EQuIP Rubric for Science

How can we be prepared for the weather?

Curriculum Developer: OpenSciEd

GRADE K | FEBRUARY 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
EXTENSIVE	EXTENSIVE	EXTENSIVE	EXTENSIVE	EXTENSIVE	EXTENSIVE

Score Category I: 3

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	EXTENSIVE	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
EXTENSIVE	EXTENSIVE	ADEQUATE	EXTENSIVE	EXTENSIVE	EXTENSIVE

Score Category III: 3

UNIT 2

Sum Categories	**9**
Rating	**E**

Overall Summary Comments

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

- **I.A Explaining Phenomena.** Individual lessons consistently return to the phenomenon to add layers of student understanding by returning to, answering, and generating new student questions.
- **II.A Relevance and Authenticity.** There is sufficient evidence that the phenomenon and classroom activities are set up in a way that authentically engages and connects with most students' lives in a grade-appropriate manner.
- **I.D and II.F Coherence.** There are frequent and consistent connections among all individual lessons to support both educators and students in following a cohesive learning sequence.

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

- **II.B Student Ideas.** Consider how at least one artifact from individual students can include elaborations, reasoning, and/or reflection to show how students' thinking has changed over time.
- **II.E Differentiated Instruction.** It can be helpful for educators to consistently know when and for whom to provide individualized support. The regular stated alignment between need and support will help all students access learning more efficiently and effectively.
- **II.B Student Ideas and III.C Scoring Guidance.** Ensure that supports and tools are provided to guide constructive feedback to students from both the educator and peers that is specifically aligned to target learning goals.

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

EXTENSIVE

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 **extensive** evidence that making sense of an anchoring phenomenon drives student learning. Materials are organized so that students are figuring out the central phenomenon: "how and why we prepare for local weather conditions."

- Instruction is focused on supporting students to better make sense of the phenomenon;
- Student questions or prior experiences related to the phenomenon consistently create a need, from the students' perspective, for the students to engage in learning throughout the materials;
- Students have frequent opportunities to feel as if they are driving the learning sequence through their questions and emerging understanding; and
- Materials provide structured support for educators to draw out student questions and prior experiences related to the phenomena and to use these connections to motivate student learning.

Evidence includes, but is not limited to the following:

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

- Lesson 1, Synthesize, Step 3: "Develop the Unit Question. Point out that we have lots of questions on our Notice and Wonder chart about the weather, but also about how to get ready for being outside. Suggest that a big question we can work on figuring out in science class is How can we be prepared for the weather? Add this question to the top of your Notice and Wonder chart" (Lesson 1, Teacher Edition). The unit question is not being "developed," it is being provided to students.
- Lesson 2, Navigate, Step 7: "Reread some questions from our Notice and Wonder chart to check in on whether we have made progress on any of them (refer to slide K). Ask students if there are questions they can now answer based on their investigation measuring and recording the temperature. Add questions to the Notice and Wonder chart. Re-read questions on the Notice and Wonder chart that we are still wondering about. Lead a discussion about what other weather information students think is needed to be prepared (ready) for going outside at recess. Invite students to add additional questions they may have about weather" (Lesson 2, Teacher Edition).
- Lesson 3, Synthesize, Step 5: "Co-construct our current understanding of what we've figured out using the prompts below. As students share ideas, add them to the column titled 'What did we figure out?'...Add their ideas using words, photos, and artifacts to the column titled, 'How did we figure it out?' Allow individual students to help attach these artifacts to the chart as time allows and allow use of any investigation materials in front of them" (Lesson 3, Teacher Edition).

- Lesson 4, Navigate, Step 1: "Use the following prompts to help students recall and point out their observations and measurements about temperature and cloudiness on the Weather Calendar, and use the Notice and Wonder chart to highlight students' questions about rain and/or snow" (Lesson 4, Teacher Edition).
- Lesson 5, Explore, Step 5: " Ask students if they have experienced wind that was really strong...Ask students how we might prepare and what we might do if there were too much wind; if it was so strong that it wasn't safe. Accept all and any responses. If students bring up any ideas that will help us with our later severe weather lessons (e.g., anything related to thunderstorms, tornados or other severe weather with strong winds), add these to the Notice and Wonder chart" (Lesson 5, Teacher Edition).
- Lesson 7, Navigate, Step 4: "In a Scientists Circle, problematize students' current understanding of weather by helping them affirm what they have figured out so far and recognize that there is more they do not yet know (but want to)..." Sidebar: "Teaching Tip:...problematizing weather forecasting is an important step in helping students link what they figured out in Lessons 1-6 to questions and ideas about forecasting and communicating about weather (and severe weather) that will drive the rest of the unit" "Ask students how we could know how to prepare if the weather might change from its usual patterns...Accept all ideas, highlighting differences in those ideas and questions we might have. Co-construct the lesson question. Briefly summarize that the class has shared a variety of ideas about how we might find out what the weather could be like in the future...Ask students how they think we could figure out the answers to our question. Students may suggest watching the news on TV, checking a weather app, etc. Problematize those ideas by wondering aloud something like, How do the people on TV or making the weather apps know what the weather will be?" (Lesson 7, Teacher Edition).

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

- The Weather Unit Front Matter Unit Overview identifies and describes the anchoring phenomenon for the unit, "The anchoring phenomenon for this unit is how and why we prepare for local weather conditions. Although local weather conditions are not a singular event, weather is a natural occurrence that students can observe and investigate, working to figure out how various weather conditions cause us to prepare to stay safe and comfortable."
- The Weather Unit Front Matter, Storyline, Lesson 1 identifies "Anchoring Phenomenon: What is it like outside today and how did we prepare for it?" but also states in the "Phenomenon" column for lesson one, "There are different weather conditions outside that we can notice and ask questions about."
- Lesson 2, Synthesize, Step 6: "Connect to the anchoring phenomenon and Unit Question. Re-read the Unit Question: How can we be prepared for the weather? and ask students how their observations can help start to answer that question" (Lesson 2, Teacher Edition).
- Lesson 4, Synthesize, Step 5: "Connect to the anchoring phenomenon and Unit Question. Re-read the Unit Question, How can we be prepared for the weather? and ask students how their work today can help us answer that question" (Lesson 4, Teacher Edition).
- Lesson 6, Explore, Step 3, sidebar: "Patterns: Students use picture graphs to identify patterns in local weather conditions over time. The patterns describe the phenomenon (local weather conditions) and can be used as evidence to support claims students make about what the weather is usually like (ex: it's cloudy more often than sunny)" (Lesson 6, Teacher Edition).

There is a close match between the phenomena and the three-dimensional learning goals for students throughout the materials:

- Lesson 1, 1.B **Ask questions about preparing for different kinds of weather**.
  - Storyline, Phenomenon column: "There are different weather conditions outside that we can notice and ask questions about."
  - Storyline, What We Figure Out column: "We can observe different types of weather conditions when we go outside."
- Lesson 6, **Compare quantitative data using simple graphs to identify patterns over time** in **local weather (temperature, cloud cover, rain or snow, and wind)**.
  - Storyline, Phenomenon column: "We can see patterns in our local weather over time."
  - Storyline, What We Figure Out column: "Weather is the combination of temperature, cloud cover, rain or snow, and wind where we live at a certain time. Picture graphs help us identify patterns describing what our weather is usually like."
- Lesson 8, 8.B **Obtain information about how local severe weather causes people to prepare**.
  - Storyline, Phenomenon column: "Severe weather is extreme and unsafe."
  - Storyline, What We Figure Out column: "Sometimes the weather is very different from our usual weather patterns. Severe weather events can be unsafe, but we can prepare for them."
- Lesson 9, **Obtain and communicate information** about **how we can prepare** for **local severe weather**.
  - Storyline, Phenomenon column: "We can prepare for and respond to severe weather events safely."
  - Storyline, What We Figure Out column: "People prepare for local severe weather in specific ways, depending on the weather event."
- Lesson 10, **Communicate information** about **how we can prepare** for **different kinds of local weather, including severe weather**.
  - Storyline, Phenomenon column: "Weather-related information can be communicated through drawing, writing, speaking, and gesturing."
  - Storyline, What We Figure Out column: "Communicating with others about how to prepare for the weather can help people stay safe and comfortable."

Criterion-Based Suggestions for Improvement: N/A

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.*

The reviewers found **extensive** evidence that the materials give students opportunities to build understanding of grade-appropriate elements of the three dimensions because students regularly engage in elements of all three dimensions to make sense of the anchoring phenomenon.

The unit centers on students using targeted elements of all three dimensions that are clearly identified and addressed throughout the unit to explain the identified anchoring phenomenon: "how and why we prepare for local weather conditions."

Rating for Criterion: SEP

EXTENSIVE

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

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

Claimed elements:

- **AQDP: P1—Ask questions based on observations to find more information about the natural and/or designed world(s).**
- **DATA: P3—Use observations (firsthand or from media) to describe patterns and/or relationships in the natural ~~and designed~~ world in order to answer scientific questions ~~and solve problems~~.**
- **DATA: P1—Record information (observations, thoughts, and ideas).**
- **MATH: P2—Use counting and numbers to identify and describe patterns in the natural and designed world(s).**
- **MATH: P3—Describe, measure, and/or compare quantitative attributes of different objects and display the data using simple graphs.**
- **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.**
- **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.**

Evidence includes, but is not limited to the following:

AQDP: Asking Questions and Defining Problems

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

Claimed as intentionally developed with greater complexity in Lessons 1-8 in the Unit Front Matter. Examples are provided in the SEP Matrix for Lessons 1-8. Examples include:

- Lesson 1, Connect, Step 4, sidebar: "Teaching Tip, Optional Extension: If students would benefit from additional practice asking questions using specific question words, consider engaging them in the Questions Gallery Tour. The included images provide opportunities to elicit questions from students and directions are provided for how to direct partners through the tour" (Lesson 1, Teacher Edition).
- Lesson 2, Navigate, Step 7: "Add questions to the Notice and Wonder chart. Re-read questions on the Notice and Wonder chart that we are still wondering about. Lead a discussion about what other weather information students think is needed to be prepared (ready) for going outside at recess. Invite students to add additional questions they may have about weather, referring to the Question Words Infographic when helpful." (Lesson 2, Teacher Edition).
- Lesson 4, Explore, Step 4, sidebar: "Community Connections:... Inviting students to share how they prepare for and respond to weather such as rain or snow can support students in developing a habit of making observations and asking questions about the world around them" (Lesson 4, Teacher Edition). The teacher asks the class to respond; therefore, individual students may not have opportunities to ask and answer questions in this lesson.
- Lesson 5, Navigate, Step 1: "Recall where we left off. Display the Notice and Wonder chart with groupings of weather noticings and questions (refer to slide A). Have students help you recall that we made observations about the weather outside last time and think about what type of weather we should investigate next." (Lesson 5, Teacher Edition).
- Lesson 6, Explore, Step 2, sidebar: "Asking Questions and Defining Problems: Generating questions from their Weather Calendar is an opportunity for students to engage in the scientific practice of asking questions based on observations. Asking questions that are answerable by data is an important aspect of scientific endeavors. If you feel students need additional support, you may choose to reread Gallery Tour Images poster from Lesson 1" (Lesson 6, Teacher Edition). Individual students may not have opportunities to ask and answer questions in this lesson.
- Lesson 8, Lesson Assessment Guidance, 8.A, How can I use this assessment information?: "As you look and listen for students' ideas, notice how students engage in the practice of asking questions and...If students need more support in asking questions, engage in out-loud wondering with them and/or reread selected pages in the Gallery Tour Images book from Lesson 1..." (Lesson 8, Teacher Edition).

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

Claimed as used periodically to support the overall development of the practice in the Front Matter Table in Lessons 1-8. The SEP Matrix lists examples of this use in Lessons 2, 4, and 5. Examples include:

- K.2 Weather Unit Front Matter: "Students use this element periodically to support overall development of the practice"
- Lesson 1, Connect, Step 4, sidebar: "Teaching Tip: Encourage students to propose possible answers to the questions even if they are not sure. An important part of an anchoring phenomenon lesson is asking students to attempt to

explain what they're trying to figure out; doing so helps us realize what we are not sure of and need to investigate" (Lesson 1, Teacher Edition).

- Lesson 2, Navigate, Step 1: "A lot of our preparations for going outside are about how warm/cool it feels outside. What questions did we have about that?" (Lesson 2, Teacher Edition). The teacher asks the class to respond, therefore individual students may not have opportunities to ask and answer questions in this lesson.
- Lesson 8, Navigate, Step 1, sidebar: "Teaching Tip: Students have considered extremes of these weather conditions one at a time in previous lessons, but this conversation invites them to consider extremes together, connect to prior ideas and experiences about how people might prepare, and focus on asking questions that can guide their investigations in this lesson and Lesson 9" (Lesson 8, Teacher Edition).

DATA: Analyzing and Interpreting Data

Claimed Element: DATA: P3 Use observations (firsthand or from media) to describe patterns and/or relationships in the natural ~~and designed~~ world(s) in order to answer scientific questions ~~and solve problems~~.

Claimed as intentionally developed by using varying levels of support throughout the unit in Lessons 1-10 in the Unit Front Matter. Examples are provided in the SEP Matrix for Lessons 2-6. Examples include:

- Lesson 1, Navigate, Step 5, sidebar: "Analyzing and Interpreting Data: Students will make and use firsthand observations of different weather conditions in Lessons 2-5. The sequence of weather condition investigations is intentional to build complexity with this practice: students begin with weather conditions that are simpler to observe and likely most familiar to them (temperature on a color scale in Lesson 2 and how sunny/cloudy the sky is in Lesson 3), then they move to making quantitative observations of precipitation amounts in Lesson 4, and end with observations of wind (which is a somewhat abstract concept) using a light-moderate-strong scale in Lesson 5" (Lesson 1, Teacher Edition).
- Lesson 2, Explore, Step 5: "Remind students (or name, if your class did not complete Unit K.1: Why do some surfaces get hot and how can we make them less hot?) that a pattern is something that happens over and over again and can help us know what will happen next. Ask the class if they see a pattern in the temperature observations so far. Can they use this pattern to say what might happen next? What temperature might the next students have to share?" (Lesson 2, Teacher Edition).
- Lesson 4, Explore, Step 4, sidebar: "Analyzing and Interpreting Data: As students make observations of more weather conditions in this lesson and Lesson 5, they do not take the time to create tally charts for each condition and therefore have less teacher support using those observations to find a pattern to be their consensus observation. If needed to support students, consider continuing to use tallies on a whiteboard or similar digital space like the class has done in previous lessons" (Lesson 4, Teacher Edition).
- Lesson 5, Explore, Step 5: "After tallying a number of the same type of wind observations, ask students if they see a pattern forming. Remember, a pattern is something that happens over and over again. Ask if they can use this pattern to say what might happen next. Or what wind observation they think might the next student have to share? After students suggest what might come next, ask remaining students to look at their own observation handout, and stand up if their observation follows the same pattern. Add remaining tally marks to the class chart. After these students sit down, have any remaining students come up and add a tally mark to represent their observation." (Lesson 5, Teacher Edition).

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

Claimed as used with increasing independence in Lessons 1-10 in the Unit Front Matter. Examples are provided in the SEP Matrix for Lessons 1-6, 8. Examples include:

- K.2 Weather Unit Front Matter "Students also use this element with increasing independence (the teacher supports the whole class in recording observations of each weather condition, then as students become familiar with the tools and methods for recording observations, they work in smaller groups or pairs to record their observations)."
- Lesson 1, Explore, Step 2, sidebar: "Analyzing and Interpreting Data: In this lesson, students make observations of what they see and feel outside, record these observations on their handout, then work as a class to record them on the Notice and Wonder chart. In future lessons, students will use their observations to describe patterns that help answer their questions about local weather" (Lesson 1, Teacher Edition).
- Lesson 2, Explore, Step 4: "... Then they will work with their partner to measure the temperature and record it on their handout..." (Lesson 2, Teacher Edition).
- Lesson 3, Explore, Step 2: "Now that students have suggested that we should go outside to make observations, show them how to record what the sky looks like, as well as measure and record the temperature outside. Show students, using a copy of the Sunny/Cloudy Observations handout (refer to slide E), how they will each draw a picture of what they see in the sky related to weather, including labels in their preferred language as needed, and then record the temperature and add a picture of themselves, including what they are wearing, while they are outside" (Lesson 3, Teacher Edition).
- Lesson 4, Explore, Step 3: "...demonstrate how we will record rain measurements by drawing a line where the rain water has filled the gauge (or, if applicable, how we will mark the depth of snow on our measuring stick). Review plans for making other observations, too: explain that while we are outside setting up our rain gauges, half the class will also take temperature measurements and the other half of the class will make and record cloud observations. Pair up students and distribute a Rain Observations handout, clipboard, and writing utensil to each student. Assign pairs to collect either temperature OR cloudiness observations; have students circle which measurement they are working on today. Let them know that they will share their observations/measurements with the whole class so we can record it on our class Weather Calendar..." (Lesson 4, Teacher Edition).

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

Claimed as used to support the overall development of the practice in Lessons 1-10 in the Unit Front Matter. Examples are provided in the SEP Matrix for Lessons 3, 5, and 10. Examples include:

- K.2 Weather Unit Front Matter: "Students use this element to support overall development of the practice."
- Lesson 3, Explore, Step 3: "...Call on individual students to share which type of cloud coverage they recorded on their Sunny/Cloudy Observations handout and help them as needed to add a tally mark to the chart..." (Lesson 3, Teacher Edition).
- Lesson 4, Explore, Step 3: "...Assign pairs to collect either temperature OR cloudiness observations; have students circle which measurement they are working on today. Let them know that they will share their observations/measurements with the whole class so we can record it on our class Weather Calendar..." (Lesson 4, Teacher Edition).

MATH: Using Mathematics and Computational Thinking

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

Claimed as intentionally developed with student increasing responsibility in the unit in Lessons 2-10 in the Unit Front Matter. Examples are provided in the SEP Matrix for Lessons 2-6. Examples include:

- Lesson 2, Explore, Step 5: "Prompts to use: Some of us noticed there were more or less tally marks for different temperatures. Let's count the tally marks and record (write) the number together on the chart. A pattern is something that happens over and over again. What pattern do we see across lots of students' observations?" (Lesson 2, Teacher Edition).
- Lesson 4, Explore, Step 2: "Prompt to use: How could we measure how much water is in our tool? (If needed: refer to the thermometers students have used and point out how we use the numbers and colors to talk about how high the temperature is. Ask, How could we know how high in the tool the rain is?) What to look and listen for: We could use numbers to count how much rain" (Lesson 4, Teacher Edition).
- Lesson 5, Explore, Step 5: "Have the class help you count how many students are standing near each icon to find a pattern in the observations and determine today's consensus temperature observation" (Lesson 5, Teacher Edition).
- Lesson 6, Explore, Step 3: "Explain to students (and demonstrate) that you can count each day that there was no rain on the class Weather Calendar. Demonstrate that to keep track of what symbols on the Weather Calendar have been counted, we can mark each no rain icon off on the calendar as we count so that we can remember that it has been counted. Say the number of "no rain" days aloud to help you and the students remember it. Then, add that number of stickers to the picture graph so that it shows we had ____ days of no rain. Include students in the counting of the weather conditions, marking off of the no rain symbols on the Weather Calendar and putting the corresponding number of stickers on the graph" (Lesson 6, Teacher Edition).

