideas and/or solutions with others in oral and/or written forms using models, drawings, writing, or numbers that provide detail about scientific ideas, practices, and/or design ideas.**

Claimed in Lessons 9 and 10. Evidence was found in both, examples include:

- Lesson 9, Explore Section, Step 3, "Design solutions. Display slide I and give students time to independently draw their idea for a solution that mimics the plants and/or animals they gathered information about, and to write or draw the materials that they will need....While students are working, circulate and check in with students using the following prompts: What plant or animal part inspired you to design this idea? How will we know that you were mimicking a plant or animal part? How will what you are designing help you solve your problem? How are the materials similar to the plant or animal part? How will the materials that you chose help you design your solution?" (Lesson 9, Teacher Guide)
- Lesson 10, Connect section, Step 3, "Explain the gallery tour and its purpose. Explain to students that today they will share their final designs with their classmates in a gallery tour, just like scientists and engineers share their work so others can learn from their ideas. Invite students to help arrange their models around the room on desks or tables. Leave space in front of each design so visitors can stop, look closely, and talk with the designer. Tell students they will each have a chance to both present and visit. Discuss how to communicate information. Gather students in a Scientists Circle and display slide E along with the class Gotta-Have-It Checklist. Explain that scientists and engineers share their ideas clearly so others can understand how their designs work. Use the sentence starters on the slide to model how the presenters can describe the problem they chose, what plant or animal part inspired their idea, how that part helps in nature, and how their design solves the problem. Encourage students to use both their design solutions, words, and gestures as they share, so classmates can see how their design connects to the natural structure or function that inspired it. Remind students that when they are the visitor in the gallery tour, they can use questions such as Who, What, When, Where, and Why (shown in the image from Lesson 1) to learn more about each other's designs. For example, a visitor might ask, Who would use your design? What inspired that part? or Why does that help solve the problem?" (Lesson 10, Teacher Guide)

The following elements were described as used, but not intentionally or explicitly developed:

AQDP: Asking Questions and Defining Problems

Claimed Element: **AQDP-P1 Ask questions based on observations to find more information about the natural and/or designed world(s).**

Claimed in Lessons 1, 4, and 8. Evidence was found in all, examples include:

- Lesson 1, Synthesize, Step 3, "Add and group questions on the Notice and Wonder chart. As students share more questions, add them to the Notice and Wonder chart in the "Wonder" column. Consider grouping similar questions or using a color code or other annotations to indicate related questions. Pause to ask students if they agree with the placement while adding the questions to the chart." (Lesson 1, Teacher Guide)
- Lesson 4, Connect section, step 5 "Have students share their stories and experiences. Break students into groups of 3–5 and have each group move to a separate space in the room. If they have their Special Plants and Animals Community Connection, they can bring it to support their sharing. Ask each student to share one plant or animal from home or the community, describe key parts they notice, and then ask at least one question about how a part might help it live and grow. Circulate and listen to how they describe the plant or animal, the parts they focus on, the comparisons they make to class examples, and the questions they generate…Come back together for a whole class discussion. Once all students have shared in their small groups, display slide K and have the class turn toward everyone for a discussion about patterns in how the plants and animals they shared are similar or different from those observed in class, and the questions they now have. Add new questions to the Notice and Wonder chart and, if helpful, cluster them by parts or functions…Build on students' ideas to lead into questions. Use the patterns students noticed and their ideas about how parts may help plants and animals live to set up the need to ask questions they could investigate further. Remind students of your example moving from notice to compare to wonder, then invite them to generate their own wonders. Ask each group to share one notice, one difference, and at least one wonder about how a specific part might help a plant or animal live and grow. Add their questions to the Notice and Wonder chart and, if helpful, cluster them by parts or functions." (Lesson 4, Teacher Guide)
- Lesson 8, Navigate, Step 6, "Display the Notice and Wonder chart. Display slide I and remind students that we can act like engineers and design solutions by using plant and animal parts, but we may have some questions to figure out how to do that. Use the following prompts to guide discussion and listen for the types of student questions that will motivate the next investigations." (Lesson 8, Teacher Guide)

Claimed Element: **AQDP-P2 Ask and/or identify questions that can be answered by an investigation.**

Claimed in Lesson 4. Examples include:

- Lesson 4, Navigate Section, Step 6, "Elicit students' questions about plant and animal parts. If groups need more inspiration, return to the anchoring images from Lesson 1 and highlight a few close-up parts (e.g., cactus spines, pumpkin flower, anole legs, goose feet). Ask students what they notice and wonder about those parts. Then, display the Notice and Wonder chart (slide L) and have students turn and share with a partner 1 or 2 new questions they have about parts from their homes, communities, or the images. After a few minutes, invite students to share and add new wonders to the chart. Decide how to answer those questions. Highlight that many of the questions students shared were about plant and animal parts. Ask how they might figure out what those parts do and how they help the plant or animal live and grow. Listen for ideas like watching closely how plants or animals use their parts, comparing the same parts across different kinds, or reading to find out more. Let students know they will explore these questions further in the next few lessons." (Lesson 4, Teacher Guide)

Claimed Element: **AQDP-P3 Define a simple problem that can be solved through the development of a new or improved object or tool.**

Claimed in Lessons 8 and 9. Evidence was found in 9, examples include:

- Lesson 8, Navigate Section, Step 8, "Share challenge ideas. Display slide L and invite groups to share the ideas for challenges that humans have. As groups share, place their sticky notes in a designated area of the room. Decide on the next steps. Point out that the class now has many possible challenges to consider. Ask students what they might do with all these ideas. Listen for students to suggest choosing a challenge to solve. Emphasize that while we know we will need to choose, we also still have more questions about parts, solutions, and how to design and build. Keep the sticky notes for Lesson 9 for students to use." (Lesson 8, Teacher Guide) Students identify many problems and a need to obtain more information, but they do not yet work on defining and learning more about a specific problem. Therefore, students are using the DCI element ETS1.A-P1 (A situation that people want to change or create can be approached as a problem to be solved through engineering. Such problems may have many acceptable solutions.) rather than engaging in the engineering practice of defining problems.
- Lesson 9, Navigate Section, Step 1, "Revisit initial ideas. Refer to slide C. Point out that the students came up with many problems to solve during Lesson 8. Suggest that we look at them again and see what patterns we notice if we can sort them into categories. Use the prompts below to guide the discussion and sorting. Continue reading and sorting each sticky note, and guide the development of these categories (Movement, Protection, Getting Food, Gets Water & Sunlight)." (Lesson 9, Teacher Guide)
- Lesson 9. Connect section, step 2, "Choose a problem to solve. Display slide D with the Design Ideas handout. Before beginning new research, explain that each student will now choose one of the problems they sorted earlier to focus on. They will research plants and animals that could inspire their own design solutions. They may choose the problem they wrote on a sticky note in Lesson 8, or they may choose another problem that interests them more. Distribute the handout and have students draw or write about the problem they will be solving in the first box on the Design Ideas handout and have them circle the category for their problem (Movement, Protection, Getting Food, Gets Water & Sunlight)." In the Student "Design Ideas" handout, students respond to the prompt, "Use the box below to draw or write about the challenge you will be solving." (Lesson 9, Teacher Guide)

MOD: Developing and Using Models

Claimed Element: **MOD-P3 Develop and/or use a model to represent amounts, relationships, relative scales (bigger, smaller), and/or patterns in the natural and designed world(s). (MOD-P3)**

Claimed in Lessons 5 and 6. Evidence was found in both, examples include:

- Lesson 5, Explore Section, Step 3: Students draw a model to show their observations of a carnation with no water and with food coloring and water. (Lesson 5, Teacher Guide)
- Lesson 6, Navigate Section, Step 1, "Motivate using models of animal parts. Remind students that we have figured out that different animals have different parts, and we can investigate them in different ways. Point out that one idea was to observe animals, but we cannot observe live animals in the classroom like we observed plants. Share that when scientists cannot observe something directly, they sometimes use a model, something that shows what the real thing is like, to help them test and figure out ideas. Display slide C and use the following prompts to help students make sense of why models are important and how they can use them in this lesson...Why might scientists use a model instead of the real thing? What do you notice about these examples of models? What do you think we could do with models of animal parts?...We can use them like animal parts to test what they help animals do." (Lesson 6, Teacher Guide)

- Lesson 6, Explore Section, Step 2, "Connect the use of models to our investigation of animal parts. Display slide D and remind students that they will use models to investigate some of the animal parts they noticed in earlier lessons (body color, beaks, and feet) in order to figure out how these parts help animals live and grow. Explain that students will work in small groups to complete each center and record their results on the Animal Parts Observations handout. Let students know that as they test these parts, they should pay attention to what is easier or harder to do and why. That will help us make sense of how these parts work for animals." Students use stations to model the impact of skin color on the anole, the shape of the feet for different animals, and the shape of the beak for different birds." (Lesson 6, Teacher Guide)

Claimed Element: **MOD-P4 Develop a simple model based on evidence to represent a proposed object or tool.**

Claimed in Lessons 9 and 10. Evidence was found in both, examples include

- Lesson 9, Explore Section, Step 3, "Demonstrate using ideas about plant and animal parts to design solutions. Display slide H and demonstrate to students how they can mimic plant and animal parts to design their solutions with a familiar example problem from Lesson 8, making bike riding safer. Use the discussion prompts below to invite students to collaboratively talk through how an engineer may have used biomimicry to make bike riding safer. As students share ideas, add them to the corresponding sections of a class copy of the Design Ideas handout. Begin by writing and/or drawing the problem in the first box." (Lesson 9, Teacher Guide)
- Lesson 10, Synthesize Section, Step 2, "Design solutions. Distribute to each student their completed Design Ideas handout from Lesson 9 and encourage students to refer to their drawings as they build. As students build, circulate, and use the following prompts based on the Gotta-Have-It Checklist to provide guidance. Remind students that engineers often test and make improvements, so it's OK to adjust their designs as they notice what works well and what could be improved. Refer to the Examples of Student Design Solutions reference for sample student designs and explanations to support your feedback and provide additional ideas as students work." (Lesson 10, Teacher Guide)

INV: Planning and Carrying Out Investigations

Claimed Element: **INV-P4 Make observations (firsthand or from media) to collect data that can be used to make comparisons. (INV-P4)**

Claimed in Lessons 2, 3, and 5. Evidence was found in all claimed lessons, examples include

- Lesson 2, Explore Section, Step 2, "Make observations in small groups. Distribute one plant or animal card from the Plant Animal Cards handout to each group (it is OK if a plant or animal is repeated with more than one group). Each page is one card featuring images of one kind of plant or one kind of animal. As groups make their observations, circulate and ask questions similar to the following: Can you show me what parts you notice all the plants/animals in these images have? What similarities do you notice between the plants/animals in these images? Does your group agree? Are you noticing anything different between the plants/animals? Does your group agree? How does the color compare between the plants or animals in the images? What about size? Are any parts different shapes?" (Lesson 2, Teacher Guide)
- Lesson 3, Explore Section, Step 2, "Make observations to sort images. Divide students into pairs and distribute one set of plant cards to half of the partner groups and one set of animal cards to the other half. Invite students to make individual observations and begin noticing details about each of the images before they work with their partners to sort and discuss. Emphasize the importance of using observations of parts to complete this task. Allow for about 5-10 minutes for pairs to sort their cards." (Lesson 3, Teacher Guide)

- Lesson 5, Explore Section, Step 3, "Make observations. Pass out carnations to each group and a copy of the Flower Observations handout to each student. Consider having writing utensils the same color as the food coloring available for students to use in their drawings. Have students observe the 2 carnations: 1 that has been sitting out of water (less fresh, starting to soften or droop) and 1 that has been sitting in food coloring (still fresh and showing color changes). Invite students to compare how the carnations look and feel, and encourage them to record their observations by drawing and adding labels, arrows, or short notes to show how they think the water with food coloring moved up the stem. Students can also discuss their ideas with a partner using sentence starters such as "I notice ___ on this carnation. What do you notice on yours?" or "I think the color changed because ___. What do you think?" Remind students to use the question "How do you know?" on their handout to include evidence from what they observed. It is fine if they carefully pull apart petals or leaves to notice details. Circulate and use the following prompts for small group discussion." (Lesson 5, Teacher Guide)

MATH: Using Mathematics and Computational Thinking

Claimed Element: **MATH-P2 Use counting and numbers to identify and describe patterns in the natural and designed world(s).**

- Claimed in Lesson 3. Examples include:
  Lesson 3, Connect Section, step 4 "Add data from the animals in the video to our table. Return to a Scientists Circle. Invite students from each group to share their observations with the class. Use the discussion to support the class in making decisions about where to add tallies to the Parent and Offspring Comparison data chart for each of the new parents and offspring from the video (cows, kangaroos, elephants, wild boar, monkeys). Have students raise their hands or use another signal to confirm the placement of the tally...Have a brief discussion about the new data. Use the prompt below to facilitate a brief discussion about the data added to the table from the video...How do the parents and offspring compare to one another? What pattern are we observing? How does that relate to what we figured out with the plant/animal cards?...Transition to the Synthesize. Summarize how students have continued to notice patterns in the ways plant and animal parents and offspring look compared to one another. " (Lesson 3, Teacher Guide)

Criterion-Based Suggestions for Improvement

- "There is a close match between the SEP, CCC, and DCI elements claimed and evidence of their development and use in the materials." (Detailed Guidance, p.10)
  - Consider adjusting the claimed elements in the front matter and the 1.4 Animal & Plant Traits SEP-DCI-CCC-ELA-Math-Matrix to accurately reflect the elements students engage with in each lesson.

Rating for Criterion: DCI **ADEQUATE**

ii. Provides opportunities to develop and use specific elements of the DCI(s).

The reviewers found **adequate** evidence that the materials provide opportunities to develop and use specific elements of the DCIs. The materials address **LS1.D-P1** in several lessons; however, students are not given opportunities to completely develop the element.

- Claimed Element: **LS1.A.P1: LS1A Structure and Function: All organisms have external parts. Different animals use their body parts in different ways to see, hear, grab objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow.**
- Claimed Element: **LS1.B-P1: LS1.B: Growth and Development of Organisms: Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive. (1-LS1-2)**
- Claimed Element: **LS1.D-P1: LS1.D: Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs. (1-LS1-1)**
- Claimed Element: **1-LS3.A-P1: LS3A Inheritance of Traits: Young animals are very much, but not exactly, like their parents. Plants also are very much, but not exactly, like their parents.**
- Claimed Element: **1-LS3B.P1: LS3.B: Variation of Traits: Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways.**
- Claimed Element: **ETS1.A.P1: .Definining and Delimiting an Engineering Problem: A situation that people want to change or create can be approached as a problem to be solved through engineering. Such problems may have many acceptable solutions.**
- Claimed Element: **ETS1.A.P2: Asking questions, making observations, and gathering information are helpful in thinking about problems. Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1)**
- Claimed Element: **ETS1.B.P1: .Developing Possible Solutions: Designs can be conveyed through sketches, drawing, or physical models. These representations are useful in communicating ideas for a problem's solution to other people (K-2-ETS1-2)**

LS1.A: Structure and Function

Claimed Element: **LS1.A.1: LS1A Structure and Function: All organisms have external parts. Different animals use their body parts in different ways to see, hear, grab objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow.**

Claimed in Lessons: 1, 2, 5, 6, 8, 9, and 10. Evidence was found in all claimed lessons, examples include:

- Lesson 1, Synthesize Section, Step 3 "Prompts to use...What observations did you make about how [plant or animal] looked? What parts did you observe?..How do you think [parts] might help the [plant or animal] live, grow, or stay safe?..What did you notice around that plant or animal, and how does that help explain what the part might be

doing?...What did you notice when there was more than one of a plant (cacti) or animal (geese) in the images?..What do you notice the baby geese are doing near the parent? Why might they do that?..For images with only one plant or animal: Do you think other [plant/animal] would look similar? Why do you think so?" (Lesson 1, Teacher Guide)

- Lesson 2, Connect Section, Step 3, "Introduce the Plant and Animal Parts: Putting the Pieces Together book. Display slide F and introduce the Plant and Animal Parts: Putting the Pieces Together book and explain that in the book, they will read about different plants and animals and about their unique parts. Facilitate an interactive read-aloud. Read the book aloud with the class. Following the reveal of each animal: 1. Invite the group that observed the plant or animal to display their plant or animal card to the class. 2. Use the associated prompts in the following table to discuss that plant or animal as a class." (Lesson 2, Teacher Guide)
- Lesson 5, Connect Section, Step 4 "Display slide K and guide students through a think–pair–share as they obtain and communicate information from the book and videos about how each plant part helps the plant live and grow. First, have students think quietly about one new idea they found in the book or noticed in a video or investigation. Then, have them share with a partner to compare what they noticed. Finally, invite pairs to contribute their ideas to the class Parts and Functions chart, connecting information from the book, videos, and the investigation. Students can act, draw, or write to show their observations about each plant part. This supported routine helps students develop the practice of obtaining and communicating information before applying it independently in later lessons...Prompts to use...What new information did we find out about roots?...What new information did we find out about stems?... What new information did we find out about leaves?...What new information did we find out about flowers?...What new information did we find out about fruit?" (Lesson 5, Teacher Guide)
- Lesson 6, Connect Section, Step 4 "Read aloud about each animal. Pause after each section to ask what parts the animal has and how those parts help it survive. As needed, point to illustrations and gesture parts or act out their function to make meaning clear beyond words. Encourage students to notice both the images and the text as they gather ideas, since informational texts use both to communicate meaning. Add these ideas to the Parts and Functions chart that began in the Explore. Ask students to share other terms for these parts or stories of their previous experience with them. As students gather more information about animals with similar parts and functions, consider adding the animal names next to the parts. Remind students that this chart is evidence they will return to in later lessons when they explain how parts help animals survive." (Lesson 6, Teacher Guide)
- Lesson 8, Synthesize Section, Step 2 " Display slide D and play the Eagle Caring For Their Young video. Have the students make observations about the adult eagle and its baby. Use the following prompts to support students in developing their explanations. Choose one parent part that helps its baby survive. Circle the animal's part. How does it help the baby? Circle the function of that part. Highlight that there is space for them to write in something if they want to include a function not on the list." (Lesson 8, Teacher Guide)
- Lesson 8, Synthesize Section, Step 2 "Point out the plant images on slide E that correspond with the plant images on their Parts and Survival Explanation assessment. Use the following prompts to support students in developing their explanations. Choose one plant and a part of that plant. Circle the plant's part. What function does that part help the plant do? Circle the function of that part." (Lesson 8, Teacher Guide)
- Lesson 9, Connect Section, Step 2, "Return to the Design Ideas handout. Display slide F. Demonstrate your expectations on how students can use words (in any language) and/or drawings to record information they find on the first page of the Design Ideas handout (students will complete the second page in the next part of the lesson). In each box, students should draw a plant or animal part they found that has a special job that would help to solve the problem. Explain that scientists don't always use their first idea or source to solve the problem. Therefore, it is important that students gather information about more than one plant or animal to help them solve their problem." (Lesson 9, Teacher Guide)

- Lesson 10, Synthesize Section, Step 4, "Turn and talk to compare similar designs. Have students find a partner who designed a solution to the same problem (movement, protection, getting food, or getting water & sunlight). Invite partners to turn and talk, using the following prompts to guide this brief discussion: What did you design to solve the problem? What plant or animal did it mimic? What was similar about how you both solved the problem? What was different?" (Lesson 10, Teacher Guide)

LS1.B: Growth and Development of Organisms

Claimed Element: **LS1.B-P1: LS1.B: Growth and Development of Organisms: Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive. (1-LS1-2)**

Claimed in Lessons: 1, 3, 7, and 8. Evidence was found in all claimed lessons, examples include

- Lesson 1, Synthesize Section, Step 3 "Prompts to use...What observations did you make about how [plant or animal] looked? What parts did you observe?..How do you think [parts] might help the [plant or animal] live, grow, or stay safe?..What did you notice around that plant or animal, and how does that help explain what the part might be doing?...What did you notice when there was more than one of a plant (cacti) or animal (geese) in the images?..What do you notice the baby geese are doing near the parent? Why might they do that?..For images with only one plant or animal: Do you think other [plant/animal] would look similar? Why do you think so?" (Lesson 1, Teacher Guide)
- Lesson 3, Explore Section, Step 2 "Discuss how smaller and larger plants and animals could be related. Use the discussion prompts below to discuss ideas about smaller and larger plants and animals...If the bigger and smaller plants or animals had those similarities, how might they be related? OR: If the bigger and smaller plants or animals look alike, what are some different ways they might be related?...They are the same kind of plant. They are the same kind of animal. They are babies....Acknowledge the different ideas students share and connect them to previous experiences in Lesson 2 of noticing that plants and animals of the same kind look similar; they are mostly the same but have some differences. Using the language students have used, further explain how the smaller versions of the plants and animals we observed today are the same kind as the larger version. They are also offspring, which are the young or babies of a particular plant or animal. Explain to students that we say offspring when we know that one came from the other, like a baby goose and its parent. But not all smaller geese are offspring; sometimes they are just other geese of the same kind. Add the offspring card to the Word Wall. " (Lesson 3, Teacher Guide)
- Lesson 7, Explore Section, Step 3, "As students observe the animals in the videos, circulate to listen for student ideas and pose the following questions, helping students to think more deeply about the purpose of the animals' behaviors and the parts that allow them to notice and respond. See the Sample Student Offspring and Parent Observations teacher reference for possible observations that students could make...Prompts to use: What did you notice the offspring doing in the video? Why do you think the offspring was doing that? What need was it trying to meet? What parts did the offspring use to signal that need? What did you notice the parent doing after the offspring signaled? Which parts did the parent use to notice the offspring's signal?...Eyes to see open mouth. Ears to hear sounds. Nose to smell. How do those parts help the parent know what the offspring needs? How did the parents' behavior help the offspring survive (live and grow)?" (Lesson 7, Teacher Guide)
- Lesson 7, Explore Section, Step 3, "Shift to observations of parents' actions. Move to the next column of the chart and ask students to share their observations of what they saw the parents do. Remind students that parents first use their parts (such as eyes, ears, or nose) to notice what the offspring is doing, and then they respond with an action. Continue to record their observations on the chart, poll the class to see if they saw similar actions in another parent animal, and add check marks to support students' noticing patterns. Use the sample prompt below to support students in sharing how the parents responded to the offspring's behavior....Prompts to Use: Let's add what we saw in our first video with the birds. What did we see the parents do?...Why do you think the parents are acting this way? To help the offspring. To feed them. To protect them" (Lesson 7, Teacher Guide)

- Lesson 7, Synthesize Section, Step 5, "Facilitate a discussion about students' claims and evidence. Prompts to use: Let's look back at our question: How do animal offspring survive with help from their parents? What did we figure out about that? Offspring use sounds or movements to get the parent's attention.Offspring use their body parts (mouths, legs, heads) to make sounds or move to communicate their needs.Parents use their body parts to hear or see the offspring and respond.Parents use their body parts to get food or use movement or touch to help the offspring.Offspring use (behavior) with their parts to signal a need. Parents use their (parts) to notice and respond with (behavior) so offspring can live and grow." (Lesson 7, Teacher Guide)
- Lesson 8, Synthesize Section, Step 2, "Recall patterns of behaviors. Before focusing only on the eagle, remind students of what they observed with the geese in Lesson 1 and the baby animals in Lesson 7. Ask students to think about what is the same across these examples. What patterns do we notice in how babies show they need something and how parents respond? What body parts help babies send signals or help parents notice or respond? Listen for ideas such as eyes, ears, mouths, or beaks. Allow a few students to share ideas before moving into watching the eagle video." (Lesson 8, Teacher Guide)
- Lesson 8, Synthesize Section, Step 4, "Make claims about animals. Shift discussion to animals and record ideas in the "What did we figure out?" column. What claims can we make to answer the question: How do plants use their parts and animals use their parts and behaviors to survive? Birds use beaks to feed their baby. Parent covers their baby with their body to keep it warm.Baby opens mouth/beak to get food.Baby makes noise when hungry.Parent hears the baby and feeds it.Geese travel together for safety. Anole changes color to hide. Why might that part or behavior be important? Helps baby survive. Helps baby get food. Keeps the baby safe/warm. Protects the baby from danger. Helps animals move together. Helps animals hide." (Lesson 8, Teacher Guide)

LS1.D: Information Processing

Claimed Element: **LS1.D-P1: LS1.D: Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs. (1-LS1-1)**

Claimed in Lessons: 1, 5, 6, 7, 8, 9, 10 in the DCI Matrix and the Unit Overview DCIs Developed in this unit table. Evidence was found in some of the claimed lessons, examples include

- Lesson 1, Synthesize Section, Step 3 "Prompts to use...What do you notice the baby geese are doing near the parent? Why might they do that?...Ideas to Look and Listen for...Baby geese are staying close to the parent. The parent goose seems to be watching out for them or leading them. The babies are copying or following what the parent is doing. Staying close to the parent might help them be safe from danger. The parent might help them find food or know where to go. Being near the parent might help them grow and survive." (Lesson 1, Teacher Guide) As they gather information, students are not prompted to consider the parts of the animals that inform the behavior(s) that help them survive.
- Lesson 5, Connect section, Step 2, "Watch and discuss the Tendril Growth and Support video. Display slide E and play the video. Then use the following prompts to continue the discussion about parts of the plant and what they help the plant do...Did you notice anything different about this plant compared to the first video? A skinny green part curled around the stick. What do you think this wrapping part helps the plant do?
- Lesson 5 Connect Section, Step 4, From Roots to Fruits Book "When something touches a cucumber plant tendril, the tendrils will wrap around whatever touches it. That wrapping part helps the plant hold on, stay up, and keep growing." (Lesson 5, Teacher Guide)
- Lesson 6, Explore Section, Step 3 "Prompts to use: Which colors were easier to find? Why were they easier?...Ideas to look and listen for: Yellow, Black, They stood out., They were different from the green paper...Possible follow-up responses: What made them easier to see? Who else noticed this? Would it be easier for a predator's eyes to notice

these colors? Why?...Prompts to use: How does being the same color help an animal live and grow?...Ideas to look and listen for: Makes them harder to see, which helps protect them from other animals. Easier to sneak up on food... Possible follow-up responses: What would an animal that hunts for food do if it could not see this animal easily? What would an animal do if it could not see another animal that was nearby?...Prompts to use: How does the color of the body part help it do this function?...Ideas to look and listen for: Helps them blend in. Helps them hide...Possible follow-up responses: How do eyes help animals notice or not notice other animals? Can anyone add to this idea?" (Lesson 6, Teacher Guide) Because questions about parts of predators' eyes that allow them to see are only part of the follow-up questions, teachers may not use them and therefore not develop this idea.

