

Seeds, Scat, Habitat

DEVELOPER: Portland Public Schools
GRADE: 2 | DATE OF REVIEW: November 2022*



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EQuIP RUBRIC FOR SCIENCE EVALUATION

OVERALL RATING: E/I

TOTAL SCORE: 6

CATEGORY I: <u>NGSS 3D Design Score</u>	CATEGORY II: <u>NGSS Instructional Supports Score</u>	CATEGORY III: <u>Monitoring NGSS Student Progress Score</u>
2	2	2

[Click here to see the scoring guidelines.](#)

This review was conducted by [NextGenScience](#) using the [EQuIP Rubric for Science](#).

CATEGORY I CRITERIA RATINGS	CATEGORY II CRITERIA RATINGS	CATEGORY III CRITERIA RATINGS
A. Explaining Phenomena/ Designing Solutions Adequate	A. Relevance and Authenticity Adequate	A. Monitoring 3D Student Performances Adequate
B. Three Dimensions Adequate	B. Student Ideas Extensive	B. Formative Adequate
C. Integrating the Three Dimensions Extensive	C. Building Progressions Inadequate	C. Scoring Guidance Inadequate
D. Unit Coherence Adequate	D. Scientific Accuracy Adequate	D. Unbiased Tasks/Items Adequate
E. Multiple Science Domains Adequate	E. Differentiated Instruction Inadequate	E. Coherent Assessment System Adequate
F. Math and ELA Extensive	F. Teacher Support for Unit Coherence Adequate	F. Opportunity to Learn Adequate
	G. Scaffolded Differentiation Over Time Adequate	

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Summary Comments

Thank you for your commitment to students and their science education. NextGenScience is glad to partner with you in this continuous improvement process. The unit is strong in many areas, including unit coherence, support for cultivating student ideas, and providing an opportunity for students to learn scientific concepts in an engaging way.

During revisions or use in the classroom, the reviewers recommend paying close attention to the following focus areas to strengthen materials:

- **Building a formative assessment process.** Currently, there are many places that are identified as formative assessment opportunities throughout the learning sequence. Building out a full formative assessment process so there is guidance for interpreting a range of student responses and how instruction could be modified based on differing student responses would be helpful.
- **Positioning students to drive their own learning** The nature of some of the dialogue educators are prompted to say, using phrasing like “It’s making *me* wonder...,” “Here’s something *I’m* wondering,” or “Remember *my* original question...” might discourage student agency. Although this type of “I do” phrasing is common in the realm of elementary educators, using it in a science unit, especially in the beginning and end of each lesson to direct the flow or coherence of the unit, might prevent students from feeling that they are driving the sense-making.
- **Clarity of Student Sense-Making as Related to Phenomenon.** The unit materials currently send mixed messages about what the central focus is for student sense-making. The “main phenomenon” is identified as raccoon scat, but this serves more as a beginning hook, grabbing students’ attention. The unit’s driving question identified by the educator, which is returned to repeatedly and expected to be “answered” during the final lesson is, “What are some connections between plants and animals?” This question in and of itself is either inaccurately limited (there is not a singular connection between plants and animals) or inappropriately broad (the number of connections between plants and animals would not be able to be addressed by second graders in a 23-day unit). Lastly, students engage with iterative modeling of why a cherry tree grew in the middle of a field, the final version of which is used as a summative assessment.

Note that in the feedback below, black text is used for either neutral comments or evidence the criterion was met and purple text is used as evidence that doesn’t support a claim that the criterion was met. The purple text in these review reports is written directly related to criteria and is meant to point out details that could be possible areas where there is room for improvement. Not all purple text lowers a score; much of it is too minor to affect the score. For example, even criteria rated as Extensive could have purple text that is meant to be helpful for continuous improvement processes. In these cases, the criterion WAS met. The purple text is simply not part of the argument for that Extensive rating.

**v1 of the unit was reviewed in April 2022. In November 2022, the Criteria I.F and II.D sections of this review report were updated to reflect related changes in v2 of the unit. Other EQuIP criteria were not affected in v2 of the unit, but the page numbers for some quotes might refer to v1 and therefore no longer be accurate.*

CATEGORY I

NGSS 3D DESIGN

I.A. EXPLAINING PHENOMENA/DESIGNING SOLUTIONS

I.B. THREE DIMENSIONS

I.C. INTEGRATING THE THREE DIMENSIONS

I.D. UNIT COHERENCE

I.E. MULTIPLE SCIENCE DOMAINS

I.F. MATH AND ELA

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I.A. EXPLAINING PHENOMENA/DESIGNING SOLUTIONS

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.

**Rating for Criterion I.A.
Explaining Phenomena/Designing Solutions**

*Adequate
(None, Inadequate, Adequate, Extensive)*

The reviewers found adequate evidence that significant learning in the unit focuses on positioning students to figure out a true phenomenon or solution to a problem. In the NGSS, phenomena are defined as observable events that occur in the universe and that science knowledge can be used to explain or predict. Therefore, either the cherry tree growing in the field, or the cherry pit being found inside animal scat **seems to present the closest thing** to an anchor phenomenon for the unit, **although neither of these is described as the unit phenomenon**. Students return to the anchor phenomenon at the end of many lessons and in some cases, student questions create a need to engage in the learning. In addition to the anchoring phenomenon, students also engage in an engineering task and design solutions to problems. The design challenge of creating a hand pollinator to grow vegetables or flowers in areas that are missing pollinators requires students to apply previously learned science to an engineering problem (presented in Lesson 10 as “missing pollinators”).

Student questions are used in many cases to drive learning, make sense of the phenomenon, and solve the engineering problem. Student questions arise at the beginning of the unit and are arranged in a Driving Question Board (DQB) that is organized by the teacher and the class. The class returns to add to these questions at the end of many lessons throughout the unit. The materials provide guidance for the teacher to support students in making connections to the phenomenon so that they feel as if they are driving the learning sequence most of the time. **However, many of the unit’s student questions related to the identified phenomenon are not meaningfully leveraged, nor are new questions elicited to create a need to engage in learning for the purposes of sense-making from the students’ perspectives.** Related evidence includes:

- Lesson 1, Day 1, Connection/Opening: The stated anchoring phenomenon of scat from a raccoon is presented by video, and students generate questions based on their observations to create a Driving Question Board (DQB). **However, this development process is mostly teacher-led.** “Say: We noticed a lot about the image and the video. Our discussion got me curious about specific things we noticed. Some people thought they saw poop, and that made me ask a question in my mind. **I wondered, What is in the animal poop? Take a moment to write ‘What is in the animal poop?’** on a large sticky

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note, then post it to the board/space for use as the Driving Question Board (DQB)” (Page 4). The educator’s sample question “What is in the animal poop?” eliminates any further need or motivation for students to figure out what they are looking at, the implication answers the lesson driving question — “What is this?” — for students. Additionally, the language educators are prompted to use “got me curious” and “made me ask a question” shifts the responsibility of figuring out to the educator, instead of the students.

- Lesson 2, Day 1, Connection/Opening: Students discuss how the scat from the phenomenon is connected to parts of the plant. “Say: Let’s take a look at our Driving Question Board. Here are some of your other questions that could help us learn more about our big, driving question. There were a few questions about what was in that image. (Show image of raccoon and scat) A lot of people in the class think this is raccoon poop, or scat. I remember that some people wondered about what exactly is in that scat, and some of us thought they saw seeds in the scat. Seeds make me think of plants. Do you think that raccoon eats plants? (Revisit the phenomenon video from the last session and refer to any student questions on the DQB that connect to fruit, food, or plants.) Seeds are one part of a plant, so I started to wonder what kinds of plants we eat. Here is an image of a plant and the fruit that comes from it. This plant is a tree called a cherry tree. Some of us eat cherries, which is a part of the cherry tree. Let’s turn and talk about other plants that we eat. Be ready to share one plant that your partner eats” (Page 4). Educators are prompted to refer to related student questions on the DQB, but they are not prompted to elicit new student questions. Similarly, there is no guidance for educators to help navigate a situation in which there were no student questions about seeds. It is also not clear why students initially look at the cherry pits exclusively. Ultimately, students are asked to claim which of the seeds may be in the raccoon’s scat and highlighting the cherry pits in the beginning of the lessons seems to purposefully reveal the answer prematurely.
- Lesson 3, Day 2, Closing: At the end of the lesson, educators are prompted to refer to related student questions on the DQB. However, they are not prompted to elicit new student questions. “Gather the class at the DQB. Say: Most (or all) of us agreed to the answer to the question, What is in the scat? Many (or all) of you made the claim that one of the materials in the scat was seeds. Ask: Think about the seeds we investigated. Which seed do you think would not be chewed well by the raccoon? Students share their responses. Add question to DQB: What happens to the seeds in the scat? if a similar question is not already there. If the question is already on the DQB, point to it. Talk about any questions on the DQB that might have to do with plants growing. Tell: What happens to seeds in scat like the cherry pits in the raccoon scat? Next session, we will plant some seeds so we can learn more about them!” (Page 7). However, students did not have to gather data, nor is a claim supported by evidence necessary at this time because students were told in the Lesson 3 Connection/Opening that the scat contains cherry seeds. In addition, there is no guidance for educators to help navigate a situation in which there were no student questions about plants growing. Also, at the end of the lesson, new student questions are not elicited. The question that educators are prompted to add to the DQB is provided by the educator, not the students.
- Lesson 4, Day 1, Connection/Opening: Students are provided connections to prior lessons through the DQB and reminded of the central phenomenon. Direct students back to the DQB, and review that the big driving question is “What are some connections between plants and animals?” Say: “We decided to investigate the plants part of the connection between plants and animals. You had many

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questions about what was in the scat. We thought that there were seeds in the scat and asked, What happens to the seeds in scat?...Direct students to take out Science Notebooks p. 7” (Page 3). After reviewing prior knowledge of plant needs, students decide the best place to put the seeds so they will grow.

- Lesson 5, Day 1, Connection/Opening: Returning to the DQB, the students reflect on previous questions and science ideas focused on the connection between plants and animals. Point to the DQB and engage the students in a brief question/answer exchange to connect the lesson to the driving question. Say: “What is our big driving question? (What are some connections between plants and animals?) What are we investigating that will help us with answering the big driving question? (We planted seeds; We sorted seeds; We made a model of the parts of a plant.) Yesterday we planted (flower types) and were wondering where these plants would grow in nature. That brings us to the question: What plants and animals live in different places? Highlight or add question to the DQB: What plants and animals live in different places? Ask: How can we find this out?” (Page 5). **The teacher provides the focus question for the lesson activity, “What plants and animals live in different places?”** After creating a class data table from observations taken of their schoolyard, students compare the data for three habitats to conclude there are many kinds of plants and animals in different habitats.
- Lesson 6, Day 1, Connection/Opening: After returning to the DQB, **the teacher uses the different habitats from the previous lesson to draw students’ attention to the relationship between bugs and flowers.** “Point to the Connections Between Plants and Animals table. Say: Our big, driving question is, What are some connections between plants and animals? In our observations of 3 habitats, we listed some connections we observed. Many of you observed that there may be a connection between bugs and flowers. There was a fly on a flower at Whitaker Pond. Today we have a new question, ‘What are those insects doing on those plants?’ Describe what you are doing as you write the new question on the DQB on a sticky note and attach it to similar questions if possible. Show pictures of bees on flowers and other pollinators in the slideshow” (Page 4). After examining pictures of pollinators on plants, the students draw a model of the parts of a flower. Then, the teacher reads a book aloud about pollination to support students in explaining the relationship between pollinators and plants. Finally, students return to their model from Lesson 2 and revise them to add in new learning about parts of plants and pollen.
- Lesson 7, Day 1, Connection/Opening: Students return to plants from Lesson 4 and plan an investigation to find out what plants need to grow. “Direct students to take out Science Notebook p. 7 from Lesson 4. Tell students to silently read their predictions. Say: Scientists, you made a prediction about what will happen to the seeds in scat. We investigated by placing seeds in soil in the trays. Now we have actual data. How are our plants doing? Pass out plants, one per student” (Page 3). **The idea of this investigation is teacher-driven and does not connect to students’ questions from the DQB or previous lessons.**
- Lesson 8, Day 1 Connection/Opening: The teacher assists students with reviewing previous lessons and the phenomenon so they can better understand the connection between the lesson activity (methods of seed dispersal) and previous learning. Direct students to take out their Science Notebooks. Return to the DQB. Say: “We are continuing to investigate the connections between plants and animals. As I look at the questions on the DQB, I’m amazed at how much we have figured

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out about the answer to the big driving question! We investigated one way that plants and animals are connected. (Review the parts of the DQB from Lesson 6 that focus on pollination.) It looks like we have some more questions about plant and animal connections. (Highlight those questions related to plant/animal connections from the DQB.” (Page 3).

- Lesson 9: While the students return to the DQB, the teacher loosely connects the anchor phenomenon to the lesson. “Introduce: What is the big driving question we want to answer? (What are some connections between plants and animals?). We realized that we needed to know more about plants to answer the question. So we decided to investigate what plants need to grow. Point out the investigation question on the DQB, What do plants need to grow? ... Scientists look for patterns in data. What is the same in our data? What is different in our data? Today, we are going to observe our plants and record data one more time. Then we will look for patterns in our data. The pattern we find will help us answer the investigation question, Do plants need water and light to grow?” (Page 5).
- Lesson 10, Day 2, Closing: Students engage in the engineering design challenge to design a hand pollinator. Although the DQB isn’t referenced directly, the lesson instructs teachers to refer to a list of science ideas added to their “Science Ideas” Chart which is linked to the DQB multiple times throughout the unit. “Review list of Science Ideas added during Lesson 6, Animals can pollinate flowers so that plants can make seeds. Flowers on the plants give animals nectar and pollen to eat. Different animals pollinate different flowers” (Page 3).
- Lesson 11, Day 1, Connecting/Opening: Students begin the lesson by referring to the DQB to reflect on questions they have answered throughout the unit and to assist them in creating their final model of the phenomenon. The lesson concludes by returning to the DQB to discuss their science ideas learned throughout the unit and discuss next steps for unanswered questions. “Go back to DQB to review our learning from the unit. Highlight the following from the list of Science Ideas. If there are unanswered questions related to investigations in the unit, prompt students to answer those questions. For other questions, e.g., off topic or beyond the unit, affirm that all questions are valued. Add: In the time we had, we could only answer some of the many questions students posed. We will leave these questions for the future or perhaps you might want to find answers with your own investigation or through independent reading” (Page 5).

The unit materials claim a “main” phenomenon as well as individual lesson-level phenomena for Lessons 2 through 4. However, the objects — raccoon scat, image of cherry tree, cherry pits, image of plant — identified specially as phenomenon would not be considered phenomenon by the NGSS definition. Related evidence includes:

- Overview Document: The “Main Phenomenon” is identified as raccoon scat and is presented to students through a video image of animal scat side-by-side with an image and video of a raccoon (Page 5). In and of itself, this image of scat would not be considered a phenomenon and is not presented to students in a way that would be a phenomenon, such as showing that scat wasn’t there before the raccoon came and was there after it left (although using that scenario as a phenomenon might lead toward inquiry about why animals produce scat, which would not focus on grade-level learning goals). In the NGSS, phenomena are defined as observable events that occur in the universe and that science knowledge can be used to explain or predict.