Claimed Element: MATH: P3 Describe, measure, and/or compare quantitative attributes of different objects and display the data using simple graphs.

Claimed as using this element periodically in Lessons 2-10 in the Unit Front Matter. Examples are provided in the SEP Matrix for Lesson 2. Examples include:

- Lesson 2, Explore, Step 3, sidebar: "Teaching Tip, Extension Opportunity: Thermometers may be a new tool for students. Consider providing additional time during this lesson or during center time for students to develop familiarity by putting their hand on/near the red bulb to 'make' the red line go up (due to their body heat). Note the thermometers will take several minutes (or longer) to adjust when moved from one environment to a warmer/less warm one" (Lesson 2, Teacher Edition).
- Lesson 5, Explore, Step 3, sidebar: "Teaching Tip: To further support students in identifying the three wind gauge measurements (light, moderate, and strong), consider adding diagonal lines, a grid, or other patterns/shading on sections of the wind gauge face. Just as the color bars on the thermometer coordinate with the numbers, these patterns could coordinate with and provide additional means of differentiating among wind-related words" (Lesson 5, Teacher Edition).

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 as supporting the development of the overall practice in the unit in Lessons 1-3, 5-10 in the Unit Front Matter table. Examples are provided in the SEP Matrix for Lessons 1-3, 5-10. Examples include:

- Lesson 1, Connect, Step 4: "Repeat this process of reading a word and its icon(s), finding a question, and having partners stand up to discuss potential answers for each row in the infographic. At a few points after students have shared potential answers with their partner, and when you're finished, consider saying something like, We are hearing lots of different ideas about what the answers to our questions could be. I'm getting excited that we get to investigate these questions together as scientists!" (Lesson 1, Teacher Edition).

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

Claimed as supporting the development of the overall practice in the Unit Front Matter. Examples are provided in the SEP Matrix for Lesson 2. Examples include:

- Lesson 1, Connect, Step 4: "First, read the word and point out the icon(s), explaining how each icon is an example of the type of answer you can expect for each question word. For example, 'my friend' is a person that could be the answer to a 'Who?' question." (Lesson 1, Teacher Edition).
- Lesson 2, Synthesize, Step 6: "Use evidence to support our ideas. Remind students (or explain) that scientists use their observations as evidence to answer their scientific questions. Evidence is the observations or information that help answer a scientific question. Using the images of what we did in this lesson, ask a few students to explain how what we did helped us figure out how we could know how warm it is outside. As students share, support them in responding to and building off of one another's ideas. Then, add photos and artifacts to the column titled, 'How did we figure it out?'" (Lesson 2, Teacher Edition).

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

Claimed as supporting the development of the overall practice in the unit in Lessons 1-3, 5-10 in the Unit Front Matter. Examples are provided in the SEP Matrix for Lessons 6-9. Examples include:

- Lesson 6, Connect, Step 5: "Demonstrate how to use text features to obtain information. Show students the cover of the Ready for Recess book, read the title and the title page. Preview the Table of Contents and explain that readers can use these features to help them gather information about something they have questions about. Remind students what they have questions about and how the information in the book may help us answer some of those" (Lesson 6, Teacher Edition).
- Lesson 7, Explore, Step 5: "Prompts to use:... Where do we find the title of this book? Turn and tell your neighbor... Title Page: The title is on the front cover of the book and also on the... (flip open the cover of the book and point to the title page)... Turn and tell your neighbor what this page is called...Title Page: How does a title help us as readers?" (Lesson 7, Teacher Edition). An Obtaining, Evaluating, and Communicating Information sidebar encourages educators to "...take this opportunity to support them in explaining what those features are and how those features help the reader..." is included, but the teacher asks the class to respond; therefore individual students may not ask and answer questions in this lesson.

- Lesson 8, Connect, Step 2: "Use text features to make a plan. As you read aloud the table of contents, have students give a thumbs up or thumbs down if they think the type of severe weather is possible in their community and if they should read that section. You will help the class actually decide what sections to read when you get to each of them in the book." (Lesson 8, Teacher Edition).
- Lesson 9, Explore, Step 2: "Hold up the sign, point out the large photo (students may recognize them from the Lesson 8 book) and describe the weather tool icons on the sign. Ask students why those particular icons are shown on that sign (e.g. a very strong wind gauge icon is used on the tornado sign because tornadoes are known for super-strong winds - that's what can make tornadoes unsafe)" (Lesson 9, Teacher Edition).

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

Claimed as supporting the development of the overall practice in the unit in Lessons 1-3, 5-10 in the Unit Front Matter. Examples are provided in the SEP Matrix for Lessons 7-10. Examples include:

- Lesson 8, Navigate, Step 5: "Ask students what else would be helpful to communicate to others about severe weather. Elevate and record any questions related to preparing for severe weather on the Wonder side of the chart, especially preparations we should make for the specific types of severe weather most likely to happen in our area" (Lesson 8, Teacher Edition).
- Lesson 10, Explore, Step 3: "Group students and assign roles. Partner students and assign one student to practice their CSA presentation first (partner 1), using the projected co-constructed checklist as a guide, as needed, and one student to listen and give feedback first (partner 2). Let students know that practicing is an important part of how scientists/meteorologists get ready to communicate information, and that when we practice, we can become more comfortable and confident" (Lesson 10, Teacher Edition).

Criterion-Based Suggestions for Improvement

- Consider increasing the frequency of opportunities for individual students to demonstrate the use and development of each claimed element (specifically AQDP elements and INFO-P3). For example, increasing partner talk could allow for more individual engagement with each element.

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. The number of claimed elements is appropriate for the length of the unit. Students have multiple opportunities to build proficiency in the following science ideas:

Claimed Elements

- **K-ESS2.D.1: ESS2.D—Weather and Climate. Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time. (K-ESS2-1)**
- **K-ESS3.B.1: ESS3.B—Natural Hazards. Some kinds of severe weather are more likely than others in a given region. Weather scientists forecast severe weather so that the communities can prepare for and respond to these events. (K-ESS3-2)**

Evidence includes, but is not limited to the following:

ESS2.D: Weather and Climate

Claimed Element: K-ESS2.D.1: ESS2.D Weather and Climate: Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time. (K-ESS2-1)

Claimed in Lessons: 1, 2, 3, 4, 5, and 6 on the DCI Matrix. Lessons 1, 2-5, and 6 are mentioned in the DCI table in the front matter. Examples include:

- K.2 Weather Unit Front Matter "Students make their own observations of what it is like outside in Lesson 1, using what they see and feel to ask questions about weather conditions that they then pursue in Lessons 2-5 (temperature, sunny/cloudy conditions; rain or snow; wind). Students record consensus measurements (which represent a pattern across many students' observations) in a class Weather Calendar. Then, in Lesson 6, students use their experiences to co-construct a definition of weather, drawing together ideas about temperature, cloud cover, rain or snow amount, and wind in their particular location at that time. Also, in Lesson 6, students organize the observations they've gathered on the Weather Calendar to notice patterns over time and figure out what their local weather is usually like"
- Lesson 1, Synthesize, Step 3: "Gather in the Scientists Circle. Display slide E and invite students to the Scientists Circle space with their completed Outside Observations handout to discuss how we notice and describe the weather outside. If your class does not often sit in a circle, explain why this structure is important to our work in science; students 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. If you have not done so already, this is also a good time to establish or revisit your classroom agreements" (Lesson 1, Teacher Edition).
- Lesson 2, Explore, Step 3: "Investigate the outside temperature. Take students outside to measure the temperature and remind them to draw themselves first while their thermometer adjusts. Then students should record the measurement on their Temperature Observations handout by marking and filling in up to the red line and circling the temperature color" (Lesson 2, Teacher Edition).

- Lesson 4, Explore, Step 4: "Add rain gauge data to the class Weather Calendar. Gather students together and make sure the Weather Calendar is visible (refer to slide J). Ask students how we could represent today's rain gauge measurement on the class Weather Calendar, co-develop symbols for amounts of rain, and then add the corresponding co-developed symbol to the correct day. Use the following prompts to help generate class consensus about how to represent the amount of raininess before marking the calendar." (Lesson 4, Teacher Edition).
- Lesson 6, Explore, Step 3: "Make sense of the picture graphs. When all pairs are done contributing to their group's graph, move all four Weather Condition Picture Graphs so they can be viewed from the Scientists Circle (refer to slide L). Gather students in a Scientist Circle to identify patterns in what the weather is usually like" (Lesson 6, Teacher Edition).

ESS3.B Natural Hazards

Claimed Element: **K-ESS3.B.1: ESS3.B Natural Hazards: Some kinds of severe weather are more likely than others in a given region. Weather scientists forecast severe weather so that the communities can prepare for and respond to these events. (K-ESS3-2)**

Claimed in Lessons: 2, 7, 8, 9, 10 on the DCI Matrix. Lessons 1, 2-5, and 7-8 are mentioned in the DCI table in the front matter. Evidence was found in Lessons 2, 4, 7, 8, 9, 10. Examples include:

- Lesson 4, Explore, Step 4: "Briefly move the discussion to include extreme rain. Use the following prompts to help students begin to consider the effects of severe weather related to heavy rain, such as flooding (not named as such until Lesson 8). Adjust the questions as needed to fit your local weather conditions and take note of any questions students raise during this discussion to add to your Notice and Wonder chart in the closing Navigate" (Lesson 4, Teacher Edition).
- Lesson 7, Connect, Step 7: "Consider where to go next. Remind students that, in the Meet the Meteorologist book, we figured out how meteorologists predict and communicate about severe weather. Use the Notice and Wonder chart (refer to slide M) to point out and remind students about our (new and previously recorded) unanswered severe weather questions. Plan together that next time, we investigate more about severe weather?" (Lesson 7, Teacher Edition).
- Lesson 8, Connect, Step 2: "Read the first sentence (until the lightbulb icon) about where that type of severe weather happens. Think aloud about whether that type of severe weather is likely to happen in your area" (Lesson 8, Teacher Edition).
- Lesson 8, Connect, Step 2: "Add "severe weather" and specific types of local severe weather to the Word Wall. Point out to students that we have figured out a lot about severe weather and we should add new words to our Word Wall. Ask them what severe weather means and show them the Word Wall card. Severe weather is weather that is unsafe. Additionally, ask students about the types of severe weather that are most likely to happen in your area and show students those Word Wall cards" (Lesson 8, Teacher Edition).

Criterion-Based Suggestions for Improvement

- Ensure claims for intentional use and development of DCI element K-ESS3.B.1 are consistent across all materials [Front Matter, Matrix, Three-Dimensional Learning Goals, etc.].

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. There are sufficient CCC elements and time that students are engaged in the elements for the length of the materials. A close match exists between the claimed CCC elements and evidence of their development and use in the materials.

Students have multiple opportunities to build the following crosscutting concepts:

- **PAT: P1: Patterns in the natural and human-designed world can be observed, used to describe phenomena, and used as evidence.**
- **CE: P1: Events have causes that generate observable patterns.**

Evidence includes, but is not limited to the following:

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 Lessons 2, 3, 5, 6, 7, and 9. Evidence was found in all claimed lessons. "Patterns" is included in the "Using the lens of" column of the Three-dimensional Learning Goal(s) section of the following lessons: 1, 2, 3, 5, 6, 7, and 8. The K.2 Weather SEP-DCI- CCC Matrix claims Lessons 1, 2, 3, 4, 5, 6, 7, 8, and 9. Examples include:

- K.2 Weather Unit Front Matter: "Students' development of this crosscutting concept is supported by ongoing formative assessment opportunities in Lessons 2, 3, 5, and 8, a key formative assessment in Lesson 6, and a summative assessment opportunity in Lesson 7. To support development of Patterns, students use this element with increasing responsibility as the unit goes on. Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence. (PAT-P1)" (Unit Front Matter).
- Lesson 2, Explore, Step 5: "Remind students (or name, if your class did not complete Unit K.1: Why do some surfaces get hot and how can we make them less hot?) that a pattern is something that happens over and over again and can help us know what will happen next. Ask the class if they see a pattern in the temperature observations so far. Can they use this pattern to say what might happen next? What temperature might the next students have to share? Have students who have not yet shared their observation look at their handouts - if they recorded the same temperature as we saw in the pattern, have them stand up. Add that number of tallies to the chart for that temperature. Record observations from any remaining students (accelerate the process by asking others who had that temperature to stand up as well)...Use the provided prompts to help students make sense of their observations and come to agreement (consensus) on one outside temperature measurement...Prompts to use:...What pattern do we see across lots of students' observations?..." (Lesson 2, Teacher Edition).
- Lesson 3, Explore, Step 3: "Call on individual students to share which type of cloud coverage they recorded on their Sunny/Cloudy Observations handout and help them as needed to add a tally mark to the chart. After tallying a number of the same type of cloud coverage, ask students if they see a pattern forming...Ask if they can use this pattern to say what might happen next. Or what sky observation they think the next student might have to share? For example, students might notice that partly cloudy has the most tallies and be able to guess that the next student might say partly cloudy too. After students suggest what might come next, ask the remaining students to look at their own observation

handout, and stand up if their observation follows the same pattern. Add remaining tally marks to the class chart. After these students sit down, have any remaining students come up and add a tally mark to represent their observation… After gathering all student observations, briefly lead a discussion in which students share their observations about the patterns they notice in the data and come to a consensus about which cloudiness condition should be added to the class Weather Calendar. Students can count and compare how many tally marks are in each category on the Sunny/Cloudy Observations chart to support them in making sense of the pattern…" (Lesson 3, Teacher Edition).

- Lesson 5, Explore, Step 5: "…have student pairs who collected temperature observations look at their Rain Observations handouts and go stand by the icon that coordinates with their temperature observation (the rest of the class stays seated). Have the class help you count how many students are standing near each icon to find a pattern in the observations and determine today's consensus temperature observation…" (Lesson 5, Teacher Edition).
- Lesson 6, Explore, Step 2: "Have the class help you count how many students are standing near each icon to find a pattern in the observations and determine today's consensus temperature observation" (Lesson 6, Teacher Edition).
- Lesson 7, Synthesize, Step 2: "…Remind students that they can (and should) look back at the Weather Condition Picture Graphs to find the pattern that shows what their chosen weather condition is usually like…Prompts to use:… Where did you find that pattern?…How did these patterns in our weather cause you to get ready in a certain way?" (Lesson 7, Teacher Edition).

CE: Cause and Effect

Claimed Element: **CE: P1: Events have causes that generate observable patterns.**

Claimed as intentionally developed in Lessons 1, 2, 3, 4, 5, 6, 7, 8, 9, 10. "Cause and Effect" is included in the "Using the lens of" column of the Three-dimensional Learning Goal(s) section of the following lessons: 1, 4, 8, 9, and 10. The K.2 Weather SEP-DCI-CCC Matrix claims Lessons 1, 3, 4, 5, 6, 7, 8, 9, and 10. Examples include,

- K.2 Weather Unit Front Matter: "…They begin in Lesson 1 asking questions about preparing for different weather. Then in Lessons 2-5 they observe and discuss how the various weather conditions they investigate cause them (and others) to prepare to be comfortable outside. Lessons 4 and 5 also provide students an opportunity to use cause-effect thinking to notice patterns in how rain gauges and wind gauges help them observe the weather. In Lessons 6 and 7, students have established what their local weather is usually like and they plan to communicate how that usual weather causes people to prepare. Students specifically connect weather forecasts to preparations in Lessons 7, 8, and 9 when they read about meteorologists and severe weather. In Lesson 9 specifically, students identify patterns in how different types of severe weather cause people to prepare in similar (or different) ways. In Lesson 10, students use their Community Service Announcements to communicate how different kinds of weather, including severe weather events, cause people to prepare and respond. Students' development of this crosscutting concept is supported by a formative assessment opportunity in Lesson 8, a key formative opportunity in Lesson 9, and a summative assessment in Lesson 10. To support development of Cause and Effect, students use this element with increasing responsibility as the unit goes on. Events have causes that generate observable patterns. (CE-P1)" (Unit Front Matter).
- Lesson 1, Synthesize, Step 3: "Have students share their ideas and questions using the provided prompts. Allow students to make cultural or family connections to any existing observations or questions about being comfortable and safe outside, or about getting ready or being prepared for the weather…Prompts to use:…What did we do when we got ready to go outside that helped us be comfortable outside?…What other experiences have you had when you got ready to go outside (or you didn't go outside) because of how (sunny/rainy/windy/cloudy) it was?" (Lesson 1, Teacher Edition).
- Lesson 4, Explore, Step 2: "Use slide G to have a discussion about how the amount of water in the rain gauge depends on how much it is raining…Prompts to use:…If it rained like that during the whole school day, would that cause the

rain gauge to have more or less rain in it?" (Lesson 4, Teacher Edition). There is no guidance in the body of the lesson to connect the rain gauge observations explicitly to the language of "patterns."

- Lesson 5, Navigate Step 1, sidebar, "Broadening Access: Use this moment to identify real-life experiences or connections with weather and wind. Bringing students' prior experiences help develop a shared understanding of why it is important to learn about patterns in order to prepare for windy weather..." (Lesson 5, Teacher Edition). The sidebar encourages the use of patterns, but the prompts do not encourage the use of patterns. There are no references to using patterns in the body of the lesson.
- Lesson 8, Navigate, Step 1: "Support students in reviewing ideas from Our Growing Ideas chart (slide A) about what we figured out about how meteorologists tell us about future weather...Prompts to use:...Why is it helpful to know about possible future weather?" (Lesson 9, Teacher Edition).
- Lesson 9, Explore, Step 2: "...Explain that it might help us as we figure out how to prepare for severe weather if we do what scientists do and notice patterns. Use prompts such as these to support students in observing patterns in how expecting different types of severe weather can cause us to prepare in similar ways...Prompts to use: What patterns do you see in how we can prepare for severe weather? Do we do anything over and over again for any type of weather we're expecting?...Why are weather forecasts so important for severe weather? What do they cause us to do?..." (Lesson 9, Teacher Edition).

Criterion-Based Suggestions for Improvement

- Consider adding instructional language to more frequently and explicitly support educators with using CCC language—especially "pattern" in relation to cause and effect—as well as encouraging the use of CCC language among students.

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 phenomenon over time requires student performances that integrate grade-appropriate elements of the SEPs, CCCs, and DCIs throughout the learning process. The three dimensions are not often used in isolation.

Evidence includes, but is not limited to the following:

Lesson 2, Lesson Learning Goal: **Use counting to analyze data** to **identify a pattern across many students' outside temperature observations**.

- Lesson 2, Explore, Step 5: "Assessment Opportunity, Formative Assessment: During the discussions analyzing students' outside temperature data on the Temperature Observations chart, you have an opportunity to gather evidence about learning goal 2, with the purpose of providing feedback and supporting students in using counting to identify a pattern in their class temperature data"..." Use the provided prompts to help students make sense of their observations and come to agreement (consensus) on one outside temperature measurement...Prompts to use: What do you notice when you look at the tally marks on the Temperature Observations chart?...Some of us noticed

there were more or less tally marks for different temperatures. Let's count the tally marks and record (write) the number together on the chart…What pattern do we see across lots of students' observations?" (Lesson 2, Teacher Edition).