- Continue the discussion about beaks. Possible follow-up prompts: How might its eyes or beak help it notice the food? How might a bird use its eyes to spot food first and then use its beak to grab it? Why might a bird need eyes to find the right kind of food for its beak? And before they use their beak, birds often use their eyes to see or find the food first. What might happen if they could not see it?"
- Lesson 6, Synthesize Section, Step 5 "Prompts to use...What did we figure out today that related to our lesson question, How do animals' parts help them live and grow?...Animals also use their senses, like eyes and ears, to notice food or danger and then use their parts to do something, like hide, chase, or move away....Prompts to use... What did we do today that helped us figure that out? What evidence allows us to make that claim?..We noticed that sometimes animals need to see or hear other animals before using their parts to hide, chase, or get food." (Lesson 6, Teacher Guide) Prior to this prompt and potential response, the only instances students consider that eyes are used to capture information are in possible prompts that teachers may not use. Students do not discuss ears as parts of animals that capture information needed for growth and survival.
- Lesson 6, Synthesize Section, Step 5 "Why do animals need to be able to do things like see, hear, hold onto things, protect themselves, move around, and find food?...*Doing these things helps the animal live and grow.*" Prior to this prompt and response, students do not collect evidence that seeing and hearing help animals live and grow. This response would be based on students' prior knowledge.
- Lesson 7, Explore Section, Step 4 "What part helped the parent notice that?...*The bird saw with its eyes that the chick opened its mouth*...What did you see the parents do in other videos?...*The parents helped.They went like this* (*mimics pushing or pulling*). *They cleaned them*...What parts helped the parents notice that?...*The cow saw the baby cow with its eyes. The dog heard the puppy with its ears.*" (Lesson 7, Teacher Guide)
- Lesson 7, Explore Section, Step 2, "Consider how we might act if we had a need. Point out that we are wondering what offspring might do if they can not use their parts in the same way as a parent. Suggest that we consider an example that relates to humans since humans are also animals. Share that we often use our voices to ask for help, but ask students to consider what it would be like using other ways (not using our voices) to tell someone we needed something. Display slide D and ask students to turn and talk about the following prompts. After partners share, invite volunteers to share their ideas with everyone...How might you use your body parts to show that you are tired? Encourage students to use words and gestures. What body parts would help someone else notice that you are tired? Someone can use their eyes to see that you are yawning and are tired. Someone can use their ears to hear you yawn. Someone can use their ears to hear snoring sounds. How might we know if a pet needs something? Encourage students to think about what they might see or hear from their pets. A dog might bark when it wants to go outside. A cat might meow or rub against you when it wants attention or food. We can use our eyes and ears to notice these clues." (Lesson 7, Teacher Guide)
- Lesson 7, Explore Section, Step 3, "As students observe the animals in the videos, circulate to listen for student ideas and pose the following questions, helping students to think more deeply about the purpose of the animals' behaviors and the parts that allow them to notice and respond. See the Sample Student Offspring and Parent Observations teacher reference for possible observations that students could make...Prompts to use: What did you notice the

parent doing after the offspring signaled? Which parts did the parent use to notice the offspring's signal?...Eyes to see open mouth. Ears to hear sounds. Nose to smell. How do those parts help the parent know what the offspring needs? How did the parents' behavior help the offspring survive (live and grow)?" (Lesson 7, Teacher Guide)

- Lesson 7, Explore section, Step 3, "Shift to observations of parents' actions. Move to the next column of the chart and ask students to share their observations of what they saw the parents do. Remind students that parents first use their parts (such as eyes, ears, or nose) to notice what the offspring is doing, and then they respond with an action. Continue to record their observations on the chart, poll the class to see if they saw similar actions in another parent animal, and add check marks to support students' noticing patterns. Use the sample prompt below to support students in sharing how the parents responded to the offspring's behavior....Prompts to Use: Let's add what we saw in our first video with the birds. What did we see the parents do? What part helped the parent notice that? The bird saw with its eyes that the chick opened its mouth. What did you see the parents do in other videos? What parts helped the parents notice that? The cow saw the baby cow with its eyes. The dog heard the puppy with its ears. Why do you think the parents are acting this way? To help the offspring. To feed them. To protect them" (Lesson 7, Teacher Guide)
- Lesson 7, Synthesize section, Step 5, "Facilitate a discussion about students' claims and evidence. Prompts to use: Let's look back at our question: How do animal offspring survive with help from their parents? What did we figure out about that? Offspring use sounds or movements to get the parent's attention.Offspring use their body parts (mouths, legs, heads) to make sounds or move to communicate their needs.Parents use their body parts to hear or see the offspring and respond. Parents use their body parts to get food or use movement or touch to help the offspring.Offspring use (behavior) with their parts to signal a need. Parents use their (parts) to notice and respond with (behavior) so offspring can live and grow." (Lesson 7, Teacher Guide)
- Lesson 8, Synthesize Section, step 2, "Identify plant parts and functions. Point out the plant images on slide E that correspond with the plant images on their Parts and Survival Explanation assessment. Use the following prompts to support students in developing their explanations. Choose one plant and a part of that plant. Circle the plant's part. What function does that part help the plant do? Circle the function of that part. Highlight that there is space for them to write in something if they want to include a function not on the list. Finish the sentence starters: This part is _____. It helps the plant survive because _____." Students answer similar questions for animals. (Lesson 8, Teacher Guide) Students may show understanding of this DCI if they choose to discuss the plant tendrils' function in climbing. If students choose one of the other plant parts and functions, they are unlikely to use this DCI in their explanation. Students are unlikely to use this DCI in any of their explanations of animal parts and functions.
- Lesson 8, Synthesize Section, Step 4 "What claims can we make to answer the question: How do plants use their parts and animals use their parts and behaviors to survive?...Birds use beaks to feed their baby. Parent covers their baby with their body to keep it warm. Baby opens mouth/beak to get food. Baby makes noise when hungry. Parent hears the baby and feeds it. Geese travel together for safety. Anole changes color to hide...Why might that part or behavior be important?..Helps baby survive. Helps baby get food. Keeps the baby safe/warm. Protects the baby from danger. Helps animals move together. Helps animals hide." (Lesson 8, Teacher Guide)
- Lesson 8, Synthesize section, Step 4, "Make claims about plants. As students share ideas, add them to the "What did we figure out?" column of the Our Growing Ideas chart.Prompts to use: What claims can we make to answer the question: How do plants use their parts and animals use their parts and behaviors to survive? Pumpkin tendrils climb. Why might that part or behavior be important? Helps plants survive. Helps plants get food. Helps plants grow. Makes new plants. Protects the plants....Make claims about animals. Shift discussion to animals and record ideas in the "What did we figure out?" column. What claims can we make to answer the question: How do plants use their parts and animals use their parts and behaviors to survive? Baby makes noise when hungry. Parent hears the baby and feeds it. Why might that part or behavior be important? Helps baby survive. Helps baby get food. Keeps the baby safe/

warm. Protects the baby from danger. Helps animals move together. Helps animals hide." The ideas to uncover do not include discussion of the specific part, the input, and the response in a series of connected events. For example, there is discussion of plant tendrils with a stated function of climbing, but no discussion of the input and response (touch, wrapping around the object). For animals, the input/response is discussed (parent hears baby, so they feed them), but not the body part that carries out the function. So neither includes the full idea of the DCI.

- Throughout the engineering portion of the unit (Lessons 9 and 10), students may use this DCI, but may not, depending on the problem they solve, the parts they mimic, and the design they create.

LS3.A: Inheritance of Traits

Claimed Element: **LS3.A-P1: LS3A Inheritance of Traits: Young animals are very much, but not exactly, like their parents. Plants also are very much, but not exactly, like their parents.**

Claimed in Lessons 1, 3, and 4. Evidence was found in all claimed lessons, examples include

- Lesson 1, Synthesize Section, Step 3 "Prompts to use...What observations did you make about how [*plant or animal*] looked? What parts did you observe?..How do you think [*parts*] might help the [*plant or animal*] live, grow, or stay safe?..What did you notice around that plant or animal, and how does that help explain what the part might be doing?...What did you notice when there was more than one of a plant (cacti) or animal (geese) in the images?..What do you notice the baby geese are doing near the parent? Why might they do that?..*For images with only one plant or animal:* Do you think other [*plant/animal*] would look similar? Why do you think so?" (Lesson 1, Teacher Guide)
- Lesson 3, Explore Section, Step 2 "What parent and offspring plant or animal is your group observing?...In the table below, add a check (✓) in the box under similar or different for each characteristic of the parent and offspring plant or animal that you observed." (Lesson 3, Student Handout)
- Lesson 3, Explore Section, Step 3 "Prompts to use...How do the parents and offspring compare to one another? What pattern are we observing?...Ideas to look and listen for...*They are similar but not exactly the same. The offspring have a lot of the same parts as the parents. The offspring and parents are sometimes the same color, but sometimes different.*" (Lesson 3, Teacher Guide)
- Lesson 4, Synthesize Section, Step 2 "When we looked at parents and babies (like the deer, pigs, geese, or anoles), what patterns did we notice?...*Babies look like their parents. They have the same parts, like ears, legs, leaves, or petals. They are not exactly the same. Sometimes the baby is smaller or has different colors.*" (Lesson 4, Teacher Guide)
- *Lesson 4, Synthesize Section, Step 2* "Share that we will practice using patterns to explain how parents and offspring look similar, but not exactly alike, using a familiar animal (the white-tailed deer) from Lesson 3. Invite students to review the images on the slide and decide which smaller deer (A or B) is more likely to be the offspring of the parent deer on the slide. Have students turn and talk about why they made their choice. Have a few groups share aloud and come to an agreement about which could be the offspring based on the patterns we have figured out about how parents and offspring look (likely Deer A). Circle Deer A on the slide." (Lesson 4, Teacher Guide)
- Lesson 4, Synthesize Section, Step 2 "Display **slide G** and explain to students that we are returning to the tree and turtle images from earlier to make observations and use patterns as evidence to figure out which could be the offspring. Show the Parent and Offspring Explanations student assessment and point out how students will: circle the possible offspring, add checks to show similarities and X's to show differences, and then write a sentence explaining their choice with evidence. Emphasize that in science, claims about parents and offspring must always be supported with evidence." (Lesson 4, Teacher Guide)

LS3.B: Variation of Traits

Claimed Element: **LS3B.P1: LS3.B: Variation of Traits: Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways.**

Claimed in Lessons: 1, 2, 3, and 4. Evidence was found in all claimed lessons, examples include

- Lesson 1, Synthesize Section, Step 3 "Prompts to use...What observations did you make about how [plant or animal] looked? What parts did you observe?..How do you think [parts] might help the [plant or animal] live, grow, or stay safe?..What did you notice around that plant or animal, and how does that help explain what the part might be doing?...What did you notice when there was more than one of a plant (cacti) or animal (geese) in the images?..What do you notice the baby geese are doing near the parent? Why might they do that?..For images with only one plant or animal: Do you think other [plant/animal] would look similar? Why do you think so?" (Lesson 1, Teacher Guide)
- Lesson 2, Explore Section, Step 2 "Begin by displaying slide D and share that we will practice making observations using an example of 2 animals called white-tailed deer. Pause for a moment to give students an opportunity to observe details from the images. Use the following discussion prompts to invite students to notice what parts the animal in each image has and how the deer compare to one another. As students share, consider inviting students to the board to circle similar parts...What parts do you notice both deer have?..What else is similar that you notice?.. What differences do you notice between the 2 deer in these images?..Summarize students' observations. Revoice students' ideas and point out that students are observing both what parts the deer has and details about the deer, like the size, shape, and color of its body or parts." (Lesson 2, Teacher Guide)
- Lesson 2, Explore Section, Step 2 "What plant or animal did your group observe? We observed:...In the table below, write or draw what is similar and different between the plants or animals your group observed." (Lesson 2, Student Handout)
- Lesson 2, Connect, Step 3 "Confirm with students how similar means having a lot in common without being exactly the same. Emphasize that just because 2 plants or animals are similar, it does not mean that they are related, like a parent and child. They could just be 2 different plants or animals of the same kind. To help students connect this idea, invite them to think about how they are similar to their classmates (for example, having 2 eyes, hair, or hands) and how they might also have differences (such as hair color, height, or clothing)...Invite students to raise their hands to confirm that the plants and animals of each kind look similar. Raise your hand: Were the anoles we observed and read about all similar? Was each anole mostly the same as the other anoles? Repeat with the maple tree, geese, cacti, pig, and pumpkin." (Lesson 2, Teacher Guide)
- Lesson 3, Explore Section, Step 2 "As students make observations, some students may be eager to start organizing the images into groups of the same kind of plants or animals. Use these moments to encourage students to explore this idea more deeply by asking them how they know the images feature the same plant or animal. Ask them what parts they observe that give them clues that the plants or animals are the same kind while encouraging students to express their sensemaking in (e.g., talk, drawing, images, embodiment)." (Lesson 3, Teacher Guide)
- Lesson 3, Explore Section, Step 2 "Prompts to use...How did partners decide to match a bigger and smaller plant or animal together? What observations or evidence did partners use in deciding how to match?...Ideas to look and listen for...Looked for the same parts. If they both were a similar color. If the parts were a similar shape." (Lesson 3, Teacher Guide)
- Lesson 4, Synthesize Section, Step 2, "Begin by having students turn and talk with a partner about what patterns they figured out about the way plants and animals look. As you listen in, look for students to: name parts they see repeatedly (e.g., leaves, stems, legs, ears), point out that individuals are similar but not exactly the same, describe variations in size, shape, or color, and reference earlier examples from the class (e.g., cacti, pumpkin plants, geese, anoles)." (Lesson 4, Teacher Guide)

ETS1.A: Defining Engineering Problems

Claimed Element: **ETS1.A-P1: .Definining and Delimiting an Engineering Problem: A situation that people want to change or create can be approached as a problem to be solved through engineering. Such problems may have many acceptable solutions.**

Claimed in Lessons: 8, 9, 10. Evidence was found in all claimed lessons, examples include

- Lesson 8, Connect Section, Step 7 "Allow time for students to generate ideas in their groups. Circulate to support groups and write ideas for students if needed. Use the following prompts to support students who may need help coming up with challenge ideas: What kinds of challenges do people have that are like this? How can this part give people an idea for something helpful? If engineers copied this part, what challenge can it solve? How can this idea make life easier or safer for people?" (Lesson 8, Teacher Guide)
- Lesson 8, Connect Section, Step 8 "Point out that each page shows 1 plant and 2 animals with examples of how their parts help them. Explain that in their groups, students will look at the parts and discuss how they help plants and animals. Then they will brainstorm challenges humans may have that can be solved by using ideas from those parts." (Lesson 8, Teacher Guide)
- Lesson 9, Connect Section, Step 2 "Display **slide D** with the Design Ideas handout. Before beginning new research, explain that each student will now choose one of the problems they sorted earlier to focus on. They will research plants and animals that could inspire their own design solutions. They may choose the problem they wrote on a sticky note in Lesson 8, or they may choose another problem that interests them more." (Lesson 9, Teacher Guide)
- Lesson 10, Synthesize Section, Step 2 "What challenge does your solution solve? How does mimicking that plant/animal part help solve the challenge?" (Lesson 10, Teacher Guide)
- Lesson 10, Connect Section, Step 3 "Remind students that when they are the visitor in the gallery tour, they can use questions such as *Who, What, When, Where*, and *Why* (shown in the image from Lesson 1) to learn more about each other's designs. For example, a visitor might ask, *Who would use your design? What inspired that part?* or *Why does that help solve the problem?*" (*Lesson 10, Teacher Guide*)

ETS1.A: Defining Engineering Problems

Claimed Element: **ETS1.A-P2: Asking questions, making observations, and gathering information are helpful in thinking about problems. Before beginning to design a solution, it is important to clearly understand the problem.** (**K-2-ETS1-1**)

Claimed in Lessons: 8, 9. Evidence was found in both claimed lessons, examples include

- Lesson 8, Navigate Section, Step 6 "Display **slide I** and remind students that we can act like engineers and design solutions by using plant and animal parts, but we may have some questions to figure out how to do that. Use the following prompts to guide discussion and listen for the types of student questions that will motivate the next investigations." (Lesson 8, Teacher Guide)
- Lesson 9, Connect Section, Step 2 "Gather students in a Scientists Circle and remind them how Galit (gah-leet) made many observations of octopuses in order to design prosthetic arms and legs. Acknowledge that we have not observed plants and animals directly, but we have used many informational resources. Refer to Our Growing Ideas chart to remind students that we found out about plant parts in Roots to Fruits: Plant Parts book and time-lapse videos from Lesson 5. We also gathered more information about animal parts in the Animal Parts in Action book and the videos from Lesson 6." (Lesson 9, Teacher Guide)

ETS1.B: Developing Possible Solutions

Claimed Element: **ETS1.B-P1: .Developing Possible Solutions: Designs can be conveyed through sketches, drawing, or physical models. These representations are useful in communicating ideas for a problem's solution to other people (K-2-ETS1-2)**

Claimed in Lessons: 9, 10. Evidence was found in both claimed lessons, examples include

- Lesson 9, Explore section, Step 3, "Design solutions. Display slide I and give students time to independently draw their idea for a solution that mimics the plants and/or animals they gathered information about, and to write or draw the materials that they will need. Remind students that their designs can be inspired by the plant and animal parts they researched on the website, the examples in our books, or the Parts and Functions chart. Explain that they can combine their ideas from the first page to make one solution for their problem on the second page. While students are working, circulate and check in with students using the following prompts: What plant or animal part inspired you to design this idea? How will we know that you were mimicking a plant or animal part? How will what you are designing help you solve your problem? How are the materials similar to the plant or animal part? How will the materials that you chose help you design your solution?" (Lesson 9, Teacher Guide)
- Lesson 10, Synthesize Section, Step 2, "Design solutions. Distribute to each student their completed Design Ideas handout from Lesson 9 and encourage students to refer to their drawings as they build. As students build, circulate, and use the following prompts based on the Gotta-Have-It Checklist to provide guidance. Remind students that engineers often test and make improvements, so it's OK to adjust their designs as they notice what works well and what could be improved....Tell and show me more about your design. What parts does it have? What plant or animal inspired this design? How is the part you built shaped or made like the plant or animal part it mimics? How does that shape help it work? What challenge does your solution solve? How does mimicking that plant/animal part help solve the challenge?" (Lesson 10, Teacher Guide)
- Lesson 10, Connect section, Step 3, "Explain the gallery tour and its purpose. Explain to students that today they will share their final designs with their classmates in a gallery tour, just like scientists and engineers share their work so others can learn from their ideas. Invite students to help arrange their models around the room on desks or tables. Leave space in front of each design so visitors can stop, look closely, and talk with the designer. Tell students they will each have a chance to both present and visit. Discuss how to communicate information. Gather students in a Scientists Circle and display slide E along with the class Gotta-Have-It Checklist. Explain that scientists and engineers share their ideas clearly so others can understand how their designs work. Use the sentence starters on the slide to model how the presenters can describe the problem they chose, what plant or animal part inspired their idea, how that part helps in nature, and how their design solves the problem. Encourage students to use both their design solutions, words, and gestures as they share, so classmates can see how their design connects to the natural structure or function that inspired it. Remind students that when they are the visitor in the gallery tour, they can use questions such as Who, What, When, Where, and Why (shown in the image from Lesson 1) to learn more about each other's designs. For example, a visitor might ask, Who would use your design? " What inspired that part? or Why does that help solve the problem?" (Lesson 10, Teacher Guide)

Criterion-Based Suggestions for Improvement

- Ensure "[t]here is a close match between the SEP, CCC, and DCI elements that are claimed and evidence of their development and use in the materials." [Detailed Guidance, p.10]
  - Ensure students are provided opportunities to explicitly develop ideas related to LS1.D, such as how specific animal and plant parts receive information and produce responses that support survival and growth.

Rating for Criterion: CCC **EXTENSIVE**

iii. Provides opportunities to *develop and use* specific elements of the CCC(s).

The reviewers found **extensive** evidence that the materials provide opportunities to develop and use specific elements of the CCCs.

