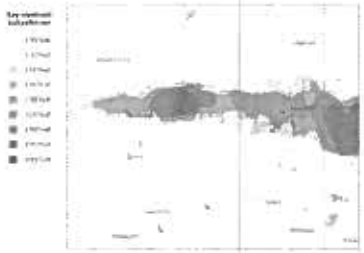
LESSON 2: What are the conditions like on days when it hails?

PREVIOUS LESSON *We observed three video clips of hail falling in different areas of the United States on different days. We developed a model to try to explain what causes this kind of precipitation event to occur. We developed questions for our Driving Question Board (DQB) and brainstormed ways we could investigate our questions.*

THIS LESSON

INVESTIGATION

1.5 days



We examine photos of hailstones and analyze and interpret data from cases of hail events at different locations and times of year to notice patterns and identify relevant factors that might explain the formation of hail.

NEXT LESSON *We will analyze temperature profile data for different altitudes of the atmosphere at a variety of locations during different times of the year. We will develop a consensus model for representing the motion of the molecules that make up air at different temperatures.*

BUILDING TOWARD NGSS

MS-PS1-4, MS-ESS2-4, MS-ESS2-5, MS-ESS2-6

WHAT STUDENTS WILL DO

Analyze and interpret data using graphical displays (e.g., maps, charts, graphs, tables) of large data sets to identify temporal and spatial patterns in the range of weather conditions that lead to the formation of precipitation (hail).

WHAT STUDENTS WILL FIGURE OUT

- Hailstones are made of ice, often in layers.
- Hailstorms are more common in the central United States, with fewer events in the west.
- The days that have hail also have relatively warm air temperatures (mostly in the 50–90°F range, which is above the melting/freezing point of water) and relative humidity in the range of 37–96 percent. There are changes in the wind when it hails.
- Hailstorms happens later in the day in the spring, summer, and fall. They impact a small area (20-60 square miles).

Lesson 2 • Learning Plan Snapshot

Part	Duration	Summary	Slide	Materials
1	3 min	**NAVIGATION** Review ideas for data to collect before, during, and after a hail event.	A	
2	8 min	**OBSERVE HAILSTONES** Observe and identify patterns of hailstones using images.	B-D	*Hailstone Images*, chart paper, markers
3	12 min	**ANALYZE HAIL FREQUENCY MAP DATA** Analyze and interpret a map showing the frequency of occurrences of hail in the United States.	E, F	*Hail Frequency Map*, tape, chart paper, markers, computer and projector, whiteboard (optional)
4	10 min	**ANALYZE AN EXAMPLE HAILSTORM CASE** Students analyze a hailstorm case in preparation for analyzing other cases independently.	G-J	*Weather Data for Fort Scott Hailstorm*, chart paper, markers, computer and projector, whiteboard (optional)
5	14 min	**ANALYZE HAILSTORM CASES IN PARTNERS** Analyze hailstorm case data with a partner, compare with another pair, and complete an exit ticket.	K-M	*Weather Data from Seven Hailstorm Sites*
				End of day 1
6	2 min	**NAVIGATION** Share one pattern students have noticed so far.	N	
7	15 min	**CONDUCT A BUILDING UNDERSTANDINGS DISCUSSION ABOUT IDENTIFYING PATTERNS IN HAILSTORM CASES** Work together to compare hailstorm cases to identify patterns.	O-Q	*Weather Data from Seven Hailstorm Sites*, chart paper, markers
8	5 min	**ADD TO OUR PROGRESS TRACKERS** Record what we have figured out about the conditions on days when it hails in our individual Progress Trackers.	R	
9	2 min	**NAVIGATION (OPTIONAL)** Discuss initial ideas about how hail formed even though the air temperature near the ground was warm.	S	
				End of day 2

Lesson 2 • Materials List

	per student	per group	per class
Lesson materials	• science notebook • *Hailstone Images* • *Hail Frequency Map* • tape • *Weather Data for Fort Scott Hailstorm*	• *Weather Data from Seven Hailstorm Sites*	• chart paper • markers • computer and projector • whiteboard (optional)

Materials preparation (minutes)

Review teacher guide, slides, and teacher references or keys (if applicable).