- **SEP: MATH-P2, Use counting and numbers to identify and describe patterns in the natural and designed world(s).**
- **DCI: ESS2.D: Weather and Climate, Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time.**
- **CCC: PAT-P1, Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.**

Lesson 3, Lesson Learning Goal: **Record observations of sunlight and cloudiness and measurements of temperature, then analyze them to identify patterns across many students' data.**

- Lesson 3, Explore, Step 3: "Have students bring their Sunny/Cloudy Observations handout to the Scientists Circle to discuss their observations of the sky and use as evidence of their observations. Call on a few students to share their observations. As you do, surface a variety of ideas about how students described how sunny or cloudy the sky is, including cloud and sky color and amount of cloud cover…Guide students' attention to the Sunny/Cloudy Observations chart with symbols added and ensure it is in a place where students can all see it and add their data (refer to slide H). Call on individual students to share which type of cloud coverage they recorded on their Sunny/Cloudy Observations handout and help them as needed to add a tally mark to the chart. After tallying a number of the same type of cloud coverage, ask students if they see a pattern forming…After gathering all student observations, briefly lead a discussion in which students share their observations about the patterns they notice in the data and come to a consensus about which cloudiness condition should be added to the class Weather Calendar…Display slide J and have student pairs who collected temperature observations look at their Rain Observations handouts and go stand by the icon that coordinates with their temperature observation (the rest of the class stays seated). Have the class help you count how many students are standing near each icon to find a pattern in the observations and determine today's consensus temperature observation" (Lesson 3, Teacher Edition).
  - **SEP: DATA-P3 Use observations (firsthand or from media) to describe patterns and/or relationships in the natural and designed world(s) in order to answer scientific questions and solve problems.**
  - **DCI: ESS2.D: Weather and Climate, Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time.**
  - **CCC: PAT-P1, Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.**

Lesson 5, Lesson Learning Goal: **Record and analyze observations and measurements of wind to identify patterns across many students' data.**

- Lesson 5, Explore, Steps 4-5: "Take the class outside to the predetermined location and have students observe, measure and record the wind and other weather conditions in pairs…Ask students how they can use everyone's wind observations to answer their question about finding out how windy it is. Anticipate students will suggest sharing and comparing their observations and/or using a tally chart (as they did in Lessons 2 and 3) in order to identify one consensus measurement to record on the class Weather Calendar…Affirm students' suggestions for using a tally chart by displaying the Wind Observations chart (refer to slide K). Call on individual students to share which type of wind they recorded on their Wind Observations handout and help them as needed to add a tally mark to the chart…After

tallying a number of the same type of wind observations, ask students if they see a pattern forming…Ask if they can use this pattern to say what might happen next. Or what wind observation they think might the next student have to share? After students suggest what might come next, ask remaining students to look at their own observation handout, and stand up if their observation follows the same pattern…After these students sit down, have any remaining students come up and add a tally mark to represent their observation…Prompts to use: What do you notice when we look at the tally marks on the Wind Observation chart?…What pattern do we see across lots of students' observations?…" (Lesson 5, Teacher Edition).

  - **SEP: DATA-P3, Use observations (firsthand or from media) to describe patterns and/or relationships in the natural and designed world(s) in order to answer scientific questions and solve problems.**
  - **DCI: ESS2.D: Weather and Climate, Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time.**
  - **CCC: PAT-P1, Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.**

Lesson 9, Lesson Learning Goal: **Obtain and communicate information** about **how we can prepare** for **local severe weather**.

- Lesson 9, Handout, How do we prepare for severe weather: "We can be prepared when there is a _. Draw and label how to prepare and stay safe" (Handout).
  - **SEP: 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.**
  - **DCI: ESS3.B: Natural Hazards, Some kinds of severe weather are more likely than others in a given region. Weather scientists forecast severe weather so that the communities can prepare for and respond to these events.**
  - **CCC: CE-P1, Events have causes that generate observable** patterns. The handout alone is not a strong artifact for representing student proficiency with the patterns portion of this CCC element.

Lesson 10, Lesson Learning Goal: **Communicate information** about **how we can prepare** for **different kinds of local weather, including severe weather**

- Lesson 10, Explore, Step 2: Describe in-school presentations. Explain that students will be communicating their Community Service Announcements to a small group of classmates and one (or more) guest(s) so that everyone gets a chance to share. If possible, share with students when this will take place (later today, tomorrow) and name the guests who will be joining your classroom" (Lesson 10, Teacher Edition).
  - **SEP: 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).**
  - **DCI: ESS3.B: Natural Hazards, Some kinds of severe weather are more likely than others in a given region. Weather scientists forecast severe weather so that the communities can prepare for and respond to these events.**
  - **CCC: CE-P1, Events have causes that generate observable patterns.**

Criterion-Based Suggestions for Improvement: N/A

I.D. Unit Coherence

EXTENSIVE

Lessons fit together to target a set of performance expectations.

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

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

The reviewers found **extensive** evidence that the lessons fit together coherently to target a set of performance expectations for these reasons:

- All the lesson themes and content are sequenced coherently and explicitly from the student's perspective;
- Each lesson builds directly on prior lessons and makes the links between lessons explicit to the students. This includes students having regular opportunities to engage in asking questions based on what they have learned so far in the unit and to revisit their questions in subsequent lessons;
- In subsequent lessons, students answer relevant questions unanswered by the sensemaking opportunities in previous lessons. Investigations are focused on students answering these questions by connecting evidence from the investigations/information collection to science ideas and concepts. It is not just the teacher answering the questions;
- Students generate questions, and there is support for educators to focus student thinking and facilitate the questions toward a goal set of questions; and
- The lessons help students develop toward proficiency in the targeted set of performance expectations: K-ESS2-1 and K-ESS3-2.

Evidence includes, but is not limited to the following:

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 3, Navigate, Step 1: "Refer to slide C and say something like, we have already figured out some of our questions about how to prepare for the weather. Use the following prompts to motivate what to investigate next... Prompts to use: What other questions do we have about preparing for the weather?...Let's look at this picture (slide D). Have you ever seen a sky like this before?...What questions do we have about sunny and cloudy weather?... Co-construct the lesson question with students by building on their ideas and questions about going outside and observing the sky and noticing whether it is cloudy or sunny outside will help us prepare for the weather today" (Lesson 3, Teacher Edition).
- Lesson 4, Synthesize, Step 5: "Re-read the lesson question on Our Growing Ideas chart and have students recall what we did in this lesson to try to answer that question. Refer to slide Q and images and artifacts you have gathered from this lesson and/or printed from Printable Chart Images, and have students' handouts or notebooks available for reference for them, if helpful. Take a couple of minutes to have students summarize what we did to answer that question" (Lesson 4, Teacher Edition).

- Lesson 5, Navigate, Step 7: "Revisit the class Notice and Wonder chart (refer to slide R). Review the groupings of weather noticings and questions from Lessons 1-4. Remind students that scientists use their observations and data from their investigations as one way to answer their questions. Ask students what questions they can now answer based on their wind investigation. Re-read questions on the Notice and Wonder chart that are not yet answered. Invite students to add additional questions they may have about preparing for the weather" (Lesson 5, Teacher Edition).
- Lesson 10, Synthesize, Step 5: "...review with students the questions on the Wonder side. Engage in a discussion with students to identify (and review) questions that have been answered across the whole unit. Notice and identify any questions that remain, and use a discussion to see if you can answer those questions or figure out parts of them. Finally, ask students what new questions they have, even now as the unit ends" (Lesson 10, Teacher Edition).

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

Two target Performance Expectations are identified in the K.2 Lesson Unit Front Matter as being "built toward":

- **K-ESS2-1**: Use and share observations of local weather conditions to describe patterns over time.
  - Lesson 1, 1.A **Make observations** of **outside weather conditions** and **identify similarities and differences in our class questions.**
  - Lesson 2, **Use counting to analyze data** to **identify a pattern across many students' outside temperature observations.**
    - Lesson 2, Lesson Assessment Guidance, How can I use this assessment information? "Students' first intentional opportunity to notice patterns over time is in Lesson 6, so they are not expected to demonstrate a secure understanding of Assessment Statement 1 before then" (Lesson 2, Teacher Edition).
  - Lesson 3, **Record observations of sunlight and cloudiness and measurements** of **temperature**, then **analyze them to identify patterns across many students' data.**
  - Lesson 4, **Use counting and numbers to describe cause-and-effect relationships related to the amount of rain in a rain gauge.**
    - Lesson 4, Explore: "Continue the routine of collecting additional weather observations and help students notice patterns across their class data, to inform later work looking for patterns over time" (Lesson 4, Teacher Edition).
  - Lesson 5, **Record and analyze observations and measurements** of **wind to identify patterns across many students' data.**
  - Lesson 6, **Compare quantitative data using simple graphs to identify patterns over time** in **local weather (temperature, cloud cover, rain or snow, and wind)**.
    - Lesson 6, What we do: "To answer our questions, we count each of the weather conditions we have observed and measured to create picture graphs that help us identify patterns over time in our weather observations and measurements" (Lesson 6, Teacher Edition).
    - Lesson 6, Navigate, Step 1: "Remind students how, so far, they have been using many students' observations to identify a pattern and record that as consensus data on the Weather Calendar. Ask students what they think will need in order to identify patterns in weather conditions over time. Invite students to turn and talk to a partner. Anticipate they will suggest having lots of observations/data

is important; they should collect more data; and/or they should have multiple students collect each kind of weather condition data. Use students' ideas to navigate into the Explore, when students will continue collecting local weather condition data" (Lesson 6, Teacher Edition).

- Lesson 6, Synthesize, Step 4: "Have completed picture graphs posted and engage students in a Consensus Discussion to answer the questions they generated from the Weather Calendar previously in the lesson Answering these questions involves noticing patterns in local weather data they have collected...Use the following discussion prompts. Prompts to use:...For each weather condition, ask the following: What patterns do we see in the (weather condition) picture graph?...We had questions about whether there were more/less days with (this variety) of this (weather condition). What patterns do we see in our (weather condition) picture graphs? (e.g. When we look at our cloudiness graph, were there more sunny or partly cloudy days?)...What are the patterns in our data?..." (Lesson 6, Teacher Edition).

– Lesson 7, 7.A **Use observations to describe patterns in local weather over time**.

- Lesson 7, Navigate, Step 1: "Support students in reviewing ideas from Our Growing Ideas chart and our Weather Conditions Picture Graphs that reflect what we figured out about patterns in local weather (refer to slide A). Use the following prompts to guide your review...Prompts to use: What patterns have we identified in our weather observations? What is the weather usually like?...Can you point to the picture graph that shows that pattern? How do we know the weather is usually like that?..." (Lesson 7, Teacher Edition).
- Lesson 7, Synthesize, Step 2: "Show students the 'How do we prepare for usual weather?' handouts (refer to slide C) and explain that they will get to choose one and use it to describe (by writing and drawing) what the weather is usually like. Remind students that they can (and should) look back at the Weather Condition Picture Graphs to find the pattern that shows what their chosen weather condition is usually like" (Lesson 7, Teacher Edition).
- Lesson 7, Synthesize, Step 2, Assessment Opportunity: "Summative assessment: The "How do we prepare for usual weather?" handouts provide an opportunity to summatively assess students' understanding by gathering evidence about Assessment Statement 1 with the purpose of noticing how students are able to identify patterns over time in their weather observations" (Lesson 7, Teacher Edition).

- **K-ESS3-2:** Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.

– Lesson 1, 1.B **Ask questions about preparing for different kinds of weather**.

– Lesson 7, 7.B **Obtain information about how meteorologists use patterns in local weather conditions to predict future weather**.

- Lesson 7, What we do: "...But we also still have questions about how we know weather in the future, so we read a book about how meteorologists use tools and patterns in many, many weather observations to make weather forecasts and communicate these so that people can be prepared, especially about severe weather..." (Lesson 7, Teacher Edition).
- Lesson 7, Lesson Assessment Guide, 7.B, How can I use this assessment information?: "...noting that students will be prompted to use Cause and Effect beginning in Lesson 8..." (Lesson 7, Teacher Edition).
- Lesson 7, Lesson Assessment Guide, 7.B, How can I use this assessment information?: "...Provide feedback to students by supporting them in the moment with questions such as: What do we do as

meteorologists? What does Betty Davis do? What questions do you have about weather forecasts or severe weather? Was there something in our book that made you wonder about that? (Refer to the Question Words Infographic, if helpful.)" (Lesson 7, Teacher Edition).

- Lesson 7, Navigate Step 4, sidebar: "Teaching Tip: 'Problematizing' is a move a teacher makes in the storyline instructional model to elevate students' uncertainties and motivate further investigation. Here, problematizing weather forecasting is an important step in helping students link what they figured out in Lessons 1-6 to questions and ideas about forecasting and communicating about weather (and severe weather) that will drive the rest of the unit. This engagement helps confirm what students have accomplished and motivates them in expanding their ideas about weather patterns and preparedness" (Lesson 7, Teacher Edition).
- Lesson 7, Navigate Step 4: "...Ask something like, So, will the weather always be like that? Can we expect it to be that way every day? Could we always prepare the same way for that weather and be comfortable?...Anticipate that students will say no, the weather changes sometimes. Ask students how we could know how to prepare if the weather might change from its usual patterns; is there a way we could know what the weather might be in the future? Accept all ideas, highlighting differences in those ideas and questions we might have. Co-construct the lesson question. Briefly summarize that the class has shared a variety of ideas about how we might find out what the weather could be like in the future. Emphasize that we are not all sure about this, and if you have questions about weather forecasting on your Notice and Wonder chart, refer to those now, too. Combine students' questions into a lesson question such as How can we find out about weather in the future? Add this question to a new row on Our Growing Ideas chart" (Lesson 7, Teacher Edition).
- Lesson 7, Connect, Step 7: "Remind students that, in the Meet the Meteorologist book, we figured out how meteorologists predict and communicate about severe weather. Use the Notice and Wonder chart (refer to slide M) to point out and remind students about our (new and previously recorded) unanswered severe weather questions. Plan together that next time, we investigate more about severe weather." (Lesson 7, Teacher Edition).

– Lesson 8, 8.A **Ask questions about local patterns** in **weather conditions to obtain information about local severe weather**.

- Lesson 8, Navigate, Step 1: "Remind students that we have figured out a lot about how to know about future weather but that we still have more we want to figure out about severe weather. Highlight any questions students have concerning severe weather on the Notice and Wonder chart (refer to slide B) and continue the discussion...Prompts to use:...What are we still wondering about severe weather?... Combine students' questions, making sure to use students' words and phrasing, into a lesson question such as, What makes weather severe? Add this question to a new row on Our Growing Ideas chart..." (Lesson 8, Teacher Edition).

– Lesson 8, 8.B **Obtain information about how local severe weather causes people to prepare.**

– Lesson 9, **Obtain and communicate information** about **how we can prepare** for **local severe weather**.

– Lesson 10, **Communicate information** about **how we can prepare** for **different kinds of local weather, including severe weather**.

Criterion-Based Suggestions for Improvement: N/A

I.E. Multiple Science Domains

EXTENSIVE

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

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

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

The reviewers found **extensive** evidence that student proficiency in the DCI learning targets and understanding of the phenomenon can be accomplished through only one science domain. Only one science domain (Earth and space science) is used, and can fully address the phenomenon: "how and why we prepare for local weather conditions."

Evidence includes, but is not limited to the following:

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

- In Lessons 1–10, only the Earth and space science domain is necessary to explain the phenomenon.

DCI PS3.B: Conservation of Energy and Energy Transfer: Sunlight warms Earth's surface.

- K.2 Weather Unit Front Matter, What ideas and experiences will students bring that can help them in this unit? Sunlight: "If you taught Unit K.1: Why do some surfaces get hot and how can we make them less hot? before this unit, your students will have figured out that the Sun warms Earth's surfaces and they may connect this idea to the weather conditions they observe. Validate these connections while helping students develop accurate ideas about weather conditions."
- Lesson 1, Navigate, Step 5: "...Point out that many of our comments about preparing to go outside were about how hot (or not) it is, so suggest that it might make sense to start first with investigating how we feel (hot or less hot, warm or not) when we are outside" (Lesson 1, Teacher Edition).
- Lesson 1, Navigate, Step 5: "...Explain that if we want to know how warm it is outside, it might be helpful to look for ways we know how warm other things are. Tell students that if they are able, they can look around with an adult after school and see if they can find tools we use or other ways we can know how warm something is. Refer to slide K and distribute the How do we know how warm something is?..." (Lesson 1, Teacher Edition).
- Lesson 2, Navigate, Step 1, sidebar: "Teaching Tip: If your students have experienced Unit K.1: Why do some surfaces get hot and how can we make them less hot?, they figured out that surfaces can be hot or less hot depending on their location. That language aligns with students' experiences across the United States and is scientifically accurate: How warm something feels coincides with an amount of energy. In this unit, cool and cold are used because of their relevance to preparing for the weather/temperature" (Lesson 2, Teacher Edition).
- Lesson 3, Navigate, Step 1, sidebar: "Teaching Tip: If you taught Unit K.1: Why do some surfaces get hot and how can we make them less hot? before this unit, your students may bring up that it feels warmer outside (especially on objects like slides) when it is sunny. If students think that it's always cooler when it's cloudy you might want to bring up a counterexample (say, a warm day that is also cloudy) so that students do not only equate cloudiness with low temperatures or rain. Feel free to explore and leverage these ideas bearing in mind that causal connections across different types of weather conditions, like temperature and cloudiness, are addressed in later grades" (Lesson 3, Teacher Edition).

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

- K.2 Weather Unit Front Matter, Intentionally Developed Crosscutting Concepts: "To support development of Patterns, students use this element with increasing responsibility as the unit goes on. Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence. (PAT-P1). Patterns is developed in all four kindergarten units: In Unit K.3: How can we move things to where we want them to go? students identify patterns of the effects of different strengths or directions of pushes and pulls on the motion of an object; in Unit K.1: Why do some surfaces get hot and how can we make them less hot?, students use patterns in how surfaces feel outside to figure out that the sun warms them; in Unit K.4: What do plants and animals need and should we help them? students use patterns in their observations to figure out what birds and other living things need."
- K.2 Weather Unit Front Matter, Intentionally Developed Crosscutting Concepts: "To support development of Cause and Effect, students use this element with increasing responsibility as the unit goes on. Events have causes that generate observable patterns. (CE-P1) Cause and Effect is developed in all four kindergarten units: In Unit K.3: How can we move things to where we want them to go? students identify causes and effects related to an object's motion; in Unit K.1: Why do some surfaces get hot and how can we make them less hot?, students explain that the patterns they observe in surfaces heating outside are caused by the sun warming those surfaces; in Unit K.4: What do plants and animals need and should we help them? students consider causes and effects related to the needs of plants and animals."
- K.2 Weather Unit Front Matter, What ideas and experiences will students bring that can help them in this unit? Cause and Effect: "...If you taught Unit K.1: Why do some surfaces get hot and how can we make them less hot?, students figured out that sunlight causes surfaces to become hot and they explicitly named other examples of cause-effect relationships. In this unit, students develop their cause-and-effect reasoning as they consider how local weather conditions and forecasts of weather (sometimes severe) cause people to prepare and respond in particular ways."
- Lesson 2, Explore, Step 5, sidebar: "Patterns: If your class has experienced the Unit K.1 they will be familiar with the word "pattern"; you might still have it on your Word Wall. If your class has not done Unit K.1 yet, explain more explicitly how the observations of this particular temperature keep happening over and over again. Students will have multiple opportunities to use and build their understanding of this crosscutting concept in this unit" (Lesson 2, Teacher Edition).
- Lesson 2, Explore, Step 5: "Remind students (or name, if your class did not complete Unit K.1: Why do some surfaces get hot and how can we make them less hot?) that a pattern is something that happens over and over again and can help us know what will happen next. Ask the class if they see a pattern in the temperature observations so far..." (Lesson 2, Teacher Edition).

