Weather and Seasons
Lesson 1c: Weather Patterns

Grade: Kindergarten	**Length of lesson:** 38 minutes	**Placement of lesson in unit:** 1c of 5 lessons on weather
Unit central questions: Is weather the same everywhere all of the time? How do you know?		**Lesson focus question:** What do bar graphs show us about temperature patterns in September?
Main learning goal: Counting and graphing temperature data helps reveal temperature patterns over time.		
Science content storyline: Observing and graphing weather over time can help us identify weather patterns in a specific place. Counting and graphing the number of sunny, cloudy, and rainy days on the class weather calendar revealed that Pomona has a pattern of mostly sunny weather in September. But weather also includes temperature. To help us identify temperature patterns in Pomona during September, we counted the number of hot or warm days and the number of cold or cool days on the weather calendar. We then used this data to make a bar graph. The graph clearly revealed a pattern of mostly hot or warm temperatures in Pomona during September. By looking at all of our graphs, we see that Pomona has a pattern of mostly sunny and hot or warm weather, with very little rain or wind in September.		
Ideal student response to the focus question: When we count and graph temperature data, it's easier to see weather patterns. Our bar graphs showed that Pomona has a pattern of mostly hot or warm temperatures in September.		

Preparation

Materials Needed

- Science notebooks
- Chart paper and markers
- Class weather calendar with weather data collected in September (from lessons 0a–d)
- Demonstration thermometer with sliding red ribbon to show temperature settings (from lesson 0c)
- Class picture graph of weather patterns for September (from lesson 1b)
- **Optional:** Video clip of a local weather forecast (https://www.youtube.com /watch?v=E1--PAFPtHw)

Student Handouts

- 1.1 Monthly Weather Observation Chart (from lesson 1b)
- 1.2 Pomona Weather Patterns for September (from lesson 1b)
- 1.4 Pomona Temperature Patterns for September, 8.5 × 14" (1 per student)
- 1.5 Blue, Green, Red, and Yellow Temperature Stickers, 1/2" size (1 set per student)

Ahead of Time

- Review the content background document.
- **Optional:** Find a video clip of a local weather forecast to show students if time allows (e.g., https://www.youtube.com /watch?v=E1--PAFPtHw).
- Review the PowerPoint slides and modify them as needed.
- Make sure students have plenty of the 1/2-inch blue, green, red, and yellow temperature stickers on their tables or desks for this graphing activity. If time allows, you can also give them the wind stickers and have them graph windy days.
- **ELL support:** Meet with ELL students in advance and introduce them to the lesson content, structure, materials, and activities so they know what's expected and can participate more fully in the lesson. Identify vocabulary terms in the lesson plan to review with students in advance, including *count*, *bar/picture graph*, *weather pattern*, *calendar*, *evidence*, and *compare*.

Lesson 1c General Outline

Time	Phase of Lesson	How the Science Content Storyline Develops
7 min	**Link to previous lesson:** The teacher engages students in reviewing the picture (bar) graphs they made in the previous lesson to show weather patterns in Pomona during September.	• Observing and graphing weather over time can help us identify weather patterns in a specific place. Our picture graphs showed that the weather pattern in Pomona during September was mostly sunny.
2 min	**Lesson focus question:** The teacher introduces the focus question, *What do bar graphs show us about temperature patterns in September?*	
7 min	**Setup for activity:** To help them identify temperature patterns, students count the number of hot or warm days and cool or cold days on the class weather calendar for September. Then they record this data on the weather calendar and on their Monthly Weather Observation Charts.	• By studying weather over time, we can identify temperature patterns. • One way to identify temperature patterns is to count the number of hot or warm days and cool or cold days there were in Pomona during September and then represent this data on a picture or bar graph.
10 min	**Activity:** Using their counting data, students make bar graphs to show the number of hot, warm, cool and cold days in September.	
5 min	**Follow-up to activity:** Students use their bar graphs to help them identify temperature patterns in Pomona during the month of September.	• By studying weather over time, we can identify temperature patterns in a place. • Graphing temperature data helps us see patterns more easily and provides us with more accurate evidence. In Pomona during September, the temperature pattern was mostly hot or warm.
6 min	**Synthesize/summarize today's lesson:** Students summarize what they learned about temperature and weather patterns from their bar/picture graphs. Then the teacher reviews the focus question and elicits ideas from students about how bar graphs can help them see temperature patterns.	• By studying weather over time, we can identify patterns in the weather and temperatures of a specific place. • Counting and graphing weather and temperature data helps us see patterns more easily and provides us with more accurate evidence. In Pomona during September, the weather pattern was mostly sunny and hot or warm.
1 min	**Link to next lesson:** The teacher foreshadows the next lesson in which students create a picture graph to help them identify weather patterns in Pomona during the month of January.	

