EQuIP Rubric for Science

Habitats & Biodiversity:

What lives where?

Curriculum Developer: OpenSciEd

GRADE 2 | JULY 2025

nsta
National Science Teaching Association

Category I Rating

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

Score Category I: 2

Category II Rating

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

Score Category II: 3

Category III Rating

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

Score Category III: 3

UNIT 2.3

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

Overall Summary Comments

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

- **Integration of the Three Dimensions.** Grade-appropriate elements of the three dimensions are used together (integrated) in nearly every lesson.
- **Teacher Support for Unit Coherence.** The materials provide tools and strategies to support teachers in linking student engagement across the lessons.
- **Formative Assessment.** Numerous three-dimensional formative assessment opportunities are embedded throughout instructional materials, providing support for next steps.
- **Student Ideas.** Connecting with community and students' everyday experiences—The materials include guidance for adapting the curriculum for place-based learning and leveraging students' cultural knowledge throughout the unit.

During revisions, the reviewers recommend paying close attention to the following areas.

- **Unit Coherence.** While the materials included support for teachers to help link student engagement across lessons, the building of lessons and the understanding of science ideas and concepts needed to explain the phenomenon are not clearly motivated by student questions and experiences. The path of learning from the student's perspective sometimes lacks coherence.
- **Building Progressions.** Materials sometimes explicitly identify prior student learning expected for all three dimensions and how this prior learning will be built upon, although not at the element level.
- **Opportunity to Learn.** Although the unit offers coherent and interconnected assessment opportunities, it does not provide students with opportunities to receive feedback focused on improving their performance across all key claimed learning outcomes in each of the three dimensions. Consider including explicit teacher and peer feedback prompts to focus on student performance related to all key claimed learning in each of the three dimensions.

Why are there two colors of text in this report?

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

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

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

CATEGORY I
NGSS 3D Design

I.A. Explaining Phenomena / Designing Solutions

ADEQUATE

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

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

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

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

The reviewers found **adequate** evidence that making sense of phenomena drives student learning. Materials are organized so that students figure out the central phenomenon: There are patterns of encountering plants and animals in multiple, different, and outside places. Questions used to drive the learning do not consistently emerge from students' questions or prior experiences, nor do they create an explicit need, framed from the student perspective, to engage in learning.

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

Student-centered focus on phenomena or problems

- Unit Front Matter: "The anchoring phenomenon for this unit is a puzzling pattern students observe through their experiences encountering plants and animals in places that are different from each other. Students have an opportunity in Lesson 1 to make and record observations of plants and animals and the places they live including students' own school and National Parks through sound clips and images." (Unit Front Matter) It is not specified what pattern is puzzling to students and how that pattern would generate compelling lines of inquiry that would lead second graders to want to figure out "What kinds of plants and animals live in different places?"
- Unit Front Matter: "The phenomenon was chosen for its place-based, accessibility for young children to experience and wonder within their own schoolyard and with guided support as they observe places beyond their community. The anchor Lesson was tested with second grade classrooms in different locations around the country to determine students' engagement, interest, and connections with the world around them." (Unit Front Matter)
- Lesson 1, Explore, Step 3, "The anchoring phenomenon for this unit is repeated observations (patterns) of encountering plants and/or animals in multiple, different, outside places. For this reason, consider having a brief discussion of local outdoor observations and plan to spend more time noticing and wondering about what is observed across all locations in the next Explore and Synthesize." (Lesson 1, Teacher Guide) This description of the anchoring phenomenon is different from that in the Front Matter.
- Lesson 1, Explore, Step 4: "Before looking at new places, have students briefly turn and talk about each of these questions to prepare for making additional observations. What other places near or far from here have you or someone you know observed plants or animals?, Where might we expect to see plants and animals in new places (in the ground, in water, in trees)?" (Lesson 1, Teacher Guide)
- Lesson 1, Explore, Step 4: "Display slide H and explain to students that each of the smaller images shows a different place in the United States that especially supports living things in nature. These places are called National Parks. People visit these parks to observe and enjoy nature. Read the name of each aloud to students and provide them the opportunity to share any connections or experiences they have with those places. Also reference the map on

slide I that shows where each National Park is located on a map of the United States. Share that we can "visit" these National Parks to see different places and the plants and animals that might live there." (Lesson 1, Teacher Guide). This navigation to investigate National Parks, while facilitated well, is not connected to an explicit need, from the student's perspective, to look at the National Parks.

- Lesson 1, Navigate, Step 6: "Add ideas for investigation to the Notice and Wonder chart. Support students in connecting the ideas they just shared for investigating to questions they asked. Write their ideas on sticky notes and place the sticky note next to the question that they are trying to answer with their investigation. "If students are uncertain, ask students why they would like to do that investigation, and then what question that investigation might answer. (Lesson 1, Teacher Guide)

- Lesson 1, Synthesize, Step 6: "Summarize wonders. Return to a Scientists Circle and celebrate with students for making great observations and asking questions about the different places we observed (Where are the animals? Where are _____ (kind of land)? How big are _____? Where do plants and animals live?) and the plants and animals (Why so many plants? What else lives near us? _____ live near me, do they live in other places too?) that can be found there. Reread the unit question co-constructed on the Notice and Wonder chart to refocus students on what we will be working toward answering before beginning the next discussion." (Lesson 1, Teacher Guide) Lesson 2, Connect, Step 2: "Share our stories and experiences as a class. Use the following discussion prompts to provide students space to share their local connections to where plants and animals live with the class. Where were the animals in your community? Where were the plants in your community? How are these places plants or animals live similar? How were they different?" "Summarize student observations about where they found animals in their communities, emphasizing larger categories of areas kids named like on the ground (gardens, grass, sidewalk, forest, park), in the water (ponds, streams), other places (buildings, in the air/sky, etc.)." (Lesson 2, Teacher Guide)

- Lesson 6, Navigate, Step 1: "Transition to planning the investigation. Emphasize ideas students share about making local observations or connections they made to observing plants and animals outside in Lesson 1. Have students briefly turn and talk about how returning outside could help us answer our Lesson Question. Listen for ideas related to being able to revisit what plants and animals we saw in Lesson 1 and noticing new animals and plants. How can we investigate what kinds of plants and animals live near us? Ask family members. Points to ideas for investigation like going outside. Go outside and look for plants and animals. Read about it in books or online. Make observations of different types of plants. Make observations of different types of animals. Observe many plants. Observe many animals. Observe in different places." (Lesson 6, Teacher Guide)

- Lesson 7, Explore, Step 3: "Create a plan for making observations. Facilitate a discussion to plan how the class will make observations and record data in this Lesson building from the ideas students shared." Prompts include: "What did we do last time when we observed plants and animals that we saw locally?" "How did we group plants that were similar last time?" "How did we group animals that were similar last time?" "How could using these groups help us with our investigation today?" (Lesson 7, Teacher Guide)

- Lesson 8, Navigate, Step 1: "Purpose: Use students' questions about where plants and animals live to motivate investigating similarities and differences between the kinds of plants and animals that live on land and in water." "Refer to the Notice and Wonder chart (see slide A) and read the Unit Question to remind students of what we are trying to figure out in science. Point out that we have answered many of our questions about what plants and animals live in the National Parks but not our questions about where we'd find these animals in the National Park. Use the following prompts to review students' wonderings about where plants and animals live." Prompts include: "What did we do last time?" "What did that make us wonder? What questions did we still have?" "Connect students' questions to co-construct a Lesson Question. Validate students' questions and research ideas. Build from students' questions to co-construct the Lesson Question that is similar to, "What kinds of plants and animals live on land and in water?" (Lesson 8, Teacher Guide)

- Lesson 8, Connect, Step 2: "While students complete the investigation, use the associated prompts to support students in noticing and further grouping the data into types of land and types of water. Encourage students to use the investigation materials, their hands, and words in any language to demonstrate their sensemaking...Possible follow-up responses include: 'You have all of these cards sorted as plants and animals that live on land. Did you notice if there are different types of land where these animals live? How do you know? What data are you using? Suggest that they further sort the land plants and animals into more specific groups.... You have all of these cards sorted as plants and animals that live in water. Did you notice if there are different kinds of water where these animals live?" "How do you know? What data are you using? Suggest that they further sort the water plants and animals into more specific groups." (Lesson 8, Teacher Guide).
- Lesson 9, Navigate, Step 1: "Recall where we left off. Display Our Growing Ideas Chart (or refer to slide A) with what we figured out about the land, water, plants, and animals in each National Park. Use the following discussion prompts to review the work students have done so far in the unit to motivate the desire to compare information across National Parks." Prompts include: "What have we done so far to answer our questions about plants, animals, and the different places they live?" "What did we decide we were ready to do to answer our question, What kinds of plants and animals live in different places?" "How can we compare across all the parks our class has researched in this unit so we can figure out what kinds live where?" (Lesson 9, Teacher Guide)
- Lesson 10, Navigate, Step 1: "Navigate to being ready to answer the Lesson set question. Celebrate with students all that they have figured out about the National Parks they are researching. Ask students if they think they are ready to answer the Lesson Set 2 question, What kinds of plants and animals live in different places? but be sure to use wording your students have been using in the unit. Revise slide B to the unit question since they will be answering that as the Lesson Question." (Lesson 10, Teacher Guide)

Student questions or prior experiences related to the phenomena and problems sometimes create the need, from the student's perspective, to engage in learning.

- Lesson 1, Connect, Step 1: "Ask students to share their experiences of being in outdoor places. Use the prompts below to support students in sharing stories of times they have been outside and what they have seen." Prompts to use include: "Where did you notice that plant or animal? What was that place like?" (Lesson 1, Teacher Guide)
- Lesson 1, Connect, Step 1: "Use student ideas to connect to a phenomenon. Summarize how students have shared many experiences noticing plants and animals in a variety of outdoor places familiar to us. Building off student ideas, suggest we "visit" some places to explore this idea more." (Lesson 1, Teacher Guide)
- Lesson 1, Explore, Step 2: "Motivate exploration of different places. Remind students how we just shared various individual experiences noticing plants and animals while being outside in our communities and brainstormed ways to explore this more like going outside or school or visiting new outdoor places. Share with students that today we will be scientists and visit familiar and new outdoor places to have a shared experience of making observations of different places and any plants or animals that may be there. The first place will be our schoolyard." (Lesson 1, Teacher Guide) The motivation to explore different places is being provided by the teacher.
- Lesson 1, Explore, Step 3: "Introduce the Notice and Wonder chart. Display the Notice and Wonder chart (refer to slide G) in a place where students can all see it and participate in the discussion. Explain that in science, it is important to share our observations (or what we noticed) and questions (what we wonder) so we can keep track of our thinking and decide what we want to figure out next. This chart is a place where we can record our first ideas and questions. The following is an example of how your Notice and Wonder chart might look. Remember to use your own class ideas, drawings, and students' languages in the chart--this is only a sample." (Lesson 1, Teacher Guide)

- Lesson 1, Explore, Step 4: "Building off of ideas about how we could see plants and animals in new other places, remind students of ideas they shared in the Connect about how to find out more about places with plants and animals like going on a field trip or visiting other places to observe plants and animals. Suggest we do something similar by "visiting" some different places unfamiliar to us to see where we can observe plants and animals in these places." (Lesson 1, Teacher Guide). In the Connect Section, students were asked to explore the question: "How could we find out more about places with plants and animals?"
- Lesson 1, Explore, Step 4: "Based on student interest, click on the name of a park to jump to a slide representing the class' visit to that park, demonstrating how students can use the slides to 'visit' different parks. Explain how there are two images on each slide. One is an image showing a large area of the park and the second shows a zoomed-in image of an animal. There is also a sound clip from the park. Connect this to how students previously explored the whole schoolyard, but needed to look closely at different places within the schoolyard to see plants or animals there." (Lesson 1, Teacher Guide).
- A Notice and Wonder Chart is developed in Lesson 1 to display student questions. For example:
  - Lesson 1, Explore, Step 4: "Record a Notice and Wonder. After students have observed multiple National Parks, have them find a partner to turn and talk about one Notice and one Wonder they have about observing plants and animals in different places. Show students how there is a space to record their Notice and Wonder at the bottom of the Observing Different Places handout." (Lesson 1, Teacher Guide)
  - Lesson 1, Synthesize, Step 5: "After students have observed multiple National Parks, have them find a partner to turn and talk about one Notice and one Wonder they have about observing plants and animals in different places. Show students how there is a space to record their Notice and Wonder at the bottom of the Observing Different Places handout." "Co-construct the unit question. Use student ideas and questions added to the chart to co-construct a unit question. The question could be something similar to, "What kinds of plants and animals live in different places? to connect to themes in student questions about different places and the variety of plants and animals that may live there." (Lesson 1, Teacher Guide)
  - Lesson 1, Synthesize, Step 6: "Facilitate an Initial Ideas Discussion. Display the Notice and Wonder chart (see slide Q). Use the prompts below to facilitate a whole group Initial Ideas Discussion about encountering plants and animals in different places. Share that the ideas the class shares are ideas the class is starting with and it is OK to share even if we are unsure. As students share with the whole group, record their observations in the "Notice" column and student questions under the "Wonder" column. Encourage students to respond to each other's ideas (e.g., with hand gestures) if they made similar or different observations." "Add ideas for investigation to the Notice and Wonder chart. Support students in connecting the ideas they just shared for investigating to questions they asked. Write their ideas on sticky notes and place the sticky note next to the question that they are trying to answer with their investigation. If students are uncertain, ask students why they would like to do that investigation, and then what question that investigation might answer." (Lesson 1, Teacher Guide)
- Lesson 2, Navigate, Step 1: "Use students' questions about water to construct a question like, 'Where is water found, and what is it like?' However, feel free to use terms and phrasing that reflect the class's ideas"(Lesson 2, Teacher Guide). While the teacher is encouraged to leverage and emphasize questions about water, the need to learn about water and what it is like, connections, and student questions about water are heavily reliant upon teacher prompting. For example,
  - Lesson 2, Navigate, Step 7: "Use the prompts below to support students to recall unanswered questions related to places, such as those around water. These may have been added during Lesson 1 or during the Connect of this lesson." Prompts include: "What else have we noticed about the National Parks and places in our communities where plants and animals live? (emphasize any noticings related to water)" (Lesson 2, Teacher Guide)

  - Lesson 2, Connect, Step 2: "Use the following discussion prompts to provide students space to share their local connections to where plants and animals live with the class." Prompts include: "Where were the animals in your community? Where were the plants in your community? (Lesson 2, Teacher Guide)

- Lesson 5, Synthesize, Step 2: "Display slide D and engage the class in a brainstorm discussion using the suggested prompts below to gather student ideas for what should be included in the National Park maps. Support students in understanding that sharing information about the shapes and kinds of land and water in the National Parks can help the class answer our question about how these parks are similar and different." (Lesson 5, Teacher Guide). Students are not positioned to understand how making sense of patterns in plants and animals connects to the need to discuss the location of different shapes and types of land and water in National Parks.
- Lesson 5, Navigate, Step 6: "Review ideas for investigation. Display slide P. Use the sticky notes to remind students of ideas for investigation they added in Lesson 1. Ask students if any of those could help them answer their questions about the plants and animals that can be found in different places. Move those sticky notes with ideas next to questions that kind of investigation might help answer. Also provide students the opportunity to add new ideas for investigation. Record these on sticky notes." (Lesson 5, Teacher Guide)
- Lesson 6, Navigate, Step 1: "Co-construct our Lesson Question. Use students' ideas and questions around plants and animals that live near them to co-construct a Lesson Question like, 'What kinds of plants and animals live near us?'. However, feel free to use terms and phrasing that reflect your class's ideas." (Lesson 6, Teacher Guide)
- Lesson 6, Explore, Step 2: "Model curiosity by wondering aloud, asking questions about details students notice, and encouraging deeper observations. Engage in observations with students rather than for them, demonstrating that you are also a learner." (Lesson 6, Teacher Guide)
- Lesson 6, Navigate, Step 6: "Share ideas about what to figure out next. Display slide N and revisit the Notice and Wonder chart to review which questions have been answered or partially answered. Ask students if they think they have answered any new questions and mark them with a check. While reviewing, focus on questions related to plants and animals, highlighting any that remain unanswered—especially those specific to students' research locations. Circle these unanswered questions or parts of them to spark curiosity and set the stage for the next lesson's investigation, emphasizing that learning something new often leads to even more questions!" (Lesson 6, Teacher Guide)
- Lesson 7, Navigate, Step 1: "Display slide C. Have students briefly turn and talk about how we might answer that question, emphasizing any ideas students share about how to make observations of the National Park plants and animals without traveling there. It may be helpful to refer back to any related ideas for investigations on sticky notes on the Notice and Wonder chart. Encourage students to think back to the previous Lesson to how they investigated their local plants and animals. Use the following prompts to support this discussion.' Prompts to use - Ideas to look and listen for include: "Could we investigate this the same way we did for what plants and animals live near us? Why not?" - "It's too far away". (Lesson 7, Teacher Guide).
- Lesson 7, Explore, Step 3: "Remind students that we want to figure out the kinds of plants and animals in each of the National Parks! Display slide E. Hold up and flip through the plant and animal cards for the class example National Park, explaining that these are 10 photographs of plants that can be found there. Invite students to turn and talk with a partner about how we could use these to figure out the kinds of plants and animals in each of the National Parks. Then, have students share their suggestions, which will likely include looking, noticing similarities and differences, and using descriptions of the ways the class organized plants and animals in Lesson 6." (Lesson 7, Teacher Guide).

- Lesson 8, Navigate, Step 1: "Connect students' questions to co-construct a Lesson Question. Validate students' questions and research ideas. Build from students' questions to co-construct the Lesson Question that is similar to, What kinds of plants and animals live on land and in water? Display slide B with your class's version of the Lesson 8 question, and also add it to the next row of Our Growing Ideas chart." "Revisit ideas for investigation. Display slide C. Have students briefly turn and talk about how we might answer that question. It may be helpful to refer back to any related ideas for investigations on sticky notes on the Notice and Wonder chart. Encourage students to think about ways they have investigated previously in the unit." (Lesson 8, Teacher Guide)
- Lesson 10, Synthesize, Step 4: Teaching Tip, "Responding to broad curiosities: When students view each other's National Park video presentations and compare the diversity of life in each, students may raise ideas and questions related to why different plants and animals live in different places (like the National Parks or their communities) or habitats (like those on land or in water). These make great questions to add to the Notice and Wonder chart. While these questions will not be answered in this unit, they support incoming ideas and experiences that students can use in later elementary grades when they explore specific populations that live in a given habitat, how changes to habitats affect what lives there, and relationships within ecosystems." (Lesson 10, Teacher Guide)

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

From the students' perspective, phenomena are sometimes logically connected and build on each other coherently. Students occasionally return to the anchor phenomenon of "a puzzling pattern students observe through their experiences encountering plants and animals in places that are different from each other" as they build on what they learn about plants and animals.

- Unit Front Matter: The Lesson Storyline identifies Lesson phenomena, questions, and navigation to the next lessons:
  - Lesson 1, Lesson Question: "Where can we observe plants and animals?" Phenomenon: "Animals and plants can be found in many different places." Navigation to next lesson: "We have a lot of questions about the places where plants and animals live." It is unclear what students would find puzzling in their school yard, and whether visiting it would lead them to generate questions about the places where animals and plants live.
  - Lesson 2, Lesson Question: "What is the land like in places where plants and animals live? Phenomenon: "The land where plants and animals live looks different." Navigation to next lesson: "Now that we figured out that the places we are researching have different shapes and kinds of land, we want to know more about the water." From the perspective of students, the connection between researching different shapes and kinds of land and the need to learn more about water is teacher-directed. It would not be made without extensive teacher prompting.
  - Lesson 3, Lesson Question: Where is water found, and what is it like? Phenomenon: "Water is in many places and can look different." Navigation to next lesson: "Now that we figured out water can be found in the ocean, rivers, lakes, and ponds, we are wondering how we can show where the land and bodies of water are in a place."
  - Lesson 4, Lesson Question: How can we show the location, shapes, and kinds of land and water in a place? Phenomenon: "There are different ways to show land and water on maps." Navigation to next lesson: "Now that we figured out that maps show where things are located and can show the shapes and kinds of land and water, we are wondering about creating our own maps of our research locations." From the perspective of students, the need to create maps is teacher-directed and would not be made without extensive teacher prompting.

  - Lesson 5, Lesson Question: How are places plants and animals live similar and different? Phenomenon: "The kinds of land and water in different places can look similar or different." Navigation to next lesson: "Now that we figured out how places where plants and animals live are similar and different, we are wondering what plants and animals live in these places." Lesson 5 marks the end of Lesson Set One and presents an opportunity for students to revisit the unit's anchoring phenomenon: different plants and animals live in different places.
  - Lesson 6, Lesson Question: What kinds of plants and animals live near us? Phenomenon: "Plants and animals are in our schoolyard." Navigation to next lesson: "Now that we figured out that many different kinds of plants and animals live on our schoolyard, we are wondering what kinds of plants and animals live in the National Parks."
  - Lesson 7, Lesson Question: What kinds of plants live in each National Park? Phenomenon: "Plants and animals live in National Parks." Navigation to next lesson: "Now that we figured out that many different kinds of plants and animals live in the National Parks, and we are wondering what kinds live on land and what kinds live in water."
  - Lesson 8, Lesson Question: What kinds of plants and animals live on land and in water? Phenomenon: "There are plants and animals on land and in water." Navigation to next lesson: "We figured out the kinds of plants and animals that live in different places on land and in water, and now we are ready to share what we figured out with our classmates."
  - Lesson 9, Lesson Question: How can we share information about the National Parks with others? Phenomenon: "There are different kinds of plants and animals in each National Park." Navigation to next lesson: "Now that we have figured out what we will share with others about the kinds of plants and animals in the National Parks, we are ready to share our presentations."
  - Lesson 10, Lesson Question: What kinds of plants and animals live in different places?" Phenomenon: "Plants and animals are in different kinds of places." (Unit Front Matter)

- Lesson 1, Explore, Step 4: "After students have observed multiple National Parks, have them find a partner to turn and talk about one Notice and one Wonder they have about observing plants and animals in different places. Show students how there is a space to record their Notice and Wonder at the bottom of the Observing Different Places handout." (Lesson 1, Teacher Guide). **Ask questions based on observations of plants and animals existing in different places to find more information about the patterns of what living things live in different places.**
- Lesson 2, Explore, Step 4: "Allow time for students to gather information about the National Park they are researching. While students are working, circulate the room and use the following prompts to support students in recording their observations." Step 5: "Group two pairs of students together to make groups of four. It is best if the pairs grouped together did not research the same National Park. Display slide H and explain that each pair of students will show their partner group their Land in _____ handout and describe the land of the National Park they researched. They can use the data they collected on their handout." (Lesson 2, Teacher Guide). **Obtain information** to **compare and describe the shapes and kinds of land that are found in** a National Park **using relative scale (bigger, smaller; taller, shorter; flatter).**
- Lesson 2, Explore, Step 5: "Begin by inviting one group to share one idea about land they gathered from researching one of the National Parks. Use prompts like the following to facilitate this student to student discussion." Prompts to use include: "How was the _____ at the park you researched similar? How was the _____ at the park you researched different?" (Lesson 2, Teacher Guide). **Use recorded observations and information** to **describe patterns** of **the shapes and kinds of land** in National Parks.

- Lesson 3, Explore, Step 2: "Navigate back to the class example National Park to demonstrate how to record information about the water on the Water in _____ handout. Explain to students that in order to find out more, we can read about the water and then record what we find out. Read the first paragraph aloud and note the accompanying image with a caption. Use the following prompts to invite students to help demonstrate how to gather and record information about one of the bodies of water. Remind students to use the written paragraphs, images, and captions to capture the main ideas about water in their National Park, but they should not copy the text word for word." Prompts to use - Possible follow-up responses include: "What details do the sentences give about that water? What about the picture?" - "Is there anything important to write on the lines about that?" (Lesson 3, Teacher Guide, and Water in _____ handout, Student Materials). **Obtain information from various texts and media to answer questions** and **observe patterns of where water is found on Earth.**

- Lesson 3, Explore, Step 4: "Display the Ice and Water chart (refer to slide I) and explain that we can use the chart as a shared space to record our observations of ice and water to help us compare them. Use prompts like the following to support this discussion and recording of ideas on the Ice and Water chart." (Lesson 3, Teacher Guide). **Make observations to collect data about water, and use that data to compare that water can be either solid (when colder) or liquid (when hotter)**.

- Lesson 4, Explore, Step 4: "Allow students 5-7 minutes at each station to explore the map(s) and record their observations. While students explore, use the following prompts to support exploration. Prompts to use include: "How is the way this map shows land and water similar or different from (point to a different map station) the way that map does?" and Step 5, "Use the prompts below (also on slide J) to facilitate a think, pair, share discussion about how the maps represented the location, shapes, and kinds of land and water at Heart Lake." Prompts to use include: "How is the way these maps show land and water similar? How are they different?" (Lesson 4, Teacher Guide). **Use maps of the shapes and kinds of land and water in an area** to **observe and describe patterns in how maps represent locations**.

- Lesson 5, Synthesize, Step 2: "Display slide D and engage the class in a brainstorm discussion using the suggested prompts below to gather student ideas for what should be included in the National Park maps. Support students in understanding that sharing information about the shapes and kinds of land and water in the National Parks can help the class answer our question about how these parks are similar and different." Prompts to use include: "We said each of the places we researched have water we can show. What patterns did we figure out about water in Lesson 3 that could help us show that water? (refer to Our Growing Ideas chart)", "What are different ways we could show these shapes and kinds of land and water in a map? How did we do this in Lesson 4? (refer to Our Growing Ideas chart.)... Give time for students to review and discuss what they figured out about land and water in their researched National Park and about mapping using their previously completed handouts. Display slide H and have students use the sentence starters to share how they will include all the parts of the Gotta-have-it checklist in their map. Encourage students to use the sentence prompts to support this pair share. As students read together, circulate to groups to listen for student ideas and help pairs think more deeply about the land and water in the National Park they are researching and the ways they could represent them." (Lesson 5, Teacher Guide). **Use observed patterns about land and water** features **to develop a model that represents the shapes, kinds, relative sizes and locations of land and water in an area of a National Park.**

- Lesson 6, Explore, Step 3: "As students make observations, circulate throughout the space and use the following prompts to support their observations and recordings. These walks help build relationships and lay the foundation for investigations." Prompts to use include: "How is this plant similar or different from other plants you have noticed so far?", "How is this animal similar or different from other animals you have noticed so far?" (Lesson 6, Teacher Guide). **Make observations** of **plants and animals** in the schoolyard **and identify patterns to use as evidence that different kinds of plants and animals live there.**

- Lesson 7, Explore, Step 3: "Display slide E. Hold up and flip through the plant and animal cards for the class example National Park, explaining that these are 10 photographs of plants that can be found there. Invite students to turn and talk with a partner about how we could use these to figure out the kinds of plants and animals in each of the National Parks. Then, have students share their suggestions, which will likely include looking, noticing similarities and differences, and using descriptions of the ways the class organized plants and animals in Lesson 6." (Lesson 7, Teacher Guide). **Make observations** of **plants and animals** in a National Park and **compare** their features to **identify patterns to use as evidence that different kinds of plants and animals live there.**
- Lesson 8.A, Connect, Step 2: "While students complete the investigation, use the associated prompts to support students in noticing and further grouping the data into types of land and types of water. Encourage students to use the investigation materials, their hands, and words in any language to demonstrate their sensemaking." Prompt to use - Possible follow-up responses include: "You have all of these cards sorted as plants and animals that live on land. Did you notice if there are different types of land where these animals live?" - "How do you know? What data are you using? Suggest that they further sort the land plants and animals into more specific groups." (Lesson 8, Teacher Guide). "**Obtain information** about **where plants and animals live** to **identify patterns to use as evidence that plants and animals exist in different places on land and in water.**
- Lesson 8.B, Explore, Step 3: "Display slide G and invite students to decide with their partner how to organize their ideas about where plants and animals are found in the National Park they are researching, showing them the spaces on the handout for drawing and also writing. Then, distribute Animal and Plant Comparisons assessment to each student." (Lesson 8, Teacher Guide). **Make observations** of **land and water plants and animals** in a National Park and **compare** them to **identify patterns to use as evidence that different kinds of plants and animals live on land and in water.**
- Lesson 9, Synthesize, Step 3: "Give partners 1-2 minutes to quietly think about what details from the Gotta-Have-It Checklist they want to include in their script. Then give partners about 2 minutes to tell their partner what they plan to include in their script to help them organize their ideas before putting them onto paper. To support students in this prewriting activity, suggest that students point to each heading on the National Park Presentation Script as they plan with their partner." (Lesson 9, Teacher Guide). Plan to **communicate information with others providing details about the many different kinds of plants and animals living on land and in water of a National Park.**
- Lesson 10, Synthesize, Step 2: "Pass back students' National Park Presentation Script, have students collect their visuals and distribute clipboards, and writing utensils for each student. Let students know that each presentation should be about 2 minutes long.
- Practice presentations. Ensure that the Gotta-Have-It Checklist is visible for all students and display slide D. Have students partner up with a student that is not their research partner, choosing (or assigning) a Partner A and Partner B, with which to practice their presentation. Give students about 5 minutes each to practice. Circulate and use the following prompts to support students in practicing their presentations." (Lesson 10, Teacher Guide). **Communicate information** about **patterns in the kinds of plants and animals that live in a National Park** to **use as evidence that a variety of plants and animals live in different habitats on land and in water.**

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

When students are designing solutions to problems (with or without connections to ETS DCIs)

- N/A

Criterion-Based Suggestions for Improvement:

- Ensure "[s]tudent questions or prior experiences related to the phenomena and problems consistently create an explicit need, from the students' perspective, for the students to engage in learning throughout the materials." [Detailed Guidance, p. 7].
  - For example, in Lesson 1, consider additional support to help students focus on generating questions around the question "'What lives where?".
- Ensure "[t]he materials are organized so that students figuring out a central phenomenon, a series of related phenomena, and/or designing a solution to a problem drives learning. Instruction is focused on supporting students to better make sense of the phenomenon or design a better solution to a problem." [Detailed Guidance, p. 7]
  - Consider how to ensure the lessons related to water are coherently connected to the central phenomenon or connected in a logical way to the previous phenomena.

I.B. Three Dimensions

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

EXTENSIVE

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

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

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

The reviewers found **extensive** evidence that the materials provide students with opportunities to build an understanding of grade-appropriate elements of the three dimensions, as students regularly engage in elements of SEPs, DCIs, and CCCs to make sense of the anchoring or lesson-level phenomenon. Teacher materials, such as the Unit Front Matter and the 2.3 Habitats & Biodiversity SEP-DCI-CCC-ELA-Math-Matrix, provide explicit descriptions of the elements that are intentionally developed and those that are practiced or used. The unit centers on students using targeted elements of all three dimensions that are clearly identified and addressed throughout the unit to explain repeated observations (patterns) of encountering plants and/or animals in multiple, different, outside places.

Rating for Criterion: SEP **EXTENSIVE**

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

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

- **MOD-P1: Distinguish between a model and the actual object, process, and/or events the model represents.**
- **MOD-P2: Compare models to identify common features and differences.**
- **MOD-P3: Develop and/or use a model to represent amounts, relationships, relative scales (bigger, smaller), and/or patterns in the natural and designed world(s).**
- **INV-P2: Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question.**
- **INV-P4: Make observations (firsthand or from media) and/or measurements to collect data that can be used to make comparisons.**
- **DATA-P1: Record information (observations, thoughts, and ideas).**
- **DATA-P2: Use and share pictures, drawings, and/or writings of observations.**
- **INFO-P1: Read grade-appropriate texts and/or use media to obtain scientific and/or technical information to determine patterns in and/or evidence about the natural and designed world(s).**
- **INFO-P2: Describe how specific images (e.g., a diagram showing how a machine works) support a scientific or engineering idea.**
- **INFO-P3: Obtain information using various texts, text features (e.g., headings, tables of contents, glossaries, electronic menus, icons), and other media that will be useful in answering a scientific question and/or supporting a scientific claim.**

There is a close match between the claimed SEP elements and evidence of their development and use in unit materials. Students use the claimed SEP elements in service of explaining the phenomenon.

MOD: Developing and Using Models

Claimed Element: **MOD-P1: Distinguish between a model and the actual object, process, and/or events the model represents.**

Claimed in Lessons 4 and 5. Evidence was found in claimed lessons, examples include:

- Lesson 4, Explore, Step 2: "Debrief student observations. After a few minutes, bring students back together. Use the following discussion prompts to elicit what students noticed and wondered. Have the image (slide D) available during the student to student discussion so that students can reference it as needed." Prompts include: "How could you tell there was water? How is this similar or different from how we have shown water?" "How could you tell there was land? How is this similar or different from how we have shown land?" "Has anyone seen a picture like this that

has land, water, and uses colors for the land and water? If so, do you know what this picture of land and water is called?" "Important Lesson guidance: In this unit students develop and use maps as models to represent the shapes and kinds of land and bodies of water in an area. When using and developing maps as models, students will use relative distances (an object is closer or farther from another object) as opposed to quantitative scaling (the distance between objects on a map as a certain ratio of actual distance of the objects in real life). Quantitative scaling will be introduced in later grades." (Lesson 4. Teacher Guide)

- Lesson 5, Synthesize, Step 2: "Support students in understanding that sharing information about the shapes and kinds of land and water in the National Parks can help the class answer our question about how these parks are similar and different. As students share ideas, create a slide, poster, or whiteboard with their ideas so all students have access to a shared visual list. A sample of the class version of the Gotta-Have-It Checklist is shown below. Co-develop a map key. Display slide F and acknowledge the different ways students suggested for representing shapes and kinds of land and water. Use these ideas to suggest developing a map key for the class to use so we can easily read other's maps." (Lesson 5, Teacher Guide)

Claimed Element: MOD-P2: Compare models to identify common features and differences.

