

5th Grade Math

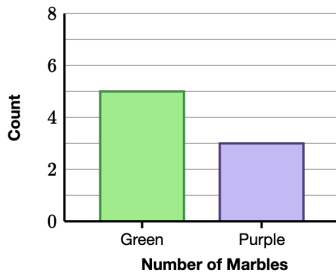
Unit 14: Representing data

5.9A, 5.9B, 5.9C

Bar graphs, dot plots, frequency tables, and scatter plots help students visualize and interpret data, find trends, compare quantities, and understand frequencies. These skills are crucial in a variety of real-world contexts.

- Create visual representations of data such as bar graphs, dot plots, frequency tables, and scatterplots
- Interpret and answer questions about information in bar graphs, dot plots, frequency tables, stem-and-leaf plots, and scatterplots



TEKS standards	Common misconceptions
<p>5.9A: Represent categorical data with bar graphs or frequency tables and numerical data, including data sets of measurements in fractions or decimals, with dot plots or stem-and-leaf plots</p>	<p>Not understanding “how many more” and “how many less” These phrases can be tricky. They are both asking for the difference between two numbers, but students must be able to interpret them and write the answer correctly.</p> <p>How to help: Review these phrases and others—like “greater than,” “less than,” “fewer than”—so students are clear about what they mean. Review the language as often as necessary. Encourage students to rephrase the question into a statement to help them better understand what the question is asking.</p> <div style="display: flex; align-items: center; justify-content: center;">  <div style="margin-left: 20px;"> <p>For example, the answer to “How many more green marbles are there than purple marbles?” is “There are 2 more green marbles than purple marbles.”</p> <p>The answer to “How many fewer purple marbles are there than green marbles?” is “There are 2 fewer purple marbles than green marbles.”</p> </div> </div> <p>Forgetting to look at the the labels and scale The labels on the axes of bar graphs, dot plots, and scatterplots are super important. They tell us what each bar or dot represents. The scale tells us how to count the quantities. If students forget to look at them, they may misinterpret the whole graph.</p>
<p>5.9B: Represent discrete paired data on a scatterplot</p>	
<p>5.9C: Solve one- and two-step problems using data from a frequency table, dot plot, bar graph, stem-and-leaf plot, or scatterplot</p>	

How to help: The *first* thing students should do when looking at a new graph is to read the labels and identify what information the graph is presenting. This is crucial before jumping into answering questions. Encourage students to slow down and understand the graph *first*. For example, they need to identify if the 5 lines they see represent 5 or 50 or something else.

Misunderstanding of fractions | Some students might not fully grasp the concept of fractions yet. For example, they might think a larger denominator means a larger fraction, which isn't always true. When plotting fractions on a dot plot, students might have trouble figuring out where to place them, especially if the fractions have different denominators.

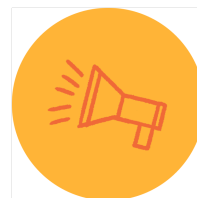
How to help: Give students opportunities to practice ordering fractions, placing them on a number line, and adding, subtracting, and multiplying them. Reinforce that a fraction represents a part of a whole. Warm up activities are great places for fraction review.

Confusing frequency with the data | Students might confuse the frequency (how often a data point appears) with the data point itself. When given a frequency table to make a dot plot, the numbers in the frequency table tell us *how many* dots to include above each number on the axis.

How to help: Clarify that a data point is the raw data while the frequency is how many times each data point appears in the set. Encourage students to read the labels for a table so they know whether it is a frequency table or not. Have students practice converting frequency tables into raw data sets and vice versa.

Misunderstanding zero | When a data point is 0, students might simply ignore it, but 0 is a valid data point! It's important to include 0 in the table and dot plot. We can't just ignore pieces of data!

How to help: Talk with students about the importance of *all* of the data points in a set. If we drop numbers, we no longer have complete data. For example, if we collect data on the number of siblings that classmates have, 0 is a valid answer (no siblings) that we need to keep track of.












Unit resources

- For the videos in this unit, use the [Learning summary video notetaking guide](#).
- For the articles in this unit, use the [Article notetaking guide](#).
- For the exercises in this unit, use the [Blank workspace template](#).
- To record key terms and information, use the [Vocabulary and notation notetaker](#).



Lesson overview

Lesson	Objective	Teaching tips
<p>Lesson 1: Bar graphs</p> <p>TEKS standard: 5.9A, 5.9C</p> <p>Video 4 Article 2 Exercise 3</p>	<p>Students will be able to make a bar graph given data, including scaling appropriately.</p> <p>Students will be able to interpret bar graphs.</p>	<ul style="list-style-type: none"> • The articles provide step by step instruction in making bar graphs with practice problems along the way. If students need extra support, these are great resources. • Encourage students to read the problems in the exercises carefully to understand what is being asked. The questions require comparisons of different values that students will need to read from the graph. The last exercise in particular will take focused reading and interpretation as they take multiple steps to answer.
<p>Lesson 2: Dot plots</p> <p>TEKS standard: 5.9A, 5.9C</p> <p>Video 5 Article 0 Exercise 5</p>	<p>Students will be able to make dot plots.</p> <p>Students will be able to interpret dot plots and answer questions about them.</p>	<ul style="list-style-type: none"> • Warm up activity: Give students number lines with tick marks but some missing labels and have them fill in the missing numbers (include fractions). <div style="text-align: center; margin: 10px 0;"> </div> • The terms “dot plot” and “line plot” are used interchangeably in this unit. The term “dot plot” is used throughout this unit guide. • Before the first exercise, review the difference between a table with raw data and a frequency table. Students make a dot plot from data and need to pay attention to the labels in the table to know what type of table it is. • For students who have trouble with the second exercise, measuring objects with a ruler, provide extra practice by giving them a ruler and asking them to find the length of various objects in the

