

Weather and Seasons

Lesson 1b: Weather Patterns

Grade: Kindergarten	Length of lesson: 33 minutes	Placement of lesson in unit: 1b of 5 lessons on weather
Unit central questions: Is weather the same everywhere all of the time? How do you know?		Lesson focus question: How can we show the weather patterns in September in a different way?
Main learning goal: Counting and graphing weather data helps reveal weather patterns over time.		
Science content storyline: By studying the September weather calendar for Pomona, we found that the weather pattern was mostly sunny and hot. But we can use a more scientific method to identify weather patterns. Data from our weather calendar can be counted and represented in a bar graph to provide more accurate evidence for weather patterns. Graphing this data helps reveal weather patterns, making the patterns more visible and easier to identify.		
Ideal student response to the focus question: When we count and graph weather data, we can see weather patterns more easily.		

Preparation

<p>Materials Needed</p> <ul style="list-style-type: none"> • Science notebooks • Chart paper and markers • Class weather calendar with weather data collected in September (from lessons 0a–d) • Optional: Video clip of a local weather forecast (https://www.youtube.com/watch?v=E1--PAFPtHw) <p>Student Handouts</p> <ul style="list-style-type: none"> • 1.1 Monthly Weather Observation Chart (1 chart per student) • 1.2 Pomona Weather Patterns for September, 8.5 × 14" (1 per student) • 1.3 Weather Stickers, 1/2" size (Students should have plenty of these on their tables or desks.) 	<p>Ahead of Time</p> <ul style="list-style-type: none"> • Review the content background document. • Optional: Find a video clip of a local weather forecast for students to watch (e.g., https://www.youtube.com/watch?v=E1--PAFPtHw). • Choose two weather-calendar months that show the most contrast in weather, probably September for lessons 1a–c and both January and September for lessons 2a–d. • Decide whether to refer to the weather graphs as either <i>picture graphs</i> or <i>bar graphs</i> for consistency throughout this lesson. • Review the PowerPoint slides and modify them as needed. • The Monthly Weather Observation Chart (handout 1.1) is sized so you can print two copies on a single page, but each student needs only one chart to paste into her or his science notebook. • In this lesson, students make picture graphs of sunny, cloudy, and rainy days. Make sure they have plenty of the 1/2-inch Sun, Cloud, and Rain weather stickers on their tables or desks for this graphing activity. If time allows, you can also give students 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 <i>count</i>, <i>graph</i>, <i>bar/picture graph</i>, <i>weather pattern</i>, <i>calendar</i>, and <i>evidence</i>.
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Lesson 1b General Outline

Time	Phase of Lesson	How the Science Content Storyline Develops
5 min	Link to previous lesson: The teacher engages students in reviewing the weather patterns they identified on their September weather calendar for Pomona in the previous lesson.	<ul style="list-style-type: none"> By studying our September weather calendar, we found that the weather pattern for Pomona was mostly sunny and hot.
1 min	Lesson focus question: The teacher introduces the focus question, <i>How can we show the September weather patterns in a different way?</i>	
5 min	Setup for activity: To help them identify weather patterns, students use the class weather calendar to count how many days in the month of September were sunny, cloudy, rainy, and windy in Pomona.	<ul style="list-style-type: none"> By studying weather over time, we can identify patterns in the weather. One way to identify weather patterns is to count the number of sunny, rainy, and cloudy days there were in Pomona during September and then represent this data on a picture graph (bar graph). This provides us with more accurate evidence of weather patterns.
10 min	Activity: Students record their counting data on a weather observation chart. Then the teacher shows students how to create a picture graph to represent their data.	
5 min	Follow-up to activity: Students use the picture graphs they constructed to help them identify weather patterns in September for sunny, cloudy, and rainy days.	<ul style="list-style-type: none"> By studying weather over time, we can identify patterns in the weather. Graphing weather data helps reveal weather patterns and provides us with more accurate evidence.
5 min	Synthesize/summarize today's lesson: Students summarize what they learned about weather patterns from their picture graphs. Then the teacher reviews the focus question and elicits ideas from students about how a picture graph can help them see weather patterns in a different way.	<ul style="list-style-type: none"> Counting and graphing weather data helps reveal weather patterns and provides us with more accurate evidence.
2 min	Link to next lesson: The teacher foreshadows the next lesson in which students use bar graphs to help them identify weather patterns for temperatures in Pomona during the month of September.	