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- Lesson 1, Day 1, Connection/Opening: Students watch a video that shows scat and a raccoon. “Project the image of the animal scat on the screen. Do not confirm that this is an image of animal scat. Guide students to just look/observe the image. If students need to be closer to the screen, make those arrangements. Say: Hmm, what is this? I am sure that you have many things to say. We will need our notebook before we start” (Page 3). After asking questions about the phenomenon, the class sets up a DQB to organize thinking and establish the unit driving question.
- Lesson 2, Overview: “Lesson phenomenon: Images of wild cherry tree and seeds from the tree” (Page 1). *An image of a cherry tree and its fruits do not constitute a phenomenon*, although a time lapse video of cherries growing on a cherry tree would be a phenomenon. In the NGSS, phenomena are defined as observable events that occur in the universe and that science knowledge can be used to explain or predict.
- Lesson 3, Day 1, Connection/Opening: After returning to the phenomenon, students re-examine the raccoon scat and notice there is a cherry pit located inside. “Say: We have talked about how seeds are a structure of a plant. Our DQB has a few questions that are related to seeds. (Read those questions to the group) Here is the image of the animal scat we saw on the first day of the unit. (Show image and place paper copy near the DQB) All the observations that we have made tell us that there were seeds in the raccoon’s scat. By looking closely at the image, we see that it is likely that these seeds were from a cherry tree. Some people call these cherry pits” (Page 3).
- Lesson 4, Lesson Overview: Revisiting the previous lesson, the teacher prompts students to plant seeds for a future investigation. *However, images of a plant seem to be intended to be a phenomenon in this lesson, although the images themselves are not a phenomenon.*

Suggestions for Improvement

- Consider clarifying unit and lesson-level phenomena. Identifying phenomena that students can figure out, rather than just objects (e.g., scat, cherry pits), could engage student curiosity and help ensure that they want to learn. From the perspective of the reviewers, either the cherry tree that grows in the field or the presence of a cherry pit in the raccoon scat seem to present the closest options for an anchor phenomenon for the unit.
- Consider developing a consistent routine for generating student questions that will authentically lead to the next lesson. Facilitation prompts to support the teacher could help ensure that students will feel that their questions are driving — not just connected to — the learning. For example:
 - Consider adding clarifying language related to the presentation of lesson-level driving questions by the educator so educators are not simply stating these verbatim to students, thus revealing the sequence, prescribing focus questions, and negating student question asking.
 - After categorization of questions in Lesson 1, students could be facilitated to choose which cluster to answer first without being told the plan for the other lessons.
 - Consider guiding educators to facilitate students to ask the suggested lesson-level driving questions rather than the educator posing the questions themselves.
 - Consider providing explicit guidance for the educator to meaningfully connect the students’ questions from the DQB to the need for the next investigation.

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- Consider adding guidance for connecting the lessons more directly to the anchoring phenomenon and engineering task.
- Consider including teacher prompts that directly elicit students' prior knowledge and experiences related to the phenomena.
- In Lesson 2, consider directing educators to include the cherry pits with the other seeds, so students observe and sort them altogether.

I.B. THREE DIMENSIONS

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.

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

Rating for Criterion I.B. Three Dimensions

*Adequate
(None, Inadequate, Adequate,
Extensive)*

The reviewers found adequate evidence that the materials give students opportunities to build understanding of grade-appropriate elements of the three dimensions. Throughout the unit, students have opportunities to use specific elements for the three dimensions. *However, there is a significant mismatch between claims and evidence of student use of the elements, particularly for CCC elements.*

Science and Engineering Practices (SEPs) | Rating: Adequate

The reviewers found adequate evidence that students have the opportunity to use or develop the SEPs in this unit because there are many opportunities for students to use grade-appropriate SEP elements and the elements are used in service of making sense of the phenomenon. *However, there is often a mismatch between claims and evidence of student SEP use, and explicit evidence that the students develop (i.e., progress in their learning of) most of the claimed SEP elements was not located.*

Planning and Carrying Out Investigations

- *Make observations (firsthand or from media) to collect data which can be used to make comparisons.*
 - Lesson 1: Students ask questions about the relationship between plants and animals. *There is no clear evidence in Lesson 1 that students are making observations in service of collecting data for the purpose of comparison.*
 - Lesson 3:

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- Day 1, Activity, Step #2, Seed Sort: “Tell: Today, we are going to observe a variety of seeds and notice how they are similar and different” (Page 4).
- Day 2, Activity, Step #3: “When you sorted the seeds by differences you were looking at the properties of the seeds. Shape, hardness, color, size are all properties. These are all on our poster from yesterday. Turn to your partner and tell your partner the property that you investigated and the pattern that you noticed” (Page 6).
- Lesson 5, Overview: “The class then compares the data for the three habitats and makes a claim, with evidence, that there are many different kinds of plants and animals that live in different habitats” (Page 1).
- Lesson 9, Activity, Step #2: “Each group of four students gets one plant with each treatment at their table. Students observe the plants and record their plant observations one last time. As they observe, prompt students to discuss: What is similar when you compare the data before treatment (Day 1) and after? (Nothing, all conditions had changes in plant growth) What is different when you compare the data before treatment (Day 1) and after?” (Page 4).
- Lesson 10, Day 3, Activity, Step #8: “Place a piece of clear tape on top of the baking soda on Flower B. That will let us compare tests” (Page 7).
- *Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question.*
 - Lesson 4, Day 1, Activity, Step #2: “Say: A lot of you said that a plant needs water and light. Let’s get some seeds and plant them. **We will place them in an area where they can get a lot of light after the plants begin to grow...**Say: We want to give our seeds a place to grow. **Please fill your seed trays with soil and lightly pack it down with your finger. Your tray should look like this:**” (Page 4). **Students are not engaged in planning this portion of the investigation.**
 - Lesson 7, Day 2, Activity, Step #2: “Ask: When we were deciding where to put the seeds we planted, we talked about what we thought plants needed to grow. Many of you said water and light...Scientists investigate to answer questions. Our investigation question is, What do plants need to grow?...Ask students: How can we plan an investigation to test this question? Listen to student conversation. As needed, prompt groups or the whole class with questions...Co-construct an investigation plan through questioning above. Groups receive four plants, one plant to be grown under each of the following conditions: Water and light (same as present growing conditions), Water, but NO light, NO water, but light, NO water and NO light” (Pages 3–4). **As this is the extent of evidence that communicates that students are expected to collaboratively plan an investigation, there is very limited guidance to equip educators to facilitate students toward success with planning an investigation. It is not clear that students would be supported to fully develop competence in this SEP element.**
- *Make predictions based on prior experiences.*
 - This SEP element is claimed as one of two lesson-level SEPs for Lesson 7. This element is not associated with the claimed PEs for the unit. In Lesson 7, Day 1, Activity, Step #4, the teacher is told “Using Numbered Heads Together, ask students: What do you predict will

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happen to the plants in each condition?” (Page 4). *Students are not facilitated to recruit prior experiences to formulate their predictions.*

Developing and Using Models

- *Develop a simple model based on evidence to represent a proposed object or tool.*
 - Lesson 10:
 - Day 2, Activity, Step #4: “Begin: Many of you were brainstorming designs (teacher observations of student ideas here, for example: they had something sticky that the pollen could stick to). Here is an engineering challenge. You will design a model of a hand pollinator. Models have parts. What kind of parts will your hand pollinator model have?” (Page 5).
 - Day 2, Activity, Step #5: “Say: We have looked closely at animal pollinators and their different structures. Some of the structures have the function to carry pollen. Raise your hand if you have a design in mind for a structure that your hand pollinator can have. Like all engineers, first you will build a model hand pollinator. Next, you will test your design” (Page 6). On Day 2, Activity, Step #6, students are told “You will walk with your partner and talk to them in a quiet voice about which materials you would like to use. Remember to describe what structure on the animal pollinator you could use the materials for in your design. Let’s practice it with a partner first. When I hold up a material, I want you to tell your partner if it is possible to use as a hand pollinator structure, and why. You could say, ‘I think the pipe cleaner can make a good structure, because it is fuzzy. It is like the body of a bee, so pollen will stick to it.’ Then, your partner might say, ‘I agree with you because I also think the pipe cleaner will hold pollen. I would like to add that a pipe cleaner can be bent into different shapes”” (Page 6).
- *Develop ~~and/or~~ use a model to represent ~~amounts, relationships, relative scales (bigger, smaller), and/or patterns in the natural and designed world(s).~~ [strikeouts added by reviewers to indicate missing parts of the claimed element.]*
 - Lesson 2, Day 2, Activity, Step #6, Student Notebook: “Lesson 2: b. Make a model. How did the cherry tree begin to grow in the field? I think the cherry tree began to grow in the field because...In the space below, make a model that shows how this happened. Use sketches and words to show your thinking” (Page 4). *The task does not focus students on patterns and instead seems to ask students to use the Grade 3–5-level element “Develop and/or use models to describe phenomena.”*
 - Lesson 8:
 - Day 2, Activity, Step #2: “Say: Seeds move and each group is going to gather information about one of the ways seeds move. As a group, you will gather information about a way that seeds move, then you will talk about and make a model of how that seed moves” (Page 3). Although students use patterns in this task, *the task does not explicitly focus students on patterns such that they would understand the way they’re using the SEP element.*

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- Day 2, Activity, Step #6: “Say: Now it is time to look at our models and make those additions and changes. You can use what you have learned, but you can also use the information on the DQB to help revise your model. This is information that we all share, just like how scientists share their learning with the world” (Page 5). *The task does not focus students on patterns and instead seems to ask students to use the Grade 3–5-level element “Develop and/or use models to describe phenomena”.*

Constructing Explanations and Designing Solutions

- *Make observations [from several sources] (~~firsthand or from media~~) to construct an evidence-based account for natural phenomena. [strikeouts added by reviewers to indicate missing parts of the claimed element.]*
 - Lesson 5, Day 3, Activity, Step #10: “Continue: When scientists make a claim, they state the data they found. The data is evidence. Students Think-Pair-Share: What data can we use as evidence to support our claim that there are lots of kinds of plants and animals in each habitat?” (Page 15).
 - Lesson 6: In the section: “Standards Addressed, NGSS, Lesson-level PE” the SEP is identified as “*Construct an explanation for how animals pollinate plants*” (Page 2), *which is not an NGSS SEP element so therefore might be confusing to educators trying to track student learning goals.* However, students are supported to construct this explanation in the lesson.
 - Lesson 9, Day 2, Activity, Step #5: “Our claim today is, Plants need water and light to grow. Where can we find the data we can use for our evidence? (students point out the class Plant Observations table and data in student notebooks.) ... Students complete the claim and evidence, in writing and with sketches where relevant. This is a summative assessment for making a claim and supporting it with evidence” (Page 7).

Obtaining, Evaluating, and Communicating Information

- *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.~~ [strikeouts added by reviewers to indicate missing parts of the claimed element.]*
 - This portion of the SEP element is claimed as the lesson-level SEP for Lesson 8. This element is not associated with the claimed PEs for the unit. In Lesson 8, Day 1, Activity, Step #2, the teacher is told “Say: Seeds move and each group is going to gather information about one of the ways seeds move. As a group, you will gather information about a way that seeds move, then you will talk about and make a model of how that seed moves” (Page 3). Although students are supported to build toward this element, students only obtain information about seed dispersal — framed as a plant and animal connection — *from one source, the captioned image slides.*

Engaging in Argument from Evidence

- *Construct an argument with evidence ~~to support a claim.~~ [strikeouts added by reviewers to indicate missing parts of the claimed element.]*

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- This portion of the SEP element is not claimed but is relevant to the work in which students are engaged, so students have an opportunity to begin to build toward this element. In Lesson 2, Day 1, Activity, Step #5, the teacher is told “Each group selects one plant food and structure from the poster and either agrees or disagrees: Pick one that the group agrees with and provide evidence for that agreement. Pick one that the group disagrees with and provide evidence for that disagreement” (Page 8).

Disciplinary Core Ideas (DCIs) | Rating: Adequate

The reviewers found adequate evidence that students have the opportunity to use or develop the DCIs in this unit because students are supported to fully develop one DCI throughout the unit and students use this DCI in service of making sense of unit phenomena. There are sufficient DCI elements included in the unit. However, two of the four DCI elements claimed are only addressed in one lesson each, leaving students very limited time to develop and use the elements in pursuit of proficiency.

LS1.A Structure and Function

- *Plants also have different parts (e.g., roots, stems, leaves, flowers, fruits) that help them survive and grow.*
 - This portion of the below grade level DCI element is not claimed, but is addressed in Lesson 2, Day 1, Activity, Step #3.

LS4.D: Biodiversity and Humans

- *There are many different kinds of living things in any area, and they exist in different places on land and in water.*
 - Lesson 5:
 - Overview: “The class then compares the data for the three habitats and makes a claim, with evidence, that there are many different kinds of plants and animals that live in different habitats” (Page 1).
 - Day 1, Connection/Opening, Step #1: “Highlight or add question to the DQB: What plants and animals live in different places?” (Page 5).
 - Day 1, Activity, Step #2: “We will probably see lots of different kinds of plants and animals. Your challenge will be for you and your partner to sketch or list as many kinds of plants and animals as possible. If you see 50 ants, you only need to sketch or write “ant” one time. ... Remember, you are looking for different kinds of plants and animals, not counting how many total you see” (Page 6). Note that with the educator previewing what students may observe, students are less likely to develop this DCI element through sense-making.
 - Day 3, Activity, Step #10: “I’ve noticed that many people have pointed out that there is a pattern. Some plants are the same in each habitat, and some plants are different. Some animals are the same, and some are different. There’s one pattern that is the same for all three habitats. What is the question we are investigating? (What plants and animals live in different places?) What is the answer to the question? (Many kinds of plants and animals live in different places)” (Page 15). It is

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possible that certain school yards would not offer a large number or variety of plants and/or animals. It is unclear what educators would do if the numbers did not reflect the subjective qualifier of “many kinds.” Additionally, the lesson resources reveal that the videos included show 10 and 12 kinds of plants in the forest and pond respectfully, and seven and eight kinds of animals in the forest and pond habitat respectfully. It is not clear what comparison is being used to determine these numbers are representative of “many kinds.”

LS2.A: Interdependent Relationships in Ecosystems

- *Plants depend on animals for pollination or to move their seeds around.*
 - Lesson 1, Day 2, Closing, Step #5: “Review the general categories of questions that emerged. Possible categories of questions: seeds, animals (generally), raccoon (specifically), scat, other. Say: The categories of your questions are about plants and also about animals” (Page 8). *Since students only ask questions about the scat, they do not discuss or investigate currently the connection between what they observe in the scat and plants. There is no evidence to support that students would ask questions related to plants, as there is no evidence in this lesson to identify the contents of the scat as seeds and confirm the connection of seeds to plants.*
 - Lesson 2:
 - Day 2, Activity, Step #6: “Tell: I noticed that some of us eat seeds, like sunflower seeds or coconut. Some of us eat fruit with seeds, like strawberries. Animals, like raccoons eat fruit with seeds inside as well. ... Here is the image of the cherry tree that I showed you at the beginning of yesterday’s lesson. (Show image on slideshow) I wonder how it came to grow in that field. Today you will make a model of how you think that tree came to grow in that spot” (Page 9). As this lesson is early in the learning sequence, the only portion of the DCI element relevant to the lesson is that plants have seeds. *Students are not given the opportunity to use this information for sense-making.*
 - Lesson 3:
 - Day 1, Connection/Opening, Step #1: “We have talked about how seeds are a structure of a plant. Our DQB has a few questions that are related to seeds. (Read those questions to the group) Here is the image of the animal scat we saw on the first day of the unit. (Show image and place paper copy near the DQB). All the observations that we have made tell us that there were seeds in the raccoon’s scat. By looking closely at the image, we see that it is likely that these seeds were from a cherry tree.” (Page 3). *However, students do not use this information to figure anything out or to solve a problem in this lesson.*
 - Day 2, Activity, Step #4: “We have done a lot of work observing seeds. We tested their hardness, we were able to sort them by their properties, and take a close look with our hand lenses. Remember my original question when we looked at the images and video of scat and raccoons: ‘What is in the scat?’ Can we answer that question? Which of the seeds that we tested today was in the raccoon scat we

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observed? ... We have gathered some data to help us answer the question, ‘What is in the scat?’ Then we can make a claim that answers our question, like, ‘I think _____ is in the scat.’ Then, we use our data as evidence to support our answer” (Page 6).