- Claimed Element: **PAT: P1: Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.**
- Claimed Element: **SF: P1 The shape and stability of structures of natural and designed objects are related to their function(s).**

PAT: Patterns

Claimed Element: **PAT: P1: Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.**

Claimed in Lessons 1, 2, 3, 4, 6, 7, and 8. Evidence was found in all claimed lessons, examples include

- Lesson 1, Explore Section, Step 2, Structure and Function sidebar: "During this discussion, students begin to notice and informally share that plant and animal structures (their parts and how they look) are related to their functions (what the parts allow them to do, such as swim, climb, or fly). Support students in making observations about what different plant and animal parts do and how they might help the plants and animals live and grow. Students' use of Structure and Function will build through the unit as they return to these observations as evidence in later lessons. This unit focuses on how the shape of structures is related to their functions and does not address stability." (Lesson 1, Teacher Guide)
- Lesson 2, Explore Section, Step 2: "What could we look for in the different images of plants and animals today? What details might we notice about the plants, animals, or their parts to decide if something looks similar or different?... Practice making observations. Begin by displaying slide D and share that we will practice making observations using an example of 2 animals called white-tailed deer...What parts do you notice both deer have? What else is similar that you notice? What differences do you notice between the 2 deer in these images? (Lesson 2, Teacher Guide)
- Lesson 3, Explore, Step 3, "Demonstrate adding data to the table with an example. If students already completed the Unit 1.3: What patterns of the Sun, Moon, and stars can we observe, describe, and predict? unit, ask them to recall how data was collected to determine the number of hours in a day or days in a month. Share that one way we can add to the table is by using a tally mark on the data table to show if a characteristic was similar or different between the smaller and bigger versions of the plants and animals each of us observed. Then we can count tallies to notice if this is a pattern most plants and animals follow. Using the geese example from the previous Explore, demonstrate, using the class's copy of the Parent and Offspring Comparisons handout, adding a tally under similar or different for each characteristic on the class data table to match what is recorded on the handout." (Lesson 3, Teacher Guide)
- Lesson 4, Synthesize Section, Step 2, "Facilitate a discussion about patterns. Display slide D and suggest recalling the patterns we have figured out during the unit to help us do this. Begin by having students turn and talk with a partner about what patterns they figured out about the way plants and animals look. As you listen in, look for students to: name parts they see repeatedly (e.g., leaves, stems, legs, ears), point out that individuals are similar but not exactly the same, describe variations in size, shape, or color, and reference earlier examples from the class (e.g., cacti, pumpkin plants, geese, anoles)...Use the following prompts to facilitate a whole class discussion about what they

figured out in previous lessons about how individuals of the same kind of animal and plant look…When we compared 2 plants or 2 animals of the same kind (like the 2 cacti or the geese photos), what patterns did we notice?…When we looked at parents and babies (like the deer, pigs, geese, or anoles), what patterns did we notice?…What evidence did we have about these patterns?" (Lesson 4, Teacher Guide)

- Lesson 6, Connect Section, Step 4, "Read aloud about each animal. Pause after each section to ask what parts the animal has and how those parts help it survive. As needed, point to illustrations and gesture parts or act out their function to make meaning clear beyond words. Encourage students to notice both the images and the text as they gather ideas, since informational texts use both to communicate meaning. Add these ideas to the Parts and Functions chart that began in the Explore. Ask students to share other terms for these parts or stories of their previous experience with them. As students gather more information about animals with similar parts and functions, consider adding the animal names next to the parts. Remind students that this chart is evidence they will return to in later lessons when they explain how parts help animals survive." (Lesson 6, Teacher Guide)
- Lesson 7, Connect Section, Step 3 "Bring students together and ask if they saw similar behaviors to the video of the birds we started with. Allow a few students to respond. Point out that there might be some patterns in the ways that animals act. Remind students that a pattern is something that happens over and over again. Ask students how we might find out if there are similarities or differences in what they saw in the videos. Look for students to suggest that we share observations to look for patterns." (Lesson 7, Teacher Guide)
- Lesson 8, Synthesize, Step 2, "Recall patterns of behaviors. Before focusing only on the eagle, remind students of what they observed with the geese in Lesson 1 and the baby animals in Lesson 7. Ask students to think about what is the same across these examples. What patterns do we notice in how babies show they need something and how parents respond? What body parts help babies send signals or help parents notice or respond? Listen for ideas such as eyes, ears, mouths, or beaks. Allow a few students to share ideas before moving into watching the eagle video. Recall patterns of plant parts and behaviors. Before asking students to explain just one plant, remind them of what they observed about plants in earlier lessons. Ask students to think about what was the same across those examples. What patterns do we notice in the ways plant parts help them survive and grow? How did roots, stems, leaves, flowers, or tendrils act or respond to their environment (like bending, climbing, or growing toward sunlight or water)? What functions do these parts help the plant do? Listen for ideas such as taking in water, moving water, collecting sunlight, making seeds, climbing, or protecting. Allow a few students to share their ideas before moving into individual work on the assessment." (Lesson 8, Teacher Guide)

SF: Structure and Function

Claimed Element: **SF: P1 The shape and stability of structures of natural and designed objects are related to their function(s).**

Claimed in Lessons 1, 5, 6, 7, 8, 9, and 10. Evidence was found in all claimed lessons, examples include

- Unit Overview, "This unit intentionally focuses on the shape of structures in relation to their functions and does not address the stability aspect of this crosscutting concept. Students engage with stability in other units across the grade level. See the unit front matter for additional details."
- Lesson 1, Synthesize, Step 3 "Facilitate an Initial Ideas Discussion. Use the prompts below to facilitate a whole group Initial Ideas Discussion about their experiences observing animal and plant features. How do you think [*parts*] might help the [*plant or animal*] live, grow, or stay safe? What did you notice around that plant or animal, and how does that help explain what the part might be doing?" (Lesson 1, Teacher Guide)

- Lesson 5, Connect Section, Step 2 "Introduce "function." Suggest to students that we have begun to consider how plants use their different parts. Explain that scientists use the word function to describe how something works or how it is used. We have been discussing ideas about the function of plant parts. Invite students to share other words for function in their home languages and describe the context or examples in which they have seen or used them." (Lesson 5, Teacher Guide)
- Lesson 5, Connect Section, Step 2 "Have students briefly turn and talk about the parts of the plants they observed in the videos and record these in the "Parts" side of the chart. Capture in words or drawings any ideas students share about the structure of these parts (e.g., tube-shaped, strong, where the part is on the plant)...Introduce the idea of function. Return to the lesson question: How do different parts of plants help them live and grow? Point out that noticing the parts and their structures is one step, but to answer the lesson question, we also need to figure out what those parts do. Use the "Functions" side of the chart to keep track of student ideas about what parts might do, even if they are unsure." (Lesson 5, Connect Section, Step 2)
- Lesson 5, Connect Section, Step 4 "Display slide K and guide students through a think–pair–share as they obtain and communicate information from the book and videos about how each plant part helps the plant live and grow. First, have students think quietly about one new idea they found in the book or noticed in a video or investigation. Then, have them share with a partner to compare what they noticed. Finally, invite pairs to contribute their ideas to the class Parts and Functions chart, connecting information from the book, videos, and the investigation. Students can act, draw, or write to show their observations about each plant part. This supported routine helps students develop the practice of obtaining and communicating information before applying it independently in later lessons...Prompts to use...What new information did we find out about roots?...What new information did we find out about stems?... What new information did we find out about leaves?...What new information did we find out about flowers?...What new information did we find out about fruit?" (Lesson 5, Teacher Guide)
- Lesson 6, Connect, Step 4, "Read aloud about each animal. Pause after each section to ask what parts the animal has and how those parts help it survive. As needed, point to illustrations and gesture parts or act out their function to make meaning clear beyond words. Encourage students to notice both the images and the text as they gather ideas, since informational texts use both to communicate meaning. Add these ideas to the Parts and Functions chart that began in the Explore. Ask students to share other terms for these parts or stories of their previous experience with them. As students gather more information about animals with similar parts and functions, consider adding the animal names next to the parts. Remind students that this chart is evidence they will return to in later lessons when they explain how parts help animals survive." (Lesson 6, Teacher Guide)
- Lesson 7, Connect Section, Step 3 "Which parts did the babies use when they were chirping or reaching?..What parts did the offspring use to signal that need?" (Lesson 7, Teacher Guide)
- Lesson 8, Synthesize Section, Step 2 "Point out the plant images on slide E that correspond with the plant images on their Parts and Survival Explanation assessment. Use the following prompts to support students in developing their explanations. Choose one plant and a part of that plant. Circle the plant's part. What function does that part help the plant do? Circle the function of that part." (Lesson 8, Teacher Guide)
- Lesson 9, Explore Section, Step 3, "Design solutions. Display slide I and give students time to independently draw their idea for a solution that mimics the plants and/or animals they gathered information about, and to write or draw the materials that they will need. ...While students are working, circulate and check in with students using the following prompts: What plant or animal part inspired you to design this idea? How will we know that you were mimicking a plant or animal part? How will what you are designing help you solve your problem? How are the materials similar to the plant or animal part? How will the materials that you chose help you design your solution?" (Lesson 9, Teacher Guide)

- Lesson 10, Synthesize Section, Step 2, "Design solutions…As students build, circulate, and use the following prompts based on the Gotta-Have-It Checklist to provide guidance…Prompts to use: Tell and show me more about your design. What parts does it have? What plant or animal inspired this design? How is the part you built shaped or made like the plant or animal part it mimics? How does that shape help it work? What challenge does your solution solve? How does mimicking that plant/animal part help solve the challenge?" (Lesson 10, Teacher Guide)

Criterion-Based Suggestions for Improvement: N/A

I.C. Integrating the Three Dimensions

EXTENSIVE

Student sense-making of phenomena and/or designing of solutions requires student performances that integrate elements of the SEPs, CCCs, and DCIs.

The reviewers found **extensive** evidence that student sense-making of phenomena and designing solutions requires student performances that integrate elements of the SEPs, CCCs, and DCIs. In the unit, students are expected to use observations to determine which plant and animal are most likely the offspring of another individual, use a website to determine how the behaviors of animals contribute to the survival of their offspring, and design solutions that are similar to plant or animals structures to solve human problems. When engage in these tasks, the three dimensions are not used in isolation, instead, they require students to integrate them as they make sense of the phenomenon or design solutions.

There are numerous instances where students are expected to figure something out or solve part of a problem in a way that requires a grade-appropriate element of each of the three dimensions working together. Examples include:

- In Lesson 3, Explore section, Step 3, Students integrate the dimensions when they analyze observations from images of plants and animals to identify the pattern that parents and offspring look similar in some ways and different in others. **PAT: P1: Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence., LS3.A-P1: Young animals are very much, but not exactly, like, their parents. Plants also are very much, but not exactly, like their parents.** and **INV-P4 Make observations (firsthand or from media) to collect data that can be used to make comparisons.**
- In Lesson 7, Explore, Step 4, students integrate the use of the elements when they identify patterns from evidence collected from websites and video about behaviors that animals do to care for their offspring in the three dimensions **CCC PAT-P1 Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence., LS1.B-P1: LS1.B: Growth and Development of Organisms: Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive. (1-LS1-2)** and **INFO-P1 Read grade-appropriate texts and/or use media to obtain scientific and/or technical information to determine patterns in and/or evidence about the natural and designed world(s).**
- In Lesson 8, Connect section, Step 7 , Students integrate the dimensions when they construct an explanation about how offspring and parent behaviors help the baby survive. **PAT: P1: Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence., LS1.B-P1: Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive.** and **CEDS: P1 Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.**

- In Lesson 10, Explore section, Step 2, Students integrate the dimensions when they build and share a design that incorporates the form and function of plant or animal parts to solve a human problem. **CCC 6.P1 The shape and stability of structures of natural and designed objects are related to their function(s), LSA.1-P1 All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. (1-LS1-1), ETS.1B-P1 Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people.** and **CEDS-P2 Use tools and/or materials to design and/or build a device that solves a specific problem or a solution to a specific problem.**

Criterion-Based Suggestions for Improvement: N/A

I.D. Unit Coherence

EXTENSIVE

Lessons fit together to target a set of performance expectations.

i. Each lesson builds on prior lessons by addressing questions raised in those lessons, cultivating new questions that build on what students figured out, or cultivating new questions from related phenomena, problems, and prior student experiences.

ii. The lessons help students develop toward proficiency in a targeted set of performance expectations.

The reviewers found **extensive** evidence that the lessons fit together coherently to target a set of performance expectations because all the lesson themes and content are sequenced coherently and explicitly from the student's perspective. The lessons work together to provide sufficient opportunities for students to build proficiency in all of the targeted learning (e.g., targeted NGSS PEs) for all three dimensions. In many lessons, part of what they figure out is used as the next question(s) to pursue. The evidence provides examples of how the structure of the lessons develops and leverages student questions to move learning forward in a logical progression through the unit.

The lessons help students develop toward proficiency in a targeted set of performance expectations

- 1-LS1-1: Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.
- 1-LS1-2: Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.
- 1-LS3-1: Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.
- K-2-ETS1-1: Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
- K-2-ETS1-2: Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

i. Each lesson builds on prior lessons by addressing questions raised in those lessons, cultivating new questions that build on what students figured out, or cultivating new questions from related phenomena, problems, and prior student experiences.

- Lesson 2, Navigate Section, Step 1 "Refer back to the chart and re-read some of the questions posed by students, specifically about the different parts students noticed the plants and animals had. Recall that we noticed all the cacti had spikey parts, but some were different sizes or shapes. We wondered more about that and how the parts of the same kind of plants or animals might be similar or different. Co-construct the lesson question. Use students' wondering about the parts of different kinds of plants and animals to construct a lesson question similar to What parts do plants and animals of the same kind have, and how do they look similar and different? " (Lesson 2, Teacher Guide)
- Lesson 3, Navigate Section, Step 1 "What questions did we have about the ways other plants and animals look that we might be able to answer now?...Do you think we could use patterns to answer these questions about how plants and animals look?...Confirm the next steps. Suggest we see how we can use the patterns we identified as evidence to explain how plants and animals look in our next lesson." (Lesson 3, Teacher Guide)
- Lesson 4, Navigate Section, Step 6 "If groups need more inspiration, return to the anchoring images from Lesson 1 and highlight a few close-up parts (e.g., cactus spines, pumpkin flower, anole legs, goose feet). Ask students what they notice and wonder about those parts. Then, display the Notice and Wonder chart (slide L) and have students turn and share with a partner 1 or 2 new questions they have about parts from their homes, communities, or the images. After a few minutes, invite students to share and add new wonders to the chart....What do you notice about this part?..Can you turn your notice into a wonder about how parts can help plants and animals?...Highlight that many of the questions students shared were about plant and animal parts. Ask how they might figure out what those parts do and how they help the plant or animal live and grow. Listen for ideas like watching closely how plants or animals use their parts, comparing the same parts across different kinds, or reading to find out more. Let students know they will explore these questions further in the next few lessons." (Lesson 4, Teacher Guide)
- Lesson 5, Navigate Section, Step 1, "Turn and talk about our experiences last time. Display slide A and the Notice and Wonder chart along with the images from the anchor in Lesson 1. In addition, ask students to recall their experiences answering and adding new questions in Lesson 4. You may want to point to these questions on the Notice and Wonder chart, possibly circled or otherwise marked, or read questions from pre-selected stickies. Use the following prompts to recall the questions students had about plants, their parts, and what those parts do." (Lesson 5, Teacher Guide)
- Lesson 6, Navigate section, Step 6, " Problematize ideas about differences in how animals look. Acknowledge how students have figured out how animals use parts to live and grow. Remind students that they also noticed animals' parts can look different, especially when comparing parents and their offspring. Display slide M with the image of geese from Lesson 1. Have students turn and talk about the following questions. How are the geese and their parts in this image different? Do you think animals can survive if their parts are different? Why or why not? How do you think a smaller animal or offspring can survive if it cannot use its parts the same way as a parent to do things like swim, find food, and protect itself?...Conclude the lesson by explaining that next time we can explore how both parents and offspring use their parts and act to help offspring live and grow." This motivates the transition to learning about how parents and offspring use behaviors to help the offspring survive." (Lesson 6, Teacher Guide)
- Lesson 7, Navigate Section, Step 6 " Remind students of our Unit Question, "How do plants and animals look and act to help them live and grow?", and ask them to consider if we are ready to answer that. Suggest that next class period we look at plants and animals and see if we can explain how they look and act to help them live and grow." (Lesson 7, Teacher Guide)

- Lesson 8, Navigate section, Step 1, "Remind students of our Unit Question, How do the ways plants and animals look and act help them live and grow? Use the following prompts to motivate putting the pieces together of what we figured out about how plants and animals use their parts to survive....Prompts to use: What have we already figured out about how animals look and the functions of their parts? Feel free to use your hands and bodies to express your ideas! What do all of these parts and behaviors help plants and animals do?...Point out that we had figured out a lot about how plants and animals look in Lessons 1-4, especially their parts, and now it sounds like we have evidence about how they act (do different things/use their parts/behave) to help them survive. Remind students that survive means to continue to live. Co-construct the lesson question. Build on students' idea, that living and growing is really about surviving, to co-create your class's version of the lesson question: How do plants use their parts and animals use their parts and behaviors to survive? Then, display the class's version of the lesson question on slide B and add it to the Our Growing Ideas chart." (Lesson 8, Teacher Guide)
- Lesson 9, Navigate Section, Step 6 "Confirm the next steps. Using students' ideas and questions about finalizing their solutions, confirm that next time we will be able to use our drawings and materials list to build our design solutions!" (Lesson 9, Teacher Guide)

ii. The lessons help students develop toward proficiency in a targeted set of performance expectations.

The lessons help students develop toward proficiency in a targeted set of performance expectations.

1-LS1-1: Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.

- Lesson 9, Explore section, Step 3, "Design solutions. Display slide I and give students time to independently draw their idea for a solution that mimics the plants and/or animals they gathered information about, and to write or draw the materials that they will need. Remind students that their designs can be inspired by the plant and animal parts they researched on the website, the examples in our books, or the Parts and Functions chart. Explain that they can combine their ideas from the first page to make one solution for their problem on the second page. While students are working, circulate and check in with students using the following prompts: What plant or animal part inspired you to design this idea? How will we know that you were mimicking a plant or animal part? How will what you are designing help you solve your problem? How are the materials similar to the plant or animal part? How will the materials that you chose help you design your solution?" (Lesson 9, Teacher Guide)
- Lesson 10, Synthesize Section, Step 2, "Design solutions. Distribute to each student their completed Design Ideas handout from Lesson 9 and encourage students to refer to their drawings as they build. As students build, circulate, and use the following prompts based on the Gotta-Have-It Checklist to provide guidance. Remind students that engineers often test and make improvements, so it's OK to adjust their designs as they notice what works well and what could be improved....Tell and show me more about your design. What parts does it have? What plant or animal inspired this design? How is the part you built shaped or made like the plant or animal part it mimics? How does that shape help it work? What challenge does your solution solve? How does mimicking that plant/animal part help solve the challenge?" (Lesson 9, Teacher Guide)

1-LS1-2: Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.

- Lesson 7, Explore Section, Step 4 "What were some of the ways you saw the offspring in your video act?..The puppy was making noises. They were walking like this (imitates the baby trying to learn to walk)...Why do you think the offspring was doing that?..They were hungry. They needed help. They were learning how to walk...Move to the next column of the chart and ask students to share their observations of what they saw the parents do. Remind students that parents first use their parts (such as eyes, ears, or nose) to notice what the offspring is doing, and then they respond with an action...Why do you think the parents are acting this way?...To help the offspring. To feed them. To protect them" (Lesson 7, Teacher Guide)

- Lesson 8, Synthesize Section, Step 2 " Display slide D and play the Eagle Caring For Their Young video. Have the students make observations about the adult eagle and its baby. Use the following prompts to support students in developing their explanations. Choose one parent part that helps its baby survive. Circle the animal's part. How does it help the baby? Circle the function of that part. Highlight that there is space for them to write in something if they want to include a function not on the list." (Lesson 8, Teacher Guide)

1-LS3-1: Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.

- Lesson 3, Connect section, step 4 "Introduce a new way to obtain information. Display slide T and explain that they will continue to obtain new information by observing animals in a new way--by watching a video...Watch a video. Play the Meet the Animal Families! video with the audio muted from 00:00-00:50 and have students notice the various animals...Make a list of animals from the video. After playing once through, ask students what animals they observed. Make a list of the different animals in a visible space (cows, kangaroos, elephants, wild boar, monkeys). Consider playing the video through again and naming the animals if there were ones the class was not collectively familiar with...Give directions for making additional observations. Share that we will watch the video again as we keep investigating how parents and offspring are similar and different. Explain that to help us observe closely, we can divide up the animals so we have scientists in the room focusing on each animal. Then, name animals one by one and have students volunteer for which animal they will watch closely for what is similar and different between the parent and the offspring. Make sure there are at least 2 students for every animal listed." (Lesson 3, Teacher Guide)
- Lesson 4, Synthesize, Step 2, "Introduce the Parent and Offspring Explanations student assessment. Display slide G and explain to students that we are returning to the tree and turtle images from earlier to make observations and use patterns as evidence to figure out which could be the offspring. Show the Parent and Offspring Explanations student assessment and point out how students will: circle the possible offspring, add checks to show similarities and X's to show differences, and then write a sentence explaining their choice with evidence. Emphasize that in science, claims about parents and offspring must always be supported with evidence." (Lesson 4, Teacher Guide)

K-2-ETS1-1: Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

- Lesson 8, Navigate section, Step 6, " Display the Notice and Wonder chart. Display slide I and remind students that we can act like engineers and design solutions by using plant and animal parts, but we may have some questions to figure out how to do that. Use the following prompts to guide discussion and listen for the types of student questions that will motivate the next investigations. Prompts to use: What information would we need to design a solution? What does that make you wonder? What parts can we mimic? What challenges can we solve? How can we plan a design? How can we build a design? After we know the challenge we are trying to solve, what information may we need to find out about? What does that make you wonder? Where can we find more information?"
- Lesson 9. Connect section, step 2, "Choose a problem to solve. Display slide D with the Design Ideas handout. Before beginning new research, explain that each student will now choose one of the problems they sorted earlier to focus on. They will research plants and animals that could inspire their own design solutions. They may choose the problem they wrote on a sticky note in Lesson 8, or they may choose another problem that interests them more. Distribute the handout and have students draw or write about the problem they will be solving in the first box on the Design Ideas handout and have them circle the category for their problem (Movement, Protection, Getting Food, Gets Water & Sunlight)." In the Student "Design Ideas" handout, students respond to the prompt, "Use the box below to draw or write about the challenge you will be solving."