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
5 min	<p>Link to Previous Lesson</p> <p>Synopsis: The teacher engages students in reviewing the weather patterns they identified on their September weather calendar for Pomona in the previous lesson.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> By studying our September weather calendar, we found that the weather pattern for Pomona was mostly sunny and hot. 	<p>Ask questions to elicit student ideas and predictions.</p> <p>Summarize key science ideas.</p>	<p>Show slide 1.</p> <p>In our last lesson, we looked at our class weather calendar to see if we could find out what the weather was mostly like in Pomona during the month of September.</p> <p>NOTE TO TEACHER: <i>Point to the class weather calendar.</i></p> <p>Show slide 2.</p> <p>You also drew pictures to show what the weather was mostly like in Pomona in September. What weather is like most of the time is called a <i>weather pattern</i>.</p> <p>What did you draw to show what the weather was mostly like in September?</p> <p>ELL support: Allow ELL students to discuss this question in a Turn and Talk with share-language partners, if possible.</p> <p>Did anyone draw a rainy day to show what our weather was like most of the time in September?</p>	<p>I drew a sunny day.</p> <p>There were lots of Sun stickers on the calendar.</p> <p>No, because it didn't rain very much in September.</p>	<p>Why did you draw a sunny day? What did you see on our calendar?</p> <p>How do you know that? What did you see on our calendar?</p>

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			<p>Did anyone draw wind blowing in your picture?</p> <p>And what were people doing in your picture?</p> <p>So what was the weather pattern in Pomona during the month of September?</p> <p>ELL support: Using the term <i>weather pattern</i> consistently throughout the lesson will help ELL students learn to use it correctly.</p> <p>NOTE TO TEACHER: <i>If time allows, show students a short video clip of a meteorologist giving a weather forecast on a local TV station.</i></p>	<p>There were only <i>[three]</i> rainy days in September.</p> <p>No, because there weren't very many windy days.</p> <p>There were only <i>[two]</i> windy days.</p> <p>Kids were playing outside.</p> <p>They were in T-shirts and shorts because it was so hot.</p> <p>It was mostly sunny.</p> <p>It was mostly hot.</p> <p>There were only a few clouds.</p> <p>It was dry because there was very little rain.</p> <p>There were hardly</p>	<p>How do you know that? What did you see on the calendar?</p> <p>What kinds of clothes did they have on?</p>

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				any windy days.	
1 min	<p>Lesson Focus Question</p> <p>Synopsis: The teacher introduces the focus question, <i>How can we show the September weather patterns in a different way?</i></p>	<p>Summarize key science ideas.</p> <p>Set the purpose with a <u>focus question</u> or goal statement.</p>	<p>In our last lesson, we looked for weather patterns on our class weather calendar, and then you drew pictures to show what the weather is mostly like in Pomona during September.</p> <p>Drawing pictures is one way to show weather patterns. But today we'll think about others ways we can show what the weather is mostly like in September.</p> <p>Show slide 3.</p> <p>Our focus question for this lesson is <i>How can we show the September weather patterns in a different way?</i></p> <p>NOTE TO TEACHER: <i>Write the focus question on the board and draw a box around it. Point to each word as you read the question aloud.</i></p>		
5 min	<p>Setup for Activity</p> <p>Synopsis: To help them identify weather patterns, students use the class weather calendar to count how many days in the month of September were sunny, cloudy, rainy, and windy in Pomona.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> By studying weather 	<p>Make explicit links between science ideas and activities before the activity.</p> <p>Select content representations and models matched to the learning goal</p>	<p>Sometimes it's easier to see weather patterns if we count how many days on our calendar were sunny or cloudy or rainy or windy.</p> <p>That's what we'll do next. Then I'll show you how to make a picture graph that will help you look for weather patterns.</p> <p>Show slide 4.</p> <p>Picture graphs, like the one on this slide, will show us very clearly what the weather patterns were in</p>		