- *Plants depend on water and light to grow.*
 - Lesson 4:
 - Day 1, Activity, Step #3: “Ask: Now that our seeds are ready to grow, we need to put them in the best place! We talked about water and light earlier. I will be watering the plants, but how do we make sure the new plants get enough light?” (Page 4). *It is not clear that students will be investigating plants’ need for water in this lesson if the educator is prompted to water all of the seeds.*
 - Day 1, Activity, Step #3: “The place for the seeds is less important than having a science argument about the best place in the room to grow plants” (Page 5). Because students are prompted to argue the location with “best light” it can be assumed that students will choose all lit locations. *If all seeds are placed in lit locations — none being placed in the dark — students are unlikely to learn that plants depend on light. It is only if the variable is removed, and the results observed that students would be able to see that light is required.*
 - Lesson 7, Day 1, Activity, Step #2: “Our investigation question is, What do plants need to grow? Write the question on DQB. Using Numbered Heads Together, ask students: How can we plan an investigation to test this question? Listen to student conversation. As needed, prompt groups or the whole class with questions such as: Do plants need water to grow? Do plants need light to grow? What would happen if a plant didn’t get enough water to grow? What would happen if a plant didn’t have enough light to grow? What if a plant didn’t have enough light or water? Co-construct an investigation plan through questioning above.” (Pages 3–4).

PS1.A Structure and Properties of Matter

- *Matter can be described and classified by its observable properties.*
 - This DCI element is not claimed, but is addressed in Lesson 3, Day 2, Activity, Step #3: “When you sorted the seeds by differences you were looking at the properties of the seeds. Shape, hardness, color, size are all properties. These are all on our poster from yesterday. Turn to your partner and tell your partner the property that you investigated and the pattern that you noticed” (Page 6).

ETS1.B Developing Possible Solution

- *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.*
 - Lesson 10: The first sentence of this element is developed, *but the second sentence is not discussed. In addition, this lesson is the only time students discuss possible solutions to the presented problem and it is the culminating engineering task at the end of the unit, so students have little time to deeply develop ideas.*

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- Day 2, Activity, Step #7: “Now that we’ve brainstormed some ideas, and thought about materials, it is time to plan your design. Launch design plan with this guidance: Engineering partners could choose one idea, or you could combine two ideas for your design that you will build. Sketch your plan for your design in your Science Notebook” (Page 7).
- Day 2, Activity, Step #7: “Launch model building with this guidance: Raise your hand after materials are labeled on your plan. I will review your plan. Pick up materials and take them to your spot to build. If your design changes as you build, change your plan to record your new design” (Page 7).
- Day 4, Activity, Step #10: “Who is ready to share the hand pollinator models we have designed? You will show your hand pollinator model and describe its structures and functions...As students are sharing, listen for how students are describing the structures and functions of their hand pollinator designs. This is an assessment opportunity” (Page 9).

Crosscutting Concepts (CCCs) | Rating: Adequate

The reviewers found adequate evidence that students have the opportunity to use or develop the CCCs in this unit. While there are many opportunities for students to use grade-appropriate CCC elements, the CCCs are often only addressed at the category title level (e.g., “Cause and Effect”) and the students are not engaged in the development of the claimed CCC elements for enough time. One of the four CCC elements claimed is only addressed in one lesson, leaving students limited time to develop and use the element in pursuit of proficiency. Evidence of one of the four claimed elements is not present at all. The following elements were claimed or used in the unit:

Structure and Function

- *The shape and stability of structures of natural and designed objects are related to their function(s).*
 - Lesson 10:
 - Day 1, Activity, Step #4: “Let’s take a closer look at the animal pollinators and how animals use their body parts when they pollinate. View detailed pictures of animal pollinators on slideshow. Ask students to Turn and Talk: Where is the pollen on the pollinator? Reintroduce science terms in context. Using Numbered Heads Together, ask students to: Name a body part of an animal pollinator. What does that body part do in pollination?... Students may also notice that many of the pollen-carrying structures have smaller structures like hair that hold the pollen. It is acceptable to name the large structure like ‘leg’ or the smaller structure like ‘hair.’ The function of the structure is to pick up and carry the pollen, and also allow it to fall or stick to another flower” (Page 5). The connection between structure (although not necessarily shape and stability) and function is therefore made explicit to students.
 - Day 4, Activity, Step #10: “You will show your hand pollinator model and describe its structures and functions...As students are sharing, listen for how students are describing the structures and functions of their hand pollinator designs. This is an assessment opportunity” (Page 9).

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Cause and Effect

- *Events have causes that generate observable patterns.*
 - Lesson 2, Day 2, Activity, Step #7: “Listen for student claims and explanations about cause and effect” (Page 9). Therefore, students are using the first three words of the element. However, prior to this educator direction, students are not prompted to think about or reflect on cause-and-effect relationships in their work, nor is the focus on cause and effect here connected to patterns.
 - Lesson 6:
 - Day 1, Connection/Opening, Step #1: “Ask students to Think-Pair-Share what they notice. Refer to the lesson question: What are those insects doing on those plants? Use this as an informal formative assessment: What do students know about pollination? What language are they using to describe the flowers and pollinators, including cause and effect relationships?” (Page 4). Teachers may therefore look for student performances that use the first part of the CCC element. However, it is unclear whether cause and effect relationships would authentically come up as students describe what they notice about an insect on a plant. Additionally, patterns resulting from events are not explicitly connected here.
 - Day 3, Activity, Step #5: “Ask students to Stand Up, Hand Up, Pair Up and describe their models with each other for about 5 minutes, focusing on cause and effect. Show example sentence stems in the lesson slideshow: _____, in order to _____. (The bee visits many flowers in order to get food.) Because _____, _____. (Because the bee pollinates the flower, a seed forms.)” (Page 8). Students are not supported in developing the entire CCC element because the cause-and-effect relationships are not connected explicitly to observable patterns, so there isn’t evidence that students would be able to independently apply in the future the idea that causes generate observable patterns.
 - Lesson 7: Claimed as lesson-level CCC. Students talk about cause-and-effect relationships where patterns are generated, but there is no evidence that students are explicitly supported in developing or using this CCC element during this lesson (i.e., that students explicitly understand that patterns are involved).

Patterns

- *Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.*
 - The first portion of the CCC element is claimed as the lesson-level CCC for Lesson 1. This element is not associated with the claimed PEs.
 - In Lessons 2–5, 8, 9 “Standards Addressed, NGSS, Level-level PE” the CCC is identified as “Look for patterns in observational data.” This is not a NGSS CCC element, but teachers might think that it is meant to be since its origin is not clear.
 - Lesson 3, Day 2, Activity, Step #3. “When you sorted the seeds by differences you were looking at the properties of the seeds. Shape, hardness, color, size are all properties.

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These are all on our poster from yesterday. Turn to your partner and tell your partner the property that you investigated and the pattern that you noticed” (Page 6).

Systems and System Models

- No element is claimed, but the CCC category title is listed in Lesson 11, Standards Addressed, NGSS, as the Lesson-level CCC. This is not a CCC category associated with the claimed unit PEs. *There is no evidence to support that students are explicitly supported in developing or using this CCC element during this lesson* — students may implicitly use the element without knowing they are using it. *However, more explicit evidence was found in other lessons:*
 - *Objects and organisms can be described in terms of their parts.*
 - Lesson 10 Day 2, Activity, Step #4: “Here is an engineering challenge. You will design a model of a hand pollinator. Models have parts. What kind of parts will your hand pollinator model have?” (Page 5). Because students are using physical models, the teacher prompt helps students understand that objects have parts and helps them begin to build toward understanding that they can describe the object in terms of their parts.

Suggestions for Improvement

General

Consider ensuring that there is consistency in the element claims that appear in the overview document and the front matter of individual lessons.

Science and Engineering Practices

- Consider rewording the modified SEP element claimed at the lesson level to match NGSS language, or clearly specifying which element statements are meant to describe SEP-related performance rather than NGSS language.
- Consider either reducing claims of SEP-related learning goals or modifying materials to support students in engaging fully in the full SEP elements claimed as learning targets. For example, for elements that are claimed as a learning goal in which students will be fully proficient by the end of the unit, it could be helpful to include opportunities and provide supports for students to progressively develop new learning and proficiency in the element throughout the unit.

Disciplinary Core Ideas

- It may be helpful to clarify for educators the connections made to other DCIs outside those associated with the PEs of this unit. For example, plant structures are addressed in the NGSS at the first-grade level. An explanation of why the content is included in this unit and if it is considered a review may be helpful.
- Consider including more opportunities for students to build full understanding of all claimed DCI elements — especially **LS2.A** and **LS4.D** — or adjusting the claims to ensure clarity of student expectations. It may be difficult for students to build understanding of and demonstrate proficiency with elements that are only addressed through one lesson.

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Crosscutting Concepts

- Consider ensuring that claims match evidence such that either students have opportunities to use each fully claimed element in its entirety or the claims are adjusted to match students' current activities.
- Consider including opportunities and providing supports for students to explicitly develop proficiency in the CCC elements such that they would be able to apply them again independently in the future.
- Consider rewording the modified CCC element claimed at the lesson level to match NGSS language, or clearly specifying which element statements are meant to describe CCC-related performance rather than NGSS language.

I.C. INTEGRATING THE THREE DIMENSIONS

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

Rating for Criterion I.C. Integrating the Three Dimensions

Extensive
(None, Inadequate, Adequate,
Extensive)

The reviewers found extensive evidence that student performances integrate elements of the three dimensions in service of figuring out phenomena and designing solutions to problems because there are some events where all students are expected to figure something out and to solve a problem in a way that requires a grade-appropriate element of each of the three dimensions working together.

The following student sense-making tasks of the phenomenon use elements of all three dimensions:

- Lesson 2, Day 2, Activity, Step #6, Student Notebook: "Lesson 2: b. Make a model. How did the cherry tree begin to grow in the field? I think the cherry tree began to grow in the field because...In the space below, make a model that shows how this happened. Use sketches and words to show your thinking" (Page 4).
 - SEP: **Developing and Using Models:** *Develop ~~and/or use~~ a model to represent ~~amounts, relationships, relative scales (bigger, smaller), and/or patterns in the natural and designed world(s)~~. Although this version of the SEP element is claimed for this lesson, ~~the task does not explicitly require students to think about or represent patterns in the natural world.~~ Students instead seem to be expected to use the Grade 3–5-level element *Develop and/or use models to describe phenomena*.*
 - DCI: **LS2.A: Interdependent Relationships in Ecosystems:** *Plants depend on animals ~~for~~ ~~pollination~~ or to move their seeds around.*

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- CCC: **Cause and Effect:** *Events have causes that generate observable patterns.* While educators are asked after students present their models to look and listen for cause-and-effect relationships, *students were not prompted to think about or reflect on cause-and-effect relationships in their work. Nor is the focus on cause and effect here explicitly connected to patterns* even though students would need to implicitly understand this element to complete the task.
- Lesson 3, Day 2, Activity, Step #4: “Remember my original question when we looked at the images and video of scat and raccoons: ‘What is in the scat?’ Can we answer that question? Which of the seeds that we tested today was in the raccoon scat we observed? ... Students write a claim that a cherry seed is in the scat with evidence from the investigations” (Page 6). While this task provides the *opportunity* to use the following learning target elements, *students are not required to draw on SEP, DCI, or CCC elements to answer the question. The following elements are claimed:*
 - SEP: **Constructing Explanations and Designing Solutions:** *Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.* This student performance is identified as an assessment opportunity and engages students in constructing explanations supported by evidence.
 - DCI: **LS2.A: Interdependent Relationships in Ecosystems:** *Plants depend on animals ~~for~~ ~~pollination~~ ~~or~~ to move their seeds around.*
 - CCC: **Patterns:** *Patterns in the natural and human designed world can be observed, ~~used to describe phenomena~~, and used as evidence.* Although this element is claimed, *there is no evidence that students would be expected to recruit their understanding of patterns to make and support a claim that there are cherry seeds in the scat.*
- Lesson 6, Day 2, Activity, Step #4: “Using Numbered Heads Together, ask students to explain What is pollination? And why is it important? Student groups may sketch on whiteboards or paper to model pollination. Have a few groups share with the class and clarify any confusion around the process of pollination. By talking in groups, students will have opportunities to clarify their understanding of pollination...On their own, students complete the model and explanation of pollination. This is an assessment opportunity. Possible student response: Pollination is pollen moving from flower to flower. It is important because a plant needs pollination to make seeds. Students then share their work with 3–4 other partners using Stand Up, Hand Up, Pair Up. See Language Recording Tool. Students may add to their models and revise their written explanations as they clarify their thinking through repeated opportunities to share and listen to others’ explanations” (Pages 6–7).
 - SEP: **Constructing Explanations and Designing Solutions:** *Make observations (firsthand or from media) to construct an **evidence-based** account for natural phenomena. **Students are not prompted to specifically use evidence** but use the other parts of this element.*
 - DCI: **LS2.A: Interdependent Relationships in Ecosystems:** *Plants depend on animals ~~for~~ ~~pollination~~ ~~or~~ ~~to move their seeds around.~~*
 - CCC: **Cause and Effect:** *Events have causes that generate observable patterns.* Note that it is not clear that students will be explicitly facilitated to recruit their understanding of cause-and-effect relationships to complete this task.
- Lesson 9, Day 2, Activity, Step #5: “Say: Our investigation question is, Do plants need light and water to grow? Based on the patterns in our data, what is the answer to this question? (Plants need light

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and water to grow. Plants without water did not grow/were not healthy, Plants without light did not grow/were not healthy, Plants without both water and light did not grow/were not healthy). The answer to our question is, Plants need water and light to grow. That is our claim. The claim is an answer to our question...Continue: Our claim today is, Plants need water and light to grow. Where can we find the data we can use for our evidence? (students point out the class Plant Observations table and data in student notebooks.) Distribute Notebook page to students (or use from Science Notebook, P. 24). Students complete the claim and evidence, in writing and with sketches where relevant. This is a summative assessment for making a claim and supporting it with evidence...For students who need extra support, students may share their claims and evidence in Stand Up, Hand Up, Pair Up to clarify and revise their thinking before completing the notebook page” (Page 7).

- SEP: **Constructing Explanations and Designing Solutions:** *Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.*
- DCI: **LS2.A: Interdependent Relationships in Ecosystems:** *Plants depend on water and light to grow.*
- CCC: **Patterns:** *Patterns in the natural and human designed world can be observed, ~~used to describe phenomena,~~ and used as evidence.*

Suggestions for Improvement

- Consider including color coded or otherwise easily identifiable three-dimensional learning targets to help teachers identify student performances that integrate grade-appropriate parts of elements of the SEPs, CCCs, and DCIs.

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I.D. UNIT COHERENCE

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.

Rating for Criterion I.D. Unit Coherence

*Adequate
(None, Inadequate, Adequate,
Extensive)*

The reviewers found adequate evidence that lessons fit together coherently to target a set of performance expectations (PEs). Thematic or content linkages are created across the unit, but *these linkages rarely assist students in seeing explicit connections between most lessons. These few linkages infrequently work together to provide opportunities to build partial proficiency for one of the four targeted PEs: 2-LS2-1. Most parts of the targeted PEs are not developed.*

Some lessons build upon prior lessons, and few are explicitly linked together coherently from the students' perspectives. *Students have few opportunities to engage in asking questions based on what they have learned so far in the unit, although they revisit their questions in future lessons. For example:*

- Lesson 1: Day 2, Closing, Step #5: "Say: The categories of your questions are *about plants* and also about animals. Most of your questions connect to a big question. That big question is: What are some connections between plants and animals? As we investigate to find the answers to your questions here on the DQB, we will figure out the answer to the big question, What are some connections between plants and animals?" (Page 7). *It is unclear how the image and video provided will produce many student questions about plants. The items in the scat are presumed to be seeds, but students are not facilitated to see the connection between seeds and plants at this time. Thus, there isn't evidence that students will see relevance or a coherent connection between animals and plants.*
- Lesson 3: Day 2, Activity, Step #4: "Say: We have done a lot of work observing seeds. We tested their hardness, we were able to sort them by their properties, and take a close look with our hand lenses. Remember my original question when we looked at the images and video of scat and raccoons: 'What is in the scat?' Can we answer that question? Which of the seeds that we tested today was in the raccoon scat we observed?... We have gathered some data to help us answer the question, 'What is in the scat?' Then we can make a claim that answers our question, like, 'I think _____ is in the scat.' Then, we use our data as evidence to support our answer" (Page 6). *Although students*

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were already told the answers to these questions earlier in the unit, they are supported to see the connections between lessons.