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7 min	**Link to Previous Lesson** **Synopsis:** The teacher engages students in reviewing the picture (bar) graphs they made in the previous lesson to show weather patterns in Pomona during September. **Main science idea(s):** • Observing and graphing weather over time can help us identify weather patterns in a specific place. Our picture graphs showed that the weather pattern in Pomona during September was mostly sunny.		**Show slides 1 and 2.** Let's look at our class weather calendar. In September, we went outside every day to observe the weather and measure the temperature with a thermometer. Then we recorded our weather observations and temperature readings on our class weather calendar to help us look for patterns in the weather. Who can tell me what a pattern is? Yes! A *pattern* is something that happens, or doesn't happen, over and over again. Who can tell me what a *weather* pattern is? That's right. So to help us find patterns in the weather, we've been studying our weather observations to see what the weather in Pomona is like most of the time during September. **Show slide 3.** In our last lesson, we counted the sunny, cloudy, and rainy days on our weather calendar and recorded the numbers on our Monthly Weather Observation Charts. Turn to your charts in your notebooks. **NOTE TO TEACHER:** *Have students refer to*	It's something that happens again and again. It's what the weather is like most of the time.	

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		Ask questions to elicit student ideas and predictions.	*handout 1.1 (Monthly Weather Observation Chart), which they pasted in their science notebooks in the previous lesson.* Who can tell us how many sunny days there were in September? Look at the number you wrote on your observation charts for sunny days. We also wrote this number on our weather calendar. And how many cloudy days did we have? What about rainy days? **Show slide 4.** To help us find weather patterns for September, we used the numbers we counted to make picture graphs. Let's look at our picture graphs. **NOTE TO TEACHER:** *Have students locate their picture graphs from the previous lesson (handout 1.2, Pomona Weather Patterns for September).* What do you see on our picture graphs for September?	There were *[13]* sunny days. *[Two.]* We had *[three]* rainy days. The sunny days were way taller than the other days. There are more Sun stickers than any	What do you mean by "taller"?

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			What do you notice about the rainy days? What about the cloudy days? So what do our picture graphs tell us about what the weather was mostly like in September? Did our picture graphs make it easier for you to see the weather patterns? Why or why not? **NOTE TO TEACHER:** *If time allows, show students a short video clip of a meteorologist giving a weather forecast on a local TV station.*	other stickers. The stack of rain stickers is really short! The stack for cloudy days is even shorter! The weather was mostly sunny in September. Yes. It was easier to see weather patterns because the graphs showed how many sunny, rainy, and cloudy days there were.	
2 min	**Lesson Focus Question** **Synopsis:** The teacher introduces the focus question, *What do bar graphs show us about temperature patterns in September?*		**Show slide 5.** So last time, we counted how many sunny, rainy, and cloudy days we had in September. Today we'll count something else on our weather calendar. What did we do every day to see how hot or cold it was outside?	We measured the temperature using a thermometer!	