Make copies of handouts and ensure sufficient copies of student references, readings, and procedures are available.

Make 1 copy of *Hail Frequency Map* for each student.

Make 1 single-sided copy of *Weather Data for Fort Scott Hailstorm* for each student.

Make 1 single-sided copy of *Weather Data from Seven Hailstorm Sites* for every 7 students. For example, if you have a class of 28 students, make 4 copies of this document, thereby producing 4 copies of each hailstorm case (A-G). Each student will get 2 pages for their case.

Where We Are Going

This lesson introduces weather data. By the end of 5th grade, students should know that weather is the minute-by-minute or day-by-day variation in the atmosphere's condition on a local scale. In this lesson students begin to analyze data for some of the conditions of the atmosphere.

Part of that weather data, temperature, is connected to a molecular model that students will revisit in Lesson 3. Hailstorms tend to form on days when thermal energy transfer from the ground leads to relatively warm air temperature at the surface (i.e., in the 50–80°F range, which is above the freezing/melting point of water), as students see in the weather data. Students will start to develop ideas around the role of thermal energy transfer as a mechanism in hailstorm formation in Lesson 5. The role of temperature and its connection to state changes of water will be developed beginning in Lesson 7.

Students also see that the days that had hail had relative humidity within 53–94 percent around the time of the hail event. Relative humidity and its relationship to the amount of water in the air will be qualitatively introduced in Lesson 6.

Both temperature and humidity data, along with wind data presented in this lesson, lay the groundwork for developing ideas related to air masses and how they move and cause weather, which will be addressed later in the unit.

Hailstones are made of ice, often in layers. Students will explain how these layers form toward the end of the unit.

Hailstorms are relatively short in duration and isolated in impact. The weather data examined in this lesson are gathered from weather stations in the vicinity of the hailstorm. Because of a hailstorm's relatively small area, we are often limited to analyzing data in the vicinity of a hailstorm rather than under the center of it. Analyzing weather changes under the center of much larger-scale weather events (e.g., along fronts for larger air masses with uniform properties) reveals additional changes in weather conditions (e.g., pressure) that help to predict and explain how those types of phenomena occur; this will be addressed in the second half of the unit.

The second part of this lesson engages students in analyzing relatively complex data sets (after they have analyzed hailstone images). Students are given a table of weather data spanning an entire day, along with a map showing the accumulated precipitation over a region on that day. Evaluating both together requires students to look for and interpret temporal and spatial patterns. Additional complexity in this data comes from the presence of multiple variables (columns) in the table as well as the absence of some data (e.g., time of the storm) for some sites. Though students have previously seen such complexity in data tables from OpenSciEd Unit 6.2: *How can containers keep stuff from warming up or cooling down?* (Cup Design Unit), this data set includes greater complexity because the weather data for each site do not start at exactly the same time of day, nor are they measured at the same time increments.

This complexity is by design, as a focal practice of this unit is supporting and developing students' literacy in data analysis and interpretation. By the end of the unit, students will need to be able to analyze data sets to find patterns across weather events over bigger areas and longer periods of time. This gradual increase in scale and data complexity will continue into their next unit of study (OpenSciEd Unit 6.4: *How and why does Earth's surface change?* [Everest Unit]). But, remember that students have already had numerous experiences in analyzing data tables for patterns in the Cup Design Unit. See this lesson as the next step in a learning progression toward fluency in data analysis, particularly related to these two elements in Appendix F of NGSS:

- Use graphical displays (e.g., maps, charts, graphs, and/or tables) of large data sets to identify temporal and spatial relationships.
- Analyze and interpret data to determine similarities and differences in findings.