- Lesson 4 concludes with students returning to the DQB to discuss learning from the day and see what questions had been answered, and like in Lesson 3, it concludes with the teacher doing some prompting for student inquiries.
- Lesson 5 begins with a loose connection made by the teacher between the DQB and the driving question which leads the students into the habitat data collection activity. Lesson 5 ends with the teacher eliciting student questions for the DQB, but then a loose connection is made between the habitat activity and their Lesson 6 discussion of pollinators.
- Lesson 6 begins with DQB reference, but the teacher drives the discussion to focus on pollinators.
- Lesson 10: The creation of hand pollinators does not serve to help students make sense of the phenomenon of how a cherry tree might have come to grow in a field, so this lesson might not seem to fit logically with the rest of the unit from a student perspective.

Four PEs are fully claimed in this unit, “NGSS Alignment in Unit” (Page 5). Students have few opportunities to build proficiency for three of the four targeted PEs: **2-LS2-2, 2-LS4-1, K-2-ETS1-2**. Most parts of the targeted PEs are not developed (see Criterion I.B for evidence related to each element). Except for Lesson 11, each Lesson 1–10 uses the subtitle “Leading to NGSS PEs:” in the Standards Addressed, NGSS section of the front matter. This indicates that the unit may not fully address the claimed NGSS PEs in their entirety. Students may not have to reach proficiency by the conclusion of the unit, but the level of proficiency expected is not clear:

- **2-LS2-1:** Plan and conduct an investigation to determine if plants need sunlight and water to grow. This PE is fully addressed in Lessons 4, 7, and 9.
- **2-LS2-2:** Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants. This PE is partially addressed in Lessons 6, 8, and 10.
- **2-LS4-1:** Make observations of plants and animals to compare the diversity of life in different habitats. Lesson 5 is the only lesson that partially addresses this PE.
- **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 10 is the only lesson this PE could apply to, and it is not fully developed.

Suggestions for Improvement

- If students are expected to reach proficiency in the claimed NGSS PEs by the conclusion of the unit, consider being explicit with how the PEs are labeled. For example, instead of using the phrasing “present in this unit” or “leading to” consider using language like “students are expected to reach full proficiency in the following NGSS PEs by the conclusion of the unit” or “students are expected to fully develop the DCI portion of this PE but not the SEP or CCC portion.” If this unit is a smaller piece to a larger instructional sequence, and students are not expected to reach proficiency, consider making that clearer with language for educators. Alternately, consider increasing support for students to learn all parts of the claimed PEs.

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- Consider providing students opportunities to build: 1) a recognition of prior knowledge from previous lessons, 2) awareness of the new target knowledge, and 3) anticipation of how (1) and (2) might be connected in a natural, logical way that makes sense to novices. For example, consider leveraging the DQB to incorporate additional opportunities to add to, revise, categorize, and identify relevant student questions that will link learning from one lesson to another. At the beginning of each lesson, consider referring specifically to where students ended in their tasks from the previous lessons (such as the questions they decided they wanted to answer, the investigations they decided to conduct, or the design plans they just made) and connecting that prior work explicitly to the next steps in the new lesson.
- Think about changing the location of Lesson 10. For example, if Lesson 10, focused on the creation of hand pollinators, immediately follow the lesson addressing pollination (Lesson 6), students might see their connection more clearly.

I.E. MULTIPLE SCIENCE DOMAINS

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.

Rating for Criterion I.E. Multiple Science Domains

*Adequate
(None, Inadequate, Adequate, Extensive)*

The reviewers found adequate evidence that links are made across the science domains when appropriate because the unit focuses on one science domain and the phenomena or problem driving the learning can be fully addressed within that domain. This unit focuses on the Life Science Domain to develop an explanation for the relationship between plants and animals. *However, students are not prompted to use or consider crosscutting concept application in different domains.*

Related evidence includes:

- The anchoring phenomena is mostly explained using the Disciplinary Core Idea **LS2.A: Interdependent Relationships in Ecosystems**. Most of the lessons, 6 of 10, are explained through this DCI. For example:
 - Lesson 2, Lesson Overview: “After identifying the parts of the plant, students analyze observations made about different types of seeds. Then they develop a model to explain how the cherry tree began to grow in its spot” (Page 1).

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- Lesson 4, Lesson Overview: “Students review the scat and cherry pits to recap the relationship between plants and animals. After reviewing prior knowledge of plant needs, students decide the best place to put some seeds so they will grow” (Page 1).
- Lesson 8, Lesson Overview: “Students examine information about different methods of seed dispersal and make observations based on patterns observed. Then they create a model to show that plants depend on animals for pollination” (Page 1).
- Lesson 10, Lesson Overview: “Students develop a model hand pollinator to simulate the pollination of plants by animals. They explain how each part of their model works together in order to pollinate the flowers and how it provides a solution to the problem of the areas without pollinators” (Page 1).
- Disciplinary Core Idea **LS4.D Biodiversity and Humans** is **somewhat** explained in Lesson 5.
 - Lesson 5, Lesson Overview: “Students observe and record data about the plants and animals in their school yard. After creating a class graph, students identify patterns and are able to determine that there are many different kinds of plants and animals living in different places on land and water” (Page 1).
- One instance of connection to another discipline — physical science (properties of materials) — is made for educators, **but there is no evidence to support that the connection is made explicit to students**. Related evidence from Lesson 3 includes:
 - Lesson Overview: “Language Focus is on describing the properties of seeds and comparing seeds” (Page 1).
 - Lesson Overview: “Students observe a cherry pit and describe its properties. Then, students receive packets of seeds and describe them in terms of patterns of differences and similarities. A connection to physical science and properties of matter is made” (Page 2).
 - Day 1, Activity, Step #2, Seed Sort: “If no one suggests hardness, ask if the properties of hard or soft could be tested?” (Page 5).
 - Day 1, Activity, Step #2, Seed Sort: “Say: We will use what we have observed about the properties of seeds when we continue our work next time” (Page 5).
 - Day 2, Activity, Step #3: “Say: When you sorted the seeds by differences you were looking at the properties of the seeds. Shape, hardness, color, size are all properties. These are all on our poster from yesterday. Turn to your partner and tell your partner the property that you investigated and the pattern that you noticed” (Page 6).

Suggestions for Improvement

- Consider using grade-appropriate crosscutting concepts explicitly to make connections to the anchor phenomenon and problem.
- Consider supporting student use of CCC elements and their understanding of the utility of CCC elements to help explain phenomena related to different domains. For example, students could be supported to connect their understanding of cause-and-effect relationships in a plant growth phenomenon (life science) to cause-and-effect relationships in reversible and irreversible changes phenomenon (physical science).

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EQUIP RUBRIC FOR SCIENCE EVALUATION

I.F. MATH AND ELA

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.

Rating for Criterion I.F. Math and ELA

Extensive
(None, Inadequate, Adequate,
Extensive)

The reviewers found extensive evidence that the materials provide grade-appropriate connections to the Common Core State Standards (CCSS) in mathematics and English language arts (ELA), because ELA/Literacy connections are explicitly made in each lesson. Students have opportunities to write, speak, and listen during the unit, and evidence for the English Language Proficiency Standards was included. *However, there is often a mismatch between CCSS-ELA standards claimed and those used by students.*

Connections are made in each lesson to CCSS-ELA. For example:

- Lesson 1: The teacher is told “Each lesson lists relevant grade 2 CCSS ELA in the Standards Addressed section. The intent of including CCSS ELA is to guide teachers of the connection between content areas. It’s recommended that teachers make explicit to students the connections between the content areas of science and ELA” (page 2).
- Lesson 1: The following CCSS-ELA is claimed: “W.2.8 Recall information from experiences or gather information from provided sources to answer a question.” *However, the only question students answer in the lesson is “Is this a new question or is it connected to another question?” (page 7) so there is little evidence that students use this CCSS.*
- Lesson 2: The following CCSS-ELA is claimed: “SL.2.2 Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.” Students talk in pairs and then are asked to orally share a plant that their partner said they eat (page 4).
- Lesson 4: The following partial CCSS-ELA is claimed: “W.2.7 Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations).” Students begin an investigation about plant growth, *but they do not record any observations.*
- Lesson 5: The following CCSS-ELA is claimed: “SL.2.4 Tell a story or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences.” In the beginning of the lesson, the teacher asks “What are we investigating that will help us with answering the big driving question?” The example student response says “We planted seeds, We sorted seeds, We made a model of the parts of a plant” (page 5). This response is likely to be oral *but is unlikely to be given by all students in the class.* Students also share their observations and data with each other (e.g., page 7). At the end of the lesson, students are asked to talk about the data that the class can use as evidence to support the “claim that there are different kinds of plants and animals in each habitat” (page 16). Students therefore are supported to build toward this CCSS.

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EQUIP RUBRIC FOR SCIENCE EVALUATION

- Lesson 5: The teacher points out the use of verbs in a table, supporting students' ELA learning.

A connection is made to CCSS mathematics:

- Lesson 1: The teacher is told "Since the unit does not engage students in grade 2 CCSS Math, there are no relevant connections between science and CCSS in grade 2 math. Lesson 5 includes grade 1 CCSS Math 1.MD.4. Teachers are encouraged to make explicit to students the connection between the content areas of science and Math in lesson 5" (page 2).
- Lesson 5: The following CCSS-Mathematics is claimed: "1.MD.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."
 - Students are told "Scientists record their observations. Those observations are data. Like any scientist, we also recorded our observations about what plants and animals we observe. Our observations are data. We can look at our data later on and use our data to support our science ideas" (page 9). This statement supports students' understanding of how mathematics can support science.
 - The class collaboratively makes a data table, and the teacher is told to "call on students to count the number of kinds of plants" (pages 8–9).
 - Students are asked to count the number of animals and plants that the class observed (page 11), and later are asked to count the number of kinds of plants and kinds of animals (pages 13–14). They are then asked to use these numbers as evidence to support the claim "that there are different kinds of plants and animals in each habitat" (page 16).

Suggestions for Improvement

- Consider support students to use all of the CCSS-ELA claimed or adjusting claims to match student activities.
- Consider supporting students to explicitly see how their ELA/Literacy activities support their science sense-making and problem solving.

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EQuIP RUBRIC FOR SCIENCE EVALUATION

OVERALL CATEGORY I SCORE: 2 (0, 1, 2, 3)	
Unit Scoring Guide – Category I	
Criteria A-F	
3	At least adequate evidence for all of the unit criteria in the category; extensive evidence for criteria A–C
2	At least some evidence for all unit criteria in Category I (A–F); adequate evidence for criteria A–C
1	Adequate evidence for some criteria in Category I, but inadequate/no evidence for at least one criterion A–C
0	Inadequate (or no) evidence to meet any criteria in Category I (A–F)

CATEGORY II

NGSS INSTRUCTIONAL SUPPORTS

II.A. RELEVANCE AND AUTHENTICITY

II.B. STUDENT IDEAS

II.C. BUILDING PROGRESSIONS

II.D. SCIENTIFIC ACCURACY

II.E. DIFFERENTIATED INSTRUCTION

II.F. TEACHER SUPPORT FOR UNIT COHERENCE

II.G. SCAFFOLDED DIFFERENTIATION OVER TIME

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EQUIP RUBRIC FOR SCIENCE EVALUATION

II.A. RELEVANCE AND AUTHENTICITY

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.

Rating for Criterion II.A. Relevance and Authenticity

Adequate
(None, Inadequate, Adequate,
Extensive)

The reviewers found adequate evidence that the materials engage students in authentic and meaningful scenarios that reflect the real world because most of the unit materials provide opportunities to make connections between the phenomena and students' lives. The phenomena and classroom activities used are somewhat engaging to students, reflect grade-appropriate scenarios, and have the potential to inspire curiosity from students. *However, the push to figure out the phenomena or solve the problem will likely need to be teacher directed because it is not clear that, as presented, the phenomena are relatable to these students.*

Students experience the phenomenon, problems, and investigative phenomenon as directly as possible in many, *although not all*, cases. For example:

- Lesson 1, Lesson Overview: "The anchoring phenomenon of scat from a raccoon is presented by video, and students generate questions based on their observations to create a Driving Question Board (DQB)" (Page 1).
- Lesson 3: After returning to the phenomenon, students notice there is a cherry pit located inside of the raccoon scat. Then the students examine a cherry pit like the one seen in the anchor phenomenon.
- Lesson 4: Students plant seeds, place them in different areas around the room and predict which place will allow the plant to grow. Students return to this investigation again two more times in the unit. These activities will be engaging for students, and students will see the results firsthand.
- Lesson 5: Day 2, Activity, Step #8: "Let's find out! I would love to take you to a pond today. While we won't be able to travel to different habitats today, we can observe plants and animals that live there through videos. We will record our observations just like we did when we went outside. We will watch a video of Whitaker Pond, which is in northeast Portland. Show the map of Whitaker Ponds [sic] and its location in relation to your school" (Page 10).

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Students have opportunities to connect the activities and phenomena to their lives. However, teacher support is not explicitly provided to cultivate student questions that arise from students' communities or cultures. Related evidence includes:

- Unit Overview: A teacher note prompts teachers outside the Portland area to make adjustments to the unit for their local area: "While the unit can stand as is, educators in other locations may want to prepare for the unit by making connections with natural spaces in your area. This might include developing a bank of plants and animals specific to your location, or finding alternative images and videos. Educators may also want to connect with local community organizations to support a field experience, a live interview with a park ranger, or a video recorded 'virtual field trip'" (page 1).
- Lesson 2:
 - Lesson Overview: "Students connect plants we eat with the parts of plants" (Page 1). This activity will be engaging for students and connects to students' everyday lives.
 - Day 1, Connection/Opening, Step #1: "Some of us eat cherries, which is a part of the cherry tree. Let's turn and talk about other plants that we eat. Be ready to share one plant that your partner eats" (Page 4).
 - Day 1, Activity, Step #5: "In science, arguments between scientists are used to understand ideas better. When a scientist disagrees with another scientist, they state the claim and then offer data as evidence for the claim. In our sort, the claim is the name of the plant structure for a plant food. The data are the images, stickies, and your experience as a plant food eater!" (Page 7).
 - There is a missed opportunity for students to make the connection between the phenomenon and the types of plants grown in their area.
- Lesson 3: Students examine different packets of seeds and describe patterns of similarities and differences. Again, this is a missed opportunity for students to make connections between the phenomenon and the types of plants grown in their area.
- Lesson 5:
 - Day 2, Activity, Step #8: "We will watch a video of Whitaker Pond, which is in northeast Portland. Show the map of Whitaker Pond and its location in relation to your school" (Page 10). The reference to a local Oregon natural area will likely increase relevancy to students that live in or around Portland, although this addition would not be relevant for students outside of Oregon.
 - Day 3, Activity, Step #9: "Refer to the whole-class Observation Tables of the schoolyard habitat and Whitaker Pond's habitat. Let students know that today the class will visit Oxbow Forest habitat. Oxbow Park is a forest with a river east of Portland. Show the map of Oxbow Park and its location in relation to your school" (Page 12). The incorporation of a local Oregon green space will likely increase relevancy to students that live in or around Portland, although this addition would not be relevant for students outside of Oregon.
 - Supplementary Materials: "Google Earth to use for reference to show students. Where are Whitaker Pond and Oxbow Park? Click 'launch', then search for Whitaker Pond Nature Park in Portland, Oregon or Oxbow Regional Park, in Multnomah County, Oregon" (Page 18). The incorporation of a local Oregon green space will likely increase relevancy to students that

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live in or around Portland, *although this addition would not be relevant for students outside of Oregon.*

- Lesson 6: Students observe and sketch a flower and then learn about pollination through a read aloud and looking at pictures. *Again, this is a missed opportunity for students to make connections between the phenomenon and the types of plants grown in their area.*
- Lesson 7, Day 2, Activity, Step #7: “Say: When scientists get together, they bring all their knowledge and experience, just like you. They have learned different things, and they do not always agree” (Page 6).
- Lesson 8: Students gather information about different methods of seed dispersal. *Again, this is a missed opportunity for students to make connections between the phenomenon and the types of plants grown in their area.*
- Lesson 10: Students learn about hand pollination and design a hand pollinator. *During this activity, some students may make connections on their own to their own personal interactions with pollinators. However, this is the only time this topic is discussed. Therefore, more emphasis on how to make this topic connect authentically to the students may be needed.*

Suggestions for Improvement

- Consider incorporating guidance for educators to support students in asking questions that come from the lens of their own background, community, or culture, and applying what they have figured out to their own community or culture.
- Consider including a note during Lesson 2 to help educators prepare for engaging students that may be experiencing food availability difficulties, or for those delivering instruction in a community considered a food desert where students and their families may not have access to fresh produce.