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	<p>over time, we can identify patterns in the weather.</p> <ul style="list-style-type: none"> One way to identify weather patterns is to count the number of sunny, rainy, and cloudy days there were in Pomona during September and then represent this data on a picture graph (bar graph). This gives us more accurate evidence of weather patterns. 	<p>and engage students in their use.</p> <p>Engage students in analyzing and interpreting data and observations.</p> <p>Engage students in communicating in scientific ways.</p>	<p>Pomona during September.</p> <p>NOTE TO TEACHER: <i>Show students an example of a picture graph. You may also want to tell them that another name for a picture graph is a bar graph. They'll be plotting temperatures on a bar graph in the next lesson.</i></p> <p>In our last lesson, we said it was mostly sunny in September, so let's look at our class weather calendar and count how many sunny days there were.</p> <p>Can someone come up and do that while we count along with you?</p> <p>NOTE TO TEACHER: <i>Ask a volunteer to come up and count aloud the number of Sun stickers on the weather calendar. Have the rest of the class count along.</i></p> <p>Who can tell me how many sunny days we had in September?</p> <p>OK. I'm going to write that number on our weather calendar to help us remember.</p> <p>What other kinds of weather did we have in September?</p> <p>How many rainy days did we have in September? Who can count them for us on our calendar?</p>	<p>There were [13] sunny days.</p> <p>There were some rainy days.</p> <p>We had [three] rainy days.</p>	<p>Does everyone agree?</p>

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			<p>I'll write that number on our calendar to help us remember.</p> <p>What other kinds of weather can we count on our calendar?</p> <p>Who can tell us how many windy days there were?</p> <p>OK. I'll write that number on our calendar too.</p> <p>How about cloudy days? Did we have any of those?</p> <p>Let's count the number of cloudy days together.</p> <p>So how many cloudy days did we have in September?</p> <p>I'll write that number on our weather calendar to help us remember when we make our graph.</p> <p>So instead of just looking for weather patterns on our weather calendar, we counted exactly how many sunny, cloudy, rainy, and windy days there were in Pomona in September.</p>	<p>We can count how many windy days there were.</p> <p>There were <i>[two]</i> windy days.</p> <p>Yes.</p> <p>We had <i>[two]</i> cloudy days.</p>	<p>Does everyone agree?</p>
10 min	<p>Activity</p> <p>Synopsis: Students record their counting data on a</p>	Select content representations	<p>Show slide 5.</p> <p>Now let's use the numbers we counted to make picture graphs, just like scientists do. Our picture</p>		

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	<p>weather observation chart. Then the teacher shows students how to create a picture graph to represent their data.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> • By studying weather over time, we can identify patterns in the weather. • One way to identify weather patterns is to count the number of sunny, rainy, and cloudy days there were in Pomona during September and then represent this data on a picture graph (bar graph). This provides us with more accurate evidence of weather patterns. 	<p>and models matched to the learning goal and engage students in their use.</p> <p>Make explicit links between science ideas and activities during the activity.</p> <p>Ask questions to elicit student ideas and predictions.</p> <p>Highlight key science ideas and focus question throughout.</p>	<p>graphs will help us see the weather patterns for sunny, rainy, and cloudy days in Pomona during September. Remember, a <i>weather pattern</i> is what the weather is like most of the time.</p> <p>We'll use our picture graphs as evidence to support our ideas about the weather pattern in during September.</p> <p>NOTE TO TEACHER: <i>Since students learned about evidence in the Plants and Animals unit, briefly review what evidence is.</i></p> <p>Do you remember learning about evidence in our unit on plants and animals? Who can tell me what evidence is?</p> <p>Show slide 6.</p> <p>So <i>evidence</i> is something that helps us answer a question about the world around us or explain why certain things happen. Evidence can also help us figure out whether our ideas about something are correct. Today we'll use evidence from our graph to show whether our ideas about the weather patterns in Pomona are right.</p>	<p>It's like a clue that helps us figure out how something works.</p> <p>It's something that helps us answer a question or explain how things work.</p>	