Where We Are NOT Going

Though the melting/freezing point of water can vary slightly based on the elevation at which it is measured (due to changes in the pressure of the surrounding atmosphere), a melting/freezing point of 32°F (0°C) is introduced as a relatively fixed and known value for both the temperature at which frozen water starts to melt when thermal energy is added to it and the temperature at which liquid water starts to freeze when thermal energy is removed from it.

LEARNING PLAN for LESSON 2

1 · NAVIGATION

3 min

MATERIALS: None

Review previously generated ideas for next steps. Present **slide A** and remind students, *In the last lesson, we observed and tried to explain a hailstorm and other long-term and short-term precipitation events. We had a lot of questions about what hail is like and what the conditions are like during a hailstorm. We also came up with some ideas for investigating some of those questions.*

from L1

Have students turn and talk and then share their ideas. Use the suggested prompts to help students recall their ideas for investigating questions about hail and hailstorms.

Suggested prompt	Sample student response
If you were at a spot where you knew a hailstorm was going to occur, what are some types of data you would want to collect before, during, and after the event to try to figure out what conditions lead to a hailstorm?	• *We would want to examine hail samples to see what the hail looks like.* • *We would want to know the area that was affected, maybe by looking at maps. Maybe the maps could help us figure out where hail falls so we can see what the conditions are like there.* • *We would want to collect weather data such as temperature and wind speed during the hailstorm.*

discourse support

Tell students that you have some of this information pooled from several different cases of when hail fell.

2 · OBSERVE HAILSTONES

8 min

MATERIALS: science notebook, *Hailstone Images*, chart paper, markers

Introduce the hailstone images. Present **slide B.** Explain that though you don't have a direct source for shipping hailstones to your class, you do have some hailstone images from different hailstorms for students to examine—some showing the outside and some showing hailstones cut in half.

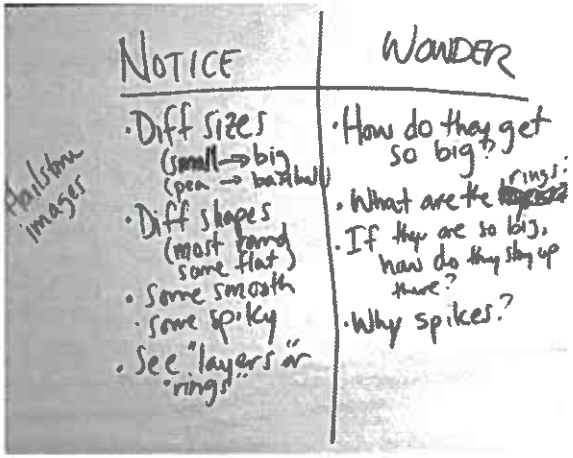
Examine the images and make observations. Have students write the heading "Hailstone Observations" on a new notebook page and create a two-column Notice and Wonder chart below that heading. Present **slide C** and refer students to *Hailstone Images* in the Student Edition. Give students 4 minutes to record their observations.

Make sense of the images. Present **slide D** and lead a whole-class discussion. You may want to go back to **slide C** as you discuss the patterns. Capture any questions on a class questions chart that you can add to as you work through other data sources in this lesson.

Suggested prompt	Sample student response	Follow-up question
What are some patterns you noticed as you examined the hailstone images?	• *Some are smooth and some are spiky on the surface.* • *They range in size from the size of peas to the size of baseballs.* • *The larger ones have (3–4) rings and look like solid ice throughout their insides.*	*Where in the images did you see that?* *Can you say more about the ways in which the hailstones looked similar? Different?* *Does anyone agree or disagree? Why?*
What ideas do you have about how hailstones are produced?	• *Maybe they have to be up there longer to get really big?* • *They must freeze up there because they look like ice.* • *Maybe they form in stages, because of the rings.*	*How do these ideas compare to the ideas you shared in Lesson 1?* *Does this provide any evidence to support your earlier ideas?*
What questions does this raise for you?	• *I don't get why some are spiky and some are smooth.* • *Why don't they melt on the way down?* • *How could they be different sizes?*	*What else could we do or look at to figure out more?*

Transition to the other data sources that students suggested using in the navigation section of this lesson.