II.B. 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.

**Rating for Criterion II.B.
Student Ideas**

*Extensive
(None, Inadequate, Adequate, Extensive)*

The reviewers found extensive evidence that the materials provide students with opportunities to both share their ideas and thinking and respond to feedback on their ideas. Students have many opportunities to share ideas with peers. *However, students have few opportunities to use peers’ ideas to change or improve their own thinking. Also, explicit evidence of the teacher providing feedback could not be located.*

Most lessons include “Interaction and Language Development Routines”. These structures provide opportunities for students to discuss their learning. For example:

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- Lesson 1, Day 1, Connection/Opening: After students are introduced to the anchor phenomenon, the teacher asks students to “Think/Pair/Write/Share” so they can discuss their observations.
- Lesson 2, Activity, Step #5: “Our big, driving question is: What are some connections between plants and animals? I think you figured out part of the answer to the big, driving question! Turn to your partner and share what you think we figured out today” (Page 8).
- Lesson 3, Day 2, Activity, Step #4: “If a student disagrees with a claim or evidence for the claim, say: In science, when you disagree you provide evidence for what you think? If someone disagrees with you, your response is ‘What is your evidence?’ Allow the student who disagreed to offer evidence. Allow the other students to offer counter evidence” (Page 7).
- Lesson 4, Day 1, Activity, Step #3: “Routine for claim of a good place and critique: Who else thinks <this> is a good place? Why do you think that? Does anyone have any information to add about why <this> is a good place? Does anyone have evidence about light to support your claim about this place? Does anyone disagree with <this> as a place for our seeds? Does anyone have another idea? This is a strategic move to involve students who have not had a say yet” (Page 5).
- Lesson 6, Day 2, Activity, Step #4: “Student groups may sketch on whiteboards or paper to model pollination. Have a few groups share with the class, and clarify any confusion around the process of pollination. By talking in groups, students will have opportunities to clarify their understanding of pollination. Direct students to open their Science Notebooks to P. 14, write their name, and date the page (06b Notebook page). On their own, students complete the model and explanation of pollination” (Pages 6–7).
- Lesson 8, Day 2, Activity, Step #7: “Ask if there is consensus. Does everyone agree? If not, help students argue by using these possible questions: Is there anything you would add to X’s suggestion? Why do you disagree? What is your evidence? Possible student responses may include: I would add an animal eating fruit from a tree. I agree we should have an animal eating seeds because we learned that is one way seeds move around” (Pages 6–7).

There are opportunities during the lesson where students can discuss and reflect on their learning. However, there are missed opportunities where students would ideally be able to (but are not currently prompted to) use individual teacher or peers’ feedback to change or improve their thinking. For example:

- Lesson 2, Day 2, Activity, Step #7: “After students share with 2–3 partners, give them time to revise their model. Inform students: Now that you have heard some of your classmates’ ideas, you might have some new ideas for your model, and maybe you’d like to add someone’s idea to your model. Use the next five minutes to make any changes to your model” (Page 9).
- Lesson 3, Day 2, Activity, Step #4: Students make a claim with evidence to determine what is in the scat. However, this is a missed opportunity for students to receive feedback from a peer or teacher to change or improve their thinking.
- Lesson 4, Day 1, Activity, Step #3: “Choose a student from each group to share what the group discussed. Prompt students to react to a sharing from a group with the following routine. Encourage students to respectfully critique their peers’ claims” (Page 5).
- Lesson 5, Days 1–2 Activity, Steps #3–6: Students collect data from their school yard and then share their observations.

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- Lesson 6, Day 2, Activity, Step #4: “Assessment opportunity: Students then share their work with 3–4 other partners using Stand Up, Hand Up, Pair Up. See Language Recording Tool. Students may add to their models and revise their written explanations as they clarify their thinking through repeated opportunities to share and listen to others’ explanations” (Page 7).
- Lesson 8, Day 2, Activity, Step #6: “With a few minutes remaining in this activity, use the Stand Up Hand Up Pair Up protocol to have students share their model with at least 2 people. Say: If the classmates you shared with had a great idea that fits in your model, you can add that right now. Scientists improve their models by learning from other scientists. Assessment opportunity: Student models” (Pages 5–6).
- Lesson 10, Days 2–3, Activity, Steps #8–10: Students create hand pollinator models and test out their designs. There is a teacher note that suggests students may revise their models in their notebooks if needed. **This is a missed opportunity for a gallery walk before prompting students to test out their designs.**
- Lesson 11, Day 1, Activity, Step #3: “Student groups take turns presenting to tell the story of how the cherry tree came to grow where it did. Each student takes their turn, then the rest of the class may comment or ask a question to the group. When groups are finished, celebrate student learning by noting specific details students had added to their model. Option to allow students to add to or revise part of their model before collecting it” (Page 5).

Suggestions for Improvement

- Consider including opportunities and prompts where teacher feedback for individual student work and ideas will support students in changing their thinking.
- In addition to linking the Accountable Talk Bookmark in Lesson 8 as a resource, consider enhancing educator guidance throughout all lesson directions for eliciting ideas from all students and facilitating the communication of student reasoning among peers.
- Consider indicating in what modality (orally or in writing) teachers will provide feedback to students and when and how students will respond or incorporate feedback in their learning.

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II.C. BUILDING PROGRESSIONS

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.

Rating for Criterion II.C. Building Progressions

Inadequate
(None, Inadequate, Adequate, Extensive)

The reviewers found inadequate evidence that the materials identify and build on students' prior learning in all three dimensions because evidence of the materials referencing students' prior proficiency regarding one or more of the dimensions was not located. Evidence of the materials clearly explaining how the prior learning will be built upon was also not located. In addition, the materials expect all students to revise models, which is an expectation from the 3–5-grade band, without guiding the teacher to understand that this isn't meant to be an assessment expectation for all students.

Evidence related to learning target progressions is limited to the following:

- The beginnings of the lessons list PEs and elements of the three dimensions that they are building toward. For example, in Lesson 1: Standards Addressed, NGSS, Lesson-level PE: "CCC (building toward): Patterns in the natural and human designed world can be observed" (Page 2). However, additional guidance is not provided about which part of the PE or element is developed and through which activity.
- Lesson 2:
 - Standards Addressed, NGSS, Lesson-level PE: "DCI: Plants depend on animals for pollination or to move their seeds around. (prior knowledge)" (Page 2). It is unclear how this DCI element could be considered prior knowledge when the same section of the lesson's front matter claims that the lesson is "Leading to NGSS PE 2-LS2-2," the PE with which the DCI element is associated.
 - Day 1, Activity, Step #3 is a direct call back to Grade 1 NGSS **LS1.A: Structure and Function...Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow** but no mention is made that this may be prior knowledge from a previous grade level.
 - Day 2, Activity, Step #7: "These initial student models may contain some developing concepts, and some may not be scientifically accurate at this point. Over time, students will revise their models" (Page 10).
- Lesson 3, Day 2, Activity, Step #3: "When you sorted the seeds by differences you were looking at the properties of the seeds. Shape, hardness, color, size are all properties. These are all on our

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poster from yesterday. Turn to your partner and tell your partner the property that you investigated and the pattern that you noticed” (Page 6). This is a direct connection to **PS1.A: Structure and Properties of Matter**...Matter can be described and classified by its observable properties but no mention is made that this may be prior knowledge from a previous unit or may be addressed again in future units.

- Lesson 5:
 - Lesson Preparation: “Note: This performance expectation is building towards a greater understanding of biodiversity, which will be explored at length in middle school. For Grade 2, it is enough for students to recognize that there are many different plants and animals in different habitats on land and in water” (Page 3).
 - Day 2, Activity, Step #7: “Note: Students quantify data here in order to provide specific evidence for ‘many kinds’ of plants and animals living in different habitats tomorrow. The data is not collected in a scientifically accurate way that can show that one habitat has more plants or animals than another. Second grade builds towards an understanding of comparing biodiversity that is addressed in later grades” (Page 9).
- Lesson 6, Day 2, Activity, Step #4: “Note: Grade 2 standards expect students to know that plants depend on animals for pollination. Explaining pollination as an animal (or pollinator) moving pollen from one flower to another so that the flower can make seeds is enough of an explanation. The exact mechanisms of pollination are addressed in middle and high school” (Page 7).

Suggestions for Improvement

- To fully meet this criterion, consider identifying (at the element level) what learning students are expected to come in with for all three dimensions and then explaining how this learning will be added to throughout the unit. Consider explicitly describing the CCC and SEP understandings that students are expected to have prior to this unit, as well as how (not just in which lesson) students will build on those understandings during this unit.
- Consider clarifying to teachers that the expectations for students to develop and revise models of phenomena are above grade level and therefore that it is not an assessment expectation.
- Think about including explicit support to provide teachers with clarification on possible alternate conceptions that they or their students may have while building toward students’ three-dimensional learning.

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EQUIP RUBRIC FOR SCIENCE EVALUATION

II.D. SCIENTIFIC ACCURACY

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

Rating for Criterion II.D. Scientific Accuracy

Adequate
(None, Inadequate, Adequate, Extensive)

The reviewers found adequate evidence that the materials use scientifically accurate and grade appropriate scientific information because supports are provided for addressing students' prior conceptions, and **there are only minor issues with the accuracy of the science ideas presented to students.**

Related evidence and reasoning include, but are not limited to:

- Lesson 5 Day 2, Step #7: "Note: Students quantify data here in order to provide specific evidence for 'many kinds' of plants and animals living in different habitats tomorrow. The data is not collected in a scientifically accurate way that can show that one habitat has more plants or animals than another" (Page 9). This teacher guidance provides helpful context for the student performance.
- Lesson 6 Day 1, Connection/Opening, Step #1: "Today we have a new question, 'What are those insects doing on those plants?'" (Page 4). A teacher note says that "pollination is a benefit caused by the bees foraging for food, not the purpose of their actions," and that it is important for the teacher to keep that idea in mind during the lesson (page 4). Later in the lesson, guidance is given to the teacher about possible ways they might hear students expressing alternate conceptions about the purpose of animals obtaining pollen and example prompts are given (page 6).
- Lesson 7 Connection/Opening, Step #1: "Say: Scientists, you made a prediction about what will happen to the seeds in scat. We investigated by placing seeds in soil in the trays. Now we have plant growth to observe. How are our plants doing? ... Students share in their groups how your prediction matched the data or not. Call on a few students to answer the question, What happened to the **seeds in scat?** (plants grew from the seeds)" (Page 4). **Students did not grow their seeds in scat,** and students are told in Lesson 4 that they are using soil **without discussing the idea of substituting soil for scat. Students might therefore find this question confusing or misleading about the procedures in scientific investigations.** Note that results might not be generalizable between soil and scat; while some seeds require being passed through the digestive tract of an animal and others may benefit from the nutrients in animal waste, others will no longer germinate if exposed to the digestive system of an animal.
- Lesson 9 Day 2, Activity, Step #5: "Review: Scientists explain the answer to an investigation question. First, to explain the answer to a question, scientists make a claim. Then they state the data that goes with the claim. The data is evidence for the claim" (Page 7). **This is an overgeneralization about both the work of scientists and the relationship between data and evidence. For example, making a claim is not always the first step in scientific investigations.**

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Suggestions for Improvement

The reviewers recommended adjusting the language referenced above to ensure it will not promote inaccurate or thinking for students. Note that while the desire to maintain grade-level appropriate language and level of complexity is recognized, a careful focus on precision in language can still achieve grade-level appropriateness and scientific accuracy.

II.E. DIFFERENTIATED INSTRUCTION

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.

Rating for Criterion II.E. Differentiated Instruction

*Inadequate
(None, Inadequate, Adequate,
Extensive)*

The reviewers found inadequate evidence that the materials provide guidance for teachers to support differentiated instruction because the materials do not explicitly describe differentiation strategies for identifying which students might struggle and do not provide individualized learning support strategies. The unit materials also do not provide adequate differentiation opportunities for emerging multilingual learners, students with high interest, and students who have already met the performance expectations. There is a lack of clearly defined support for students with special needs or those that read well below grade level, and the materials do not provide reading, writing, listening, or speaking alternatives in multiple modalities to support different student groups in developing proficiency in the targeted learning.

Lesson slides — available for each lesson — provide images, sentence stems, CloZe statements, and symbols to support student comprehension and performance. This support is likely to be helpful to all students.

Extension activities were only found in one lesson. In Lesson 6 in the section titled “Supplementary Materials” it states, “Extension for flower and pollinator shape: Show video Flowers and Their Pollinators: A Perfect Match! Ask students to Think-Pair-Share: How does the flower shape affect which animals help with

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pollination? How does the shape of an animal’s mouthpart affect which flowers it can get pollen and nectar from?” (Page 10). This supports student growth in two of the three dimensions (DCIs and CCCs).

Guidance is provided to draw educator attention to and support struggling students, and/or those that may have difficulty with writing *but is there is no guidance about the progression of student expectations related to the targeted elements of the three dimensions at this grade band to help educators anticipate needs and move students appropriately forward. Related evidence includes:*

- Lesson 3, Day 1, Connection/Opening, Step #1: “Students turn and talk to share their observations. Call on a few students to share their observations...For students who may need it, create a list of adjectives together” (Page 4).
- Lesson 5:
 - Day 1, Activity, Step #4: “While student pairs work independently, circulate among the students. Consider focusing on students whose language or process you are specifically interested in hearing, or on student pairs who might need support recording observations” (Page 7).
 - Day 3, Step #10: “For students who need support with defining ‘many’, the Quantity words resource may be helpful” (Page 14).
- Lesson 6, Day 3, Step #5: “Students work in pairs to add the new connection to their models (assessment opportunity). At this point, encourage productive struggle. Redirect students to the driving question, What are some connections between plants and animals?, and encourage them to look at the list of Science Words if that would be helpful” (Page 7).
- Lesson 9, Day 2, Step #5: “For students who need extra support, students may share their claims and evidence in Stand Up, Hand Up, Pair Up to clarify and revise their thinking before completing the notebook page” (Page 7).
- Lesson 10, Day 2, Step #6: “For students who need support, demonstrate using the agree/disagree stems. Emphasize using evidence to back up their ideas” (Page 6).
- Lesson 11, Day 1, Activity, Step #2: “Students work in pairs to add their new learning to their models, for example, specifying structure and function of pollinators. At this point, encourage productive struggle. Redirect students to the driving question, What are some connections between plants and animals?, and encourage them to look at the list of Science Words if that would be helpful” (Page 3).