Claimed in Lessons 4 and 5. Evidence was found in claimed lessons, examples include:

- Lesson 4, Explore, Step 4: "Display slide G and explain students will get to explore maps made in 3 different ways to consider how maps can show where things are located and how they represent land and water. Point out that these maps do not have map keys, rather, students will need to work together to think about what the parts and colors represent." On Map Observations: "Use the boxes below to write or draw how each map shows shapes and kinds of land and water." (Lesson 4, Teacher Guide)
- Lesson 5, Connect, Step 4: "Participate in a Gallery Tour. Have students pair up with their research partner for a quick 5-10 minute tour around the classroom to view the maps their peers made. As students move between maps, encourage them to look for what is similar or different about the land and water in the different National Parks." (Lesson 5, Teacher Guide)

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

Claimed in Lessons 2, 3, 4, and 5. Evidence was found in claimed lessons, examples include:

- Lesson 2, Explore, Step 4: "In this lesson, students use relative scales (taller/shorter, more/less flat, bigger/smaller) to compare the landforms found in the National Park they are researching. Students also have opportunities to connect to scale when describing kinds of land of different sizes in different places like a sandbox, a basketball court, or soccer field in their community versus larger areas of land like deserts or forests." (Lesson 2, Teacher Guide)
- Lesson 3, Connect, Step 5: "Read the infographic and discuss the following prompts. Read the title of the Ask Infographic, the text in the first box, and the text in the solid and liquid water boxes. Facilitate a discussion of this infographic using questions similar to the following." Prompts include: "What do the thermometers show us? How do they show that information?" "How does this information help us answer our Lesson Question, 'Where is water found, and what is it like?'" (Lesson 3, Teacher Guide)
- Lesson 5, Synthesize, Step 3: "As students create their individual map on their paper plate, displaying the kinds, shapes, and locations of land and water in the area of the National Park they are researching, circulate between groups to pose prompts suggested below to support students in describing the parts they plan to include in their map, the relative shape and location of the parts and in making connections between the materials/colors used in their maps and what the materials/colors represent in the area of the National Park they are researching." (Lesson 5, Teacher Guide)

INV: Planning and Carrying Out Investigations

Claimed Element: **INV-P2: Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question.** Claimed in Lessons 6 and 7. Evidence was found in claimed lessons, examples include

- Lesson 6, Explore, Step 2: "Make a plan for investigating plants and animals near us. Display slide E and remind students that we want to figure out the kinds of plants and animals that live near us. Suggest that we come up with a plan together so that we can work together to answer that question. Ask students what we need to plan before going outside using discussion prompts such as the following, and listen for ideas on what to observe and how to record our findings." Prompts include: "Remember we want to figure out what kinds of plants and animals live near us, so what can we do when we go outside to answer that question?" "What different parts of our schoolyard can we try to find plants and animals?" (Lesson 6, Teacher Guide)
- Lesson 7, Connect, Step 2: "In this Explore, students use picture cards to make observations and collect data about plants and animals in the National Park they are researching. They build on the first-hand observations they made as a class in Lesson 6 by making observations from media with a partner and using the data to compare the kinds of plants and animals in the National Park they are researching. If the class needs less support, consider shortening the interactive class demonstration or just doing so with a small group in this Explore and move to making observations of plant cards in partners. Alternatively, if the class or groups of students need more support after observing plants, add a second demonstration with the animal cards before partners make observations of animals." (Lesson 7, Teacher Guide)
- Lesson 7, Explore, Step 3: "Hold up and flip through the plant and animal cards for the class example National Park, explaining that these are 10 photographs of plants that can be found there. Invite students to turn and talk with a partner about how we could use these to figure out the kinds of plants and animals in each of the National Parks. Then, have students share their suggestions, which will likely include looking, noticing similarities and differences, and using descriptions of the ways the class organized plants and animals in Lesson 6." "Create a plan for making observations. Facilitate a discussion to plan how the class will make observations and record data in this Lesson building from the ideas students shared." Planning and Carrying Out Investigations, "In this Explore, students use picture cards to make observations and collect data about plants and animals in the National Park they are researching. They build on the first-hand observations they made as a class in Lesson 6 by making observations from media with a partner and using the data to compare the kinds of plants and animals in the National Park they are researching." (Lesson 7, Teacher Guide)

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

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

- Lesson 1, Explore, Step 2: "Give students an opportunity to plan how to make observations outside, and emphasize how to demonstrate respect to the landscape as well as plant and animal life in the chosen outdoor space." "Show how the first column has a place to write the place they are making observations, 'Schoolyard,' and the second and third columns have space to draw and/or write about plants and animals they find." (Lesson 1, Teacher Guide)
- Lesson 1, Explore, Step 3: "Distribute the clipboards, writing utensils, and any other materials needed for going outside. Bring students outside and have them work with their partners to make observations of plants and animals. Consider taking photographs of plants and animals, including the surrounding area--like the patch of grass, body of water, or other area like a nest-- where the plant or animal was found, that can be added to future slides, as well as photographs of students observing for the Notice and Wonder chart that will be started in the Synthesize." (Lesson 1, Teacher Guide)

- Lesson 3, Explore, Step 4: "Have students sit in small groups and give each group one cup of ice and one cup of water to observe. Give students about 2-3 minutes to make their observations." "Display the Ice and Water chart (refer to slide I) and explain that we can use the chart as a shared space to record our observations of ice and water to help us compare them." (Lesson 3, Teacher Guide)
- Lesson 5, Connect, Step 4: "Motivate the need to discuss our map connections. Engage the class in a brief brainstorming discussion around the following prompts to help illuminate the need to discuss what we figured out about the kinds and shapes of land and water in the National Parks. Now that we have seen our classmates' maps and compared them to our own, what can we do as scientists to share what we figured out what is similar and different between the National Parks?" (Lesson 5, Teacher Guide)
- Lesson 6, Explore, Step 2: "An important element of this practice is making observations to collect data that can be used to make comparisons. Students had an explicit opportunity to make outdoor and media-based observations in Lesson 1 and again in Lesson 3 while observing ice and water. The discussions in this Explore, serve to remind students of how to make high quality observations that will result in data that the class can use to make comparisons." (Lesson 6, Teacher Guide)
- Lesson 6, Explore, Step 4: "Analyze the data as a class. Continue to display the Plants in Our Schoolyard and Animals in Our Schoolyard charts and facilitate a discussion in which students analyze the class data recorded on the Plants in our Schoolyard and Animals in Our Schoolyard charts. The goal of this discussion is to compare the kinds of plants and animals observed on the schoolyard. Tell students that they can use their counting skills from math to help answer some questions from their observation." (Lesson 6, Teacher Guide)
- Lesson 7, Connect, Step 2: "Display the New Plant Discovered at Big Bend National Park article (refer to slide D) and introduce the article by reading its title." "Read the New Plant Discovered at Big Bend National Park article aloud, pausing to ask the discussion questions shown here (and cited in the article's footnotes)." Prompts include: "1st paragraph: Wow! They discovered a new plant! Have you ever found a plant that looked really different from ones you know about and wondered what it was?" (Lesson 7, Teacher Guide)
- Lesson 8, Explore, Step 3: "Review the Animal and Plant Comparisons assessment. Display slide G and invite students to decide with their partner how to organize their ideas about where plants and animals are found in the National Park they are researching, showing them the spaces on the handout for drawing and also writing. Then, distribute Animal and Plant Comparisons assessment to each student." (Lesson 8, Teacher Guide)

DATA: Analyzing and Interpreting Data

Claimed Element: **DATA-P1: Record information (observations, thoughts, and ideas).**

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

- Lesson 1, Explore, Step 2: "Demonstrate how to record observations. Share with students that they will record their observations on the Observing Different Places handout. Show how the first column has a place to write the place they are making observations, "Schoolyard," and the second and third columns have space to draw and/or write about plants and animals they find." (Lesson 1, Teacher Guide)
- Lesson 1, Explore, Step 3: "Go outside to make observations. Display slide F and use it as needed to clarify procedures for going outside. Distribute the clipboards, writing utensils, and any other materials needed for going outside. Bring students outside and have them work with their partners to make observations of plants and animals. Consider taking photographs of plants and animals, including the surrounding area--like the patch of grass, body of water, or other area like a nest-- where the plant or animal was found, that can be added to future slides, as well as

photographs of students observing for the Notice and Wonder chart that will be started in the Synthesize." (Lesson 1, Teacher Guide)

- Lesson 2, Explore, Step 3: "Introduce the Land in _____ handout. Display slide F and tell students that scientists record information and ideas when doing their research. Remind students that record means to write or draw observations or ideas. Just like scientists, we have a handout that we can use to organize the information we are collecting about the land in each of the National Parks." (Lesson 2, Teacher Guide)
- Lesson 4, Explore, Step 4: "Introduce the Map Observations handout. Let students know that as they rotate from station to station, they will record (write and/or draw about) how the map at a given station represents land and water on the Map Observations handout (refer to slide H)." (Lesson 4, Teacher Guide)
- Lesson 6, Explore, Step 2: "Plan to record observations. Display slide H and show students the Plants and Animals Near Me handout where they can record their observations. Remind students that scientists record their observations in writing and drawing and they can use these to share and compare their observations with others. Show students how there is a page to record observations about plants and one to record observations about animals. Explain how each page has a table to help us organize our observations and since we may not know the names of the plants and animals we observe, we can use the number of legs to sort animals and relative size to sort plants." (Lesson 6, Teacher Guide)
- Lesson 7, Explore, Step 3: "Demonstrate how to record data. Show students the Plant and Animal Observations handout and where they can circle the kinds of plants that were part of the card sort for the given National Park. Then have students turn and talk about the similarities and differences they observe within and between the groups of cards to further compare the plants, using a prompt like, How are the _____ similar or different? (one has flowers and one does not, one is a tall tree and one is not, etc.) Then, have a few students share and use a class copy of the handout to demonstrate how students can draw pictures or write words to record this information." (Lesson 7, Teacher Guide)
- Lesson 8, Explore, Step 3: "Make and record observations. Transition students to making and recording observations with their partner. As students work, use the following prompts to support them in recording their sensemaking." (Lesson 8, Teacher Guide)

Claimed Element: DATA-P2: Use and share pictures, drawings, and/or writings of observations.

Claimed in Lessons 2, 3, 4, 6, 7, 8, and 9. Evidence was found in claimed lessons, examples include:

- Lesson 2, Explore, Step 5: "Use research to discuss kinds of land in National Parks. Group two pairs of students together to make groups of four. It is best if the pairs grouped together did not research the same National Park. Display slide H and explain that each pair of students will show their partner group their Land in _____ handout and describe the land of the National Park they researched. They can use the data they collected on their handout. Remind students data are observations and recordings used to answer questions. Encourage students to use specific language and gestures to describe details about different kinds, shapes, and sizes of the land. and have each small group of partners think, pair, share about the question: What kind of land is in the National Park?" (Lesson 2, Teacher Guide)
- Lesson 3, Explore, Step 3: "Display slide E and invite students to compare what they found in their research with someone who researched a different National Park. Have students pair up with a new partner. They should bring their Water in _____ handout to use during the upcoming partner discussion." (Lesson 3, Teacher Guide)
- Lesson 4, Explore, Step 4: "Emphasize that it is important for every student to touch and try out the materials in order to support their sensemaking about how maps show the location, shape, and kind of land and water." Students are handed a Map Observations handout, allow students 5-7 minutes at each station to explore the map(s) and record their observations...When they finish recording observations have students bring their handouts and gather in a

Scientist Circle to share observations. As students transition, have them walk and talk with a neighbor about their observations."(Lesson 4, Teacher Guide)

- Lesson 6, Explore, Step 4: "Analyze the data as a class. Continue to display the Plants in Our Schoolyard and Animals in Our Schoolyard charts and facilitate a discussion in which students analyze the class data recorded on the Plants in our Schoolyard and Animals in Our Schoolyard charts. The goal of this discussion is to compare the kinds of plants and animals observed on the schoolyard. Tell students that they can use their counting skills from math to help answer some questions from their observation. The key takeaways will depend on factors such as location, time of day, and seasonality. Possible student observations might include: We found many examples of _____ legged animals, but only a few _____ legged animals. There were a lot of plants that were short ground, but some had flowers and some did not. Most of the plants on our schoolyard were similar, they all were _____ (name of group). There are different kinds of plants and animals on our schoolyard." (Lesson 6, Teacher Guide)
- Lesson 6, Synthesize, Step 5: "Consider providing sentence starters such as "I notice that _____" or "I can connect with what you said because _____". More discussion stems are available in the Discussion Supports resource. Use ideas the students shared, as well as photos and/or artifacts from this lesson's work, to complete the row for Lesson 6." (Lesson 6, Teacher Guide)
- Lesson 7, Explore, Step 3: "Remind students that we want to figure out the kinds of plants and animals in each of the National Parks! Display slide E. Hold up and flip through the plant and animal cards for the class example National Park, explaining that these are 10 photographs of plants that can be found there. Invite students to turn and talk with a partner about how we could use these to figure out the kinds of plants and animals in each of the National Parks." (Lesson 7, Teacher Guide)
- Lesson 8, Connect, Step 2: "Show students the card set (plants or animals) and have them turn and talk about where to navigate next. Have a few groups share and then click on the plant or animals page the class needs." (Lesson 8, Teacher Guide)
- Lesson 9, Synthesize, Step 3: "Distribute materials and have students gather what they need for making their scripts. Have students collect their handouts from previous lessons in the unit Land in _____ handout, Water in _____ handout, National Park Map handout and map, Animal Cards, and Animal and Plant Comparisons. Each student will need a National Park Presentation Script, a clipboard and a colored writing utensil. Make sure to have scissors, tape or glue handy for students who decide to cut and paste the writing that they have already done into their script." (Lesson 9, Teacher Guide)

INFO: Obtaining, Evaluating, and Communicating Information

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

Claimed in Lessons 4, 7, and 8. Evidence was found in claimed lessons, examples include:

- Lesson 4, Explore, Step 5: "Emphasize to students that the class just noticed similarities in how different types of maps represent land and water, such as using similar colors and making sure the water on the map was a similar shape to the real water feature in the area being mapped. Remind students that when we observe something over and over again, like we just did with maps, scientists call this a pattern." (Lesson 4, Teacher Guide)
- Lesson 7, Connect, Step 2: "Engage students in an interactive read-aloud. Read the New Plant Discovered at Big Bend National Park article aloud, pausing to ask the discussion questions shown here (and cited in the article's

footnotes)." Prompts include: "How could using images help answer our questions about the kinds of plants and animals that live in the National Parks?" (Lesson 7, Teacher Guide)

- Lesson 8, Connect, Step 2: "Practice grouping with an example. Place one of the National Park image card sets for the class example National Park in the center of the Scientists Circle, along with the Card Sort Labels. Then, invite students to help demonstrate how to obtain information and sort cards based on the information they find. Consider the following steps: (1)Invite students to help navigate to the example National Park homepage on the Explore Extraordinary National Parks website. (2) Show students the card set (plants or animals) and have them turn and talk about where to navigate next. Have a few groups share and then click on the plant or animals page the class needs. (3) Begin with the first plant or animal listed, and ask students to recall how to use website features to read or listen to obtain information about where it lives and then do so. (4) As a class, find the matching image card and decide together whether it belongs under the "land" or "water" label. (5) Repeat this process with another plant or animal to show that both plants and animals can be placed within the same group." "Confirm next steps. Give students an opportunity to ask questions about the task and how to use different materials. Then prepare to split into partners to obtain information from the website." (Lesson 8, Teacher Guide)
- Lesson 8, Connect, Step 4: "Read a book and discuss the associated prompts. Display slide H. Come together as a class to read the Plants and Animals on Land and in Water book aloud and use the prompts below to support students in noticing the pattern that places on land and in water have a variety of different kinds of plants and animals that live there." (Lesson 8, Teacher Guide)

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

Claimed in Lesson 3. Evidence was found in claimed lessons, examples include:

- Lesson 3, Explore, Step 2: "Demonstrate how to record information with the class example National Park. Navigate back to the class example National Park to demonstrate how to record information about the water on the Water in _____ handout. Explain to students that in order to find out more, we can read about the water and then record what we find out. Read the first paragraph aloud and note the accompanying image with a caption. Use the following prompts to invite students to help demonstrate how to gather and record information about one of the bodies of water. Remind students to use the written paragraphs, images, and captions to capture the main ideas about water in their National Park, but they should not copy the text word for word. Repeat with additional examples as needed." (Lesson 3, Teacher Guide)
- Lesson 3, Connect, Step 5: "Introduce an infographic. Gather students in a Scientists Circle and introduce the Water at Different Temperatures infographic (slide J). Share that you thought might be helpful based on the images that include solid and liquid water! Remind students that an infographic combines images and text to provide information about different topics. Read the infographic and discuss using the prompts below." "Read the infographic and discuss the following prompts. Read the title of the infographic, the text in the first box, and the text in the solid and liquid water boxes. Facilitate a discussion of this infographic using questions similar to the following Prompts include: "When is water ice or solid? What do you notice in the images on the infographic?" "How is the information about solid water/ice similar to our previous observations of ice?" (Lesson 3, Teacher Guide)

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

Claimed in Lessons 2, 3, 8, 9, and 10. Evidence was found in claimed lessons, examples include:

- Lesson 2, Explore, Step 3: "Point out the URL or login icon students will use to access the Explore Extraordinary National Parks website. Demonstrate how students will access the website. Show the class the menu of links under each Park name on the main webpage. Pose prompts like the following for the class to turn-and-talk about to help students consider the home page of the research website. Encourage students to identify the links and icons associated with each location and share with students how these links operate like a table of contents. Help students notice additional text features, like headings, links, and captions on the research webpage. Have 1-2 student pairs share aloud for each question." (Lesson 2, Teacher Guide)
- Lesson 3, Explore, Step 2: "Obtaining information from the website and recording on their Water in _____ handout provide an opportunity to gather evidence of student understanding related to Learning Goal 3.A, with the purpose of providing feedback and supporting students in clarifying and communicating ideas using the text and media about where water is found and that it can be solid or liquid." (Lesson 3, Teacher Guide)
- Lesson 8, Connect, Step 2: "This Lesson builds on previous experiences of obtaining information by asking students to use multiple texts (animal page and plant page), where previously all information could be obtained from a single text with multiple features (land page or water page)." (Lesson 8, Teacher Guide)
- Lesson 9, Synthesize, Step 1: "Co-develop a Gotta-Have-It Checklist. Display slide C and have students turn and talk about what might be important to include in our presentations if we want to be able to use these presentations to compare the kinds of plants and animals that live in each. Have Our Growing Ideas chart available for students to reference throughout this discussion, drawing students' attention to patterns in what is in the National Parks (plants and animals) and where they are usually found (shapes and kinds of land and water)." (Lesson 9, Teacher Guide)
- Lesson 10, Connect, Step 3: "Explain to guests that students have been noticing patterns in the plants and animals that can be found in the various places on land and in water of the National Parks they researched and using them to describe the kinds of plants and animals that can be found there. Today, students will be sharing their presentations and looking for patterns in the kinds of plants and animals that live in the different National Parks." "Make sure all students have a Comparing Across National Parks handout, clipboard and writing utensil. Briefly demonstrate how to listen to a presentation while noticing details about the kinds of plants and animals in habitats on land and in water. Show students how to add a check if the National Park follows the pattern we have started to observe that many kinds of plants and animals live in habitats on land and in water." (Lesson 10, Teacher Guide)

Criterion-Based Suggestions for Improvement: N/A

Rating for Criterion: DCI **EXTENSIVE**

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

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

Students have multiple opportunities to build the following science ideas: Claimed Elements.

- **ESS2.B-P1: Maps show where things are located. One can map the shapes and kinds of land and water in any area.**
- **ESS2.C-P1: Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form.**
- **LS4.D-P1: There are many different kinds of living things in any area, and they exist in different places on land and in water.**
- **PS1.A: Different kinds of matter exist, and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties.**

ESS2.B: Plate Tectonics and Large-Scale System Interactions

Claimed Element: **ESS2.B-P1: Maps show where things are located. One can map the shapes and kinds of land and water in any area.**

Claimed in Lessons: 1, 2, 4, 5, 9, and 10. Evidence was found in claimed lessons, examples include,

- Lesson 1, Explore, Step 4: "Display slide H and explain to students that each of the smaller images shows a different place in the United States that especially supports living things in nature. These places are called National Parks. People visit these parks to observe and enjoy nature. Read the name of each aloud to students and provide them the opportunity to share any connections or experiences they have with those places. Also reference the map on slide I that shows where each National Park is located on a map of the United States." (Lesson 1, Teacher Guide) While the teacher references a map that shows the location of each National Park, students do not use the map to show where things are located. This is explained in the 2.3 Habitats & Biodiversity SEP-DCI-CCC-ELA-Math-Matrix: "Students will explicitly build ideas about how maps show where things are located and mapping shapes of kinds of land and water in Lessons 4-5; see the unit front matter for details." (2.3 Habitats & Biodiversity SEP-DCI-CCC-ELA-Math-Matrix)
- Lesson 2, Connect, Step 2: "Add land to the word wall. Use students' observations of plants or animals living on or in the ground to define land. Share with students that we can use the word land to describe these areas we observed and add this word to the Word Wall. Land is the solid part of Earth's surface. Connect to this unit's activities by noticing how our community is made up of different land, water, and other places and plants and animals live." (Lesson 2, Teacher Guide)
- Lesson 4, Explore, Step 2: "Add to the Word Wall. Add the word "map" to the word wall. Explain that a map is something that shows the shape and types of land and water in an area. Connect this definition to any ideas about maps students may have shared in the previous discussion based on their experiences. Elicit initial ideas about maps. Briefly have students turn and talk with a partner about whether they or someone they know have used maps before, what the map looked like, and how they used it. As students share, listen in to discussions before bringing the class back together." (Lesson 4, Teacher Guide)

- Lesson 4, Explore, Step 4: "Introduce mapping location. While students are still gathered in a Scientist Circle, let them know that they will have the opportunity to explore maps of one location (refer to slide F). Use prompts like the following to support students in considering the land and water features in the image: What land do you notice in this image? What does it look like? What water do you notice? What does it look like? What shape is it? How have we shown land and water like this on handouts and charts so far?" (Lesson 4, Teacher Guide)
- Lesson 5, Synthesize, Step 2: "Display slide G and share with the class that students will work with their research partner to review the kinds, shapes, and locations of land and water in their researched National Park to think about how they plan to develop a map including the components the class added to the Gotta-Have-It checklist." (Lesson 5, Teacher Guide)
- Lesson 9, Synthesize, Step 3: "Point out to students where they can find the chart paper with the class co-constructed Gotta-Have-It checklist (slide E). Distribute materials and have students gather what they need for making their scripts. Have students collect their handouts from previous lessons in the unit Land in _____ handout, Water in ___ handout, National Park Map handout and map, Animal Cards, and Animal and Plant Comparisons." (Lesson 9, Teacher Guide)
- Lesson 9, National Park Map Handout: "Use the box to add a picture of your National Park Map." "Describe the shapes and kinds of land in your National Park map." "Describe the shapes and kinds of water in your National Park map." (2.3 Lesson 5 Student Assessment 2 National Park Map)
- Lesson 10, Synthesize, Step 2: "Have students think, pair, share with a partner about what they need to have with them when they record and what they can do to be effective communicators while presenting. Make sure to add these class generated ideas to the bottom of the Gotta-Have-It Checklist for students to refer to in order to support them in communicating information with their peers." Prompts include: 'What will we do when we are being recorded?' Ideas to look and listen for include: "We can show our maps." "Practice presentations. Ensure that the Gotta-Have-It Checklist is visible for all students and display slide D. Have students partner up with a student that is not their research partner, choosing (or assigning) a Partner A and Partner B, with which to practice their presentation. Give students about 5 minutes each to practice. Circulate and use the following prompts to support students in practicing their presentations." Prompts to use include: "How are you introducing the plants and animals in the National Park you researched?" Ideas to look and listen for include: "I am showing my map. I am saying _____." (Lesson 10, Teacher Guide)

ESS2.C: The Roles of Water in Earth's Surface Processes

Claimed Element: ESS2.C-P1: Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form.

Claimed in Lessons: 1, 3, 5, 9, and 10. Evidence was found in claimed lessons, examples include:

- Lesson 1: While the students do go outside and observe plants, animals, and their surrounding areas, they do not initially figure out that water is found in oceans, rivers, lakes, and ponds when making these initial observations. This is explained in the 2.3 Habitats & Biodiversity SEP-DCI-CCC-ELA-Math-Matrix: "Students begin to figure out water is found in oceans, rivers, lakes, and ponds when they make initial observations and ask questions about bodies of water in images of different National Parks. While students may begin to figure out that water can be solid or liquid through observations of both solid and liquid water in the National Park images, this idea will not be explicitly developed until Lesson 3." (2.3 Habitats & Biodiversity SEP-DCI-CCC-ELA-Math-Matrix)

- Lesson 3, Explore, Step 2: "Where is one place water can be found at the _____ National Park? pond, river, ocean, lake, stream, creek, pools. What details do the sentences give about that water? What about the picture? The river is wide and flows. Small ponds. Water in the ponds is frozen. Water in the creek moves slower than a stream. River is shaped like a snake. Lake looks like a heart in the picture. Define body of water. Have students recall the places that water was found in the class example National Park. Explain to students that we can use the term body of water to describe these areas of water." (Lesson 3, Teacher Guide)
- Lesson 3, Explore, Step 3: "Turn and talk to compare bodies of water in National Parks. Read each question aloud on slide E and give students about 1 minute to turn and talk for each. Where is water found in each National Park? How are the bodies of water similar in the National Parks? How are the bodies of water different in the National Parks?" "Begin the Bodies of Water chart. Display slide F and suggest we share and record our ideas about each body of water using a chart. Hang up a sheet of chart paper and label "Bodies of Water" to begin building the chart as a class. Ask students what types of bodies of water were found in the National Parks. Listen for ponds, lakes, ocean, and rivers (as well as other variations of these bodies of water like streams, creeks, tinajas and pools)." "Summarize noticings about bodies of water. Summarize that we have noticed water can be found in different bodies of water and that the bodies of water can be different shapes. Some of us used words like "ice" when we were sharing our observations." (Lesson 3, Teacher Guide)
- Lesson 3, Water in _____ handout: "Draw or write about the water in the National Park you are researching." (2.3 Lesson 3 Handout 1 Water in _____)
- Lesson 5, Synthesize, Step 2: "Create a Gotta Have It Checklist. Display slide D and engage the class in a brainstorm discussion using the suggested prompts below to gather student ideas for what should be included in the National Park maps. Support students in understanding that sharing information about the shapes and kinds of land and water in the National Parks can help the class answer our question about how these parks are similar and different." Prompts include: "If we were to create a checklist of the things we need to put in the National Park Maps to help us answer our Lesson Question, what information should we include?" Ideas to look and listen for include: "If the water is solid or liquid," "The shape of the water," and "Where the water is." (Lesson 5, Teacher Guide)
- Lesson 9, Synthesize, Step 3: "Remind students that they can check whether their script has all the ideas listed in our Gotta-Have-It Checklist and that they can share suggestions for their peers to use as they finish their scripts." Prompts include:" What are important ideas you need to share about the National Park you researched?" Ideas to look and listen for include: "What the land/water/other places are like there. The kind of water and where it is located" (Lesson 9, Teacher Guide)
- Lesson 10, Synthesize, Step 2: "Ensure that the Gotta-Have-It Checklist is visible for all students and display slide D. Have students partner up with a student that is not their research partner, choosing (or assigning) a Partner A and Partner B, with which to practice their presentation. Give students about 5 minutes each to practice. Circulate and use the following prompts to support students in practicing their presentations." Prompts include: "How are you communicating/showing kinds of animals and plants on habitats in/near water?" (Lesson 10, Teacher Guide) While students are encouraged to share the kinds of plants and animals in habitats near/in water, they are not using this element to make sense of phenomena and/or design solutions to problems using the idea that water is found in the ocean, rivers, lakes, and ponds, or that water exists as solid ice and in liquid form.

LS4.D: Biodiversity and Humans

Claimed Element: **LS4.D-P1: There are many different kinds of living things in any area, and they exist in different places on land and in water.**

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

- Lesson 1, Synthesize, Step 3: "Remind students that they can check whether their script has all the ideas listed in our Gotta-Have-It Checklist and that they can share suggestions for their peers to use as they finish their scripts." Prompts include: "Did we observe any plants or animals? How many plants and animals did you observe? What did they look like? Where were they? What was the surrounding area like? What are we wondering?" (Lesson 1, Teacher Guide)
- Lesson 6, Explore, Step 4: "Use students' language and ideas to affirm the observed patterns in how plants and animals in an area around their school are similar and different. Then, continue the discussion to support students in using this pattern in their data as evidence of the diversity of living things in their schoolyard." Prompts include: "When we use our chart, what do we notice about our examples of plants and animals: are they all the same?" Ideas to look and listen for include: "There are lots of different ones! There are different kinds of animals on the schoolyard. There are different kinds of plants on the schoolyard." (Lesson 6, Teacher Guide)
- Lesson 7, Explore, Step 3: "Generate student ideas for observing plants and animals. Remind students that we want to figure out the kinds of plants and animals in each of the National Parks! Display slide E. Hold up and flip through the plant and animal cards for the class example National Park, explaining that these are 10 photographs of plants that can be found there. Invite students to turn and talk with a partner about how we could use these to figure out the kinds of plants and animals in each of the National Parks. Then, have students share their suggestions, which will likely include looking, noticing similarities and differences, and using descriptions of the ways the class organized plants and animals in Lesson 6." (Lesson 7, Teacher Guide)
- Lesson 7, Explore, Step 4: "After students sort their cards into groups, support them in noticing and discussing the similarities and differences within and across each group. Circulate between groups and use the following discussion prompts to support them in their work." Prompts include: "What do you notice about the plants in this pile? (teacher points to sorted pile) How are they similar? How are they different?" (Lesson 7, Teacher Guide)
- Lesson 7, Explore, Step 5: "Encourage students to discuss together what they are noticing about the animals and why they are sorting each card into a group. After students sort their cards into the different groups, support them in noticing, discussing and recording the similarities and differences within and/or across each group. As partners sort, circulate and use the prompts like the following to support their work." Prompts include: "What do you notice about the animals in this group? (teacher points to a group on the Animal Cards) How are they similar? How are they different?" (Lesson 7, Teacher Guide)
- Lesson 8, Explore, Step 3: "Students making and recording observations on the Animal and Plant Comparisons assessment and the surrounding discussion provides an opportunity to gather evidence about Learning Goal 8.B (aligned to Assessment Statement 2), with the purpose of providing feedback and supporting students in clarifying and communicating their ideas about similarities and differences between different plants and animals. Students should also use patterns from those comparisons as evidence of biodiversity on land and in water within the National Park." (Lesson 8, Teacher Guide)
- Lesson 9, Synthesize, Step 3: "Co-construct an opening and closing sentence. Explain to students that when we are communicating what we figured out about something to others, it helps to include an opening and closing sentence to tie the ideas together. An opening sentence helps the listener or reader know the topic you will explain. A closing sentence retells the main idea and lets the listener or reader know that you are finished explaining your

ideas. Remind students that, just like in ELA, we can use opening and closing sentences when we speak or write to communicate what we have figured out in science. Invite students to engage in shared writing to co-construct an opening and closing sentence that students can use as a starting template for their own writing. The opening and closing sentence should summarize what students have observed about biodiversity in the National Park they researched." (Lesson 9, Teacher Guide)

- Lesson 10, Connect, Step 3: "Distribute and review recording handout. Make sure all students have a Comparing Across National Parks handout, clipboard and writing utensil. Briefly demonstrate how to listen to a presentation while noticing details about the kinds of plants and animals in habitats on land and in water. Show students how to add a check if the National Park follows the pattern we have started to observe that many kinds of plants and animals live in habitats on land and in water." (Lesson 10, Teacher Guide)

PS1.A: Structures and Properties of Matter

Claimed Element: **PS1.A-P1: Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties.**

Claimed in Lesson 3. Evidence was found in claimed lessons, examples include:

- Lesson 3, Explore, Step 2: "Like this (traces shape with finger) Points to a familiar shape on a math poster. Water in the middle and land around it. Use different colors to show ponds with water and ponds with ice." (Lesson 3, Teacher Guide)
- Lesson 3, Explore, Step 4: "As students observe and compare ice and liquid water, prompt them to describe how each feels to elicit ideas about the relative temperatures of the ice and water. Encourage students to notice patterns across the class's observations. Leverage these ideas when reading about how water is solid or liquid depending on temperature in the Connect." (Lesson 3, Teacher Guide)
- Lesson 3, Explore, Step 5: "Compare water and ice. Have students turn and talk about how ice and water are similar and different based on their observations." "Have students briefly turn and talk about when they think they would find solid water and when they think they would find liquid water to begin connecting ideas back to their observations of water in the National Parks." "Read the infographic and discuss the following prompts. Read the title of the infographic, the text in the first box, and the text in the solid and liquid water boxes. Facilitate a discussion of this infographic using questions similar to the following: Prompts include: "When is water ice or solid? What do you notice in the images on the infographic?" "Bring students together and highlight that they have made many observations about where water is found, and how it can be solid or liquid." (Lesson 3, Teacher Guide)

Criterion-Based Suggestions for Improvement:

- Ensure "[s]tudents use the SEP, CCC, and DCI elements that are listed as key learning objectives in service of making sense of phenomena or designing solutions to problems." [Detailed Guidance, p. 10]

Rating for Criterion: CCC **EXTENSIVE**

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

The reviewers found **extensive** evidence that the materials provide opportunities to develop and use specific elements of the CCCs. Students use elements of the CCCs, such as Patterns and System and System Models, to make sense of phenomena.

Claimed Elements

- **PAT-P1: Patterns in the natural and human-designed world can be observed, used to describe phenomena, and used as evidence.**
- **SPQ-P1: Relative scales allow objects and events to be compared and described (e.g., bigger and smaller; hotter and colder; faster and slower).**
- **SYS-P1: Objects and organisms can be described in terms of their parts.**

PAT: Patterns

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

Claimed as intentionally developed in the Unit Front Matter. Claimed in Lessons 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 in the 2.3 Habitats & Biodiversity SEP-DCI-CCC-ELA-Math-Matrix. Evidence was found in claimed lessons, examples include

- Lesson 1, Explore, Step 3: "Give students roughly 2 minutes to share their ideas. Tell students that they are going to use their counting skills from math to help answer some questions from their observation. Use the following questions to facilitate this brief discussion. Record students' ideas on the "Notice" column of the chart and questions on the "Wonder" column. Note that students will continue to add ideas to this chart as they observe additional places in this lesson." "Did we observe any plants or animals? How many plants and animals did you observe? What did they look like? Where were they? What was the surrounding area like?" (Lesson 1, Teacher Guide)
- Lesson 1, Explore, Step 4: "The plant and animal stories and experiences students share and the class' shared experiences on the schoolyard and observing new places lead to initial ideas and questions about plants, animals, and the different places they live, motivating them to explore patterns of what the land and water is like in different places and the variety of plants and animals who live there throughout the rest of the unit. They will work in upcoming lessons to explicitly observe patterns in the shapes and kinds of land and water in various places." (Lesson 1, Teacher Guide)
- Lesson 2, Connect, Step 2: "Summarize community connections. Summarize student observations about where they found animals in their communities, emphasizing larger categories of areas kids named like on the ground (gardens, grass, sidewalk, forest, park), in the water (ponds, streams), other places (buildings, in the air/sky, etc.)." (Lesson 2, Teacher Guide)
- Lesson 2, Explore, Step 5: "Notice aloud how over and over again, we noticed similarities in either shapes or kinds of land across the different National Parks. When something happens over and over again, scientists call it a pattern. We observed patterns that land can take similar shapes (some land is flat, some is not flat) and land with similar features can be described as the same kind (e.g., all the forests have a lot of trees, all the beaches are sandy or rocky and along water)." (Lesson 2, Teacher Guide)

- Lesson 3, Explore, Step 3: "Hang up a sheet of chart paper and label 'Bodies of Water' to begin building the chart as a class. Ask students what types of bodies of water were found in the National Parks. Listen for ponds, lakes, ocean, and rivers (as well as other variations of these bodies of water like streams, creeks, tinajas and pools)... Share our observations as a class. Use the following discussion prompts for each body of water to organize student observations. Remind students they may use their Water in _____ handout or their observations during the gallery tour to discuss their water observations. This student to student discussion allows an opportunity for students to observe patterns in the relationships between the water and land to help notice some common features to define the bodies of water." (Lesson 3, Teacher Guide)
- Lesson 3, Explore, Step 3: "Students engage in the crosscutting concept of patterns by comparing and contrasting multiple examples of the same type of body of water—such as rivers, lakes, ponds, and oceans. Explicit prompts to notice and discuss similarities between these examples support students in identifying observable patterns. They will work in upcoming lessons to observe and compare different types of maps to recognize how land and water are shown, helping them better understand patterns in how land and water are shown on maps." (Lesson 3, Teacher Guide)
- Lesson 4, Explore, Step 5: "Use the prompts below (also on slide J) to facilitate a think, pair, share discussion about how the maps represented the location, shapes, and kinds of land and water at Heart Lake." Prompts include: "How is the way these maps show land and water similar? How are they different?" (Lesson 4, Teacher Guide)
- Lesson 5, Synthesize, Step 5: "With students' maps on display in front of the students, use the following prompts to guide the student to student discussion while asking probing questions to encourage students to use evidence from what they see to support their ideas." Probing Questions include: "Based on our maps, what is similar about the different National Parks?" "What patterns are we noticing about the land and water in these different places?" (Lesson 5, Teacher Guide)
- Lesson 6, Explore, Step 2: "What do you notice about the plant you are observing? How is this plant similar or different from other plants you have noticed so far? What do you notice about the animal you are observing? How is this animal similar or different from other animals you have noticed so far?" (Lesson 6, Teacher Guide)
- Lesson 6, Explore, Step 4: "Use a class data display of the plants and animals students observed on the schoolyard to emphasize how scientists look for patterns and order when making observations about the world." "Analyze the data as a class. Continue to display the Plants in Our Schoolyard and Animals in Our Schoolyard charts and facilitate a discussion in which students analyze the class data recorded on the Plants in our Schoolyard and Animals in Our Schoolyard charts. The goal of this discussion is to compare the kinds of plants and animals observed on the schoolyard." Prompts include: "According to our chart, what did we notice about plants on our schoolyard?" "According to our chart, what did we notice about animals in our schoolyard?" "What was similar about what we noticed about the plants and animals on the schoolyard?" "So if we go to the park or another schoolyard, what might we expect to notice? What might be different?" (Lesson 6, Teacher Guide)
- Lesson 7, Explore, Step 5: Patterns, "In this lesson, students continue to use observations of plants and animals to observe patterns in how plants and animals are similar and different and use those patterns as evidence of biodiversity in an area. Students' ongoing opportunities to make observations of both plants and animals (first on their schoolyard and now from images of plants and animals in the National Parks) and their work to identify patterns in their growing data set as a class on Our Growing Ideas chart support their understanding that patterns in the natural world represent many, many scientific observations." (Lesson 7, Teacher Guide)
- Lesson 8, Connect, Step 4: "Read a book and discuss the associated prompts. Display slide H. Come together as a class to read the Plants and Animals on Land and in Water book aloud and use the prompts below to support students in noticing the pattern that places on land and in water have a variety of different kinds of plants and animals that live there." Prompts include: "How are these animals and plants (refer to images) found on different

kinds of land similar to ones we observed? How are they different?" "How are these animals and plants (refer to images) found on different kinds of water similar to ones we observed?" (Lesson 8, Teacher Guide)

- Lesson 9, Synthesize, Step 2: "Display slide C and have students turn and talk about what might be important to include in our presentations if we want to be able to use these presentations to compare the kinds of plants and animals that live in each. Have Our Growing Ideas chart available for students to reference throughout this discussion, drawing students' attention to patterns in what is in the National Parks (plants and animals) and where they are usually found (shapes and kinds of land and water). As students share, add co-constructed ideas to chart paper so that students can refer back to it throughout the lesson." (Lesson 9, Teacher Guide)
- Lesson 10, Connect, Step 3, "In previous lessons, students have used observed patterns in the different kinds of plants and animals to describe how different kinds of plants and animals live on land and in water within a single National Park. Sharing their National Park video presentations and using the Comparing Across National Parks handout support students in observing that biodiversity across land and water is a pattern across the National Parks, as well as their schoolyard and community." (Lesson 10, Teacher Guide).