Say, OK, so comparing images of different hailstones helped us see specific similarities and differences. This raised more questions. Comparing several cases is a really useful approach when trying to figure out how things work. It can help us see patterns we may not see in a single case. Let's do that again, but for some of the other data you asked for—weather conditions before, after, and during the hailstorm.



3 · ANALYZE HAIL FREQUENCY MAP DATA

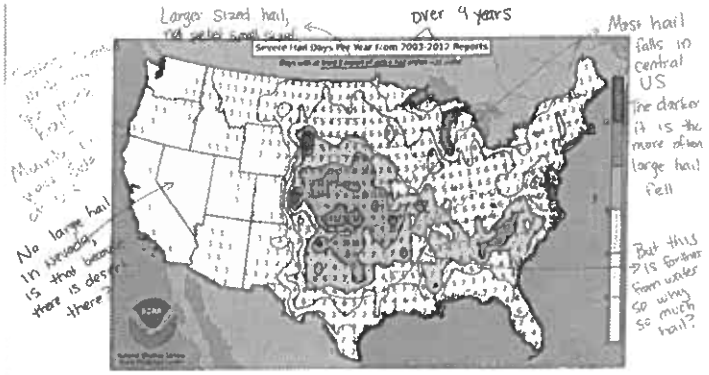
12 min

MATERIALS: science notebook, *Hail Frequency Map*, tape, chart paper, markers, computer and projector, whiteboard (optional)

Present the map. Distribute the *Hail Frequency Map* and project **slide E.** *Say, This map might be useful as we try to answer some of our questions.*

Ask students to tape the *Hail Frequency Map* into their notebook and make a two-column chart on the opposite page, with the column headings "Patterns" and "Questions".

Point out the map features.* Project **slide F.** If possible, project it on a whiteboard where you can annotate features of the map that will help students make sense of the data. Use the prompts below and encourage students to annotate their copy of the map.



Suggested prompt	Sample student response
What is this a map of? What does the title of the map tell us about what it shows?	*Severe hail days per year.*
What does it mean by "severe"?	*It says "inch+ hail," so big hail-not pellet-sized.*
What else does the title tell us about this data?	*How many storms per year.* *It shows hail over 9 years.*
What do the little numbers mean?	*They show how many days in a year had severe hail.*
What do you think the darker and lighter parts on the map mean? How do you know?	*Darker means there are more severe hail days in that location. Lighter means there are fewer.* *The green bar on the side shows us.*
As an example, can you point out an area where you think there's a lot of hail?	*Right in the middle, like in Kansas, there is a bunch of dark green.*

Analyze the map and record patterns and questions.* Ask students to spend 3-4 minutes individually analyzing the map, recording any patterns they notice and questions these patterns raise.

Discuss patterns and questions. After students have worked on their own, spend about 5 minutes as a class having them share out patterns they saw in the data. Use the prompts below. As students share, encourage them by saying, *Record questions that come up as we encounter observations we can't fully explain.* One way to share and record ideas during this discussion is to continue projecting the map on a whiteboard and annotating around it. [image set:OP.WC.L2.004, OP.WC.L2.018]

* SUPPORTING STUDENTS IN ENGAGING IN ANALYZING AND INTERPRETING DATA

The ways in which data are represented can help students notice patterns. However, students need to understand the data that are represented in the map before they can identify those patterns. Prompting students to explain the map features and annotating them as a class will support their sensemaking and ability to identify patterns in the data.

* SUPPORTING STUDENTS IN DEVELOPING AND USING PATTERNS

Noticing patterns can lead to questions about how and why these patterns occur. For example, why do centrally located states have more hail? What are the conditions there or on any day when there is hail? Encourage students to record questions that arise, while you capture those questions on a class chart and/or Driving Question Board.