Criterion-Based Suggestions for Improvement: N/A

I.F. Math and ELA

EXTENSIVE

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

The reviewers found **extensive** evidence that the materials provide grade-appropriate connections to the Common Core State Standards in Mathematics and/or English Language Arts because the materials explicitly state the mathematics and ELA standards that are used in the unit and sometimes support students to see the connections between content areas.

Evidence includes, but is not limited to the following:

ELA

LA: Language

CCSS-ELA-LITERACY.L.K.1E Use the most frequently occurring prepositions (e.g., to, from, in, out, on, off, for, of, by, with).

- Claimed as being connected to Lesson 4
  - Lesson 4, Explore, Step 3, sidebar: "Literacy Supports: Commonly used prepositions (e.g, from, in, out, under, by) are needed for students to decide which places would be best for the rain gauges. You can demonstrate using a variety of these words and use the prompt 'What might happen if we put it _____?' to encourage students to incorporate these prepositions into their oral language" (L.K.1E)" (Lesson 4, Teacher Edition).

CCSS-ELA-LITERACY.L.K.1F Produce and expand complete sentences in shared language activities.

- Claimed as being connected to Lesson 4
  - Lesson 4, Synthesize, Step 5, sidebar: "Literacy Supports: During Building Understandings Discussions, consider using follow-up response prompts as a way to expand upon students' oral language and demonstrate communication with complete sentences. If a student's claim about preparing for rain or snow is incomplete, you can prompt them to 'say more', or ask follow-up questions to encourage students to complete their thoughts using a complete sentence. (L.K.1F)" (Lesson 4, Teacher Edition)
- Claimed as being connected to Lesson 10
  - Lesson 10, Connect, Step 4, sidebar: "Encourage students to communicate their science ideas alongside their written work on the Community Service Announcements. Students can use their written work to prompt communicating in expanded and complete sentences. For example students can say, 'Our poster shows ____' or 'We can prepare for _____'. This supports L.K.1F" (Lesson 10, Teacher Edition).

ELA: Reading: Informational Text

CCSS.ELA-LITERACY.RI.K.2 With prompting and support, identify the main topic and retell key details of a text.

- Claimed as being connected to Lesson 2
  - Lesson 2, Connect, Step 2: "Read the Measuring Temperature book. Use the following prompts to engage in an interactive read aloud of the Measuring Temperature book...Prompts to use: After reading: What was the main topic of this book? What did we figure out from reading this book?" (Lesson 2, Teacher Edition).

CCSS-ELA-LITERACY.RI.K.5 Identify the front cover, back cover, and title page of a book.

- Claimed as being connected to Lesson 7
  - Lesson 7, Explore, Step 5, sidebar: "Literacy Supports: Identifying the front cover and title page of the Meet the Meteorologist book orients students to what the book might be about. Examining these words and pictures helps students think about ideas they have relevant to the book topic. When students activate these connections before reading they are more likely to understand and engage with the book. (RI.K.5)" (Lesson 7, Teacher Edition).
  - Lesson 7, Explore, Step 5: "Use the following prompts to introduce the book. Prompts to use:...Where do we find the title of this book? Turn and tell your neighbor...The title is on the front cover of the book and also on the... (flip open the cover of the book and point to the title page)... Turn and tell your neighbor what this page is called..." (Lesson 7, Teacher Edition).

CCSS-ELA-LITERACY.RI.K.7 With prompting and support, describe the relationship between illustrations and the text in which they appear (e.g., what person, place, thing, or idea in the text an illustration depicts).

- Claimed as being connected to Lesson 3
  - Lesson 3, Explore, Step 3, sidebar: "Literacy Supports: As you add a co-developed symbol for cloudiness, explain why the symbol is important for their calendar and what it represents. Adding additional details, like drawings, symbols, or pictures can add additional detail or explain information in a text. Remind students that they can do this in their own writing to provide additional details and information. This work supports RI.K.7 as students explain the relationship between illustrations and images in a text" (Lesson 3, Teacher Edition).

- Claimed as being connected to Lesson 5
  - Lesson 5, Connect, Step 2, sidebar: "Literacy Supports: Support students in seeing how their typical reading practices can support their science sensemaking; in this case describing the relationship between the images and the text to understand what thing or idea in the text an illustration depicts. (RI.K.7)" (Lesson 5, Teacher Edition).

ELA: Speaking and Listening

CCSS-ELA-LITERACY.SL.K.1A Follow agreed-upon rules for discussions (e.g., listening to others and taking turns speaking about the topics and texts under discussion).

- Claimed as being connected to Lesson 10
  - Lesson 10, Explore, Step 2, sidebar: "Support students in understanding the class expectations for listening and sharing during their Community Service Announcement presentations. Remind students that good listeners follow agreed-upon rules for discussion like taking turns and raising their hands to ask questions. While presenting students can speak loudly with confident voice to clearly communicate their ideas (SL.K.1A, SL.K.6)" (Lesson 10, Teacher Edition).

CCSS-ELA-LITERACY.SL.K.5 Add drawings or other visual displays to descriptions as desired to provide additional detail.

- Claimed as being connected to Lesson 5
  - Lesson 5, Explore, Step 5, sidebar: "Literacy Supports: As you add symbols for different temperatures and weather conditions to the Weather Calendar, they are gaining practice adding drawings and other visual displays to written descriptions. This reinforces the idea that drawings and visual displays can add important details and key ideas to written language. Share with students that this work helps us communicate our science ideas clearly to others (SL.K.5)" (Lesson 5, Teacher Edition). There is a missed opportunity to guide educators in more explicitly supporting students to see the connections between what they may be learning in language arts and what they are doing - applying - in science.

CCSS-ELA-LITERACY.SL.K.6 Speak audibly and express thoughts, feelings, and ideas clearly.

- Claimed as being connected to Lesson 10. There are many more lessons, in addition to only Lesson 10, in which this standard can be explicitly named and used. SL.K.1A is explicitly called out in a Lesson 3 sidebar, but this is not marked in the front matter's matrix.
  - Lesson 10, Explore, Step 2, sidebar: "Support students in understanding the class expectations for listening and sharing during their Community Service Announcement presentations. Remind students that good listeners follow agreed-upon rules for discussion like taking turns and raising their hands to ask questions. While presenting students can speak loudly with confident voice to clearly communicate their ideas (SL.K.1A, SL.K.6)" (Lesson 10, Teacher Edition).

ELA: Writing

CCSS-ELA-LITERACY.W.K.5 With guidance and support from adults, respond to questions and suggestions from peers and add details to strengthen writing as needed.

- Claimed as being connected to Lesson 7
  - Lesson 7, Synthesize, Step 3, sidebar: "Literacy Supports: As students respond to and address feedback on their written work, they gain practice in responding to questions and suggestions from peers. Encourage students to add details to their writing based on their peers' feedback. Remind students that feedback and added details help readers understand our writing (W.K.5)" (Lesson 7, Teacher Edition).
  - Lesson 7, Synthesize, Step 3: "Remind students that having others look at our drawing/writing can help us make sure we clearly showed our ideas. Explain that in a minute, we will take turns moving around to other students' drawings. If you're at your seat, when someone stops by your handout, show and tell them about your work. If you're moving around, after hearing and seeing someone's work, you can say (refer to slide D): I notice that you _____I wonder _____Then, we can add or change things on our handouts because of what our classmates noticed and wondered" (Lesson 7, Teacher Edition).

Mathematics

Counting and Cardinality

CCSS-Math-K.CC.A.1 Count to 100 by ones and by tens.

- Claimed as being supported within Lesson 2
  - Lesson 2, Explore, Step 3, sidebar: "Math Supports: Measuring temperature with a thermometer reinforces the use of number lines; thermometers are vertical number lines. Though students may make different choices in counting, most will describe temperatures on the thermometers to the nearest ten or in-between tens (part of K.CC.A.1)" (Lesson 2, Teacher Edition).

CCSS-Math-K.CC.A.3 Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).

- Claimed as being supported within Lesson 4
  - Lesson 4, Explore, Step 2, sidebar: "Math Supports:...As they construct the rain gauge, students will write numbers (part of K.CC.A.3) that will later help them in measuring the amount of rain collected" (Lesson 4, Teacher Edition).

CCSS-Math-K.CC.B.4 Understand the relationship between numbers and quantities; connect counting to cardinality.

- Claimed as being supported within Lesson 2
  - Lesson 2, Explore, Step 3, sidebar: "Math Supports: A Hundred Chart is a mathematical tool (MP5) that can further support your students in using the thermometer to connect counting with cardinality (K.CC.B.4). You may choose to color different sections of the hundreds chart to match the thermometer (example: 70-79 is orange, 80-89 is red, etc.). This can support students in making sense of the numbers between multiples of ten as they measure the temperature" (Lesson 2, Teacher Edition).

- Claimed as being supported within Lesson 3
  - Lesson 3, Explore, Step 3, sidebar: "Math Supports: As shared in lesson 2, tallies are a helpful tool for students as they begin to discuss and compare their data (MP5). In this lesson, students can begin individually adding tally marks to share their sunny/cloudy observation data on the chart. Teachers can support students in counting the tallies by 1's. 5's, and/or 10s as they continue to understand the relationship between counting and cardinality (part of K.CC.A.1 and part of K.CC.B.4)" (Lesson 3, Teacher Edition).

CCSS-Math-K.CC.B.5 Count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1-20, count out that many objects.

- Claimed as being supported within Lesson 2
  - Lesson 2, Explore, Step 5, sidebar: "Math Supports: To progress students in their representation of data, use tally marks to model the temperature data. Modeling the data with tally marks builds on subitizing skills and supports counting and comparison, as well as supporting counting by and number recognition building off 1s, 5s, and 10s. Ask how many in total and model how to count the tally marks connecting each number name with one and only one tally mark when counting (part of K.MD.B.3, K.CC.B.4, part of K.CC.B.5, and MP4)" (Lesson 2, Teacher Edition).

CCSS-MATH-K.CC.C.7 Compare two numbers between 1 and 10 presented as written numerals.

- Claimed as being supported within Lesson 4
  - Lesson 4, Explore, Step 2, sidebar: "Math Supports:...Have students compare the written numbers on the rain gauge (K.CC.C.7) as they practice using the rain gauge and once they go outside to collect rain data" (Lesson 4, Teacher Edition)

Math Practices

CCSS-Math-Practice.MP1 Make sense of problems and persevere in solving them.

- Claimed as being supported within Lesson 2
  - Lesson 2, Explore, Step 3, sidebar: "Math Supports: Measuring the inside temperature provides a meaningful reference point for students who may be new to measuring, making sense of, and discussing temperature in degrees Fahrenheit. Using the benchmark of the classroom (inside) temperature can be helpful for students in making sense of the numbers on the thermometer (degrees Fahrenheit). (MP1) Students do not need to label or name the unit" (Lesson 2, Teacher Edition).

CCSS-Math-Practice.MP2 Reason abstractly and quantitatively.

- Claimed as being supported within Lesson 3
  - Lesson 3, Explore, Step 3, sidebar: "Math Supports...Encourage the use of words such as 'more' and 'less' as students make sense of how different quantities relate to one another (MP2)" (Lesson 3, Teacher Edition).

CCSS-Math-Practice.MP4 Model with mathematics.

- Claimed as being supported within Lesson 2
  - Lesson 2, Explore, Step 5, sidebar: "Math Supports: To progress students in their representation of data, use tally marks to model the temperature data. Modeling the data with tally marks builds on subitizing skills and supports counting and comparison, as well as supporting counting by and number recognition building off 1s, 5s, and 10s. Ask how many in total and model how to count the tally marks connecting each number name with one and only one tally mark when counting (part of K.MD.B.3, K.CC.B.4, part of K.CC.B.5, and MP4)" (Lesson 2, Teacher Edition).

CCSS-Math-Practice.MP5 Use appropriate tools strategically.

- Claimed as being supported within Lesson 2
  - Lesson 2, Explore, Step 3, sidebar: "Math Supports: Thermometers are helpful tools that students will use to measure the outside temperature (MP5). Ask students to tell you what they notice about the numbers and the different colors. Students will use this tool throughout the unit" (Lesson 2, Teacher Edition).
  - Lesson 2, Explore, Step 3, sidebar: "Math Supports: A Hundred Chart is a mathematical tool (MP5) that can further support your students in using the thermometer to connect counting with cardinality (K.CC.B.4). You may choose to color different sections of the hundreds chart to match the thermometer (example: 70-79 is orange, 80-89 is red, etc.). This can support students in making sense of the numbers between multiples of ten as they measure the temperature" (Lesson 2, Teacher Edition).

- Claimed as being supported within Lesson 3
  - Lesson 3, Explore, Step 3, sidebar: "Math Supports: During the investigation and discussion, students will classify the weather into three different categories and count the number of tally marks in each category (part of K.MD.B.3 and MP5)..." (Lesson 3, Teacher Edition).

- Claimed as being supported within Lesson 4
  - Lesson 4, Explore, Step 2, sidebar: "Math Supports: Rain gauges are a helpful tool that students will construct to measure the amount of precipitation that collects (MP5). If needed, remind students of the other mathematical tool (thermometer) they have used throughout this unit to collect weather data..." (Lesson 4, Teacher Edition).
  - Lesson 4, Explore, Step 2, sidebar: "Math Supports: Similar to the thermometer in previous lessons, the rain gauge acts as a vertical number line (MP5) that students use to make sense of the amount of rain collected. Have students compare the written numbers on the rain gauge (K.CC.C.7) as they practice using the rain gauge and once they go outside to collect rain data" (Lesson 4, Teacher Edition).

- Claimed as being supported within Lesson 5
  - Lesson 5, Connect, Step 2, sidebar: "Math Supports: Similar to the previous lessons, students will explore a tool (wind gauge) that can be used to measure how fast or slow the wind is moving (MP5). As they explore the infographic, have students make comparisons to other measurement tools (thermometer and rain gauge) that help us measure specific weather conditions" (Lesson 5, Teacher Edition).
  - Lesson 5, Explore, Step 5, sidebar: "Math Supports: Students have been practicing using and counting tally marks since lesson 2 of this unit. As such, have students count by 5s and 10s as they count and compare the number of tally marks in each section of the Wind Observations chart. Additionally, students may be ready to add tally marks to the chart and count them independently. (part of K.MD.B.3, MP5)" (Lesson 5, Teacher Edition).

Measurement and Data

CCSS-Math-K.MD.A.2 Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. For example, directly compare the heights of two children and describe one child as taller/shorter.

- Claimed as being supported within Lesson 2
  - Lesson 2, Connect, Step 2, sidebar: "Math Supports: As you read the book, ask students to practice counting by tens as they look at the thermometer (part of K.CC.A.1) to compare the measurable attribute of temperature using terms such as 'more' and 'less' (K.MD.A.2)" (Lesson 2, Teacher Edition). There is a missed opportunity to guide educators in more explicitly supporting students to see the connections between what they may be learning in math and what they are doing - applying - in science.

CCSS-Math-K.MD.B.3 Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.* (*Limit category counts to be less than or equal to 10.)

- Claimed as being supported within Lesson 3
  - Lesson 3, Explore, Step 3, sidebar: "Math Supports: During the investigation and discussion, students will classify the weather into three different categories and count the number of tally marks in each category (part of K.MD.B.3 and MP5)..." (Lesson 3, Teacher Edition).

- Claimed as being supported within Lesson 5
  - Lesson 5, Explore, Step 5, sidebar: "Math Supports: Students have been practicing using and counting tally marks since lesson 2 of this unit. As such, have students count by 5s and 10s as they count and compare the number of tally marks in each section of the Wind Observations chart. Additionally, students may be ready to add tally marks to the chart and count them independently. (part of K.MD.B.3, MP5)" (Lesson 5, Teacher Edition).

Criterion-Based Suggestions for Improvement

- The language of the lesson plan body (what is said to students) could more explicitly "...support students to see the connections between content areas" (Detailed Guidance, p. 18).

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 for these reasons:

- The phenomena and classroom activities used are engaging to students and reflect grade-appropriate, realistic scenarios that students are authentically motivated to figure out;
- Students can relate to the phenomena;
- Students experience the phenomenon as directly as possible;
- Students have multiple opportunities to connect the phenomena they figure out to their own prior experiences, community, or culture;
- The materials provide support to educators for connecting instruction to all students' homes, neighborhoods, communities, and cultures as appropriate;
- The materials provide support to educators for anticipating and handling topics that are potentially sensitive, controversial, or difficult to discuss for certain students or populations of students; and
- Educators are supported to cultivate student questions and ideas that connect to students' experiences, community, or culture.

Evidence includes, but is not limited to the following:

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

- The Weather Unit Front Matter Unit Overview identifies and describes the anchoring phenomenon for the unit: "The anchoring phenomenon for this unit is how and why we prepare for local weather conditions. Although local weather conditions are not a singular event, weather is a natural occurrence that students can observe and investigate, working to figure out how various weather conditions cause us to prepare to stay safe and comfortable."
- Lesson 1, Explore, Step 2: "Remind students that we wanted to explore what the weather is like for us today, so we are planning to go outside and investigate that" (Lesson 1, Teacher Edition).
- Lesson 2, Navigate, Step 1: "Prompts to use:...When we go outside again today, do you think it will be hotter or cooler or the same as the last time you were outside?" (Lesson 2, Teacher Edition).

- Lesson 4. Lesson Materials and Preparation, Preparation Checklist: "…If snow is common in your area at the time you're teaching this unit, plan to use this lesson to explore how to measure and prepare for snow in addition to or instead of rain…Find an open location where snowfall is not blocked by a roof or very affected by wind. Use a yardstick or meter stick to measure how much snow has fallen…" (Lesson 4, Teacher Edition).
- Lesson 4, Explore, Step 3: "Pair up students and distribute a Rain Observations handout, clipboard, and writing utensil to each student. Assign pairs to collect either temperature OR cloudiness observations; have students circle which measurement they are working on today. Let them know that they will share their observations/measurements with the whole class so we can record it on our class Weather Calendar" (Lesson 4, Teacher Edition).

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

- Lesson 3, Explore, Step 2, sidebar: "Teaching Tip: If your local area is often foggy, you may want to edit the Sunny/Cloudy Observations handout to think beyond just the sky, expand your discussion of cloudiness to include the word "fog", "a cloud near the ground" to the Word Wall. You may want to include fog on student Weather Measurement handouts in future lessons" (Lesson 3, Teacher Edition, 17).
- Lesson 5, Explore, Step 4: sidebar: "Community Connections: Each student can take home their wind gauge to gather data with their families/communities, building a culture in which science ideas grow through contributions from inside and outside of school. Students can share their out-of-school wind gauge measurements with the class for consideration as additions to the Wind Observations chart" (Lesson 5, Teacher Edition).
- Lesson 9, Navigate, step 1: "Display slide D and remind students that they may have had a chance to talk with an adult about severe weather experiences…Have students turn and talk with a partner about experiences they've heard about or preparations they think people do related to severe weather" (Lesson 9, Teacher Edition).