SPQ: Scale, Proportion, and Quantity

Claimed Element: SPQ-P1: Relative scales allow objects and events to be compared and described (e.g., bigger and smaller; hotter and colder; faster and slower).

Claimed as intentionally developed in the Unit Front Matter. In the 2.3 Habitats & Biodiversity SEP-DCI-CCC-ELA-Math-Matrix claimed in Lessons 1, 2, 3, 4, 5, 6, 7, and 8. Evidence was found in claimed lessons, examples include

- Lesson 1, Navigate, Step 6: "Summarize wonders. Return to a Scientists Circle and celebrate with students for making great observations and asking questions about the different places we observed (Where are the animals? Where are _____ (kind of land)? How big are _____? Where do plants and animals live?) and the plants and animals (Why so many plants? What else lives near us? _____ live near me, do they live in other places too?) that can be found there." While students are encouraged to use relative scales in their observations, this does not mean that all students are using or developing this element.
- Lesson 2, Explore, Step 5: "Compare kinds of land in the National Parks. Display slide I and have groups continue the peer to peer small group discussion to compare the land in parks they researched. Direct students to use with the sentence starters 'The land is similar because _____.' 'The land is different because _____' to support this discussion. Explain that similar means something that both places have that is alike." (Lesson 2, Teacher Guide) While students do compare and describe National Parks, they are not prompted to do so in a way that ensures all students will respond using relative scales. This is explained in the 2.3 Habitats & Biodiversity SEP-DCI-CCC-ELA-Math Matrix: "Students use relative scales of bigger and smaller and taller and flatter to describe and compare the land features of the National Park they research and the land in other National Parks. They will build on their use of the relative scale bigger and smaller and begin to use hotter and colder to describe and compare bodies of water in Lesson 3."
- Lesson 2, Explore, Step 5, "Prompts to use: Does anyone have another kind of land in the Park you researched that is different from what we have shared so far? Ideas to look and listen for: There are cliffs at the National Park we researched! Possible follow-up responses: How can I show that the _____ is taller/ shorter/ bigger/ steeper than the other land?" (Lesson 2, Teacher Guide)
- Lesson 3, Explore, Step 3: "Share our observations as a class. Use the following discussion prompts for each body of water to organize student observations. Remind students they may use their Water in _____ handout or their observations during the gallery tour to discuss their water observations. This student to student discussion allows an opportunity for students to observe patterns in the relationships between the water and land to help notice some

common features to define the bodies of water." "Share our observations of ponds. Suggest to students that you begin finding patterns in one type of body of water, ponds, and that you will look for patterns across all bodies of water. Use the following prompts for a brief student to student discussion about ponds." Prompts include "What is similar about all the ponds? What pattern are we starting to observe?" Teachers are provided with an idea to look and listen for: "ponds are smaller." Prompts include: "What is similar about all the lakes?" Ideas to look for include: "All the lakes were big." Prompts include: "How are oceans the same/different to lakes and ponds?" Ideas to look and listen for include: "Both are big but oceans are bigger." (Lesson 3, Teacher Guide)

- Lesson 3, Explore, Step 4: "Students engage with this crosscutting concept as they begin using relative temperature scales, such as warmer/colder, hot/cold, cold/colder to describe and compare water when it is liquid (water) and solid (ice). The discussion to make observations using the sense of touch supports students in using relative scales (colder/hotter) to describe and make sense of differences between solid and liquid water. The crosscutting concept is intentionally developed here and will be revisited in Lesson 4, when students compare the relative scale of land and water features on physical maps using terms like bigger, smaller, near, and far." (Lesson 3, Teacher Guide)
- Lesson 4, Explore, Step 4: "Students are using relative scales to compare and describe the shapes and kinds of land and water on maps. While exploring different physical maps, support students in describing and comparing the relative scales of land and water (e.g., a lake is smaller than a pond, the land part of my map is bigger than the water part). Students had previous opportunities to use relative scale in Lesson 3 while using terms like bigger and smaller to describe differences between lakes and ponds and rivers and creeks. In Lesson 5, students continue to develop this crosscutting concept as they independently decide the relative sizes of the land and water features for the map that they make of the National Park they are researching." (Lesson 4, Teacher Guide)
- Lesson 4, Explore, Step 4: "Students engage with this crosscutting concept as they begin using relative temperature scales, such as warmer/colder, hot/cold, cold/colder to describe and compare water when it is liquid (water) and solid (ice). The discussion to make observations using the sense of touch supports students in using relative scales (colder/hotter) to describe and make sense of differences between solid and liquid water. "(Lesson 4, Teacher Guide)
- Lesson 4, Explore, Step 4: Developing and Using Models, "One important element of this practice is representing amounts and relative scales. As students work with the maps (models) at each station, support them in considering how the maps represent various amounts of land or water or the relative scale (bigger/smaller, taller/shorter) of the land and water features." (Lesson 4, Teacher Guide)
- Lesson 5, Synthesize, Step 3: Scale, Proportion, and Quantity, "Encourage students to use comparative terms (more/less, bigger/smaller) to describe the shapes, kinds, and locations of land and water on their map. Support students by showing images from the National Parks from the website side by side and referencing the Land chart and Bodies of water chart to continue to connect to ideas about comparative scale developed in Lessons 2-4." (Lesson 5, Teacher Guide)
- Lesson 6, Explore, Step 4: "To support students in understanding the differences between the categories of low-lying, medium-sized, and high reaching plants, relate the categories to how students might interact with the highest part of the plants. Short ground plants can be reached when students are low to the ground, medium sized plants can be reached without crouching, and high-reaching plants can be reached by reaching their hands up or are so high they could not even touch the top. These are relative ways to describe plants, so use examples that are relevant to the class with the purpose of coming to a shared understanding of these words/variations of these words." (Lesson 6, Teacher Guide)
- Lesson 7, Explore, Step 5: "Partner discussions and recorded observations on Plant and Animal Observations handout during the animal card sort provides an opportunity to gather evidence about Learning Goal 7, with the purpose of providing feedback and supporting students in making media-based observations of plants and animals with the purpose of making observations to compare their features to identify patterns that are evidence of biodiversity." "Encourage students to discuss together what they are noticing about the animals and why they are sorting each

card into a group. After students sort their cards into the different groups, support them in noticing, discussing and recording the similarities and differences within and/or across each group. As partners sort, circulate and use the prompts like the following to support their work." (Lesson 7, Teacher Guide)

- Lesson 8, Explore, Step 3: "Celebrate the great work students have done in sorting their cards by where the plants and animals live on land and water. Recall that we just discussed how we have observed and compared plants and animals to describe different kinds in previous lessons and we can do something similar for plants and animals on land and in water." Prompts include: "What details have we noticed to know if plants are different kinds?" Ideas to look and listen for include: "If they are low to the ground, high reaching, or in the middle." (Lesson 8, Teacher Guide) While students are prompted to remember making observations and comparisons, and the sample student response includes a relative scale, the suggested prompt "What details have we noticed to know if plants are different kinds" does not cue the use of relative scales.

SYS: System and System Models

Claimed Element: **SYS-P1: Objects and organisms can be described in terms of their parts.**

Systems and System Models is claimed as an opportunity to practice this CCC in Lessons 6-8. The 2.3 Habitats & Biodiversity SEP-DCI-CCC-ELA-Math-Matrix claimed in Lessons 6, 7, and 8. Evidence was found in claimed lessons, examples include:

- Lesson 6, Explore, Step 4: "Organize animal data. Display slide L and read the headings aloud on the Animals in Our Schoolyard chart for students. Follow a similar procedure as was done with plants to organize class animal data on this chart. Invite each pair to come to the chart and add one tally in the second column if their group found an animal for each of the given categories (0 legged, 2 legged, 4 legged, many legged). The tallies represent the number of student groups that made that observation, not the number of plants or animals in that category." (Lesson 6, Teacher Guide)
- Lesson 7, Explore. Step 3: "Practice grouping plants with an example. Lay out prepared Card Sort Labels in the middle of the Scientists Circle. Show students the Plant Cards and how they can organize the plants as they sort their cards. Invite a student to select one of the cards from the class National Park example set of Plant Cards. Read the available labels and ask how the plant on the card can be sorted into one of these groups of plants. Repeat with the remaining 9 cards. Demonstrate how to record data. Show students the Plant and Animal Observations handout and where they can circle the kinds of plants that were part of the card sort for the given National Park. Then have students turn and talk about the similarities and differences they observe within and between the groups of cards to further compare the plants, using a prompt like, How are the _____ similar or different? (one has flowers and one does not, one is a tall tree and one is not, etc.). Then, have a few students share and use a class copy of the handout to demonstrate how students can draw pictures or write words to record this information." (Lesson 7, Teacher Guide)
- Lesson 8, Explore, Step 3: "Celebrate the great work students have done in sorting their cards by where the plants and animals live on land and water. Recall that we just discussed how we have observed and compared plants and animals to describe different kinds in previous lessons and we can do something similar for plants and animals on land and in water." Prompts include: "What details have we noticed to know if plants are different kinds?" Ideas to look and listen for include: "If they are low to the ground, high reaching, or in the middle. If they have flowers or not. Shape of leaves. Bark or no bark. Colors. (Lesson 8, Teacher Guide)

Criterion-Based Suggestions for Improvement:

- Ensure "[s]tudents use the SEP, CCC, and DCI elements that are listed as key learning objectives in service of making sense of phenomena or designing solutions to problems." [Detailed Guidance, p. 10]

I.C. Integrating the Three Dimensions

EXTENSIVE

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

The reviewers found **extensive** evidence that student sensemaking of the patterns of encountering plants and animals in multiple, different, outside places requires student performances that integrate elements of the SEPs, CCCs, and DCIs.

In most lessons, students are expected to figure something out (a phenomenon) in a way that requires grade-appropriate elements of the three dimensions working together.

Learning is integrated

- Lesson 1, Explore, Step 3: and Synthesize, Step 5: Students integrate the use of the elements when they answer the question, "What are we wondering?" during the Think, Pair, Share discussion after they collected local outdoor observations on the Observing Different Places handout in the three dimensions (Lesson 1, Teacher Guide): **Ask questions based on observations of plants and animals existing in different places to find more information about the patterns of what living things live in different places.**
- Lesson 2, Explore, Step 4: Students integrate the use of the elements when, in pairs, they read about land in their assigned National Park on a website, record information about the Park on the Land in Places handout in which they write and draw - using ideas from their math studies on shape attributes and their knowledge of polygons to help them describe and draw the shapes of land they observe and read about on the website in the three dimensions (Lesson 2, Teacher Guide): **Obtain information** to **compare and describe the shapes and kinds of land that are found in** a National Park **using relative scale (bigger, smaller; taller, shorter; flatter).**
- Lesson 2, Explore, Step 5: "Use research to discuss kinds of land in National Parks. Group two pairs of students together to make groups of four. It is best if the pairs grouped together did not research the same National Park. Display slide H and explain that each pair of students will show their partner group their Land in _____ handout and describe the land of the National Park they researched. They can use the data they collected on their handout. Remind students data are observations and recordings used to answer questions. Encourage students to use specific language and gestures to describe details about different kinds, shapes, and sizes of the land. and have each small group of partners think, pair, share about the question: What kind of land is in the National Park?" (Lesson 2, Teacher Guide) **CCC SPQ-P1 Relative scales allow objects and events to be compared and described (e.g., bigger and smaller; hotter and colder; faster and slower). DCI ESS2.B-P1 Plate Tectonics and Large-Scale System Interactions: Maps show where things are located. One can map the shapes and kinds of land and water in any area. DATA-P2 Use and share pictures, drawings, and/or writings of observations.**
- Lesson 3, Explore, Step 2: "Share our observations of ponds. Suggest to students that you begin finding patterns in one type of body of water, ponds, and that you will look for patterns across all bodies of water. Use the following prompts for a brief student to student discussion about ponds. As students share evidence from their research about the bodies of water add drawings to capture their thinking and provide visuals of these bodies of water for the class to reference. What did we notice about the ponds? How can we show these ponds on our chart? What is similar about all the ponds? What pattern are we starting to observe?" (Lesson 3, Teacher Guide) **CCC PAT-P1 Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence. DCI ESS2.C-P1 The Roles of Water in Earth's Surface Processes: Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form. MOD-P3 Develop and/or use a model to represent amounts, relationships, relative scales (bigger, smaller), and/or patterns in the natural and designed world(s).**

- Lesson 3, Explore, Step 4: Students integrate the use of the elements when, in small groups, they record and share their observations of ice and water to help compare how ice and water are similar and different based on their observations. (Lesson 3, Teacher Guide). **Make observations to collect data about water, and use that data to compare that water can be either solid (when colder) or liquid (when hotter).**
- Lesson 4, Explore, Step 4 and Step 5: Students integrate the use of the elements when they observe, record, and share and compare how maps made in 3 different ways (clay, dry erase, and construction paper) represent the location, shapes, and kinds of land and water at Heart Lake. (Lesson 4, Teacher Guide): **Use maps of the shapes and kinds of land and water in an area** to **observe and describe patterns in how maps represent locations.**
- Lesson 5, Synthesize, Step 2: "We said each of the places we researched have land we can show. What patterns did we figure out about land in Lesson 2 that could help us show that land? (refer to Our Growing Ideas chart) Gestures tall and short while saying land can be flat or not flat. Land can be different kinds (gesturing to beaches, forests on Land chart). Places can have different kinds and shapes of land. We said each of the places we researched have water we can show. What patterns did we figure out about water in Lesson 3 that could help us show that water? (refer to Our Growing Ideas chart) Points to bodies of water (rivers, lakes, ponds, and ocean) on bodies of water chart or Word Wall. Lakes are surrounded by land. Rivers flow through land. The water can be liquid water or frozen water (ice). Ponds are smaller than lakes." (Lesson 5, Teacher Guide) **CCC PAT-P1 Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence. DCI ESS2.B-P1 Plate Tectonics and Large-Scale System Interactions: Maps show where things are located. One can map the shapes and kinds of land and water in any area. SEP MOD-P3 Develop and/or use a model to represent amounts, relationships, relative scales (bigger, smaller), and/or patterns in the natural and designed world(s).**
- Lesson 5, Synthesize, Step 3: Viewing the image of the National Park they will map from the National Park Photos and think about where the land and water is located and the size and shape of the land and water. (Lesson 5, Teacher Guide): **Use observed patterns about land and water** features **to develop a model that represents the shapes, kinds, relative sizes and locations of land and water in an area of a National Park.**
- Lesson 6, Explore, Step 4: "Organize animal data. Display slide L and read the headings aloud on the Animals in Our Schoolyard chart for students. Follow a similar procedure as was done with plants to organize class animal data on this chart. Invite each pair to come to the chart and add one tally in the second column if their group found an animal for each of the given categories (0 legged, 2 legged, 4 legged, many legged). The tallies represent the number of student groups that made that observation, not the number of plants or animals in that category. Use a discussion prompt and follow-ups like the following to compare the animals found within each category (0 legged, 2 legged, 4 legged, many legged). As students share about each new animal, record their thinking using words and or drawings in the example column. Repeat questions like these until the chart represents ideas about all of the various animals students may have seen on the schoolyard. It is OK if the class collectively only observes a few animals or only multiple of one category of animal." (Lesson 6, Teacher Guide) **CCC PAT-P1 Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence. DCI LS4.D-P1 There are many different kinds of living things in any area, and they exist in different places on land and in water. DATA Use observations (firsthand or from media) to describe patterns and/or relationships in the natural and designed world(s) in order to answer a scientific question.**
- Lesson 6, Explore, Step 3: and Explore, Step 4: Students integrate the use of the elements when they, in a Scientists Circle plan or how to observe, and then, in pairs observe and record plants and animals in an outdoor space using the Plants and Animals Near Me handout, a hand lens and pencil. Finally, they share their observations and create a class chart to compare each category of plant and animal they found in their assigned spaces (Lesson 6, Teacher Guide). **Make observations** of **plants and animals** in the schoolyard **and identify patterns to use as evidence that different kinds of plants and animals live there.**

- Lesson 7, Explore, Step: Students integrate the use of the elements when they "discuss together what they are noticing about the animals and why they are sorting each card into a group. After students sort their cards into the different groups, support them in noticing, discussing and recording the similarities and differences within and/or across each group." (Lesson 7, Teacher Guide): **Make observations** of **plants and animals** in a National Park and **compare** their features to **identify patterns to use as evidence that different kinds of plants and animals live there.**
- Lesson 8, Connect, Step 2: Students integrate the use of the elements when they visit the Explore Extraordinary National Parks website, with partner(s), find the matching image card, and decide together where it belongs under the "land" or "water" label." (Lesson 8, Teacher Guide): **Obtain information** about **where plants and animals live** to **identify patterns to use as evidence that plants and animals exist in different places on land and in water.**
- Lesson 8, Explore, Step 3: Animals are found in the National Park they are researching and record their determinations on the Animal and Plant Comparisons handout. (Lesson 8, Teacher Guide): **Make observations** of **land and water plants and animals** in a National Park and **compare** them to **identify patterns to use as evidence that different kinds of plants and animals live on land and in water.**
- Lesson 9, Synthesize, Steps 2 and 3: Students integrate the use of the elements when they co-develop the Gotta-Have-It Checklist, and when they pre-write and write their National Park Presentation Script using their maps and handouts from prior lessons. (Lesson 9, Teacher Guide). Students **share their findings** with the whole group **to observe the pattern that different kinds of plants and different kinds of animals live in many areas across the National Parks.**
- Lesson 10, Synthesize, Step 4: students integrate the use of the elements when they use their Comparing Across National Parks handout and turn and talk about what they noticed across parks from the presentation by responding to prompts such as "What did you notice about plants and animals that live in habitats on land in the different National Parks?," "What patterns are we noticing?," "What was similar about the plants and animals that live in/near water between the National Park you researched and others? What was different?" (Lesson 10, Teacher Guide). **Communicate information** about **patterns in the kinds of plants and animals that live in a National Park** to **use as evidence that a variety of plants and animals live in different habitats on land and in water.**

Integration to support student sense-making over time

- Lesson 2, Synthesize, Step 6: "Read the Lesson Question in the first column of Our Growing Ideas chart, What is the land like in places where plants and animals live? and direct students to think first, then talk with a partner, then share with the group. Consider using the following prompts to facilitate this student to student discussion." Prompts to use: Let's look back at our question, What is the land like in places where plants and animals live? What did we figure out about that?" - Ideas to look and listen for: "The land is different shapes (flat like plains or taller/not flat like mountains, hills, and dunes); The land is different kinds like deserts, prairies, forests, and beaches. There are different shapes and kinds of land in our communities and in the National Parks." - Possible follow-up responses include: "Were there any other patterns?" (Lesson 2, Teacher Guide).
- Lesson 3, Explore, Step 2: "Share our observations as a class. Use the following discussion prompts for each body of water to organize student observations. Remind students they may use their Water in _____ handout or their observations during the gallery tour to discuss their water observations. This student to student discussion allows an opportunity for students to observe patterns in the relationships between the water and land to help notice some common features to define the bodies of water." (Lesson 3, Teacher Guide)

- Lesson 4, Explore, Step 4: "Explore maps and record observations. Allow students 5-7 minutes at each station to explore the map(s) and record their observations. While students explore, use the following prompts to support exploration. Can you tell me more about what each of these pieces of the map could be showing? Why do you think so? Can you say more about how you are using these map materials to show what is in the image? What do you mean to represent with _____? What can you tell me from this model about the land and the water? Is one bigger or smaller than the other? How can you tell? How is the way this map shows land and water similar or different from (point to a different map station) the way that map does?" (Lesson 4, Teacher Guide)
- Lesson 5, Synthesize, Step 2: "Create a Gotta Have It Checklist. Display slide D and engage the class in a brainstorm discussion using the suggested prompts below to gather student ideas for what should be included in the National Park maps. Support students in understanding that sharing information about the shapes and kinds of land and water in the National Parks can help the class answer our question about how these parks are similar and different. As students share ideas, create a slide, poster, or whiteboard with their ideas so all students have access to a shared visual list. A sample of the class version of the Gotta-Have-It Checklist is shown below. If applicable, encourage and support multilingual students to include annotated translations of checklist items to support them when building maps." (Lesson 5, Teacher Guide)
- Lesson 7, Synthesize, Step 6: "Display slide L. Using their completed Plant and Animal Observations handout, have students who have researched the same park, discuss how they sorted their cards and what similarities and differences they noticed and recorded about the animals in each group. Encourage students to use the investigation materials, their hands, words in any language to demonstrate their sensemaking." (Lesson 7, Teacher Guide).
- Lesson 10, Synthesize, Step 4: "Gather students in a Scientists Circle and invite them to bring their Comparing Across National Parks handout. Display slide F and remind students of the Lesson set question we have been figuring out throughout this part of the unit, What kinds of plants and animals live in different places?"..." Using their Comparing Across National Parks handout, students turn and talk about what they noticed across parks from the presentations. Listen in as students share and then after bringing students back together, use the ideas you heard to motivate coming to a consensus about our Lesson set question." (Lesson 10, Teacher Guide)

Criterion-Based Suggestions for Improvement: N/A

I.D. Unit Coherence

ADEQUATE

Lessons fit together to target a set of performance expectations.

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

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

The reviewers found **adequate** evidence that the lessons fit together coherently because each Lesson builds on prior lessons, but not in a way that is always explicit to students. The unit encourages students to revisit their questions and prior learning; however, student questions are heavily motivated by teacher prompts and suggestions.

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

- Lesson 1, Explore, Step 4: "Turn and talk about experiences in other places with plants and animals. Before looking at new places, have students briefly turn and talk about each of these questions to prepare for making additional observations. What other places near or far from here have you or someone you know observed plants or animals? Where might we expect to see plants and animals in new places (in the ground, in water, in trees)?" (Lesson 1, Teacher Guide)

In Lesson 5, students discuss the kinds and shapes of land and water in National Parks. In Lesson 6, students look at the plants and animals that live near them. In Lesson 7, students examine the plants and animals that live in National Parks. This Lesson sequencing (land and water in National Parks, then plants and animals in the schoolyard, and finally back to National Parks) could be confusing for students.

- Lesson 5, What we do: "In this Putting Pieces Together lesson, we look for similarities and differences (patterns) in land and water in places where we observed plants and animals (National Parks) by mapping these locations. We co-create a Gotta-Have-It Checklist to recall what information we need to include and how to represent it in our maps, we do a gallery tour to observe the land and water across the National Parks, and we take stock of questions about plants and animals in these places we still need to answer." (Lesson 5, Teacher Guide) In this lesson, the students focus on water and land in National Parks.
- Lesson 6, What we do: "In this Investigation lesson, we want to figure out what plants and animals live near us. We start by making observations of plants and animals in our schoolyard and compare what we found to look for patterns across the class data. By analyzing and comparing our observations, we can better describe the different kinds of plants and animals near us. This helps us consider what kinds of plants and animals could live in places not near us." (Lesson 6, Teacher Guide) In this lesson, students focus on the animals and plants in their schoolyard.
- Lesson 7, What we do: "In this Investigation lesson, we want to figure out what kinds of plants and animals can be found in each National Park. We read an article about how scientists use images as data to answer scientific questions, and we plan and carry out an investigation in which we sort images of plants and animals in each National Park. We make and record observations of how the plants and animals are similar and different to determine the variety of kinds of plants and animals in each National Park." Lesson 7, Synthesize, Step 6: "Connect making plant and animal observations to the Lesson set question. Ask the following prompts to students to help them make connections between their investigations and how that helps to figure out, what kinds of plants and animals live in different places?" Prompts to use include: How can we use what we figured out about the kinds of plants and animals that live in the National Parks to help us answer our question, what kinds of plants and animals live in different places?" Ideas to look and listen for: The National Parks are a lot of different places and now we figured out some of the plants and animals there. We have observations about the kinds of plants and animals in each National Park." (Lesson 7, Teacher Guide) In this lesson, students focus on animals and plants in National Parks.
- Lesson 8, Explore, Step 3: "Facilitate small group discussions about making observations. Display slide F. Pose the following discussion prompts to small groups to plan for making observations of plants and animals with the purpose of comparing the kinds in the land group and the kinds in the water group." Prompts include: "How have you made observations of plants and animals before?" "What details have we noticed to know if plants are different kinds?" "What details have we noticed to know if plants are different kinds?" (Lesson 8, Teacher Guide)
- Lesson 10, Connect, Step 3: "Invite members of groups to share what they figured out and ask questions. After all students have finished their presentations, invite guests (and/or other students in the group) to share something they

figured out, ask questions, and/or provide celebrations of students' work, either with their small groups or as a whole class. Additionally, consider inviting students to share a few questions they still have or want to do further research on about a National Park, so the students can dialogue with their guests (and/or other students in the group)." (Lesson 10, Teacher Guide).

Students routinely return to their Notice/Wonder Chart, which was created in Lesson 1. Lessons 2-10 begin with students returning to the Notice/Wonder Chart to remind them of questions they still have and to co-construct a Lesson Question that drives the learning. For example:

- Lesson 1, Synthesize, Step 6: "Continue the discussion to add and group questions on the Notice and Wonder chart. Prompt the class to share wonders about the observations they made of encounters with plants and animals in different places. As students share questions, add them to the Notice and Wonder chart under the "Wonder" column. Consider grouping similar questions (e.g., questions about the locations and questions about variety or kinds of plants and animals) or using a color code or other annotations to indicate related questions. Pause to ask students if they agree with the placement while adding the questions to the chart." (Lesson 1, Teacher Guide)
- Lesson 2, Navigate, Step 1: "Revisit ideas for investigation. Display slide B. On the Notice and Wonder chart, point out the investigation ideas on sticky notes that relate to researching different places where plants and animals live. Use discussion prompts like the following to help students recall the investigation ideas the class generated." Prompt included: "What were some of the investigation ideas we came up with to find out more about different places where we noticed plants and animals?"(Lesson 2, Teacher Guide)
- Lesson 8, Navigate, Step 6: "Take stock in what we figured out. Revisit the class Notice and Wonder Chart (refer to slide K) and add any new noticings to the chart, if needed. Reread questions on the chart about the different kinds of plants and animals and where they live and invite students to place check marks by the questions for which they have enough information from their research to answer now." (Lesson 8, Teacher Guide)

Students routinely return to their Growing Ideas Chart created in Lesson 2 to keep track of what they have figured out in each lesson. Students return and update the Growing Ideas Chart in Lessons 3, 4, 5, 6, 7, and 8. For example:

- Lesson 2, Synthesize, Step 6: "Continuing introducing Our Growing Ideas chart. Continue to explain that in order to add ideas to our chart today, it will be important for us to not only share what we figured out about our Lesson Question, What is the land like where plants and animals live? but also listen to and connect with what other students have shared. This is so we can understand what we think we figured out and where we still have questions." (Lesson 2, Teacher Guide)
- Lesson 3, Navigate, Step 1: "What did we do last time to investigate land? We shared about land in our communities. Point to Our Growing Ideas chart to indicate using a website. What did we notice about the land? Land being made of different things. Land has rocks. Some land is flat/not flat. (gestures mountains with hands) Land can be different shapes and kinds. What else did we start to notice in the National Parks? What about places plants and animals live in our community that weren't land? Water, Oceans, Plants and animals. Fish and geese were in the pond near us. What questions did we have? What did we wonder about the water? Is the water different, too? Do all the places have water? Is the water the same in the different places? Does the place with snow have water? Co-construct our Lesson Question. Use students' questions about water to construct a question like, "Where is water found, and what is it like?". However, feel free to use terms and phrasing that reflect the class's ideas. Record the Lesson Question. Display slide B with the class' version of the Lesson 3 question. Write the class's version of the Lesson 3 question on the next row of Our Growing Ideas chart." (Lesson 3, Teacher Guide)
- Lesson 4, Navigate, Step 1: "Display the Our Growing Ideas chart (refer to slide A) and read the unit question. Use the following discussion prompts to help students recall what they did to figure out shapes and kinds of bodies of water

and how they thought they could share that with others." Prompts to use include, "What did we wonder/still wonder after figuring out about land in Lesson 2 and water in Lesson 3?" (Lesson 4, Teacher Guide).

- Lesson 5, Synthesize. Step 5: "How can we use what we figured out about how places plants and animals live are similar and different to answer our unit question, What lives where? We figured out a lot of different places where plants and animals live. We can show/tell about where plants and animals live. Land and water are places where plants and animals could live. Summarize wonders. Notice aloud how many of the remaining wonders are about the plants and animals that could be found in these different places. Connect these questions to the part of the class' selected unit question about plants, animals, or what/who lives in different places. Based on students' remaining (or new) wonders, co-construct a new Lesson set question: What kinds of plants and animals live in different places? and add this question to Our Growing Ideas chart." (Lesson 5, Teacher Guide)
- Lesson 6, Navigate. Step 1: "Navigate into a new Lesson set. Refer to Our Growing Ideas chart (or slide B) to remind students that last time we decided on a new Lesson Set question similar to What kinds of plants and animals live in different places? Read the question aloud for students and have them turn and talk about what we will need to figure out to fully answer that question. Listen for ideas related to finding out about plants and animals in different places like those locally, at the different National Parks or in the land and water places they have researched in the parks. As students share, connect those ideas to the questions on the Notice and Wonder chart and add new ideas as questions if they are not yet represented…Co-construct our Lesson Question. Use students' ideas and questions around plants and animals that live near them to co-construct a Lesson Question like, "What kinds of plants and animals live near us?". However, feel free to use terms and phrasing that reflect your class's ideas." (Lesson 6, Teacher Guide)

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

The lessons help students develop toward proficiency in a targeted set of performance expectations. The unit's target Performance Expectations are 2-LS4-1, 2-ESS2-3, and 2-ESS2-2.

2-LS4-1 Make observations of plants and animals to compare the diversity of life in different habitats.

- Lesson 1, Explore, Step 3: "Bring students outside and have them work with their partners to make observations of plants and animals. (Lesson 1, Teacher Guide).
- Lesson 6, Explore, Step 2: "Remind students that we want to make observations about different kinds of plants. Suggest we look at some examples of plants to think about the kinds of observations we can make to help us know if we are noticing different kinds of plants. Display slide F with images of plants and use the following prompts to facilitate a discussion about observing plants on the schoolyard." Prompts to use include: How can we tell if we are observing different kinds of plants? How are the plants in these images similar or different?" (Lesson 6, Teacher Guide)
- Lesson 6, Explore, Step 2: "Display slide G and use the following prompts to facilitate a discussion about observing plants on the schoolyard." Prompts to use include: How can we tell if we are observing different kinds of animals? How are the plants in these images similar or different?" (Lesson 6, Teacher Guide).
- Lesson 7, Explore, Step 5: "Encourage students to discuss together what they are noticing about the animals and why they are sorting each card into a group. After students sort their cards into the different groups, support them in noticing, discussing and recording the similarities and differences within and/or across each group. As partners sort, circulate and use the prompts like the following to support their work." Prompts to use include: "What do you notice about the animals in this group? (teacher points to a group on the Animal Cards) How are they similar? How are they different?" (Lesson 7, Teacher Guide).

- Lesson 8, Connect, Step 4: "Display slide H. Come together as a class to read the Plants and Animals on Land and in Water book aloud and use the prompts below to support students in noticing the pattern that places on land and in water have a variety of different kinds of plants and animals that live there." Prompts to use include: "Page 9: How are these animals and plants (refer to images) found on different kinds of land similar to ones we observed? How are they different?... Page 16: How are these animals and plants (refer to images) found on different kinds of water similar to ones we observed?" (Lesson 8, Teacher Guide).
- Lesson 10, Synthesize, Step 4: "Have students keep their Comparing Across National Parks handout and prepare for a Consensus Discussion. Celebrate how they have brought together ideas across the unit to compare the many different plants and animals living in different kinds of places in the National Parks. Make sure to record the patterns that students observe that answer the Lesson set question to the Our Growing Ideas chart as they arise." Prompts to use include: "What was similar about the plants and animals that lived on land between the National Park you researched and others? What was different?" "What patterns are we noticing?" (Lesson 10, Teacher Guide).

2-ESS2-3 Obtain information to identify where water is found on Earth and that it can be solid or liquid.

- Lesson 3, Explore, Step 3: "Display slide F and suggest we share and record our ideas about each body of water using a chart. Hang up a sheet of chart paper and label "Bodies of Water" to begin building the chart as a class. Ask students what types of bodies of water were found in the National Parks. Listen for ponds, lakes, ocean, and rivers (as well as other variations of these bodies of water like streams, creeks, tinajas and pools)...Use the following discussion prompts for each body of water to organize student observations. Remind students they may use their Water in _____ handout or their observations during the gallery tour to discuss their water observations. This student to student discussion allows an opportunity for students to observe patterns in the relationships between the water and land to help notice some common features to define the bodies of water" (Lesson 3, Teacher Guide).
- Lesson 4, Explore, Step 4: "Display slide I and explain to students that they will spend approximately 5-7 minutes at each station and should remember to make sure everyone gets a turn. Emphasize that it is important for every student to touch and try out the materials in order to support their sensemaking about how maps show the location, shape, and kind of land and water. Distribute the Map Observations handout, a clipboard, and writing utensil to each student and then transition groups to their first station. Once students complete each of the stations, they should clean up at each station to prepare for the next group, and add any final details to their Map Observations handouts before moving to the next station...Explore maps and record observations. Allow students 5-7 minutes at each station to explore the map(s) and record their observations. While students explore, use the following prompts to support exploration." Prompts to use include: What can you tell me from this model about the land and the water? Is one bigger or smaller than the other? How can you tell?" (Lesson 4, Teacher Guide).
- Lesson 5, Synthesize, Step 2: "Give time for students to review and discuss what they figured out about land and water in their researched National Park and about mapping using their previously completed handouts. Display slide H and have students use the sentence starters to share how they will include all the parts of the Gotta-have-it checklist in their map. Encourage students to use the sentence prompts to support this pair share." (Lesson 5, Teacher Guide).
- Lesson 9, Synthesize, Step 2: "Display slide C and have students turn and talk about what might be important to include in our presentations if we want to be able to use these presentations to compare the kinds of plants and animals that live in each. Have Our Growing Ideas chart available for students to reference throughout this discussion, drawing students' attention to patterns in what is in the National Parks (plants and animals) and where they are usually found (shapes and kinds of land and water)." (Lesson 9, Teacher Guide).