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			What did we put on our weather calendar to show how hot or cold it was outside each day?	We put different-colored thermometer stickers on our calendar.	
			That's right! We used red thermometer stickers to show hot days, yellow stickers for warm days, green stickers for cool days, and blue stickers for cold days. **NOTE TO TEACHER:** *Use the demonstration thermometer with the color scale and number labels to review what the different colors mean.* So today we'll look at our weather calendar again, but this time we'll count the number of days in September that were hot, warm, cool, or cold. Then we'll create a graph to help us see any patterns in our temperatures for September.		
		Ask questions to elicit student ideas and predictions.	What kind of graph can we use to show our temperatures?	A picture graph, like last time?	
			Yes, we can use a picture graph to show our temperatures. A picture graph is also called a *bar graph*. **Show slide 6.**		
		Set the purpose with a <u>focus question</u> or	The focus question we'll think about today is *What do bar graphs show us about temperature patterns in September?*		

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		goal statement.	**NOTE TO TEACHER:** *Write the focus question on the board and draw a box around it. Point to each word as you read the question aloud.*		
7 min	**Setup for Activity** **Synopsis:** To help them identify temperature patterns, students count the number of hot or warm days and cool or cold days on the class weather calendar for September. Then they record this data on the weather calendar and on their Monthly Weather Observation Charts. **Main science idea(s):** • By studying weather over time, we can identify temperature patterns. • One way to identify temperature patterns is to count the number of hot or warm days and cool or cold days there were in Pomona during September and then represent this data on a picture or bar graph.	Ask questions to elicit student ideas and predictions. Engage students in analyzing and interpreting data and observations.	So let's study our class weather calendar again. We put different-colored thermometer stickers on our calendar to show how hot or cold it was outside each day. Do you see any patterns? **NOTE TO TEACHER:** *Use the demonstration thermometer with the color scale to remind students of what the different colors mean.*	Yes. There are a lot of red thermometers on the top. Yes. Red means it was a hot day. We had lots of warm days, too. Because the	By "on top" do you mean on the days at the top of the calendar? And what does the red color on the thermometer tell us about the temperature that day? What else do we notice about the temperatures in September? And how do we know we had warm days?

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			So let's count the number of red thermometer stickers on our calendar that show how many hot days we had in September. Let's have someone come up and help us count all the hot days on our calendar. **NOTE TO TEACHER:** *Ask a volunteer to come up and count aloud the number of red thermometer stickers on the weather calendar. Have the rest of the class count along.* So who can tell us how many hot days there were? I'm going to write that number on our weather calendar to help us remember. Now let's count all of the yellow or warm days on our calendar. Who can tell us how many warm days we had? OK. I'll write that number on our calendar. Next, let's count the number of cool days in September. What color sticker should we look for on the calendar? **NOTE TO TEACHER:** *Use the demonstration thermometer to remind students that green*	thermometer stickers are yellow. There were *[nine]* hot days. We had *[10]* warm days. Green.	

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			thermometer stickers represent cool days, and blue stickers represent cold days. Who can tell us how many cool days there were in September? I'll write that number on our calendar too. Did we have any cold days in September? What color sticker should we look for? Do you see any cold days on our calendar? So what number should I write on our calendar for the number of cold days? Before we make bar graphs to help us see if there are any patterns in the temperatures for September, I want you to find your Monthly Weather Observation Charts in your notebooks. Now let's look at our class weather calendar to see how many hot days we counted. Who can tell me how many hot days we had in September? OK. Please write that number on your observation charts under the column that says "Month 1: September" and on the row at the bottom that says "Hot Days." **NOTE TO TEACHER:** *This might be a good time to have students count and record the number of windy days on their Monthly Weather*	There was only *[one]* cool day. Blue. No! A big zero! We had *[nine]* hot days.	
		Make explicit links between science ideas and activities **before** the activity.			

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			Observation Charts if they haven't already done so.		
10 min	**Activity** **Synopsis:** Using their counting data, students make bar graphs to show the number of hot, warm, cool and cold days in September. **Main science idea(s):** • By studying weather over time, we can identify temperature patterns. • One way to identify temperature patterns is to count the number of hot or warm days and cool or cold days there were in Pomona during September and then represent this data on a picture or bar graph.	Select content representations and models matched to the learning goal and engage students in their use. Make explicit links between science ideas and activities **during** the activity.	**Show slide 7.** Next, we'll use the numbers we counted to make bar graphs, just like scientists. Remember, a bar graph is the same as a picture graph. Our bar graphs will help us see temperature patterns in Pomona during September. When we make our bar graphs, we're going to put all of the hot and warm days together in one column and stack our stickers one above the other just like we did with our picture graphs last time. **NOTE TO TEACHER:** *Point to the stacked stickers on the class picture graph from the previous lesson.* Then we'll put all the cool and cold days together and stack the stickers one above the other. **NOTE TO TEACHER:** *Distribute handout 1.4 (Pomona Temperatures Patterns for September) and orient students to the graph format. Be sure to model the graphing activity for students.* *Use handout 1.4 (Pomona Temperature Patterns for September) as a class bar graph and show students how to count out their stickers and stack them one above the other on the graph.*		