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: "Invite students to turn and talk with a partner about what we figured out about how we can find out and prepare for how warm it is outside…Re-read the Unit Question, How can we be prepared for the weather? and ask students how their observations can help start to answer that question. These ideas do not need to be recorded on the chart" (Lesson 2, Teacher Edition).
- Lesson 3, Navigate, Step 1: "Refer to slide C and say something like, we have already figured out some of our questions about how to prepare for the weather. Use the following prompts to motivate what to investigate next… Prompts to use: What other questions do we have about preparing for the weather?…Let's look at this picture (slide D). Have you ever seen a sky like this before?…What questions do we have about sunny and cloudy weather?… Co-construct the lesson question with students by building on their ideas and questions about going outside and observing the sky and noticing whether it is cloudy or sunny outside will help us prepare for the weather today" (Lesson 3, Teacher Edition).
- Lesson 6, Explore, Step 2: "Go through the Lesson 2-5 rows of Our Growing Ideas chart and the Weather Calendar to support students in reviewing how they have figured out how to measure and prepare to go outside in these different weather conditions that change from day to day" (Lesson 6, Teacher Edition).
- Lesson 8, Navigate, Step 1: " Remind students that we have figured out a lot about how to know about future weather but that we still have more we want to figure out about severe weather. Highlight any questions students have concerning severe weather on the Notice and Wonder chart (refer to slide B) and continue the discussion…Last time, some of us shared our experiences with severe weather. Who wants to share using your words, body or hands

about this?...What are we still wondering about severe weather?...Briefly summarize what students have shared about their experiences and ideas about severe weather. Combine students' questions, making sure to use students' words and phrasing, into a lesson question such as, What makes weather severe? Add this question to a new row on Our Growing Ideas chart" (Lesson 8, Teacher Edition).

Criterion-Based Suggestions for Improvement: N/A

II.B. Student Ideas

EXTENSIVE

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

The reviewers found **extensive** evidence that the materials provide students with opportunities to clarify, justify, and build upon their ideas and the ideas of others.

- The educator has enough support to act as an expert facilitator to draw out individual student ideas and multiple perspectives;
- Classroom discourse includes explicitly expressing, clarifying, and justifying student reasoning;
- Students have opportunities to share ideas with peers directly;
- Students are supported to communicate their ideas in ways that are meaningful to them; and
- Supports are provided to guide constructive feedback to students, with some teacher-to-student and peer-to-peer feedback loops that result in students' revision of their work and/or thinking.

Evidence includes, but is not limited to the following:

Materials provide students with opportunities to express, clarify, justify, and build upon their ideas and the ideas of others.

- Many unit discussions (primarily reflected in Explore and Synthesize sections) are framed with charts that include three columns: "Prompts to use," "Ideas to look and listen for," and "Possible follow-up responses." Example follow-up responses that will encourage students to clarify, justify, and/or build upon include, but are not limited to:
  - Lesson 1, Explore, Step 2: "What do you mean by__?" (Lesson 1, Teacher Edition).
  - Lesson 3, Synthesize, Step 5: "Who can add to ___'s idea?" (Lesson 3, Teacher Edition).
  - Lesson 5, Explore, Step 4: "Why do you think that?" (Lesson 5, Teacher Edition).
  - Lesson 7, Synthesize, Step 2: "Can you point to your evidence?" (Lesson 7, Teacher Edition).
  - Lesson 9, Explore, Step 2: "Who can add on to what _____ said?" (Lesson 9, Teacher Edition).
- Lesson 1, Synthesize, Step 3, sidebar: "Broadening Access: 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 images, and using words from multiple languages" (Lesson 1, Teacher Edition).

Whole group artifacts show evidence of students' reasoning and changes in their thinking over time.

- Lesson 2, Teacher Assessment Tool 1, Following Students' Sensemaking: "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. During and after each lesson, jot down evidence of a few students' sensemaking. You can use the checklist provided here, a seating chart, your class list, or another way to keep track of what students say, do, write, draw, objects they manipulate, etc. to note how they are demonstrating the listen-fors and look-fors. Use this evidence to formatively evaluate students' progress in Lessons 2-6 (see the Instructional Guidance 1 tool to plan next steps based on the evidence you have collected) and to support your decisions related to the Summative Guidance 1 in Lesson 7." Educators are asked to "jot down evidence of a few students," which limits their ability to track each student's progress. Teachers are not prompted to focus on changes in student thinking over time, which may affect their ability to provide alternative explanations or design extensions for individual students
- There are multiple whole group artifacts that are designed to show changes in thinking over time. However, these artifacts are not reflective of individual student thinking.
  - Lesson 2, Navigate, Step 7: "Reread some questions from our Notice and Wonder chart to check in on whether we have made progress on any of them (refer to slide K). Ask students if there are questions they can now answer based on their investigation measuring and recording the temperature. Add questions to the Notice and Wonder chart. Re-read questions on the Notice and Wonder chart that we are still wondering about. Lead a discussion about what other weather information students think is needed to be prepared (ready) for going outside at recess. Invite students to add additional questions they may have about weather" (Lesson 2, Teacher Edition).
  - Lesson 3, Synthesize, Step 5: "Co-construct our current understanding of what we've figured out using the prompts below. As students share ideas, add them to the column titled 'What did we figure out?'...Add their ideas using words, photos, and artifacts to the column titled, "How did we figure it out?" Allow individual students to help attach these artifacts to the chart as time allows and allow use of any investigation materials in front of them" (Lesson 3, Teacher Edition).
  - Lesson 5, Synthesize, Step 6: "Co-construct our current understanding of what we've figured out using the prompts below. As students share ideas, add them to the column titled 'What did we figure out?'...Prompts to use: How did we use patterns to answer our lesson question, How can we find out how windy it is outside?... Remind students that in science, we always use evidence to support what we have figured out...Add their ideas using words, photos, and artifacts to the column titled, 'How did we figure it out?'" (Lesson 5, Teacher Edition).

Supports are provided to guide constructive feedback to students, with some teacher-to-student and limited peer-to-peer feedback loops that result in student revision of their work and/or thinking.

- Lesson 1, Lesson Assessment Guidance, How can I use this assessment information? "Give feedback as students ask questions based on observations: Direct them back to their outside experiences in this lesson: What did it feel like outside? What did it look like outside? Invite them to recall and share experiences from outside of the classroom: What did it look/sound/feel like during (that weather event)? What did you/your family/your friends do in that situation? Point out that the questions they have shared will help the class work on figuring out more about weather and how we can prepare for it" (Lesson 1, Teacher Edition).

- Lesson 2, Teacher Assessment Tool 1, Following Students' Sensemaking (evidence that indicates students are encouraged and supported to revise their thinking):
  - Possible Lesson 2 Feedback "...Let's work together to add some labels to your drawing of your outside. What word should we write here? What sound does that word begin with?"
  - Possible Lesson 3 Feedback "...Let's work together to add some labels to your drawing of what you see in the sky. What word should we write here? What sound does that word begin with?..."
  - Possible Lesson 4 Feedback "...Let's work together to add some labels to your drawing of you outside. What word should we write here? What sound does that word begin with?"
  - Possible Lesson 5 Feedback "...How did you know that the wind was ____ today?..."
- The explicit and intentional incorporation of peer feedback is limited to Lessons 7 and 10.
  - Lesson 7, Synthesize, Step 3, Assessment Opportunity: "Peer feedback: During the gallery tour, students will provide feedback to each other about their "How do we prepare for usual weather?" handout to support each other in communicating what they figured out about patterns in our weather observations over time (what the weather is usually like). After students share this feedback, they have an opportunity to make revisions to their handouts based on that feedback" (Lesson 7, Teacher Edition)..."When students return to their own seats and their own work, display slide E and encourage them to reflect on their work and the comments their classmate(s) made. Ask, What do you think you could add or change to make your ideas clearer? Give students a few minutes to add extra labels, colors, redraw lines, etc. as needed based on the feedback from their peers" (Lesson 7, Teacher Edition).
  - Lesson 10, Explore, Step 3: "After the presenting partners (partner 1) share their presentations, bring the class back together so that the listening partner (partner 2) has an opportunity to give peer feedback. One at a time, review each of the four rows of the co-created CSA Communication Checklist with students. Offer examples of what feedback might look like, for example speak louder, remember to introduce yourself, point to the poster. Allow time for listening partners to share their feedback with their partner...Let presenting students know they can put a sticky note on their presentation (on the part they want to improve) to help them remember to revise their presentation with the invited guests...Have partners switch roles so that the listening partner can practice their presentation and the other partner can listen and give feedback for improvement" (Lesson 10, Teacher Edition).

Criterion-Based Suggestions for Improvement

- Consider individual student artifacts and/or opportunities for students to demonstrate how their thinking has changed over time.

II.C. Building Progressions

EXTENSIVE

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 **extensive** evidence that the materials identify and build upon students' prior learning in all three dimensions for these reasons:

- The materials explicitly identify prior learning expected for all three dimensions;
- The supports to educators explain how the prior learning will be built upon;
- Learning progresses logically throughout the materials;
- A progression of learning toward the targeted elements of all three dimensions is clearly described for educators for each section of the materials; and
- The materials provide explicit support to educators to clarify adult understanding of the potential alternate conceptions that they or their students may have during the unit.

Evidence includes, but is not limited to the following:

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

Disciplinary Core Ideas:

- K.2 Weather Unit Front Matter, Which Performance Expectations does this unit build toward?: "...The elements of these ideas listed in the table are used in lesson-level learning goals in the context of the unit's phenomena and are included in the lesson's assessment opportunities."

Science and Engineering Practices:

- K.2 Weather Unit Front Matter, Which Performance Expectations does this unit build toward?: "...The elements of the practice listed in the table are often used in lesson-level learning goals because they describe the work students do in the lesson, and the lesson's assessment opportunity(ies) will be tied to this work. Some elements are used repeatedly in the unit, with varying support and/or complexity, while other elements are used only occasionally, where appropriate, to support the overall development of the intentionally developed practice."

Crosscutting Concepts:

- K.2 Weather Unit Front Matter, Which Performance Expectations does this unit build toward?: "...The elements of the concept listed in the table are often used in lesson-level learning goals because they describe the work students do in the lesson, and the lesson's assessment opportunity(ies) will be tied to this work. Some elements are used repeatedly in the unit, with varying support and/or complexity, while other elements are used only occasionally, where appropriate, to support the overall development of the intentionally developed crosscutting concept."

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

- The Unit Overview section titled "What ideas and experiences will students bring that can help them in this unit?" identifies students' prior learning in the unit's key ideas, practices, and concepts, including, but not limited to:
  - K.2 Weather Unit Front Matter, What ideas and experiences will students bring that can help them in this unit?: "Asking Questions Young children ask many questions about the world around them and bring their curiosity to kindergarten. Asking questions allows kindergartners the opportunity to connect their prior experiences with what they are observing in the classroom. In this unit, students will intentionally practice generating questions based on their observations."
  - K.2 Weather Unit Front Matter, What ideas and experiences will students bring that can help them in this unit?: "Patterns Students bring with them everyday experiences with patterns - something that happens over and over again. Students are familiar with recurring visual patterns in nature, on clothing, and/or with math manipulatives and toys. If you taught Unit K.1: Why do some surfaces get hot and how can we make them less hot?, students have experiences identifying the pattern that surfaces in shady places are less hot compared with surfaces in sunny places. In this unit, students use patterns they identify in their observations of daily weather to find consensus observations to record, and they find patterns over time to describe what their local weather is usually like."

Criterion-Based Suggestions for Improvement: N/A

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

The only inaccuracies identified include these:

- K.2, Weather, About the Science: "Temperature. In this unit, students measure and record the air temperature with thermometers in order to describe local weather conditions. Students may use a variety of words to describe temperature (cold, cool, warm, hot), which are all accepted throughout the unit. This language is useful in conveying how people feel when they go outside in the weather and provides a functionality around human comfort that is relevant to this unit's focus on preparing for and responding to local weather. This language is also used regularly by meteorologists when communicating about temperature with the public...In that unit, warm/hot is used, but not cool/cold...Energy and energy transfer. Like Unit K.1, teaching resources in this unit (e.g., the Lesson 2 question, How can we find out and prepare for how warm it is outside?) use the terms 'heat' and 'warmer/hotter' because this language more accurately conveys the idea that how warm something feels reflects an amount of energy" (About the Science).
- While the About the Science document's explanation of energy and energy transfer describes temperature as "how much heat something has." In the evidence below, the term temperature refers to "how hot something is."

  - K.2 Weather Word Wall Cards, Temperature, "How hot something is."
    - Lesson 1, Community Connection letter asks, "How do we know how hot something is?"
    - Slide 8, page 3 of K.2 Lesson 2, Measuring Temperature book, "Temperature is how hot something is."
  - K.2 Weather Word Wall Cards, Thermometer, "A tool to measure how hot something is."
    - Slide 11, page 5 of K.2 Lesson 2, Measuring Temperature book, "Thermometers measure how hot something is."
    - Lesson 2, Navigate, Step 2: "Summarize that we think maybe a kind of tool could help us tell how warm (or not) something is" (Lesson 2, Teacher Edition).
    - K.2 Lesson 5 Weather Tools Infographic describes a thermometer as "measures air temperature."

- K.2 Weather Word Wall Cards, Severe Weather, "Weather that is unsafe." Severe weather is not necessarily unsafe.
- K.2, Weather, About the Science: "In this unit, students use the inside (classroom) temperature as a reference point for numbers (degrees Fahrenheit) and colors on the thermometer. This offers students an opportunity to practice using comparison language like they do in Unit K.1. When students use comparison language (e.g., warmer, colder), it is important to probe them about the comparison they are making (e.g., "Warmer or colder than what?")." (About the Science).
  - Lesson 2, Handout 1 Temperature Observations also includes thermometers without an F or C label
  - Lesson 3, Handout 1 Sunny Cloudy Observations includes a thermometer without an F or C label
  - Lesson 4, Handout 1 Rain Observations includes a thermometer without an F or C label (snow handouts as well)

Criterion-Based Suggestions for Improvement

- Align the definitions of *temperature* and *thermometer* to the "About the Weather" explanation; that is, use the word *heat* instead of defining temperature as "how hot something is" (i.e., how much heat something has).

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 educators to support differentiated instruction by including the following:

- multiple and varied individualized learning strategies to support students in accessing learning;
- guidance for educators to accept multiple modalities of expression throughout the materials;
- some suggestions for adaptations; and
- extensions for students with high interest.

Evidence includes, but is not limited to the following:

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

- The OpenSciEd Elementary Teacher Handbook includes a section for "Supporting Multilingual Students"
- K.2, Weather Unit Front Matter: "What unit-specific strategies are important for supporting equitable science learning in this unit? The OpenSciEd Elementary Program aims to create equitable science instruction for all students, centering students' resources, interests, and identities in the classroom community's sensemaking work. Specifically, our materials are grounded in an equity design stance that supports and intentionally makes space for all students to be(come) expert learners of themselves and engage in sensemaking in ways that are authentic to them, including ways that are often unnoticed or are devalued in school spaces. Please see the Teacher Handbook to learn more about the principles that guided our design work, and for more information about how you can further enhance equitable science learning in your classroom..."
- OpenSciEd Additional Accessibility Resources, "OpenSciEd elementary lessons have been designed in a way to allow for students to provide multiple ways to engage, represent, and communicate their learning. While these opportunities exist within the current materials, there may be needs in your classroom that will require additional customized adaptation to make them more accessible for learner needs. It is not uncommon for elementary students who require adaptations to get pulled from their science classes for interventions. However, we hope that these guidelines will give you ideas for how to include all of your students meaningfully in your science lessons. In fact, many of these strategies will just be good teaching strategies for all of your students..."
- Lesson 2, Explore, Step 4, sidebar: "Broadening Access: To minimize threats and distractions, be mindful of student IEPs, 504s, languages, and other accommodations, including access to assistive technology, needed as you would in the classroom. Ensure that while outside, all guidelines can still be met" (Lesson 2, Teacher Edition).

- Lesson 6, Explore, Step 2: "If applicable, you might encourage your multilingual students to add vocabulary words across named languages (e.g., Spanish, Mandarin, Arabic) to the Word Wall to support sensemaking throughout the unit" (Lesson 6, Teacher Edition).
- Lesson 8, Explore, Step 3, sidebar: "Teaching Tip: If your students need additional support or differentiation options for writing/drawing, see the guidance provided in the 'Supporting Literacy for All Students' section of the Teacher Handbook" (Lesson 8, Teacher Edition).

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

- K.2, Lesson 6, Teacher Assessment Tool, Instructional Guidance 1: "...Depending on which of the statements below align with what you notice about your students (most of the class or only a few of your students), you may choose to take some or several of the suggested next steps...If you notice...Students are not yet using observations organized in the picture graphs to describe patterns in local weather conditions over time. Possible next steps..."
- K.2, Lesson 9, Teacher Assessment Tool, Instructional Guidance 2: "...Depending 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 suggested next steps...If you notice...Students are not yet connecting the purpose of weather forecasting to preparing for local weather. Possible next steps..."
- Lesson 1, Explore, Step 2, sidebar: "Teaching Tip, Optional Extension: If you taught Unit K.1: Why do some surfaces get hot and how can we make them less hot? with this class, consider revisiting the 'Making Observations' section of the Scientists Make and Use Observations book to review how we use our senses to notice details. If Unit K.1 has not been completed, consider reading this book at another time to supplement students' understanding; reading it at this moment would feel out of place" (Lesson 1, Teacher Edition). This sidebar suggestion for educators is more of an added support for targeting struggling students, rather than an extension.
- Lesson 3, Explore, Step 2, sidebar: "Teaching Tip, Extension: Students may enjoy collecting data more often than specified, and additional data may support students in identifying patterns over time. You could collect weather data any day of the week in addition to your science day(s), assign and rotate teams of students to collect data at convenient non-science times (such as recess), and/or encourage students to collect weather observations at home with their families. Make sure to add their consensus data to the class Weather Calendar periodically" (Lesson 3, Teacher Edition). This sidebar suggestion for educators is more of an added support for targeting struggling students, rather than an extension.
- Lesson 5, Lesson Assessment Guidance, How can I use this assessment information?: "...If students struggle to find patterns across the class data, count the tallies on the Wind Observations chart together and use comparisons to identify which wind type has the most tallies..." (Lesson 5, Teacher Edition).
- Lesson 7, Connect, Step 7, sidebar: "Teaching Tip, Optional Extension: If you are able to offer your class additional choices for how they share their community service announcements, such as in formats other than posters and including translations for multilingual families, when applicable (see the Community Service Announcements reference for ideas), ask students what ways they could share other than using a poster. Students may suggest mailing a letter, creating a video, or calling someone on the phone" (Lesson 7, Teacher Edition). This sidebar suggestion for educators is more of an added support for targeting struggling students, rather than an extension.