		<p>classroom (paper clip, stapler, etc.).</p> <ul style="list-style-type: none"> As in the previous lesson, encourage students to read the problems very carefully, especially in the last exercise. They should make an action plan before starting to solve since many of the problems are multi-step. 												
<p>Lesson 3: Frequency tables</p> <p>TEKS standard: 5.9A</p> <p>Video  2 Article  0 Exercise  2</p>	<p>Students will be able to create frequency tables.</p> <p>Students will be able to interpret frequency tables and answer questions about them.</p>	<ul style="list-style-type: none"> Students saw frequency tables in the previous lesson and they'll be making their own here, given a set of data. Model how to make a frequency table and offer methods for keeping track of the numbers so that some aren't missed or double counted, like crossing them out. It may be helpful to rewrite the data in order from least to greatest as a first step. 												
<p>Lesson 4: Stem-and-leaf plots</p> <p>TEKS standard: 5.9C</p> <p>Video  2 Article  0 Exercise  0</p>	<p>Students will be able to read stem-and-leaf plots.</p>	<ul style="list-style-type: none"> This lesson is an introduction to stem-and-leaf plots. Students will learn how to read and interpret them. Do some examples where you expand the stem plot to show what each stem-and-leaf plot entry means. <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: left;">Stem-and-leaf plot</th> <th style="text-align: left;">Expanded</th> </tr> </thead> <tbody> <tr> <td style="border-left: 1px solid black; padding-left: 5px;">0 7</td> <td>→ 07</td> </tr> <tr> <td style="border-left: 1px solid black; padding-left: 5px;">1 1 4 8</td> <td>→ 11 14 18</td> </tr> <tr> <td style="border-left: 1px solid black; padding-left: 5px;">2 5 5 5 6 7 7 9</td> <td>→ 25 25 25 26 27 27 29</td> </tr> <tr> <td style="border-left: 1px solid black; padding-left: 5px;">3 </td> <td>→</td> </tr> <tr> <td style="border-left: 1px solid black; padding-left: 5px;">4 </td> <td>→</td> </tr> </tbody> </table>	Stem-and-leaf plot	Expanded	0 7	→ 07	1 1 4 8	→ 11 14 18	2 5 5 5 6 7 7 9	→ 25 25 25 26 27 27 29	3	→	4	→
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<p>Lesson 5: Scatterplots</p> <p>TEKS standard: 5.9B</p> <p>Video  1 Article  0 Exercise  1</p>	<p>Students will be able to determine which scatterplot best represents given data by analyzing the axes labels and plotted points.</p>	<ul style="list-style-type: none"> Warm up activity: Give students 4-6 points in a table or written as coordinate pairs to graph on a coordinate plane (quadrant I only). Scatterplots created on coordinate planes, so make connections with students from their work in Unit 13: Patterns on a coordinate plane. Look for the common error of mixing up the x- and y-axes (or plotting the points in the incorrect order). 												

TRY THIS
WITH YOUR STUDENTS

Best practices



CLASSROOM ACTIVITIES

Bring dot plots to life!

A fun activity is to make a dot plot from student data. Choose a topic like height, shoe size, preferred time to wake up on the weekend, etc. (when choosing a topic, make sure that whatever you choose won't make any students uncomfortable). Collect an answer from each student, who will be one "dot" on the dot plot. Have students make a frequency table and a dot plot from the data. Groups of students can also come up with their own question to ask of the class and then collect their data, make a frequency table, dot plot, and present their findings to the class. This can also be a home activity to engage families!

Student-led data collection

Have students (individually, in pairs, or small groups) choose a question they want to answer and let them collect their own data. This is a great opportunity for student agency and curiosity. Before students begin collecting data, it's a good idea to vet their proposed question. Give a minimum number of data points, say 10-20, and let them ask classmates, family members, or community members. They can create bar graphs, dot plots, frequency tables, stem-and-leaf plots, and/or scatterplots to represent their findings. Have students create a poster and/or give presentations. Extend the activity by asking students to explain which type of graph best represents their data.

GENERAL CLASSROOM IMPLEMENTATION RESOURCES:

- [Weekly Khan Academy quick planning guide](#): Use this template to plan your week using Khan Academy.
- [Using Khan Academy in the classroom](#): Learn teaching techniques and strategies to support your students and save time with Khan Academy.
- [Differentiation strategies for the classroom](#): Discover strategies to support the learning of all students.