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			<p>NOTE TO TEACHER: <i>Distribute handouts 1.1 (Monthly Weather Observation Chart) and 1.2 (Pomona Weather Patterns for September). These handouts will be used again in lesson 2. Have students paste the Monthly Weather Observation Chart into their science notebooks. This might take some time, but it will be easier for students to retrieve for lesson 2.</i></p> <p><i>Students will count only sunny, cloudy, and rainy days in this lesson, but if time allows, you might want to have them create graphs for windy days as well. The handouts are set up for this option, but incorporating this into the lesson will depend on how much support students need to count the weather stickers on the weather calendar and create the graph. If students don't count and graph windy days for September in this lesson, they'll need to do so in lesson 2 before completing column 2 on the observation chart.</i></p> <p>Today we're only looking at the month of September. I want you to write <i>September</i> where it says "Month 1: _____" in the middle column on your Monthly Weather Observation Chart.</p> <p>NOTE TO TEACHER: <i>In this lesson, students will only complete the first column 1 (for Month 1) on the Monthly Weather Observation Calendar. They should leave the column for Month 2 blank until lesson 2. Be sure to model the activity for students.</i></p>		

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			<p>We counted the number of sunny days. How many did we find?</p> <p>Write that number on your Monthly Weather Observation Charts under the column that says “Month 1: September” and on the row that says “Sunny Days.”</p> <p>NOTE TO TEACHER: <i>Demonstrate for students how to write numbers higher than 20.</i></p> <p>Next, I want you to count out the correct number of Sun stickers and put them on your picture graphs. That’s the handout that says “Pomona Weather Patterns for September.” I’ll help you count the Sun stickers. Then I want you to count the stickers for the cloudy days on your own.</p> <p>NOTE TO TEACHER: <i>Give students time to write the number on their observation charts and count out their Sun stickers.</i></p> <p>Now that you’ve counted out your Sun stickers, I want you to place the first sticker in row number 1 right above the words “Sunny Days.” Then place the rest of your stickers in a stack one above the other. Let me show you how.</p> <p>NOTE TO TEACHER: <i>Use handout 1.2 (Pomona Weather Patterns for September) as a class picture graph and show students how to place a Sun sticker on the first row at the bottom of the graph. Then place the remaining Sun stickers on the class graph, one above the other. After all of the stickers are</i></p>	<p>We counted [13] sunny days.</p>	

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			<p><i>stacked one above the other in the “Sunny Days” row for column 1, make sure the number of stickers and the number of rows match up. For example, if you have 15 Sun stickers, they should fill 15 rows on the chart.</i></p> <p><i>Your students probably won’t stack their Sun stickers as neatly on their own graphs, but you can model this process for them so they can be as accurate as possible. If students need help remembering how many stickers they have, they might also write a number next to each sticker.</i></p> <p>OK. Now I want you to try this on your own. How many cloudy days did we count on our weather calendar?</p> <p>Write that number on your Monthly Weather Observation Charts under the column that says “Month 1: September” and on the row that says “Cloudy Days.”</p> <p>Now count out your cloud stickers and put them on your picture graphs in the column that says “Cloudy Days.” Start at the bottom and place the stickers one above the other just like I showed you. If you need help, raise your hand.</p> <p>NOTE TO TEACHER: <i>Give students time to record the number of cloudy days on their charts, count their cloud stickers, and place them on their picture graphs. As students are working, circulate around the room and make sure they’ve written the correct numbers on their charts and have counted</i></p>	<p>[Two.]</p>	