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

- Lesson 2, Explore, Step 5, sidebar: "Teaching Tip, Extension Opportunity: As you and your class find a routine for collecting daily temperatures, consider whether you might have students measure and record the temperature in the morning and also in the afternoon each day, especially if students have raised questions about the temperature being different at different times of day. Then, when you get to Lesson 6 (or at another time that works for your class), support students in finding patterns over times of day (in addition to across multiple days)" (Lesson 2, Teacher Edition).
- Lesson 4, Explore, Step 4, sidebar: "Teaching Tip, Extension Opportunity: Consider reading the rest of the Let's Go Outside! book from Lesson 3 with students who would benefit from and/or enjoy thinking more about how we prepare to be outside in the rain and/or snow. Alternatively, add the book to your classroom library for students to read during choice time or share access to the digital version for students to read on individual devices" (Lesson 4, Teacher Edition). This suggestion is a repetition of an earlier activity. It is not representative of an opportunity that extends sensemaking with a different, but related application.
- Lesson 6, Synthesize, Step 4, sidebar: "Teaching Tip, Extension Opportunity: After this lesson, class-wide weather observations will no longer be included in the lesson components. However, if you and your class are able to continue to collect outside weather observations, students will have more opportunities to practice using weather tools and more data to inform ongoing observations of patterns over time. A general Weather Observations page is available for you to copy as needed" (Lesson 6, Teacher Edition). This suggestion is a repetition of an earlier activity. It is not representative of an opportunity that extends sensemaking with a different but related application.
- Lesson 7, Explore, Step 5, sidebar: "Teaching Tip, Optional Extension: Use a weather app or website to look up the day's weather forecast for your community. Have students take turns during Morning Meeting or circle time pretending to be a meteorologist on the local news and communicating the weather forecast to the class, including giving tips about how to prepare for going outside (or staying safe inside) as needed" (Lesson 7, Teacher Edition).
- Lesson 8, Connect, Step 2, sidebar: "Teaching Tip, Extension Opportunity: If your students are interested in investigating severe weather that is not likely to happen in your area, consider adding the What is Severe Weather? book to your classroom library for students to read during choice time, or share access to the digital version for students to read on individual devices" (Lesson 8, Teacher Edition).

Criterion-Based Suggestions for Improvement

- Consider offering extensions that include related, but different phenomena. Detailed Guidance, p. 28—Supports for "students who have already met the performance expectation(s) or who have high interest in the subject matter and are ready to develop deeper understanding in any of the three dimensions could include applying learning in new contexts (e.g., transfer phenomena) or through the lenses of different CCC elements, or could include extending to learning from the next grade level, such as the next level SEP element in a learning progression (e.g., grade five students extending to prioritize criteria)."

II.F. Teacher Support for Unit Coherence

EXTENSIVE

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

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

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

The reviewers found **extensive** evidence of teacher support for unit coherence. The materials support educators in facilitating coherent learning experiences over time by providing the following:

- guidance and support for how to recognize what students figure out in a lesson, what questions are left unanswered, and what new questions could be answered in the next investigation;
- frequent guidance to support linking student engagement across lessons; and
- guidance and strategies for learning in all three dimensions as coherently linked to the progress students make toward explaining the phenomenon.

Evidence includes, but is not limited to the following:

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.).

- Lesson 1, Synthesize, Step 3, sidebar: "Teaching Tip: If your class does not have ideas or questions on the Notice and Wonder chart right now about all of the four categories of weather they will investigate in the upcoming lessons (temperature, cloud cover, precipitation, and wind), that is OK. As students make outside observations in the next few lessons, look and listen for their ideas and questions about those aspects of the weather, and take a moment to add them to the Notice and Wonder chart" (Lesson 1, Teacher Edition).
- Lesson 2, Navigate, Step 7: "Reread some questions from our Notice and Wonder chart to check in on whether we have made progress on any of them (refer to slide K). Ask students if there are questions they can now answer based on their investigation measuring and recording the temperature. Add questions to the Notice and Wonder chart. Re-read questions on the Notice and Wonder chart that we are still wondering about. Lead a discussion about what other weather information students think is needed to be prepared (ready) for going outside at recess. Invite students to add additional questions they may have about weather" (Lesson 2, Teacher Edition).
- Lesson 3, Navigate, Step 1: "Refer to slide C and say something like, we have already figured out some of our questions about how to prepare for the weather. Use the following prompts to motivate what to investigate next... Prompts to use: What other questions do we have about preparing for the weather?...Let's look at this picture (slide D). Have you ever seen a sky like this before?...What questions do we have about sunny and cloudy weather?... Co-construct the lesson question with students by building on their ideas and questions about going outside and observing the sky and noticing whether it is cloudy or sunny outside will help us prepare for the weather today" (Lesson 3, Teacher Edition).

- Lesson 4, Navigate, Step 1: "...help students recall and point out their observations and measurements about temperature and cloudiness on the Weather Calendar, and use the Notice and Wonder chart to highlight students' questions about rain and/or snow" (Lesson 4, Teacher Edition).
- Lesson 8, Navigate, Step 1, sidebar: "Teaching Tip: Students have considered extremes of these weather conditions one at a time in previous lessons, but this conversation invites them to consider extremes together, connect to prior ideas and experiences about how people might prepare, and focus on asking questions that can guide their investigations in this lesson and Lesson 9" (Lesson 8, Teacher Edition).
- Lesson 9, Navigate, Step 1: "Display slide D and remind students that they may have had a chance to talk with an adult about severe weather experiences...Have students turn and talk with a partner about experiences they've heard about or preparations they think people do related to severe weather" (Lesson 9, Teacher Edition).

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

- The K.2 Weather Assessment System Overview, "Lesson-by-Lesson Assessment Opportunities" chart lists the color-coded three-dimensional learning (s) of each lesson and includes a color-coded description of "What to look and listen for across opportunities" in the "Assessment Guidance" column.
- Each lesson has one or two "Three-dimensional Learning Goals" that are color-coded (Blue-SEP, Orange-DCI, Green-CCC) to signal the intended incorporation of each dimension.
- Each lesson includes following the "Three-dimensional Learning Goal(s)," a section for "Lesson Assessment Guidance" that provides a color-coded (Blue-SEP, Orange-DCI, Green-CCC) description of "What to look and listen for across opportunities."
- K.2, Lesson 2, Teacher Assessment Tool 1, Following Students' Sensemaking covers Lessons 2-7, for Assessment Statement 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." The recording document includes a "Checklist of listen-fors and look-fors" that lists color-coded (Blue-SEP, Orange-DCI, Green-CCC) lesson learning goals. The "Possible evidence of student sensemaking" and "Possible lesson feedback" is not organized and/labeled as dimension specific.
- K.2, Lesson 7, Teacher Assessment Tool 2, Following Students' Sensemaking covers Lessons 7-9, for Assessment Statement 2. The recording document includes a "Checklist of listen-fors and look-fors" that lists color-coded (Blue-SEP, Orange-DCI, Green-CCC) lesson learning goals. The "Possible evidence of student sensemaking" and "Possible lesson feedback" is not organized and/labeled as dimension specific.

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 support is provided through a variety of approaches to help students explicitly build an understanding of and proficiency in specific elements of the SEPs over time. Supports are gradually adjusted over time so that students are increasingly responsible for making sense of phenomena for most of the intentionally developed SEP elements. Educator materials provide some guidance for where and when to add and remove support.

In the Unit Matter, the following SEP elements are claimed within charts marked "Intentionally Developed." However, some elements are marked within the description with varying degrees of student use:

"Students use the following element in more complex ways/with increasing complexity as the unit goes on."

1. AQDP-P1
2. DATA-P3

"Students also use this element with increasing independence/responsibility as the unit goes on."

3. DATA-P1
4. MATH-P2

Evidence includes, but is not limited to the following:

AQDP: Asking Questions and Defining Problems

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

- Lesson 1, Lesson Assessment Guidance, 1.B, How can I use this assessment information?: "This pre-assessment is not an opportunity to take a grade or score; instead take these opportunities to uncover students' initial ideas about preparing for the weather and their initial practice of asking questions based on observations…" (Lesson 1, Teacher Edition). While students are given the opportunity to share with a partner what they noticed, "Have students share with a partner what they noticed from when they were outside. Consider providing the sentence starter 'I noticed _____'" and the educator is prompted in the body of the lesson "…it is important to acknowledge and take up all students' ideas and stories…" as well as, "…It is important to elicit and acknowledge all questions that students have…" in a sidebar, students are not given the opportunity to first share questions with a partner before contributing to the group collection of questions. Consequently, all individual students may not have an explicit chance to practice this SEP element at this time.
- Lesson 4, Explore, Step 4, sidebar: "Asking Questions and Defining Problems: Support students' use of question words by referring back to the Question Words Infographic poster when students are asking questions about their observations. Discuss what kind of answers we would expect for those questions (times, places, etc.). Alternatively, if you notice that students are using question words more independently, you can withdraw the support of referring to the poster and specifically pointing out the question words students use" (Lesson 4, Teacher Edition). At this time, not all individual students have an explicit chance to practice this SEP element.

- Lesson 5, Navigate, Step 1, sidebar: "Asking Questions and Defining Problems: As students ask questions about the wind, consider whether they are using the Question Words Infographic. Refer them to it if they could use that support and discuss what kind of answers we would expect for those questions (times, places, etc.). Alternatively, if you notice that students are using question words more independently, you can withdraw the support of referring to the poster and specifically pointing out the question words students use" (Lesson 5, Teacher Edition). At this time, not all individual students have an explicit chance to practice this SEP element.
- Lesson 7, Connect, Step 7, sidebar: "Asking Questions and Defining Problems: Recording new questions on the Notice and Wonder chart as they are generated through lesson activities, such as those we've generated in this lesson about severe weather, can help students recognize that scientists regularly identify new questions. Asking new questions can help us confirm what we have figured out so far, and focus our efforts to figure out more about the world around us" (Lesson 7, Teacher Edition). At this time, not all individual students have an explicit chance to practice this SEP element.
- Lesson 8, Navigate, Step 1, sidebar: "Asking Questions and Defining Problems: Trying to imagine something we have not experienced (or experienced only rarely) is a strategy that young children and professional scientists use toward generating questions that will lead to obtaining more information. Encourage students to imagine unusual weather conditions and to wonder what those conditions would look or feel like or how we could prepare or respond" (Lesson 8, Teacher Edition). At this time, not all individual students have an explicit chance to practice this SEP element.
- Lesson 10, Synthesize, Step 5, sidebar: "Asking Questions and Defining Problems: Asking questions is an ongoing practice that is at the heart of scientific endeavors. As scientists pursue answers by obtaining information, making observations, and analyzing data, they figure many things out (just like students in this unit). They also notice new things, leading them to ask new questions that they and others can explore" (Lesson 10, Teacher Edition). At this time, not all individual students have an explicit chance to practice this SEP element.

DATA: Analyzing and Interpreting Data

Claimed Element: DATA: P3 Use observations (firsthand or from media) to describe patterns and/or relationships in the natural and designed world(s) in order to answer scientific questions and solve problems.

- K.2 Weather Unit Front Matter "To support development of Analyzing and Interpreting Data, students use this element with increasing complexity (using different tools to gather qualitative and quantitative data, describing patterns across one day and then several days) and varying levels of support (beginning with teacher-guided tallying and counting to describe patterns and withdrawing that scaffold as students are ready)."
- Lesson 1, Explore, Step 2, sidebar: "Teaching Tip, Optional Extension: If you taught Unit K.1: Why do some surfaces get hot and how can we make them less hot? with this class, consider revisiting the "Making Observations" section of the Scientists Make and Use Observations book to review how we use our senses to notice details. If Unit K.1 has not been completed, consider reading this book at another time to supplement students' understanding; reading it at this moment would feel out of place" (Lesson 1, Teacher Edition).
- Lesson 2, Explore, Step 5, sidebar: "Teaching Tip, Extension Opportunity: As you and your class find a routine for collecting daily temperatures, consider whether you might have students measure and record the temperature in the morning and also in the afternoon each day, especially if students have raised questions about the temperature being different at different times of day. Then, when you get to Lesson 6 (or at another time that works for your class), support students in finding patterns over times of day (in addition to across multiple days)" (Lesson 2, Teacher Edition).

- Lesson 2, Explore, Step 5: "Remind students (or name, if your class did not complete Unit K.1: Why do some surfaces get hot and how can we make them less hot?) that a pattern is something that happens over and over again and can help us know what will happen next. Ask the class if they see a pattern in the temperature observations so far. Can they use this pattern to say what might happen next? What temperature might the next students have to share?" (Lesson 2, Teacher Edition).
- Lesson 5, Explore, Step 5, sidebar: "Analyzing and Interpreting Data: As students make observations of more weather conditions in this lesson, they do not take the time to create tally charts for each condition and therefore have less teacher support using those observations to find a pattern to be their consensus observation. If needed to support students, consider continuing to use tallies on a whiteboard or similar digital space like the class has done in prior lessons" (Lesson 5, Teacher Edition).
- Lesson 6, Lesson Assessment Guidance, Where can I check for understanding?: " During the second Explore when students are working together to count, numerically record and begin to make sense of weather data (slide F) and students work together as a class and then in groups analyzing and interpreting data using the four picture graphs..." (Lesson 6, Teacher Edition).

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

- K.2 Weather Unit Front Matter "Students also use this element with increasing independence (the teacher supports the whole class in recording observations of each weather condition, then as students become familiar with the tools and methods for recording observations, they work in smaller groups or pairs to record their observations)."
- Lesson 1, Explore, Step 2: "...invite students to help you demonstrate how to draw observations, label drawings with letters or words, and write letters or words about what we see and feel outside. Remind students to record only what they observe and feel, avoiding imagined or wished-for details" (Lesson 1, Teacher Edition).
- Lesson 2, Explore, Step 4: "... Then they will work with their partner to measure the temperature and record it on their handout..." (Lesson 2, Teacher Edition).
- Lesson 3, Explore, Step 2: "Now that students have suggested that we should go outside to make observations, show them how to record what the sky looks like, as well as measure and record the temperature outside. Show students, using a copy of the Sunny/Cloudy Observations handout (refer to slide E), how they will each draw a picture of what they see in the sky related to weather, including labels in their preferred language as needed, and then record the temperature and add a picture of themselves, including what they are wearing, while they are outside" (Lesson 3, Teacher Edition).
- Lesson 3, Explore, Step 2, sidebar: "Analyzing and Interpreting Data: Throughout this unit, students will continue to practice recording their observations of weather. Use multimodal ways of communicating ideas (drawing, labeling, writing, circling, body gestures) to scaffold and build capacity for robust observations of phenomena" (Lesson 3, Teacher Edition).
- Lesson 4, Explore, Step 3: "...demonstrate how we will record rain measurements by drawing a line where the rain water has filled the gauge (or, if applicable, how we will mark the depth of snow on our measuring stick). Review plans for making other observations, too: explain that while we are outside setting up our rain gauges, half the class will also take temperature measurements and the other half of the class will make and record cloud observations. Pair up students and distribute a Rain Observations handout, clipboard, and writing utensil to each student. Assign pairs to collect either temperature OR cloudiness observations; have students circle which measurement they are working on today. Let them know that they will share their observations/measurements with the whole class so we can record it on our class Weather Calendar..." (Lesson 4, Teacher Edition).

MATH: Using Mathematics and Computational Thinking

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

- Lesson 2, Explore, Step 5: "Prompts to use: Some of us noticed there were more or less tally marks for different temperatures. Let's count the tally marks and record (write) the number together on the chart. A pattern is something that happens over and over again. What pattern do we see across lots of students' observations?" (Lesson 2, Teacher Edition).
- Lesson 3, Explore, Step 2: "Follow up response: Can you show me that? Let's count together. How is that the same/different from what your partner noticed?" (Lesson 3, Teacher Edition).
- Lesson 4, Explore, Step 2: "Prompt to use: How could we measure how much water is in our tool? (If needed: refer to the thermometers students have used and point out how we use the numbers and colors to talk about how high the temperature is. Ask, How could we know how high in the tool the rain is?) What to look and listen for: We could use numbers to count how much rain" (Lesson 4, Teacher Edition).
- Lesson 5, Explore, Step 5: "Have the class help you count how many students are standing near each icon to find a pattern in the observations and determine today's consensus temperature observation" (Lesson 5, Teacher Edition).
- Lesson 6, Explore, Step 2: "Make a plan for answering questions using the Weather Calendar. Ask students how they could answer some of the questions they just generated. Anticipate students will suggest counting the symbols on the Weather Calendar and/or making tally charts (like those used in Lessons 2-5). Use these suggestions to lead into the counting and recording with stickers that students will do for each of the weather conditions" (Lesson 6, Teacher Edition).
- Lesson 6, Explore, Step 3, "Explain to students (and demonstrate) that you can count each day that there was no rain on the class Weather Calendar. Demonstrate that to keep track of what symbols on the Weather Calendar have been counted, we can mark each no rain icon off on the calendar as we count so that we can remember that it has been counted. Say the number of 'no rain' days aloud to help you and the students remember it. Then, add that number of stickers to the picture graph so that it shows we had ____ days of no rain. Include students in the counting of the weather conditions, marking off of the no rain symbols on the Weather Calendar and putting the corresponding number of stickers on the graph" (Lesson 6, Teacher Edition).

Criterion-Based Suggestions for Improvement

- Consider incorporating more frequent instances of partner or small-group sharing before and/or during whole-group question generation so that individual students have regular opportunities to engage with AQDP elements. Detailed Guidance, p. 33—"Teacher supports are provided to help all students, including those with special needs and abilities and emerging multilingual students, explicitly build an understanding [of] and proficiency in specific elements of the SEPs over time through a variety of approaches over the course of the unit."

CATEGORY III

Monitoring NGSS Student Progress

III.A. Monitoring 3D Student Performance

EXTENSIVE

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 **extensive** 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.

- Assessment opportunities are incorporated into all lessons, and are primarily focused on figuring out aspects of real-world phenomena;
- Students are able to demonstrate their understanding in a variety of ways;
- Materials routinely elicit direct, observable evidence; and
- Student artifacts that require student engagement with grade-appropriate elements are used frequently.

Evidence includes, but is not limited to the following:

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

- About the Science "What science ideas will students figure out in this unit? This unit focuses on developing science ideas about weather...Students enter kindergarten with many daily experiences related to local weather conditions and preparing for the weather, including asking questions about what to do when getting ready to go outside. It is also likely that they will have encountered local forms of severe weather and related family, school, and/or community preparations and responses. However, it is unlikely that students will have engaged in formal weather data collection experiences using scientific tools, identified patterns in local weather conditions over time, or considered weather-related preparation and responses from a cause-and-effect perspective. This unit leverages students' everyday experiences, questions, and motivations to get ready to go outside in order to broaden their weather-related experiences and deepen their understanding. In this unit, students figure out how to use thermometers and build and use rain and wind gauges as tools that help them observe, measure, and record weather conditions. Together, patterns in these conditions over time can be used to describe the weather...Additionally, students gather information about types of local severe weather events and how we can prepare for them, and then communicate what they have figured out through Community Service Announcements."