2-ESS2-2: Develop a model to represent the shapes and kinds of land and bodies of water in an area.

- Lesson 1, Explore, Step 4: "These places are called National Parks. People visit these parks to observe and enjoy nature. Read the name of each aloud to students and provide them the opportunity to share any connections or experiences they have with those places. Also reference the map on slide I that shows where each National Park is located on a map of the United States. Share that we can "visit" these National Parks to see different places and the plants and animals that might live there." (Lesson 1, Teacher Guide). The Unit Front matter lists this as a place where the DCI of this PE is developed. In this lesson, students review a map.
- Lesson 4, Explore, Step 4: "Allow students 5-7 minutes at each station to explore the map(s) and record their observations. While students explore, use the following prompts to support exploration." Prompts to use: "Can you say more about how you are using these map materials to show what is in the image?" (Lesson 4, Teacher Guide).
- Lesson 5, Synthesize, Step 3: "Invite students to gather the map-making materials they will need to create their map, reminding students to use the materials safely. As students create their individual map on their paper plate, displaying the kinds, shapes, and locations of land and water in the area of the National Park they are researching, circulate between groups to pose prompts suggested below to support students in describing the parts they plan to include in their map, the relative shape and location of the parts and in making connections between the materials/colors used in their maps and what the materials/colors represent in the area of the National Park they are researching. This is a great opportunity to engage students in multimodal language use with materials to express their sensemaking." (Lesson 5, Teacher Guide).
- Lesson 9, Synthesize, Step 2: "Display slide C and have students turn and talk about what might be important to include in our presentations if we want to be able to use these presentations to compare the kinds of plants and animals that live in each. Have Our Growing Ideas chart available for students to reference throughout this discussion, drawing students' attention to patterns in what is in the National Parks (plants and animals) and where they are usually found (shapes and kinds of land and water)." (Lesson 9, Teacher Guide).
- Lesson 10, Synthesize, Step 2: "Discuss classroom specific norms for presenting. Display slide C and celebrate that students are almost ready to record and present their National Park video presentations. Have students think, pair, share with a partner about what they need to have with them when they record and what they can do to be effective communicators while presenting. Make sure to add these class generated ideas to the bottom of the Gotta-Have-It Checklist for students to refer to in order to support them in communicating information with their peers." (Lesson 10, Teacher Guide).

Criterion-Based Suggestions for Improvement:

- Ensure "all the Lesson themes and content are sequenced coherently and explicitly from the student's perspective." [Detailed Guidance, p. 15]
- Ensure student questions are explicitly used to create a "need to know." For example, in Lesson 7, the sequence may be more coherent from the student perspective if students first explore water, land, and organisms in their local environment before examining water, land, and organisms in the National Parks.

I.E. Multiple Science Domains

EXTENSIVE

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

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

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

The reviewers found **extensive** evidence that links are made across the science domains when appropriate because this unit currently integrates the Life, Physical, and Earth and Space Science domains. The phenomenon—different plants and animals live in different locations—requires multiple domains to be clearly included so students can explain it. DCIs from Earth and Space Science, Physical Science, and Life Science are used to explain the phenomenon "different plants and animals live in different locations."

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

- Lesson 2, Connect, Step 2: "Explain how to share stories and experiences. Display slide C and explain to students that they will share their experiences and stories of a place where plants and animals live with a partner." "Each person should 1) share about one place, 2) where in that place they noticed plants and/or animals." "Use the following discussion prompts to provide students space to share their local connections to where plants and animals live with the class." Prompts include: "Where were the animals in your community? "Where were the plants in your community?" "How are the places plants or animals live similar?" "How were they different?" (Lesson 2, Teacher Guide) Here, students are using the **DCIs LS4.D-P1: There are many different kinds of living things in any area, and they exist in different places on land and in water,** and the **DCI, ESS2.C-P1: Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form** when they describe specific areas and the plants and animals that live in that area. While students are prompted to share experiences and stories of a place where plants and animals live, students could appropriately respond without considering water. Students are able to respond without using the different domains together.
- Lesson 3, Explore, Step 3: "This student to student discussion allows an opportunity for students to observe patterns in the relationships between the water and land to help notice some common features to define the bodies of water."
  - "Suggest to students that you begin finding patterns in one type of body of water, ponds, and that you will look for patterns across all bodies of water."
  - "Suggest to students that you now discuss a different body of water, lakes. Use the following prompts for students to share their observations about lakes." Prompts include: "How can we show these lakes on our chart?" "What is similar about all the lakes? What pattern are we starting to observe?" "How are lakes and ponds similar or different?"
  - "Suggest to students that you now discuss a different body of water, oceans. Use the following prompts for students to share their observations about oceans." Prompts include: "How can we show oceans on our chart?" "What is similar about all the oceans we researched? What pattern are we starting to observe?" "How are oceans the same/different to lakes and ponds?"

  - "Suggest to students that you now discuss a different body of water, rivers. Use the following prompts for students to share their observations about rivers." Prompts include: "How can we show those ideas about rivers on our chart?" "What is similar about the rivers we researched? What patterns are we starting to observe?"
  - "Students may or may not have mentioned streams and creeks when talking about rivers. If they didn't, now is a great time to ask if anyone has seen or thought of smaller types of flowing water. Listen for the idea that streams and creeks are smaller versions of rivers. They both flow in one direction, just like rivers do, but they are usually narrower and may move more slowly." (Lesson 3, Teacher Guide) Here, students are using the **DCI, ESS2.C-P1: Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form** as they build their understanding of the anchoring phenomenon of patterns of plants and animals living in a variety of areas (**LS4.D-P1: There are many different kinds of living things in any area, and they exist in different places on land and in water**)

- Lesson 5, Synthesize, Step 5: "Engage the students in a brief turn and talk discussion around the following prompt to generate a need to compare maps of the different *habitats*." Prompt: "How can we find out what the land and water is like in other National Parks and if they are similar or different?" "If not suggested by the students, present the idea of taking a quick Gallery Tour to see the maps their peers created to see if the shapes and kinds of land and water are similar or different." (Lesson 5, Teacher Guide) Here students are using the **ESS2.B-P1: Maps show where things are located. One can map the shapes and kinds of land and water in any area** as they build their understanding of the anchoring phenomenon of patterns of plants and animals living in a variety of areas (**LS4.D-P1: There are many different kinds of living things in any area, and they exist in different places on land and in water**) While "habitats" are mentioned in generating the need to discuss maps, students are not prompted to connect their need to look at various maps to building an understanding of habitats and patterns of animals and plants living in a different locations.

- Lesson 7, Synthesize, Step 7: "Remind students that we did a lot of figuring out about shapes and kinds of water in the parks we have been investigating. Have students turn and talk about the following prompts to consider how plants and animals in these land and water places may compare to motivate further investigation of biodiversity across different kinds of places within each National Park. Use the following prompts." Prompts include:"Do you think we would find similar or different plants and animals in the different parts of the National Parks, like the land or water? Why do you think so?" "How would investigating what kinds of plants live in land and water parts of the National Parks help us answer our question, What kinds of plants and animals live in different places?" (Lesson 7, Teacher Guide) Here, students are using the **DCI, ESS2.C-P1: Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form,** and **LS4.D-P1: There are many different kinds of living things in any area, and they exist in different places on land and in water,** as they describe different water in National Parks and the kinds of animals and plants living there.

- Lesson 8, Synthesize, Step 5: States the following will happen in Lesson 8: "When done sorting the plant and animal cards, pause and engage the whole class in a brief discussion. The purpose of this discussion is to highlight that plants and animals live not just on land or water but within different shapes and kinds of land and water." (Lesson 8, Teacher Guide) Later in the same step, Lesson 8, Synthesize, Step 5, teacher prompt: "How can we use what we figured out about the kinds of plants and animals that live in the National Parks to help us answer our question, what kinds of plants and animals live in different places?" Ideas to look and listen for: "The different land and water are a lot of different places and now we figured out some of the plants and animals there. We have observations about the kinds of plants and animals in different places on land and in water." This describes an opportunity for students to use the **DCI, ESS2.C-P1: Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form** and **LS4.D-P1: There are many different kinds of living things in any area, and they exist in different places on land and in water.**

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

The usefulness of crosscutting concepts in making sense of phenomena across science domains is referenced but not consistently highlighted for students.

- Lesson 2, Explore, Step 5: "Notice aloud how over and over again, we noticed similarities in either shapes or kinds of land across the different National Parks. When something happens over and over again, scientists call it a pattern. We observed patterns that land can take similar shapes (some land is flat, some is not flat) and land with similar features can be described as the same kind (e.g., all the forests have a lot of trees, all the beaches are sandy or rocky and along water)." (Lesson 2, Teacher Guide) This is an example of the CCC of patterns being pointed out to students, though patterns are not explicitly used to connect the Earth and Life science domains.
- Lesson 3, Explore, Step 2: "Share our observations of ponds. Suggest to students that you begin finding patterns in one type of body of water, ponds, and that you will look for patterns across all bodies of water. Use the following prompts for a brief student to student discussion about ponds. As students share evidence from their research about the bodies of water add drawings to capture their thinking and provide visuals of these bodies of water for the class to reference. What did we notice about the ponds? How can we show these ponds on our chart? What is similar about all the ponds? What pattern are we starting to observe?" (Lesson 3, Teacher Guide)
- Lesson 5, Synthesize, Step 5: "Engage the students in a brief turn and talk discussion around the following prompt to generate a need to compare maps of the different habitats." Prompt: "How can we find out what the land and water is like in other National Parks and if they are similar or different?" (Lesson 5, Teacher Guide) While students are not explicitly prompted to link the similarities and differences between the LS and ESS domains, they do utilize ideas from both domains when searching for similarities and differences in the maps.
- Lesson 7, Explore, Step 4: "Remind students to discuss together what they are noticing about the plant and why they are sorting it into a group. After students sort their cards into groups, support them in noticing and discussing the similarities and differences within and across each group. Circulate between groups and use the following discussion prompts to support them in their work." Prompts include: "Can you show or tell me why you placed _____ (card) in (group)? What did you observe on the card?" (Lesson 7, Teacher Guide)
- Lesson 9, Synthesize, Step 2: "Co-develop a Gotta-Have-It Checklist. Display slide C and have students turn and talk about what might be important to include in our presentations if we want to be able to use these presentations to compare the kinds of plants and animals that live in each. Have Our Growing Ideas chart available for students to reference throughout this discussion, drawing students' attention to patterns in what is in the National Parks (plants and animals) and where they are usually found (shapes and kinds of land and water)."
(Lesson 9, Teacher Guide) The teacher is prompted to draw students attention to patterns that connect the **DCI, ESS2.C-P1: Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form.** and **LS4.D-P1: There are many different kinds of living things in any area, and they exist in different places on land and in water.**

Criterion-Based Suggestions for Improvement:

- Ensure "[i]f the unit focuses on more than one science domain, it clearly conveys to students how ideas from different domains together are required to explain the phenomenon or design solutions to the problem." (Detailed Guidance, p. 17)
  - Consider how teachers can be supported to clearly convey to students how ideas from the different domains work together to explain where different plants and animals live on land and in water in Lessons 2 and 5.
- Ensure "[g]rade appropriate elements of CCCs are explicitly used to make connections across science domains." (Detailed Guidance, p. 17)
  - Consider how to make the CCC connections across the LS and ESS domains explicit to students.

I.F. Math and ELA

EXTENSIVE

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

The reviewers found **extensive** evidence that the materials provide grade-appropriate connections to the Common Core State Standards in Mathematics and/or English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects because the materials explicitly state the mathematics and ELA standards that are used in the unit and support students to see the connections between content areas. Student learning is connected to the use and learning of mathematics and ELA, and students are encouraged to see where these disciplines are useful within their sensemaking. Students' reading, writing, speaking, and listening skills are developed as an integral part of sensemaking. Student reading material is presented in a variety of formats. The document titled SEP-DCI-CCC-ELA-MATH-Matrix includes a table that lists all the ELA and Math standards explicitly used and named in the lesson, providing specific support for teachers. There are also standards listed in the Matrix document that are claimed to be embedded in the unit's work so frequently that the standard is not explicitly called out in the lessons.

ELA

Writing

CCSS-ELA-LITERACY.W.2.2 Write informative/explanatory texts in which they introduce a topic, use facts and definitions to develop points, and provide a concluding statement or section. Claimed to be explicitly used in Lesson 9. Examples include:

- Lesson 9, Synthesize, Step 3: "Co-construct an opening and closing sentence. Explain to students that when we are communicating what we figured out about something to others, it helps to include an opening and closing sentence to tie the ideas together. An opening sentence helps the listener or reader know the topic you will explain. A closing sentence retells the main idea and lets the listener or reader know that you are finished explaining your ideas. Remind students that, just like in ELA, we can use opening and closing sentences when we speak or write to communicate what we have figured out in science. Invite students to engage in shared writing to co-construct

an opening and closing sentence that students can use as a starting template for their own writing. The opening and closing sentence should summarize what students have observed about biodiversity in the National Park they researched." (Lesson 9, Teacher Guide)

CCSS-ELA-LITERACY.W.2.5 With guidance and support from adults and peers, focus on a topic and strengthen writing as needed by revising and editing. Claimed to be explicitly used in Lesson 5. Examples include:

- Lesson 5, Synthesize, Step 3: "Students will then use their research and map to write about the land and water in the National Park on the lines at the bottom of the National Park Map." "As students create their individual map on their paper plate, displaying the kinds, shapes, and locations of land and water in the area of the National Park they are researching, circulate between groups to pose prompts suggested below to support students in describing the parts they plan to include in their map, the relative shape and location of the parts and in making connections between the materials/colors used in their maps and what the materials/colors represent in the area of the National Park they are researching." (Lesson 5, Teacher Guide)

CCSS-ELA-LITERACY.W.2.6 With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. Claimed to be explicitly used in Lesson 10. Examples include:

- Lesson 10, Connect, Step 3: "Share with our community: Welcome any invited guests and introduce the work students have done in this unit. Take a few minutes to make sure students are ready with the technology they will use to play videos, welcome invited guests and provide a brief overview of students' science work in this unit leading up to today's National Park videos (refer to slide E)." ". Organize students into small groups and invite guests to join each group so that there is at least one guest per group. Have each student share their video or if not using video, present their script and selected artifacts with the group. Each student will have 3-5 minutes to present." (Lesson 10, Teacher Guide)

CCSS-ELA-LITERACY.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). Claimed to be explicitly used in Lessons 2, 3, and 8. Examples include:

- Lesson 2, Explore, Step 3: "By engaging in this research, students will gather information to answer their Lesson Question about how land in different places can be similar or different. Students navigate to different information sources on the website (text, images, and video) and use different website text features to find information to answer their questions." "Share that, to help us figure out more about the land in each research location, we are going to go to a new Explore Extraordinary National Parks website that has information, including text and videos, about different places." (Lesson 2, Teacher Guide)
- Lesson 3, Connect, Step 5: "Read the title of the infographic, the text in the first box, and the text in the solid and liquid water boxes. Facilitate a discussion of this infographic using questions similar to the following." Prompts include: "When is water ice or solid? What do you notice in the images on the infographic?" (Lesson 3, Teacher Guide)
- Lesson 5, Synthesize, Step 2, "Plan to revisit past Lesson resources. Display slide G and share with the class that students will work with their research partner to review the kinds, shapes, and locations of land and water in their researched National Park to think about how they plan to develop a map including the components the class added to the Gotta-Have-It checklist....Read, think, pair, and share about a plan for developing models. Give time for students to review and discuss what they figured out about land and water in their researched National Park and about mapping using their previously completed handouts. Display slide H and have students use the sentence starters to share how they will include all the parts of the Gotta-have-it checklist in their map. Encourage students to use the sentence prompts to support this pair share. As students read together, circulate to groups to listen for student ideas and help pairs think more deeply about the land." (Lesson 5, Teacher Guide)

- Lesson 8, Connect, Step 4: "Come together as a class to read the Plants and Animals on Land and in Water book aloud and use the prompts below to support students in noticing the pattern that places on land and in water have a variety of different kinds of plants and animals that live there." (Lesson 8, Teacher Guide)
- Lesson 9, Synthesize, Step 3, "Co-construct an opening and closing sentence. Explain to students that when we are communicating what we figured out about something to others, it helps to include an opening and closing sentence to tie the ideas together. An opening sentence helps the listener or reader know the topic you will explain. A closing sentence retells the main idea and lets the listener or reader know that you are finished explaining your ideas. Remind students that, just like in ELA, we can use opening and closing sentences when we speak or write to communicate what we have figured out in science. Invite students to engage in shared writing to co-construct an opening and closing sentence that students can use as a starting template for their own writing. The opening and closing sentence should summarize what students have observed about biodiversity in the National Park they researched. Some examples could include: Opening: There are many _____ (similar/different) kinds of plants and animals in _____ (National Park). Opening: If you visited _____ (National Park) you could find _____ (similar or different) kinds of plants and animals in different places. Closing: These are the kinds of plants and animals you would find at _____ (National Park)." (Lesson 9, Teacher Guide)

Reading: Informational Text

CCSS.ELA-LITERACY.RI.2.2: Identify the main topic of a multi-paragraph text as well as the focus of specific paragraphs within the text. Claimed to be explicitly used in Lesson 2. Examples include:

- Lesson 2, Explore, Step 3: "Although the website includes additional details about land in each National Park, such as the names of specific landforms, students primarily need to identify the kinds and shapes of land in the National Park they research. Encourage students to focus their recordings on summarizing main ideas and their observations, rather than copying details word for word. (Lesson 2, Teacher Guide)

CCSS-ELA-LITERACY.RI.2.5 Know and use various text features (e.g., captions, bold print, subheadings, glossaries, indexes, electronic menus, icons) to locate key facts or information in a text efficiently. Claimed to be explicitly used in Lessons 2, 3, and 8. Examples include:

- Lesson 2, Explore, Step 3: "Websites are one type of text where scientists share scientific information. By engaging in this research, students will gather information to answer their Lesson Question about how land in different places can be similar or different. Students navigate to different information sources on the website (text, images, and video) and use different website text features to find information to answer their questions." (Lesson 2, Teacher Guide)
- Lesson 3, Connect, Step 5: "Read the infographic and discuss the following prompts. Read the title of the infographic, the text in the first box, and the text in the solid and liquid water boxes." (Lesson 3, Teacher Guide)
- Lesson 8, Connect, Step 2: Literacy Supports, "Support students in using the website to participate in shared research and obtain more information about plants and animals in a specific location. Model how to navigate between the menu and individual pages and use headings to quickly locate information about plants and animals to support their sensemaking." (Lesson 8, Teacher Guide)

CCSS-ELA-LITERACY.RI.2.7 Explain how specific images (e.g., a diagram showing how a machine works) contribute to and clarify a text. Claimed to be explicitly used in Lessons 3 and 4. Examples include:

- Lesson 3, Explore, Step 5, "Students can use specific images in the text to support their understanding of how water can be solid or liquid. Help students understand that "infographics" are a kind of informational text that provide

readers with information using images and writing. They are intended to provide information quickly and in easy to understand ways. The word "infographic" comes from combining the words "information" and "graphics." Readers can learn from infographics by paying close attention to the images and text and how these images and text provide different information and key details for the reader (RI.2.7)." (Lesson 3, Teacher Guide)

- Lesson 4, Connect, Step 3: Developing and Using Models, "Maps are models used to represent the shape and types of land and water in an area. At this age, students develop spatial reasoning skills around the relative sizes (big, small) and distances (near, far) of objects in an area and can represent those ideas in maps. Importantly, as students figure out how to develop a map, they are figuring out how to use increasingly abstract symbology to represent the object, such as a color representing land or water." (Lesson 4, Teacher Guide)

CCSS-ELA-LITERACY.RI.2.9 Compare and contrast the most important points presented by two texts on the same topic. Claimed to be explicitly used in Lesson 8. Examples include:

- Lesson 8, Connect, Step 2: "Re-introduce the website and plant and animal card sets. Display slide D and tell students that we have the National Park image cards of plants and animals and the website available to help us answer our question, but still need to make decisions about how to organize any information we find." Literacy Supports, "As students make comparisons between plants and animals in their park sites, they are gaining practice comparing and contrasting important points presented by two texts on the same topic. This supports RI.2.9 and offers students the opportunity to integrate key details across two science texts to support their sensemaking." (Lesson 8, Teacher Guide)

Speaking and Listening

CCSS-ELA-LITERACY.SL.2.1A Follow agreed-upon rules for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion). Claimed to be explicitly used in Lesson 9. Evidence was also found in Lesson 10. Examples include:

- Lesson 9, Synthesize, Step 3: "Set expectations for peer feedback." Prompts include: "What are some examples of ways to share feedback that show kindness and respect to our partner?" "What can we share with our partner so they feel good about their presentation and all their hard work?" "Give and receive peer feedback. Display slide E to show the sentence starters that the students can use while giving peer feedback." (Lesson 9, Teacher Guide)

- Lesson 10, Synthesize, Step 2: "Discuss classroom specific norms for presenting. Display slide C and celebrate that students are almost ready to record and present their National Park video presentations. Have students think, pair, share with a partner about what they need to have with them when they record and what they can do to be effective communicators while presenting. Make sure to add these class generated ideas to the bottom of the Gotta-Have-It Checklist for students to refer to in order to support them in communicating information with their peers." (Lesson 10, Teacher Guide)

CCSS-ELA-LITERACY.SL.2.4 Tell a story or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences. Claimed as being explicitly used in Lessons 1, 9, and. Examples include:

- Lesson 1, Synthesize, Step 5: "Display the Notice and Wonder chart (see slide Q). Use the prompts below to facilitate a whole group Initial Ideas Discussion about encountering plants and animals in different places. Share that the ideas the class shares are ideas the class is starting with and it is OK to share even if we are unsure. As students share with the whole group, record their observations in the "Notice" column and student questions under the "Wonder" column."Literacy Supports: "Use this opportunity to make explicit to students how skills utilized in ELA are used in science. Point out to students that they are going to be recounting an experience with appropriate facts and relevant, descriptive details and speaking audibly in coherent sentences, which addresses SL.2.4. Consider bringing in relevant sentence stems used in your ELA block for this section of the Synthesize component." (Lesson 1, Teacher Guide)

- Lesson 9, Synthesize, Step 2: "Gather students in a scientist circle and reiterate that we will be making videos to communicate our research about the plants and animals that can be found in the different National Parks to share with our classmates and help us answer the unit question. Remind students that to communicate means *to share thoughts, feelings, information, or ideas with others*. Suggest developing a Gotta-Have-It Checklist to help us decide what information we want to share about each National Park." (Lesson 9, Teacher Guide)

CCSS-ELA-LITERACY.SL.2.5 Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. Claimed as being explicitly used in Lesson 9. Examples include:

- Lesson 9, Synthesize, Step 2: "Display slide C and have students turn and talk about what might be important to include in our presentations if we want to be able to use these presentations to compare the kinds of plants and animals that live in each." Prompts include: "What things that we made (artifacts) do we want to include in our video? What will help us show and tell about the plants and animals and where they live in the National Parks?" "Once students have come to an agreement about the important information needed to share about the National Park they researched, explain that they will now be able to start using those ideas to compile their video script using the writing and drawings they did in prior lessons. Explain that a script is a written plan for what they will say in their video." (Lesson 9, Teacher Guide)

Language

CCSS-ELA-LITERACY.L.2.1B Form and use frequently occurring irregular plural nouns (e.g., feet, children, teeth, mice, fish). Claimed to be explicitly used in Lesson 1. Examples include:

- Lesson 1, Explore, Step 4: Literacy Supports, "As students discuss animals in this Lesson and throughout the unit, you can support their language skills by calling their attention to common animal names that are also irregular plural nouns (examples include the plural form of fish, sheep, moose, geese, mice, deer). This provides students practice with L.2.1B and helps them appropriately integrate irregular nouns into their oral and written language." (Lesson 1, Teacher Guide)

CCSS-ELA-LITERACY.L.2.1E Use adjectives and adverbs, and choose between them depending on what is to be modified. Claimed to be explicitly used in Lessons 6 and 7. Examples include:

- Lesson 6, Explore, Step 3: Literacy Supports, "As students share their observations with their partner and additional partner pairings, encourage them to notice the variety of adjectives and adjectives they use to describe what they see and how the animal moves (adjectives: color, texture, adverbs: speed, direction). Students can also draw using shading, arrows, or other symbols to clarify what the animals look like and how they move. This work supports L.2.1E as students use adjectives and adverbs in their observations and recordings." (Lesson 6, Teacher Guide)
- Lesson 7, Synthesize, Step 6: "Discuss plant observation data in small groups. Display slide K. Using their completed Plant and Animal Observations handout, have students who have researched the same park, discuss how they sorted their cards and what similarities and differences they noticed and recorded about the plants. Encourage students to use the investigation materials, their hands, words in any language to demonstrate their sensemaking." Literacy Supports, "As students participate in the building understandings discussion, support their use of a variety of adjectives and adverbs to describe the plants and animals living in their park. This supports L.2.1E and encourages students to share relevant details and make comparisons across parks." (Lesson 7, Teacher Guide)

CCSS-ELA-LITERACY.L.2.5 Demonstrate understanding of word relationships and nuances in word meanings. Claimed to be explicitly used in Lesson 4. Examples include:

- Lesson 4, Connect, Step 3: Literacy Supports, "Support students in understanding the relationship between the definition of and use of a map key. When the concept of a map key is introduced, encourage students to make connections with other uses of the word "key" that may be familiar. For example, physical keys are used to unlock doors. Connect for students that map keys can unlock meaning about where things are located on a map." (Lesson 4, Teacher Guide)

Mathematics

Standards for Mathematical Practice

CCSS-MATH-Practice.MP2 Reason abstractly and quantitatively. Claimed in Lessons 1 and 6. Evidence was found in

- Lesson 1, Explore, Step 3: "During the discussion, prompt students to share how many different living things they observed when they were outside. Sentence frames such as "I saw more _____ than _____" and "I saw a lot of _____ and only a few _____" support students in comparing the amounts of living things they observed. They may use comparison language (more/less) or name the exact quantity to describe what they saw, such as 'I saw 12 red flowers.'" (Lesson 1, Teacher Guide)
- Lesson 6, Explore, Step 4: "The goal of this discussion is to compare the kinds of plants and animals observed on the schoolyard. Tell students that they can use their counting skills from math to help answer some questions from their observation. The key takeaways will depend on factors such as location, time of day, and seasonality. Possible student observations might include: We found many examples of _____ legged animals, but only a few _____ animals. There were a lot of plants that were short ground, but some had flowers and some did not. Most of the plants on our schoolyard were similar, they all were _____ (name of group). There are different kinds of plants and animals on our schoolyard." (Lesson 6, Teacher Guide)

CCSS-MATH-Practice.MP6 Attend to precision. Claimed in Lesson 4. Evidence was found in

- Lesson 4, Explore, Step 4: "As students develop paper cut out and clay models of the map, prompt students to consider and compare the amount of relative space needed for land and water to help with precision. Consider questions such as 'Is there more land or water?' or 'Which is bigger, the lake or the pond?'"(MP6)

Number and Operations in Base Ten

CCSS-MATH-2.NBT.A.2 Count within 1000; skip-count by 5s, 10s, and 100s. Claimed in Lessons 1, 6. Evidence was found in

- Lesson 1, Explore, Step 3: "Give students roughly 2 minutes to share their ideas. Tell students that they are going to use their counting skills from math to help answer some questions from their observation. Use the following questions to facilitate this brief discussion." Prompts include: "How many plants and animals did you observe?" (Lesson 1, Teacher Guide).
- Lesson 6, Explore, Step 4: "Invite each pair to come to the chart and add one tally in the second column if their group found a plant for each of the given categories (short ground, medium sized, high reaching). The tallies represent the number of student groups that made that observation, not the number of plants or animals in that category." (Lesson 6, Teacher Guide).

Geometry

CCSS-MATH-2.G.A.1 Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces.* Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. (*Sizes are compared directly or visually, not compared by measuring.) Claimed in Lessons 2, 5. Evidence was found in

- Lesson 2, Explore, Step 4: "Display slide G and share that pairs should first navigate to their assigned park on the website and read the text and view the texts and images together. Next, each student should complete their handout. Propose that students can use ideas from their math studies on shape attributes and their knowledge of polygons to help them describe and draw the shapes of land they observe and read about on the website. Give them the Shapes Tool handout at this time as support." (Lesson 2, Teacher Guide).
- Lesson 5, Synthesize, Step 3: "Invite students to gather the map-making materials they will need to create their map, reminding students to use the materials safely. As students create their individual map on their paper plate, displaying the kinds, shapes, and locations of land and water in the area of the National Park they are researching, circulate between groups to pose prompts suggested below to support students in describing the parts they plan to include in their map, the relative shape and location of the parts and in making connections between the materials/colors used in their maps and what the materials/colors represent in the area of the National Park they are researching." (Lesson 5, Teacher Guide).

Criterion-Based Suggestions for Improvement: N/A

CATEGORY II

NGSS Instructional Supports

II.A. Relevance and Authenticity

EXTENSIVE

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

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

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

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

The reviewers found **extensive** evidence that the materials engage students in authentic and meaningful scenarios that reflect the practice of science and engineering as experienced in the real world because the phenomena of different plants and animals living in different areas is connected to students' lives. Students are provided with opportunities to bring their diverse prior experiences from their own lives to their understanding of the phenomenon, and they are given opportunities to experience phenomena as directly as possible.

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

- Lesson 1, Explore, Step 2: Student-facing slide "Plan to explore" What different parts of our school yard can we observe?" The slide includes a message to teachers: "Teacher, add an image of your schoolyard or chosen outdoor space for students to reference during this discussion." (Lesson 1, Teacher Guide)
- Lesson 1, Explore, Step 3: "Go outside to make observations. Display slide F and use it as needed to clarify procedures for going outside. Distribute the clipboards, writing utensils, and any other materials needed for going outside. Bring students outside and have them work with their partners to make observations of plants and animals. Consider taking photographs of plants and animals, including the surrounding area--like the patch of grass, body of water, or other area like a nest-- where the plant or animal was found, that can be added to future slides, as well as photographs of students observing for the Notice and Wonder chart that will be started in the Synthesize." (Lesson 1, Teacher Guide)
- Lesson 3, Explore, Step 4: "Remind students that we wanted to figure out similarities and differences between ice and water, after seeing examples in the National Park and sharing our own experiences! Hold up a cup of ice and a cup of water and invite students to turn and talk with a partner about how we can use our senses to make observations that will help us compare these. Then, have students share their suggestions, which will likely include looking, touching and possibly smelling and tasting." "Have students sit in small groups and give each group one cup of ice and one cup of water to observe. Give students about 2-3 minutes to make their observations." (Lesson 3, Teacher Guide)
- Lesson 4. Navigate, Step 1: "Before naming the map as a 'map', allow students to contribute their expertise and previous experiences with maps as they co-construct meaning together while noticing and wondering the features of the map. As students explore the map, this will allow them to build upon each other's prior knowledge while collaboratively engaging in a shared sensemaking experience" (Lesson 4, Teacher Guide)
- Lesson 6, Preparation Checklist: "Take or gather images or videos of plants and animals that can be found in your local area. This can be done when going outside for recess over a couple of days or by visiting an outdoor space that plants and animals can more readily be observed than around the school." (Lesson 6, Teacher Guide)

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

- Lesson 1, Preparation Checklist: "Update slide A and slide B with an image of the plant or animal your class encountered that you use for the opening Connect. Update slide C with an image of your local schoolyard or chosen outside space the class will use to make observations in the Explore." (Lesson 1, Teacher Guide)
- Lesson 1, Connect, Step 1: "Students may start naming pets, farm animals, or other domesticated animals or plants not in their native area, but exist as part of students' everyday experiences in their communities. Accept these ideas, and encourage them to think of (wild) animals and plants growing and living in nature as well during this brief discussion." (Lesson 1, Teacher Guide)
- Lesson 1, Explore, Step 2: "Use the prompts below to facilitate a discussion about the importance of how to go outside respectfully. As part of this discussion, explain that during our observations, we should remember to be kind to the environment and the things that live there. As students share ideas, look and listen for ideas that students share verbally, as well as through gestures and facial expressions." Prompts to use include, "How do you, your family, and your community show respect for plants and animals?", "What are some ways we can protect plants and animals in this community we are all a part of?". (Lesson 1, Teacher Guide).
- Lesson 1, Explore, Step 4: "To increase relevance, allow time for students to share their related experiences to the phenomenon. These could be their own experiences noticing plants and animals in places they or family members have traveled to or experiences with these ideas through television, magazines, books, or other media. Community Connections: If you have used maps with students in the past, consider showing a map of the United States to point out both your location and the locations of each of the National Parks so students can visualize where these places are in relation to you and each other." (Lesson 1, Teacher Guide).
- Lesson 1, Navigate, Step 6: "Welcome Letter Community Connection. Display slide T. Go over the Welcome Letter with students and explain how they can use it to document stories and/or observations in their communities. Tell students that you are excited to hear their community stories about the places plants and animals live, and that we will plan to share in our next science time together." (Lesson 1, Teacher Guide)
- Lesson 2, Navigate, Step 1: "Motivate the connections to students' lived experiences. Build on student ideas about looking at different places in the community to motivate the need to share about the places visited by students. Remind students of the Welcome Letter community connection they completed in Lesson 1 to help us figure out about the places where we can find plants and animals in our local area." (Lesson 2, Teacher Guide)
- Lesson 2, Connect, Step 2: "Turn and talk to share stories and experiences. After providing a moment for students to think privately, have them turn and talk about the place with a partner. Share our stories and experiences as a class. Use the following discussion prompts to provide students space to share their local connections to where plants and animals live with the class." Prompts include: "Where were the animals in your community?" "Where were the plants in your community?" (Lesson 2, Teacher Guide)
- Lesson 3, Explore, Step 3: "Make connections to experiences with ice and water. Display slide G Use prompts like the following for students to turn and talk about their experiences with ice and/or water. When have you seen or touched water? What was it like? When have you seen or touched ice? What was it like?" (Lesson 3, Teacher Guide).
- Lesson 4, Explore, Step 2: "To help students make connections between the diverse ways that science appears in their home or community, it is important to allow students time to share their ideas and stories of when they or someone they know used a map. This allows them to connect their lives with their science classroom learning and to see how their experiences can contribute to the sensemaking of the classroom community." (Lesson 4, Teacher Guide)

- Lesson 5, Synthesize, Step 2: "Many cultures found across the United States (which may or may not be represented by students in your class) have unique connections to the different National Parks or different areas with similar land or water features the class will research. Consider leveraging these connections to help deepen and broaden students' understanding of the parks, including honoring the students' home languages for the kinds, shapes, and locations of land and water studied." (Lesson 5, Teacher Guide)
- Lesson 7, Explore, Step 4: "Many cultures found across the United States (which may or may not be represented by students in your class) have unique connections to, and stories with, some of the different plants and animals found in National Parks. Consider leveraging these cultural connections and experiences to help deepen and broaden students' understanding of these plants and animals, including honoring the students' home languages for the plants and animals studied and any cultural relationships they might hold with them." (Lesson 7, Teacher Guide)
- Lesson 8, Navigate, Step 6: "Invite students to make outside-of-school connections. To increase relevance and continue to connect this unit's ideas to students' communities, share the Plants and Animals with students to complete outside of school with a trusted adult (refer to slide L). Show students how they can use this community connection to record different kinds of plants and animals and where they live (land or water) in their communities. Invite students to bring these back in Lesson 10 to share with the class." (Lesson 8, Teacher Guide)
- Lesson 9, National Park Presentations: Audience and final product, "You and students may decide that others in the school and the community should be part of your target audience. For example, families/community members might be interested because there are two different at home community connections in this unit. Sharing the videos with family/community members could be a great way to compare what is similar and different between where we live and other places." (2.3 Lesson 9 Teacher Reference National Park Presentations)
- Lesson 9, Synthesize, Step 3: "Community Connections: Before students start to provide and receive feedback, you might find it helpful to remind them of their classroom agreement: "we look, listen, and respond to each others' ideas." You could even ask students why they think it is important for them to engage with this agreement, and what it might look like for them to do so. This conversation might encourage students to engage more with peers' ideas, and in doing so could prompt additional students to share their thinking around giving or receiving feedback about their National Park Presentation Script." (Lesson 9, Teacher Guide).
- Lesson 10, Connect, Step 3: "Teaching Tip At the conclusion of the unit, share videos students made with caregivers and family members. Sharing the National Park videos with others outside the classroom can help more people learn about the diversity of life within the National Parks, build connections across the school and community, communicate how students are scientists, and provide opportunities to extend what students figured out in this unit." (Lesson 10, Teacher Guide)

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

- Lesson 2, Synthesize, Step 6: "Ask the following prompts to students to help them make connections between their investigations and their questions about how places are similar and different." Prompts to use include, "How can we use what we figured out about the land where plants and animals live to help us answer our question, How are places plants and animals live similar and different?"
- Lesson 3, Explore, Step 4: "Responding to broad curiosities: Students are not expected to build an understanding of freezing point and melting point in second grade. However, teachers can anticipate that students will bring different funds of knowledge and that some students may have an understanding of freezing and melting from previous experiences. When appropriate, make use of these ideas to enrich discussions and honor the experiences students

bring to the science classroom and consider adding these ideas as wonders on the Notice and Wonder chart." (Lesson 3, Teacher Guide)

- Lesson 5, Synthesize, Step 5: "Ask the following prompts to students to help them make connections between what they have figured out in this first Lesson set and answering the unit question. After students share out, have them remain in the Scientists Circle to briefly navigate to the next lesson." Prompts to use include, "How can we use what we figured out about how places plants and animals live are similar and different to answer our unit question, What lives where?" (Lesson 5, Teacher Guide)
- Lesson 6, Synthesize, Step 5: "Ask the following prompts to students to help them make connections between their investigations and how that helps to figure out how plants and animals in different places are similar and different." Prompts to use, "How does what we did today help us answer our Lesson set question, What kinds of plants and animals live in different places?", Ideas to look and listen for, "We have data about the plants and animals that live near us.; We can tell about the kinds of plants and animals in one place, our schoolyard." (Lesson 6, Teacher Guide).
- Lesson 7, Explore, Step 4: "Community Connections: Many cultures found across the United States (which may or may not be represented by students in your class) have unique connections to, and stories with, some of the different plants and animals found in National Parks. Consider leveraging these cultural connections and experiences to help deepen and broaden students' understanding of these plants and animals, including honoring the students' home languages for the plants and animals studied and any cultural relationships they might hold with them." (Lesson 7, Teacher Guide).