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			<p><i>the correct number of stickers for their picture graphs. If time allows, you could have them record and graph the number of windy days as well.</i></p> <p>Now that our graphs show how many sunny days and cloudy days we had in September, let’s put the rainy days on our graphs. How many rainy days did we count on our weather calendar?</p> <p>Write that number on your Monthly Weather Observation Charts under the column that says “Month 1: September” and on the row that says “Rainy Days.”</p> <p>Which stickers should we use for the rainy days?</p> <p>So let’s count out the number of rain stickers you need and stack them on our picture graphs in the column that says “Rainy Days.”</p> <p>NOTE TO TEACHER: <i>After students have completed their graphs, check their work and make sure to complete the class picture graph. You could also have students pair up with an elbow partner and check each other’s work.</i></p>	<p>We had [<i>three</i>] rainy days.</p> <p>The rainy ones!</p>	
5 min	<p>Follow-Up to Activity</p> <p>Synopsis: Students use the picture graphs they constructed to help them identify weather patterns in September for sunny, cloudy, and rainy days.</p>	<p>Ask questions to elicit student ideas and predictions.</p> <p>Engage</p>	<p>Show slide 7.</p> <p>Now that we’ve finished our graphs, can anyone tell me why we made them? Why would making a picture graph help us understand the weather?</p> <p>NOTE TO TEACHER: <i>During this discussion, it might be helpful to project an accurately completed</i></p>	<p>Because it’s easier to see what the weather was like most of the time if</p>	

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	<p>Main science idea(s):</p> <ul style="list-style-type: none"> • By studying weather over time, we can identify patterns in the weather. • Graphing weather data helps reveal weather patterns and provides us with more accurate evidence. 	<p>students in constructing explanations and arguments.</p> <p>Make explicit links between science ideas and activities after the activity.</p> <p>Highlight key science ideas and focus question throughout.</p> <p>Engage students in analyzing and interpreting data and observations.</p> <p>Engage students in communicating in scientific ways.</p>	<p><i>picture graph on a document reader or Elmo projector so that everyone is looking at the same graph.</i></p> <p>OK. So our picture graphs help us see the number of sunny days and cloudy days we had in September. Scientists use this type of graph to look for patterns, and we're going to do the same thing!</p> <p>Look at your picture graph. Do you see any patterns? Remember, a <i>pattern</i> is something that happens again and again.</p> <p>So the stack of Suns is greater than the stack of clouds. Did anyone else notice that on your graph?</p> <p>What do you think it means that there are more Suns than clouds on our picture graphs?</p>	<p>we look at a picture graph.</p> <p>It helps us see that there are lots more Sun stickers than cloud or rain stickers.</p> <p>The Sun stack is bigger than the cloud stack.</p> <p>Yeah. The Suns are taller, and the cloud stack is shorter.</p> <p>There are more Suns than clouds.</p> <p>My graph shows the same thing.</p> <p>That it's really sunny?</p>	<p>What does our graph help us see?</p> <p>What do you mean by "taller"?</p> <p>Does anyone agree or disagree?</p>

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			<p>Show slide 8.</p> <p>So we just discovered a weather pattern on our picture graphs that we can use as evidence. Our graphs show that we had [13] sunny days in September, and only [two] cloudy days and [three] rainy days. This evidence supports our idea that the weather pattern in Pomona during September is mostly sunny.</p> <p>NOTE TO TEACHER: Use the data from your class weather graph when you summarize the number of sunny, cloudy, and rainy days you had in September.</p>	<p>There are a lot of Suns because most days were sunny in September!</p>	
5 min	<p>Synthesize/Summarize Today's Lesson</p> <p>Synopsis: Students summarize what they learned about weather patterns from their picture graphs. Then the teacher reviews the focus question and elicits ideas from students about how a picture graph can help them see weather patterns in a different way.</p>	<p>Ask questions to elicit student ideas and predictions.</p> <p>Engage students in making connections by synthesizing and summarizing</p>	<p>Show slide 9.</p> <p>Who can tell me one thing you learned about weather patterns today?</p> <p>What are some other things we learned about</p>	<p>I learned that September is a very sunny month.</p> <p>Me, too!</p> <p>I learned that we don't have many clouds in September.</p>	