K-2-ETS1-2: Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

- Lesson 9, Explore, Step 3, "Design solutions. Display slide I and give students time to independently draw their idea for a solution that mimics the plants and/or animals they gathered information about, and to write or draw the materials that they will need. Remind students that their designs can be inspired by the plant and animal parts they researched on the website, the examples in our books, or the Parts and Functions chart. Explain that they can combine their ideas from the first page to make one solution for their problem on the second page. While students are working, circulate and check in with students using the following prompts: What plant or animal part inspired you to design this idea? How will we know that you were mimicking a plant or animal part? How will what you are designing help you solve your problem? How are the materials similar to the plant or animal part? How will the materials that you chose help you design your solution? Improve the designs. Once both partners have given and received feedback, suggest to students that they use that feedback to make decisions about how to improve their final design solution. Continue to connect to the Classroom Agreement, "We let our ideas change and grow," by explaining that students can make changes to their design. Allow students to update their drawings on the Design Ideas handout." (Lesson 9, Teacher Guide)
- Lesson 10, Synthesis, Step 2, "Design solutions. Distribute to each student their completed Design Ideas handout from Lesson 9 and encourage students to refer to their drawings as they build. As students build, circulate, and use the following prompts based on the Gotta-Have-It Checklist to provide guidance. Remind students that engineers often test and make improvements, so it's OK to adjust their designs as they notice what works well and what could be improved. Refer to the Examples of Student Design Solutions reference for sample student designs and explanations to support your feedback and provide additional ideas as students work." (Lesson 9, Teacher Guide)

Criterion-Based Suggestions for Improvement: N/A

I.E. Multiple Science Domains

EXTENSIVE

When appropriate, links are made across the science domains of life science, physical science, and Earth and space science.

i. Disciplinary core ideas from different disciplines are used together to explain phenomena.

ii. The usefulness of crosscutting concepts to make sense of phenomena or design solutions to problems across science domains is highlighted.

The reviewers found extensive evidence that links are made across the science domains when appropriate because the unit only requires life science concepts to make sense of the phenomenon: plants and animals have unique parts.

i. Disciplinary core ideas from different disciplines are used together to explain phenomena.

- In Lesson 1-10, only ideas from the life science domain are necessary to explain the phenomenon and design solutions. The focus is on LSA.1: Structure and Function, LS1.B: Growth and Development of Organisms, LS1.D: Information Processing, LS3.A: Inheritance of Traits, and LS3.B: Variation of Traits. The phenomenon and solutions driving the learning can be fully addressed within the life domain; there are no significant missed opportunities. (See 1.B. DCI for evidence)

ii.The usefulness of crosscutting concepts to make sense of phenomena or design solutions to problems across science domains is highlighted.

Students are supported in using grade-appropriate elements of CCCs to make connections across science domains. Examples include:

- Lesson 2, Connect Section, Step 3 "Notice aloud how over and over again, we raised our hands to confirm that the plants and animals of each kind that we observed and read about were similar. If students have already completed Unit 1.2: How can we communicate using objects that make sound? and Unit 1.3: What patterns of the Sun, Moon, and stars can we observe, describe, and predict?, they may already be familiar with patterns. Have them recall that when *something happens over and over again*, scientists call it a **pattern**. We figured out a **pattern** that plants and animals of the same kind are similar; they are mostly the same as each other, but can be a little bit different." (Lesson 2, Teacher Guide)
- Lesson 5, connect section, step 2, "Introduce 'function.' Suggest to students that we have begun to consider how plants use their different parts. Explain that scientists use the word function to describe how something works or how it is used. We have been discussing ideas about the function of plant parts. Invite students to share other words for function in their home languages and describe the context or examples in which they have seen or used them." (Lesson 5, Teacher Guide)

Criterion-Based Suggestions for Improvement: N/A

I.F. Math and ELA

EXTENSIVE

Provides grade-appropriate connection(s) to the Common Core State Standards in Mathematics and/or English Language Arts & Literacy in History/Social Studies, Science and Technical Subjects.

The reviewers found **extensive** evidence that the materials provide grade-appropriate connections to the Common Core State Standards in Mathematics and/or English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects because the materials explicitly state the mathematics and ELA standards used in the unit and support students to see the connections between content areas.

ELA

Informational Text CCSS-ELA-LITERACY.RI.1.5 Know and use various text features (e.g., headings, tables of contents, glossaries, electronic menus, icons) to locate key facts or information in a text. Claimed in Lessons 6 and 7.

- Lesson 6, Connect Section, Step 4 "Introduce the Animal Parts in Action book. Display slide J and explain that students will be reading about some additional animals, their unique parts, and how those parts help them survive. Turn to the table of contents and read the names of each section aloud with their page numbers. Explain that this page lists the animals in the book and where information about them can be found. Let students know that we will read about several animals today, but we may not get to all of them in one sitting. Use the following prompts to support students in noticing how the book is structured and how they can use it to find information about animals and their parts...Table of contents: How can the table of contents help us find information about animals and their parts?..Page 2: What do you notice about the layout of this page?" (Lesson 6, Teacher Guide)

- Lesson 7, Connect Section, Step 3 "Demonstrate accessing and navigating the website. Demonstrate to students how they will be accessing the How Plants and Animals Meet Their Needs Website using available classroom technology. Point out the various headings and menus they can choose from, reading these aloud before students use the website with their partners." (Lesson 7, Teacher Guide)

Informational Text CCSS-ELA-LITERACY.RI.1.6 Distinguish between information provided by pictures or other illustrations and information provided by the words in a text. Claimed in Lessons 2 and 6.

- Lesson 2, Connect Section, Step 3 "How are the anoles we observed (*refer to the animal card held up by the anole group*) similar to the one in this book? What is similar?How do some of the anoles look different from each other? Have you ever seen an animal similar to this one but used a different name? How was it similar or different?..How are the maple trees we observed (*refer to the plant card held up by the maple tree group*) similar to the one in this book? What is similar? How do some of the maple trees look different from each other?..How are the Canada geese we observed (*refer to the animal card held up by the Canada geese group*) similar to the one in this book? What is similar? How do some of the Canada geese look different from each other?..How are the cacti we observed (*refer to the plant card held up by the cacti group*) similar to the one in this book? What is similar? How do some of the cacti look different from each other?" (Lesson 2, Teacher Guide)
- Lesson 6, Connect Section, Step 4 " Pause after each section to ask what parts the animal has and how those parts help it survive. As needed, point to illustrations and gesture parts or act out their function to make meaning clear beyond words. Encourage students to notice both the images and the text as they gather ideas, since informational texts use both to communicate meaning." (Lesson 6, Teacher Guide)

Informational Text CCSS-ELA-LITERACY.RI.1.7 Use the illustrations and details in a text to describe its key ideas. Claimed in Lessons 1, 5 and 6.

- Lesson 1, Connect Section, Step 1 "Read the Plants and Animals in Our Communities book using the associated prompts. Display slide C to introduce the Plants and Animals in Our Communities book. Then, read the book aloud to students, pausing to note the images in the book and discuss the following questions...Page 3: Have you ever seen a plant like this before? What was the plant? What did the plant look like?..Page 6: Why do you think Fiona and Michaela had to look closely to notice the anole?..Page 10: What other types of animals have you seen or do you know that swim? What do you notice about animals that swim?" (Lesson 1, Teacher Guide)
- Lesson 5, Connect Section, Step 4 "Facilitate an interactive read-aloud. Read the title of the Roots to Fruits: Plant Parts book to the class and ask them what kind of information they think the book will give based on the title. Then, read pages 1-5, pausing to discuss the prompts below to focus on roots...Page 3: How are the roots in these images similar to the roots we saw in the time-lapse?...Page 4: What do you notice about the shape of the roots? How do you think that helps the plant stand tall?" (Lesson 5, Teacher Guide)
- Lesson 6, Connect Section, Step 4 " Pause after each section to ask what parts the animal has and how those parts help it survive. As needed, point to illustrations and gesture parts or act out their function to make meaning clear beyond words. Encourage students to notice both the images and the text as they gather ideas, since informational texts use both to communicate meaning." (Lesson 6, Teacher Guide)

Writing CCSS-ELA-LITERACY.W.1.5 With guidance and support from adults, focus on a topic, respond to questions and suggestions from peers, and add details to strengthen writing as needed. Claimed in Lessons 4 and 8.

- Lesson 4, Synthesize Section, Step 3 "Students give peer feedback. Have students turn to their shoulder partner and share their explanations using the agree-and-question routine. Make sure each student has their Parent and Offspring Explanations student assessment with them as they talk. Students revise explanations. After both partners have

shared, give students a few minutes to revise their explanations on the Parent and Offspring Explanations student assessment." (Lesson 4, Teacher Guide)

- Lesson 8, Synthesize Section, Step 3 "Provide the Discussion Supports handout with sentence starters to support students when giving feedback...Use feedback to revise. Once all partners have shared, give students a few minutes to make revisions to their explanations on their Parts and Survival Explanation handout." (Lesson 8, Teacher Guide)

Writing CCSS-ELA-LITERACY.W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). Claimed in Lesson 9.

- Lesson 9, Connect Section, Step 2 "Gather information from media independently. Have each student work independently to gather information about plants and animals that could inspire their design ideas. Make sure every student has their Design Ideas handout and access to a device with the website bookmarked. Also, ensure students know where to find print materials, such as the books from Lessons 5 and 6 and the unit charts (Our Growing Ideas, Parts and Functions)." (Lesson 9, Teacher Guide)

Speaking and Listening CCSS-ELA-LITERACY.SL.1.1A Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion). Claimed in Lessons 1 and 9.

- Lesson 1, Explore Section, Step 2 "Motivate the need for Classroom Agreements. If you have not already established Classroom Agreements for figuring things out in science, take time to do so now before the class has their discussion to share observations in the Synthesize. Help students see why agreements are important by connecting to a recent experience, such as when they needed to share and respond to one another's ideas while observing the plant and animal images, or another classroom situation where they had to find ways to work together productively. Build Classroom Agreements. The procedure for drafting these agreements is available in the Classroom Agreements Lesson Set reference. Your class will return to these agreements throughout the year to add to, refine, and revise them. If you have already established Classroom Agreements for science, take this opportunity to review them with the class and add examples of how the agreements look, sound, and feel in our classroom." (Lesson 1, Teacher Guide)
- Lesson 9, Explore Section, Step 4 "Practice giving and receiving feedback. Invite students to help demonstrate how students should carry out a conversation with their peers using the prompts and sentence starters on slide J. 1. Invite a student to share their solution with the rest of the class by showing and telling about their ideas. The prompts on the left side of the slide aligned to the Gotta-Have-It Checklist are a guide for what to share. 2. Then invite 1-2 students to use the sentence starters on the right side of slide J to provide helpful feedback about the ideas. Consider providing translations in students' home language(s) if applicable. 3. Explain that partners should then switch roles. When possible, pair multilingual learners with peers who can support them in using the feedback prompts and navigating both languages, and encourage students to draw on their full linguistic resources during feedback conversations." (Lesson 9, Teacher Guide)

Speaking and Listening CCSS-ELA-LITERACY.SL.1.2 Ask and answer questions about key details in a text read aloud or information presented orally or through other media. Claimed in Lesson 5.

- Lesson 5, Connect Section, Step 4 "Facilitate an interactive read-aloud. Read the title of the Roots to Fruits: Plant Parts book to the class and ask them what kind of information they think the book will give based on the title. Then, read pages 1-5, pausing to discuss the prompts below to focus on roots...Page 3: How are the roots in these images similar to the roots we saw in the time-lapse?...Page 4: What do you notice about the shape of the roots? How do you think that helps the plant stand tall?" (Lesson 5, Teacher Guide)

Speaking and Listening CCSS-ELA-LITERACY.SL.1.6 Produce complete sentences when appropriate to task and situation. (See grade 1 Language standards 1 and 3 for specific expectations.) Claimed in Lesson 3 and 9.

- Lesson 3, Explore Section, Step 2 "How might we know whether smaller and larger versions of a plant or animal are the same kind? What kinds of details can we notice?..The kinds of parts. How the parts look. They look similar...How might we know whether smaller and larger versions of a plant or animal are not the same kind? What details can we notice?..The parts are different kinds. They look totally different." (Lesson 3, Teacher Guide)
- Unit Connections to the Common Core State Standards identifies this element as "explicitly used and named in the lesson with specific support for teachers." in Lesson 9.The reviewers were unable to find evidence for this standard.

Language CCSS-ELA-LITERACY.L.1.1D Use personal, possessive, and indefinite pronouns (e.g., I, me, my; they, them, their; anyone, everything). Claimed in Lesson 10.

- Lesson 10, Connect Section, Step 3 "Model and encourage students to use personal and possessive pronouns as students talk in small groups and the whole class including: "I designed wings;" "Their design will solve ____;" "My design will ____;" "Anyone could use my design;" "Their design is different than mine." This work supports L.1.1D as students use personal and possessive pronouns to share their ideas." (Lesson 10, Teacher Guide)

Language CCSS-ELA-LITERACY.L.1.1E Use verbs to convey a sense of past, present, and future (e.g., Yesterday I walked home; Today I walk home; Tomorrow I will walk home). Claimed in Lesson 7.

- Lesson 7, Explore Section, Step 4 "Support students' use of action words (i.e., verbs) to describe the offspring's and parents' actions they previously observed. Encourage students to notice they are using the past tense forms of the verbs because they made observations of animals who completed the actions they are sharing in the past, and using present or future tense forms would not be accurate (L.1.1E). Consider reminding your class that using the correct verb form helps to communicate our science ideas and observations with others." (Lesson 7, Teacher Guide)

Language CCSS-ELA-LITERACY.L.1.1F Use frequently occurring adjectives. Claimed in Lesson 3 and 4.

- Lesson 3, Explore Section, Step 2 "In this part of the lesson, we are emphasizing the use of oral language to communicate scientific ideas. Encourage students to communicate using common adjectives (e.g., green, skinny, spiky) and complete sentences as they share detailed observations." (Lesson 3, Teacher Guide)
- Lesson 4, Synthesize Section, Step 2 "As students construct their explanations, they will rely on adjectives to explain evidence of how the animal or plant parents and offspring look similar but not exactly alike. Support students in using commonly occurring adjectives (big, small, green) to categorize each plant and animal by its key attributes (e.g., the parent goose is the bigger bird)" (Lesson 4, Teacher Guide)

CCSS-ELA-LITERACY.1.1G Use frequently occurring conjunctions (e.g., and, but, or, so, because). Claimed in Lesson 2.

- Lesson 2, Connect section, Step 3, Literacy Supports sidebar, "As students are using words and images in the book to identify similarities, explain how frequently occurring conjunctions (e.g., and, but, or, so, because) help to make comparisons. For example, "and" can be used to explain similarities between the plants and animals in the book with the ones they observed in the Explore. "But" can help students explain differences between plants and animals of the same kind. "So" and "because" can be used to explain students' science ideas about how these plants and animals are similar (RI.1.6, L.1.1G)."

CCSS-ELA-LITERACY.L.1.4B Use frequently occurring affixes as a clue to the meaning of a word. Claimed in Lesson 8

- Lesson 8, Connect section, Step 5, "Identifying and clarifying the meaning of the prefix (bio) and root (mimic) of biomimicry provides students with an example and practice using affixes, which helps students understand the meaning of a word. This supports L.1.4B and supports students' understanding of scientific ideas and concepts."
- Lesson 8, Connect section, Step 5, "Recall that biomimicry is to make a design that copies a plant or animal in some way. Point out the parts of the word "bio" and "mimic." Ask students to recall what the word mimic means. Look for them to say it means to copy. Ask students to consider our definition of biomimicry and ask students to consider what "bio" might mean. Look for students to suggest living things like plants and animals."

CCSS-ELA-LITERACY.L.1.5B Define words by category and by one or more key attributes (e.g., a duck is a bird that swims; a tiger is a large cat with stripes). Claimed in Lesson 4.

- Lesson 4, Synthesize section, Step 2, "As students construct their explanations, they will rely on adjectives to explain evidence of how the animal or plant parents and offspring look similar but not exactly alike. Support students in using commonly occurring adjectives (big, small, green) to categorize each plant and animal by its key attributes (e.g., the parent goose is the bigger bird) (L.1.5B, L.1.1F)."
- Lesson 4, Synthesize section, Step 2, "Practice using patterns about similarities as evidence. Have partners turn and talk; then invite a few groups to share the similarities between the parent and offspring deer. ...Examples students might name include pointy ears, slender legs, or black noses on Deer A and the parent. Practice using patterns about differences as evidence. Summarize for students that plants and animals of the same kind, including parents and offspring, can vary, so they are not exactly alike. Have students turn and talk about what looks different between the parent and offspring deer, then invite a few pairs to share aloud....Examples might include the parent's brown fur and Deer A's dotted fur. "

Mathematics

Standards for Mathematical Practice CCSS-MATH-Practice.MP3 Construct viable arguments and critique the reasoning of others. Claimed in Lessons 2 and 3.

- Lesson 2, Synthesize Section, Step 4 "While students discuss their observations of plants and animals of the same kind, have them use evidence from their observations, such as the size, shape, color, and/or parts of each plant and animal. Specific evidence will help students support their arguments and critique the arguments of others." (Lesson 2, Teacher Guide)
- Lesson 3, Explore Section, Step 2 "While students discuss how they sorted the plant or animal cards, have them use evidence from their observations, such as the size, shape, color, and/or parts of each plant and animal. Specific evidence will help students support their arguments and critique the arguments of others." (Lesson 3, Teacher Guide)

Standards for Mathematical Practice CCSS-MATH-Practice.MP5 Use appropriate tools strategically. Claimed in Lesson 3.

- Lesson 3, Explore Section, Step 3 "To help students count the number of tallies in each section of the data table, use a pointer or your finger to support one-to-one correspondence and ask students to practice counting with you (part of 1.NBT.A.1). Additionally, students can use manipulatives such as a hundreds data table or cubes to support them in counting." (Lesson 3, Teacher Guide)

Standards for Mathematical Practice CCSS-MATH-Practice.MP8 Look for and express regularity in repeated reasoning. Claimed in Lesson 4.

- Lesson 4, Synthesize Section, Step 2 " Display **slide D** and suggest recalling the patterns we have figured out during the unit to help us do this. Begin by having students turn and talk with a partner about what patterns they figured out about the way plants and animals look. As you listen in, look for students to: name parts they see repeatedly (e.g., leaves, stems, legs, ears), point out that individuals are similar but not exactly the same, describe variations in size, shape, or color, and reference earlier examples from the class (e.g., cacti, pumpkin plants, geese, anoles). If helpful, prompt students to point to entries on Our Growing Ideas chart that support their ideas. Use the following prompts to facilitate a whole class discussion about what they figured out in previous lessons about how individuals of the same kind of animal and plant look." (Lesson 4, Teacher Guide)

Number and Operations in Base Ten CCSS-MATH-1.NBT.A.1 Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral. Claimed in Lessons 3 and 6.

- Lesson 3, Explore Section, Step 3 " Share that one way we can add to the table is by using a tally mark on the data table to show if a characteristic was similar or different between the smaller and bigger versions of the plants and animals each of us observed. Then we can count tallies to notice if this is a pattern most plants and animals follow." (Lesson 3, Teacher Guide)
- Lesson 6, Explore Section, Step 2 "Count and record the tallies and total number of each color collected in the table on the "Body Color" page of the handout." (Lesson 6, Teacher Guide)

Measurement and Data CCSS-MATH-1.MD.C.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. Claimed in Lesson 3.

- Lesson 3, Explore 3, Step 3 "The class will co-construct a data table to help them organize, represent, and interpret data about the similarities and differences between parent and offspring plants and animals (part of 1.MD.C.4). Once the data table is complete, students can use it to make sense of patterns in the data by counting and comparing the number of tallies in each section." (Lesson 3, Teacher Guide)

Criterion-Based Suggestions for Improvement: N/A

CATEGORY II

NGSS Instructional Supports

II.A. Relevance and Authenticity

EXTENSIVE

Engages students in authentic and meaningful scenarios that reflect the practice of science and engineering as experienced in the real world.

i. Students experience phenomena or design problems as directly as possible (firsthand or through media representations).

ii. Includes suggestions for how to connect instruction to the students' home, neighborhood, community and/or culture as appropriate.

iii. Provides opportunities for students to connect their explanation of a phenomenon and/or their design solution to a problem to questions from their own experience.

The reviewers found **extensive** evidence that the materials engage students in authentic, meaningful scenarios that reflect the practice of science and engineering as experienced in the real world because students investigate recognizable plants, animals, and community-based challenges and use those contexts to make sense of how structure and behaviors support survival and growth.

Students experience phenomena or design problems as directly as possible when they observe and revisit images, texts, and videos of plants and animals. The materials include suggestions for how to connect instruction to the students' homes, neighborhoods, communities, and cultures by inviting students to share observations of local plants and animals, document organisms that are meaningful to them or their community, compare classroom examples to neighborhood organisms, and consider how plant and animal structures inspire solutions to everyday human challenges. The materials provide opportunities for students to connect their explanation of a phenomenon and/or their design solution to questions from their own experiences when students draw on personal and community-based examples to generate questions, explain how parts help organisms live and grow, and apply biomimicry ideas to designing solutions to problems.

i. Students experience phenomena or design problems as directly as possible (firsthand or through media representations)

- Lesson 1, Connect Section, Step 1 "Read the Plants and Animals in Our Communities book using the associated prompts. Display slide C to introduce the Plants and Animals in Our Communities book. Then, read the book aloud to students, pausing to note the images in the book and discuss the following questions." (Lesson 1, Teacher Guide)
- Lesson 2, Navigate Section, Step 1 " Display the Notice and Wonder chart and the 4 images from Lesson 1 (refer to slide B). Use the questions below to recall Lesson 1: What did we do last time? What were some of the things we noticed about the plants and animals we observed? What did that leave us wondering?" (Lesson 2, Teacher Guide)
- Lesson 3, Navigate Section, Step 1 " Display slide B with the images from Lesson 1 and continue the brief discussion to recall connections made to the unit phenomenon--different plants and animals have unique parts--to remind students of what we are still wondering related to how plants and animals look (refer to the Notice and Wonder chart as relevant to the class's discussion)." (Lesson 3, Teacher Guide)
- Lesson 5, Navigate Section, Step 1 ". Display slide A and the Notice and Wonder chart along with the images from the anchor in Lesson 1. In addition, ask students to recall their experiences answering and adding new questions in Lesson 4. You may want to point to these questions on the Notice and Wonder chart, possibly circled or otherwise marked, or read questions from pre-selected stickies. Use the following prompts to recall the questions students had about plants, their parts, and what those parts do." (Lesson 5, Teacher Guide)

- Lesson 7, Navigate Section, Step 1 "Remind students that during the last lesson, we figured out that animals use their body parts in different ways to help them survive. Ask them to recall what they figured out about how beaks, feet, and color help animals live and grow. Display the Notice and Wonder chart (refer to slide A) and circle students' questions about how offspring survive if they can not use their parts the same way as the parent, or wonderings about parents helping the offspring. Display slide B and ask students to share a wondering they had about what the parent and offspring geese are doing in the picture. After a few minutes, bring students together and ask them to share any new wonders they have. Add these wonders to the Notice and Wonder chart." (Lesson 7, Teacher Guide)
- Lesson 9, Connect Section, Step 2 "Choose a problem to solve. Display slide D with the Design Ideas handout. Before beginning new research, explain that each student will now choose one of the problems they sorted earlier to focus on. They will research plants and animals that could inspire their own design solutions. They may choose the problem they wrote on a sticky note in Lesson 8, or they may choose another problem that interests them more. Distribute the handout and have students draw or write about the problem they will be solving in the first box on the Design Ideas handout and have them circle the category for their problem (Movement, Protection, Getting Food, Gets Water & Sunlight)." (Lesson 9, Teacher Guide)

ii. Includes suggestions for how to connect instruction to the students' home, neighborhood, community, and/or culture as appropriate.