Criterion-Based Suggestions for Improvement: N/A

II.B. Student Ideas

EXTENSIVE

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

The reviewers found **extensive** evidence that the materials provide students with opportunities to share ideas and feedback with one another directly and to use others' ideas to improve or change their own thinking. Students are supported to make productive contributions to classroom discourse in a variety of ways. Students are positioned as the central focus of classroom discussions through teacher facilitation directions, and discourse focuses on explicitly expressing and clarifying student reasoning. Students have frequent opportunities to share ideas and feedback directly with one another and to use others' ideas to refine or change their own thinking. The teacher is provided with support to act as an expert facilitator, drawing out student ideas and perspectives. Artifacts show evidence of students' reasoning and changes in thinking over time.

Student ideas are clarified, justified, and built upon

- Lesson 1, Explore, Step 3: "Think, pair, share about local outdoor observations. Ask students to gather in a shared meeting space with their Observing Different Places handout. Suggest we share our observations using a "Think, Pair, Share." If students are unfamiliar with "Think, Pair, Share," explain that they will have the chance to: (1) think quietly about how they would answer the question, (2) discuss their ideas with a partner, and (3) share something their partner said with the class." (Lesson 1, Teacher Guide)

- Lesson 3, Explore. Step 5: "Think, pair, share about maps. Use the prompts below (also on slide J) to facilitate a think, pair, share discussion about how the maps represented the location, shapes, and kinds of land and water at Heart Lake. What did you notice about how the _____ map showed land and water? (repeat for each type of map.) Feel free to use evidence from your Map Observations to support your ideas. How is the way these maps show land and water similar? How are they different? Feel free to use evidence from your Map Observations to support your ideas." (Lesson 4, Teacher Guide)
- Lesson 5, Synthesize, Step 2: "Turn and talk about materials. Have students briefly turn and talk about how they could use the materials to develop their maps. Have 1-2 pairs share their ideas aloud with the class to support students in thinking about how they will represent the land and water features in their individual maps. Look and listen for ideas about using different colors to represent different features of the areas they will map. Co-develop a map key. Display slide F and acknowledge the different ways students suggested for representing shapes and kinds of land and water. Use these ideas to suggest developing a map key for the class to use so we can easily read other's maps. Use a slide, blank piece of chart paper, or digital chart space to make the map key." (Lesson 5, Teacher Guide)
- Lesson 5, Connect, Step 4: "Suggest a Gallery Tour. Gather students in a scientists circle and to discuss expectations for a Gallery Tour. Display slide K and review class expectations for a brief partner gallery tour or other peer-sharing protocol the students are familiar with, making special note to remind students to respectfully look but not touch the maps their classmates have created. Show students how they can draw or write one similarity and/or difference between the National Park they mapped and each of the other 4 on the Land and Water Map Comparisons handout... The map gallery tour is intended to help students identify patterns based on the similarities and differences in the shapes and kinds of land and water in different places. To support differentiation and provide access for diverse learners, students can tour, observe, and discuss with a partner to strengthen both social and academic vocabulary. Viewing the maps of their classmates can also reinforce student interest, motivation, and creativity. To support students who are color or sight disabled, consider encouraging students to mark agreed-upon patterns into the different colors of clay with a craft stick to help students know by feeling which clay represents the land with or without plants, solid water, and liquid water." (Lesson 5, Teacher Guide)
- Lesson 6, Synthesize, Step 5: "Update Our Growing Ideas chart. Display Our Growing Ideas chart and slide M for a Building Understandings Discussion about the kinds of plants and animals that live in our schoolyard. Remind students that it will be important for them to not only share what they observed in the investigation but also listen to and connect with what other groups/students share so we can understand what we think we figured out and where we still have questions. Consider providing sentence starters such as "I notice that _____" or "I can connect with what you said because _____". More discussion stems are available in the Discussion Supports resource. Use ideas the students shared, as well as photos and/or artifacts from this lesson's work, to complete the row for Lesson 6. An example of how this chart update might look is below. Remind students as they share that they can use their observations as evidence to support their claims about what we figured out." (Lesson 6, Teacher Guide)
- Lesson 7, Explore, Step 4: "Can you show or tell me why you placed _____ (card) in _____ (group)? What did you observe on the card? This plant is _____. This plant is (mid sized/short ground/tall) because _____. Do both partners agree? What evidence do you have for that idea?" (Lesson 7, Teacher Guide)

Artifacts show evidence of students' reasoning and changes in their thinking over time

Growing Ideas Chart

- Lesson 2, Synthesize, Step 6: "Introduce Our Growing Ideas chart. Display a blank version of Our Growing Ideas chart (refer to slide K). Explain to students that we will use this chart to keep track of what we have figured out throughout the course of the unit as we work toward answering each of our big Lesson set questions. Write the class' version of the Lesson Set 1 question, which may be similar to, How are places plants and animals live similar and

different? at the top of Our Growing Ideas chart. Leave some space below for the Lesson Set 2 question that will be added in Lesson 5." "Continue to explain that in order to add ideas to our chart today, it will be important for us to not only share what we figured out about our Lesson Question, What is the land like where plants and animals live? but also listen to and connect with what other students have shared. This is so we can understand what we think we figured out and where we still have questions." (Lesson 2, Teacher Guide)

- Lesson 3, Lesson Assessment Guidance: "Use these formative assessment opportunities to determine how students' three-dimensional thinking around Assessment Statement 1 (aligned to 2-ESS2-2 and 2-ESS2-3) is progressing. You can use the Following Student Sensemaking 1 tool to keep track of students' developing thinking." (Lesson 3, Teacher Guide)
- Lesson 5, Synthesize, Step 5: "Update Our Growing Ideas chart. Use ideas the students shared as well as photos and/or artifacts from this lesson's work (example printable images can be found on the Printable Chart Images) to complete the row for Lesson 5. An example of how this chart update might look is below, remember this is only a sample." (Lesson 5, Teacher Guide)
- Lesson 6, Navigate, Step 1: "Record the Lesson Question. Write the class's version of the Lesson 6 question on the next row of Our Growing Ideas chart. Then, display slide C. Use the following prompt to have the class briefly discuss how they could answer this question." (Lesson 6, Teacher Guide)
- Lesson 6, Synthesize, Step 5: "Update Our Growing Ideas chart. Display Our Growing Ideas chart and slide M for a Building Understandings Discussion about the kinds of plants and animals that live in our schoolyard. Remind students that it will be important for them to not only share what they observed in the investigation but also listen to and connect with what other groups/students share so we can understand what we think we figured out and where we still have questions." (Lesson 6, Teacher Guide)
- Lesson 8, Synthesize, Step 5: "Update Our Growing Ideas chart. Display Our Growing Ideas chart (refer to slide J). Use ideas the students shared as well as photos and/or artifacts from this lesson's work (example printable images can be found on the Printable Chart Images) to complete the row for Lesson 8. An example of how this chart update might look is below. Remind students as they share that they can use their observations as evidence to support their claims about what we figured out." (Lesson 8, Teacher Guide)
- Lesson 10, Synthesize, Step 4: "Transition to closing the unit. Have students keep their Comparing Across National Parks handout and prepare for a Consensus Discussion. Celebrate how they have brought together ideas across the unit to compare the many different plants and animals living in different kinds of places in the National Parks. Make sure to record the patterns that students observe that answer the Lesson set question to the Our Growing Ideas chart as they arise." "Record what we figured out. Display Our Growing Ideas chart (refer to slide G) and add how we answered the Lesson Question to the Lesson 10 row if you did not during the discussion. Remind students of the Lesson Question and use the following prompts. Use ideas the students shared as well as photos and/or artifacts from this lesson's work to complete the row for Lesson 10. An example of how this chart update might look is below." (Lesson 10, Teacher Guide)

Notice and Wonder Chart

- Lesson 3, Navigate, Step 7: "Display the Notice and Wonder chart (refer to slide M). Have students share if any of the circled questions are now answered after today's lesson. For any questions that were answered, add a checkmark next to the question so we know we have figured that out." (Lesson 3, Teacher Guide)
- Lesson 5, Navigate, Step 6: "Take stock in what we figured out. Revisit the class Notice and Wonder Chart (refer to slide N) and work with students to add checks next to any questions that have been answered. Notice aloud how many of the questions about places have been answered." (Lesson 5, Teacher Guide)

- Lesson 10, Navigate, Step 6: "Revisit the Notice and Wonder chart. Display slide I and gather students around the Notice and Wonder chart to do a final pass at the questions they have asked over the course of the unit. Ask students if we can answer any more of the questions and put a star next to any questions." (Lesson 10, Teacher Guide)

Students receive feedback and revise their thinking accordingly.

Following Student Sensemaking 1, Lesson 2-4, "Throughout each lesson, jot down evidence of a few students' sensemaking. You can use this table, a seating chart, your class list, or another way to keep track of what students say, do, write, draw, objects they manipulate and how, etc. to note how they are demonstrating the listen-fors and look-fors. Use recorded evidence to formatively evaluate students' progress in Lessons 2-4..."(Following Student Sensemaking 1, Lessons 2-4).

- Lesson 2, Possible Feedback include, "What other land did you see or read about? How is it similar or different from the land you showed here?", and "In the second drawing, I also see you included some details about different shapes of land. Can you say more about how the land in this part of the drawing (points to flat part) is different from (points to higher curved part) this part of the drawing?" (Following Student Sensemaking 1, Teacher Materials).
- Lesson 3, Possible Feedback include, "I notice you used different colors. Can you tell me more about what each color shows?", and "You used different shapes for each of the bodies of water. Can you tell me more about each one?" (Following Student Sensemaking 1, Teacher Materials).

Following Student Sensemaking 2, Lessons 6,7,8, Students might write/draw

- Lesson 6, Possible feedback includes, "How would you say these plants are similar (or different)? What observations support those ideas?", "Would you say similar kinds or different kinds of plants live on our schoolyard? Why do you think so?" (Following Student Sensemaking 2, Teacher Materials).
- Lesson 7, Possible feedback includes, "How are plants in the same category (size) different?", "Would you say similar kinds or different kinds of animals live in _____ National Park? Why do you think so?" (Following Student Sensemaking 2, Teacher Materials).

The classroom agreements, specifically Agreement #3, "We look, listen, and respond to each other's ideas", are understood to be actively practiced by both teachers and students throughout the unit. While not always explicitly referenced, opportunities to observe, apply, and revisit these agreements are embedded across lessons and assumed to be employed by the students and teachers throughout the unit.

- Lesson 1, Synthesize, Step 5: "Share with students that professional scientists also collaborate with one another to brainstorm, discuss, and review their work. Revisit the classroom agreements to focus on supporting each other in a whole class discussion." (Lesson 1, Teacher Guide).
- Lesson 2, Synthesize, Step 6: "Community Connections Provide multiple means of engagement by reviewing the classroom agreements before whole class discussions. This helps to minimize possible threats so students can share ideas even when they are not sure and to support, listen, and respond to each other's ideas. Consider having students pick one agreement to focus on during this discussion." (Lesson 2, Teacher Guide).
- Lesson 6, Explore, Step 2: "Community Connections As students begin to share ideas in the discussion to plan for going outside, you might find it helpful to remind them of their classroom agreements, such as "we can do science in many different ways." You could even ask students why they think it is important for them to engage with this agreement, and what it might look like for them to do so while going outside. Encourage students to leverage their shared experiences observing plants and animals in Lesson 1 and the varied personal experiences they may have doing so in their communities. Reviewing these agreements helps to minimize possible threats and distractions for students." (Lesson 6, Teacher Guide).

- Lesson 9, Synthesize, Steps 3 and 4: "Give partners 1-2 minutes to quietly think about what details from the Gotta-Have-It Checklist they want to include in their script. Then give partners about 2 minutes to tell their partner what they plan to include in their script to help them organize their ideas before putting them onto paper. Display slide E to show the sentence starters that the students can use while giving peer feedback. When necessary and helpful for multilingual students, provide a translation scaffold of the sentence starters to support students in giving peer feedback. Each student should take a couple minutes to share their National Park Presentation Script with a partner. After sharing, the listening partner should provide feedback connected to how the script includes ideas from the Gotta-Have-It Checklist. When all students have received feedback, have students turn and talk about what they plan to do next based on that feedback." (Lesson 9, Teacher Guide)

Scientists Circle

- Lesson 2, Synthesize, Step 6: "Gather students in the Scientists Circle for a Building Understandings Discussion about the National Parks we investigated today and the land we found in each. Remind students that they will be sharing their ideas with one another and to do that well, they need to be able to hear and see everyone (not only the teacher) in the circle. Have copies of the Discussion Supports available for students to use during this student to student discussion." (Lesson 2, Teacher Guide).
- Lesson 8, Synthesize, Step 5: "Gather students in a Scientist circle with their Animal and Plant Comparisons assessment and have them sit near the other partners to someone researching the same National Park for a Building Understandings Discussion. Have copies of the Discussion Supports available for students to use during the discussion. Think, Pair, Share about what we figured out today. Display slide I and direct students to think first, then talk with their research partner, then share with their National Park group about what they figured out today. Consider using the following prompts to facilitate this student-to-student discussion." Prompts to use include, "What kinds of plants and animals lived on land? What about in water?" (Lesson 8, Teacher Guide).
- Lesson 10, Synthesize, Step 4: "Using their Comparing Across National Parks handout have students turn and talk about what they noticed across parks from the presentations. Listen in as students share and then after bringing students back together, use the ideas you heard to motivate coming to a consensus about our Lesson set question." (Lesson 10, Teacher Guide).

Building Understandings Discussion

- Lesson 2, Synthesize, Step 6: "Gather students in the Scientists Circle for a Building Understandings Discussion about the National Parks we investigated today and the land we found in each. Remind students that they will be sharing their ideas with one another and to do that well, they need to be able to hear and see everyone (not only the teacher) in the circle. Have copies of the Discussion Supports available for students to use during this student to student discussion." (Lesson 2, Teacher Guide).
- Lesson 4, Synthesize, Step 6: "Remain in a Scientists Circle and display slide K for a Building Understandings Discussion." Prompts to use include, "We read about a scientist who makes and uses maps, what did we find out from that book?", "What did we do with maps today? What did we figure out?". (Lesson 4, Teacher Guide).
- Lesson 7, Synthesize, Step 6, "Have students return all sorting cards to a designated space and transition to a Scientists circle with their Plant and Animal Observations handout and gather in a Scientist circle for a building understandings discussion to answer the Lesson Question, What kinds of plants and animals live in the National Park?" (Lesson 7, Teacher Guide)

Initial Ideas Discussion and Consensus Discussion

- Lesson 1, Synthesize, Step 5: "Use the prompts below to facilitate a whole group Initial Ideas Discussion about encountering plants and animals in different places. Share that the ideas the class shares are ideas the class is starting with and it is OK to share even if we are unsure. As students share with the whole group, record their observations in the "Notice" column and student questions under the "Wonder" column. Encourage students to respond to each other's ideas (e.g., with hand gestures) if they made similar or different observations." (Lesson 1, Teacher Guide).
- Lesson 10, Synthesize, Step 4: "Have students keep their Comparing Across National Parks handout and prepare for a Consensus Discussion. Celebrate how they have brought together ideas across the unit to compare the many different plants and animals living in different kinds of places in the National Parks. Make sure to record the patterns that students observe that answer the Lesson set question to the Our Growing Ideas chart as they arise." Prompts to use include, "What was similar about the plants and animals that lived on land between the National Park you researched and others? What was different?", "What patterns are we noticing? What was similar about the plants and animals that live in/near water between the National Park you researched and others? What was different? What patterns are we noticing?" (Lesson 10, Teacher Guide).

Peer Feedback

- Lesson 9, Synthesize, Step 4: "Display slide E to show the sentence starters that the students can use while giving peer feedback. When necessary and helpful for multilingual students, provide a translation scaffold of the sentence starters to support students in giving peer feedback. Each student should take a couple minutes to share their National Park Presentation Script with a partner. After sharing, the listening partner should provide feedback connected to how the script includes ideas from the Gotta-Have-It Checklist. When all students have received feedback, have students turn and talk about what they plan to do next based on that feedback." (Lesson 9, Teacher Guide).

Gallery Tours

- Lesson 5, Connect, Step 5: "Participate in a Gallery Tour. Have students pair up with their research partner for a quick 5-10 minute tour around the classroom to view the maps their peers made. As students move between maps, encourage them to look for what is similar or different about the land and water in the different National Parks. Motivate the need to discuss our map connections. Engage the class in a brief brainstorming discussion around the following prompts to help illuminate the need to discuss what we figured out about the kinds and shapes of land and water in the National Parks. Now that we have seen our classmates' maps and compared them to our own, what can we do as scientists to share what we figured out what is similar and different between the National Parks?" (Lesson 5, Teacher Guide).

Criterion-Based Suggestions for Improvement: N/A

II.C. Building Progressions

ADEQUATE

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

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

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

The reviewers found **adequate** evidence that the materials identify and build upon students' prior learning in all three dimensions because the materials do identify expected prior learning for some of the featured three dimensions, though it is not at the element level. The supports to teachers explain how some prior learning will be built upon in all three dimensions. The materials do provide limited support to teachers to clarify adult understanding of the potential alternate conceptions they or their students may have during the unit.

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

The materials contain the Habitats and Biodiversity Unit Front Matter document that features a section titled, "What ideas and experiences will my students bring that can help them in this unit." It contains the expected learning students will come with to unit 2.3 on the following topics: "Diversity of Life Across Habitats" "Land and Water" "Solid and Liquid Water" "Making observations for comparisons" "Developing and Using Models" "Obtaining, evaluating, and communicating info" "Patterns", and "Scale Proportion, and Quantity." This information addresses the three dimensions but does not provide information about expected prior learning at the element level. For example:

Disciplinary Core Ideas:

- Diversity of Life (2-LS4-1) "Students come to school with many experiences of plants and animals in their communities. They may have noticed what plants and animals live in their communities. However, students may not be familiar with the large range in types of plants and animals in places different from their communities. Students may come into this unit with experiences from the Unit K.4: Do birds, other animals, and plants need people to help take care of them? about what plants and animals need to survive, as well as how plants and animals change their environments to meet their needs. These kindergarten experiences emphasize that animals need food and water, and plants need water and sunlight to survive. Students build on those experiences in this unit when they notice many kinds of plants and animals living on land and in water and name the natural areas where plants and animals live and grow as habitats. In kindergarten, students also figure out that animals get their food from plants or other animals. Lastly, kindergarteners figure out that plants and animals live in places where they can get what they need to survive and that they can change their environments to meet those needs. In this unit, students expand on their prior experiences to observe plants and animals in their schoolyard and in different National Parks to figure out that many different kinds of plants and animals live in different land and/or water places around the United States. Additionally, in 1st grade, students have experiences observing and modeling how different parts of plants and animals help them survive and grow. In this unit, students expand on their experiences in 1st grade to use those observable features of plants and animals to sort and compare the animals and determine that there are different kinds in any area. This unit provides many opportunities to build on the experiences that students have had in kindergarten, 1st grade, and those outside of school." (Habitats and Biodiversity Unit Front Matter) The prior learning related to what plants and animals need to survive is not used to help students build an understanding of the diversity of life across habitats. The information provided does not describe the prior learning at the element level.

Science and Engineering Practices:

- Developing and Using Models: "Students may have seen or used models and maps before. Students may also be familiar with diagrams or other representations from books or media that try to explain how something works. Students also often use maps as tools in their everyday life, whether using a map app on a phone for directions, at a public zoo or museum, or riding public transportation, among other options. Students who have completed Kindergarten and 1st grade OpenSciEd bring in many experiences developing and using models to explain phenomena (e.g., explaining how to read under covers when it is dark in Unit 1.1: How can we read under covers when it's dark? or explaining and preventing land change in Unit 2.1: How do wind and water change the shape of land and what can we do about it?) and for designing solutions to problems (e.g., developing a model to solve the problem of the hot black top in Unit K.1: Why do some surfaces get hot and how can we make them less hot?). Across these experiences students figure out how to distinguish between the model and what the model represents, compare models, and develop and use models that use a variety of representations. In this unit, students expand on their experiences in previous grades, as well as their everyday experiences with models and maps as models to inform the development of their own maps (models) of an area of the National Park they research. They distinguish between the land and water in maps (models) and the land and water in the actual area it represents. Students also have opportunities to develop and use maps (models) that represent land and water using various representations such as colors. Prior to this unit, many of the students' models were concrete representations. In this unit, students begin to consider how to use more abstract representations - like different colors - to show land and water. Finally students also build on comparing models, when they compare their maps (models) in this unit." (Habitats and Biodiversity Unit Front Matter) This prior learning is related to models but is not at the element level and is not used to develop and/or use a model to represent amounts, relationships, relative scales (bigger, smaller), and/or patterns in the natural and designed world(s) (MOD-P3)

Crosscutting Concepts:

- Patterns: "Students are likely to have had many experiences identifying patterns. For example, students might have identified and created repeating patterns in math with a specific structure (AB, ABC, etc.) using items such as cubes, pattern blocks, shapes, and colors. Students likely have experienced patterns in seasons and patterns in the events of their day from day to day. Students also may bring ideas from Unit K.2: How can we be prepared for the weather?, when students analyze data points to identify patterns on their Weather Calendar across multiple students' data, Unit 1.2: How can we communicate using objects that make sound?, where they make observations and identify patterns about what causes sounds, or in Unit 2.1: How do wind and water change the shape of land and what can we do about it? when they observe patterns in how wind and water change land. Students will continue to build experiences observing patterns and using patterns as evidence in this unit." This provides information about prior learning for a portion of the element, **Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.** (**PAT-P1**)

Teacher Editions provide additional guidance on what a teacher should expect a student's prior experience to be upon arrival and how to further develop their use of the SEPs, CCCs, and DCIs. This information addresses the three dimensions but does not provide information about expected prior learning for all elements.

Disciplinary Core Ideas:

LS4.D.1: 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 6, Explore, Step 2: Teaching Tip, "If students have completed Unit 1.4: How do the ways plants and animals look and act help them live? they may bring in ideas about specific plant parts such as stems, leaves, flowers, fruit, and roots and ideas about animal parts such as feet, beaks, or skin type or color (e.g., scales, skin color that helps

camouflage). If these ideas come up, support students in connecting observations of these traits to this lesson's goals of recognizing the variety of plants and animals that may live in an area using those details as evidence that given plants or animals are different kinds." (Lesson 6, Teacher Guide)

- Lesson 6, Explore, Step 2: Teaching Tip, "Students are not expected to know the scientific or specific names of the plants and animals that they observe. Additionally, students will not differentiate animals into their class (mammal, bird, reptile, amphibian, fish) until later grades. The Plants and Animals Near Me handout supports students in recognizing different kinds of plants and animals by organizing observations of plants by relative size and animals by number of legs. Most plants and animals students observe should fall into one of these categories, but it may be helpful to create shared meaning around these words prior to making observations." (Lesson 6, Teacher Guide)
- Lesson 8, Lesson Assessment Guidance: "Students may bring in ideas from Unit K.4: Do birds, other animals, and plants need people to help take care of them? about plants and animals getting what they need from their environment during this discussion to introduce habitats. Use of the word "habitat" in this unit supports students' sensemaking about biodiversity across different habitats, including places on land and water. Students' ideas that connect how plants and animals get what they need from the environment to specific habitats make great questions to add to the Notice and Wonder chart. While these questions will not be answered in this unit, they support incoming ideas and experiences that students can use in later elementary grades when they explore specific populations that live in a given habitat, how changes to habitats affect what lives there, and relationships within ecosystems." (Lesson 8, Teacher Guide)

ESS2.C The Roles of Water in Earth's Surface Processes: Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form.

- Unit Front Matter, "Prior to entering 2nd grade, students have experienced land and water, including land and water features, in school and their communities. Their own everyday experiences of land features and water in their communities are experiences that students bring to the classroom and can be built upon in their schooling. Students who have completed Unit 2.1: How do wind and water change the shape of land and what can we do about it? will bring in ideas about land, including landforms, and land changing shape. They can build on what they figured out in that unit when investigating different shapes and kinds of land in different places in this unit." (Unit Front Matter) This description is not at the element level.

ESS2.B Plate Tectonics and Large-Scale System Interactions: Maps show where things are located. One can map the shapes and kinds of land and water in any area.

- Unit Front Matter, "Students may have seen or used models and maps before. Students may also be familiar with diagrams or other representations from books or media that try to explain how something works. Students also often use maps as tools in their everyday life, whether using a map app on a phone for directions, at a public zoo or museum, or riding public transportation, among other options. Students who have completed Kindergarten and 1st grade OpenSciEd bring in many experiences developing and using models to explain phenomena (e.g., explaining how to read under covers when it is dark in Unit 1.1: How can we read under covers when it's dark? or explaining and preventing land change in Unit 2.1: How do wind and water change the shape of land and what can we do about it?) and for designing solutions to problems (e.g., developing a model to solve the problem of the hot black top in Unit K.1: Why do some surfaces get hot and how can we make them less hot?). Across these experiences students figure out how to distinguish between the model and what the model represents, compare models, and develop and use models that use a variety of representations. In this unit, students expand on their experiences in previous grades, as well as their everyday experiences with models and maps as models to inform the development of their own maps (models) of an area of the National Park they research. They distinguish between the land and water in maps (models) and the land and water in the actual area it represents. Students also have opportunities to develop and use

maps (models) that represent land and water using various representations such as colors. Prior to this unit, many of the students' models were concrete representations. In this unit, students begin to consider how to use more abstract representations - like different colors - to show land and water. Finally students also build on comparing models, when they compare their maps (models) in this unit." (Unit Front Matter)

- Lesson 2, Connect, Step 2: "The word land is introduced in Unit 2.1: How do wind and water change the shape of land and what can we do about it?. If this word is familiar to the class and already on the Word Wall, remind students of this definition and show them the card from Unit 2.1: How do wind and water change the shape of land and what can we do about it?. Connect new examples shared from students Community Connections to Places community connection to continue building ideas about this word in the context of this unit." (Lesson 2, Teacher Guide)

PS1.A Structure and Properties of Matter: Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties.

- Unit Front Matter, "Students enter school with many experiences with water that is solid and liquid. Their experiences with frozen water can include ice cubes in a cup of water, and, in some places, students may have experiences with snow or sleet and frozen lakes, rivers or ponds in winter months. They also have many experiences with liquid water from swimming in pools, rivers, lakes, and/or the ocean to observing the rain, splashing in puddles, and even just drinking water. With each of these experiences, they may not have described them as water that is solid or liquid, but have experienced water in different forms. If students have completed previous OpenSciEd units, they will bring in ideas and experiences related to solid water, liquid water, and temperature. In Unit K.2: How can we be prepared for the weather?, students observed different temperatures and gathered data using a thermometer and rain gauge of the temperature and amount of rain and/or snow that fell in a given time on their schoolyard. Students also can build on prior experiences from Unit 2.2: How can we design a new toy? when they figured out the properties of different materials, including observing a heated crayon melt and then freeze to be a solid crayon after it cooled. Each of these experiences can be expanded upon in the current unit to support students in figuring out that water is solid or liquid based on the temperatures." (Unit Front Matter)

Science and Engineering Practices:

INV: Planning and Carrying Out Investigations

INV–P2: Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question. (INV-P2)

- Lesson 1, Connect, Step 2: "The word observation was first introduced in Unit K.3: How can we move things to where we want them to go? and again in second grade in Unit 2.1: How do wind and water change the shape of land and what can we do about it?. If this word is new to students, take a moment to define making observations as details we notice using our senses." (Lesson 1, Teacher Guide)
- Lesson 1, Synthesize, Step 5: "Asking Questions and Defining Problems: "An important element of this science practice is asking questions based on observations." "Students previously developed this practice in Unit 2.1: How do wind and water change the shape of land and what can we do about it? and Unit 2.2: How can we design a new toy?." (Lesson 1, Teacher Guide)

INV–P4: Make observations (firsthand or from media) and/or measurements to collect data that can be used to make comparisons. (INV-P4).

- Unit Front Matter, "In kindergarten and 1st grade, students have many opportunities to make and record observations of the natural and designed worlds as part of kindergarten and first grade OpenSciEd units. They

can build on those experiences, as well as their experiences outside of school noticing the world around them and questioning what they experience. During this unit, students make observations of land, water, and plants and animals to compare the different land, bodies of water, and plants and animals in their schoolyard and different National Parks. Students use these comparisons to figure out that there are different kinds of land and bodies of water based on their relative size and shapes, as well as the broad biodiversity in different places." (Unit Front Matter)

MOD: Developing and Using Models

MOD–P1 Distinguish between a model and the actual object, process, and/or events the model represents. (MOD-P1)

MOD–P2 Compare models to identify common features and differences. (MOD -P2)

- The evidence included for MOD-P3 is loosely connected to MOD–P1 and MOD–P2; however, explicit information about expected prior learning specific to these elements was not found.

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

- Developing and Using Models. Unit Front Matter, "Students may have seen or used models and maps before. Students may also be familiar with diagrams or other representations from books or media that try to explain how something works. Students also often use maps as tools in their everyday life, whether using a map app on a phone for directions, at a public zoo or museum, or riding public transportation, among other options. Students who have completed Kindergarten and 1st grade OpenSciEd bring in many experiences developing and using models to explain phenomena (e.g., explaining how to read under covers when it is dark in Unit 1.1: How can we read under covers when it's dark? or explaining and preventing land change in Unit 2.1: How do wind and water change the shape of land and what can we do about it?) and for designing solutions to problems (e.g., developing a model to solve the problem of the hot black top in Unit K.1: Why do some surfaces get hot and how can we make them less hot?). Across these experiences students figure out how to distinguish between the model and what the model represents, compare models, and develop and use models that use a variety of representations. In this unit, students expand on their experiences in previous grades, as well as their everyday experiences with models and maps as models to inform the development of their own maps (models) of an area of the National Park they research. They distinguish between the land and water in maps (models) and the land and water in the actual area it represents. Students also have opportunities to develop and use maps (models) that represent land and water using various representations such as colors. Prior to this unit, many of the students' models were concrete representations. In this unit, students begin to consider how to use more abstract representations - like different colors - to show land and water. Finally students also build on comparing models, when they compare their maps (models) in this unit." (Unit Front Matter)

INFO: Obtaining, Evaluating, and Communicating Information

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

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

- The evidence included for INFO-P3 is loosely connected to INFO–P1 and INFO-P4; however, explicit information about expected prior learning specific to these elements was not found.

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

- Lesson 3, Explore, Step 5: "Students used thermometers in Unit K.2: How can we be prepared for the weather? to measure local weather conditions and observe patterns in local temperature. Like the thermometers in that unit, the ones in the Water at Different Temperatures infographic use colors to represent relative temperature scales (e.g. red hotter, blue colder). Leverage students' experiences reading thermometers in that unit while reading and discussing the images of thermometers on the infographic." (Lesson 3, Teacher Guide)

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

- Obtaining, Evaluating, and Communicating Information. Unit Front Matter, "Prior to 2nd grade, students have many experiences obtaining information from different texts, as well as using text features to obtain information. Students specifically have experiences obtaining information from websites in Unit K.4: Do birds, other animals, and plants need people to help take care of them? and Unit 1.4: How do the ways plants and animals look and act help them live?. In those units, students focus on individual website pages and obtain most of their information from images, captions, and sentences of text. Students build on those experiences in this unit when they navigate multiple website pages and use more complex text including paragraphs to obtain information. Students also have many experiences communicating information using evidence from their investigations and models throughout their experiences in prior science units. Beyond science experiences, students come to school with many experiences obtaining, evaluating, and communicating scientific information from various text sources (e.g., signs on nature walks or in zoos, billboards, TV advertisements, movies, among others). Building on these experiences can support students' experiences obtaining and communicating information in the current unit related to the different land, water, and different plants and animals and where they live." (Unit Front Matter)

Crosscutting Concepts:

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

- Unit Front Matter, "Students are likely to have had many experiences identifying patterns. For example, students might have identified and created repeating patterns in math with a specific structure (AB, ABC, etc.) using items such as cubes, pattern blocks, shapes, and colors. Students likely have experienced patterns in seasons and patterns in the events of their day from day to day. Students also may bring ideas from Unit K.2: How can we be prepared for the weather?, when students analyze data points to identify patterns on their Weather Calendar across multiple students' data, Unit 1.2: How can we communicate using objects that make sound?, where they make observations and identify patterns about what causes sounds, or in Unit 2.1: How do wind and water change the shape of land and what can we do about it? when they observe patterns in how wind and water change land. Students will continue to build experiences observing patterns and using patterns as evidence in this unit." (Unit Front Matter)

SPQ-P1: Relative scales allow objects and events to be compared and described (e.g., bigger and smaller; hotter and colder; faster and slower).