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			Let's count the number of stickers we'll need for our graph to show the number of hot days we counted. What color stickers will we need? And how many red stickers to do we need to show the number of hot days? Look at the number of hot days we recorded on our weather calendar. OK. Let's count out our red stickers. Now put your stickers on the graph in the column with the red and yellow thermometers at the bottom that says "Hot/Warm Days." Make sure to stack your stickers one above the other in each of the numbered rows, starting with row number 1 at the bottom of your graphs. **NOTE TO TEACHER:** *Using the class bar graph, show students how to stack the red stickers on the graph, starting at the bottom.* How many stickers for warm days will we need for our graph? Look on our weather calendar to see how many warm days we counted. OK. Let's count out our yellow stickers for warm days. Now stack the yellow stickers above the red stickers in the column with the red and yellow	The red ones. We need *[nine]* red stickers. We need *[10]* yellow stickers.	

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			thermometers at the bottom. Make sure to stack the yellow stickers one above the other. **NOTE TO TEACHER:** *Demonstrate how to stack the stickers in the column for hot/warm days*. How far up the graph do the red and yellow stickers go? What is the number at the top of our stack? *[So we have 19 stickers.]* That's a big number, isn't it? Now let's put our cool and cold stickers in the column with the blue and green thermometers at the bottom that says "Cool/Cold Days." How many cool days did we have in September? Look at the number we wrote on our weather calendar. So let's take one of our green stickers and put it at the bottom of the column that says "Cool/Cold Days." Now how many cold days did we have in September? Should we put any blue stickers in this column? **NOTE TO TEACHER:** *After students have completed their graphs, check their work and make sure you've filled in the class bar graph.*	It's a *[one]* and a *[nine]*. We had just *[one]* cool day. *[Zero!]* No!	

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			You might also consider having students pair up with an elbow partner and check each other's work.		
5 min	**Follow-Up to Activity** **Synopsis:** Students use their bar graphs to help them identify temperature patterns in Pomona during the month of September. **Main science idea(s):** • By studying weather over time, we can identify temperature patterns in a place. • Graphing temperature data helps us see patterns more easily and provides us with more accurate evidence. In Pomona during September, the temperature pattern was mostly hot or warm.	Ask questions to elicit student ideas and predictions. Engage students in constructing explanations and arguments. Make explicit links between science ideas and activities	**Show slide 8.** Now that we've finished our bar graphs, can anyone tell me why we made them? Why would making a bar graph help us understand our temperatures in September? OK. So our bar graphs help us see the number of hot or warm days and the number of cool or cold days we had in September. Scientists use this type of graphs to look for patterns, and we're going to do the same thing! **Show slide 9.** Look at your bar graph. Do you see any patterns in the temperature? Remember, a *pattern* is something that happens again and again.	Because it's easy to see how tall the stickers are. How many hot and warm days we had in September. How many cool and cold days we had in September. There are lots more warm and hot days	And what does our graph help us see?

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		after the activity. Engage students in analyzing and interpreting data and observations. Engage students in communicating in scientific ways. Summarize key science ideas.	 What else do you notice? What can we say about our temperature pattern for September when we look at our graphs? So we just discovered a temperature pattern on our bar graphs that we can use as evidence. Our graphs showed that we had *[19]* hot and warm days in September compared to only *[1]* cool and cold days. This evidence supports our idea that the temperature pattern in Pomona during September is mostly hot or warm. **NOTE TO TEACHER:** *Use the actual temperature data from your class weather calendar to compare the number of hot/warm days in September with the number of cool/cold days.*	in September. The yellow and red stickers are way taller. We didn't really have any cool or cold days in September. Because there's only *[one]* green sticker and *[no]* blue stickers on the graph. It's mostly hot and warm in September.	What do you mean by "lots more?" How do we know that?