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

- K.2, Lesson 7, Teacher Assessment Tool 2, Following Students' Sensemaking covers Lessons 7-9, for Assessment Statement 2. The recording document includes a "Checklist of listen-fors and look-fors" that lists color-coded (Blue-SEP, Orange-DCI, Green-CCC) lesson learning goals. The "Possible evidence of student sensemaking" and "Possible lesson feedback" is not organized and/labeled as dimension specific.
  - K.2, Weather Assessment System Overview, Lesson-by-Lesson Assessment Opportunities, Lesson 7.A: "Assessment Type: Summative Assessment, Peer Feedback. Where to check for understanding: In the first Synthesize on students' "How do we prepare for usual weather?" handout..."
    - Lesson 7, Synthesize, Step 2, Assessment Opportunity: "Summative Assessment: The 'How do we prepare for usual weather?' handouts provide an opportunity to summatively assess students' understanding by gathering evidence about Assessment Statement 1 with the purpose of noticing

how students are able to identify patterns over time in their weather observations…The "How do we prepare for usual weather?" handouts also include drawing space for students to communicate about how people can prepare for local weather; this information supports students' Community Service Announcements and is not directly related to Assessment Statement 1, so it need not be included in your summative assessment" (Lesson 7, Teacher Edition).

- K.2, Weather Assessment System Overview, Lesson-by-Lesson Assessment Opportunities, Lesson 8.A: "Assessment type: Formative. Where to check for understanding:…in the Explore when students are individually recording information about local severe weather on their What kind of severe weather do we experience? handouts…"
- K.2, Weather Assessment System Overview, Lesson-by-Lesson Assessment Opportunities, Lesson 9: "Assessment Type: Key Formative Assessment. Where to check for understanding:…during the first Synthesize, when students are individually completing their How can we prepare for severe weather? Handout…"
    - Lesson 9, Synthesize, Step 3, Assessment Opportunity: "Key formative assessment: Students' How can we prepare for severe weather? handout and the surrounding discussions provide an opportunity to gather evidence about Assessment Statement 2…" (Lesson 9, Teacher Edition).
    - Lesson 9, Handout, How do we prepare for severe weather: "We can be prepared when there is a _. Draw and label how to prepare and stay safe."
    - **SEP: 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.**
    - **DCI: ESS3.B: Natural Hazards, Some kinds of severe weather are more likely than others in a given region. Weather scientists forecast severe weather so that the communities can prepare for and respond to these events.**
    - **CCC: CE-P1, Events have causes that generate observable** patterns. The handout alone does not serve as a strong artifact for representing student proficiency with the patterns portion of this CCC element.

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

- Lesson 1, Lesson Learning Goal 1B: **Ask questions about preparing for different kinds of weather**.
    - Lesson 1, Synthesize, Step 3: "Have students share their ideas and questions using the provided prompts. Allow students to make cultural or family connections to any existing observations or questions about being comfortable and safe outside, or about getting ready or being prepared for the weather" (Lesson 1, Teacher Edition).
- Lesson 2, Lesson Learning Goal: **Use counting to analyze data** to **identify a pattern across many students' outside temperature observations**.
    - Lesson 2, Explore, Step 5, Assessment Opportunity: "Formative assessment: During the discussions analyzing students' outside temperature data on the Temperature Observations chart, you have an opportunity to gather evidence about learning goal 2, with the purpose of providing feedback and supporting students in using counting to identify a pattern in their class temperature data. Use the suggestions in the Lesson Assessment Guidance and use the 1 Following Students' Sensemaking to record evidence of students'

developing ideas. If students struggle to name/identify numbers on the thermometer, support them through pointing, and referencing the Thermometer Poster, providing a 100-chart, and/or by consistently referencing the corresponding color. If students struggle to find patterns across the class data, count the tallies on the Temperature Observations chart together and use comparisons to identify which temperature number/color has the most. Remind students that we will continue to observe the temperature each day during this unit, so they will have additional opportunities to practice measuring it with thermometers and finding a consensus temperature" (Lesson 2, Teacher Edition).

- Lesson 3, Lesson Learning Goal: **Record observations of sunlight and cloudiness and measurements** of **temperature**, then **analyze them to identify patterns across many students' data.**
  - Lesson 3, Explore, Step 3: "Have students bring their Sunny/Cloudy Observations handout to the Scientists Circle to discuss their observations of the sky and use as evidence of their observations. Call on a few students to share their observations. As you do, surface a variety of ideas about how students described how sunny or cloudy the sky is, including cloud and sky color and amount of cloud cover...Guide students' attention to the Sunny/Cloudy Observations chart with symbols added and ensure it is in a place where students can all see it and add their data (refer to slide H). Call on individual students to share which type of cloud coverage they recorded on their Sunny/Cloudy Observations handout and help them as needed to add a tally mark to the chart..." (Lesson 3, Teacher Edition).
- Lesson 9, Lesson Learning Goal: **Obtain and communicate information** about **how we can prepare** for **local severe weather**.
  - Lesson 9, Handout, How do we prepare for severe weather: "We can be prepared when there is a _. Draw and label how to prepare and stay safe" (Handout).

Criterion-Based Suggestions for Improvement: N/A

III.B. Formative

EXTENSIVE

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

The reviewers found **extensive** evidence that explicit, frequent, and varied formative assessment processes evaluate student learning to inform instruction. The instructional sequence of every lesson includes opportunities to gather, record, and use formative assessment information to inform future instruction.

Evidence includes, but is not limited to the following:

- K.2 Weather Assessment System Overview, Unit Assessment Plan by Assessment Type, Ongoing Formative: "As students engage in these lessons, there are multiple opportunities to gather formative evidence of students' ongoing and developing sensemaking. This evidence can be used to support students by providing individual and group feedback and/or making minor instructional modifications as suggested in unit materials. Ongoing formative assessment opportunities related to class discussions, handouts, and other student work are described in the front matter of each lesson and noted in the teacher guide with a yellow 'Assessment Opportunity' box where they happen in the lesson."
- K.2 Weather Assessment System Overview, Unit Assessment Plan by Assessment Type, Key Formative: "These key formative assessment opportunities indicate a place to 'take stock' of where students are in their sensemaking and

decide how to move forward. Suggestions for interpreting and responding to students' sensemaking is provided in the teacher guide and associated assessment materials. In Lesson 6, use the ideas students share as they create and discuss the Weather Condition Picture Graphs and evidence you have gathered on the 1 Following Students' Sensemaking tool from Lessons 2-6 to evaluate students' progress toward Assessment Statement 1. Use the Instructional Guidance 1 to provide feedback to students and plan your upcoming instruction. In Lesson 9, use the ideas students share on their How can we prepare for severe weather? handout along with evidence you have gathered on the 2 Following Students' Sensemaking tool from Lessons 7-9 to evaluate students' progress toward Assessment Statement 2. Use the Instructional Guidance 2 to provide feedback to students and plan your upcoming instruction"

- K.2, Lesson 2, Teacher Assessment Tool 1 Following Students' Sensemaking "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...Students might gesture/manipulate...Students write/draw numbers, letters, and words...Students might write/draw images..."
- K.2 Weather Assessment System Overview, Lesson-by-Lesson Assessment Opportunities, Lesson 3: "Assessment type: Formative...Evidence of students' ideas may be expressed in words, drawings, written or spoken descriptions, movement, and/or gestures"
- K.2 Weather Assessment System Overview, Lesson-by-Lesson Assessment Opportunities, Lesson 4: "Assessment type: Formative, Self-Reflection. Where to check for understanding: During the Explore when students are building and making sense of their rain gauges (slides D-G), and during the Building Understandings Discussion in the Synthesize (slide P)...Refer to the 1 Following Students' Sensemaking tool for detailed information. See additional ideas to look and listen for in the discussion prompts provided in the lesson"
  - Lesson 4, Explore, Step 2, Assessment Opportunity: "Formative Assessment...If students struggle to picture how the rain gauge will work, consider using water to demonstrate filling one and/or providing rain gauges at the class water table for students to interact with at other times of their day" (Lesson 4, Teacher Edition).
- K.2 Weather Assessment System Overview, Lesson-by-Lesson Assessment Opportunities, Lesson 5: "Assessment type: Formative, Self-Reflection...What to look and listen for across opportunities: pointing to/describing the wind levels as light/moderate/strong on the wind gauge face or Wind Observations handout; Counting (by pointing, out loud, on fingers) the tally marks on the Wind Observations chart to identify a pattern in the wind measurements being shared, and to identify a consensus wind measurement. Using the consensus wind measurement as evidence for describing the weather in order to prepare for it..."
- K.2 Weather Assessment System Overview, Lesson-by-Lesson Assessment Opportunities, Lesson 9: "Assessment type: Key Formative. Where to check for understanding: During the Explore when students are engaging with the Severe Weather Preparations Cards (slide E) and during the first Synthesize, when students are individually completing their How can we prepare for severe weather? handout (slide F)."
  - Lesson 9, Explore, Step 2, Assessment Opportunity: "Key Formative Assessment...Refer to the 2 Following Students' Sensemaking tool and the Assessment Guidance at the beginning of the lesson, using the Instructional Guidance 2 tool to decide next steps" (Lesson 9, Teacher Edition).
  - K.2, Lesson 9, Teacher Assessment Tool, Instructional Guidance 2: "...Depending 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 suggested next steps...If you notice...Students are not yet connecting the purpose of weather forecasting to preparing for local weather. Possible next steps..."

Criterion-Based Suggestions for Improvement: N/A

III.C. Scoring Guidance

ADEQUATE

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 **adequate** evidence that the materials include scoring guidelines that provide guidance for interpreting student performance related to grade-appropriate elements of the three dimensions, to support educators in (a) planning instruction and (b) providing ongoing feedback to students. The materials do not include provision of ongoing, targeted feedback to individual students. There is no evidence that students track their own progress.

Evidence includes, but is not limited to the following:

- Lesson 1, Lesson Assessment Guidance, How can I use this assessment information? "Give feedback as students ask questions based on observations: Direct them back to their outside experiences in this lesson: What did it feel like outside? What did it look like outside? Invite them to recall and share experiences from outside of the classroom: What did it look/sound/feel like during (that weather event)? What did you/your family/your friends do in that situation? Point out that the questions they have shared will help the class work on figuring out more about weather and how we can prepare for it" (Lesson 1, Teacher Edition).
- K.2, Lesson 2, Teacher Assessment Tool 1, Following Students' Sensemaking covers Lessons 2-7, for Assessment Statement 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." The recording document includes a "Checklist of listen-fors and look-fors" that lists color-coded (Blue-SEP, Orange-DCI, Green-CCC) lesson learning goals. The "Possible evidence of student sensemaking" and "Possible lesson feedback" is not organized and/labeled as dimension specific. Additionally, there is not a range of written student work shown, just one example.
- K.2, Lesson 6, Teacher Assessment Tool, Instructional Guidance 1 includes a color-coded assessment statement - Students can use observations of local weather conditions to describe patterns over time in temperature, cloud cover, rain/snow, or wind. (aligned to K-ESS2-1) - and explains, "Use the evidence you have gathered on the 1 Following Students' Sensemaking tool from formative assessment opportunities in Lessons 2-6 to evaluate students' progress toward Assessment Statement 1 and plan your upcoming instruction accordingly. Depending on which of the statements below align with what you notice about your students (most of the class or only a few of your students), you may choose to take some or several of the suggested next steps. You will have summative opportunities to check students' progress toward Assessment Statement 1 in Lesson 7 using the Summative Guidance 1."
  - The "If you notice..." statements are loosely tied to the three dimensional target elements but are not explicitly color-coded or labeled as such.
  - The "Possible next steps" are not labeled or organized by three-dimensional learning targets.
- K.2, Lesson 7, Teacher Assessment Tool 2, Following Students' Sensemaking covers Lessons 7-9, for Assessment Statement 2. The recording document includes a "Checklist of listen-fors and look-fors" that lists color-coded (Blue-SEP, Orange-DCI, Green-CCC) lesson learning goals. The "Possible evidence of student sensemaking" and "Possible lesson feedback" is not organized and/labeled as dimension specific. Additionally, the tool does not identify a range of student performance for each assessment task and what that looks like from partial to complete proficiency.

- Lesson 7, Lesson Assessment Guide, 7.B, How can I use this assessment information?: "...Provide feedback to students by supporting them in the moment with questions such as: What do we do as meteorologists? What does Betty Davis do? What questions do you have about weather forecasts or severe weather? Was there something in our book that made you wonder about that? (Refer to the Question Words Infographic, if helpful.)" (Lesson 7, Teacher Edition).
- K.2, Lesson 9, Teacher Assessment Tool, Instructional Guidance 2 includes a color-coded assessment statement - Students can ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, local severe weather. (aligned to K-ESS3-2) - and explains, "Use the evidence you have gathered on the Summative Guidance 1 tool from formative assessment opportunities in Lessons 6-9 to evaluate students' progress toward Assessment Statement 2 and plan your upcoming instruction accordingly. Depending 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 suggested next steps."
  - The "If you notice..." statements are loosely tied to the three dimensional target elements but are not explicitly color-coded or labeled as such.
  - The "Possible next steps" are not labeled or organized by three-dimensional learning targets.

Criterion-Based Suggestions for Improvement

- While images of sample student work are included in some resources, providing a visual example, it is not clear what the criteria are for determining "secure" vs. "secure with prompting."
- Ensure that educators are supported to provide ongoing, specific feedback to individual students related to three-dimensional learning targets at the element level.
- Consider making all assessment tools explicitly three dimensional. The Following Students' Sensemaking documents are three dimensional, but the only document that indicates a "score" (the Summative Guidance 1 and 2) is not explicitly organized, labeled, and/or color-coded as three dimensional. Doing this will ensure that all feedback and instructional next steps are connected to three-dimensional learning goals, and that all students are robustly supported to progress with each learning target.
- Consider guidance to support students with tracking their own progress toward three-dimensional learning goals, in a grade-appropriate manner. This is not required to be a formal self-assessment (Detailed Guidance).

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.

- Vocabulary and text volume in student assessments are grade-level appropriate, and text in tasks is frequently accompanied by other methods of communicating the expectations for student performance;
- Task representations or scenarios are fair, unbiased, and refrain from assuming students know culturally specific information;
- Some task representations or scenarios support educators in being aware of the limitations of the scenario for reaching all students, including when the materials are designed for a specific geographic area; and
- There is structured variety in the modalities expected for student responses, and use of different modalities is balanced.

Evidence includes, but is not limited to the following:

- K.2 Weather Assessment System Overview, Lesson-by-Lesson Assessment Opportunities, Lesson 2: "Assessment type: Formative...Evidence of students' ideas may be expressed in words, drawings, written or spoken descriptions, movement, and/or gestures"
- Lesson 3, Explore, Step 2, sidebar "Broadening Access: Provide multiple means of representation by allowing students to use sky-related terminology that is already familiar to them. We want to honor all students' language and descriptions, especially including students from non-dominant communities. Allowing students to first describe observations in their own way will support deeper connections to and understandings of cloud/sunshine-related phenomena before adding more complex scientific wording" (Lesson 3, Teacher Edition)
- Lesson 5, Explore, Step 5, sidebar "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 arm movements, blowing out air, pointing at the tally charts, demonstrating with the wind gauge, and words from any languages your students use including scientific and everyday language.." (Lesson 5, Teacher Edition).
- Lesson 6, Explore, Step 3: "Ask students how they could add information to the blank graph to help everyone know how many days there were with no rain, rain to the 1 mark, rain to the 2 mark, and rain to the 3 mark. Explain to students (and demonstrate) that you can count each day that there was no rain on the class Weather Calendar. Demonstrate that to keep track of what symbols on the Weather Calendar have been counted, we can mark each no rain icon off on the calendar as we count so that we can remember that it has been counted. Say the number of "no rain" days aloud to help you and the students remember it. Then, add that number of stickers to the picture graph so that it shows we had ____ days of no rain. Include students in the counting of the weather conditions, marking off of the no rain symbols on the Weather Calendar and putting the corresponding number of stickers on the graph" (Lesson 6, Teacher Edition).

- Lesson 7, Synthesize, Step 2: "In order to help them recall the ways they prepared for different weather we observed in class, have students revisit their handouts from Lessons 2-5 (refer to slide B) and look at their drawings. Direct students to turn and tell a partner about how they were dressed, where they were, and/or what they were doing in the various weather conditions we observed" (Lesson 7, Teacher Edition).
- Lesson 7, Synthesize, Step 2: "...Show students the "How do we prepare for usual weather?" handouts (refer to slide C) and explain that they will get to choose one and use it to describe (by writing and drawing) what the weather is usually like..." (Lesson 7, Teacher Edition). While students are given an option of which handout to use during this significant assessment opportunity, they are not offered, prior to completion and in the handout directions, a choice between different modalities for expression; each handout requires students to write and draw.
- Lesson 8, Explore, Step 3: "Introduce the handout. Show students the What kind of severe weather do we experience? handout (refer to slide G) and read the directions, clarifying with students how to complete it. Students' drawings/descriptions may use information from What is Severe Weather? book, their own experiences with this type of local severe weather, and/or what they have figured out through others' stories" (Lesson 8, Teacher Edition).
- Lesson 10, Lesson Assessment Guidance, How can I use this assessment information?: "...If you have not yet checked off each box for certain students, make sure to talk individually with those students about their Community Service Announcement so they have an opportunity to explain their thinking and inform your summative assessment of their progress..." (Lesson 10, Teacher Edition).

Criterion-Based Suggestions for Improvement

- Ensure incorporating language into the body of the lesson so that at least one significant assessment task makes students aware- before completing the task-that they have a choice in how they respond. Detailed Guidance, p. 43: "The materials include at least one significant task that provides students with a choice of responses across multiple modalities."
- Consider revisions that ensure that all student tasks are accompanied by directions for completion. Detailed Guidance, p. 43: "Student expectations are communicated in a variety of ways to ensure all students understand exactly what the task is asking them to do."

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. A coherent assessment system exists that is clearly described to support educators in understanding how students' three-dimensional performances in each assessment fit together to reflect student learning related to the assessment statements across the unit.

Evidence includes, but is not limited to the following:

All four of the assessment types mentioned in the criterion are present:

Pre-Assessment. Evidence is limited to:

- K.2, Weather Assessment System Overview, Unit Assessment Plan by Assessment Type, Pre-Assessment, Lesson 1: "As students engage in Lesson 1, there are multiple opportunities to gather pre-assessment evidence. This evidence can be used to determine what incoming ideas, experiences, and sensemaking strategies students bring to the unit. All ideas and experiences should be invited into the classroom and be considered as resources to support students' ongoing sensemaking. These opportunities should not be used to assign a score or a grade. The initial ideas students share on their Outside Observations and when the class creates their Notice and Wonder chart can inform your plans about how to build and leverage student ideas across the unit."
- K.2, Weather Assessment System Overview, Lesson-by-Lesson Assessment Opportunities, Lesson 1: "As students engage in Lesson 1, there are multiple opportunities to gather pre-assessment evidence" (Assessment System Overview)
  - 1.A, Assessment type: Pre-assessment, Where to check for understanding:
    - During the Explore, as students record observations on their Outside Observations handouts and discuss with a partner (slide D).
    - During the Synthesize, as students contribute ideas to the Notice and Wonder chart (slide F).
  - 1.B, Assessment type: Pre-assessment, Where to check for understanding:
    - During the Synthesize, when students are adding their questions about weather conditions to the Notice and Wonder chart (slide G)
    - In the second Connect, when students work with questions words and add additional questions to the Notice and Wonder chart (slide I)

Formative Assessment

- See evidence in III.B

Summative Assessment

- K.2, Weather Assessment System Overview, Unit Assessment Plan by Assessment Type, Summative, Lesson 7: "In Lesson 7, use the evidence you have gathered on the 1 Following Students' Sensemaking tool from Lessons 2-7 to make a summative claim about students' understanding of Assessment Statement 1. If you have not yet checked off both boxes for certain students, make sure to talk individually with those students about their Temperature: How do we prepare for usual weather? so they have an opportunity to explain their thinking and inform your summative assessment of their progress. See the range of student samples shown in the [WF.L7.TAT1, 1] to guide what you look and listen for, and use the suggested prompts to help you gather evidence about students' understandings and provide them with feedback."
- K.2, Weather Assessment System Overview, Unit Assessment Plan by Assessment Type, Summative, Lesson 10: "In Lesson 10, use the evidence you have gathered on the 2 Following Students' Sensemaking tool from Lessons 7-9 to make a summative claim about students' understanding of Assessment Statement 2. If you have not yet checked off both boxes for certain students, make sure to listen in while those students practice sharing their CSA with a partner and/or with invited guests so they have an opportunity to explain their thinking and inform your summative assessment of their progress. See the range of student ideas described in the Summative Guidance 2 tool, and use the suggested prompts as you provide feedback and evaluate the ideas students share."