- Lesson 1, Connect Section, Step 1 "Connect to students' experiences. Invite students to share their experiences about noticing different plants and animals with unique parts or that do interesting things using the prompts on slide A. The purpose of this discussion is to begin thinking about how those parts and actions might help plants and animals survive and grow in order to motivate our figuring out for the unit...What is an interesting plant or animal you have seen?..What parts did you notice on the plant or animal? What was it doing with those parts?..Why do you think that part or action might be helpful for the plant or animal?" (Lesson 1, Teacher Guide)
- Lesson 1, Connect Section, Step 1 "Use the box and lines below to draw or add images of a plant or animal that is special to you. Add labels or words to help share about the different parts of the plant or animal and the different things the plant or animal can do...On the lines, write about why this plant or animal is special to you or members of your community." (Lesson 1, Community Connections)
- Lesson 2, Connect Section, Step 3 "Page 12: How are the maple trees we observed (*refer to the plant card held up by the maple tree group*) similar to the one in this book? What is similar? How do some of the maple trees look different from each other? Are there similar trees in your community or neighborhood that you have encountered? How are they similar or different?" (Lesson 2, Teacher Guide)
- Lesson 8, Connect Section, Step 7 "Brainstorm challenges with groups. Allow time for students to generate ideas in their groups. Circulate to support groups and write ideas for students if needed. Use the following prompts to support students who may need help coming up with challenge ideas: What kinds of challenges do people have that are like this? How can this part give people an idea for something helpful? If engineers copied this part, what challenge can it solve? How can this idea make life easier or safer for people?" (Lesson 8, Teacher Guide)

iii. Provides opportunities for students to connect their explanation of a phenomenon and/or their design solution to a problem to questions from their own experience.

- Lesson 3, Explore Section, Step 2 "Use the following prompts to encourage students to use their prior experience to brainstorm what plants and animals we can observe to figure out more about larger and smaller plants and animals.... Think about pets people might have or animals you might have seen at the zoo, on a farm, or even in a book or movie. What are some ideas of animals that we can observe?...Have any of you ever planted a seed or a garden? Also, think about the fruits and vegetables you may have eaten. What are some ideas of plants that we can observe?" (Lesson 3, Teacher Guide)

- Lesson 4, Connect Section, Step 5 "Have students share their stories and experiences. Break students into groups of 3–5 and have each group move to a separate space in the room. If they have their Special Plants and Animals Community Connection, they can bring it to support their sharing. Ask each student to share one plant or animal from home or the community, describe key parts they notice, and then ask at least one question about how a part might help it live and grow. Circulate and listen to how they describe the plant or animal, the parts they focus on, the comparisons they make to class examples, and the questions they generate." (Lesson 4, Teacher Guide)
- Lesson 8, Connect Section, Step 5, "Connect biomimicry to familiar items. Briefly invite students to share examples of items they have seen or used that copy plant or animal parts, such as helmets (like turtle shells), flippers (like whale tails), or camouflage clothing (like animals that blend into their surroundings). This helps students connect structure and function to familiar experiences and increases relevance." (Lesson 8, Teacher Guide)

Criterion-Based Suggestions for Improvement: N/A

II.B. Student Ideas

EXTENSIVE

Student Ideas: Provides opportunities for students to express, clarify, justify, interpret, and represent their ideas and respond to peer and teacher feedback orally and/or in written form as appropriate.

The reviewers found **extensive** evidence that the materials provide students with opportunities to clarify, justify, and build upon their ideas through structured whole-group and partner discussions. Students regularly explain their thinking, listen to others' ideas, and use questions and evidence to refine their understanding during sensemaking discussions and investigations. The materials include whole-class discussions, turn-and-talks, partner conversations, shared charts (Notice and Wonder and Our Growing Ideas), written explanations, drawings, and design sketches. The unit includes artifacts that show evidence of students' reasoning and changes in their thinking over time. There are teacher-to-student and peer-to-peer feedback loops to help students refine their explanations and designs.

Student ideas are clarified, justified, and built upon. Teacher support to facilitate rich classroom conversations is specifically customized to the lesson materials. Students have opportunities to share ideas directly with peers, elicit ideas from others, and use others' ideas to improve or refine their own thinking. Examples include:

- Lesson 1, Synthesize Section, Step 3, "Facilitate an Initial Ideas Discussion. Use the prompts below to facilitate a whole group Initial Ideas Discussion about their experiences observing animal and plant features. Share that the ideas the class shares are ideas the class is starting with, and it is OK to share even if we are unsure. As students share with the whole group, record their observations in the "Notice" column and questions in the "Wonder" column... Prompts to use: How do you think [parts] might help the [plant or animal] live, grow, or stay safe?...Who can add to that idea? What do you notice the baby geese are doing near the parent? Why might they do that? What makes you think that?Can anyone add another reason why young animals might stay close to their parent?" (Lesson 1, Teacher Guide)
- Lesson 4, Synthesize Section, Step 2 "Practice making a claim about offspring. Display slide E. Share that we will practice using patterns to explain how parents and offspring look similar, but not exactly alike, using a familiar animal (the white-tailed deer) from Lesson 3. Invite students to review the images on the slide and decide which smaller deer (A or B) is more likely to be the offspring of the parent deer on the slide. Have students turn and talk about why they made their choice. Have a few groups share aloud and come to an agreement about which could be

the offspring based on the patterns we have figured out about how parents and offspring look (likely Deer A). Circle Deer A on the slide." (Lesson 4, Teacher Guide)

- Lesson 5, Explore Section, Step 5 "Use the following prompts to guide a brief discussion about students' observations of the carnations. Display slide I and/or use sample carnations from students' investigation. As students share, add their ideas with words and drawings to the Parts and Functions chart to show how the stem moves water from the roots to the other parts of the plant. Use the chart below as an example, focusing only on plant parts...What did you notice was different between the carnation that was in the food coloring and the carnation that was not in the water?..What do you think that tells us a stem does for a plant? What evidence do we now have for that?" (Lesson 5, Teacher Guide)
- Lesson 7, Connect Section, Step 3 "Observe more animals with a partner. Have students continue to observe animals with a partner. As students observe the animals in the videos, circulate to listen for student ideas and pose the following questions, helping students to think more deeply about the purpose of the animals' behaviors and the parts that allow them to notice and respond...Prompts to use: Why do you think the offspring was doing that? What need was it trying to meet?...What makes you think that? What did you see in the video that tells you this?" (Lesson 7, Teacher Guide)

The unit includes artifacts that show evidence of students' reasoning and changes in their thinking over time

- The Notice and Wonder chart tracks student questions throughout the unit.
  - Lesson 1, Synthesize Section, Step 3, "Facilitate an Initial Ideas Discussion. Use the prompts below to facilitate a whole group Initial Ideas Discussion about their experiences observing animal and plant features. Share that the ideas the class shares are ideas the class is starting with, and it is OK to share even if we are unsure. As students share with the whole group, record their observations in the "Notice" column and questions in the "Wonder" column... Prompts to use: How do you think [parts] might help the [plant or animal] live, grow, or stay safe?...Who can add to that idea? What do you notice the baby geese are doing near the parent? Why might they do that? What makes you think that?Can anyone add another reason why young animals might stay close to their parent?"
  - The Notice and Wonder chart is updated in lessons 2 - 8.
- The Growing ideas chart tracks what students figure out in each lesson.
  - Lesson 2, Synthesize section, Step 4, "Gather students in a Scientists Circle. Gather students in a Scientists Circle for a Building Understandings Discussion to begin to identify patterns in the similarities and differences between plants of the same kind and animals of the same kind. Remind students that they will be sharing their ideas with one another, and to do that well, they need to be able to hear and see everyone (not only the teacher) in the circle...Introduce Our Growing Ideas chart. Display a blank class version of Our Growing Ideas chart (refer to slide G). Explain to students that we will use this chart to keep track of what we have figured out throughout the course of the unit. In order to add ideas to our chart today, it will be important for us to not only share what we figured out from our observations of our plant and animal images but also listen to and connect with what other students have shared. This is so we can understand what we have figured out and where we still have questions."
  - The chart is updated in lessons 3 - 10.

- In Lesson 9 students draw an idea for a solution that mimics the plants and/or animals parts. They update these drawings after they have received peer feedback.
  - Lesson 9, Explore Section, Step 3 "Design solutions. Display slide I and give students time to independently draw their idea for a solution that mimics the plants and/or animals they gathered information about, and to write or draw the materials that they will need. Remind students that their designs can be inspired by the plant and animal parts they researched on the website, the examples in our books, or the Parts and Functions chart. Explain that they can combine their ideas from the first page to make one solution for their problem on the second page." (Lesson 9, Teacher Guide)
  - Lesson 9, Explore Section, Step 3 "Improve the designs. Once both partners have given and received feedback, suggest to students that they use that feedback to make decisions about how to improve their final design solution. Continue to connect to the Classroom Agreement, "We let our ideas change and grow," by explaining that students can make changes to their design. Allow students to update their drawings on the Design Ideas handout." (Lesson 9, Teacher Guide)

Students receive feedback and revise their thinking accordingly.

- Lesson 4, Synthesize Section, Step 3 "Display slide H and explain that one partner will share the parent and offspring pair they chose (green sea turtle or oak tree) and what they wrote to explain their choice. The listening partner will then share: one thing they agree with or that was similar to their own explanation, and one question they have about their partner's explanation and evidence. Then, partners switch roles. To support students in giving clear and helpful feedback, remind them of the sentence frames from the Discussion Supports handout (e.g., "I noticed that...," "I wonder...," or "I agree with...because..."). Demonstrating 1 or 2 examples can help students know what thoughtful feedback sounds like....After both partners have shared, give students a few minutes to revise their explanations on the Parent and Offspring Explanations student assessment." (Lesson 4, Teacher Guide)
- Lesson 8, Synthesize Section, Step 3 "Explain the peer feedback. Display slide F and partner students. Explain that their job is to look at each other's Parts and Survival Explanation assessments and give feedback about what is clear and what could be made stronger. Point out the partner directions and that they will checkmark if something is included or circle if it is not and/or needs more...Use feedback to revise. Once all partners have shared, give students a few minutes to make revisions to their explanations on their Parts and Survival Explanation handout. While students are revising, circulate and ask: What changes are you making to your explanation(s)? Why are you making those changes?" (Lesson 8, Teacher Guide)
- Lesson 9, Explore Section, Step 4 "Pair the students with a partner who is trying to solve a similar problem. Provide students with about 5 minutes to meet with their partner to gather feedback about their ideas as well as give feedback. Suggest that they circle areas that they might want to improve based on the feedback." (Lesson 9, Teacher Guide)

Criterion-Based Suggestions for Improvement: N/A

II.C. Building Progressions

ADEQUATE

Identifies and builds on students' prior learning in all three dimensions, including providing the following support to teachers:

i. Explicitly identifying prior student learning expected for all three dimensions

ii. Clearly explaining how the prior learning will be built upon.

The reviewers found **adequate** evidence that the materials identify and build on students' prior learning in all three dimensions because the Unit Overview describes general entry ideas students may bring from everyday experiences and, in some cases, from prior OpenSciEd units. However, the materials do not explicitly identify prior learning expected for all focal elements across the DCIs and SEPs. While prior learning is described for several elements (e.g., LS1.A, LS3.A, LS3.B, ETS1.A/B, CEDS-P1, and the CCCs), clear descriptions are not provided for all focal elements, including LS1.B, LS1.D, and CEDS-P2.

The materials explain how some prior learning will be built upon in the Unit Overview and the "Disciplinary Core Ideas Developed in this Unit" table, which outlines how student understanding progresses across lessons. The materials do not provide explicit support for teachers to clarify adult understanding f potential alternate conceptions held by students or teachers.

i. Explicitly identifying prior student learning expected for all three dimensions

Disciplinary Core Ideas:

The Unit Front Matter description includes the expected prior learning/experiences students will have with LS1.A: Structure and Function and LS1.D: Information Processing, but not at the element level.

- Front Matter "Through everyday experiences with plants and animals, students may enter 1st grade with ideas about the external parts living things have and what those parts help them do. For example, they may recognize that a goldfish has fins for swimming or that birds they see outside have wings for flying. Students who have completed Unit K.4: Do birds, other animals, and plants need people to help take care of them? will have figured out that animals need food, water, air, and homes to live and grow, and that plants need water and sunlight. In this unit, students build on these ideas by connecting how plants and animals use their parts in ways that help them meet their needs and live and grow. These ideas connect to LS1.A and LS1.D, which focus on how external body parts and sense organs help plants and animals get what they need, respond to information, and survive. (Front Matter)

The Unit Front Matter description includes the expected prior learning/experiences students will have with LS3.A: Inheritance of Traits and LS3.B: Variation of Traits, but not at the element level.

- Front Matter "Students come to school with many experiences noticing plants and animals in their communities. They often notice what plants and animals look like including their parts and the size, shape, and color of those parts. Students may already recognize that plants and animals of the same kind look similar, but they may not yet have noticed the variation that exists between individuals. These everyday experiences provide useful starting points for students' initial observations and for identifying similarities and differences they will describe more systematically in this unit. These experiences connect to the LS3.A and LS3.B ideas about how young plants and animals are like, but not exactly like, their parents and how individuals of the same kind are similar but can vary. (Front Matter)

The Unit Front Matter description includes the expected prior learning/experiences students will have with ETA1.A: Defining and Delimiting an Engineering Problem and ETS1.B: Developing Possible Solutions, but not at the element level.

- Unit Overview "What ideas and experiences will students bring that can help them in this unit, "Young children come to school having many experiences solving everyday problems. Many of these may not be engineering problems or problems solved using the engineering design process, but they still highlight students' resourcefulness and familiarity with figuring out ways to meet needs. If students have had experiences with OpenSciEd units in kindergarten and first grade, they will have had opportunities to engage in the engineering design process. For instance, in Unit 1.2: How can we communicate using objects that make sound?, students defined an engineering problem in the context of their school experiences when they needed a way to communicate a good news message to all classmates anywhere in the classroom. Students can draw on these experiences as they define design problems and generate possible solutions in this unit. These experiences build toward ETS1.A and ETS1.B, where students define engineering problems and represent possible solutions with sketches, drawings, or models." (Front Matter)

Expected prior learning about LS1.B Growth and Development of Organisms is not provided.

Science and Engineering Practices:

While some of the SEPs have descriptions of prior learning, they are not provided for all focal elements.

CEDS-P1: Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.

- Unit Overview "Students who have had experiences with OpenSciEd units in first grade will have many opportunities to make observations and use those observations as evidence in constructing explanations. During earlier units, students added evidence to the Our Growing Ideas chart and used prompts such as "What did we do to figure that out?" and "What evidence supports this claim?" to support their reasoning. Students also constructed individual explanations in Unit 1.1: How can we read under covers when it's dark?, where they explained light related phenomena. In this unit, students build on those experiences as they use observed patterns to construct evidence based accounts about how animals and plants of the same kind are similar to one another, but not exactly alike, based on the parts they observe. This connects to the Constructing Explanations element CEDS-P1, where students use observations as evidence to construct accounts of natural phenomena. (Unit Overview)

CEDS-P2: Use tools and/or materials to design and/or build a device that solves a specific problem or a solution to a specific problem.

- Expected prior learning about CEDS-P2 is not provided.

INFO-P1 Read grade-appropriate texts and/or use media to obtain scientific and/or technical information to determine patterns in and/or evidence about the natural and designed world(s).

- Unit Overview, "Most students will have experience using language to communicate information. They are typically able to take turns in a conversation by making comments and asking and answering questions. Students also develop this practice as part of Unit K.2: How can we be prepared for the weather?. Throughout 1st grade, students will leverage their prior experiences to build their skills obtaining information from books, observations, and conversations. In this unit, students obtain scientific information by engaging in interactive read-alouds using grade-appropriate texts and using resources like a website with read-aloud text, images, and videos. Students are not expected to read independently for that work to "count" as reading. The class uses text features including book covers, tables of contents, and electronic menus to identify information that will be useful in answering their questions. Students communicate information about solutions to problems using drawings, writings, and models to support their oral and physical presentations. This connects to INFO-P1, INFO-P3, and INFO-P4, where students obtain information from texts and media and communicate ideas using drawings, writing, and models." (Unit Overview)

Crosscutting Concepts:

All of the CCC have descriptions of prior learning.

PAT-P1: Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.

- Unit Overview, "Students bring everyday experiences with patterns, such as noticing things that happen over and over again. They are familiar with recurring visual patterns in nature, on clothing, or in math manipulatives and toys. Students who have experienced Unit 1.2: How can we communicate using objects that make sound? will have identified the pattern that vibrating materials cause sounds, and students who have experienced Unit 1.3: What patterns of the Sun, Moon, and stars can we observe, describe, and predict? will have used repeated observations to identify patterns related to visible objects in the sky and their changing but predictable locations. These prior experiences prepare them to notice and use patterns as they make sense of new ideas in this unit. These experiences connect to PAT-P1, which focuses on using patterns in the natural and human-designed world to describe phenomena and as evidence in explanations." (Unit Overview)

SF-P1 The shape and stability of structures of natural and designed objects are related to their function(s).

- Unit Overview "Students will enter school with everyday ideas about the relationship between the structure of objects in the world around them and their function. For example, they may notice that objects they use in daily life, like eating utensils, have parts with different shapes that change how they work. Children may choose a fork with pointed edges to pick up certain foods, but a spoon with a curved cup to scoop up liquids. Students who have experienced Unit 1.2: How can we communicate using objects that make sound? will also bring ideas about how the shape of an object relates to what it can do, such as when they designed sound signal devices with structures that produced sound to communicate a good news message across the classroom. These everyday ideas prepare students to engage with SF-P1 as they connect the shapes of natural and designed structures to the functions those structures support." (Unit Overview)

ii. Clearly explaining how the prior learning will be built upon.

- The "Disciplinary Core Ideas Developed in this Unit" table in the Unit Overview describes how each DCI element is developed in the unit. Examples include:
  - Unit Overview "All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. (1-LS1-1): Throughout the unit, students develop these ideas by observing plants and animals, reading texts, gathering information from videos, and building models. In the opening lessons, students focus on identifying and describing the external parts of organisms without yet connecting those parts to survival or growth. As the unit progresses, students investigate how plant parts such as roots, stems, and leaves help plants live and grow. Students then explore how animals use their body parts in different ways to protect themselves, move, get food, and care for offspring. By the end of the unit, students apply what they have figured out about plant and animal parts and their functions to design a solution to a problem involving movement, protection, or getting food or water. Students will extend their understanding of structure and function to include internal structures in Unit 4.4: How do the structures and functions of living things' traits benefit them? Students' development of this disciplinary core idea is supported by formative assessment opportunities in Lessons 5 through 7, a summative assessment in Lesson 10, and instructional guidance in Lesson 9." (Unit Overview)

- Unit Overview, About the Science "In the first lesson set, students develop foundational ideas about variation and inheritance of traits....At this grade level, students focus on observing and describing patterns of traits in plants and animals of the same kind, but they are not yet expected to explain how or why those traits are inherited. Students may notice similarities between adults and young or among individuals of the same kind without assuming a parent-offspring relationship. These early observations of variation build the foundation for later explanations about inheritance." (Unit Overview)
- Unit Overview, About the Science "In the second lesson set, students figure out that plants and animals have external parts, and they use those parts to help them survive, grow, and meet their needs. In Lessons 5-7, they figure out how animals and plants use their parts in different ways to help them survive. Animals use their body parts in order to see, hear, grasp objects, protect themselves from predators, move in different ways, find and eat food, and more. Different animals might have different parts that help them with these goals...Since animals live in different environments and eat different foods (which students figure out in Unit K.4: Do birds, other animals, and plants need people to help take care of them?), they need different body parts to help them survive." (Unit Overview)
- Unit Overview, Front matter, About the Science "In Lessons 5-7, students also figure out that animals have various body parts that they use to both convey and receive information... Some common animal body parts used for communication include mouths, ears, eyes, tails, noses, etc. For example, animals use their eyes, ears, and noses to find where food may be or sense predators. Animals respond to this different information through behaviors that help the animals survive. Some plants also have responses to inputs like these. For instance, some plants respond to sunlight by growing toward it. Other plants have parts called tendrils that respond to touch by wrapping around anything they touch, helping the plant to grow in that direction. Additional responses that plants have are to curl up their leaves or even to create bad smells that keep animals that might want to eat them away." Some of these examples, like sensing predators, curling leaves, or creating bad smells, are not discussed in the unit.
- Front matter, About the Science, "The following resources are recommended to help build your understanding of the phenomena and Performance Expectations bundle for this unit." There is no description or explicit support around possible misconceptions that students or adults might have.

Criterion-Based Suggestions for Improvement

- Ensure "the materials explicitly state the expected level of prior proficiency students should have with individual elements of all three dimensions for the core learning of the materials." (Detailed Guidance, p. 25)
    - Clarify prior learning expectations for all focal DCI and SEP elements, including LS1.B, LS1.D (sensory input), and CEDS-P2, at the element level in the Front Matter.
- Ensure "explicit support is provided to teachers to clarify adult understanding of the potential alternate conceptions that they, or their students, may have while building toward students' three-dimensional learning, along with guidance for how to help students negotiate their understandings (vs. telling students they are wrong)." (Detailed Guidance, p. 25)
    - Consider targeted support in either the About the Science Section or in sidebar comments in the teacher guide.

II.D. Scientific Accuracy

ADEQUATE

Scientific Accuracy: Uses scientifically accurate and grade-appropriate scientific information, phenomena, and representations to support students' three-dimensional learning.

The reviewers found **adequate** evidence that students use scientifically accurate and grade-appropriate scientific information, phenomena, and representations to support students' three-dimensional learning. All science ideas and representations included in the materials, including content related to all three dimensions as well as content that is not included in the three dimensions of the standards, are accurate with the exception of inaccurate information about the function of the spines of cacti.

- Lesson 2, Synthesize Section, Step 2 "Summarize the discussion about patterns. Summarize for students that the evidence from Lessons 2 and 3 shows a pattern: plants and animals of the same kind, including parents and offspring, have many of the same parts. Over and over, we noticed they look alike but are not exactly the same." (Lesson 2, Teacher Guide)
- Lesson 5, Connect Section, Step 4 "Update words on the Word Wall. Remind students that we added plant part words to our Word Wall in Lesson 2. Refer to all the information students gathered about plant parts in this lesson to suggest adding definitions to these words. Return to the Word Wall card for "Leaf" that the class posted in Lesson 2. First, ask students for their ideas about what the leaf does to develop a definition that should be similar to the part of a plant that collects sunlight and makes food. Ask students how they could update this card by adding information from the book and their investigations so far. Update the leaf card by replacing the card from Lesson 2 with the card that includes both the image and the suggested definition. Update stem, flower, and fruit cards. Repeat for stem, flower, and fruit. Definitions should be similar to stem: the part of a plant that supports it and moves water to the rest of the plant; flower: the part of a plant that can make seeds that grow into new plants; and fruit: the part of a plant that holds and protects the seeds. Add root to the Word Wall. Remind students that we observed and gathered information about one more plant part, the root. Ask students to briefly share their ideas about what roots do to develop a definition that should be similar to the part of a plant that takes in water and holds the plant in the ground. Then, add the root card to the Word Wall. Invite students to share words for each plant part in their home languages and add these alongside the English terms on the Word Wall, creating a multilingual resource that reflects the diverse ways students understand and describe plant structures." (Lesson 5, Teacher Guide)
- Lesson 5, Connect section, Step 4, "Return to the Word Wall card for "Leaf" that the class posted in Lesson 2. First, ask students for their ideas about what the leaf does to develop a definition that should be similar to the part of a plant that collects sunlight and makes food...Repeat for stem, flower, and fruit. Definitions should be similar to stem: the part of a plant that supports it and moves water to the rest of the plant; flower: the part of a plant that can make seeds that grow into new plants; and fruit: the part of a plant that holds and protects the seeds...Ask students to briefly share their ideas about what roots do to develop a definition that should be similar to the part of a plant that takes in water and holds the plant in the ground. Then, add the root card to the Word Wall." Describing the process as 'collecting sunlight' may imply that the leaf keeps or gathers up the sunlight.
- Lesson 5, Connect Section, Step 4, "Assessment Opportunity Formative assessment: Support students in recognizing that one structure can also serve multiple functions (for example, cactus leaves or spines collect sunlight like other leaves but also provide protection). (Lesson 5, Teacher Guide) The materials use the example of cactus spines collecting sunlight, but cactus spines generally do not photosynthesize and are not a significant contributor to energy production in cacti.