Suggestions for Improvement

- Consider including suggestions for identifying and supporting students who struggle with any one of the three dimensions. Current guidance doesn’t include supports related to CCCs.
- Consider providing callouts throughout the unit that provide strategies that teachers can use to support students in their development of the three dimensions, including specific supports for emerging multilingual learners, learners with special needs, struggling students, and learners who read below grade level.
- Consider providing extensions or other differentiation activities to support students who have already met the learning goal and have an opportunity to build a deeper understanding in all three dimensions.

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- To provide differentiation supports for students with special needs, consider including supports to assist teachers with presenting abstract content in small incremental steps.
- To assist students with different reading levels, consider providing more alternative texts with varying reading levels or additional alternative texts and videos for all lessons that require readings. Students reading at home would ideally have alternatives to access inside and outside of the classroom.

II.F. TEACHER SUPPORT FOR UNIT COHERENCE

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.

Rating for Criterion II.F. Teacher Support for Unit Coherence

Adequate
(None, Inadequate, Adequate, Extensive)

The reviewers found adequate evidence that the materials support teachers in facilitating coherent student learning experiences over time because some guidance is provided to teachers to support linking student engagement across lessons. However, support is not provided to help students see connections between CCC learning and their sense-making or problem solving.

Some guidance is provided to teachers to support linking student engagement across lessons. Related evidence includes:

- In the Overview Document educators are provided with unit-level essential questions and enduring understandings, as well as a brief overview of each lesson that includes a description of what students do.
- Individual lessons include an overview that briefly summarizes the lesson. The teacher is supported to use the DQB and is provided with sample images resulting in a structure helpful for unit material organization. For example:
 - Lesson 1 ends with students creating a DQB after examining the scat and raccoon phenomenon. Lesson 2 begins with students revisiting the DQB, focusing on the questions created by students that surround the seeds in the scat. This leads to the discussion about plant parts which is the focus of Lesson 2.
 - Lesson 2 ends with students returning to the DQB to discuss seeds. However, teacher guidance for this was not explicitly located. Lesson 3 begins with a brief reference to the

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- DQB, once again, teacher guidance on this discussion was not located, and the teacher begins the lesson by informing students of the activity for the day.
- Lesson 3 begins with a brief reference to the DQB and how it relates to the examination of seeds. Guidance is not provided to support students in making authentic connections to previous learning.
 - Lesson 5 begins with a loose connection made by the teacher between the DQB and the driving question, leading the students into the habitat data collection activity. Lesson 5 ends with the teacher eliciting student questions for the DQB, and then a very loose connection is prompted between the habitat activity and their Lesson 6 discussion of pollinators.
 - Lesson 6 begins with DQB reference, but the teacher drives the discussion to focus on pollinators. The students aren't figuring out what next question to pursue because the connection between Lessons 5 and 6 is not explicit.

Throughout the unit insufficient guidance is provided that allows students to recognize what they have learned in all three dimensions and there is no guidance provided to link students' CCC learning to sense-making. For example, at the beginning of the unit the CCCs are included in the NGSS Alignment in the Unit (Page 7). However, evidence of guidance provided to ensure student sense-making or problem solving with the CCCs was not located.

Suggestions for Improvement

- Consider including explicit educator guidance to help students see smooth and coherent connections between all lessons and activities that recruit their questions and progressing understanding. For example, consider prompting more frequent opportunities for students to ask new questions throughout the learning sequence.
- Consider clarifying if and when a class consensus model is to be employed. Currently, the only mention of one is in Lesson 8, but it is implied that a consensus model has been incorporated up to this point, which it has not.
- Consider including more explicit strategies to help educators ensure that student sense-making (e.g., explaining the cherry tree growth) is clearly linked to learning in all three dimensions and that the cumulative effect of all opportunities for student sense-making address all three-dimensional learning targets.

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II.G. SCAFFOLDED DIFFERENTIATION OVER TIME

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.

Rating for Criterion II.G. Scaffolded Differentiation Over Time

*Adequate
(None, Inadequate, Adequate, Extensive)*

The reviewers found adequate evidence that the materials support teachers in helping students engage in the practices as needed and gradually adjust supports over time because while some SEP elements are used more than once in the unit, *the differentiation with which the expectations are presented is inconsistent and does not represent a progression toward independence over time.*

The most iterative examples of students engaged with SEPs over the course of the learning sequence are listed below. *However, there is little evidence to support that educators are guided to facilitate progressing student proficiency over time:*

Developing and Using Models

- *Develop and/or use a model to represent ~~amounts, relationships, relative scales (bigger, smaller), and/or patterns in the natural and designed world(s).~~*
 - *During the unit, students are not engaged in using all the claimed part of this element, and instead are expected to develop and use the following Grade 3–5-level element: **Develop and/or use models to describe and/or predict phenomena.***
 - Lesson 2, Day 2, Activity, Step #6: “I wonder how it came to grow in that field. Today you will make a model of how you think that tree came to grow in that spot. I am going to add that as a question to the DQB. ‘How did this cherry tree begin to grow here?’” (Page 9). The task does not engage students with the full SEP element. *It is unclear of what prior knowledge and skill with which students are expected to approach this task.*
 - Lesson 2:
 - Day 2, Activity, Step #6, Student Notebook: “Lesson 2: b. Make a model. How did the cherry tree begin to grow in the field? I think the cherry tree began to grow in the field because...In the space below, make a model that shows how this happened. Use sketches and words to show your thinking” (Student Notebook Page 4). The task does not focus students on patterns. *It is unclear what prior knowledge and skill with which students are expected to approach this task.* It appears the assumption is that students already know what a model is.
 - Closing, Step #8: “Scientists use models all the time. A model helps describe what we know about a science idea. Let’s add model to our list of Science Words. Add ‘model’ to the list of science words” (Page 10). *It is not until after students are*

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expected to create a model that the educator is prompted to give some background about what a model is. Students are not asked to discuss why a scientist may use a model.

- Lesson 6, Day 3, Step #5: “Continue: Models are tools for thinking and showing connections. Scientists like you make models to describe and explain phenomena. Remember how you observed the cherry tree and the cherry pits? Remember how we asked the question, How did this cherry tree begin to grow here? Then you sketched your initial ideas? We have figured out a lot about plants and animals and the connections between them. Last time, we read and talked about another connection between plants and animals. With your partner, add the new connection to the model. Students work in pairs to add the new connection to their models (assessment opportunity). At this point, encourage productive struggle. Redirect students to the driving question, What are some connections between plants and animals?, and encourage them to look at the list of Science Words if that would be helpful. Students may want to start their model all over” (Page 7). The task does not engage students with the full SEP element.
- Lesson 8, Day 2, Step #6: “Say: Now it is time to look at our models and make those additions and changes. You can use what you have learned, but you can also use the information on the DQB to help revise your model. This is information that we all share, just like how scientists share their learning with the world. Give students 10 minutes to work on making changes to their models. You may need to prompt students to add to their model. What plant and animal connection are you adding? On day X, we learned about Y, do you think that would fit somewhere on your model? What is this? Do you think a label will help someone read your model? What did your partner talk about? Do you think that belongs in your model? With a few minutes remaining in this activity, use the Stand Up Hand Up Pair Up protocol to have students share their model with at least 2 people” (Page 5). The task does not engage students with the full SEP element.
- Lesson 9, Day 2, Step #6: “Direct students to open their Science Notebooks to p. 22, or their most recent version of their student model of the cherry tree. Our models are thinking tools. We started at the very beginning of the unit with showing our initial thinking about the raccoon and the scat. Since then, we may have changed our thinking and we may have added to our thinking. As our thinking changes, we revise our models to show our change in thinking. How does our thinking about what plants need to live help us understand the raccoon and the scat? Remember our big driving question? Are you ready to answer the question, What are some connections between plants and animals? Students add to their models, then share... New understanding: The seed can sprout with rain, but the seedling will need light and water to grow into a tree. The scat with seeds has to be in a place with enough light and water” (Page 8). The task does not engage students with the full SEP element. Note that revising models is not an expectation for all students until the 3–5 grade band, but guidance is not provided during this unit about using expectations from a higher grade band.
- Lesson 11:

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- Activity, Step #2: “Students work in pairs to add their new learning to their models, for example, specifying structure and function of pollinators” (Page 3). *The task still does not engage students with the full SEP element. Additionally, working in pairs to demonstrate a portion of the SEP element toward the end of the unit, instead of being asked to work independently, represents a step backward in terms of decreasing scaffolding over time.*
- Activity, Step #3: “Say: Each group will answer the question, What are some connections between plants and animals? by sharing their models and explaining how the cherry tree came to grow where it did. Each group member will share a part of their model” (Page 4).

Constructing Explanations and Designing Solutions

- *Make observations [from several sources] (~~firsthand or from media~~) to construct an evidence-based account for natural phenomena:*
 - Lesson 3:
 - Day 2, Activity, Step #4: “Remember my original question when we looked at the images and video of scat and raccoons: ‘What is in the scat?’ Can we answer that question? Which of the seeds that we tested today was in the raccoon scat we observed? ... Students write a claim with evidence from the investigations (Page 6). In Lesson 3, Day 1, Connection/Opening, Step #1 the educator is prompted to tell students that what is seen are cherry seeds, ‘All the observations that we have made tell us that there were seeds in the raccoon’s scat. By looking closely at the image, we see that it is likely that these seeds were from a cherry tree’” (Page 3).
 - Day 2, Activity, Step #4: “Say: Data is another word for information. We have gathered some data to help us answer the question, ‘What is in the scat?’ Then we can make a claim that answers our question, like, ‘I think _____ is in the scat.’ Then, we use our data as evidence to support our answer. Students get out their Science Notebook and open to page 6. There is a Claim and Evidence template to use. Students write a claim with evidence from the investigations (assessment opportunity) ... Allow time for students to write their responses in the Claim and Evidence template” (Pages 6–7). *Students were not tasked with making observations to determine if the seeds are cherry. So, while this task provides the opportunity to practice formulating a claim, students would not have to draw from observation or use evidence to support a claim. They would simply repeat what was said by the educator.*
 - Lesson 5, Day 3, Step #10: “Continue: When scientists make a claim, they state the data they found. The data is evidence. Students Think-Pair-Share: What data can we use as evidence to support our claim that there are lots of kinds of plants and animals in each habitat?” (Page 15).
 - Lesson 9, Day 2, Step #5: “Say: Our investigation question is, Do plants need light and water to grow? Based on the patterns in our data, what is the answer to this question? (Plants need light and water to grow. Plants without water did not grow/were not healthy, Plants

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without light did not grow/were not healthy, Plants without both water and light did not grow/were not healthy). The answer to our question is, Plants need water and light to grow. That is our claim. The claim is an answer to our question...Continue: Our claim today is, Plants need water and light to grow. Where can we find the data we can use for our evidence? (students point out the class Plant Observations table and data in student notebooks.) Distribute 09b Notebook page to students (or use from Science Notebook, p. 24). Students complete the claim and evidence, in writing and with sketches where relevant. This is a summative assessment for making a claim and supporting it with evidence...For students who need extra support, students may share their claims and evidence in Stand Up, Hand Up, Pair Up to clarify and revise their thinking before completing the notebook page” (Page 8).

Suggestions for Improvement

- Consider including explicit support for a few focus SEP elements on which to support student development throughout the unit. These elements could then be used multiple times throughout the unit, with progressively reduced teacher scaffolds such that students are able to use the elements more independently or deeply by the end of the unit.

OVERALL CATEGORY II SCORE:	
2	
(0, 1, 2, 3)	
Unit Scoring Guide – Category II	
Criteria A-G	
3	At least adequate evidence for all criteria in the category; extensive evidence for at least two criteria
2	Some evidence for all criteria in the category and adequate evidence for at least five criteria, including A
1	Adequate evidence for at least three criteria in the category
0	Adequate evidence for no more than two criteria in the category

CATEGORY III

MONITORING NGSS STUDENT PROGRESS

III.A. MONITORING 3D STUDENT PERFORMANCES

III.B. FORMATIVE

III.C. SCORING GUIDANCE

III.D. UNBIASED TASK/ITEMS

III.E. COHERENT ASSESSMENT SYSTEM

III.F. OPPORTUNITY TO LEARN

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III.A. MONITORING 3D STUDENT PERFORMANCES

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.

Rating for Criterion III.A. Monitoring 3D Student Performances

*Adequate
(None, Inadequate, Adequate,
Extensive)*

The reviewers found adequate evidence that the materials elicit direct, observable evidence of students using practices with core ideas and crosscutting concepts to make sense of phenomena or design solutions because there are some opportunities to elicit direct, observable evidence that students integrate the three dimensions in service of sense-making. However, most tasks are two dimensional and match a DCI with either an SEP or CCC but not both. Two of the four DCI elements claimed are only addressed in one lesson each. This limits the number of opportunities for students to engage with the DCI elements and to demonstrate progress toward mastery.

Students produce artifacts in the form of drawings, worksheets, individual student responses, and class discussions. These artifacts elicit little direct, observable evidence that students are integrating multiple dimensions in service of sense-making or problem solving.

For example:

- Lesson 2, Day 2, Activity, Step #6, Student Notebook: “Lesson 2: b. Make a model. How did the cherry tree begin to grow in the field? I think the cherry tree began to grow in the field because...In the space below, make a model that shows how this happened. Use sketches and words to show your thinking” (Page 4). Then, students create a model that describes how they think the cherry tree came to grow in its spot. Then, students share their models with other class members (Lesson 2, Page 9). This artifact could align with the SEP and the CCC, although the SEP element that students use (*Develop and/or use models to describe and/or predict phenomena*) is from the 3–5-grade level. The lesson plan states that the students should have prior knowledge in the DCI dimension, but no evidence was located to show where this prior knowledge could come from.
- Lesson 3, Day 2, Activity, Step #4: Students write a claim with evidence from their seed sort activity to determine what is in the scat. This artifact is not aligned with the focus standard for this lesson. The focal SEP is making observations to collect data and the CCC is patterns in observational data, while the activity has the students writing a claim from evidence. Evidence for the DCI was not located.
- Lesson 5, Day 1, Activity, Step #4: Students make observations about the plants and animals in their school yard and other habitats. They create a data table to develop a list and share their findings with the class.
- Lesson 6, Day 3, Step #5: “With your partner, add the new connection to the model. Students work in pairs to add the new connection to their models (assessment opportunity). At this point,

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encourage productive struggle. Redirect students to the driving question, What are some connections between plants and animals?, and encourage them to look at the list of Science Words if that would be helpful. Students may want to start their model all over” (Page 7). *Explicit alignment to the CCC was not located. In addition, paired student work to revise models may not produce accurate or complete information regarding individual student understanding or performance.*

- Lesson 8, Day 2, Step #6: “Say: Now it is time to look at our models and make those additions and changes. You can use what you have learned, but you can also use the information on the DQB to help revise your model. This is information that we all share, just like how scientists share their learning with the world. Give students 10 minutes to work on making changes to their models. You may need to prompt students to add to their model. What plant and animal connection are you adding? On day X, we learned about Y, do you think that would fit somewhere on your model? What is this? Do you think a label will help someone read your model? What did your partner talk about? Do you think that belongs in your model? With a few minutes remaining in this activity, use the Stand Up Hand Up Pair Up protocol to have students share their model with at least 2 people” (Page 5). *Explicit alignment to CCC was not located. In addition, students are expected to revise models, which is not part of the standards at this grade level.*
- Lesson 9, Day 2, Step #6: “Direct students to open their Science Notebooks to p. 22, or their most recent version of their student model of the cherry tree. Our models are thinking tools. We started at the very beginning of the unit with showing our initial thinking about the raccoon and the scat. Since then, we may have changed our thinking and we may have added to our thinking. As our thinking changes, we revise our models to show our change in thinking. How does our thinking about what plants need to live help us understand the raccoon and the scat? Remember our big driving question? Are you ready to answer the question, What are some connections between plants and animals? Students add to their models, then share... New understanding: The seed can sprout with rain, but the seedling will need light and water to grow into a tree. The scat with seeds has to be in a place with enough light and water” (Page 8).
- Lesson 10: Students watch a video that explains how hand pollinators work, discuss the materials about their possible structure and function, then design a model hand pollinator to transfer pollen from one flower to another (Pages 6–8).
- Lesson 11:
 - Activity, Step #2: “Students work in pairs to add their new learning to their models, for example, specifying structure and function of pollinators” (Page 3).
 - Activity, Step #3: “Say: Each group will answer the question, What are some connections between plants and animals? by sharing their models and explaining how the cherry tree came to grow where it did. Each group member will share a part of their model” (Page 4).