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6 min	**Synthesize/Summarize Today's Lesson** **Synopsis:** Students summarize what they learned about temperature and weather patterns from their bar/picture graphs. Then the teacher reviews the focus question and elicits ideas from students about how bar graphs can help them see temperature patterns. **Main science idea(s):** • By studying weather over time, we can identify patterns in the weather and temperatures of a specific place. • Counting and graphing weather and temperature data helps us see patterns more easily and provides us with more accurate evidence. In Pomona during September, the weather pattern was mostly sunny and hot or warm.	Ask questions to elicit student ideas and predictions. Engage students in making connections by synthesizing and summarizing key science ideas. Highlight key science ideas and focus question throughout.	**Show slide 10.** Who can tell me one thing you learned about temperature patterns today? What are some other things we learned about temperature patterns in September? **Show slide 11.** Let's revisit today's focus question*, How can we show the weather patterns in September in a different way?* First, who can tell me what a pattern is? That's right! And how did we show the temperature patterns in September? **NOTE TO TEACHER:** *As students share their ideas, write them on chart paper.*	I learned that September is mostly hot and warm. September isn't very cool or cold at all. A pattern is when you have a lot of something. Or maybe it's when something happens over and over. We made a bar graph *[or picture graph]* to show the temperatures. The warm and hot days were really tall	And what pattern did the bar graph help you see?

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				on the graph. There was only *[one]* cool and cold day on the graph.	
			Show slide 12. **NOTE TO TEACHER:** *Display the class picture graph of Pomona weather patterns for September next to the class bar graph of temperature patterns.* Now let's look at both of our graphs. What do they show us about weather patterns in Pomona during September?	It's mostly sunny. It's mostly hot or warm. There aren't many rainy days. There's only *[one]* cool day and *[no]* cold days There are only a few cloudy days.	
			What did you learn about evidence today?	Our graph gave us evidence about how many days in September were hot	

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				or warm and how many were cool or cold.	
			Great! So let's review what we've learned so far about weather. **Show slide 13.** What do these pictures tell us about weather?	We can see weather. Observe. We can feel weather. We can measure temperatures.	What word do scientists use to describe how they see weather? What else do the pictures on the slide tell us?
			So we know what the weather is like outside by looking at it, feeling it, and measuring it with a thermometer. And who can tell me what weather is? After we observed the weather and measured the temperature outside, what did we do with this information?	It's what it looks like and feels like outside. We put it on our weather calendar.	

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				We counted the number of days when it was sunny or cloudy or rainy, and then number of warm and hot days. To make our graphs. To see what the weather was like most of the time.	Why did we count the days? And why did we make graphs? What word did we use to describe what the weather is like most of the time?
			What weather patterns did we find when we looked at our graphs?	Patterns. It was mostly sunny and hot or warm in Pomona during September. And we hardly had any rain or clouds.	
		Summarize key	**Show slide 14.** We've learned a lot about weather so far! • Counting and making graphs can help us see		

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		science ideas.	weather and temperature patterns. • Our graphs showed that the weather pattern in Pomona during September is mostly sunny and warm or hot, with very few rainy or cloudy days. • We can use counting and graphs as evidence to support our ideas about weather patterns.		
1 min	**Link to Next Lesson** **Synopsis:** The teacher foreshadows the next lesson in which students create a picture graph to help them identify weather patterns in Pomona during the month of January.	Link science ideas with other science ideas.	**Show slide 15.** Next time, we'll look at our weather calendar for January and create a picture graph to help us find weather patterns. **NOTE TO TEACHER:** *If students didn't graph windy days in this lesson, they'll need to do so before starting lesson 2a so they can use handouts 1.1 (Monthly Weather Observation Chart) and 1.2 (Pomona Weather Patterns for September) in lesson 2c to compare weather patterns.*		