- Lesson 6, Connect Section, Step 4 "Add lesson vocabulary words to the Word Wall. Remind students that we read about new science words from the Animal Parts in Action book, "camouflage," "predator," "scales," and "survive." Ask students to recall the definitions and provide examples. Refer back to the infographic to support students in developing their definitions: camouflage is an animal's color or shape that helps it blend in with its surroundings, a predator is an animal that hunts other animals, scales are small, hard plates on the skin, and survive means to continue to live. Add camouflage, predator, scales, and survive to the Word Wall. If helpful for sensemaking, invite students to share words in their home languages and add these alongside the English terms on the Word Wall, creating a multilingual resource that reflects the diverse ways students understand and describe these terms." (Lesson 6, Teacher Guide)

Criterion-Based Suggestions for Improvement

- All science ideas and representations included in the materials…are accurate. (Detailed Guidance, p. 26)
  - Remove language that describes cactus leaves as structures that collect sunlight.

II.E. Differentiated Instruction

EXTENSIVE

Provides guidance for teachers to support differentiated instruction by including:

i. Supportive ways to access instruction, including appropriate linguistic, visual, and kinesthetic engagement opportunities that are essential for effective science and engineering learning and particularly beneficial for multilingual learners and students with disabilities.

ii. Extra support (e.g., phenomena, representations, tasks) for students who are struggling to meet the targeted expectations.

iii. Extensions for students with high interest or who have already met the performance expectations to develop deeper understanding of the practices, disciplinary core ideas, and crosscutting concepts.

The reviewers found **extensive** evidence that there is guidance for teachers to support differentiated instruction. Materials included a variety of ways for students to access instruction, including opportunities to learn through movement, alternative ways to make observations for students who are visually impaired, and extensive support for students who are multilingual learners. The materials provide suggestions for extra support for students who are not yet meeting expectations through assessment guidance that helps teachers identify needs and provide targeted next steps within lessons and across the unit. Extensions are provided for students with high interest, however extensions are not provided for students who have already met the targeted performance expectations.

i. Supportive ways to access instruction, including appropriate linguistic, visual, and kinesthetic engagement opportunities are essential for effective science and engineering learning and particularly beneficial for multilingual learners and students with disabilities.

The materials support teachers in anticipating the needs of students who might struggle with any of the three dimensions within a particular activity. Differentiation strategies support teachers in addressing the needs of all students. Examples Include:

- Lesson 2, Explore Section, Step 2 "To support a range of student writing, groups could use checks and Xs or another agreed-on annotation as a way to indicate what they notice as similar and different between the plants or animals in their set of images." (Lesson 2, Teacher Guide)
- Lesson 2, Connect Section, Step 3 "When engaging students in an interactive read-aloud, it is important to use questions that help them comprehend the information in the text, as well as questions that help them connect what they figure out from the text with their own explorations. Engaging in questioning strategies while reading benefits all readers, but also supports learners who may need additional cues or time to process key details in the text. Additional strategies to support developing readers are described in the Supporting Literacy for All Students section of the Teacher Handbook." (Lesson 2, Teacher Guide)
- Lesson 2, Connect Section, Step 3, "To support multilingual learners in sharing their ideas, consider providing scaffolds for speaking, inviting both linguistic and non-linguistic resources, and allowing for partner discussions in their preferred language before sharing with the group." (Lesson 2, Teacher Guide)
- Lesson 3, Explore Section, Step 2, "Because this activity relies on photographs, consider adding tactile objects so that students with visual impairments can engage more meaningfully in the comparisons. Introduce each tactile object clearly (e.g., "This is the parent leaf; this is the offspring leaf.") before comparison to avoid confusion. Options might include small vs. large leaves from the same tree or a small vs. large stuffed animal. Encourage students to touch, describe, and compare these items alongside the photos. Pair tactile observations with group discussion so that all students contribute to identifying similarities and differences between parent and offspring." (Lesson 3, Teacher Guide)
- Lesson 5, Connect Section, Step 4 "Share that we can use our bodies to help us understand how the shape of roots can help a plant stay stable, or not fall over. First, have students stand up and find a space where they can extend their arms without touching another student. Have them stand with their legs wide apart to model how roots branch out and grip the ground. Then, have students sway to represent what happens when the wind blows. Now try again by asking the students to stand like a plant above the ground (the part we mostly see), with their feet together to represent what it would be like for a plant to not have roots. Have them sway again to represent what happens when the wind blows. This time, when the wind comes, they might feel like they need to move a foot to stay standing." (Lesson 5, Teacher Guide)
- Lesson 6, Explore Section, Step 2 "To ensure the beak shape activity is physically accessible for all students, including those with motor impairments, you might consider: adding grips to the beak tools, providing gripping aids, providing adaptive tools, and/or including additional food items. Work with students' case managers (if applicable) for additional guidance. Offering options that accommodate a wide range of motor abilities supports both equitable participation and student agency, as students are able to make choices to meet their needs." (Lesson 6, Teacher Guide)
- Lesson 9, Explore Section, Step 4 "Explain that partners should then switch roles. When possible, pair multilingual learners with peers who can support them in using the feedback prompts and navigating both languages, and encourage students to draw on their full linguistic resources during feedback conversations." (Lesson 9, Teacher Guide)

ii. Extra support (e.g., phenomena, representations, tasks) for students who are struggling to meet the targeted expectations.

- L3 Explore Step 3 SPQ sidebar "Students will use the relative scale of bigger and smaller to sort and compare the plants and animals in the images. Since the "bigger" and "smaller" versions of each plant and animal are on separate cards, they may need extra support in identifying which plant or animal is bigger or smaller. Identifying details from the plant and animal's surroundings in relation to the plant or animal is one way to support students in making size comparisons." (Lesson 3, Teacher Guide)

- Lesson 7, Synthesize section, Step 2, "In this lesson, students practice using the crosscutting concept of structure and function as they connect plant and animal parts to what those parts do. In previous lessons, students considered how the shape of parts relates to their functions and recorded ideas on the Parts and Functions chart. If students need support applying this independently, refer back to that chart or the Our Growing Ideas chart as scaffolds." (Lesson 7, Teacher Guide)
- Lesson 7, Connect Section, Step 4, "As students observe the behaviors of the offspring and parents, support them in noticing the parts that the animal is using and how they are using them to behave. Help students consider what parts the parent is using to respond to the communication from the offspring. Cue students to consider how the parent knows to respond, and ask students to consider which parts the parent would have to use to collect information from the offspring." (Lesson 7, Teacher Guide)
- The "How can I use this assessment information?" section in most lessons describes how teachers can adjust instruction or provide extra support for students who are not meeting the targeted expectations.
  - Lesson 5, Lesson Assessment Guidance " If students need more support connecting observations of the structure of plant parts with their function, use the discussion prompts that guide students in noticing details in the text, images, and videos about how those parts help the plant meet needs for water and sunlight. Additionally, use the Parts and Functions chart to help the class organize their ideas about the structure and function of plant parts throughout the lesson, making connections between the information obtained from the videos, through first-hand investigation, and from the book." (Lesson 5, Teacher Guide)
  - Lesson 7, Lesson Assessment Guidance "As you look and listen for students' ideas, notice how they describe how the offspring and parents behave and how body parts (such as eyes, ears, or noses) help capture the signals that lead to those behaviors. Look for students to explain the reason the offspring is behaving in that way and connect that to how the parent responds. When needed, probe students for more accurate observations and for evidence supporting their ideas about why the offspring/and or parent is behaving in a certain way." (Lesson 7, Teacher Guide)
- Lesson 3 and 7 Instructional Guidance describes possible next steps teachers can follow if students are not meeting targeted expectations.
  - Lesson 3 Instructional Guidance "If you notice students recognize how plants or animals of the same kind are similar but are not yet observing differences between individuals....Before Lesson 4 repeat the Explore in Lesson 2, but have student groups or partners closely observe a different plant or animal than they did in Lesson 2. Suggest using an annotation like an X to indicate characteristics of the animals or plants in the images that look different. Remind students to notice shape, size, color, and number of a type of part to help notice the differences....
  - Lesson 7 Instructional Guidance "If you notice students are noticing parent or offspring actions, but not noticing the body parts used to sense or respond...Provide copies of the Word Wall cards with eyes, ears, nose, beak, etc. Have students place or point to the card that matches the part used in the video. Prompt them to explain, "The parent used its ____ to ____." (Lesson 7, Teacher Guide)
- Summative Guidance 1 and 2 describe possible next steps teachers can follow if students are not meeting targeted expectations.
  - Summative Guidance 1 "If students select an offspring that is not consistent with the shared-parts evidence, or they leave one or both sets mostly unmarked, or their writing does not connect a claim to specific checked and X'd parts even after reminders, use one of the following feedback prompts while eliciting student ideas multimodally (e.g., gesturing, drawings, circling, orally) and across class reference materials: Can you show me what tells you in the pictures that this is possibly the offspring/baby of that parent

animal/plant? What parts are similar? Can you add checks next to those? What parts look different? Can you put X's on those parts?"

- Summative Guidance 2 "If you notice students are identifying parts and functions that do not match…With a small group, return to the Roots to Fruits: Plant Parts book and select one plant or animal to focus on. Ask the student(s) to point out parts of the plant/animal and follow up with the function of that part. Use a parts/function T-chart or provide a handout/paper with a blank parts/function T-chart (like the one the class made in Lessons 5 and 6) for students to write/draw during this discussion. Repeat with a few more examples from the book if needed." (Summative Guidance 2)

iii. Extensions for students with high interest or who have already met the performance expectations to develop deeper understanding of the practices, disciplinary core ideas, and crosscutting concepts.

- Lesson 4, Synthesize Section, Step 4 "**Extension Opportunity:** Invite students to keep noticing patterns outside of class. Ask them to look for a plant or animal in their home, yard, or community and prompt questions, like *Does a younger one look similar but not exactly the same? What parts match? What parts are different?* At the start of the next lesson, take 2 minutes for students to turn and talk or share one example. You may add any new evidence to Our Growing Ideas chart." (Lesson 4, Teacher Guide)
- Lesson 7, Explore Section, Step 4 "**Extension Opportunity:** To extend student thinking, invite students to compare the animal featured in the class video with another species they know about from books, the zoo, or personal experience. Guide them to ask: What is similar about the ways both kinds of animals use their body parts or behaviors to help their offspring? What is different? This encourages students who are ready for more challenge to broaden their sensemaking and connect patterns across multiple species." (Lesson 7, Teacher Guide)
- Lesson 8, Connect Section, Step 7 "Extension Opportunity: If students show interest or finish early, invite them to explore animal behaviors further by watching an additional short video (e.g., parent penguins taking turns protecting eggs or baby elephants learning to use their trunks). After viewing, prompt students to: turn and talk about the lesson question: *What part is the animal using, and what behavior is helping it survive?* • draw or write 1 way this behavior helps the animal live or grow, or • share out and add any new ideas to the Our Growing Ideas chart under Lesson 8 (optional)." (Lesson 8, Teacher Guide)
- Suggestions for extensions are for students who have high interest. The materials do not describe extensions for students who have met the performance expectations.

Criterion-Based Suggestions for Improvement

- Differentiation strategies explicitly clarity how they address the needs of all the following groups of students: Students who have already met the performance expectation(s). [Detailed Guidance, p. 28]
  - Provide additional extensions for students who have already met the targeted performance expectation.

II.F. Teacher Support for Unit Coherence

EXTENSIVE

Supports teachers in facilitating coherent student learning experiences over time by:

i. Providing strategies for linking student engagement across lessons (e.g. cultivating new student questions at the end of a lesson in a way that leads to future lessons, helping students connect related problems and phenomena across lessons, etc.).

ii. Providing strategies for ensuring student sense-making and/or problem-solving is linked to learning in all three dimensions.

The reviewers found **extensive** evidence of teacher support for unit coherence. The materials support teachers in facilitating coherent learning experiences over time by providing a storyline in the front matter that outlines what students figure out in each lesson and how ideas intentionally build from one lesson to the next. Strategies for linking student engagement across lessons include use of Navigate sections, a Notice and Wonder chart, and teacher guidance to revisit student questions and determine what has been figured out and what still needs to be explored.

i. Providing strategies for linking student engagement across lessons (e.g. cultivating new student questions at the end of a lesson in a way that leads to future lessons, helping students connect related problems and phenomena across lessons, etc.).

- The unit storyline in the front matter provides simplified guidance around what students figure out in each lesson and the conceptual navigation between lessons.
  - Front matter, Storyline, Lesson 1 "What we figure out: Animals can be different sizes (e.g., a goose and goslings). Some plants look similar to each other (e.g., cacti), and some look different from other plants (e.g., pumpkin). Plants and animals have different parts that we can observe. We have questions about what parts do and how they help plants and animals live and grow....Navigation to next lesson: Now that we have noticed that plants and animals look and act in different ways, we are wondering if plants and animals of the same kind have similar parts."
- Each lesson begins and ends with a Navigate section. These sections provide support for teachers in using student ideas and questions to guide the learning for the lesson.
  - Teacher Handbook "The Navigate component directly supports coherence for students from lesson to lesson. This component generally happens at the beginning and end of each lesson and provides opportunities for the class to take stock of where they are in finding answers to their questions, remind themselves what they figured out last time, and decide where they want to go next. Often this navigation will come naturally from questions generated by students, but occasionally the teacher will "problematize" an idea or investigation result by asking a salient question or pushing the class to consider other situations or new directions.
  - Lesson 2, Navigate Section, Step 2 "Refer back to the chart and re-read some of the questions posed by students, specifically about the different parts students noticed the plants and animals had. Recall that we noticed all the cacti had spikey parts, but some were different sizes or shapes. We wondered more about that and how the parts of the same kind of plants or animals might be similar or different." (Lesson 2, Teacher Guide)
  - Lesson 4, Navigate Section, Step 6 "Decide how to answer those questions. Highlight that many of the questions students shared were about plant and animal parts. Ask how they might figure out what those parts do and how they help the plant or animal live and grow. Listen for ideas like watching closely how plants or animals use their parts, comparing the same parts across different kinds, or reading to find out more. Let students know they will explore these questions further in the next few lessons." (Lesson 4, Teacher Guide)

  - Lesson 7, Navigate section, Step 1, "Display the Notice and Wonder chart (refer to slide A) and circle students' questions about how offspring survive if they can not use their parts the same way as the parent, or wonderings about parents helping the offspring. Display slide B and ask students to share a wondering they had about what the parent and offspring geese are doing in the picture. After a few minutes, bring students together and ask them to share any new wonders they have. Add these wonders to the Notice and Wonder chart...Craft the lesson question. Summarize that we have figured out a lot about how animals use their parts to survive, but it seems like we are wondering more about how offspring use their parts to survive and if they get help from their parents. Work with students to craft a lesson question like, How do animal offspring survive with help from their parents?" The picture does not support questions about how animals survive with help from their parents because it does not show the parent helping the offspring.

- A Notice and Wonder Chart is created in lesson 1 to capture student questions. This tool is revisited throughout the unit to take stock of what student questions have been answered and what new questions students may have.
  - Lesson 1, Synthesize Section, Step 3 "Introduce the Notice and Wonder chart. Display the Notice and Wonder chart (refer to slide G) in a place where students can all see it and participate in the discussion. Explain that in science, it is important to share our observations (or what we noticed) and questions (what we wonder) so we can keep track of our thinking and see what we can figure out next. This chart is a place where we can record our first ideas and questions. The following is an example of how your Notice and Wonder chart might look. Remember to use your own class ideas, drawings, and students' languages in the chart--this is only a sample... As students share more questions, add them to the Notice and Wonder chart in the "Wonder" column. Consider grouping similar questions or using a color code or other annotations to indicate related questions. Pause to ask students if they agree with the placement while adding the questions to the chart." (Lesson 1, Teacher Guide)
  - Lesson 3, Navigate Section, Step 1 "Display slide B with the images from Lesson 1 and continue the brief discussion to recall connections made to the unit phenomenon--different plants and animals have unique parts--to remind students of what we are still wondering related to how plants and animals look (refer to the Notice and Wonder chart as relevant to the class's discussion)." (Lesson 3, Teacher Guide)
  - Lesson 5, Navigate Section, Step 6 "Now that we figured out how plant parts help plants do different things, what questions do we still have on our Notice and Wonder chart?" (Lesson 5, Teacher Guide)

ii. Providing strategies for ensuring student sense-making and/or problem-solving is linked to learning in all three dimensions.

- Lesson 2, Explore Section, Step 2 " Distribute one plant or animal card from the Plant Animal Cards handout to each group (it is OK if a plant or animal is repeated with more than one group). Each page is one card featuring images of one kind of plant or one kind of animal. As groups make their observations, circulate and ask questions similar to the following: Can you show me what parts you notice all the plants/animals in these images have? What similarities do you notice between the plants/animals in these images? Does your group agree? Are you noticing anything different between the plants/animals? Does your group agree? How does the color compare between the plants or animals in the images? What about size? Are any parts different shapes?" (Lesson 2, Teacher Guide)
- Lesson 5, Explore Section, Step 3 "Celebrate that students gathered evidence about how stems help the plant. Point out that the class still has questions about other plant parts, like leaves, flowers, and fruit. Highlight that plants also need light, but we have not yet figured out which part helps them get that. Ask students to share other ways scientists can gather evidence. Listen for ideas such as reading books, looking at pictures, or observing real plants. Explain that today we will read a book to find out more about the jobs of different plant parts." (Lesson 5, Teacher Guide)

- Lesson 10, Synthesize Section, Step 2, "Revisit the Gotta-Have-It Checklist. Display the class's Gotta-Have-It Checklist (refer to slide C). Remind students that even though they may be designing items inspired by different plants or animals, we agreed as a class what each of the solutions should include to successfully solve the problem. Invite students to read the checklist aloud...Give directions for designing solutions. Explain that students will now begin building the design they created and revised based on feedback from Lesson 9. Remind students to use the materials available to construct a device that mimics a plant or animal part to help solve a problem related to movement, protection, getting food, or getting water and sunlight. As they build, they should make sure their solution meets the criteria listed on the class Gotta-Have-It Checklist. Review the Gotta-Have-It Checklist with the class." (Lesson 10, Teacher Guide)

Criterion-Based Suggestions for Improvement

- Ensure the images students observe authentically motivate the intended lesson questions.

II.G. Scaffolded differentiation over time

ADEQUATE

Provides supports to help students engage in the practices as needed and gradually adjusts supports over time so that students are increasingly responsible for making sense of phenomena and/or designing solutions to problems.

The reviewers found **adequate** evidence that supports is provided to help students engage in the practices as needed and gradually adjust supports over time so that students are increasingly responsible for making sense of phenomena and/or designing solutions to problems for most of the intentionally developed SEP elements. CEDS-P2 is claimed as an intentionally developed element; however when students first engage with it they do so independently without explicit support.

CEDS: Constructing Explanations and Designing Solutions

CEDS: P1: Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.

- In Lesson 1, students first use the elements by making observations as a class. In Lesson 2 they are asked to make observations in small groups. In Lesson 3, students make observations individually, then share with a partner. This progression culminates with students making observations individually as part of a summative assessment in Lesson 4. Evidence includes:
  - Lesson 1, Explore Section, Step 2 "Remind students that we decided to take a closer look at the images of plants and animals to notice more details. Ask students what some things we might look for are when we make closer observations. Listen for ideas about their parts and what they do. Explain that today they will get to make closer observations of the images from the Plants and Animals in Our Communities book." (Lesson 1, Teacher Guide)
  - Lesson 2, Explore Section, Step 2 "Display slide E and share that they will be doing something similar for one type of plant or one type of animal with a small group. Explain how some of the plants and animals are the ones we looked at in Lesson 1, but some will be new since we want to find out about a lot of different plants and animals. Each group will be an expert on their plant or animal. First, students will circle the parts that the plants or animals in the images have in common and Xs next to parts that look different. Then, they will write or draw what is similar and what is different on the Plant or Animal Comparisons handout." (Lesson 2, Teacher Guide)

  - Lesson 3, Explore Section, Step 2 "Divide students into pairs and distribute one set of plant cards to half of the partner groups and one set of animal cards to the other half. Invite students to make individual observations and begin noticing details about each of the images before they work with their partners to sort and discuss." (Lesson 3, Teacher Guide)
  - Lesson 4, Synthesize Section, Step 2 "Display slide G and explain to students that we are returning to the tree and turtle images from earlier to make observations and use patterns as evidence to figure out which could be the offspring. Show the Parent and Offspring Explanations student assessment and point out how students will: circle the possible offspring, add checks to show similarities and X's to show differences, and then write a sentence explaining their choice with evidence. Emphasize that in science, claims about parents and offspring must always be supported with evidence." (Lesson 4, Teacher Guide)

Claimed Element: CEDS**: P2: Use tools and/or materials to design and/or build a device that solves a specific problem or a solution to a specific problem.**

- In Lesson 9, students are supported in planning how they will use materials to build a solution to a problem before they have a chance to use the materials. In Lesson 10, students are able to use the materials.
  - Lesson 9, Explore Section, Step 3 "Gather students in a Scientists Circle and reiterate that we will be designing solutions inspired by the ways the plants and animals we just gathered information about use their parts to survive. Show students the bin of available classroom materials they will be able to use for their designs (e.g., paper, cardboard, tape, string, straws, foil, craft sticks, etc.). Explain that they will not be building yet; they will be looking at the materials helps engineers plan what they might use and how they could use it. Give students a few moments to observe the materials and discuss what each one could be used for. What could you use this material for? How is this material similar to a plant or animal part (structure)? How could this material mimic (the function) of a plant or animal part? How could you combine some of these materials to make your idea work? Explain that seeing the materials first will help them think about what is possible as they draw their design solutions. (Lesson 9, Teacher Guide) Because this SEP is being intentionally developed in this unit and this is the first time students are engaging in this practice, students may need more support to use the properties of the materials in the design.
  - Lesson 10, Synthesize Section, Step 2 "Remind students to use the materials available to construct a device that mimics a plant or animal part to help solve a problem related to movement, protection, getting food, or getting water and sunlight." (Lesson 9, Teacher Guide)

INFO: Obtaining, Evaluation, and Communicating information

INFO: P1: Read grade-appropriate texts and/or use media to obtain scientific information to describe patterns in and/or evidence about the natural and designed world(s).