Self Assessment.

- Lesson 4, Explore, Step 4, Assessment Opportunity: "Self-reflection: The discussion prompts suggested here offer an opportunity for students to consider their own science work around making observations of the weather and finding patterns in their class observations, with the purpose of helping them celebrate what they are doing well and find ways to improve. Students will have another opportunity for self-reflection when the class uses wind gauges in Lesson 5" (Lesson 4, Teacher Edition).
- Lesson 5, Explore, Step 5, Assessment Opportunity: "Self-reflection: Similar to Lesson 4, the discussion prompts suggested here offer an opportunity for students to consider their own science work around making observations of the weather and finding patterns in their class observations, with the purpose of helping them celebrate what they are doing well and find ways to improve" (Lesson 5, Teacher Edition).
- Lesson 10, Explore, Step 3, sidebar: "Community Connections: Provide multiple means of engagement by developing collaborative self-assessment and reflection through peer feedback, as this is closely tied with the classroom agreement,' We look, listen, and respond to each other's ideas' and 'We let our ideas change and grow.' Having students be reciprocal in their feedback with each other can increase their awareness around their progress towards goals and how to modify their work from listening and responding to each other's ideas" (Lesson 10, Teacher Edition).

A coherent three-dimensional assessment system rationale is clearly described.

- K.2, Weather Assessment System Overview: "Each OpenSciEd unit includes an assessment system that offers many opportunities for different types of assessments throughout the lessons. These opportunities include: pre-assessment, formative assessment, summative assessment, peer assessment (called peer feedback with students), and/or self assessment (called self reflection with students). Grades K-2 units may only include peer or self assessment, not always both. Assessment opportunities are embedded and called out directly in the lesson plans. Please look for the yellow "Assessment Opportunity" support in each lesson plan to identify suggested assessments. In addition, there are two tables below that outline where each type of assessment can be found in the unit. The first table, Unit Assessment Plan by Assessment Type, lists the purpose, placement, and tools for each assessment type. The second table, Lesson-by-Lesson Assessment Opportunities, chronologically lists the assessment guidance for each lesson. For more information about the OpenSciEd approach to assessment, visit the OpenSciEd Elementary Teacher Handbook."

Assessments are connected to learning objectives and require students to apply grade-appropriate elements of the three dimensions to make sense of phenomena.

- Lesson 1, 1.A **Make observations** of **outside weather conditions** and identify similarities and differences in our class questions.
  - Lesson 1 includes pre-assessment. Students record observations on a handout and contribute ideas to the class Notice and Wonder chart. At this point, the lesson guides the educator to group student questions. However, students are not engaged in identifying similarities and differences in the class questions.
- Lesson 2, **Use counting to analyze data** to **identify a pattern across many students' outside temperature observations.**
  - Assessment type: Formative Where to check for understanding: During the data analysis discussion in the Explore when the class compiles their data on the Temperature Observations chart (slide G), and during the Building Understandings Discussion in the Synthesize (slide H). What to look and listen for across opportunities:
    - **Using numbers and/or colors** on the **thermometer to describe** the **temperature**

- **Counting (out loud, on fingers, by pointing) the tally marks** on the Temperature Observations chart to **identify a pattern** in the **temperatures** being shared, and to **identify a consensus temperature**.
- Using the **consensus temperature** as evidence for **describing the weather** in order to prepare for it.

- Lesson 6, **Compare quantitative data using simple graphs to identify patterns over time** in **local weather (temperature, cloud cover, rain or snow, and wind)**.
  - Assessment type: Key Formative. Where to check for understanding: During the second Explore when students are working together to count, numerically record and begin to make sense of weather data (slide F), and students work together as a class and then in groups analyzing and interpreting data using the four picture graphs (slides G-I); and during the Synthesize, when engaged in the Consensus Discussion (slide J). What to look and listen for:
    - **Counting (by pointing, out loud, on fingers)** the **weather conditions** on the Weather Calendar to **identify a pattern** in the **local weather**
    - **Pointing to/describing patterns** in **local weather** while **making simple picture graphs**
    - **Counting (by pointing, out loud, on fingers)** the **weather conditions** on the Weather Calendar while **describing local weather patterns to make simple picture graphs**
    - **Using** the **consensus wind, rain/snow, temperature, and cloud measurements and observations as evidence** for **describing the weather over time** in order to prepare for it.

- Lesson 7, 7.B **Obtain information about how** meteorologists use patterns **in local weather conditions to** predict **future weather**.
  - The read-aloud mentions meteorologists using patterns, and a sidebar on page 24 of Lesson 7 highlights this as well. However, during Lesson 7, when meteorologists are discussed, there is little evidence to suggest that students engage in learning to connect meteorologists' use of patterns to making predictions. The word "predict" is not used in the read-aloud Meet a Meteorologist or during the associated portion of the lesson. The term "predict" first appears in Step 7 of the "Connect" section later in the lesson.

- Lesson 9, **Obtain and communicate information** about **how we can prepare** for **local severe weather**.
  - Assessment Type: Key Formative Assessment. Where to check for understanding: During the Explore when students are engaging with the Severe Weather Preparations Cards (slide E) and during the first Synthesize, when students are individually completing their How can we prepare for severe weather? handout (slide F). What to look and listen for:
    - **Obtaining and communicating information** related to **preparing for and responding to local severe weather events.**
    - **Describing how severe weather forecasts and/or conditions cause** us to **prepare** in **similar and different ways.**

Criterion-Based Suggestions for Improvement

- Consider continuing to strengthen pre-assessment opportunities to guarantee that educators collect evidence from all individual students, and that the evidence can be linked to all target learning goals in the three dimensions.
- Consider revising lesson-level learning goal language and/or opportunities within the lesson so that there is an accurate and strong connection between learning objectives in every lesson. Detailed Guidance, p. 45: "Assessments are connected to learning objectives and require students to apply grade-appropriate elements of the three dimensions to make sense of phenomena and/or solve problems."

III.F. Opportunity to Learn

EXTENSIVE

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 **extensive** 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, as well as receive and respond to feedback. There is evidence of multiple, iterative, student performances in which students demonstrate their progress toward full proficiency with the targeted assessment statements over time:

- Assessment Statement 1: Students can **use observations** of **local weather conditions to describe patterns over time in temperature, cloud cover, rain/snow, or wind**. (aligned to K-ESS2-1)
- Assessment Statement 2: Students can **ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, local severe weather**. (aligned to K-ESS3-2)

Evidence includes, but is not limited to the following:

Assessment Statement 1: Students can **use observations** of **local weather conditions to describe patterns over time in temperature, cloud cover, rain/snow, or wind**. (aligned to K-ESS2-1).

- K.2, Lesson 2, Teacher Assessment Tool 1 Following Students' Sensemaking, Lessons 2-7 Assessment Statement 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**...Use this evidence to formatively evaluate students' progress in Lessons 2-6...and to support your decisions related to the Summative Guidance 1 in Lesson 7" (Lesson 2, Teacher Assessment Tool 1).
- Lesson 2, **Use counting to analyze data** to **identify a pattern across many students' outside temperature observations.**
  - Lesson 2, Lesson Assessment Guidance, How can I use this assessment information? "Students' first intentional opportunity to notice patterns over time is in Lesson 6, so they are not expected to demonstrate a secure understanding of Assessment Statement 1 before then" (Lesson 2, Teacher Edition).
- Lesson 4, **Use counting and numbers to describe cause-and-effect relationships related to the amount of rain in a rain gauge**.

  - Lesson 4, Explore: "Continue the routine of collecting additional weather observations and help students notice patterns across their class data, to inform later work looking for patterns over time" (Lesson 4, Teacher Edition).

- Lesson 6, **Compare quantitative data using simple graphs to identify patterns over time** in **local weather (temperature, cloud cover, rain or snow, and wind)**.
  - Lesson 6, What we do: "To answer our questions, we count each of the weather conditions we have observed and measured to create picture graphs that help us identify patterns over time in our weather observations and measurements" (Lesson 6, Teacher Edition).
  - Lesson 6, Navigate, Step 1: "Remind students how, so far, they have been using many students' observations to identify a pattern and record that as consensus data on the Weather Calendar. Ask students what they think will need in order to identify patterns in weather conditions over time. Invite students to turn and talk to a partner. Anticipate they will suggest having lots of observations/data is important; they should collect more data; and/or they should have multiple students collect each kind of weather condition data. Use students' ideas to navigate into the Explore, when students will continue collecting local weather condition data" (Lesson 6, Teacher Edition).
  - Lesson 6, Synthesize, Step 4: "Have completed picture graphs posted and engage students in a Consensus Discussion to answer the questions they generated from the Weather Calendar previously in the lesson Answering these questions involves noticing patterns in local weather data they have collected...Use the following discussion prompts. Prompts to use:...For each weather condition, ask the following: What patterns do we see in the (weather condition) picture graph?...We had questions about whether there were more/less days with (this variety) of this (weather condition). What patterns do we see in our (weather condition) picture graphs? (e.g. When we look at our cloudiness graph, were there more sunny or partly cloudy days?)... What are the patterns in our data?..." (Lesson 6, Teacher Edition).

- K.2, Lesson 6, Teacher Assessment Tool Instructional Guidance 1: "Use the evidence you have gathered on the 1 Following Students' Sensemaking tool from formative assessment opportunities in Lessons 2-6 to evaluate students' progress toward Assessment Statement 1...You will have summative opportunities to check students' progress toward Assessment Statement 1 in Lesson 7 using the Summative Guidance 1. By the end of Lesson 6, after creating and discussing the picture graphs, most or all of your students should have reached a secure-with-prompting understanding for Assessment Statement 1..." (Lesson 6, Instructional Guidance 1).
- K.2, Lesson 7, Teacher Assessment Tool Summative Guidance 1: "Use the evidence you have gathered on the 1 Following Students' Sensemaking tool from this and prior lessons to make a summative claim about students' understanding of Assessment Statement 1. If you have not yet checked off both main boxes for certain students, make sure to talk individually with those students about their 'How do we prepare for usual weather?' handout so they have an opportunity to explain their thinking and inform your summative assessment of their progress... (Lesson 7, Summative Guidance 1).

Assessment Statement 2: Students can **ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, local severe weather**. (aligned to K-ESS3-2)

- K.2, Lesson 7, Teacher Assessment Tool 2 Following Students' Sensemaking, Lessons 7-9 Assessment Statement 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**...Use this evidence to formatively evaluate students' progress in Lessons 7-9..." (Lesson 7, Teacher Assessment Tool 2).

- Lesson 7, 7.B **Obtain information about how meteorologists use patterns in local weather conditions to predict future weather**.

  - Lesson 7, What we do: "...But we also still have questions about how we know weather in the future, so we read a book about how meteorologists use tools and patterns in many, many weather observations to make weather forecasts and communicate these so that people can be prepared, especially about severe weather..." (Lesson 7, Teacher Edition).
  - Lesson 7, Lesson Assessment Guide, 7.B, How can I use this assessment information?: "...noting that students will be prompted to use Cause and Effect beginning in Lesson 8..." (Lesson 7, Teacher Edition).
  - Lesson 7, Lesson Assessment Guide, 7.B, How can I use this assessment information?: "...Provide feedback to students by supporting them in the moment with questions such as: What do we do as meteorologists? What does Betty Davis do? What questions do you have about weather forecasts or severe weather? Was there something in our book that made you wonder about that? (Refer to the Question Words Infographic, if helpful.)" (Lesson 7, Teacher Edition).
  - Lesson 7, Navigate Step 4: "...Ask something like, So, will the weather always be like that? Can we expect it to be that way every day? Could we always prepare the same way for that weather and be comfortable?... Anticipate that students will say no, the weather changes sometimes. Ask students how we could know how to prepare if the weather might change from its usual patterns; is there a way we could know what the weather might be in the future? Accept all ideas, highlighting differences in those ideas and questions we might have. Co-construct the lesson question. Briefly summarize that the class has shared a variety of ideas about how we might find out what the weather could be like in the future. Emphasize that we are not all sure about this, and if you have questions about weather forecasting on your Notice and Wonder chart, refer to those now, too. Combine students' questions into a lesson question such as How can we find out about weather in the future? Add this question to a new row on Our Growing Ideas chart" (Lesson 7, Teacher Edition).
  - Lesson 7, Connect, Step 7: "Remind students that, in the Meet the Meteorologist book, we figured out how meteorologists predict and communicate about severe weather. Use the Notice and Wonder chart (refer to slide M) to point out and remind students about our (new and previously recorded) unanswered severe weather questions. Plan together that next time, we investigate more about severe weather." (Lesson 7, Teacher Edition).

- Lesson 8, 8.A **Ask questions about local patterns** in **weather conditions** **to obtain information about local severe weather**.
  - Lesson 8, Navigate, Step 1: "Remind students that we have figured out a lot about how to know about future weather but that we still have more we want to figure out about severe weather. Highlight any questions students have concerning severe weather on the Notice and Wonder chart (refer to slide B) and continue the discussion...Prompts to use:...What are we still wondering about severe weather?...Combine students' questions, making sure to use students' words and phrasing, into a lesson question such as, What makes weather severe? Add this question to a new row on Our Growing Ideas chart..." (Lesson 8, Teacher Edition).
- K.2, Lesson 9, Teacher Assessment Tool Instructional Guidance 2: "Use the evidence you have gathered on the Summative Guidance 1 tool from formative assessment opportunities in Lessons 6-9 to evaluate students' progress toward Assessment Statement 2...You will have summative opportunities to check students' progress toward Assessment Statement 2 in Lesson 10. By the end of Lesson 9, after completing their How can we prepare for severe weather? and discussing their work to update Our Growing Ideas chart, most or all of your students should have reached a secure-with-prompting understanding for Assessment Statement 2..." (Lesson 9, Instructional Guidance 2).
- K.2, Lesson 10, Teacher Assessment Tool Summative Guidance 2: "Use the evidence you have gathered on the 2 Following Students' Sensemaking tool from this and prior lessons to make a summative claim about students' understanding of Assessment Statement 2. If there is evidence for both listen-fors and look-fors listed on that tool,

students have a secure understanding of Assessment Statement 2. If students don't yet have a secure understanding, make sure to listen in as these students share their Community Service Announcements (CSAs) with their invited guests. Follow up with these students after they present so that they have an opportunity to explain their thinking and inform your summative assessment of their progress. If that additional information does not provide evidence of secure understanding, students can be considered not yet secure…" (Lesson 10, Summative Guidance 2).

There are a variety of opportunities for feedback loops.

- K.2, Lesson 2, Teacher Assessment Tool 1, Following Students' Sensemaking covers Lessons 2-7, for Assessment Statement 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." The recording document includes a "Checklist of listen-fors and look-fors" that lists color-coded (Blue-SEP, Orange-DCI, Green-CCC) lesson learning goals. The "Possible evidence of student sensemaking" and "Possible lesson feedback" is not organized and/labeled as dimension specific.
  - Lesson 2, Teacher Assessment Tool 1, Following Students' Sensemaking (evidence that indicates students are encouraged and supported to revise their thinking):
    - Possible Lesson 2 Feedback "…Let's work together to add some labels to your drawing of your outside. What word should we write here? What sound does that word begin with?"
    - Possible Lesson 3 Feedback "…Let's work together to add some labels to your drawing of what you see in the sky. What word should we write here? What sound does that word begin with?…"
    - Possible Lesson 4 Feedback "…Let's work together to add some labels to your drawing of you outside. What word should we write here? What sound does that word begin with?"
    - Possible Lesson 5 Feedback "…How did you know that the wind was ____ today?…"
- K.2, Lesson 7, Teacher Assessment Tool 2, Following Students' Sensemaking covers Lessons 7-9, for Assessment Statement 2. The recording document includes a "Checklist of listen-fors and look-fors" that lists color-coded (Blue-SEP, Orange-DCI, Green-CCC) lesson learning goals. The "Possible evidence of student sensemaking" and "Possible lesson feedback" is not organized and/labeled as dimension specific.
- Lesson 1, Lesson Assessment Guidance, How can I use this assessment information? "Give feedback as students ask questions based on observations: Direct them back to their outside experiences in this lesson: What did it feel like outside? What did it look like outside? Invite them to recall and share experiences from outside of the classroom: What did it look/sound/feel like during (that weather event)? What did you/your family/your friends do in that situation? Point out that the questions they have shared will help the class work on figuring out more about weather and how we can prepare for it" (Lesson 1, Teacher Edition).
- Lesson 2, Explore, Step 5: "Assessment Opportunity, Formative Assessment: During the discussions analyzing students' outside temperature data on the Temperature Observations chart, you have an opportunity to gather evidence about learning goal 2, with the purpose of providing feedback and supporting students in using counting to identify a pattern in their class temperature data"…" Use the provided prompts to help students make sense of their observations and come to agreement (consensus) on one outside temperature measurement…Prompts to use: What do you notice when you look at the tally marks on the Temperature Observations chart?…Some of us noticed there were more or less tally marks for different temperatures. Let's count the tally marks and record (write) the number together on the chart…What pattern do we see across lots of students' observations?" (Lesson 2, Teacher Edition).
- Lesson 7, Synthesize, Step 3: "When students return to their own seats and their own work, display slide E and encourage them to reflect on their work and the comments their classmate(s) made. Ask, What do you think you

could add or change to make your ideas clearer? Give students a few minutes to add extra labels, colors, redraw lines, etc. as needed based on the feedback from their peers" (Lesson 7, Teacher Edition).

- Lesson 10, Explore, Step 3, sidebar: "Community Connections: Provide multiple means of engagement by developing collaborative self-assessment and reflection through peer feedback, as this is closely tied with the classroom agreement, "We look, listen, and respond to each other's ideas" and "We let our ideas change and grow." Having students be reciprocal in their feedback with each other can increase their awareness around their progress towards goals and how to modify their work from listening and responding to each other's ideas" (Lesson 10, Teacher Edition). Feedback guidance is not specific to learning targets.

Criterion-Based Suggestions for Improvement

- Consider continuing to strengthen feedback language and tools so that educators are equipped with the knowledge to ensure that all feedback is specifically targeted to improve student performance in all key claimed learning goals in each of the three dimensions.

Category Ratings

CATEGORY I	**NGSS 3D Design**	0	1	2	(3)
CATEGORY II	**NGSS Instructional Supports**	0	1	2	(3)
CATEGORY III	**Monitoring NGSS Student Progress**	0	1	2	(3)
TOTAL SCORE				**9**	

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