Suggested prompt	Sample student response
What are some patterns you noticed as you examined the hail map?	• *There are more days of hail in the middle of the country.* • *There aren't very many days of hail on the west coast, particularly near the ocean.* • *Some places have a lot of hail (more than 13 days).*
What new ideas or questions does this raise about hailstorms?	• *Do places like California have hail? Is it just smaller, so it didn't show up on the map?* • *Why do centrally located states have more hail? Maybe something about the conditions in the middle of the country makes hail more common?* • *What are conditions like on the days when there is hail?*

listen Ars

connections to hail experiences in LA (site E)

Transition to the hail weather data. Say, *So, maybe if we zoomed in on some of these locations we could find out more about what is going on when hailstorms happen.*

4 · ANALYZE AN EXAMPLE HAILSTORM CASE

10 min

MATERIALS: *Weather Data for Fort Scott Hailstorm*, science notebook, chart paper, markers, computer and projector, whiteboard (optional)

Orient to the weather data. Present **slide G.** Tell students, *We have weather data from eight sites where hail hit, shown in the map on the right. We saw three of these storms in the videos.*

Direct students' attention to the photograph of the weather station on the slide. Explain that near each of the eight sites is a weather station that measures weather conditions. Lead a short discussion, using the prompts below, about what is meant by "weather" and "weather conditions".

Suggested prompt	Sample student response
How have you heard the word condition used before?	*"Condition" is what something is like.*
For example, if we were describing this (textbook, desk, other item), what words would you use to describe its condition?	*We could describe the condition as new, old, scratched, and so forth.*
When weather people talk about weather conditions, they focus on specific measurements about the air. What are some common weather measurements you have heard of that might be measured at this weather station?	*Temperature* *Wind* *Rain (precipitation)* humidity

Say, *All these conditions together make up our weather in a particu'ar place at any given point in time. So, when we talk about weather conditions we mean what the air is like at a given time in terms of things like the temperature, how windy it might be, how humid it is, and other factors.*

ADDITIONAL GUIDANCE

By the end of 5th grade, students should know that weather is the minute-by-minute or day-by-day variation in the atmosphere's condition on a local scale. In this lesson students begin to analyze data for some of the conditions of the atmosphere. You may want to start a word wall and add examples of data about the atmosphere that are used to describe weather as in this unit.

prior learning

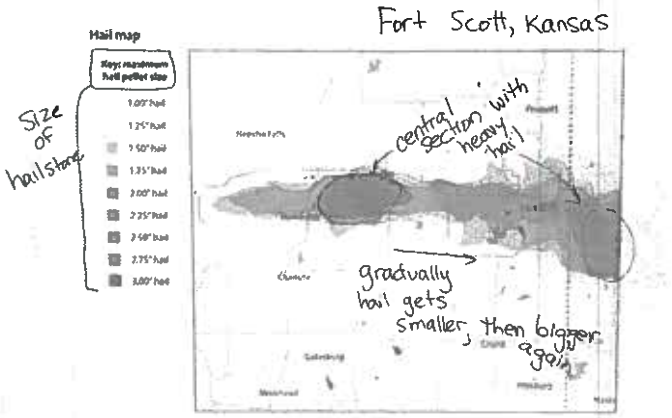
Refer again to the weather station on the slide. Explain that the devices used to measure the air must be suspended in the air. The image shows a typical example of a station with instruments mounted on it to keep them off the ground.

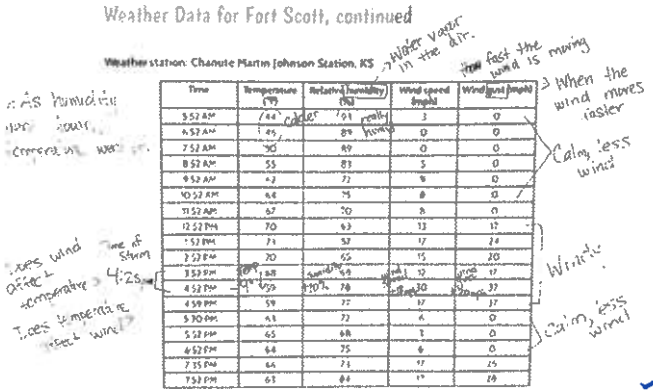
Analyze a hailstorm case together. Project **slide H**. Explain that each of the eight sites has a case file containing four things:

- a map of the United States showing the location of the case (and the other cases)
- a zoomed-in map showing the area impacted by hail
- when the event happened
- the weather data from a weather station at a nearby location

Say, *We will analyze these data to help us identify patterns in the location, timing, and conditions of several hailstorm events.* Ask students to write the question, **"What patterns do we notice in the location, scale, timing, and weather conditions during hailstorms?"** on the next page in their notebooks.

Go through the Fort Scott case together to help students identify the available information, and ask them for possible observations. Record these observations on a chart so groups can later compare their own cases to these initial observations to identify patterns. As previously, it is helpful to project the map on a whiteboard and annotate around it to share and record ideas, as in these examples:





Support for ID'ing Patterns in Data

Analyze the zoomed-in map of Fort Scott, KS. Present **slide I**. Say, *Let's look first at one of the cases we saw in the videos.* Distribute the handout *Weather Data for Fort Scott Hailstorm* to each student and project the zoomed-in map of Fort Scott, KS. Help students interpret the representation by posing questions such as, *What do the different colors mean?*

Tell students to individually draw an arrow to something they notice and then write what they notice on their handout, as directed by the slide. Ask for a few responses and record their ideas on chart paper or the whiteboard projection. Listen for student responses such as, *It seems like streaks instead of one big blob. Some parts are darker than other parts.*

Analyze the data table for Fort Scott, KS. Present **slide J**. With the class, model making observations about the weather data for a particular site.

Help students make sense of the weather data in the case file.

- On the data table, ask students to put a mark next to the time the hail event started.
- Examine row 1 of the data table and discuss what each item means. Annotate the projected table as you discuss.

Ask pairs to identify one thing they notice about the time of day or conditions (temperature and humidity) when hail occurred, as directed by the slide. Have pairs share out one or two observations as you record them on the observations chart or whiteboard.

Listen for these student responses:

- *The hail happened in the afternoon.*
- *It was warm that day (above 75 °F).*
- *The wind changed. There were big wind gusts around the time of the hail.*
- *Humidity was pretty high.*
- If students don't mention it, ask about when the storm happened: e.g., *It happened in the afternoon. It happened in the spring.*

ADDITIONAL GUIDANCE

Students may note that these data are from 2012-2013 and be concerned that it is not more current. The years in which the hailstorm data were collected do not impact its relevance to our question of figuring out what conditions are like on a typical day when it hails. Complete and accurate data sets are more important in this case than having more recent data. However, having more recent data might help to validate our models about what conditions are necessary for hail to form.

5 · ANALYZE HAILSTORM CASES IN PARTNERS

14 min

MATERIALS: *Weather Data from Seven Hailstorm Sites*

Analyze cases in partners. Present **slide K** and have students group in partners. Distribute the case files from *Weather Data from Seven Hailstorm Sites* and have partners identify patterns in their assigned case by marking and writing what they notice on the map and weather data tables. Give students 8-10 minutes for the task.

Share observations with another pair. Project **slide L**. After pairs have had a chance to annotate their data, have them share their observations with another pair. Ask students to listen for similarities and differences between the cases as they share.

Introduce exit ticket. Project **slide M**. Ask students to individually record patterns they are starting to see between the cases: one regarding the location of hailstorms and one regarding the timing or conditions needed for hailstorms to occur. They can record these on a sheet of paper or index card to turn in.

✱ ATTENDING TO EQUITY

Cases A and G are somewhat more complex because in one case there are two hailstorm events and in one case the time of the hailstorm is unknown. As an opportunity for differentiation, you can provide these cases to students who may benefit from the extra challenge.

End of day 1

6 · NAVIGATION

2 min

MATERIALS: None

Turn and talk. Show **slide N**. Ask students to discuss with their partner 1 pattern they have noticed so far regarding the location, timing, or conditions of a hailstorm.