- In Lesson 2, the class reads a book to obtain information together. In Lesson 3, students think-pair-share to compare information they gathered. In Lesson 9, students gather information from a website and book independently.
  - In Lesson 2, Connect Section, Step 3 the class reads a book to obtain information together. "Reading together supports students in accessing information and modeling how scientists use text to gather evidence about the natural world. The whole-class approach also provides scaffolding as students figure out how to make sense of scientific texts. Students will have additional opportunities to engage in this practice in later lessons when the scaffolding is gradually removed and they use websites with a partner to obtain scientific information." (Lesson 2, Teacher Guide)

- Lesson 3, Connect Section, Step 4 Students are told to watch a video twice and prompted to observe closely."Give directions for making additional observations. Share that we will watch the video again as we keep investigating how parents and offspring are similar and different. Explain that to help us observe closely, we can divide up the animals so we have scientists in the room focusing on each animal. Then, name animals one by one and have students volunteer for which animal they will watch closely for what is similar and different between the parent and the offspring. Make sure there are at least 2 students for every animal listed." (Lesson 3, Teacher Guide)
- Lesson 3, Connect Section, Step 4 students engage in a think-pair-share to compare the information they gathered. "Add new information to the Parts and Functions chart. Display slide K and guide students through a think–pair–share as they obtain and communicate information from the book and videos about how each plant part helps the plant live and grow. First, have students think quietly about one new idea they found in the book or noticed in a video or investigation. Then, have them share with a partner to compare what they noticed. Finally, invite pairs to contribute their ideas to the class Parts and Functions chart, connecting information from the book, videos, and the investigation. Students can act, draw, or write to show their observations about each plant part. This supported routine helps students develop the practice of obtaining and communicating information before applying it independently in later lessons."
- Lesson 9, Connect Section, Step 2 "Have each student work independently to gather information about plants and animals that could inspire their design ideas. Make sure every student has their Design Ideas handout and access to a device with the website bookmarked. Also, ensure students know where to find print materials, such as the books from Lessons 5 and 6 and the unit charts (Our Growing Ideas, Parts and Functions). While students are gathering information and filling out their Design Ideas handout, circulate to aid with any questions or confusion." (Lesson 9, Teacher Guide)

Criterion-Based Suggestions for Improvement

- Ensure "[s]caffolding is explicitly reduced over time for use of nearly all SEP elements stated as targeted learning objectives... [Detailed Guidance, p. 33]
  - Consider adding additional support for students who are engaging with CEDS-P2 (Use tools and/or materials to design and/or build a device that solves a specific problem or a solution to a specific problem.) for the first time. Some students may need additional support to know what to do with their materials or how to use them.

CATEGORY III

Monitoring NGSS Student Progress

III.A. Monitoring 3D Student Performance

ADEQUATE

Elicits direct, observable evidence of three-dimensional learning; students are using practices with core ideas and crosscutting concepts to make sense of phenomena and/or to design solutions.

The reviewers found **adequate** evidence that materials elicit direct, observable evidence of three-dimensional learning and that students are using practices with core ideas and crosscutting concepts to make sense of phenomena and/or to design solutions. In Lessons 1-10, teachers are prompted to assess student performance by listening to students' ideas and making observations of artifacts produced by students. Students produce several artifacts that require them to integrate the use of the three-dimensions; however, there are several instances that artifacts produced by students that are related to lesson goals do not require the use of the claimed elements.

Formal tasks in the materials are driven by well-crafted phenomena- and problem-based scenarios that can elicit rich student performances.

- Lesson 4, Synthesize Section, Step 2 "Students are shown one image of a turtle labeled "parent" and two turtles labeled "offspring." They are asked to Circle the image of the smaller turtle that could be the offspring of the larger one... Use checks (✓) to show what is similar and Xs to show what is different between the parent and offspring... Explain why you circled that offspring." Later students are given an image of a tree labeled "parent" and two trees labeled "offspring." Students are asked to Circle the image of the smaller tree that could be the offspring of the larger one... Use checks (✓) to show what is similar and Xs to show what is different between the parent and offspring... Explain why you circled that offspring." (Lesson 4, Teacher Guide)
- Lesson 8, Synthesize Section, Step 2 "Students observe an eagle video and pictures. They are asked to "Circle the parent's part in the picture, and then circle how the parent helps the baby survive...Explain how this helps the baby survive." Later students are given two images of plants and are asked to "Circle a part of one of the plants, and then circle how the plant uses that part...Explain how the part can help the plant survive." (Lesson 8, Teacher Guide)
- Lesson 10, Connect Section, Step 3: Students "Use the box below to draw or write about the challenge you will be solving." They are prompted "In the table below, draw or write about parts plants or animals use that could be helpful to mimic to help you solve your challenge...In the box below, draw your design solution that mimics the plant and animal parts you found...Draw or write a list of the materials you will use in the box below." (Lesson 10, Teacher Guide)

Student performances produce artifacts of integrating the three dimensions in service of sense-making or problem-solving.

- Lesson 2, Explore Section, Step 2: " First, students will circle the parts that the plants or animals in the images have in common and Xs next to parts that look different. Then, they will write or draw what is similar and what is different on the Plant or Animal Comparisons handout. Demonstrate how there is space to do this on a class copy of the handout or the image of the handout on **slide E**." (Lesson 2, Teacher Edition) **CEDS: P1: Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. LS3.B: Variation of Traits: Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. PAT: P1: Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.**
- Lesson 7, Connect Section, Step 3 "**Demonstrate accessing and navigating the website.** Demonstrate to students how they will be accessing the How Plants and Animals Meet Their Needs Website using available classroom technology. Point out the various headings and menus they can choose from, reading these aloud before students

use the website with their partners. **Demonstrate where to record observations.** Display **slide H** and remind students that we are interested in figuring out how offspring survive. We already have some initial ideas that they might act in certain ways or communicate with others, so we will be observing how offspring and parent animals act and what body parts they use to notice and respond. Suggest that we record our observations on the Offspring and Parent Observations handout. Remind students that **observations** *are details you notice by watching, listening, or feeling*. Encourage students to use words, symbols, or drawings to capture both the body parts (such as eyes, ears, nose, mouth) and the behaviors they observe. Pass out a copy of the Offspring and Parent Observations handout to each student." (Lesson 7, Teacher Guide) INFO**: P1: Read grade-appropriate texts and/or use media to obtain scientific information to describe patterns in and/or evidence about the natural and designed world(s). LS1.D: Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs. (1-LS1-1) LS1.B: Growth and Development of Organisms: Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive. (1-LS1-2) PAT: P1: Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.**

- Lesson 9, Connect, Step 2, "**Choose a problem to solve.** Display **slide D** with the Design Ideas handout. Before beginning new research, explain that each student will now choose one of the problems they sorted earlier to focus on. They will research plants and animals that could inspire their own design solutions. They may choose the problem they wrote on a sticky note in Lesson 8, or they may choose another problem that interests them more. Distribute the handout and have students draw or write about the problem they will be solving in the first box on the Design Ideas handout and have them circle the category for their problem (Movement, Protection, Getting Food, Gets Water & Sunlight)." (Lesson 9, Teacher Guide) **Use tools and/or materials to design and/or build a device that solves a specific problem or a solution to a specific problem. (CEDS-P2) All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. (LS1.A-P1) The shape and stability of structures of natural and designed objects are related to their function(s). (SF-P1)**

Students sometimes produce artifacts with evidence of using the grade-appropriate elements of SEPs, CCCs, and DCIs that are targeted as learning objectives

- Lesson 3, Explore section, Step 2, "What parent and offspring plant or animal is your group observing?...In the table below, add a check (✓) in the box under similar or different for each characteristic of the parent and offspring plant or animal that you observed." (Parent and Offspring Comparisons) Elements: **LS3.B-P1 Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. LS3.A-P1 Young animals are very much, but not exactly, like their parents. Plants also are very much, but not exactly, like their parents. PAT-P1 Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence. INV-P4 Make observations (firsthand or from media) to collect data that can be used to make comparisons. (not an intentionally developed SEP)** Students record their observations and whether or not their data matches the class patterns, The task does demonstrate student ability to use observations to make comparisons. Because students do not record what they think the pattern is, the artifact does not demonstrate individual student ability to use patterns or their understanding of ideas related to the DCI, because they do not use the pattern to draw conclusions about the relationships between young plants and animals and their parents beyond the plant/animal that they observed.
- Lesson 4, Synthesize section, Step 2, "Circle the image of the smaller turtle that could be the offspring of the larger one. Use checks (✓) to show what is similar and Xs to show what is different between the parent and offspring... Explain why you circled that offspring...Circle the image of the smaller tree that could be the offspring of the larger

one.Use checks (✓) to show what is similar and Xs to show what is different between the parent and offspring… Explain why you circled that offspring." (Parent and Offspring Explanations) **PAT: P1: Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence., LS3.B-P1: Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways, LS3.A-P1: Young animals are very much, but not exactly, like, their parents. Plants also are very much, but not exactly, like their parents.** and **CEDS: P1 Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.**

- Lesson 6, Connect section, Step 4, "Read aloud about each animal. Pause after each section to ask what parts the animal has and how those parts help it survive. As needed, point to illustrations and gesture parts or act out their function to make meaning clear beyond words. Encourage students to notice both the images and the text as they gather ideas, since informational texts use both to communicate meaning. Add these ideas to the Parts and Functions chart that began in the Explore. Ask students to share other terms for these parts or stories of their previous experience with them. As students gather more information about animals with similar parts and functions, consider adding the animal names next to the parts. Remind students that this chart is evidence they will return to in later lessons when they explain how parts help animals survive." The teacher creates an artifact of student learning when they record observations on the "Following Students' Sensemaking 2" tool. **LS1.A-P1 All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. LS1.B-P1: Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive, LS1.D-P1 Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs. INFO-P1 Read grade-appropriate texts and/or use media to obtain scientific and/or technical information to determine patterns in and/or evidence about the natural and designed world(s). CCC 6.P1 The shape and stability of structures of natural and designed objects are related to their function(s).**

- Lesson 7, Connect Section, Step 3, "Use words, symbols, and/or drawings to record what the offspring and their parents are doing in the video. Show the body part they use to notice and how they respond." (Offspring and Parent Observations Handout) **PAT: P1: Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence., LS1.B-P1: Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive, LS1.A-P1 All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. LS1.D-P1 Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs.** and INFO-P1 **Read grade-appropriate texts and/or use media to obtain scientific and/or technical information to determine patterns in and/or evidence about the natural and designed world(s).** Students record observations of the body parts used to notice and how the parents and offspring respond, however the artifact will not demonstrate if students understand that the behaviors help the offspring survive.

- Lesson 8, Synthesize section, Step 2 "Observe the eagle video and pictures. Circle the parent's part in the picture, and then circle how the parent helps the baby survive…Explain how this helps the baby survive.Circle a part of one of the plants, and then circle how the plant uses that part…Explain how the part can help the plant survive."(Parts and Survival Explanation)**CEDS-P1: Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (CEDS-P1) LS1.B-P1 Adult plants and animals can have young. In**

many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive, LS1.D-P1 Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs. Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence. (**PAT-P1** The idea that the plant part helps it survive is provided by the assessment rather than students. In addition, students are unlikely to use knowledge of how body parts capture and convey information. Students may show understanding of LS1.D-P1 if they choose to discuss the plant tendrils function in climbing, but the assessment does not specifically require it. If students choose one of the other plant parts and functions, they are unlikely to use LS1.D-P1 in their explanation. Students are unlikely to use LS1.D-P1 in their explanations related to animal parts and functions.The only parent part pictured is the beak and that is not a sensory organ.

- Lesson 9, Explore section, Step 3, "Use the box below to draw or write about the challenge you will be solving... Category: Movement Protection Getting Food Gets Water & Sunlight...In the table below, draw or write about parts plants or animals use that could be helpful to mimic to help you solve your challenge." (Design Ideas Handout) **LS1.A-P1 All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. CCC 6.P1 The shape and stability of structures of natural and designed objects are related to their function(s),CEDS-P2 Use tools and/or materials to design and/or build a device that solves a specific problem or a solution to a specific problem.**

Criterion-Based Suggestions for Improvement

- Ensure that "Student artifacts that require grade-appropriate elements of all three dimensions to be used together are used frequently, including to evaluate targeted learning objectives." (Detailed Guidance, p35)

III.B. Formative

EXTENSIVE

Embeds formative assessment processes throughout that evaluate student learning to inform instruction.

The reviewers found **extensive** evidence that formative assessment processes evaluate student learning to inform instruction. There are opportunities in every lesson for formative assessment information to be gathered, recorded, and used to inform future instruction.

The materials include explicit, frequent, and varied supports for formative assessment processes.

- Each lesson has at least one formative assessment opportunity that is explicitly called out. Many lessons have more than one formative assessment opportunity called out. The materials describe different types of formative assessments in the yellow callout boxes: pre-assessment, formative assessment, self-reflection, and key formative assessments. Teachers can find instructional next steps using the formative assessments in both the formative assessment call-out boxes and the "How can I use this information" section of the Lesson Assessment Guidance at the beginning of each lesson.

- Lesson 3, Explore Section, Step 2 "Students' card sorting and the surrounding discussions provide an opportunity to gather evidence about Learning Goal 3 (aligned to Assessment Statement 1), with the purpose of providing feedback to students and guiding instruction in upcoming lessons. Encourage students to clarify and communicate their ideas about patterns observed in Lesson 2 about the way 2 plants or animals of the same kind look to determine which images feature a smaller and bigger version of the same plant or animal. Refer to the Following Student Sensemaking 1 tool and the Lesson Assessment Guidance at the beginning of the lesson." (Lesson 3, Teacher Guide)
- Lesson 6, Connect Section, Step 4 " Students' use of the Animal Parts in Action book to add evidence to the Parts and Functions chart provides an opportunity to gather evidence about Learning Goal **6** (aligned to Assessment Statement 2) with the purpose of providing feedback and supporting students in obtaining information from a text and using it to connect animal parts to how they help animals survive. Look for how students attend to both text and images to identify animal parts, what those parts do, and how that helps the animal survive. See the Lesson Assessment Guidance and Following Students' Sensemaking 2 tool for more support. If students are only naming animal parts, prompt with something like, "What does that part help the animal do, and how does that help it survive?" If students are only describing what the animal does, prompt with something like, "Which part helps the animal do that so it can survive?" If students are struggling to connect both, guide them back to the image or labels and reread the section together." (Lesson 6, Teacher Guide)

Formative assessment processes routinely provide varied support for student thinking across all three dimensions.

- Support for student thinking across all three dimensions can be found in the yellow formative assessment call-out boxes and the Instructional Guidance documents. Examples include:
  - Lesson 2, Explore Section, Step 2 "Formative assessment: Students' written, spoken, and gestured observations while observing the Plant Animal Cards handout and completing the Plant or Animal Comparisons handout provides an opportunity to gather evidence about Learning Goal 1 (aligned to Assessment Statement 1) with the purpose of supporting students in making observations that will support identifying patterns of similarities and differences between the same kinds of plants and animals. Students will use these patterns to construct an evidence-based account in the Synthesize of this lesson. Use the Following Student Sensemaking 1 tool to record evidence of students' developing sensemaking. **If students are using general terms such as "the animals look the same," follow with questions like, "Can you show or tell me what parts look the same?" or "What details do you notice that help you know they are similar?"** If students are not yet **noticing variation between animals or plants of the same type, point to a part they circled and, as applicable, ask what they notice about the size, shape, or color.** Students may begin to discuss some of the functions of different animal parts. Add these ideas and questions to the Notice and Wonder chart to revisit in Lessons 5 and 6."
  - Lesson 6, Connect Section, Step 4 "Formative assessment: Students' use of the Animal Parts in Action book to add evidence to the Parts and Functions chart provides an opportunity to gather evidence about Learning Goal 6 (aligned to Assessment Statement 2) with the purpose of providing feedback and supporting students in obtaining information from a text and using it to connect animal parts to how they help animals survive. Look for how students attend to both text and images to identify animal parts, what those parts do, and how that helps the animal survive. See the Lesson Assessment Guidance and Following Students' Sensemaking 2 tool for more support. **If students are only naming animal parts, prompt with something like, "What does that part help the animal do, and how does that help it survive?**" If students are only describing what the animal **does**, prompt with something like, **"Which part helps the animal do that so it can survive?"** If students are struggling to connect both, **guide them back to the image or labels and reread the section together.**" (Lesson 6, Teacher Guide)

Formative assessment processes routinely attend to multiple aspects of student equity.

- Lesson 5, Connect Section, Step 4 "Formative assessment: Students' spoken, written, and gestured observations while adding to the Parts and Functions chart provide an opportunity to gather evidence for Learning Goal 5 (aligned to Assessment Statement 2). This assessment focuses on how students obtain and use information from a text to identify relationships between the structure of plant parts and their functions in helping plants live and grow. Use the Following Students' Sensemaking 2 tool to record evidence of students' developing sensemaking." (Lesson 5, Teacher Guide)
- Lesson 7, Explore Section, Step 4 "As students begin to share ideas, you might find it helpful to encourage them to use gestures/sounds to help them explain the behaviors that they observed. As you work to capture their ideas on the patterns chart, include visual representations of their ideas (drawings, symbols, etc.) if possible. Both strategies will benefit multilingual students, as well as all students, as they ensure that all students can share ideas and understand the ideas being shared." (Lesson 7, Teacher Guide)

Criterion-Based Suggestions for Improvement: N/A

III.C. Scoring Guidance

EXTENSIVE

Includes aligned rubrics and scoring guidelines that provide guidance for interpreting student performance along the three dimensions to support teachers in (a) planning instruction and (b) providing ongoing feedback to students.

The reviewers found **extensive** evidence that the materials include scoring guidelines that provide guidance for interpreting student performance along the three dimensions to support teachers in (a) planning instruction and (b) providing ongoing feedback to students.

The Lesson Assessment Guidance at the beginning of each lesson describes what the teacher should look and listen for aligned to targeted learning. Examples Include:

- Lesson 3, Lesson Assessment Guidance "What to look and listen for: Matching **plant or animal parent and offspring** based on **observed similarities**. **Comparing** the shape, size, and color of the **parent and offspring** to **observe** the **pattern** that each **plant and/or animal offspring** in the set **looks a lot like the parent, but is not exactly the same."** (Lesson 3, Teacher Guide)
- Lesson 7, Lesson Assessment Guidance "What do look and listen for: Students **making observations** (written, gestured, and/or spoken) of **offspring and parent behaviors** that **are similar or different**. Students **using observations to explain** a **pattern** in which **offspring use behaviors to communicate a need, and how parents detect those signals with their body parts.** Students **using observations to explain** a **pattern** in which **parents use behaviors to respond to a need after gathering information with their body parts."** (Lesson 7, Teacher Guide)

The Following Student Sensemaking 1 and and Following Student Sensemaking 2 tools provides a checklist related to targeted learning and directs teachers where they should look for evidence of that learning. Examples include:

- **Following Student Sensemaking 1 "Observations** (written, gestured, and/or spoken) of **plants' and animals' parts** that **look similar or different.** (Likely in Lessons 2-3) **Observations and descriptions of patterns** in which **individuals of the same kind are similar but can also vary.** (Likely in Lessons 2-3) **Comparisons of patterns in observations of parents and offspring** to determine that each **plant and/or animal offspring** in the set **looks a lot like the parent, but is not exactly the same.** (Likely in Lesson 3)" (Following Student Sensemaking)

The Lesson 3, 7, and 9 Instructional Guidance documents provide teachers with the connection between the Key Formative assessments in the unit and the targeted three-dimensional learning objectives. These documents describe what evidence for student learning teachers should look for in their students' responses and possible next steps for the whole class or smaller groups of students. Example from Lesson 7:

- Lesson 7 Teacher Assessment Tool "If you notice students...are only identifying what they saw (e.g., "the baby made a sound" or "the parent moved") without connecting the behaviors to how they help the offspring survive....Possible next steps...If this applies to most or all of your class: Before Lesson 8, return to one video from the How Plants and Animals Meet Their Needs Website site and replay a video. Pause after the offspring's action and ask something like, *What do you think the baby was trying to get?* Then, replay the parent's response and ask something like, *How did the parent's action help the baby?* Record the connection on the class chart to model linking behavior to survival. If this applies to some of your class:Work in a small group with 1-2 videos. Use sentence frames or T-charts (offspring-parent response-how it helps) to support students in making connections. Especially for multilingual learners, allow explanations in their home language or with sentence frames to ensure reasoning is captured" (Lesson 7 Teacher Assessment Tool)

The Summative Guidance 1 and 2 documents describe how to provide feedback to students for a range of student responses. Examples include:

- Summative Guidance 1 "If students select an offspring that is not consistent with the shared-parts evidence, or they leave one or both sets mostly unmarked, or their writing does not connect a claim to specific checked and X'd parts even after reminders, use one of the following feedback prompts while eliciting student ideas multimodally (e.g., gesturing, drawings, circling, orally) and across class reference materials: Can you show me what tells you in the pictures that this is possibly the offspring/baby of that parent animal/plant? What parts are similar? Can you add checks next to those? What parts look different? Can you put X's on those parts?" (Summative Guidance 1)

Criterion-Based Suggestions for Improvement: N/A

III.D. Unbiased Tasks/Items

EXTENSIVE

Assesses student proficiency using methods, vocabulary, representations, and examples that are accessible and unbiased for all students.

The reviewers found **extensive** evidence that tasks/items assess student proficiency using methods, vocabulary, representations, and examples that are accessible and unbiased for all students. The unit does not provide students with an opportunity to choose a modality for demonstrating their learning in an assessment.

Multiple modes of communication

- The Summative Assessment Callouts in Lessons 4 support teachers in identifying evidence for student learning using multiple modes of communication. Examples include:
  - Lesson 4, Synthesize Section, Step 2 "Summative assessment: Students' individual explanations on the Parent and Offspring Explanations or Parent and Offspring Explanations in Black-and-White student assessments provide an opportunity to gather evidence about Learning Goal 4, with the purpose of summatively assessing students' use of patterns as evidence to explain how parents and offspring of the same kind of animal or plant are like, but not exactly alike, one another. Students can show their evidence in multiple ways: circling and marking similarities/differences, drawing parts that are the same and different, writing a sentence about evidence, or explaining orally or with gestures. Accept any of these modalities as evidence of students using patterns to explain how plant and animal offspring are similar to, but not exactly like, their parents. If students share their ideas orally, consider using the Following Student Sensemaking 1 tool to keep track of their ideas. If students use the black-and-white version, project the color images from the slides to support accurate observations. Use the Following Student Sensemaking 1 and Summative Guidance 1 tools to provide feedback to students." (Lesson 4, Teacher Guide)
- The Summative Assessment callout in Lesson 8 provides teachers guidance for using writing and class discussions as evidence for student learning.
  - Lesson 8, Synthesize Section, Step 2 "Summative assessment: Students' individual explanations on the Parts and Survival Explanation handout provide an opportunity to gather evidence about Learning Goal 8.A (aligned to Assessment Statement 2), with the purpose of summatively assessing students' explanations of how plant and animal parts and behaviors help them survive. Evidence may also be observed during the Consensus Discussion when students share their explanations as a class. Refer to the Summative Guidance 2 tool and the Lesson Assessment Guidance at the beginning of the lesson for more guidance." (Lesson 8, Teacher Guide)

Supports success for all students

- All assessment tasks are fair, unbiased, and refrain from assuming students know culturally specific information.
- For each summative assessment, students have an opportunity to individually reflect on their work, get peer feedback, and revise following peer feedback before being evaluated.
  - Lesson 4, Synthesize section, Step 2 "Reflect on the written explanations. As students finish, refer back to slide F and remind them of the steps their explanations should include. Have students quickly check that they circled, checked, X'd, and wrote about evidence. Give students a moment to revise if needed."
  - Lesson 4, Synthesize section, Step 3 "Students give peer feedback. Have students turn to their shoulder partner and share their explanations using the agree-and-question routine. Make sure each student has their

Parent and Offspring Explanations student assessment with them as they talk. Students revise explanations. After both partners have shared, give students a few minutes to revise their explanations on the Parent and Offspring Explanations student assessment."