- Unit Front Matter, "In kindergarten, students have experiences with relative scale to compare how surfaces in sunny and shady places feel (hot, less hot), as well as experiences comparing how fast and far objects travel when testing the effects of different pushes and pulls. Later, in 1st grade they have experiences observing the relative scales of the Sun's changing location across the sky (earlier, later) and daytime lengths across seasons (longer daytimes, shorter

daytimes). In the current unit, students expand on these experiences, as well as other experiences in 2nd grade comparing how land changes, to compare the relative size and shape of land and water in different National Parks and the schoolyard. They also expand on prior kindergarten experiences with hotter and colder temperatures related to the weather to then compare hotter or colder water when figuring out that water is solid or liquid depending on the temperature." (Unit Front Matter)

- About the Science, "Students at this age in this unit do not need to use cardinal directions, exact locations, or quantitative scale, which begin to be used in upper elementary grades. Rather, the focus at this age in this unit is relative locations, shapes, sizes, and scales (e.g., near, far, next to, behind, at the edge of, bigger, smaller)." (About the Science)

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

This information is found in Unit 2.3 Habitats and Biodiversity Front Matter. While some of the DCIs, CCCs, and SEPs have descriptions of how prior learning will be built upon, there is not clear evidence that this occurs. Descriptions of how prior learning will be built upon are not provided for all focal DCIs and SEPs. For example:

- Unit Front Matter, "Students may come into this unit with experiences from the Unit K.4: Do birds, other animals, and plants need people to help take care of them? about what plants and animals need to survive, as well as how plants and animals change their environments to meet their needs. These kindergarten experiences emphasize that animals need food and water, and plants need water and sunlight to survive. Students build on those experiences in this unit when they notice many kinds of plants and animals living on land and in water and name the natural areas where plants and animals live and grow as habitats. In kindergarten, students also figure out that animals get their food from plants or other animals. Lastly, kindergarteners figure out that plants and animals live in places where they can get what they need to survive and that they can change their environments to meet those needs. In this unit, students expand on their prior experiences to observe plants and animals in their schoolyard and in different National Parks to figure out that many different kinds of plants and animals live in different land and/or water places around the United States. Additionally, in 1st grade, students have experiences observing and modeling how different parts of plants and animals help them survive and grow. In this unit, students expand on their experiences in 1st grade to use those observable features of plants and animals to sort and compare the animals and determine that there are different kinds in any area. This unit provides many opportunities to build on the experiences that students have had in kindergarten, 1st grade, and those outside of school." (Unit Front Matter) While it is claimed, there is no evidence that all students build on experiences about what animals and plants need to survive.

- Unit Front Matter, "This unit draws on the part of PS1.A from 2-PS1-1 that focuses on different kinds of matter existing as solid or liquid, depending on the temperature. Though this DCI is split between this unit and Unit 2.2: How can we design a new toy? unit, the two units do not need to be taught in a particular order. The parts of the DCI are not dependent upon one another. However, if this unit is taught after Unit 2.2: How can we design a new toy?, then you can build on students' experiences melting and cooling a crayon in Unit 2.2: How can we design a new toy? when discussing water as solid or liquid in different habitats in this unit. Both this unit and Unit 2.1: How do wind and water change the shape of land and what can we do about it? develop ideas about land. While these units can be taught in any sequence, students who have not yet experienced Unit 2.1: How do wind and water change the shape of land and what can we do about it? may be new to the words land and landform in Lesson 2. Similarly, both this unit and Unit 2.4: How can plants grow in different places? develop ideas related to plants. While these units can also be taught in any order, students who have completed Unit 2.4: How can plants grow in different places? may bring in additional ideas about plants meeting their needs for sunlight and water in the places they live." (Unit Front Matter)

- Lesson 1, Explore, Step 2: Teaching Tip: "The word observation was first introduced in Unit K.3: How can we move things to where we want them to go? and again in second grade in Unit 2.1: How do wind and water change the shape of land and what can we do about it?. If this word is new to students, take a moment to define making observations as details we notice using our senses." (Lesson 2, Teacher Guide)

- Lesson 1, Explore, Step 4: Patterns, "The plant and animal stories and experiences students share and the class' shared experiences on the schoolyard and observing new places lead to initial ideas and questions about plants, animals, and the different places they live, motivating them to explore patterns of what the land and water is like in different places and the variety of plants and animals who live there throughout the rest of the unit. They will work in upcoming lessons to explicitly observe patterns in the shapes and kinds of land and water in various places." (Lesson 1, Teacher Guide)
- Lesson 2, Important Lesson Guidance: "In this lesson, students are observing and comparing land for the purpose of figuring out about the shapes and kinds of land that they will map in Lessons 4-5. While students will observe plants and animals in these places in the second Lesson Set, they will not be connecting why certain types of land or water are the habitats for different kinds of plants and animals. The focus of this unit is in recognizing that there are a variety of plants and animals that can be found in different kinds of places on land and in water. They will explore how changes in habitats affect the plants and animals that live there in later elementary grades." (Lesson 2, Teacher Guide)
- Lesson 3, Important Lesson Guidance: "Freshwater and saltwater concepts are not introduced until 5th grade. While adding definitions of these kinds to the word wall, some students may know that the ocean contains salt water and rivers, lakes, and ponds contain freshwater. Teachers can include these concepts if students share them during discussions. See Unit 5.3: How does changing the flow of water impact Earth's systems, and how can humans help? for further guidance on how these science ideas are developed in context of the phenomenon." (Lesson 3, Teacher Guide)
- Lesson 3, Explore, Step 4: Scale, Proportion, and Quantity, "The crosscutting concept is intentionally developed here and will be revisited in Lesson 4, when students compare the relative scale of land and water features on physical maps using terms like bigger, smaller, near, and far." (Lesson 3, Teacher Guide)
- Lesson 4, Navigate, Step 1: Teaching Tip, "Before naming the map as a 'map', allow students to contribute their expertise and previous experiences with maps as they co-construct meaning together while noticing and wondering the features of the map. As students explore the map, this will allow them to build upon each other's prior knowledge while collaboratively engaging in a shared sensemaking experience." (Lesson 4, Teacher Guide)
- Lesson 5, Synthesize, Step 3: "Encourage students to use comparative terms (more/less, bigger/smaller) to describe the shapes, kinds, and locations of land and water on their map. Support students by showing images from the National Parks from the website side by side and referencing the Land chart and Bodies of water chart to continue to connect to ideas about comparative scale developed in Lessons 2-4." (Lesson 5, Teacher Guide)
- Lesson 7, Lesson Materials and Preparation: "Important Lesson guidance: At this point in the unit, students are observing plants and animals in locations different from their schoolyard. Students may begin to raise ideas or questions about why plants and animals that are found in different places may be similar or different or live where they do. Please note that students are not yet expected to identify habitats or explain why plants and animals live where they do. While some of those ideas--like investigating where on land or in water plants and animals live—will come later in this unit, the focus here is on observing and comparing what kinds of plants and animals are found in a given area for the purpose of recognizing biodiversity in an area. They will explore specific populations in specific habitats and how changes in habitats affect the plants and animals that live there in later elementary grades. For now, support students in describing what they observe and using patterns as evidence of—not an explanation for—different kinds of plants and animals living in an area." (Lesson 7, Teacher Guide)

Guidance for addressing alternative conceptions

- The About the Science Document identifies science ideas that students encounter in the unit. The document also provides resources and links to build their science understanding of concepts in the unit. It is implied that this information will support teachers in clarifying adults' understanding of potential alternate conceptions that they or their students may have while building toward students' three-dimensional learning.

- About the Science: "To learn more about the NGSS Disciplinary Core Ideas in this unit, Duncan, Kracjik, and Rivet (Eds). (2017). Disciplinary Core Ideas: Reshaping Teaching and Learning. Arlington, VA: NSTA" (Habitats and Biodiversity About the Science)
- Lesson 3, Explore, Step 3. "Teaching Tip Students may think all ponds are round, but ponds can be any shape! The key feature of a pond is that it is surrounded by land on all sides. Encourage students to look beyond shape and focus on what makes a pond a pond—its water and the land around it. Consider pointing to examples of ponds with different shapes to challenge their thinking!" (Lesson 3, Teacher Guide)

Criterion-Based Suggestions for Improvement:

- Ensure "materials explicitly state the expected level of prior proficiency students should have with individual elements of all three dimensions for the core learning of the materials." [Detailed Guidance, p. 24]
- Ensure "progression of learning toward the targeted elements of all three dimensions is clearly described for teachers for each section of the materials." [Detailed Guidance, p. 25]
- Ensure "explicit support is provided to teachers to clarify adult understanding of the potential alternate conceptions that they or their students may have while building toward students' three-dimensional learning, along with guidance for how to help students negotiate their understandings [vs. telling students they are wrong]." [Detailed Guidance, p. 25]
  - Consider listing potential student or adult alternative conceptions about temperature, habitats, and biodiversity in the About the Science Document.

II.D. Scientific Accuracy

EXTENSIVE

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

The reviewers found **extensive** evidence that the materials use scientifically accurate and grade-appropriate scientific information, phenomena, and representations to support students' three-dimensional learning. Student-facing materials have precise, grade-appropriate wording to help students scaffold their understanding; websites and slide presentations present information that is accurate and engaging. The only inaccuracy is the definition of temperature.

- The Unit 2.3 Habitats and Biodiversity document includes "What Are The Boundaries of the Science Ideas for the Students in This Unit? (2.3 Habitats and Biodiversity About the Science) Where the language is simplified for the students' level, it is carefully explained for the teacher. For example: "Water can be found in many places and in various forms on Earth. The focus in this unit is on oceans, rivers, lakes, ponds and other variations of these water features specific to the context of the phenomenon (tinajas, pools, creeks, streams). Freshwater, including ideas about how most of Earth's freshwater is found in Earth's glaciers, and saltwater concepts are not introduced until later elementary grades." (About the Science, Teacher Material).

- Lesson 1, Explore, Step 2: Teaching Tip: "Students could encounter a variety of animals such as bugs, birds, and reptiles. Students may need guidance in recognizing that all of these are animals when recording on their handout. Students may also bring up fungi, which are technically not plants; that is okay because students will not differentiate decomposers from producers until 5th grade." (Lesson 1, Teacher Guide).
- Lesson 3, Explore, Step 2: Teaching Tip, "Freshwater and saltwater concepts are not introduced until 5th grade. While adding definitions of these kinds to the word wall, some students may know that the ocean contains salt water and rivers, lakes, and ponds contain freshwater. Teachers can include these concepts if students share them during discussions." (Lesson 3, Teacher Guide).
- Lesson 3, Explore, Step 3: "Students may or may not have mentioned streams and creeks when talking about rivers. If they didn't, now is a great time to ask if anyone has seen or thought of smaller types of flowing water. Listen for the idea that streams and creeks are smaller versions of rivers. They both flow in one direction, just like rivers do, but they are usually narrower and may move more slowly. Add streams and creeks to the "river" section of the chart, and draw a picture of a small stream or creek flowing between land. Underneath, write any details like: small, flowing water that moves in one direction, like a river." (Lesson 3, Teacher Guide).
- Lesson 3, Explore, Step 4: "Teaching Tip Responding to broad curiosities: Students are not expected to build an understanding of freezing point and melting point in second grade. However, teachers can anticipate that students will bring different funds of knowledge and that some students may have understanding of freezing and melting from previous experiences. When appropriate, make use of these ideas to enrich discussions and honor the experiences students bring to the science classroom and consider adding these ideas as wonders on the Notice and Wonder chart." (Lesson 3, Teacher Guide).
- Lesson 3, Explore, Step 4: "Teaching Tip Students do not need to explain the molecular distinction between solid and liquid. They also do not need to make sense of gases. These concepts will be expanded upon in later grades. In this unit, students should make sense of water as being liquid (when flowing) and solid (when ice), as well as how the temperature to cause water to be solid or liquid." (Lesson 3, Teacher Guide).
- Lesson 3, Explore, Step 4: "Explain that when something keeps its shape, like ice, it is called a solid. When something flows and changes shape, like water, it is called a liquid. Add the words "solid" and "liquid" to the Word Wall. Solid is something that keeps its shape. Liquid is something that can flow and change shape." (Lesson 3, Teacher Guide)
- Lesson 3, Water at Different Temperatures Infographic, "Water is solid below 32°F and Water is liquid above 32°F"
- Lesson 3, Connect, Step 5: "Add to the word wall. Add the word 'temperature' to the Word Wall. Temperature is how hot something is." (Lesson 3, Teacher Guide) This is a common misconception. Temperature is better defined as "how much heat something has.
- Lesson 6, Explore, Step 2: "Teaching Tip: Students are not expected to know the scientific or specific names of the plants and animals that they observe. Additionally, students will not differentiate animals into their class (mammal, bird, reptile, amphibian, fish) until later grades. The Plants and Animals Near Me handout supports students in recognizing different kinds of plants and animals by organizing observations of plants by relative size and animals by number of legs. Most plants and animals students observe should fall into one of these categories, but it may be helpful to create shared meaning around these words prior to making observations." (Lesson 6, Teacher Guide)
- Lesson 8, Explore Step 2: "Add the word 'map' to the word wall. Explain that a map is something that shows the shape and types of land and water in an area." (Lesson 8, Teacher Guide).
- Lesson 8, Explore, Step 2: "Teaching Tip Important Lesson guidance: In this unit students develop and use maps as models to represent the shapes and kinds of land and bodies of water in an area. When using and developing maps as models, students will use relative distances (an object is closer or farther from another object) as opposed to

quantitative scaling (the distance between objects on a map as a certain ratio of actual distance of the objects in real life). Quantitative scaling will be introduced in later grades." (Lesson 8, Teacher Guide)

- Meet the Expert: Flor Sangermano, "Page 07: "A map key is a box that explains what the symbols on a map represent. This map key shows that a picnic table is a symbol that represents places where people can eat in this park." and Page 09, "Birds-eye view maps help scientists, like Flor, understand the shapes and kinds of land across big spaces, like forests and farms." (Meet the Expert Book, Student Materials)

Criterion-Based Suggestions for Improvement:

- Ensure "'student-facing materials have precise, grade-appropriate wording to help students scaffold their understanding of concepts in all three dimensions, avoiding creating misconceptions." [Detailed Guidance, p. 26]
  - The current definition of *temperature* as "how hot something is" may unintentionally reinforce a common misconception. Instead of defining temperature as "how hot something is," consider wording such as "how much heat [energy] something has." While the full explanation—that temperature is a measure of the average kinetic energy of particles—is beyond the K–2 grade band, the wording can still maintain scientific accuracy.

II.E. Differentiated Instruction

EXTENSIVE

Provides guidance for teachers to support differentiated instruction by including:

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

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

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

The reviewers found **extensive** evidence for teachers to support differentiated instruction by including reading, writing, listening, and/or speaking alternatives. Materials provide multiple access points and modalities for students to learn (e.g., students can use argumentation and evidence-based discourse to develop scientific understanding rather than simply reading for understanding; students can use modeling to make sense of phenomena and problems and to make thinking visible in ways that are less dependent on English language proficiency; etc.). Teaching materials include detailed guidance on how individual students with various needs can be supported to access and engage in each specific learning activity. Differentiation supports are provided to help students access learning for all targeted learning objectives.

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

- Lesson 1, Preparation Checklist: "Throughout the unit, students will engage in discussions to support their figuring out science ideas. The Discussion Type Prompts reference provides examples of the kinds of questions you can ask students during discussions. You can provide students with coordinating sentence starters using the Discussion Supports handout to support them as they look, listen, and respond to one another's ideas." (Lesson 1, Teacher Guide)
- Lesson 1, Explore, Step 2: "Invite multilingual students to annotate these handout column labels in their preferred language to support their data collection and observations outside. Show how the first column has a place to write the place they are making observations, 'Schoolyard,' and the second and third columns have space to draw and/or write about plants and animals they find. Invite multilingual students to annotate these handout column labels in their preferred language to support their data collection and observations outside. Consider using the example you or one of the students shared in the previous Connect to fill in the first row using words or drawings." (Lesson 1, Teacher Guide)
- Lesson 1, Explore, Step 3: "Intentionally group students to support English language use and development (sometimes with peers who know the same languages as them, and other times with peers whose English language development is slightly more advanced). Thoughtful grouping that varies throughout a unit allows multilingual students to benefit from working with different peers and learn from the uses of other students' linguistic resources." (Lesson 1, Teacher Guide)
- Lesson 1, Explore, Step 4: "Encourage students to share their thinking in a variety of ways, and validate all the ways we communicate our ideas, such as with gestures or body movements, pointing at the photos, drawings (if helpful), and words from any languages students use." (Lesson 1, Teacher Guide)
- Lesson 2, Connect, Step 2: "To provide multiple means of comprehension and support young readers, the website includes audio recordings of all of the text. Also, consider using web-based text readers that include text-to-speech translation options to support multilingual learners as they access the website in this and future lessons." (Lesson 2, Teacher Guide)
- Lesson 2, Explore, Step 4: "To support equitable discussions, invite students to share their thinking about the shapes of land in a variety of ways, including using body movements, pointing at photos or their drawn ideas, and using words from any languages your students use. Encourage both scientific and everyday language to express their ideas. Physical movement can be especially useful in communicating about the shapes of land and water. Consider mirroring gestures and body movements back to students to highlight the idea shared." (Lesson 2, Teacher Guide)
- Lesson 2, Synthesize, Step 6: "Remind students that they will be sharing their ideas with one another and to do that well, they need to be able to hear and see everyone (not only the teacher) in the circle. Have copies of the Discussion Supports available for students to use during this student to student discussion."
- Lesson 3, Explore, Step 2: "If applicable, you might encourage multilingual students to add vocabulary words and kid-friendly definitions to the word wall across named languages (e.g., Spanish, Mandarin, Arabic) that they know and use if it would support their sensemaking throughout the unit." (Lesson 3, Teacher Guide)
- Lesson 3, Synthesize, Step 6: "Broadening Access A Building Understanding Discussion provides an authentic opportunity for you to enhance students' language learning and language use for sensemaking work. You might find it helpful to use the Discussion Type Prompts teacher reference during the discussion. This handout provides teacher

prompts that you could use to encourage students to explain where water is found and it being solid or liquid." (Lesson 3, Teacher Guide).

- Lesson 4, Synthesize, Step 6: "Broadening Access When recording students' ideas on Our Growing Ideas chart, it is important that students have their ideas recorded in alignment with the ways they shared them (e.g., using their own words, capturing gestures they might have used, etc.). Doing so not only helps students understand what is recorded in the chart, but also sends the message that their language resources and practices are valuable for the classroom community's sensemaking work. Verify what you are interpreting from the student while recording. This is an important message for all students to receive, and especially for those whose language resources are not always valued in school spaces, such as multilingual students" (Lesson 4, Teacher Guide).
- Lesson 5, Synthesize, Step 5: "Display Our Growing Ideas chart (refer to slide M). Read the first question on the slide and direct students to think first, then talk with a partner, and finally share with the group. Repeat this process with the second and third questions on the slide using discussion prompts such as the following. Discussing with a partner first in smaller group structures offer multilingual students a chance to engage in sensemaking with their peers as well as the space to use their linguistic and nonlinguistic resources to express their ideas (and learn from other students' uses of these resources too)." (Lesson 5, Teacher Guide)
- Lesson 6, Explore, Step 3: "Offering students an opportunity to work with peers gives them a chance to use their linguistic and nonlinguistic resources to express their ideas (and learn from other students' uses of these resources too) before sharing their ideas in a larger discussion. This is especially beneficial for multilingual learners but provides an opportunity for all learners to review their developing thoughts allowing for self-reflection. This might promote confidence, which ultimately optimizes motivation to engage in whole-class discussions." (Lesson 6, Teacher Guide)
- Lesson 7, Explore, Step 4: "Teaching Tip Adjust the time and structure for this investigation based on your students' needs. The recommended sequence includes one Explore to investigate plants and a second Explore to investigate animals. If students are more interested in animals, consider beginning with the animal sort. If they finish quickly and are ready to move on, shorten the time by bringing the class back together and transition to the next card sort." (Lesson 7, Teacher Guide)

Learners with special needs (visual impairments, tactile engagement, etc.)

- Unit Front Matter, "Students will be learning by and engaging with a variety of print and digital images and videos. There are suggestions throughout the unit to support making visual information accessible to students. This includes providing accommodations Following Student' IEP or 504 plan, and working with their case manager as needed. For website media, starting in Lesson 2, it is encouraged to: utilize video features (e.g., playback speed, and zoom features), consider students' proximity to the video, and provide various methods and opportunities for students to access the video. Students can consider features that support access to text and images, including: adjusting screen contrast, zooming in/enlarging text, and/or using a screen reader. These strategies can also support students' use of the website in Lessons 3 and 8. Some suggested strategies for observing printed media could include tactile or textured images (e.g., using raised outlines, different materials [felt for animals, sandpaper for plants], or braille labels) and/or audio descriptions of each plant or animal via a tablet for digital sorting with alt-text and screen reader compatibility. Additionally, consider pairing student(s) with a sighted peer or adult for collaborative engagement in the visual-based task where the student with visual impairment gives verbal directions based on descriptions provided." (Unit Front Matter)
- Lesson 1, Explore, Step 3: "Children who have tactile challenges or specific sensory needs may feel uncomfortable in outside spaces, due to changes in sounds, light, textures, and smells. See Going Outside Supports for guidance on ways to support students outdoors while they make observations of differences or patterns related to the physical

features of the place as well as plants and animals. Some suggestions to help ensure students' needs are met during outdoor learning include Following Student' IEP or 504 accommodations or planning ahead with students' case managers." (Lesson 1, Teacher Guide)

- Lesson 1, Teacher Reference Going Outside, "Identify barriers to physical access and plan accordingly. For instance, you may look for paths that are unpaved or uneven and determine a route that is accessible for all students." (Lesson 1, Teacher Reference Going Outside)
- Lesson 1, Teacher Reference Going Outside, "Be mindful of student IEPs, 504s, languages, and other accommodations needed as you would in the classroom. Ensure that while outside, all guidelines can still be met. Consider: Do you need to supply the student with additional ways to communicate while outside the classroom (personal whiteboards, etc.)? Can adaptive technology support students while outside? What areas can the student explore with reduced external stimuli (sounds, smells, textures)?" (Lesson 1, Teacher Reference Going Outside)
- Lesson 2, Explore, Step 3: "To minimize threats and distractions, especially for students with visual impairments, provide accommodations Following Student' IEP or 504 plans, or work with case managers as needed. Some ideas to support your students' visual access to the information in videos include: varying the playback speed and zoom features as needed, and provide students with opportunities to view the video on a tablet or classroom computer to watch it again as needed. Features that can support access to text and images include adjusting screen contrast, zooming in/enlarging text, and/or using a screen reader." (Lesson 2, Teacher Guide)
- Lesson 2, Explore, Step 5: "Broadening Access To enhance students' language learning and language use opportunities, provide some time for pairs to rehearse their similarities and differences with each other before sharing with the group. Encourage multiple means of expression by encouraging students to practice with their handouts as a model they can point and refer to in order to anchor their discussion with collected evidence. Support the use of gestures or everyday language they prefer." (Lesson 2, Teacher Guide)
- Lesson 4, Explore, Step 2. "The colors used on the map indicate different kinds of land and water. If students struggle to distinguish between the colors on the map, consider using patterns (like dots or crosshatches) or adding words to the various components of the map. This provides multiple means of representation by providing alternate versions of the visual information." (Lesson 4, Teacher Guide)
- Lesson 5, Synthesize, Step 2: "Visual aspects of this task may pose challenges to students with certain visual impairments. Consider the following options as appropriate and in consultation with students' IEP, 504 Plan, and recommendations from students' case managers. Importantly, we encourage you seek out assistance from members of your school team who specialize in different aspects of equitable and accessible learning, such as your special education team members, assistive and/or district technology specialists, and any other education team member who can get to know your students and your unique needs from unit to unit. It is critical that any differentiation and/or accommodations made do not lessen or take away from the sensemaking work that students engage in throughout this unit. Consider adding tactile components like a textured outline using puffy paint or wikki stix to the different land and water features on the National Park Photos handout images. Support students in recognizing how each image shows land and water features. Consider incorporating a tactile component to the maps and map keys such as marking agreed-upon patterns into the different colors of clay with a craft stick to help students know by feeling which clay represents the land with or without plants, solid water, and liquid water. You can record audio descriptions of the National Park Photos handout images for the student(s) to listen to while planning and developing their maps." (Lesson 5, Teacher Guide)
- Lesson 6, Explore, Step 3: "Broadening Access Children who have tactile challenges or specific sensory needs may feel uncomfortable in outside spaces. They can still make observations of plants and animals but make sure their

individual needs are considered by discussing a plan with the student(s) before going outside. See Going Outside Supports for additional guidance." (Lesson 6, Teacher Guide).

- Lesson 7, Explore, Step 3: "To provide accessible options for students with visual impairments during the card-sorting task, partner up with the student's resource specialist to plan the best way to support student(s). For example, you could offer tactile or textured cards (e.g., using raised outlines, different materials [felt for animals, sandpaper for plants], or braille labels) and/or audio descriptions of each plant or animal via a tablet for digital sorting with alt-text and screen reader compatibility. Additionally, you could pair student(s) with a sighted peer or adult for collaborative sorting where the student with visual impairment gives verbal directions based on descriptions provided." (Lesson 7, Teacher Guide)

Learners reading below grade level

- Lesson 3, Preparation Checklist: "Some students may benefit from additional support as they engage in this reading and writing task. Please see the "Supporting Literacy for All Students" section of the Teacher Handbook for ways to scaffold literacy tasks for students based on their individual needs." (Lesson 3, Teacher Guide)
- Lesson 6, Navigate, Step 6: Teaching Tip, "Re-reading questions that have been answered already allows for a more student-driven discussion. This also supports students who are not yet reading or multilingual learners." (Lesson 6, Teacher Guide)
- Lesson 8, Lesson Materials and Preparation, "Some students may benefit from additional support as they engage in this reading and writing task. Please see the "Supporting Literacy for All Students" section of the Teacher Handbook for ways to scaffold literacy tasks for students based on their individual needs." (Lesson 8, Teacher Guide).
- K-5 Teacher Handbook includes a "Supporting Literacy for All Students" with "Scaffolds for Read Alouds" "Scaffolds for Independent Reading, and "Scaffolds for Writing." Support is outlined in three column charts, the first column includes what the teacher might observe, the second column provides suggestions on how they might respond, and the third column provides the rationale for the recommendation. For example: Scaffolds for Writing:
  - "When you observe a student who... demonstrates difficulty with letter formation."
  - "You might respond by... allowing students to write in whatever form they are able and the teacher writes down what the student says about the science ideas that are drawn or represented on the page."
  - "Rationale... This scaffold ensures that the teacher can decipher the science ideas that the student is trying to communicate. This can be particularly helpful for students who struggle to translate their oral language into written language for a variety of reasons." (Teacher Handbook, Supporting Literacy for All Students)
- Lesson 6, Navigate, Step 6: Teaching Tip, "Re-reading questions that have been answered already allows for a more student-driven discussion. This also supports students who are not yet reading or multilingual learners." (Lesson 6, Teacher Guide)

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

- Lesson 4, Instructional Guidance, "Students are representing land and water in a map (model), but are not connecting ideas about patterns or relative scale in describing the land and water features." (Lesson 4, Teacher Assessment Tool Instructional Guidance)

- Lesson 6 Assessment Tool, "Not yet secure: Student makes observations of individual plants or animals without comparing them. Student makes observations that do not yet support making comparisons. Comparing plants or comparing animals with peer and/or class level support. Possible feedback: I see you pointing and counting that this animal has 2 legs and this animal has 4 legs. According to the labels we have, do you think they would be in the same group or different groups? I noticed you drew a lot of details about these two plants. Let's use those details to think about what is similar and what is different (with option to use a Venn diagram or other graphic organizer). Let's look back to how we sorted plants and animals." (Lesson 6, Following Student Sensemaking 2, Page 13)
- Lesson 7, Explore, Step 7: "If students need more support making observations to sort their cards, encourage students to observe cards one at a time, prompting them to observe the feature they are sorting by (no legs, 2 legs, 4 legs, many legs)." "If students need more support making comparisons, break the task into smaller parts. While comparing across cards, have students focus on one group of cards or just two cards at a time. Also consider providing the sentence stems 'The animals are similar because _____' or 'The animals are different because _____' for students to use in verbal response or in their writing." (Lesson 7, Teacher Guide)
- Lesson 8 Assessment Tool: "During the second Synthesize in Lesson 9 when students write their National Park script, work with a small group of students to revisit their drawing and writing from Lesson 8. Ask questions about the observations they recorded to support students in recognizing which observations show how plants (or animals) were different. (Lesson 8, Instructional Guidance)

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.

Extension opportunities are embedded in several of the lessons, for example:

- Lesson 3, Explore, Step 5: "Extension Opportunity: To further explore how water can be solid or liquid depending on temperature, consider providing students with an opportunity to investigate how ice changes to liquid when heat is applied. See Solid and Liquid Extension for setup and additional guidance." (Lesson 3. Teacher Guide)
- Lesson 5, Synthesize, Step 3: "Extension opportunity: To further apply ideas related to mapping the shapes and kinds of land and water in any area, students can develop additional maps of other areas of the National Park they researched. They can use images from the Explore Extraordinary National Parks website or their own drawings from Lessons 2 or 3. Questions like, "How is the land or water in this area similar or different to the one in your original map?" and "How does that similarity/difference affect how you need to represent _____ (feature) in the new map?" can support students' further exploration of the ideas and practices they are working toward in this unit." (Lesson 5, Teacher Guide)
- Lesson 6, Explore, Step 2: "Extension opportunity: Note that this Lesson does not already call for students to specifically measure as a form of data collection, so that they can compare these observations with those they will make from photos in subsequent lessons. However, as an option, you could consider providing students with rulers, yardsticks, meter sticks, and/or measuring tapes to take measurements in addition to qualitative observations of plants to use as data to extend students' use of Planning and Carrying out Investigations in this lesson. Measuring length with appropriate tools and estimating lengths using units of inches, feet, centimeters, and meters also connect to math standards 2.MD.A.1 and 2.MD.A.3." (Lesson 6, Teacher Guide)
- Lesson 7, Synthesize, Step 6: "Extension: Students may leave this Lesson with questions about other kinds of plants and animals that live in the National Park or questions about the plants and animals they observed within the lesson. Consider providing opportunities for students can also go beyond the scope of this Lesson and use additional resources such as books from the school library or a web-based search to find out more about the biodiversity in the National Parks or another chosen area." (Lesson 7, Teacher Guide)

- Lesson 8, Instructional Guidance for Lesson 8, "If you notice...Shows a secure understanding of the Assessment Statement", Possible next steps, "If this applies to some of your class: Provide opportunities for them to make further connections to everyday life and their communities by writing a script they could use to share about the plants and animals on land and in water in their local area or an area of interest." (Lesson 8, Teacher Guide)
- Lesson 8, Connect, Step 2: "Extension: As an extension, students can make observations of plants and/or animals to build ideas about biodiversity in places and habitats beyond the examples provided in this unit. At the time of this unit's development, Glacier National Park was offering virtual tours where a ranger guides students on a virtual hike to explore 4 habitats and look for at least one animal in each. See this website for details: https://www.nps.gov/teachers/classrooms/glacier-habitats-distance-learning.htm" (Lesson 8, Teacher Guide)

Criterion-Based Suggestions for Improvement: N/A

II.F. Teacher Support for Unit Coherence

EXTENSIVE

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

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

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

The reviewers found **extensive** evidence of teacher support for unit coherence. Teachers are supported in helping students see how lessons fit together. For example, the material includes strategies for linking student engagement, such as cultivating new questions at the end of lessons in a way that leads to future lessons and including navigation routines to help make connections among lessons explicit to students.

i. Provide 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.).

- Lesson 1, Explore, Step 4: "Transition to making additional observations of new places. Building off of ideas about how we could see plants and animals in new other places, remind students of ideas they shared in the Connect about how to find out more about places with plants and animals like going on a field trip or visiting other places to observe plants and animals. Suggest we do something similar by "visiting" some different places unfamiliar to us to see where we can observe plants and animals in these places." (Lesson 1, Teacher Guide)
- Lesson 1, Synthesize, Step 6, "Motivate researching places. Summarize that we have shared ideas to investigate our two big groups of questions, those about the places we encountered plants and animals and those about plants and animals. Suggest starting with investigating the different places. A Lesson set question similar to, How are places where plants and animals live similar and different? that builds from students' questions on the Notice and Wonder chart can support this work. Highlight connections students made between these questions and ideas they had related to researching/gathering information about these places from various sources that might include images, videos, books, websites, etc." (Lesson 1, Teacher Guide)

- Lesson 2, Navigate, Step 1: "Revisit ideas for investigation. Display slide B. On the Notice and Wonder chart, point out the investigation ideas on sticky notes that relate to researching different places where plants and animals live. Use discussion prompts like the following to help students recall the investigation ideas the class generated... What were some of the investigation ideas we came up with to find out more about different places where we noticed plants and animals? [point to a question related to places on the Notice and Wonder chart] "Summarize big groups of questions. Use students' discussion of the Notice and Wonder chart to summarize that in Lesson 1 the class generated ideas to investigate two big groups of questions, those about the places where plants and animals live and those about different kinds of plants and animals in a place. Remind students of the decision to begin with investigating where plants and animals live, using a Lesson Set question similar to "How are places plants and animals live similar and different?" (Lesson 2, Teacher Guide)
- Lesson 2, Connect, Step 2: "Turn and talk about places outside of our community. Remind students we observed that there were plants and animals outside of our communities in the National Parks in Lesson 1. Have students turn and talk about whether they think the National Parks also have areas outside that are land/"on the ground" or in the water like our communities. Then, invite a few pairs to share aloud and invite the class to add any new questions about land, water, or places plants and animals live to the Notice and Wonder chart. Develop today's Lesson Question with students. Use students' ideas about what places plants and animals may live in the National Park and questions about where plants and animals live to suggest we begin with investigating the land parts of the National Parks first. Co-construct a question like, "What kinds of land are in the different National Parks?" and then display the class' version of this question on slide D." (Lesson 2, Teacher Guide)
- Lesson 2, Explore, Step 5: "Through research and observation, students will describe many kinds of similarities and differences of land in different places. Some of these observations may include ideas about the abundance or types of plants visible on that land. As these ideas come up, support students in reframing them as questions to investigate in the second Lesson set when students explore diversity of life in their local communities and the National Parks." (Lesson 2, Teacher Guide)
- Lesson 3, Navigate, Step 1: "Gather in a Scientists Circle. Use the following discussion prompts to help students recall their work investigating land in Lesson 2 and motivate figuring out more about where water is and the similarities and differences of the water in the different National Parks. Display the Notice and Wonder chart (slide A) and have Our Growing Ideas chart within view and available for students to reference during this brief discussion. As students share their ideas and questions about water, point out relevant noticings and wonders and add any new wonders that arise. Circle any questions about water to return to at the end of the Lesson to check if they were answered." (Lesson 3, Teacher Guide)
- Lesson 3, Synthesize, Step 6: "Check for answered questions. Display the Notice and Wonder chart (refer to slide M). Have students share if any of the circled questions are now answered after today's lesson. For any questions that were answered, add a checkmark next to the question so we know we have figured that out. Problematize next steps. Remind students they have figured out about land and water in the different places and that we are going to be working together to share information about the different parks with other groups. Ask students to turn and talk about any remaining questions they had about where or the places plants and animals live and what new questions they have." (Lesson 3. Teacher Guide)
- Lesson 4, Navigate, Step 1: "Revisit Notice and Wonder chart. Point out the noticings and wonders (refer to slide B) that relate to showing and/or communicating (i.e., drawings) about both the land and water in the National Park they are researching to others. Circle any questions to return to at the end of the Lesson to check if they were answered. Develop today's Lesson Question with students. Co-construct the Lesson Question with students by building on their questions about where the different shapes and kinds of land and water are in the National Parks. The Lesson Question should be something like, How can we show the location, shapes, and kinds of land and water in a place?

but be sure to use wording your students have been using. Revise slide C to the Lesson Question the class agreed upon and display the Lesson Question. Add the class Lesson Question to the next row of Our Growing Ideas chart to continue to keep track of what we figure out." (Lesson 4, Teacher Guide)

- Lesson 5, Navigate, Step 1: "Ask students how we might answer that question, emphasizing any ideas students share about developing maps of each National Park to share with the class. As needed, encourage students to think back to previous lessons to review how they modeled the kinds and shapes of land and water. Share that they will be making maps as models to help show their classmates the different kinds, shapes, and locations of land and water in the National Park they researched." (Lesson 5, Teacher Guide).
- Lesson 6, Navigate, Step 1: "Refer to Our Growing Ideas chart (or slide B) to remind students that last time we decided on a new Lesson Set question similar to What kinds of plants and animals live in different places? Read the question aloud for students and have them turn and talk about what we will need to figure out to fully answer that question. Listen for ideas related to finding out about plants and animals in different places like those locally, at the different National Parks or in the land and water places they have researched in the parks." (Lesson 6, Teacher Guide)
- Lesson 7, Explore, Step 4: "The sorting activities in this Lesson support making multiple observations of many kinds of plants and animals in each National Park. Discussions of similarities and differences allow students to observe the kinds of animals and plants that tend to live in the park, although make sure students understand that the ones they observe and how they might make sense of the variety is not exhaustive. You can add questions about this to the Notice and Wonder chart and return to them when students read about how many types of plants and animals are in the National Parks using the Explore Extraordinary National Parks website in Lesson 8." (Lesson 7, Teacher Guide)
- Lesson 7, Navigate, Step 1: "Co-construct the Lesson Question with students by building on their questions about the plants and animals in the National Parks. The Lesson Question should be something like, What kinds of plants and animals live in the National Parks? but be sure to use the wording students suggested." "Revisit ideas for investigation. Display slide C. Have students briefly turn and talk about how we might answer that question, emphasizing any ideas students share about how to make observations of the National Park plants and animals without traveling there. It may be helpful to refer back to any related ideas for investigations on sticky notes on the Notice and Wonder chart. Encourage students to think back to the previous Lesson to how they investigated their local plants and animals." (Lesson 7, Teacher Guide)

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

- L2-4 Following Student Sensemaking tool, used to evaluate students' progress toward Assessment Statement 1, "Use recorded evidence to formatively evaluate students' progress in Lessons 2-4 (see the Instructional Guidance for Lesson 4 tool to plan next steps based on the evidence you have collected). You will summatively evaluate students' progress in Lesson 5 using the Summative Guidance 1 tool; if needed, evidence gathered using this tool can also be used to summatively evaluate students' progress."
- L6-8 Following Student Sensemaking tool, used to evaluate students' progress toward Assessment Statement 2, "Use recorded evidence to formatively evaluate students' progress in Lessons 6-8 (see the Instructional Guidance for Lesson 8 tool to plan next steps based on the evidence you have collected). You will summatively evaluate students' progress in Lessons 9-10 using the Summative Guidance 2 tool; if needed, evidence gathered using this tool can also be used to summatively evaluate students' progress."