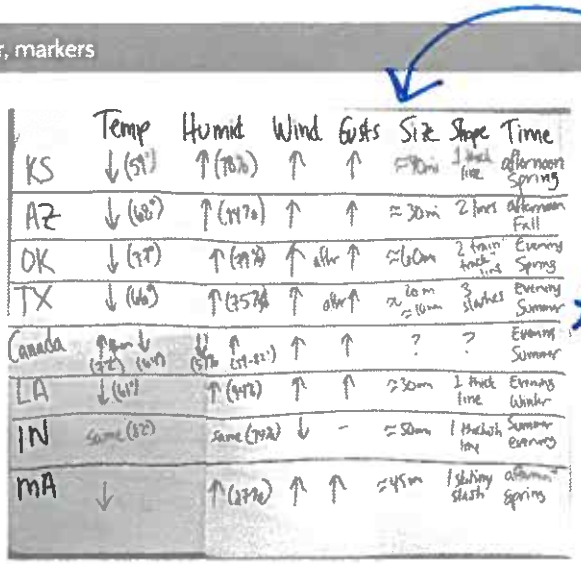
7 · CONDUCT A BUILDING UNDERSTANDINGS DISCUSSION ABOUT IDENTIFYING PATTERNS IN HAILSTORM CASES

15 min

MATERIALS: science notebook, *Weather Data from Seven Hailstorm Sites*, chart paper, markers

Gather in a Scientists Circle. Project **slide O** and have students bring their science notebooks and chairs to the circle.

Compile observations.* Ask the student pairs to share what they noticed in their data. Project **slide P**. Record their data observations for each site on chart paper or a spreadsheet so students can then identify patterns across the large data set. Add columns for anything else that students identify as important in the data.



*** SUPPORTING STUDENTS IN ENGAGING IN ANALYZING AND INTERPRETING DATA**

Scientists use a range of approaches and tools to derive meaning from data. In this lesson, one approach to making sense of the large amounts of data shown across the eight sites is the use of a summary table that lines up the findings from each site side by side first to compare key categories and changes in values across sites. Such a tool often helps scientists see larger patterns and outliers that would not be apparent by comparing the data from only one case to another.

SUPPORTING STUDENTS IN MAKING CONNECTIONS IN MATH

Ask students to summarize or describe what a typical (average) humidity or temperature value is when hail occurs, or otherwise ask students to look for centers (averages, typical values) as well as variability within the data. Drawing patterns from typical values supports the practice of using measures of center (even if we're not calculating them) to find patterns within data.

Examine the compiled data. Give students 2 minutes to silently examine the compiled data on the class chart for any patterns they see across the sites.

Discuss patterns. Project **slide Q**. Lead a class discussion using the prompts below. Make another class chart and record patterns students agree on.

KEY IDEAS

Purpose of the discussion:

- Identify patterns in the location, scale, timing, and weather conditions that can help us determine what most hail events have in common.

Listen for these ideas:

- Location and scale
  - Hailstorms happen more often in the Midwest.
  - Hailstorms appear to happen in "lines".
  - Hailstorms impact relatively small areas (20-60 square miles).
  - Hailstorms are relatively short (10-30 minutes).
- Timing
  - Hail is less common in the winter months.
  - Hail happens later in the day.
- Weather conditions
  - The temperature is relatively warm (above 50°F) on days when it hails.
  - Humidity is relatively high when it hails.
  - The humidity goes up and the temperature goes down around the time of a hailstorm
  - There are changes in wind when it hails.

middle of country

warmer than freezing - students won't consider this "warm"