Suggestions for Improvement

- Consider proportionally matching assessments with the claimed learning goals or prioritizing and identifying key learning targets to which assessment opportunities are aligned. For example, some SEP elements are more regularly assessed throughout the learning sequence, while others may be aligned with only one assessment event. An explanation of this may be helpful for educators if the

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focus on certain elements is intentional. In addition, aligning students' modeling assessment expectations with the targeted learning goals would be helpful.

- Consider adding explicit prompts for students to use CCCs in the assessment opportunities.
- Consider including rubrics and criteria that could include levels of "proficiency" for students requiring all three dimensions working together, including the designing of solutions.

III.B. FORMATIVE	
Embeds formative assessment processes throughout that evaluate student learning to inform instruction.	
Rating for Criterion III.B. Formative	Adequate (None, Inadequate, Adequate, Extensive)

The reviewers found adequate evidence that the materials embed formative assessment processes throughout the unit that evaluate student learning and inform instruction because formative assessment opportunities are called out regularly throughout the unit. The assessments and teacher materials include accompanying guidance for teacher interpretation. *However, reviewers found very little guidance for when and how to modify whole group and individual instruction based upon assessment results.*

Examples include:

- An Assessment Map is included on pages 15–17 in the Unit Overview document that includes assessment opportunities throughout the unit.
- It can be implied by the language used in the assessment map, as considered with the language used in the front matter of each individual lesson, that each of the following pieces of evidence is considered in the materials to be formative assessment. *However, some confusion arises when items listed under the "Formative Assessment" category of the lesson front matter are designated as either "formal" or "informal." Also, there aren't any teacher supports to assist students if they answer these questions incorrectly.*
- Lesson 1, Formative Assessment: "Teacher observation of student discourse and questions." (Page 1). Step #2: "Notice/Wonder (10 min)/*informal assessment*: Say: Let's use our noticings to wonder like I just did. Read the noticings in your science notebook and on our class list, and choose one that makes you curious or wonder about what we are looking at...When you are talking to your classmates, I want you to share what you saw or observed with an 'I notice...' then change it to a question about what you have observed with an 'I wonder...' question. I will be around to help" (Page 4). *It is not clear that educators would be able to collect information from all students during a discussion to inform instruction.*

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- Lesson 2, Formative Assessment: “Informal: Class discussion about plants we eat and what part of the plant they come from. Formal: Student model from end of lesson (Day 2)” (Page 1). *However, in the steps below, guidance is not provided to support educators in making decisions about instructional next steps based on student discourse.*
 - Day 1, Activity, Step #4: “Let’s use this sentence frame to describe a plant structure we eat. Think about the plant food that you said you eat. Then, in your small group decide what structure the plant food comes from before you place it on the poster...Say: One plant structure that I love to eat are strawberries. Let’s use this sentence frame to show the connection between this food and the plant structure it comes from. (Reference the sentence frame below as you go.) A strawberry is the fruit of a plant. I am going to place this next to the fruit label on the poster. _____ is the _____ of a plant. Ask students to sort their sticky on the poster using the sentence frame to share their ideas about plant parts and structures (assessment opportunity)” (Pages 6–7).
 - Day 2, Activity, Step #6: “Today you will make a model of how you think that tree came to grow in that spot. I am going to add that as a question to the DQB. ‘How did this cherry tree begin to grow here?’ Add question to DQB: How did this cherry tree begin to grow here? Direct students to open their science notebooks to page 4, write their name, and date the page. Students will work on these individually at first (assessment opportunity). Remind students that while they are working individually, it is okay for students to talk about their ideas at their tables. Scientists share their thinking with other scientists all the time” (Page 9).
 - Day 2, Activity, Step #7: “Say: Let’s get up and share our thinking with our classmates ... Remember that your model describes how you think that tree came to grow in that spot. How did this cherry tree begin to grow here? I think the cherry tree began to grow in the field because...Use the Stand Up Hand Up Pair Up protocol for student sharing. About every two minutes, initiate a switch, so everyone has a chance to share with more than one person (assessment opportunity) ... Listen for student claims and explanations about cause and effect” (Page 9). *It is not clear that educators would be able to collect information from all students during a discussion to inform instruction. Students are not explicitly prompted to include cause-and-effect relationship language in their dialogue, so it is unclear if this opportunity serves as a pre-assessment.*
- Lesson 3, Formative Assessment: “Informal: How are students sorting their seeds, and are they able to communicate their criteria? Formal: Can students write a claim to answer a question and provide 2 pieces of evidence for that claim?” (Page 1).
 - Day 2, Activity, Step #3: “When you sorted the seeds by differences you were looking at the properties of the seeds. Shape, hardness, color, size are all properties. These are all on our poster from yesterday. Turn to your partner and tell your partner the property that you investigated and the pattern that you noticed. Use this sentence frame in Science Notebook p. 5 to help students with the sharing. One property we investigated was _____. The pattern I noticed was...(assessment opportunity)” (Page 6). *It is not clear that educators would be able to collect information from all students during a discussion to gauge student*

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- proficiency and/or inform instruction. While sample student responses are provided, guidance is not given to help educators make instructional decisions based on what is heard.
- Day 2, Activity, Step #4: “Remember my original question when we looked at the images and video of scat and raccoons: ‘What is in the scat?’ Can we answer that question? Which of the seeds that we tested today was in the raccoon scat we observed? Say: Data is another word for information. We have gathered some data to help us answer the question, ‘What is in the scat?’ Then we can make a claim that answers our question, like, ‘I think _____ is in the scat.’ Then, we use our data as evidence to support our answer. Students write a claim with evidence from the investigations (assessment opportunity)” (Page 6). Students were explicitly told at the conclusion of Lesson 2 as well as the beginning of Lesson 3 that the scat contains seeds, and at the beginning of Lesson 3 it was revealed that the seeds were likely cherry seeds. Students would not be required to use evidence to retell that the scat contains cherry seeds. This task would not serve to inform the educator about student proficiency with three-dimensional learning targets. Instead, students could repeat what they have been told to answer the question.
 - Lesson 4, Formative Assessment: “Informal: Student discussion around plant placement. Does the student participate in the argument through agreement, providing support in the form of evidence, adding on, or disagreement?” (Page 1). However, educators are not given support regarding instructional decisions based on what is heard.
 - Connection/Opening, Step #1: “We thought that there were seeds in the scat and asked, What happens to the seeds in scat? ... Direct students to write a prediction to answer the question, What happens to the seeds in scat (assessment opportunity)? Ask: Why do you predict that? Share predictions and the reason for your prediction with your partner” (Page 3).
 - Activity, Step #3: “Ask: Now that our seeds are ready to grow, we need to put them in the best place! We talked about water and light earlier. I will be watering the plants, but how do we make sure the new plants get enough light? Use Numbered Heads Together to get small groups talking about the place with the best light. Give time for students to discuss. Choose a student from each group to share what the group discussed. Prompt students to react to a sharing from a group with the following routine. Encourage students to respectfully critique their peers’ claims (assessment opportunity)” (Pages 4–5). It is not clear that educators would be able to collect information from all students during a discussion to gauge student proficiency and/or inform instruction. One student presenting group ideas does not accurately represent performance of the other students. Educators are not provided guidance for what they should be listening for.
 - Lesson 5, Formative Assessment: “Student contributions to oral conversations. Collected data. Oral and written evidence to support a claim” (Page 1). Day 3, Step #10: “Students Think-Pair-Share (Assessment opportunity): What data can we use as evidence to support our claim that there are lots of kinds of plants and animals in each habitat? Use and encourage students to use phrases such as, Can you tell me more? This data goes with our claim because _____. I agree with including this data, because _____. I think we should add this data as evidence because _____. I disagree with including this data, because _____ to facilitate discussion

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when students share their pair thinking. Evidence is stated as statements with specific data such as: (Habitat) has (x number) of kinds of animals and (x number) of kinds of plants” (Pages 15–16). It is not clear that educators would be able to collect information from all students during a discussion to gauge student proficiency and/or inform instruction. In addition to this, guidance as to how teachers should proceed instructionally if students incorrectly complete this activity was not located. Also, this is the only time in the unit when this PE is addressed. Therefore, it is unlikely the teacher will have the opportunity to formally assess students again on mastery of this standard before the summative assessment.

- Lesson 6, Formative Assessment: “06b Notebook page. Students’ oral presentation” (Page 1).
 - Day 1, Connection/Opening, Step #1: “Show pictures of bees on flowers and other pollinators in the slideshow. Ask students to Think-Pair-Share what they notice. Refer to the lesson question: What are those insects doing on those plants? Use this as an informal formative assessment: What do students know about pollination? What language are they using to describe the flowers and pollinators, including cause and effect relationships? At this point, do not correct student ideas as they think-pair-share. Knowing what students think the insects are doing can help you pose probing questions throughout this lesson and the next as students shape their understanding of pollination” (Page 4).
 - Day 2, Step #4: “Using Numbered Heads Together, ask students to explain What is pollination? And Why [sic] is it important? Student groups may sketch on whiteboards or paper to model pollination. Have a few groups share with the class, and clarify any confusion around the process of pollination. By talking in groups, students will have opportunities to clarify their understanding of pollination. Direct students to open their Science Notebooks to p. 14, write their name, and date the page (06b Notebook page). On their own, students complete the model and explanation of pollination. This is an assessment opportunity. Possible student response: Pollination is pollen moving from flower to flower. It is important because a plant needs pollination to make seeds” (Pages 6–7).
 - Day 2, Step #4: “Assessment opportunity: Students then share their work with 3–4 other partners using Stand Up, Hand Up, Pair Up. See Language Recording Tool. Students may add to their models and revise their written explanations as they clarify their thinking through repeated opportunities to share and listen to others’ explanations” (Page 7).
- Lesson 7, Formative Assessment: “Investigation plan. Numbered Heads Together prediction activity and science notebook pages 15–20” (Page 1).
 - Connection/Opening, Step #1: “In Round Robin at their table group, students make a claim about how the plant is growing. **Assessment opportunity:** Possible student response: This plant is healthy. I know this because the leaves are green and they aren’t drooping” (Page 3). It is not clear that educators would be able to collect information from all students during a discussion to gauge student proficiency and/or inform instruction. While a sample student response is provided, guidance is not given to help educators make instructional decisions based on what is heard, especially if what is heard does not match the desired response given.
 - Activity, Step #2: “Using Numbered Heads Together, ask students: How can we plan an investigation to test this question? Listen to student conversation. As needed, prompt

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- groups or the whole class with questions such as...Co-construct an investigation plan through questioning above...**Assessment opportunity:** Listen to table conversations about the investigation plan” (Page 4). A spectrum of possible student plans is not provided for educators. Therefore, they may not know what to listen for. It may be difficult for educators to gauge individual student performance during small and/or whole group discussions, since they may only hear from a limited number of students. In addition to this, students are assessed very soon after this lesson. Therefore, it may be too late in the instructional sequence for teachers to shift instruction and guide students’ understanding.
- Lesson 8, Formative Assessment: “Formal: Revised plant and animal connection model. Informal: Student arguments during consensus model discussion” (Page 1).
 - Day 2, Step #6: “Say: Now it is time to look at our models and make those additions and changes. You can use what you have learned, but you can also use the information on the DQB to help revise your model...Give students 10 minutes to work on making changes to their models. You may need to prompt students to add to their model. What plant and animal connection are you adding? On day X, we learned about Y, do you think that would fit somewhere on your model? What is this? Do you think a label will help someone read your model? What did your partner talk about? Do you think that belongs in your model?...**Assessment opportunity:** Student models” (Pages 5–6).
 - Day 2, Step #7: “Briefly review what is in the class consensus model so far. Ask: What is something that should be changed or added to the model? What is your evidence? Call on a student to suggest something. Remind them that it should help show how plants and animals are connected. (**Assessment opportunity**)” (Page 6). Although possible student responses are provided, it is not clear that educators will be able to accurately gauge that performance of all individual students when only initiating contributions from a select few. Guidance as to how teachers should proceed instructionally if students incorrectly complete this activity was not located.

Suggestions for Improvement

- Consider including suggestions for how instruction might be modified to react to the learning needs of individual students. For example, ideas could be provided for how the next activity could shift if some students aren’t quite proficient in applying a CCC element or how to modify instruction if formative assessment reveals that students are already proficient with the targeted learning (e.g., providing extensions).
- Consider utilizing multiple modalities to assess students. There are many areas in the unit where students discuss their learning process. Recording and assessing these discussions would allow the teacher to better identify areas where students may need additional support or enrichment.
- Consider providing more opportunities for grade band-appropriate, multi-dimensional formative assessments.

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III.C. SCORING GUIDANCE

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.

Rating for Criterion III.C. Scoring Guidance

*Inadequate
(None, Inadequate, Adequate,
Extensive)*

The reviewers found inadequate evidence that the materials include aligned rubrics and scoring guidelines that help the teacher interpret student performance for all three dimensions. *Scoring guidance tools to interpret student progress in relation to the learning targets were not located other than expected (exemplar) student responses.* The optional summative performance assessment contains an answer key and an Assessment Standards Breakdown. *However, they do not provide enough interpretation information about student performance in each dimension such that the teacher would be able to modify instruction and provide feedback to students. In addition, guidance is not provided to help interpret student progress along a continuum of performance — only exemplar student responses are included.*

Sample student responses are offered consistently throughout the materials when discourse is referenced, as well as for some written tasks. Related evidence includes but is not limited to:

- Lesson 2, Day 1, Connection/Opening, Step #1: “Say: Now that you have had a chance to share plants you eat, *we can write down the parts of the plant we eat* so we can add them to a class list later. When I call on you, share one plant that your partner has eaten. A plant my partner eats is _____ . Possible student responses: A plant my partner eats is lettuce. My partner eats the strawberries off of a plant. A plant my partner eats is an onion, but is that the whole plant? A plant my partner eats is carrots. My partner eats beets. I think they are yucky, but they say beets are very good” (Page 4). *The educator prompt that serves as directions does not match the sentence frame or sample responses. It is not clear whether students are equipped at this time to articulate the part of the plant that they are eating.* Students, later in the lesson, are more explicitly prompted to connect the plant material they eat to the parts of a plant. For example, “Possible student responses: A peach is the fruit of a plant. A carrot is a root of a plant” (Page 7).
- Lesson 5: “There’s one pattern that is the same for all three habitats. Hint: notice the number data we added to each table? Solicit student responses and confirm. In each habitat there are lots of kinds of plants and lots of kinds of animals. What is the question we are investigating? (What plants and animals live in different places?) What is the answer to the question? (Many kinds of plants and animals live in different places) ...Our Explanation. Question: What plants and animals live in different places? Claim: There are lots of kinds of plants and animals in each habitat” (Page 15). *The student prompt asks, “What plants and animals” and the desired response is framed to describe a quantity, so there is a mismatch between the prompt and expectations of students.*

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- Lesson 5, Day 3, Closing, Step #11: “Revisit the question: What plants and animals live in different places? Does our claim answer that question? (yes). Summarize: We just figured out something that will help us get to the answer to the big driving question, What are some connections between plants and animals? Many kinds of plants and many kinds of animals live in habitats together. (Write this on the list of Science Ideas.)” (Pages 16–17). The provided claim in the previous section of the lesson does not answer the question of what plants and animals live in different places. The claim answers the question with how many. In addition, students are asked for “the” connection between plants and animals, indicating that the answer is singular.
- Lesson 6, Day 2, Step #4: “On their own, students complete the model and explanation of pollination. This is an assessment opportunity. Possible student response: Pollination is pollen moving from flower to flower. It is important because a plant needs pollination to make seeds” (Page 7).
- Lesson 8, Day 2, Step #7: “Call on a student to suggest something. Remind them that it should help show how plants and animals are connected. (Assessment opportunity) Ask if there is consensus. Does everyone agree? If not, help students argue by using these possible questions: Is there anything you would add to X’s suggestion? Why do you disagree? What is your evidence? Possible student responses may include: I would add an animal eating fruit from a tree. I agree we should have an animal eating seeds because we learned that is one way seeds move around” (Pages 6–7).