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	<p>Main science idea(s):</p> <ul style="list-style-type: none"> Counting and graphing weather data helps reveal weather patterns and provides us with more accurate evidence. 	<p>key science ideas.</p> <p>Highlight key science ideas and focus question throughout.</p>	<p>weather patterns?</p> <p>Show slide 10.</p> <p>Let's revisit today's focus question, <i>How can we show the weather patterns in September in a different way?</i></p> <p>First, who can tell me what a pattern is?</p> <p>That's right! And how did we show the weather patterns in September in a different way?</p> <p>NOTE TO TEACHER: <i>As students share their ideas, write them on chart paper.</i></p>	<p>It doesn't rain much here in September.</p> <p>A pattern is when you have a lot of something.</p> <p>It's when something happens over and over.</p> <p>We made a picture graph to show how many Suns and clouds there were.</p> <p>That the Suns stack was way taller than the clouds stack.</p> <p>That there are more Suns than clouds.</p>	<p>And what pattern did the picture graph help you see?</p> <p>And what do you think "more Suns than clouds" means? What weather pattern does it show</p>

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		Summarize key science ideas.	<p>What did you learn about evidence today?</p> <p>NOTE TO TEACHER: <i>Students' ideas about evidence are likely to be pretty vague at this point. This is an idea they will come to understand after multiple exposures to the idea in a variety of science contexts.</i></p> <p>Great! So let's review what we learned today.</p> <p>Show slide 11.</p> <ul style="list-style-type: none"> We learned that scientists count and make graphs to find weather patterns. Like scientists, we counted the number of sunny days, cloudy days, and rainy days on our weather calendar and showed them on a picture graph to help us see patterns in the weather. 	<p>It means that it's sunny most of the time in September.</p> <p>Counting is evidence.</p> <p>Our graph gave us evidence about how many days in September were sunny, cloudy, and rainy.</p> <p>It's more like what scientists do.</p> <p>It helps us answer a question or explain something.</p> <p>It tells us whether our ideas are right.</p>	<p>us?</p> <p>And what is evidence?</p>

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			<ul style="list-style-type: none"> • Our graphs showed that the weather pattern in Pomona during September is mostly sunny. • And we learned that we can use counting and picture graphs as evidence to support our ideas about weather patterns. 		
2 min	<p>Link to Next Lesson</p> <p>Synopsis: The teacher foreshadows the next lesson in which students use bar graphs to help them identify weather patterns for temperatures in Pomona during the month of September.</p>	<p>Link science ideas to other science ideas.</p> <p>Ask questions to elicit student ideas and predictions.</p> <p>Ask questions to probe student ideas and predictions.</p>	<p>Show slide 12.</p> <p>In our next lesson, we'll use counting and a kind of picture graph called a <i>bar graph</i> to help us look for weather patterns in our September temperatures.</p> <p>What weather patterns do you think we'll find when we look at our temperatures?</p>	<p>I think we'll find that it's mostly hot in Pomona.</p> <p>Because it's mostly sunny in Pomona in September, and sunshine makes it hot.</p> <p>I think there will be mostly warm days, not hot days.</p> <p>Because when it's sunny, it's not always hot. Sometimes it's sunny and warm.</p>	<p>What makes you think that?</p> <p>What do others predict?</p> <p>Why do you think that?</p>

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			<p>We'll find out if our predictions are right next time.</p> <p>NOTE TO TEACHER: <i>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.</i></p>		