- Lesson 4, Instructional Guidance for Lesson 4, "By Lesson 4, it is important that students are using information their **research** to describe **patterns** of **shapes and kinds of land and water** in different areas, as well as ideas about **relative scale**, to **develop maps** (**models**) **that represent** the **shapes and kinds of land and water in an area**. This is because students will apply their understanding of mapping shapes and types of land to develop their own maps in Lesson 5. Use the evidence you have gathered on the Following Student Sensemaking 1 tool in Lessons 2-4 to evaluate students' progress toward the assessment statement above and plan your upcoming instruction accordingly." If you notice…Possible Next Steps." (Lesson 4, Teacher Guide)
- Lesson 5, Navigate, Step 6: "Summarize wonders. Notice aloud how many of the remaining wonders are about the plants and animals that could be found in these different places. Connect these questions to the part of the class' selected unit question about plants, animals, or what/who lives in different places. Based on students' remaining (or new) wonders, co-construct a new Lesson set question to What kinds of plants and animals live in different places? and add this question to Our Growing Ideas chart (refer to slide 0)" (Lesson 5, Teacher Guide).
- Lesson 8, Instructional Guidance for Lesson 8, "By the end of Lesson 8, it is important that students are **making observations** of **plants and animals** and **using their data to compare** how they are **similar and different and using those patterns as evidence** that **many different plants and animals live in an area**. Use the evidence you have gathered on the Following Student Sensemaking 2 tool in Lessons 6-8 and students work on Animal and Plant Comparisons to evaluate students' progress toward the assessment statement above and plan your upcoming instruction accordingly. When you get to Lesson 9, focus on supporting students who are not yet secure in their sensemaking. Based on which of the statements below align with what you notice about your students (most of the class, some of the class, or a few students), you may choose to take some or several of the next steps suggested here. Note that students will continue to work toward this assessment statement in Lessons 9-10." (Lesson 8, Teacher Guide).
- Lesson 10, Navigate, Step 1: "Navigate to being ready to answer the Lesson set question. Celebrate with students all that they have figured out about the National Parks they are researching. Ask students if they think they are ready to answer the Lesson Set 2 question, What kinds of plants and animals live in different places? but be sure to use wording your students have been using in the unit. Revise slide B to the unit question since they will be answering that as the Lesson Question. Add this question to the next row of Our Growing Ideas chart to continue to keep track of what we figure out." (Lesson 10, Teacher Guide).

The materials include student handouts that students return to and reference as they continue to build understanding across the unit. For example:

- Lesson 1, Navigate, Step 6: "Close the Lesson by collecting the handout from this lesson. Students will be working in research pairs for many upcoming lessons in this unit to investigate the land, water, plants, and animals at one of the National Parks." (Lesson 1, Teacher Guide).
- Lesson 2, Navigate, Step 7: "Close the Lesson by collecting the handout from this Lesson and plan to keep them for the remainder of the unit. Students will need the handouts in Lessons 5, 9, and 10 as they synthesize ideas from their research at different points in the unit." (Lesson 2, Teacher Guide)
- Lesson 4, Navigate, Step 7: "Close the Lesson by collecting the handout from this Lesson and plan to return them to students in Lesson 5." (Lesson 4, Teacher Guide).
- Lesson 5, Synthesize, Steps 2 and 3: "Display slide G. Have students take out their handouts from Lessons 2, 3, and 4 to look back on what they wrote about the land and water in the National Park they are researching and the ways they represented land and water using a map in Lesson 4. Read, think, pair, and share about a plan for developing models. Give time for students to review and discuss what they figured out about land and water in their researched National

Park and about mapping using their previously completed handouts. Display slide I to show students that they will first look at an image from the National Park they have been researching that has some/many of the land and water features they researched to make their map. These images are on the National Park Photos handout. They should use their research to help identify what land and water features could be in the image to use for their maps of one area of the National Park they researched." (Lesson 5, Teacher Guide).

- Lesson 9, Navigate, Step 4: "Collect handouts. Close the Lesson by collecting National Park Presentation Script and plan to return them to students to use to make their video presentation in Lesson 10." (Lesson 9, Teacher Guide)

Criterion-Based Suggestions for Improvement: N/A

II.G. Scaffolded differentiation over time

EXTENSIVE

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

The reviewers found **extensive** evidence that supports are provided to help students engage in the practices as needed, and supports can gradually be adjusted over time so that students are increasingly responsible for making sense of phenomena using the SEP elements. The level of scaffolding provided for students at different points in the unit is reduced in later lessons compared to the levels in earlier lessons. The 2.3 Habitats & Biodiversity Unit Front Matter identifies three elements indicating that the unit provides support to scaffold over time: MOD-P3, INFO-P3, and INV-P4.

MOD: Developing and Using Models

MOD:-P1: Develop and/or use a model to represent amounts, relationships, relative scales (bigger, smaller), and/or patterns in the natural and designed world(s). (MOD-P3) The 2.3 Habitats & Biodiversity Unit Front Matter states that students use this element with increasing independence. Claimed in the 2.3 Habitats & Biodiversity SEP-DCI-CCC-ELA-Math-Matrix in Lessons 2, 3, 4, and 5.

- Lesson 2, Explore, Step 3: "Invite students to share other features they notice, like the map and the captions, along with the images." Teaching Tip, "In this lesson, students are observing and comparing land for the purpose of figuring out about the shapes and kinds of land that they will map in Lessons 4-5." (Lesson 2, Teacher Guide)
- Lesson 3, Explore, Step 3: "Begin the Bodies of Water chart. Display slide F and suggest we share and record our ideas about each body of water using a chart. Hang up a sheet of chart paper and label "Bodies of Water" to begin building the chart as a class." "Suggest to students that you begin finding patterns in one type of body of water, ponds, and that you will look for patterns across all bodies of water. Use the following prompts for a brief student to student discussion about ponds. As students share evidence from their research about the bodies of water add drawings to capture their thinking and provide visuals of these bodies of water for the class to reference." "Use the following discussion prompts for each body of water to organize student observations." Prompts include: "How can we show these ponds on our chart?" Patterns, "Explicit prompts to notice and discuss similarities between these examples support students in identifying observable patterns. They will work in upcoming lessons to observe and compare

different types of maps to recognize how land and water are shown, helping them better understand patterns in how land and water are shown on maps." (Lesson 3, Teacher Guide)

- Lesson 4, Explore, Step 4: "Introduce mapping location. While students are still gathered in a Scientist Circle, let them know that they will have the opportunity to explore maps of one location (refer to slide F). Use prompts like the following to support students in considering the land and water features in the image: What land do you notice in this image? What does it look like? What water do you notice? What does it look like? What shape is it? How have we shown land and water like this on handouts and charts so far?" Developing and Using Models, "One important element of this practice is representing amounts and relative scales. As students work with the maps (models) at each station, support them in considering how the maps represent various amounts of land or water or the relative scale (bigger/smaller, taller/shorter) of the land and water features. While students may be familiar with these ideas, especially related to relative scale, from shared drawn representations of land on the Lesson 2 Land chart and Lesson 3 Bodies of Water chart, this is the first time students are using maps (models) representing both land and water features in an area." (Lesson 4, Teacher Guide)
- Lesson 5, Synthesize, Steps 2 and 3: "Create a Gotta Have It Checklist. Display slide D and engage the class in a brainstorm discussion using the suggested prompts below to gather student ideas for what should be included in the National Park maps. Support students in understanding that sharing information about the shapes and kinds of land and water in the National Parks can help the class answer our question about how these parks are similar and different. As students share ideas, create a slide, poster, or whiteboard with their ideas so all students have access to a shared visual list." "Co-develop a map key. Display slide F and acknowledge the different ways students suggested for representing shapes and kinds of land and water. Use these ideas to suggest developing a map key for the class to use so we can easily read other's maps. Continue to display slide I and share the procedure students will use to create their individual National Park maps of the area in the image they use. Have the map making materials students will have available while discussing the procedure for developing the maps and be sure students know how to access the materials when they are ready to begin. Students will individually develop maps, but can sit with a partner who researched the same National Park." Developing and Using Models, "Students previously used preconstructed maps (models) that represented land and water in an area in Lesson 4 and here they build on that use by using materials to develop maps (models) of the land and water in a new area." (Lesson 5, Teacher Guide)

INV: Planning and Carrying Out Investigations

INV- P4: Make observations (firsthand or from media) and/or measurements to collect data that can be used to make comparisons. (INV-P4). The 2.3 Habitats & Biodiversity Unit Front Matter lists this as an element students use with increasing complexity. Claimed in the 2.3 Habitats & Biodiversity SEP-DCI-CCC-ELA-Math-Matrix in Lessons 1, 3, 6, 7, and 8.

- Lesson 1, Explore, Step 3: "Bring students outside and have them work with their partners to make observations of plants and animals." (Lesson 1, Teacher Guide)
- Lesson 3, Synthesize, Step 6: "Display slide K and bring students together in a Scientists Circle to engage in a Building Understandings Discussion. Have the Bodies of Water Chart and the Ice and Water chart displayed and use the following prompts for students to share their observations and experiences about where water is found and it being solid or liquid. Remind students that their ideas are important for helping the whole class figure out what we figured out. Consider providing sentence starters, such as I think _____ because _____ and I agree with that idea because _____."
- Lesson 6, Explore, Step 2: "Make a plan for investigating plants and animals near us. Display slide E and remind students that we want to figure out the kinds of plants and animals that live near us. Suggest that we come up with a plan together so that we can work together to answer that question. Ask students what we need to plan

before going outside using discussion prompts such as the following, and listen for ideas on what to observe and how to record our findings." Planning and Carrying Out Investigations, "An important element of this practice is making observations to collect data that can be used to make comparisons. Students had an explicit opportunity to make outdoor and media-based observations in Lesson 1 and again in Lesson 3 while observing ice and water. The discussions in this Explore, serve to remind students of how to make high quality observations that will result in data that the class can use to make comparisons." (Lesson 6, Teacher Guide)

- Lesson 7, Explore, Step 3: "Remind students that we want to figure out the kinds of plants and animals in each of the National Parks! Display slide E. Hold up and flip through the plant and animal cards for the class example National Park, explaining that these are 10 photographs of plants that can be found there. Invite students to turn and talk with a partner about how we could use these to figure out the kinds of plants and animals in each of the National Parks. Then, have students share their suggestions, which will likely include looking, noticing similarities and differences, and using descriptions of the ways the class organized plants and animals in Lesson 6." Planning and Carrying Out Investigations, "In this Explore, students use picture cards to make observations and collect data about plants and animals in the National Park they are researching. They build on the first-hand observations they made as a class in Lesson 6 by making observations from media with a partner and using the data to compare the kinds of plants and animals in the National Park they are researching." (Lesson 7, Teacher Guide)
- Lesson 8, Explore, Step 3: "Facilitate small group discussions about making observations. Display slide F. Pose the following discussion prompts to small groups to plan for making observations of plants and animals with the purpose of comparing the kinds in the land group and the kinds in the water group." Planning and Carrying Out Investigations, "This is the third opportunity students have in this unit to explicitly make observations of plants and animals to collect data that they can use to compare them. Students have opportunities to show more independence in this practice as they discuss how they plan to make observations and comparisons within partnerships or small groups and make decisions about recording their ideas to show evidence of using their observations to compare." (Lesson 8, Teacher Guide)

INFO: Obtaining, Evaluating, and Communicating Information

INFO: P3: Obtain information using various texts, text features (e.g., headings, tables of contents, glossaries, electronic menus, icons), and other media that will be useful in answering a scientific question and/or supporting a scientific claim. (INFO-P3) The 2.3 Habitats & Biodiversity Unit Front Matter lists this as an element students use with increasing complexity. Claimed in the 2.3 Habitats & Biodiversity SEP-DCI-CCC-ELA-Math-Matrix in Lessons 2, 3, and 8.

- Lesson 2, Explore, Step 3: "Gather the class so all students have a clear view of the projected Lesson slides (refer to slide E). Share that, to help us figure out more about the land in each research location, we are going to go to a new Explore Extraordinary National Parks website that has information, including text and videos, about different places... Help students notice additional text features, like headings, links, and captions on the research webpage. Have 1-2 student pairs share aloud for each question... Ask students to turn and talk about whether they think the information on this page can help answer their Lesson Question about how land can be similar and different. Look and listen for ideas about how there is not much information about the land on this page, and suggest using the website's text features to look at other pages for the class example National Park." (Lesson 2, Teacher Guide)
- Lesson 3, Explore, Step 2: "Obtain information from the website. Allow time for students to gather water information for the National Park they are researching. While students are working, circulate around the room and use the following prompts to support students in obtaining and recording information about the water." Prompts include: "What details do the sentences give about that water? What about the picture?" Obtaining, Evaluating, and

Communicating Information: "This is the second opportunity in this unit for students to use a website to gather information about the land and water in the National Park they are researching. Gathering information from various texts is an important aspect of this practice. Support students in recognizing how the texts in this Lesson may present information in similar and different ways than the paragraphs and videos in Lesson 2." (Lesson 3, Teacher Guide)

- Lesson 8, Connect, Step 2: "Re-introduce the website and plant and animal card sets. Display slide D and tell students that we have the National Park image cards of plants and animals and the website available to help us answer our question, but still need to make decisions about how to organize any information we find." Obtaining, Evaluating, and Communicating Information, "This Lesson builds on previous experiences of obtaining information by asking students to use multiple texts (animal page and plant page), where previously all information could be obtained from a single text with multiple features (land page or water page)." (Lesson 8, Teacher Guide)

Criterion-Based Suggestions for Improvement: N/A

CATEGORY III

Monitoring NGSS Student Progress

III.A. Monitoring 3D Student Performance

ADEQUATE

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

The reviewers found **adequate** evidence that materials elicit direct, observable evidence of three-dimensional learning and that students are using practices with core ideas and crosscutting concepts to make sense of phenomena. However, the summative task, the presentation of research, is confirmatory in nature rather than focused on sensemaking. Students can successfully complete the task by restating ideas already developed in the lesson.

Students have opportunities to demonstrate that they have reached or exceeded all targeted learning objectives. Lessons 5 and 10 contain summative assessments. Students apply existing knowledge, but not in a way that constructs a new understanding of the scenario presented. Students complete group tasks. While the artifacts can be collected and evaluated to determine mastery of learning objectives, this occurs only if teachers apply the provided "Following Sensemaking Tools."

- Lesson 2, Assessment Tool "Lessons 2-4 Assessment Statement 1: Develop a model to represent the shapes and kinds (patterns) and relative sizes of land and bodies of water in an area using information gathered about where land and water is found on Earth. (aligned to 2-ESS2-2 and 2-ESS2-3) Each lesson's learning goal and the specific work students do in the Lesson are designed to move students forward in their use of Science and Engineering Practices, Crosscutting Concepts, and Disciplinary Core Ideas. Throughout each lesson, jot down evidence of a few students' sensemaking. You can use this table, a seating chart, your class list, or another way to keep track of what students say, do, write, draw, objects they manipulate and how, etc., to note how they are demonstrating the listen-fors and look-fors. Use recorded evidence to formatively evaluate students' progress in Lessons 2-4 (see the Instructional Guidance for Lesson 4 tool to plan next steps based on the evidence you have collected). You will summatively evaluate students' progress in Lesson 5 using the Summative Guidance 1 tool; if needed, evidence gathered using this tool can also be used to summatively evaluate students' progress. (Lesson 2, Assessment Tool)
- Lesson 5, Synthesize, Step 3: "Invite students to gather the map-making materials they will need to create their map, reminding students to use the materials safely. As students create their individual map on their paper plate, displaying the kinds, shapes, and locations of land and water in the area of the National Park they are researching, circulate between groups to pose prompts suggested below to support students in describing the parts they plan to include in their map, the relative shape and location of the parts and in making connections between the materials/colors used in their maps and what the materials/colors represent in the area of the National Park they are researching. This is a great opportunity to engage students in multimodal language use with materials to express their sensemaking." "Students' individual National Park Map provides an opportunity to gather evidence about learning goal 5 (aligned to Assessment Statement 1), with the purpose of summatively assessing students' use of observed patterns to develop a model that represents the shapes and kinds of land and water in the National Park they are researching. Refer to the Summative Guidance 1 tool and the Assessment Guidance at the beginning of the Lesson to evaluate students' assessment and provide feedback." (Lesson 5, Teacher Guide) In this summative assessment, students are applying prior learning to making maps; they are not constructing new learning.

Individual evaluation occurs if teachers utilize the Following Sensemaking Tool.

- Lesson 6, Assessment Tool 2: "Lessons 6, 7, 8 Assessment Statement 2: Make observations of plants and animals to compare the kinds of plants and animals in different habitats on land and in water. (Aligned to 2-LS4-1). Each lesson's learning goal and the specific work students do in the Lesson are designed to move students forward in their use of Science and Engineering Practices, Crosscutting Concepts, and Disciplinary Core Ideas. Throughout each lesson,

jot down evidence of a few students' sensemaking. You can use this table, a seating chart, your class list, or another way to keep track of what students say, do, write, draw, objects they manipulate and how, etc., to note how they are demonstrating the listen-fors and look-fors. Use recorded evidence to formatively evaluate students' progress in Lessons 6-8 (see the Instructional Guidance for Lesson 8 tool to plan next steps based on the evidence you have collected). You will summatively evaluate students' progress in Lessons 9-10 using the Summative Guidance 2 tool; if needed, evidence gathered using this tool can also be used to summatively evaluate students' progress. (Lesson 6, Assessment Tool)

- Lesson 10, Synthesize, Step 2: "Pass back students' National Park Presentation Script, have students collect their visuals and distribute clipboards, and writing utensils for each student. Let students know that each presentation should be about 2 minutes long." "Ensure that the Gotta-Have-It Checklist is visible for all students and display slide D. Have students partner up with a student that is not their research partner, choosing (or assigning) a Partner A and Partner B, with which to practice their presentation... Students' presentation of the National Park Presentation Script provides an opportunity to gather evidence about Assessment Statement 2, with the purpose of summatively assessing students' comparisons of the plants and animals in the park they researched in habitats on land and in water. Use Summative Guidance 2 to provide feedback to students. If you have not yet checked off the box for certain students, make sure to talk with and listen to those students as they practice and present in this Lesson so they have an opportunity to explain their thinking and inform your summative assessment of their progress." (Lesson 10, Teacher Guide) In this summative assessment, students are applying prior learning to writing and presenting scripts; they are not constructing new learning. Individual evaluation occurs if teachers utilize the Following Sensemaking Tool.

Student performances produce artifacts of integrating the three dimensions in service of sense-making or problem-solving. Throughout the unit, several student performances produce artifacts that integrate the three dimensions in service of sensemaking or problem-solving.

- Lesson 4 Learning Goal: **Use maps of the shapes and kinds of land and water in an area** to **observe and describe patterns in how maps represent locations**. Lesson 4, Explore, Step 4: "Students' exploration of map stations and their observations recorded on their Map Observations handout provide an opportunity to gather evidence about Assessment Statement 1, with the purpose of providing feedback to students and guiding instruction in upcoming lessons. Encourage students to make connections between the map materials they are using and the real land and water features in the Heart Lake Photograph image the materials represent. (Lesson 4, Teacher Guide) The Following Student Sensemaking Tool is used to record evidence for students.
- Lesson 5, Learning Goal: **Use observed patterns about land and water** features **to develop a model that represents the shapes, kinds, relative sizes and locations of land and water in an area of a National Park.** Lesson 5, Synthesize, Step 3: "Develop a National Park map. Invite students to gather the map-making materials they will need to create their map, reminding students to use the materials safely. As students create their individual map on their paper plate, displaying the kinds, shapes, and locations of land and water in the area of the National Park they are researching, circulate between groups to pose prompts suggested below to support students in describing the parts they plan to include in their map, the relative shape and location of the parts and in making connections between the materials/colors used in their maps and what the materials/colors represent in the area of the National Park they are researching. This is a great opportunity to engage students in multimodal language use with materials to express their sensemaking." "Refer to the Summative Guidance 1 tool and the Assessment Guidance at the beginning of the Lesson to evaluate students' assessment and provide feedback." (Lesson 5, Teacher Guide) This is identified as a Summative Assessment moment; however, the map that students create is only used to evaluate individual understanding if teachers use the Assessment Guidance for every student.

- Lesson 8, Learning Goal: **Obtain information** about **where plants and animals live** to **identify patterns to use as evidence that plants and animals exist in different places on land and in water.** Lesson 8, Explore, Step 3: "Display slide G and invite students to decide with their partner how to organize their ideas about where plants and animals are found in the National Park they are researching, showing them the spaces on the handout for drawing and also writing. Then, distribute Animal and Plant Comparisons assessment to each student." "Use the ideas students share on their Animal and Plant Comparisons handout and evidence you have gathered on the Following Student Sensemaking 2 tool from Lessons 6 and 7 to evaluate students' progress toward Assessment Statement 2. Use the Instructional Guidance for Lesson 8 tool to provide feedback to students and plan your upcoming instruction."(Lesson 8, Teacher Guide) The handout is co-constructed with a partner, and the artifact produced cannot be used to evaluate individual student understanding.
- Lesson 9, Learning Goal: Plan to **communicate information with others providing details about the many different kinds of plants and animals living on land and in water of a National Park.** Lesson 9, Synthesize, Step 3: "Explain that we are ready to take what we have already written about the National Park they researched and use that to create a script for their video. Show students the National Park Presentation Script (refer to slide D) that they will use to compose their script. Let students know there is space for them to take their ideas from writing they have already done in previous lessons to include information about the kinds of plants, kinds of animals, and where they live in each National Park." "Co-construct an opening and closing sentence. Explain to students that when we are communicating what we figured out about something to others, it helps to include an opening and closing sentence to tie the ideas together." "To support students in writing their scripts invite students to use information from the class example National Park to collaboratively write a few sections of a script on a class copy (or chart paper copy) of the National Park Presentation Script handout." (Lesson 9, Teacher Guide)
- Lesson 10, Learning Goal: **Communicate information** about **patterns in the kinds of plants and animals that live in a National Park** to **use as evidence that a variety of plants and animals live in different habitats on land and in water.** Lesson 10, Synthesize, Step 2: "Students' presentation of National Park Presentation Script provides an opportunity to gather evidence about Assessment Statement 2, with the purpose of summatively assessing students' comparisons of the plants and animals in the park they researched in habitats on land and in water. Use Summative Guidance 2 to provide feedback to students. If you have not yet checked off the box for certain students, make sure to talk with and listen to those students as they practice and present in this Lesson so they have an opportunity to explain their thinking and inform your summative assessment of their progress. The Consensus Discussion (or "During Synthesize" or during "Connect") is an additional opportunity to gather evidence of sensemaking." (Lesson 10, Teacher Guide).

Students routinely produce artifacts that demonstrate the use of grade-appropriate elements of SEPs, CCCs, and DCIs, which are targeted as learning objectives.

- Lesson 5, Summative Guidance 1, "Use this tool to gather evidence of students' sensemaking and provide feedback to students on their National Park Map and National Park Map assessment. Then, use the evidence you have gathered on this tool and, if needed, the Following Student Sensemaking 1 tool from prior lessons to make a summative claim about students' understanding of Assessment Statement 1...See the range of samples shown here and use the suggested prompts as you provide feedback and evaluate the ideas students express in and about their map." (Lesson 5, Lesson 5 Assessment Tool)
- Lesson 6, Explore, Step 2: "Partner discussions and recorded observations on Plants and Animals Near Me handout during the outdoor investigation provide an opportunity to gather evidence about Learning Goal 6, with the purpose of providing feedback and supporting students in making firsthand observations of plants and animals with the purpose of making observations that they can use to compare plants and animals. Use the Following Student Sensemaking 2 tool to record evidence of students' developing sensemaking. If students are not yet making

observations of plants and animals that will support making comparisons, prompt them to describe what they see, hear, or notice about a plant or animal nearby. If students focus only on one living thing, prompt them to look in a different place in the schoolyard to see if they notice something new or different. Remind students of kinds of land/and or water students shared where plants and animals live in the community to consider new areas of the schoolyard they could explore." (Lesson 6, Teacher Guide)

- Lesson 7, Explore, Step 4: "After students sort their cards into groups, support them in noticing and discussing the similarities and differences within and across each group. Circulate between groups and use the following discussion prompts to support them in their work. Can you show or tell me why you placed _____ (card) in _____ (group)? What did you observe on the card? What do you notice about the plants in this pile? (teacher points to sorted pile) How are they similar? How are they different?" (Lesson 7, Teacher Guide)
- Lesson 10, Summative Guidance 2, "Use this tool to gather evidence of students' sensemaking and provide feedback to students on their National Park Presentation Script and presentation. Then, use the evidence you have gathered on this tool and, if needed, the Following Student Sensemaking 2 tool from prior lessons to make a summative claim about students' understanding of Assessment Statement 2." (Lesson 10, Lesson 10 Assessment Tool).
- Following Student Sensemaking 1 and 2, "Each lesson's learning goal and the specific work students do in the Lesson are designed to move students forward in their use of **Science and Engineering Practices**, **Crosscutting Concepts**, and **Disciplinary Core Ideas**. Throughout each lesson, jot down evidence of a few students' sensemaking. You can use this table, a seating chart, your class list, or another way to keep track of what students say, do, write, draw, objects they manipulate and how, etc., to note how they are demonstrating the listen-fors and look-fors."

Criterion-Based Suggestions for Improvement:

- Ensure "[s]tudent artifacts that require grade-appropriate elements of all three dimensions to be used together are used frequently, including to evaluate targeted learning objectives. Many of these artifacts may be from group activities if there is evidence that the teacher has recorded evidence from individual students." [Detailed Guidance, p. 35]
  - Consider providing more explicit support for teachers to collect evidence of individual student progress from group activities.
- Ensure "[m]ost tasks are focused on sensemaking, in contrast to representing or communicating previously learned material without applying it to a phenomenon or problem. Tasks do this by requiring student reasoning to connect their existing understanding and abilities to new information (provided by the scenario or previous investigations) to construct a new understanding of the scenario presented—and thus demonstrate knowledge-in-use." [Detailed Guidance, p. 35]

III.B. Formative

EXTENSIVE

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

The reviewers found **extensive** evidence that formative assessment processes evaluate student learning to inform instruction. There are opportunities in every Lesson for gathering, recording, and using formative assessment information to inform future instruction.

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

- Lesson 2, Where to check for understanding: In Explore on the Land in _____ handout (slide G). How can I use this assessment information? Use these formative assessment opportunities to determine how students' three-dimensional thinking around Assessment Statement 1 (aligned to 2-ESS2-2 and 2-ESS2-3) is progressing. You can use the Following Student Sensemaking 1 tool to keep track of students' developing thinking. If students need more support in obtaining information about shapes and kinds of land and using relative scale to describe the land: Work with the student/group read aloud and discuss the land images on the given land page for the National Park, using questions like, "What do you notice about the land and its shape in this picture?" or "How is this land similar or different from [other land]" or "How does the text describe the sizes of these two examples of land?" (Lesson 2, Lesson Assessment Guidance).
- Lesson 3, Explore, Step 5: "Formative assessment: Class discussion of the Water at Different Temperatures infographic provides an opportunity to gather evidence about Learning Goal 3.B, with the purpose of providing feedback and supporting students in using observations from media to compare water, using relative scales to describe how water is solid when colder and liquid when hotter. Use the Following Student Sensemaking 1 tool to record evidence of students' developing sensemaking. If students are not yet connecting temperature to water being solid or liquid, have students recall how the ice felt in the investigation (cold) and it being solid and the water (liquid) feeling less cold/hotter/warmer. Emphasize use of the prompts that connect these experiences to the information about temperature in the Water at Different Temperatures infographic." (Lesson 3, Teacher Guide)
- Lesson 4, Explore, Step 4: "Key formative assessment: Students' exploration of map stations and their observations recorded on their Map Observations handout provide an opportunity to gather evidence about Assessment Statement 1, with the purpose of providing feedback to students and guiding instruction in upcoming lessons. Encourage students to make connections between the map materials they are using and the real land and water features in the Heart Lake Photograph image the materials represent. Refer to the Instructional Guidance for Lesson 4 tool and the Assessment Guidance at the beginning of the lesson" (Lesson 4, Teacher Guide).
- Lesson 5, Synthesize. Step 3: "Reflect on our National Park Maps. Once students have had about 10 minutes to develop their maps, display slide J and be sure the Gotta-Have-it Checklist is visible for all students. Explain that we will be pausing to use the Gotta-Have-It Checklist to reflect on the progress we made today. Read each item aloud on the checklist and give students a quiet minute to consider if that item is something they have completed, if it is something they are still working on, or if it is something they would like to change. Explain that this is a way to help us figure out what we still need to work on for the rest of our time today." (Lesson 5, Teacher Guide)
- Lesson 8, Connect, Step 2: "Key formative assessment: The card sort and individual/small-group discussions while students obtain information provide opportunities to gather evidence about Learning Goal 8.A (aligned to Assessment Statement 2), with the purpose of providing feedback and supporting students in clarifying and communicating their ideas about observing and using patterns about where plants and animals live based on their

observations and research. Use the suggestions in the Assessment Guidance at the beginning of the Lesson and the Instructional Guidance for Lesson 8 teacher reference to provide feedback and determine next steps before moving on to Lesson 9." (Lesson 8, Teacher Guide)

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

- Lesson 4, Explore, Step 4: "Students' exploration of map stations and their observations recorded on their Map Observations handout provide an opportunity to gather evidence about Assessment Statement 1, with the purpose of providing feedback to students and guiding instruction in upcoming lessons. Encourage students to make connections between the map materials they are using and the real land and water features in the Heart Lake Photograph image the materials represent. (2.3 Lesson 4 Teacher Guide) Assessment Statement 1: **Develop a model to represent the shapes and kinds (patterns)** and **relative sizes of land and bodies of water in an area** using **information gathered about where** land and **water is found on Earth**. (aligned to 2-ESS2-2 and 2-ESS2-3)
- Lesson 5, Synthesize. Step 3: "If students are struggling moving from a 2D side-view image to a bird's-eye map, consider engaging the class, small group, or individual students in a brief discussion and demonstration of the difference between side-view and bird's-eye view using a classroom object students are familiar with, such as a student desk. Also refer to the Meet the Expert: Flor Sangermano book and their experiences in Lesson 4." (Lesson 5, Teacher Guide)
- Lesson 6, Explore. Step 2: "An important element of this practice is making observations to collect data that can be used to make comparisons. Students had an explicit opportunity to make outdoor and media-based observations in Lesson 1 and again in Lesson 3 while observing ice and water. The discussions in this Explore, serve to remind students of how to make high quality observations that will result in data that the class can use to make comparisons. If most of the class is comfortable with making detailed observations, consider shortening this discussion. Alternatively consider adding more examples of plants and animals to compare on slide F and slide G if students need extra practice prior to going outside." (Lesson 6, Teacher Guide)
- Lesson 6, Explore, Step 4: "As students compare their recorded observations of plants and animals and contribute to the class chart, look and listen for how they are using their data to observe a pattern in how plants and animals can be similar and different. Students' participation in creating the chart and the surrounding discussion provides an opportunity to gather evidence related to Learning Goal 6 (aligned to Assessment Statement 2), with the purpose of providing feedback and guiding instruction in upcoming lessons." "If students are not yet making comparisons, prompt them to describe the plants or animals using descriptions of color, size, or shape to help decide if plants or animals are similar or different... In the Synthesize begin to support students in using their observations about different groups of plants and animals as evidence for different kinds of plants and/or animals on the schoolyard." (2.3 Lesson 6 Teacher Assessment Tool Following Student Sensemaking) Assessment Statement 2: **Make observations of plants and animals to compare** the **kinds of plants and animals in different habitats on land and in water.** (Aligned to 2-LS4-1).
- Lesson 7, Explore, Step 5: "If students need more support making observations to sort their cards, encourage students to observe cards one at a time, prompting them to observe the feature they are sorting by (no legs, 2 legs, 4 legs, many legs). If students need more support making comparisons, break the task into smaller parts. While comparing across cards, have students focus on one group of cards or just two cards at a time. Also consider providing the sentence stems "The animals are similar because _____" or "The animals are different because _____" for students to use in verbal response or in their writing." (Lesson 7, Teacher Guide)

- Lesson 8, Connect, Step 2: "The card sort and individual/small-group discussions while students obtain information provide opportunities to gather evidence about Learning Goal 8.A (aligned to Assessment Statement 2), with the purpose of providing feedback and supporting students in clarifying and communicating their ideas about observing and using patterns about where plants and animals live based on their observations and research. Use the suggestions in the Assessment Guidance at the beginning of the Lesson and the Instructional Guidance for Lesson 8 teacher reference to provide feedback and determine next steps before moving on to Lesson 9." (Lesson 8, Teacher Guide)

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

- Lesson 4, Explore, Step 4: "Allowing students to touch and manipulate materials provides opportunities for all students including those with physical disabilities or multilingual learners to engage with the materials they will use to explore and eventually in Lesson 5 create their own maps. Additional suggestions to increase accessibility, specifically around visual aspects of this task, can be found in the Map Stations Investigation reference." (Lesson 4, Teacher Guide)
- Lesson 5, Synthesize, Step 5: Broadening Access, "To support equitable discussions for all learners, encourage students to share their thinking in a variety of ways. Validate and invite all the ways we communicate our ideas, such as with gestures or body movements, pointing at the photos, models, drawings (if helpful), and words from any languages your students use." (Lesson 5, Teacher Guide)
- Lesson 7, Explore, Step 4: Assessment Opportunity "If students need more support making observations to sort their cards, encourage students to observe cards one at a time, prompting them to observe the feature they are sorting by (short ground, medium sized, tall). If students need more support making comparisons, break the task into smaller parts. While comparing across cards, have students focus on one group of cards or just two cards at a time. Also consider providing the sentence stems "The animals are similar because _____" or "The animals are different because _____" for students to use in verbal response or in their writing." (Lesson 7, Teacher Guide)
- Lesson 7, Synthesize, Step 6: "To support equitable discussions for all learners, encourage students to share their thinking in a variety of ways such as part of a small group or turn and talk discussion before a class discussion. Also, validate and invite all the ways we communicate our ideas, such as with gestures or body movements, pointing at the photos, drawings or recordings on their handouts, and words from any languages your students use." (Lesson 7, Teacher Guide)
- Lesson 9, National Park Presentations: Tips for planning time, "If students opt in for this, allow students to choose whether they script and/or record entirely in their home language, mix languages (translanguaging), or use English with scaffolds. It might be beneficial to pair students where they could complement their script's ideas when recording the video (e.g., the same idea is shared in Chinese followed by English). Create a safe space where using a home language is not seen as "translation," but as part of learning. Highlight multilingual role models (videos, books, or guest speakers) who use more than one language to share knowledge. Encourage students to invite an authentic audience (e.g., family, community members) who speak their home language for presenting in Lesson 10." (2.3 Lesson 9 Teacher Reference National Park Presentations)
- The Lessons 2-4, 6-8 Following Student Sensemaking Tool describes what students might write, draw, say, or gesture in response to the formative assessment tasks throughout the unit. The document also describes possible feedback, for example:
  - Following Student Sensemaking 1, Lessons 2-4, Evidence of Sensemaking has a checklist of listen-/look-fors: "Possible evidence of student sensemaking: Remember that students are often using multiple means of communication to express their sensemaking. As you are looking for evidence that students have a secure grasp of the assessment statement, look and listen for these examples. Students might say: 'Sand dunes are

like hills but made of sand.' 'When water is warmer, it is liquid, and when water is colder, it is solid.' 'The paper map uses brown to show land, green to show plants and blue to show water.' "Students might gesture/manipulate 'Points to multiple similar pictures of land or water features to indicate a pattern.', 'Traces map symbol in the air with finger.'. (Lessons 2-4 Following Student Sensemaking 1).