One rubric was located titled, “Rubric for Final Student Model.” The rubric is referenced in the unit’s Assessment Map that is included in the Overview Document, but it is not employed until the last lesson in the learning sequence, Lesson 11. Students are never shown the rubric. The criteria and levels of proficiency are not explicitly framed in relation to the three-dimensional learning targets at the element level. In addition, the task, identified as a summative assessment for the unit, does not require students to demonstrate understanding of all three-dimensional learning targets at the element level claimed for the unit.

Suggestions for Improvement

- Consider including scoring guidance notes that would support interpretation of student performance on each of the three dimensions such that teachers would be able to modify instruction if, for example, students understood the DCIs but not the CCCs. This would ideally be done for all major assessments in the unit, including:
 - identifying three-dimensional learning targets using the element levels of each dimension;
 - providing guidance for how the teacher can interpret student progress and how students can interpret their own progress, such as rubrics for student performance related to all three dimensions (or each dimension separately); and
 - providing enough interpretation information about student performance in each dimension that the teacher would be able to modify instruction and provide feedback to students. The [Science Task Screener](#) (Criterion D) is a helpful resource when developing scoring guidance.
- Consider clarifying the intended use of the 2-LS4-1 supplemental assessment.

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III.D. UNBIASED TASK/ITEMS

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

Rating for Criterion III.D. Unbiased Task/Items

*Adequate
(None, Inadequate, Adequate,
Extensive)*

The reviewers found adequate evidence that the materials assess student proficiency using accessible and unbiased methods, vocabulary, representations, and examples because the unit offers opportunities that measure student learning in a variety of ways. Over the course of the unit students write, draw, discuss, and verbally present. *However, students are not given a choice of modality for expression and some tasks provide limited supports to ensure that all students can successfully understand and complete the expected procedure.*

Related evidence includes:

- Multiple lessons throughout the unit feature videos or texts read aloud. *However, most of the videos do not include Closed Captioning or a transcript in order to support all students.*
- Lesson 3, Day 2, Activity, Step #4: “Say: Data is another word for information. We have gathered some data to help us answer the question, ‘What is in the scat?’ Then we can make a claim that answers our question, like, ‘I think _____ is in the scat.’ Then, we use our data as evidence to support our answer. Students get out their Science Notebook and open to page 6. There is a Claim and Evidence template to use. Students write a claim with evidence from the investigations (assessment opportunity) ... Allow time for students to write their responses in the Claim and Evidence template” (Pages 6–7). For students who have no prior experience with claim and evidence, a template is provided, including sentence starters for evidence statements. *However, all the questions that follow ask for a verbal response.*
- Lesson 6,
 - Day 2, Step #4: “Using Numbered Heads Together, ask students to explain What is pollination? And Why [sic] is it important? Student groups may sketch on whiteboards or paper to model pollination. Have a few groups share with the class, and clarify any confusion around the process of pollination. By talking in groups, students will have opportunities to clarify their understanding of pollination” (Pages 6–7).
 - Day 3, Step #5: “Students work in pairs to add the new connection to their models (assessment opportunity). At this point, encourage productive struggle. Redirect students to the driving question, What are some connections between plants and animals?, and encourage them to look at the list of Science Words if that would be helpful. Students may want to start their model all over...As students revise their models, circulate to prompt students to label, identify symbols used (e.g., arrow, dotted line) with a key...It is okay if

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student models are different, as they reflect student thinking...Ask students to Stand Up, Hand Up, Pair Up and describe their models with each other for about 5 minutes, focusing on cause and effect” (Pages 7–8). *Students are not facilitated to reflect cause-and-effect relationships in their model, but they are expected to describe their models to peers in terms of cause and effect. This is a mismatch between prompts and assessment expectations.*

- Lesson 7, Activity, Step #2: “Ask: When we were deciding where to put the seeds we planted, we talked about what we thought plants needed to grow. Many of you said water and light...Scientists investigate to answer questions. Our investigation question is, What do plants need to grow?... Ask students: How can we plan an investigation to test this question? Listen to student conversation. As needed, prompt groups or the whole class with questions...*Co-construct an investigation plan through questioning above.* Groups receive four plants, one plant to be grown under each of the following conditions: Water and light (same as present growing conditions), Water, but NO light, NO water, but light, NO water and NO light” (Pages 3–4). *When students make predictions and discuss their possible investigations this is done as a whole class. Therefore, the teacher is only measuring the student understanding verbally. Also, the variables that are changed are decided as a class, students do not have an individual choice in how to conduct their experiment.*
- Lesson 9, Day 2, Step #5: “Distribute 09b Notebook page to students (or use from Science Notebook, p. 24). Students complete the claim and evidence, in writing and with sketches where relevant. This is a summative assessment for making a claim and supporting it with evidence. Assessment opportunity. For students who need extra support, students may share their claims and evidence in Stand Up, Hand Up, Pair Up to clarify and revise their thinking before completing the notebook page” (Page 7).
- Lesson 10, Day 2, Step #7: “Say: Now that we’ve brainstormed some ideas, and thought about materials, it is time to plan your design. Launch design plan with this guidance: Engineering partners could choose one idea, or you could combine two ideas for your design that you will build. Sketch your plan for your design in your Science Notebook p. 26 (10b Notebook page — Assessment opportunity) Label the materials you will use for each structure” (Page 7).

Suggestions for Improvement

- Consider incorporating reminders for educators to offer students a choice of modality (e.g., oral, written, gestures, drawing) during assessment opportunities.
- Consider ensuring that videos used include Closed Captioning and transcripts to increase accessibility.

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III.E. COHERENT ASSESSMENT SYSTEM

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

Rating for Criterion III.E. Coherent Assessment System

*Adequate
(None, Inadequate, Adequate,
Extensive)*

The reviewers found adequate evidence that the materials include pre-, formative, summative, and self assessment measures that assess three-dimensional learning. Both formative and summative assessment types are included, *but the materials provide very little guidance for how assessments can be used to support students in meeting three-dimensional learning goals. The materials also do not show explicit evidence of how different assessment types work together to provide a coherent assessment system.*

Related evidence includes:

- Two similar, but not the same assessment maps are linked in the unit materials. One assessment map is included in the overview document, and the other version is linked in Lesson 6, Day 2, Step #4. Each map is organized by lesson, identifying the NGSS-related student goal or focus, the English Language Proficiency goal, and the assessment task or artifact. *However, the reviewers did not find sufficient teacher support for teachers to know what student learning is intended to be measured when and how to use that information to support students. Also, this document does not specify the elements or portion of the elements being assessed in each lesson.* Additional evidence related to formative assessments is listed under Criterion III.B.
- At the beginning of each lesson there is a box that denotes the formal and informal assessment opportunities that could occur throughout the lesson. *However, most of these assessments do not have three-dimensional learning goals.*
- Only formative (see evidence under Criterion III.B) and summative assessment is explicitly referenced throughout the learning sequence. For example:
 - Lesson 9, Summative Assessment: “09b Notebook page” (Page 1). This student’s page provides space for students to write a claim in response to the question “Do plants need light and water to grow?” and to sketch or write to reflect the pattern in the data as supporting evidence.
 - Lesson 9, Day 2, Step #5: “Distribute 09b Notebook page to students (or use from Science Notebook, p. 24). Students complete the claim and evidence, in writing and with sketches where relevant. This is a summative assessment for making a claim and supporting it with evidence. Assessment opportunity” (Page 7).
 - Lesson 11, Summative Assessment: “Students’ oral and presentations. Final model (rubric)” (Page 1).

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- Activity, Step #3: “In groups of four, each person in the group chooses a part of their model to present to the class. It is okay and expected that students' models will look different from one another. Possible elements to present include: Plant structures (seed, fruit, flowers, etc.) Pollination. Animal pollinator structure and function. Seed dispersal (perhaps raccoon and scat). Light and water. Other (?)...Student groups take turns presenting to tell the story of how the cherry tree came to grow where it did” (Pages 4–5).
- “Supplementary Materials” (not the same as the “Supplemental resources and Activities” section of the Overview Document) is a “Diversity in Life in Different Habitats Assessment” that only assesses **2-LS4-1**. Provided in conjunction with the assessment is educator scoring guidance. These two documents are also linked in a “Common Assessment” section of the Overview Document. *However, there is no explanation of if, how, and for what purpose this assessment might be used. The limitation to 2-LS4-1 when the unit includes connections to other PEs is not explained.*
- An optional common assessment is included. *However, because it is optional, teachers may not utilize this assessment.*

Suggestions for Improvement

- Consider including additional assessment forms for measuring student learning throughout the unit, including self-assessments and pre-assessments for SEPs and CCCs in addition to the summative and formative assessments. It would also be helpful to clearly identify to teachers why students are engaging in each of those assessment opportunities and how teachers can make use of the information they receive.
- Consider including more formal and structured assessments for students beyond oral questioning and group-developed models. This would allow for more effective individual-level assessments. This could include opportunities for claims, evidence, and reasoning written responses and other formative assessment protocols.
- Consider including a variety of measures of student growth and feedback for the students so they are aware of their progress.
- Consider providing guidance about how the different assessments work together to measure key and/or targeted learning in the unit. Educator guidance could be enhanced to include an explanation of the purpose and rationale for how and why student learning is measured across the materials.

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III.F. OPPORTUNITY TO LEARN

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

Rating for Criterion III.F. Opportunity to Learn

*Adequate
(None, Inadequate, Adequate,
Extensive)*

The reviewers found adequate evidence that the materials provide multiple opportunities for students to demonstrate performance of practices connected with their understanding of core ideas and crosscutting concepts. Students have some opportunities to demonstrate they have progressed toward three-dimensional learning in the unit.

While most of the opportunities for learning are not three-dimensional, students have opportunities to demonstrate their increasing understanding related to **LS2.A: Interdependent Relationships in Ecosystems**.

Related evidence includes:

- Lesson 1, Lesson Overview: Students ask questions about the relationship between plants and animals.
- Lesson 5, Lesson Overview: Students observe and record data about the plants and animals in their schoolyard. They develop a class data table and compare data for three habitats.
- Lesson 6, Lesson Overview: Students observe and sketch a flower, including its pollen, then they write an explanation of what pollination is.
- Lesson 8, Lesson Overview: Students obtain information about different methods of seed dispersal, then they work with groups to present information to the class.
- Lesson 9, Lesson Overview: Students have been observing plants with different treatments and recording their observations. Students make one final observation and then assemble a class data table. The class looks for patterns in data to determine that plants need light and water to grow.

Students also have opportunities to iteratively deepen their understanding of modeling through instruction and feedback, although the student expectations to revise models go beyond the K–2 grade band. Related evidence includes:

- Lesson 2, Day 2, Activity, Step #7: “After students share with 2–3 partners, give them time to revise their model. Inform students: Now that you have heard some of your classmates' ideas, you might have some new ideas for your model, and maybe you'd like to add someone's idea to your model. Use the next five minutes to make any changes to your model” (Page 9).
- Lesson 6, Day 2, Activity, Step #4: “Assessment opportunity: Students then share their work with 3–4 other partners using Stand Up, Hand Up, Pair Up. See Language Recording Tool. Students may add to their models and revise their written explanations as they clarify their thinking through repeated opportunities to share and listen to others' explanations” (Page 7).

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- Lesson 8, Day 2, Activity, Step #6: “With a few minutes remaining in this activity, use the Stand Up Hand Up Pair Up protocol to have students share their model with at least 2 people. Say: If the classmates you shared with had a great idea that fits in your model, you can add that right now. Scientists improve their models by learning from other scientists. Assessment opportunity: Student models” (Pages 5–6).

Students also have the option to receive some agreement- or disagreement-based feedback from peers in the second to last lesson of the unit and have a chance to revise their performance before the final student artifacts are created, **but students do not receive feedback from the teacher on this performance.**

- Lesson 10, Day 1, Activity, Step #6: “We’re going to spend a few minutes looking at the materials we have to use. You will walk with your partner and talk to them in a quiet voice about which materials you would like to use. Remember to describe what structure on the animal pollinator you could use the materials for in your design. Let’s practice it with a partner first. When I hold up a material, I want you to tell your partner if it is possible to use as a hand pollinator structure, and why. You could say, ‘I think the pipe cleaner can make a good structure, because it is fuzzy. It is like the body of a bee, so pollen will stick to it.’ Then, your partner might say, ‘I agree with you because I also think the pipe cleaner will hold pollen. I would like to add that a pipe cleaner can be bent into different shapes.’ Excuse students to look at the materials’ display. For students who need support, demonstrate using the agree/disagree stems. Emphasize using evidence to back up their ideas.”

Suggestions for Improvement

- Consider ensuring that educator and student materials consistently include clear and iterative opportunities for student learning toward *all* key learning goals such that students can demonstrate their learning through assessment, and 2) receive oral and written feedback and a chance to apply the feedback to improve their performance in each key targeted dimension.
- Proportionate to the length of the unit, students have very limited to no opportunities to apply feedback from the educator to construct new learning that will advance their progress in sense-making and performance related to their learning goals. Consider incorporating regular guidance for educators to give feedback and to prompt students to apply feedback.

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OVERALL CATEGORY III SCORE:

2

(0, 1, 2, 3)

Unit Scoring Guide – Category III

Criteria A-F

3	At least adequate evidence for all criteria in the category; extensive evidence for at least one criterion
2	Some evidence for all criteria in the category and adequate evidence for at least five criteria, including A
1	Adequate evidence for at least three criteria in the category
0	Adequate evidence for no more than two criteria in the category

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SCORING GUIDES

SCORING GUIDES FOR EACH CATEGORY

UNIT SCORING GUIDE – CATEGORY I (CRITERIA A-F)

UNIT SCORING GUIDE – CATEGORY II (CRITERIA A-G)

UNIT SCORING GUIDE – CATEGORY III (CRITERIA A-F)

OVERALL SCORING GUIDE

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Scoring Guides for Each Category

Unit Scoring Guide – Category I (Criteria A-F)

3	At least adequate evidence for all of the unit criteria in the category; extensive evidence for criteria A–C
2	At least some evidence for all unit criteria in Category I (A–F); adequate evidence for criteria A–C
1	Adequate evidence for some criteria in Category I, but inadequate/no evidence for at least one criterion A–C
0	Inadequate (or no) evidence to meet any criteria in Category I (A–F)

Unit Scoring Guide – Category II (Criteria A-G)

3	At least adequate evidence for all criteria in the category; extensive evidence for at least two criteria
2	Some evidence for all criteria in the category and adequate evidence for at least five criteria, including A
1	Adequate evidence for at least three criteria in the category
0	Adequate evidence for no more than two criteria in the category

Unit Scoring Guide – Category III (Criteria A-F)

3	At least adequate evidence for all criteria in the category; extensive evidence for at least one criterion
2	Some evidence for all criteria in the category and adequate evidence for at least five criteria, including A
1	Adequate evidence for at least three criteria in the category
0	Adequate evidence for no more than two criteria in the category

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OVERALL SCORING GUIDE	
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)