  - Lesson 8, synthesize section, step 3, "Once all partners have shared, give students a few minutes to make revisions to their explanations on their Parts and Survival Explanation handout."

- Many of the assessment opportunities (formative and summative) include or suggest sentence starters or frames for students.
  - Lesson 2, Synthesize section, step 4, "As students share ideas, add them to the column titled, "What did we figure out?" You may also display the Discussion Supports handout to provide additional sentence starters for students to use as needed throughout the discussion."
  - Lesson 3, Explore section, Step2, "Have students return to their original partnerships and distribute one copy of the Parent and Offspring Comparisons handout to each set of partners. Instruct each partner group to complete the Parent and Offspring Comparisons handout for just one of the plants or animals they observed... As students finish recording their observations, invite 1-2 partners who observed plants and 1-2 partners who observed animals to share what they observed and recorded with each other. To support multilingual students, provide sentence stems or scaffolds for speaking and oral participation as needed."
  - Lesson 4, Student Assessment, Parent and Offspring Explanations, " Use sentence starters as needed: I think this is the offspring because ___. They both have ___ but ___ is different. The ___ on both the parent and offspring are similar. I know this is the offspring because I noticed ___. A pattern I see is ___."
  - The Lesson 8 Parts and Survival Explanation handout includes sentence starters / frames to support students in constructing their claim.

Multiple modalities and student choice

- Lesson 3, Parent and Offspring Comparisons handout, "What parent and offspring plant or animal is your group observing? You may draw or write."
- Lesson 5 Lesson Assessment Guidance, "What to look and listen for: Spoken descriptions of and/or gestures to information from texts and media about what plant parts (structure) do to help plants survive and grow (function). Roots anchor the plant into the ground (structure) and take in water (function). The stem is like a tube (structure) that moves water through the plant (function). Leaves grow toward the sun (structure) and collect light (function). Evidence of students' ideas may be expressed in words, drawings, written or spoken descriptions, movement, and/or gestures. Refer to the Following Students' Sensemaking 2 tool for additional details."
- Design Ideas Handout, "Use the box below to draw or write about the challenge you will be solving ...In the table below, draw or write about parts plants or animals use that could be helpful to mimic to help you solve your challenge."
- Lesson 10, Connect section, Step 3, "Depending on students' needs and interests, offer flexibility in how they present their designs. In addition to a gallery tour, students might record a short video demonstration or present to a partner group. Providing options allows all students to share their thinking in a way that feels accessible and engaging." This is presented as optional. It is the only opportunity in the unit for student choice in the modality of a major assessment.

Criterion-Based Suggestions for Improvement

- "The materials include at least one significant task that provides students with a choice of responses across multiple modalities." (Detailed Guidance, p. 43)
  - Ensure students have an opportunity to select the modality they express their learning in the unit.

III.E. Coherent Assessment System

ADEQUATE

Includes pre-, formative, summative, and self-assessment measures that assess three-dimensional learning.

The reviewers found **adequate** evidence that the materials include pre-, formative, summative, and self-assessment measures that assess three-dimensional learning. There is an assessment system that supports teachers in understanding how students' three-dimensional performances in each assessment fit together to reflect student learning related to the assessment statements across the unit. Some, but not all, assessments require students to apply grade-appropriate elements included in three-dimensional learning goals.

Sometimes assessments require students to apply grade-appropriate elements included in the three-dimensional learning objectives.

- Lesson 3, the three dimensional learning objective is **Make observations of plant and animal offspring to compare how they are similar to and different from their parents.**
  - Lesson 3, Explore section, Step 2, "What parent and offspring plant or animal is your group observing?...In the table below, add a check (✓) in the box under similar or different for each characteristic of the parent and offspring plant or animal that you observed." (Parent and Offspring Comparisons) Elements: **LS3.B-P1 Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. LS3.A-P1 Young animals are very much, but not exactly, like their parents. Plants also are very much, but not exactly, like their parents. PAT-P1 Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence. INV-P4 Make observations (firsthand or from media) to collect data that can be used to make comparisons. (not an intentionally developed SEP)** Students record their observations and whether their data match the class pattern, but they do not record what they think the pattern is, so the artifact does not demonstrate individual student understanding of ideas related to the DCI or their ability to use patterns. The task does demonstrate students' ability to use observations to make comparisons.
- Lesson 4, the three-dimensional learning objective is **Make observations and construct an evidence-based account that explains how plant and animal offspring are similar to, but not exactly like, their parents, using patterns as evidence.**
  - Lesson 4, Synthesize Section, Step 2, "Introduce the Parent and Offspring Explanations student assessment. Display slide G and explain to students that we are returning to the tree and turtle images from earlier to make observations and use patterns as evidence to figure out which could be the offspring. Show the Parent and Offspring Explanations student assessment and point out how students will: circle the possible offspring, add checks to show similarities and X's to show differences, and then write a sentence explaining their choice with evidence. Emphasize that in science, claims about parents and offspring must always be supported with evidence." (Lesson 4, Teacher Guide)

- Lesson 5, the three-dimensional learning objective is **Obtain information from texts and media to gather evidence about how different parts of plants (structure) help plants survive and grow (function).**
  - Lesson 5, Connect Section, Step 2 "Formative assessment: Students' written, spoken, and gestured observations while co-constructing the Parts and Functions chart provide an opportunity to gather evidence about Learning Goal 5 (aligned to Assessment Statement 2) with the purpose of supporting students in gathering information from video that will support identifying the relationship between the structure of plant parts and their functions in helping plants live and grow." (Lesson 5, Teacher Guide) LSD.1-P1 is claimed as a target element in this lesson, but is not explicitly addressed in the Parts and Function chart or surrounding conversations.
- Lesson7, the three-dimensional learning objective is **Obtain and use information from videos to identify patterns in how animals use their body parts to respond to information from their environment, and how parents' and offspring's behaviors help them live and grow.**
  - Lesson 7, Connect Section, Step 3, "Use words, symbols, and/or drawings to record what the offspring and their parents are doing in the video. Show the body part they use to notice and how they respond." (Offspring and Parent Observations Handout) Students record observations but do not synthesize them and record their meaning, so the artifact does not show student understanding of the central idea that the behaviors help the offspring survive.
- Lesson 8, the three-dimensional learning objective is **Construct an evidence-based account that explains how patterns in parents' and offspring's behaviors, including how they use their body parts, help the offspring live and grow.**
  - Lesson 8, Synthesize Section, Step 2 "Observe the eagle video and pictures. Circle the parent's part in the picture, and then circle how the parent helps the baby survive...Explain how this helps the baby survive.Circle a part of one of the plants, and then circle how the plant uses that part...Explain how the part can help the plant survive."(Parts and Survival Explanation) The idea that the plant part helps it survive is provided by the assessment, not the students. In addition, students are unlikely to use knowledge of how body parts capture and convey information. Students may show understanding of LS1.D-P1 if they choose to discuss the plant tendrils' function in climbing, but the assessment does not specifically require it. If students choose one of the other plant parts and functions, they are unlikely to use LS1.D-P1 in their explanation. Students are unlikely to use LS1.D-P1 in their explanations related to animal parts and functions. The only parent part pictured is the beak, and that is not a sensory organ.
- Lesson 9, the three dimensional learning objective is **Use materials to design a solution** that mimics **the function** of **external parts of plants or animals (structure) to solve a human problem**.
  - Lesson 9, Explore Section, Step 3, "Design solutions. Display slide I and give students time to independently draw their idea for a solution that mimics the plants and/or animals they gathered information about, and to write or draw the materials that they will need....While students are working, circulate and check in with students using the following prompts: What plant or animal part inspired you to design this idea? How will we know that you were mimicking a plant or animal part? How will what you are designing help you solve your problem? How are the materials similar to the plant or animal part? How will the materials that you chose help you design your solution?" (Lesson 9, Teacher Guide)

Pre-, formative, summative, and self-assessment

Pre-Assessment

- Assessment System Overview, "As students engage in these lessons, there are multiple opportunities to gather pre-assessment evidence. This evidence can be used to determine what incoming ideas, experiences, and sensemaking strategies students bring to the unit. All ideas and experiences should be invited into the classroom and be considered as resources to support students' ongoing sensemaking. These opportunities should not be used to assign a score or a grade." (Unit Front Matter)
- Lesson 1, Explorer Section, Step 2 "The small-group observations (slide F) provide an opportunity to gather evidence about Learning Goals 1.A and 1.B (aligned to Assessment Statements 1 and 2), with the purpose of determining any support students may need in upcoming lessons as they begin making observations of plant and animal parts and noticing behaviors of parents and offspring. Accept all student ideas. Teachers can also listen for these ideas during the Initial Ideas Discussion (slide H). Refer to the Lesson Assessment Guidance at the beginning of the lesson for more details." (Lesson 1, Teacher Guide)
- Lesson 8, Connect Section, Step 7 "Pre-assessment: Students' small-group and whole class work with the How Parts Help handout (slides K–L) provides an opportunity to gather evidence about Learning Goal 8.B (aligned to Assessment Statement 3), with the purpose of determining support students may need in upcoming lessons as they generate solutions to problems by mimicking how plants and animals use their parts. Accept all student ideas. Refer to the Lesson Assessment Guidance at the beginning of the lesson for more guidance." (Lesson 8, Teacher Guide) Students do not generate any solutions to a problem in this lesson and are not engaging with the tagged SEP.

Formative Assessment

- Lesson 3, Explore section, Step 2, "Students' Parent and Offspring Comparisons handout and the surrounding discussions provide an opportunity to gather evidence about Learning Goal 3 (aligned to Assessment Statement 1), with the purpose of providing feedback to students and guiding instruction in upcoming lessons about explaining patterns in how parent and offspring plants and animals look compared to one another.
- Lesson 6, Connect Section, Step 2, "Students' use of the Animal Parts in Action book to add evidence to the Parts and Functions chart provides an opportunity to gather evidence about Learning Goal 6 (aligned to Assessment Statement 2) with the purpose of providing feedback and supporting students in obtaining information from a text and using it to connect animal parts to how they help animals survive. Look for how students attend to both text and images to identify animal parts, what those parts do, and how that helps the animal survive." LSD.1-P1 is claimed as a target element in this lesson, but is not explicitly addressed in the Parts and Function chart, the Animal Parts in Action book, or surrounding conversations
- Lesson 7, Explore section, Step 4, "Observing and describing patterns of behaviors in the videos provides evidence for Learning Goal 7 (aligned to Assessment Statement 2). Students use information from the video to identify how offspring signal their needs and how parents respond, demonstrating that organisms use body parts and behaviors to sense and respond to information from their environment." (Lesson 7, Teacher Guide)

Summative Assessment

- Summative assessments are provided in Lessons 4, 8 and 10.
- Lesson 4, Synthesize Section, Step 2 "Summative assessment: Students' individual explanations on the Parent and Offspring Explanations or Parent and Offspring Explanations in Black-and-White student assessments provide an opportunity to gather evidence about Learning Goal 4, with the purpose of summatively assessing students' use of patterns as evidence to explain how parents and offspring of the same kind of animal or plant are like, but not

exactly alike, one another. Students can show their evidence in multiple ways: circling and marking similarities/differences, drawing parts that are the same and different, writing a sentence about evidence, or explaining orally or with gestures. Accept any of these modalities as evidence of students using patterns to explain how plant and animal offspring are similar to, but not exactly like, their parents. If students share their ideas orally, consider using the Following Student Sensemaking 1 tool to keep track of their ideas. If students use the black-and-white version, project the color images from the slides to support accurate observations. Use the Following Student Sensemaking 1 and Summative Guidance 1 tools to provide feedback to students." (Lesson 4, Teacher Guide)

- Lesson 8, Synthesize Section, Step 2 "Summative assessment: Students' individual explanations on the Parts and Survival Explanation handout provide an opportunity to gather evidence about Learning Goal 8.A (aligned to Assessment Statement 2), with the purpose of summatively assessing students' explanations of how plant and animal parts and behaviors help them survive. Evidence may also be observed during the Consensus Discussion when students share their explanations as a class. Refer to the Summative Guidance 2 tool and the Lesson Assessment Guidance at the beginning of the lesson for more guidance." (Lesson 8, Teacher Guide)
- Lesson 10, Connect Section, Step 3 "Summative assessment: Students' individual designs provide an opportunity to gather evidence about Learning Goal 10, with the purpose of summatively assessing students' solution devices to human problems by mimicking how plants and/or animals use their external parts. Use the Following Students' Sensemaking 2 tool and the Summative Guidance 3 tool to provide feedback to students." (Lesson 10, Teacher Guide)

Self Assessment

- Lesson 10, Synthesize Section, Step 2 "**Self-reflection:** These prompts offer an opportunity for students to use the Gotta-Have-It Checklist to reflect on their design solutions. This helps them celebrate how they applied scientific ideas about plant and animal parts to solve their chosen problem and consider next steps for improving or completing their solution. Refer to the Lesson Assessment Guidance at the beginning of the lesson." (Lesson 10, Teacher Guide)

Coherent three-dimensional assessment system rationale is clearly described.

- The "Assessment System Overview" section of the Teacher Guide describes the organization and intent behind the assessment system. It includes a table outlining each assessment opportunity, including the type of assessment, location in the unit, and how to evaluate student thinking.
- Each assessment opportunity is noted with an "assessment opportunity" box in the Teacher Guide, inline with the relevant instruction.

Criterion-Based Suggestions for Improvement

- "For all targeted learning objectives for each of the three dimensions and their use together, there are multiple student performances that provide students with iterative opportunities, not including pre-assessment, to demonstrate their progress towards full proficiency over time." [DG, p. 47]
  - Ensure assessment tasks require student use of the claimed elements from all three dimensions.

III.F. Opportunity to Learn

ADEQUATE

Provides multiple opportunities for students to demonstrate performance of practices connected with their understanding of disciplinary core ideas and crosscutting concepts and receive feedback

The reviewers found **adequate** evidence that the materials provide multiple opportunities for students to demonstrate the performance of practices connected with their understanding of disciplinary core ideas and crosscutting concepts and receive feedback. There is some evidence that there are multiple opportunities for students to demonstrate performances of the targeted learning objectives of the Assessment Statements for each of the three dimensions. Reviews did not find adequate evidence that students have opportunities to build towards LS1.D as claimed in the Assessment Statements. Students also have opportunities to apply peer and teacher feedback from prior activities to help them progress in their learning.

Multiple, interconnected opportunities over time

Assessment Statement 1: "Students can **make observations to construct an evidence-based account** that **young plants and animals are like, but not exactly like, their parents, using patterns as evidence."** (aligned to 1-LS3-1) (**CEDS-P1**, **LS3.B-P1, LS3.A-P1**, **PAT-P1**)

- Lesson 2, Connect Section, Step 2 "Make observations in small groups. Distribute one plant or animal card from the Plant Animal Cards handout to each group (it is OK if a plant or animal is repeated with more than one group). Each page is one card featuring images of one kind of plant or one kind of animal. As groups make their observations, circulate and ask questions similar to the following: Can you show me what parts you notice all the plants/animals in these images have? What similarities do you notice between the plants/animals in these images? Does your group agree? Are you noticing anything different between the plants/animals? Does your group agree? How does the color compare between the plants or animals in the images? What about size? Are any parts different shapes?" (Lesson 2, Teacher Guide)
- Lesson 3, Explore Section, Step 2 "As students make observations, some students may be eager to start organizing the images into groups of the same kind of plants or animals. Use these moments to encourage students to explore this idea more deeply by asking them how they know the images feature the same plant or animal. Ask them what parts they observe that give them clues that the plants or animals are the same kind while encouraging students to express their sensemaking in (e.g., talk, drawing, images, embodiment). Circulate and consider using prompts and questions like the following: What are you observing about these plants/animals? Can you show me or tell me more about why you put these 2 images together? What was similar? Can you show me or tell me more about why you did not put these 2 images together? What did you notice that was different?" (Lesson 3, Teacher Guide)
- Lesson 4, Synthesize Section, Step 2 "Have students construct explanations. Display slide F and give each student a Parent and Offspring Explanations student assessment and writing utensil. As students are working, circulate and ask the following questions, such as: Which turtle could be the offspring? Why do you think that? What evidence do you see that shows they could be parent and offspring? Which parts are similar? Which parts are different? Which tree could be the offspring? Why do you think that? What evidence do you see that shows they could be parent and offspring? Which parts are similar? Which parts are different?" (Lesson 4, Teacher Guide)

Assessment Statement 2: Students can obtain information from texts and use media to identify patterns in how parents and offspring use their body parts to respond to information from their environment, and describe how these behaviors help offspring survive. (aligned to 1-LS1-2) (INFO-P1, LS1.B-P1, PAT-P1)

- Lesson 5, Connect Section, Step 2 "Record observations and ideas about plant parts. Have students briefly turn and talk about the parts of the plants they observed in the videos and record these in the "Parts" side of the chart. Capture in words or drawings any ideas students share about the structure of these parts (e.g., tube-shaped, strong, where the part is on the plant)." (Lesson 5, Teacher Guide)
- Lesson 6, Connect Section, Step 4 "Read aloud about each animal. Pause after each section to ask what parts the animal has and how those parts help it survive. As needed, point to illustrations and gesture parts or act out their function to make meaning clear beyond words. Encourage students to notice both the images and the text as they gather ideas, since informational texts use both to communicate meaning. Add these ideas to the Parts and Functions chart that began in the Explore. Ask students to share other terms for these parts or stories of their previous experience with them. As students gather more information about animals with similar parts and functions, consider adding the animal names next to the parts. Remind students that this chart is evidence they will return to in later lessons when they explain how parts help animals survive." (Lesson 6, Teacher Guide)
- Lesson 7, Connect Section, Step 3 "Observe more animals with a partner. Have students continue to observe animals with a partner.As students observe the animals in the videos, circulate to listen for student ideas and pose the following questions, helping students to think more deeply about the purpose of the animals' behaviors and the parts that allow them to notice and respond. See the Sample Student Offspring and Parent Observations teacher reference for possible observations that students could make." (Lesson 7, Teacher Guide) LS1.D is not claimed in this assessment statement, but is claimed as being part of Lesson 7. It is unclear whether these activities are intended to represent students' understanding of LS1.D.
- Lesson 8, Synthesize Section, Step 2 "Display slide C and provide each student with a Parts and Survival Explanation assessment. Explain that the assessment has 2 parts: animals and plants. For the animals, students will observe a video. They will circle the parent's part, circle how that part helps, and finish the sentence starters to explain how the parent uses that part to help the baby survive. For the plants, students will circle a part, circle how the part helps, and finish the sentence starters to explain how the part helps the plant survive." (Lesson 8, Teacher Guide) Students are unlikely to demonstrate knowledge of the impact of offspring behaviors (LS1.B-P1) or the role of sense-related parts (LS1.D). LS1.D is not claimed in this assessment statement, but is claimed as being part of Lesson 8. It is unclear whether these activities are intended to represent student understanding of LS1.D.

Assessment Statement 3: Use materials to design a solution to a human problem by **mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs** (aligned to 1-LS1-1). (**CEDS-P2**, **LS1.A-P1, LS1.D-P1**, **SF-P1**)

- Lesson 9, Explore Section, Step 3 "Gather students in a Scientists Circle and reiterate that we will be designing solutions inspired by the ways the plants and animals we just gathered information about use their parts to survive. Show students the bin of available classroom materials they will be able to use for their designs (e.g., paper, cardboard, tape, string, straws, foil, craft sticks, etc.). Explain that they will not be building yet; they will be looking at the materials helps engineers plan what they might use and how they could use it. Give students a few moments to observe the materials and discuss what each one could be used for." (Lesson 9, Teacher Guide) Students are not prompted to demonstrate LS1.D-P1 in this task.
  - Lesson 10, Synthesize Section, Step 2 "Remind students to use the materials available to construct a device that mimics a plant or animal part to help solve a problem related to movement, protection, getting food, or getting water and sunlight." (Lesson 9, Teacher Guide) Students are unlikely to demonstrate LS1.D-P1 in this task.

Multi-modal feedback loops

- Lesson 4, Synthesize Section, Step 3, "Students give peer feedback. Have students turn to their shoulder partner and share their explanations using the agree-and-question routine. Make sure each student has their Parent and Offspring Explanations student assessment with them as they talk…Students revise explanations. After both partners have shared, give students a few minutes to revise their explanations on the Parent and Offspring Explanations student assessment." (Lesson 4, Teacher Guide)
- Lesson 8, Synthesize Section, Step 3 "Explain the peer feedback. Display slide F and partner students. Explain that their job is to look at each other's Parts and Survival Explanation assessments and give feedback about what is clear and what could be made stronger. Point out the partner directions and that they will checkmark if something is included or circle if it is not and/or needs more…Use feedback to revise. Once all partners have shared, give students a few minutes to make revisions to their explanations on their Parts and Survival Explanation handout. While students are revising, circulate and ask: What changes are you making to your explanation(s)? Why are you making those changes?" (Lesson 8, Teacher Guide)
- Lesson 9, Explore Section, Step 4 "Pair the students with a partner who is trying to solve a similar problem. Provide students with about 5 minutes to meet with their partner to gather feedback about their ideas as well as give feedback. Suggest that they circle areas that they might want to improve based on the feedback…Improve the designs. Once both partners have given and received feedback, suggest to students that they use that feedback to make decisions about how to improve their final design solution. Continue to connect to the Classroom Agreement, "We let our ideas change and grow," by explaining that students can make changes to their design. Allow students to update their drawings on the Design Ideas handout." (Lesson 9, Teacher Guide)

Criterion-Based Suggestions for Improvement

- Ensure that "For all targeted learning objectives for each of the three dimensions and their use together, there are multiple student performances that provide students with iterative opportunities, not including pre-assessment, to demonstrate their progress towards full proficiency over time. " [Detailed Guidance, p. 47]
  - Ensure students are provided opportunities to build towards and demonstrate understanding of LS1.D.

Category Ratings

CATEGORY I	**NGSS 3D Design** *(Criteria A–F)*	0	1	(2)	3
CATEGORY II	**NGSS Instructional Supports** *(Criteria A–G)*	0	1	2	(3)
CATEGORY III	**Monitoring NGSS Student Progress** *(Criteria A–F)*	0	1	2	(3)
TOTAL SCORE				**8**	

Overall Ratings

Overall ratings:

The score total is an *approximate* guide for the rating. Reviewers should use the evidence of quality across categories to guide the final rating. In other words, the rating could differ from the total score recommendations if the reviewer has evidence to support this variation.

E: Example of high quality NGSS design—High quality design for the NGSS across all three categories of the rubric; a lesson or unit with this rating will still need adjustments for a specific classroom, but the support is there to make this possible; exemplifies most criteria across Categories I, II, & III of the rubric. (total score ~8–9)

E/I: Example of high quality NGSS design if Improved—Adequate design for the NGSS, but would benefit from some improvement in one or more categories; most criteria have at least adequate evidence (total score ~6–7)

R: Revision needed—Partially designed for the NGSS, but needs significant revision in one or more categories (total ~3–5)

N: Not ready to review—Not designed for the NGSS; does not meet criteria (total 0–2)

Overall rating below:

E