- Following Student Sensemaking 2, Lessons 6-8, Evidence of Sensemaking, Checklist of listen-/look-fors, Possible evidence of student sensemaking: Students might say, Students might gesture/manipulate, Examples of animal and plant observations, "The following tables include possible ways students can sort Plant Cards and Animal Cards in Lessons 7 and 8." Not yet secure, Possible feedback; Secure with prompting, Possible feedback; Secure, Possible feedback. (Lessons 6-8 Following Student Sensemaking 2).

Criterion-Based Suggestions for Improvement: N/A

III.C. Scoring Guidance

EXTENSIVE

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

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

Support for planning instruction

- Lesson 4: "It is important that students are using information from their research to describe patterns of shapes and kinds of land and water in different areas, as well as ideas about relative scale, to develop maps (models) that represent the shapes and kinds of land and water in an area. This is because students will be applying their understanding of mapping shapes and kinds of land to develop their own maps in Lesson 5. Use the evidence you have gathered on the Following Student Sensemaking 1 tool in Lessons 2-4 to evaluate students' progress toward the assessment statement above and plan your upcoming instruction accordingly. When you get to Lesson 5, focus on supporting students who are not yet secure in their sensemaking. Based on which of the statements below align with what you notice about your students (most of the class, some of the class, or a few students), you may choose to take some or several of the next steps suggested here. Note that students will continue to work toward this assessment statement in Lesson 5." (Lesson 4, Teacher Assessment Tool Following Student Sensemaking, page 1)
- Lesson 6, Teacher Assessment Tool: Following Student Sensemaking. "Lesson 6 Possible feedback: I notice you drew four plants here. Can you tell me more about how you decided to place them in those groups? What observations did you make? I see you used labels (berries, flower) to describe different parts of the plants you observed. Those will be helpful for sharing your observations! How would you say these plants are similar (or different)? What observations support those ideas? Would you say similar kinds or different kinds of plants live on our schoolyard? Why do you think so?" (Lesson 6, Teacher Assessment Tool Following Student Sensemaking, page 4)

Support for ongoing feedback

- Lesson 5, Summative Guidance 1, "Use this tool to gather evidence of students' sensemaking and provide feedback to students on their National Park Map and National Park Map assessment. Then, use the evidence you have gathered on this tool and, if needed, the Following Student Sensemaking 1 tool from prior lessons to make a summative claim about students' understanding of Assessment Statement 1. See the range of samples shown here and use the suggested prompts as you provide feedback and evaluate the ideas students express in and about their map. Evidence of students' understanding of the land and water features they researched could be part of their spoken description, written work, and/or labels they add to their maps." (Lesson 5, Teacher Guide)
- Lesson 6, Teacher Assessment Tool: Following Student Sensemaking. "Not yet secure: Student makes observations of individual plants or animals without comparing them. Student makes observations that do not yet support making comparisons. Comparing plants or comparing animals with peer and/or class level support. Secure with prompting: Student sorts multiple animals or plants into one group and says/writes that is evidence are many kinds of animals or plants. Student compares plants and/or animals by sorting into groups but it is not clear why a plant or animal is in a certain group. Secure: Student sorts plants and animals by observable features (e.g., number of legs, relative size, or other differences within a group of plants like many high reaching plants with different shaped leaves) by sorting and/or spoken or written descriptions. Student explains how many kinds of plants and/or animals live in an area and use evidence of the patterns they observed from observing and comparing the plants and animals." (Lesson 6, Teacher Assessment Tool Following Student Sensemaking, page 9)
- Lesson 8, Instructional Guidance for Lesson 8, "During the second Synthesize in Lesson 9 when students write their National Park script, work with a small group of students to revisit their drawing and writing from Lesson 8. Ask questions about the observations they recorded to support students in recognizing which observations show how plants (or animals) were different." (Lesson 8, Teacher Assessment Tool Following Student Sensemaking)

Criterion-Based Suggestions for Improvement: N/A

III.D. Unbiased Tasks/Items

EXTENSIVE

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

The reviewers found **extensive** evidence that tasks/items assess student proficiency using methods, vocabulary, representations, and examples that are accessible and unbiased for all students. The unit tasks include a range of modalities that the students can use to respond, including writing, gestures, and drawings. The unit includes a key formative assessment that provides students with a choice across multiple modalities, but does not include a summative assessment that provides students with a choice across multiple modalities.

Multiple modes of communication

Students are encouraged to show their understanding in a variety of ways.

- Lesson 2, Explore, Step 4: "To support equitable discussions, invite students to share their thinking about the shapes of land in a variety of ways, including using body movements, pointing at photos or their drawn ideas, and using

words from any languages your students use. Encourage both scientific and everyday language to express their ideas. Physical movement can be especially useful in communicating about the shapes of land and water. Consider mirroring gestures and body movements back to students to highlight the idea shared." (Lesson 2, Teacher Guide)

- Lesson 4, Explore, Step 5: "Display slide G and explain students will get to explore maps made in 3 different ways to consider how maps can show where things are located and how they represent land and water. Point out that these maps do not have map keys, rather, students will need to work together to think about what the parts and colors represent. As you introduce each center in the following part of the lesson, consider having one setup of each center available (in the Scientists Circle or pre-set up in the classroom) for students to reference, point to, or manipulate when discussing and clarifying directions." (Lesson 4, Teacher Guide).
- Lesson 5, Synthesize, Step 3: "Develop a National Park map. Invite students to gather the map-making materials they will need to create their map, reminding students to use the materials safely. As students create their individual map on their paper plate, displaying the kinds, shapes, and locations of land and water in the area of the National Park they are researching, circulate between groups to pose prompts suggested below to support students in describing the parts they plan to include in their map, the relative shape and location of the parts and in making connections between the materials/colors used in their maps and what the materials/colors represent in the area of the National Park they are researching. This is a great opportunity to engage students in multimodal language use with materials to express their sensemaking." (Lesson 5, Teacher Guide)
- Lesson 6, Teacher Assessment Tool: Following Student Sensemaking. "Students might gesture/manipulate: Gesture with arms or hands to show the height/size of multiple plants to compare them. Use fingers to show a number to indicate the number of legs of multiple animals to compare them. Point to examples of different kinds of plants or animals to show examples of different kinds. Gesturing/acting out different animals by the number of legs. Gesturing/acting out different plants by how tall/wide they are or where they are located. Counting on fingers or tallying the different kinds of plants/animals while pointing to evidence. Sort Plant Cards and Animal Cards by land and water, number of legs, and/or relative size." (Lesson 6, Teacher Assessment Tool Following Student Sensemaking, page 4)
- Lesson 6, Lesson Assessment Guidance: "Evidence of students' ideas may be expressed in words, drawings, physical or symbolic representations, written or spoken descriptions, movement, and/or gestures such as Drawings or descriptions of animals grouped by 0-,2-,4-, and/or many legs. Drawings or descriptions of plants grouped by short ground, medium-sized, and high reaching. Drawings or descriptions of how given plants or given animals are similar and/or different." (Lesson 6, Teacher Guide)
- Lesson 7, Lesson Assessment Guidance: "As you look and listen for students' ideas, support them in making careful observations of the plants and animals to compare how they are similar and different with the purpose of recognizing that there are a variety of kinds of plants and animals in the National Parks. Use the Following Student Sensemaking 2 tool to help you provide in-the-moment feedback to students. Also use the Following Student Sensemaking 2 tool to jot notes about which students you were able to hear/see evidence from during this lesson, and plan to focus on seeking evidence from other students in Lesson 8. As students continue to work on related learning goals in the next lesson, check in with those students who need more support." (Lesson 7, Teacher Guide) Evidence of Sensemaking Tools: "Notes about what students say, write, draw, gesture, do." (2.3 Lesson 6 Teacher Assessment Tool Following Student Sensemaking)
- Lesson 8, Connect, Step 2: "Make sure that each pair has a set of plant and animal cards for the National Park they are researching and theCard Sort Labels labels for land and water. If more than one partner group is working on the same park, have them sit together to facilitate group discussions that will happen during the investigation." While students complete the investigation, use the associated prompts to support students in noticing and further grouping the data into types of land and types of water. Encourage students to use the investigation materials, their hands, and words in any language to demonstrate their sensemaking." Prompts to use include, "Can you show or tell me

why you placed _____ (card) in _____ (group)? What information helped you sort that way?, You have all of these cards sorted as plants and animals that live in water. Did you notice if there are different kinds of water where these animals live?" (Lesson 8, Teacher Guide).

- Lesson 9, Synthesize, Step 3: "Broadening Access Provide multiple means of engagement by offering students the choice and autonomy to select the drawings, pictures, and artifacts that interest them most about the National Park they are communicating about when selecting the visuals that will be used as part of their video. This is especially important for multilingual learners to have a chance to use their linguistic and nonlinguistic resources to plan how they will express their ideas. Additionally, this empowers learners to take charge of their own learning. You may consider having students choose at this point in the Lesson or you may have students give their preference prior to this Step of the Explore so you can help students organize their visuals prior to beginning the writing." (Lesson 9, Teacher Guide)

Supports success for all students

- Lesson 1, Lesson Materials and Preparation, "If it is not possible for your class to make observations outside the school building, consider taking photos of 1-2 plants and 1-2 animals that can be found in your school's local area for students to observe in the second Explore. Alternatively, example images of plants and/or animals from various regions across the United States can also be found in the 2.3 Community Plant and Animal Examples. You could instead select one plant image and/or one animal image to use for making observations in the second Explore. The remaining images can be used in Lesson 6 when students make additional outdoor observations of plants and animals." (Lesson 1, Teacher Guide).
- Lesson 4, Explore, Step 5: "Prepare to share observations. Display slide J and invite students to join a Scientists Circle with their Map Observations handout. Have a map from each station displayed in the middle of the circle and use the following prompts for students to share their observations of and experiences with the maps at the stations." (Lesson 4, Teacher Guide).
- Lesson 4, Explore, Step 5: "Broadening Access Allowing students to touch and manipulate materials provides opportunities for all students including those with physical disabilities or multilingual learners to engage with the materials they will use to explore and eventually in Lesson 5 create their own maps. Additional suggestions to increase accessibility, specifically around visual aspects of this task, can be found in the Map Stations Investigation reference." (Lesson 4, Teacher Guide).
- Lesson 5, Synthesize, Step 4: "Continue to display slide I and share the procedure students will use to create their individual National Park maps of the area in the image they use. Have the map making materials students will have available while discussing the procedure for developing the maps and be sure students know how to access the materials when they are ready to begin. Students will individually develop maps, but can sit with a partner who researched the same National Park. Plan to provide one copy of the National Park Photos to each pair." (Lesson 5, Teacher Guide).
- Lesson 8, Connect, Step 2: "Give students an opportunity to ask questions about the task and how to use different materials. Then prepare to split into partners to obtain information from the website. Review partners. Share with students that they will work with the same partner(s) they have been researching a National Park with." (Lesson 8, Teacher Guide).
- Lesson 9, Synthesize, Step 3: "Encourage multilingual students to see scripting ideas across languages as a valuable part of learning. Ask the class: "What could we do to get this information to more people? We could record in different languages!" If students opt in for this, allow students to choose whether they script and/or record entirely

in their home language, mix languages (translanguaging), or use English with scaffolds to share with others. (Please see National Park Presentations reference)" (Lesson 9, Teacher Guide)

- Lesson 9, National Park Presentations: Tips for writing time, "Depending on students' levels of independence during writing time and the time in the year you teach this unit, you might wish to structure this writing in different ways. Some ideas are: Children work in a small group with a teacher or volunteer during a reading workshop, writing workshop, or center time. That way, a teacher can support children in the process of composing their presentation script. Children work independently or in pairs to compose their script. Plan for an expansive range of writing. Students may express their writing in various ways including, but not limited to: drawing with labels, drawing paired with spoken words that can be scribed by the teacher or converted to text with a voice-to-text tool written words using the first letter sound, invented spelling, words, sentences, and more than one full sentence." (2.3 Lesson 9 Teacher Reference National Park Presentations)
- Lesson 10, Preparation Checklist: "Students should have their first draft of their script written at the start of this lesson. If most of the class needs additional time to finish coming out of Lesson 9 or they need time to respond to your written feedback, plan to provide that writing time before this Lesson begins." (Lesson 10, Teacher Guide)

Multiple modalities and student choice

Students have some choice in how they express their ideas.

- Lesson 1, Explore, Step 3: "Think, pair, share about local outdoor observations. Ask students to gather in a shared meeting space with their Observing Different Places handout. Suggest we share our observations using a "Think, Pair, Share." If students are unfamiliar with "Think, Pair, Share," explain that they will have the chance to: (1) think quietly about how they would answer the question, (2) discuss their ideas with a partner, and (3) share something their partner said with the class. Intentionally group students to support English language use and development (sometimes with peers who know the same languages as them, and other times with peers whose English language development is slightly more advanced)." Broadening Access: "Encourage student pairs to use whatever modalities of expression they choose: gestures, named languages other than English, etc. To allow for equitable sharing, consider labeling one partner A and one partner B. Signal when it is time for partner A to share, and instruct students when it is time for partner B to share. This can help ensure that each partner has roughly the same amount of time to share their ideas." (Lesson 1, Teacher Guide)
- Lesson 1, Explore, Step 4: "Share that students will work in small groups to choose at least 2-3 parks to observe based on their interest. If time allows, they may observe more of the Parks." (Lesson 1, Teacher Guide)
- Lesson 3 Handout, Water in _____: "Draw or write about the water in the National Park you are researching." (2.3 Lesson 3 Handout 1 Water in _____)
- Lesson 5, Synthesize, Step 2: Broadening Access: "To optimize individual student choice, autonomy, and motivation, consider providing the option for students to show the kinds, shapes, and locations of land and water in their map using their choice of modality. Options could include the use of clay, paper, and coloring utensils like they used in Lesson 4 or other available materials the class is familiar with (e.g., colored bricks, stacking cubes, or a collage of different consumable materials made available to them). Alternate materials can be determined and gathered ahead of time based on availability and the interests of your individual learners." Step 3: "Develop a National Park map. Invite students to gather the map-making materials they will need to create their map, reminding students to use the materials safely. As students create their individual map on their paper plate, displaying the kinds, shapes, and locations of land and water in the area of the National Park they are researching, circulate between groups to pose prompts suggested below to support students in describing the parts they plan to include in their map, the relative shape and location of the parts and in making connections between the materials/colors used in their maps and

what the materials/colors represent in the area of the National Park they are researching. (Lesson 5, Teacher Guide) Although students have a choice of material to use when developing their physical maps, this is not a choice of modality (such as talking, creating a visual representation, writing, etc.).

- Lesson 8, Explore, Step 3: Broadening Access, "When recording observations, encourage a range of response types. Some students may make drawings only. Some students may use one-word labels. Some students may use labels with complete sentences to convey ideas. Encourage all response types and words from any languages your students use. Teachers should strive to encourage any type of writing to convey scientific observations and ideas."(Lesson 8, Teacher Guide)
- Lesson 9, Synthesize, Step 3: "To support script preparation, provide options for expression and encourage students to use a variety of communication methods to prepare for and/or make their videos as makes sense in your classroom. Writing and video making can happen in many ways. Students may voice record their ideas to accompany an image or dictate to a teacher to record, type, or use sentence starters and visual supports. Offer flexible tools like graphic organizers, word banks/wall, and/or partner planning to meet varied learning needs. Providing these options ensures all students can access the task and share their understanding in ways that work best for them." (Lesson 9, Teacher Guide)
- Lesson 9, Synthesize, Step 2: "Provide multiple means of engagement by offering students the choice and autonomy to select the drawings, pictures, and artifacts that interest them most about the National Park they are communicating about when selecting the visuals that will be used as part of their video. This is especially important for multilingual learners to have a chance to use their linguistic and nonlinguistic resources to plan how they will express their ideas. Additionally, this empowers learners to take charge of their own learning. You may consider having students choose this." (Lesson 9, Teacher Guide) Although students can choose which picture/drawing to include from the National Park, they do not have a choice for the task; they all had to complete the park assigned to them.

Criterion-Based Suggestions for Improvement:

- Ensure that "[t]he materials include at least one significant task that provides students with a choice across multiple modalities." [Detailed Guidance, p. 43]
  - Consider suggestions other than presentations of parks to show summative learning.

III.E. Coherent Assessment System

EXTENSIVE

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

The reviewers found **extensive** evidence that the materials include pre-, formative, summative, and self-assessment measures that assess three-dimensional learning. There is an assessment system that supports teachers in understanding how students' three-dimensional performances in each assessment fit together to reflect student learning related to the assessment statements across the unit.

Matches three-dimensional learning objectives

- Lesson 2, Explore, Step 4: In pairs, "Allow time for students to gather information about the National Park they are researching. While students are working, circulate the room and use the following prompts to support students in recording their observations." (Lesson 2, Teacher Guide). Learning Objective 2.b: **Obtain information** to **compare and describe the shapes and kinds of land that are found in** a National Park **using relative scale (bigger, smaller; taller, shorter; flatter).**
- Lesson 3, Connect, Step 2: "Make sure that each pair has a set of plant and animal cards for the National Park they are researching and theCard Sort Labels labels for land and water. If more than one partner group is working on the same park, have them sit together to facilitate group discussions that will happen during the investigation." (Lesson 3, Teacher Guide) Learning Objective 3.A: **Obtain information from various texts and media to answer questions** and **observe patterns of where water is found on Earth.**
- Lesson 7, Explore, Step 4: "Display slide H and review plan for the investigation. Ask students if they have any questions before they get started. Remind students to discuss together what they are noticing about the plant and why they are sorting it into a group. After students sort their cards into groups, support them in noticing and discussing the similarities and differences within and across each group. Circulate between groups and use the following discussion prompts to support them in their work." (Lesson 7, Teacher Guide). Learning Objective 7: **Make observations** of **plants and animals** in a National Park and **compare** their features to **identify patterns to use as evidence that different kinds of plants and animals live there.**
- Lesson 8, Explore, Step 3: "Key formative assessment: Students making and recording observations on the Animal and Plant Comparisons assessment and the surrounding discussion provides an opportunity to gather evidence about Learning Goal 8.B (aligned to Assessment Statement 2), with the purpose of providing feedback and supporting students in clarifying and communicating their ideas about similarities and differences between different plants and animals. Students should also use patterns from those comparisons as evidence of biodiversity on land and in water within the National Park." (Lesson 8, Teacher Guide) **Make observations of plants and animals to compare** the **kinds of plants and animals in different habitats on land and in water.** (Aligned to 2-LS4-1)

Pre-, formative, summative, and self-assessment

Pre-Assessment

- Lesson 1, Explore, Step 4: "Students' work on the Observing Different Places handout, spoken ideas, and gestures provide an opportunity to gather evidence about Learning Goal 1 (aligned to Assessment Statements 1 and 2), with the purpose of determining any support students may need in making and recording observations and asking questions to help figure out the many different plants and animals and places they live. Students will continue to develop these ideas and practices throughout this unit." (Lesson 1, Teacher Guide)
- Lesson 1, Synthesize, Step 6: "Pre-assessment: This discussion and students' work on the Observing Different Places handout provide an opportunity to gather evidence about Learning Goal 1 (aligned to Assessment Statements 1 and 2), with the purpose of determining any support students may need in making and recording observations and figuring out the many different plants and animals and places they live. Students will continue to develop these ideas and practices throughout this unit. Accept all student ideas and refer to the Assessment Guidance at the beginning of the lesson." (Lesson 1, Teacher Guide)

Formative Assessment

- At least one formative assessment is included in each lesson. (See III B for a specific analysis of formative assessment.)

Summative Assessment

- Lesson 5, Synthesize, Step 3: "Students' individual National Park Map provides an opportunity to gather evidence about learning goal 5 (aligned to Assessment Statement 1), with the purpose of summatively assessing students' use of observed patterns to develop a model that represents the shapes and kinds of land and water in the National Park they are researching." (Lesson 5, Teacher Guide)
- Lesson 10, Synthesize, Step 2: "Students' presentation of National Park Presentation Script provides an opportunity to gather evidence about Assessment Statement 2, with the purpose of summatively assessing students' comparisons of the plants and animals in the park they researched in habitats on land and in water." (Lesson 10, Teacher Guide)
- Lesson 10, Synthesize, Step 4: "Summative assessment: This Consensus Discussion provides an opportunity to gather evidence about Assessment Statement 2, with the purpose of summatively assessing students' explanations of the plants and animals and where they tend to live across all the National Parks. Use Summative Guidance 2 to provide feedback to students. If you have not yet checked off the box for certain students, make sure to give them an opportunity to explain their thinking and inform your summative assessment of their progress during this discussion." (Lesson 10, Teacher Guide)

Self Assessment

- Lesson 5, Synthesize. Step 3: "Self reflection: The check in using the Gotta-Have-It Checklist to reflect on their National Park Map with the purpose of supporting them in connecting how they have used observed patterns from their research of land and water to represent the shapes, kinds, and locations of land and water in the area of the National Park they have been researching and consider next steps in developing their map (model). Refer to the Assessment Guidance at the beginning of the lesson." (Lesson 5, Teacher Guide) This reflection focuses on the student completing the task, instead of evaluating their performance across all three dimensions.
- Lesson 5, Slides, Becoming the Expert of Me: Slide B, "Recall our Classroom Agreements, Classroom Agreements for How We Figure Things Out in Science: We can do science in many different ways, We look, listen, and respond to each other's ideas, We share ideas even when we are not sure, We let our ideas change and grow." On slide H "What are things YOU need to feel comfortable and to fully participate in science work?" On slide J, Classroom Agreements "Think and share: Are any of these ideas the same as yours? What can I do (or ask for) to better support myself?" (2.3 Lesson 5 Slides Be(com)in the Expert of Me)

The rationale for the coherent three-dimensional assessment system is clearly described.

- Lessons 1-10 include a Lesson Assessment Guidance section that outlines what students will do, where the teacher can check for understanding, and how the teacher can utilize the assessment information.
- Lesson 5 Summative Guidance 1, "By the end of Lesson 5, most or all students should have reached a secure understanding for **using information about where land and water is found on Earth from various sources to develop a model to represent the shapes and kinds and relative sizes of land and bodies of water in an area**. Use this tool to gather evidence of students' sensemaking and provide feedback to students on their National Park Map and National Park Map assessment. Then, use the evidence you have gathered on this tool and, if needed, the Following Student Sensemaking 1 tool from prior lessons to make a summative claim about students' understanding of Assessment Statement 1." (Lesson 5, Summative Guidance).
- Lesson 10, Summative Guidance 2, "By the end of Lesson 10, most or all students should have reached a secure understanding for **making observations** of **plants and animals** and **using their data to compare** how they are **similar and different and using those differences as evidence** that **many different plants and/or animals live in the land and water of an area.** Use this tool to gather evidence of students' sensemaking and

provide feedback to students on their National Park Presentation Script and presentation. Then, use the evidence you have gathered on this tool and, if needed, the Following Student Sensemaking 2 tool from prior lessons to make a summative claim about students' understanding of Assessment Statement 2." (Lesson 10, Summative Guidance).

Criterion-Based Suggestions for Improvement:

- Ensure the self-reflection feedback support and prompts in Lessons 5 and 10 evaluate student performance across all three dimensions.

III.F. Opportunity to Learn

ADEQUATE

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

The reviewers found **adequate** evidence that the materials provide multiple opportunities for students to demonstrate the performance of practices connected with their understanding of disciplinary core ideas and crosscutting concepts and receive feedback. There are many opportunities for teachers to provide oral feedback; however, there is limited evidence of students formally giving feedback to one another. There was no explicit evidence that students were given the opportunity to use the feedback given to improve their performance in preparation for the next assessment opportunity.

Multiple, interconnected opportunities over time

Teacher Assessment Tools provide lists of three-dimensional "evidence of sensemaking" checklists connected to specific lessons, indicating when the same evidence is assessed in more than one lesson.

Assessment Statement 1: Develop a model to represent the shapes and kinds (patterns) and relative sizes of land and bodies of water in an area using **information gathered about where** land and **water is found on Earth**. (aligned to 2-ESS2-2 and 2-ESS2-3), Lessons 2-4 Following Student Sensemaking 1, Evidence of Sensemaking, Checklist of listen-/look-fors:

- **Comparing and describing the shapes and kinds of land and water that are found in** a National Park **using relative scale (bigger, smaller; taller, shorter; flatter) based on information from the website**. (Likely to be found in Lessons 2 and 3) Examples of where evidence is "likely to be found" include:
  - Lesson 2, Explore, Step 5: "Compare kinds of land in the National Parks. Display slide I and have groups continue the peer to peer small group discussion to compare the land in parks they researched. Direct students to use with the sentence starters The land is similar because _____. The land is different because _____ to support this discussion." "Suggest we share more of the information we found about the parks and that we write the information we have gathered on a chart so that the whole class can see the land found in each National Park. This will help us recognize many different shapes and kinds of land across the National Parks." "Facilitate a discussion about land across all parks. Begin by inviting one group to share one idea about land they gathered from researching one of the National Parks. Use prompts like the following to facilitate this student to student discussion." (Lesson 2, Teacher Guide)

  - Lesson 3, Navigate, Step 1: "Use the following discussion prompts to help students recall their work investigating land in Lesson 2 and motivate figuring out more about where water is and the similarities and differences of the water in the different National Parks." Prompts include: "What did we notice about the land?" Ideas to look and listen for: "Land can be different shapes and kinds." (Lesson 3, Teacher Guide)

- **Comparing that water can be either solid (when colder) or liquid (when hotter) based on observations**. (Likely to be found in Lesson 3) Examples of where evidence is "likely to be found" include:
  - Lesson 3, Synthesize, Step 6: "Display slide K and bring students together in a Scientists Circle to engage in a Building Understandings Discussion. Have the Bodies of Water Chart and the Ice and Water chart displayed and use the following prompts for students to share their observations and experiences about where water is found and it being solid or liquid." Prompts include: "How can water be solid or liquid?" (Lesson 3, Teacher Guide)
- **Using maps (models)** to find **patterns in how maps represent where land and water are located**. (Likely to be found in Lesson 4) Examples of where evidence is "likely to be found" include:
  - Lesson 4, Synthesize, Step 6: "Think, pair, share about maps. Use the prompts below (also on slide J) to facilitate a think, pair, share discussion about how the maps represented the location, shapes, and kinds of land and water at Heart Lake." Prompts include: "What did you notice about how the _____ map showed land and water? (repeat for each type of map)" (Lesson 4, Teacher Guide)
- **Describing patterns of the shapes and kinds of land and water** in National Parks **based on information from the website**. (Likely to be found in Lessons 2 and 3) Examples of where evidence is "likely to be found" include:
  - Lesson 2, Explore, Step 5: "Students obtaining and recording information on Land in _____ handout provide an opportunity to gather evidence about Learning Goal 2.B, with the purpose of providing feedback and supporting students in clarifying and communicating their ideas about observed patterns in shapes and kinds of land across the National Parks.
  - Lesson 3, Synthesize, Step 6: "Display Our Growing Ideas chart (refer to slide L). Use ideas the students shared as well as photos and/or artifacts from this lesson's work to complete the row for Lesson 3. An example of how this chart update might look is below. Remind students as they share that they can use their observations as evidence to support their claims about what we figured out." Prompts include: "What did we figure out today, related to our Lesson Question, Where is water found, and what is it like?" "How did we figure that out?" (Lesson 3, Teacher Guide)
- **Comparing that water can be either solid (when colder) or liquid (when hotter) based on observations**. (Likely to be found in Lesson 3) Examples of where evidence is "likely to be found" include:
  - Lesson 3, Synthesize, Step 6: "Display slide K and bring students together in a Scientists Circle to engage in a Building Understandings Discussion. Have the Bodies of Water Chart and the Ice and Water chart displayed and use the following prompts for students to share their observations and experiences about where water is found and it being solid or liquid." Prompts include: "How can water be solid or liquid?" (Lesson 3, Teacher Guide)

Assessment Statement 2: Make observations of plants and animals to compare the **kinds of plants and animals in different habitats on land and in water.** (Aligned to 2-LS4-1), Lessons 6-8 Following Student Sensemaking 2, Evidence of Sensemaking, Checklist of listen-/look-fors:

- **Observations** of **plants and animals and identifying patterns of how they are similar and different** (likely in Lessons 6-8). Examples of where evidence is "likely to be found" include:
  - Lesson 6, Explore, Step 4: "As students compare their recorded observations of plants and animals and contribute to the class chart, look and listen for how they are using their data to observe a pattern in how plants and animals can be similar and different. Students' participation in creating the chart and the surrounding discussion provides an opportunity to gather evidence related to Learning Goal 6." (Lesson 6, Teacher Guide)
  - Lesson 7, Explore, Step 3: "Create a plan for making observations. Facilitate a discussion to plan how the class will make observations and record data in this Lesson building from the ideas students shared." Prompts include: "What did we do last time when we observed plants and animals we saw locally? What to look and listen for include: "Observed how they were similar and different?" (Lesson 7, Teacher Guide)
  - Lesson 8, Connect, Step 2: "The card sort and individual/small-group discussions while students obtain information provide opportunities to gather evidence about Learning Goal 8.A (aligned to Assessment Statement 2), with the purpose of providing feedback and supporting students in clarifying and communicating their ideas about observing and using patterns about where plants and animals live based on their observations and research." (Lesson 8, Teacher Guide)
- **Comparisons of plants and animals** using **observations** to **identify patterns to use as evidence that different kinds of plants and animals live in an area** (likely in Lessons 6-8). Examples of where evidence is "likely to be found" include:
  - Lesson 6, Explore, Step 4: "Ask students how we can keep track of the different kinds of plants and animals that were found during their investigation on the schoolyard. Listen for ideas such as making a list, drawing pictures, or creating a class chart. Build on their ideas and explain that a class chart will help us organize our data, look for patterns, and compare what they found with what others saw. Let students know they will contribute to the chart by sharing their observations." (Lesson 6, Teacher Guide)
  - Lesson 7, Synthesize, Step 6: "Display slide L. Using their completed Plant and Animal Observations handout, have students who have researched the same park, discuss how they sorted their cards and what similarities and differences they noticed and recorded about the animals in each group." "Connect making plant and animal observations to the Lesson set question. Ask the following prompts to students to help them make connections between their investigations and how that helps to figure out, what kinds of plants and animals live in different places?" Prompts include: "How can we use what we figured out about the kinds of plants and animals that live in the National Parks to help us answer our question, what kinds of plants and animals live in different places?" (Lesson 7, Teacher Guide)
  - Lesson 8, Connect, Step 2: "The card sort and individual/small-group discussions while students obtain information provide opportunities to gather evidence about Learning Goal 8.A (aligned to Assessment Statement 2), with the purpose of providing feedback and supporting students in clarifying and communicating their ideas about observing and using patterns about where plants and animals live based on their observations and research." (Lesson 8, Teacher Guide)

- **Comparisons of plants and animals** using **observations** to **identify patterns to use as evidence that different kinds of plants and animals live in habitats on land and in water** (likely in Lesson 8). Examples of where evidence is "likely to be found" include:
  - Lesson 8, Explore, Step 3: "Students making and recording observations on the Animal and Plant Comparisons assessment and the surrounding discussion provides an opportunity to gather evidence about Learning Goal 8.B (aligned to Assessment Statement 2), with the purpose of providing feedback and supporting students in clarifying and communicating their ideas about similarities and differences between different plants and animals. Students should also use patterns from those comparisons as evidence of biodiversity on land and in water within the National Park." (Lesson 8, Teacher Guide)

Multi-modal feedback loops

- Lesson 3, Explore, Step 4: "This brief investigation provides an opportunity to gather evidence of student understanding related to Learning Goal 3.B, with the purpose of providing feedback and supporting students in clarifying and communicating their ideas about how water can be solid or liquid depending on temperature, based on their observations." (Lesson 3, Teacher Guide). There is limited evidence of how students receive feedback or are supported in using feedback to advance their understanding across all three dimensions.
- Lesson 5, Synthesize, Step 3: "Self reflection: The check in using the Gotta-Have-It Checklist to reflect on their National Park Map with the purpose of supporting them in connecting how they have used observed patterns from their research of land and water to represent the shapes, kinds, and locations of land and water in the area of the National Park they have been researching and consider next steps in developing their map (model). Refer to the Assessment Guidance at the beginning of the lesson." "Once students have had about 10 minutes to develop their maps, display slide J and be sure the Gotta-Have-it Checklist is visible for all students. Explain that we will be pausing to use the Gotta-Have-It Checklist to reflect on the progress we made today. Read each item aloud on the checklist and give students a quiet minute to consider if that item is something they have completed, if it is something they are still working on, or if it is something they would like to change. Explain that this is a way to help us figure out what we still need to work on for the rest of our time today." (Lesson 5, Teacher Guide).
- Lesson 9, Synthesize, Step 3: Display slide E to show the sentence starters that the students can use while giving peer feedback. When necessary and helpful for multilingual students, provide a translation scaffold of the sentence starters to support students in giving peer feedback. Each student should take a couple minutes to share their National Park Presentation Script with a partner. After sharing, the listening partner should provide feedback connected to how the script includes ideas from the Gotta-Have-It Checklist." (Lesson 9, Teacher Guide).
- Lesson 10, Synthesize, Step 4: "Using their Comparing Across National Parks handout have students turn and talk about what they noticed across parks from the presentations. Listen in as students share and then after bringing students back together, use the ideas you heard to motivate coming to a consensus about our Lesson set question." (Lesson 10, Teacher Guide).

Criterion-Based Suggestions for Improvement:

- "Ensure feedback focuses on improving performance for all key claimed learning in each dimension." [Detailed Guidance, p. 47]
- "Ensure students have opportunities to use their feedback to construct new learning and improve their performance in preparation for the next assessment opportunity." [Detailed Guidance, p. 47]

Category Ratings

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

Overall Ratings

Overall ratings:

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

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

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

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

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

Overall rating below:

E