Suggested prompt	Sample student response	Follow-up question
What was one pattern you noticed in the location, scale, timing, and weather conditions that lead to the formation of hail?	*They come in a line and don't cover a very big area.*	*Can you show us where you see that in our data?* *Do others agree?* *Did others say that idea in a different way?*
What about the duration?	*They don't last that long.*	*Has anyone experienced a storm that is short like that?*
What does the pattern of data lead you to conclude about the timing of hailstorms?	*They happen later in the day-in the afternoon or evening.*	*Can you give us some examples from the data that support that pattern?* *What else can you say about when hailstorms happen?*
What patterns do you observe in the data about the weather conditions around the time of a hailstorm?	*It was pretty warm.*	*Do others agree?* *What other patterns did you notice about temperature?*
What other patterns do you observe in the data about the weather conditions?	*The humidity was kind of high.* *What is humidity?*	*What does it feel like when someone says, "It's really humid out?"* *What can we say about the humidity when there is hail?*

support for discourse — revisit after reviewing exit tickets

Suggested prompt	Sample student response	Follow-up question
Any other patterns?	*The wind increased and there were bigger gusts right around the time of the storm.*	

SUPPORTING STUDENTS IN MAKING CONNECTIONS IN MATH

It is also helpful to discuss the outliers in the data, an important skill in both math and science. Students develop the concept of outliers and quantitative measures of central tendency for what is typical in a data set in their work in CCS in math in 6th grade. Help students recognize that one way to look for patterns is to start by identifying the "typical" conditions for a phenomenon (e.g., what the weather conditions are like on most days when hailstorms occur, how each weather condition changes from before to after the hailstorm in most cases). Identifying outliers can be a second useful step in looking for patterns, because they can help us see when a case doesn't match the general patterns–such case(s) are relatively rare. Patterns in weather data can be very complex; most weather phenomena have more than one cause, and identifying outliers can help support this argument. Suggest to students that the general patterns we find in what is typical on most days will help us figure out the primary mechanisms causing the phenomenon in most cases.

building on 6th math

Problematize the idea that it was warm out but hail is frozen. Say, *These temperature data are really strange and hard to explain. Water freezes from a liquid to a solid when its temperature drops below 32 °F (0 °C). This is the freezing and melting point of water, because above this temperature, frozen water starts to melt. So, if the temperature near Earth's surface is well above this point all day, how is it possible that frozen water can be falling from the sky?*

building on PSI-4

Suggested prompt	Sample student response
What did you notice about where the weather data were collected?	*Air conditions are measured with stations a little above the ground (we had a photo of the weather instrument package that took the measurements).*
Based on the patterns in the data you analyzed about the air at the weather stations, was the air temperature ever that cold when it hailed?	*No, it was usually in the 60s and 70s.*
What new questions does this raise for you?	*What's it like in the air up high to be able to make ice?*

problematizing support

8 · ADD TO OUR PROGRESS TRACKERS

5 min

MATERIALS: science notebook

Set up the Progress Tracker. Tell students to take some individual time to capture what we figured out from our analysis of the hailstorm data. Have them turn to the Progress Tracker section in their notebooks. Use **slide R** to guide students in drawing a two-column chart on the first page of this section and completing the two columns.

Give students 3-5 minutes to quietly update their Progress Tracker using words and drawings to show what they've learned so far about the conditions on days when it hails. Ask students to draw a line underneath their responses when done. Prompt students to use patterns from the data they analyzed.

9 · NAVIGATION (OPTIONAL)

2 min

MATERIALS: science notebook

Consider how hail forms when temperatures are warm near the ground. Show **slide S.** Ask students to stop and jot in their notebooks about their ideas for how it is possible for hail to form and fall from the sky when the temperature in the air near the ground outside is not cold enough for water to freeze?

if continuing to L3, skip

ADDITIONAL GUIDANCE

If you are continuing to Lesson 3 on the same day as you are ending Lesson 2, you can skip this section, as it is repeated as a turn and talk in Lesson 3.

Additional Lesson 2 Teacher Guidance

SUPPORTING STUDENTS IN MAKING CONNECTIONS IN MATH

CCSS.MATH.CONTENT.6.SP.A.2 Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.

This lesson provides an opportunity for students to describe and summarize numerical data sets by summarizing or describing what a typical (average) humidity or temperature value is when hail occurs.