Great Graphs and Smart Charts: Pre-K to Grade 3



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2023 California Early Math Symposium June 23, 2023

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- -Instructional coaching
- -Increasing family/home engagement
- -Increasing student engagement

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- -Increasing student engagement
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HarperCollins Children's Books: MathStart 63 Books

Charlesbridge Publishing: I SEE I LEARN 16 books Show and Tell!: Great Graphs and Smart Charts

Savvas Learning (Pearson Education): enVisionMATH Three Cheers for Pre-K



Content:

- Data collection in early math education:
 Why is it important?
- How to collect, organize, and represent data:

Making data meaningful.

- Different types of charts and graphs:
 Different ways to display data.
- Infographics

What they are and how to create them.

Classroom Examples











Bar Graphs

Graphs that use parallel bars to show data are called bar graphs. They are especially good for showing and comparing data that can easily be separated into items or categories.

It might be fun to know which meal is most popular among your family and friends. First, make a list of some favorites.

I 💐 Burritos.

AF

It's Pizzas for Me!





Take a poll. Ask everyone you know which of these meals they like best. Keep track with tally marks, and then add them up. You can make a chart, sometimes called a table, to show your data.

ONE VOTE PER PERSON.

TALLY	TOTAL	
	10	
	21	
	15	
JHT111	8	DOGS DON'T COUNT!
	18	
	13	
	Image: Second	TALLY TOTAL ##T ##T 10 ##T ##T ##T 21 ##T ##T ##T 15 ##T ##T ##T 15 ##T ##T ##T 18 ##T ##T ##T 13





art

Infographic

tasty

- 1. Draw a large L on your paper. The vertical line is called the y-axis and the horizontal line is the x-axis.
- 2. List the meals along the bottom (the x-axis).
- 3. List the number of votes up the side (the y-axis) by fives (from 0 to 25 with four tick marks in between each number).
- 4. Use the data you collected and draw bars for each meal.
- 5. Be sure to add labels and a title.

How Many people picked pizza or burritos?



PICTOGRAPHS

16

THESE FIVE ARE THE MOST COMMON HERE?

Pictographs use pictures to represent the data shown on a graph. Let's say the members of your science club want to know which are the most common household pets in your school. Recent statistics show that in the United States fish are at the top of the list. That's because people usually own more than one fish at a time! After fish, the four most common pets are cats, dogs, birds, and hamsters or other small mammals.

THER

GO

SOME

The students made a chart. In the first column, they listed the five most popular pets in alphabetical order. They created pictures of each pet. After visiting every classroom, they found that the pet populations of these five pets in their schools' families came out like this:

I FOUND A

PETS	PICTURES	APPROXIMATE QUANTITIES	ALL FIVE FETS.
Birds	•••	10	
COIS	>****	45	
DOGS		40	
Fish		60	
HOLMSTERS	***	25 THAT LIKE	17 17 17
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- 1. Draw a large L on a blank piece of paper.
- 2. List the pets down the side and draw pictures of the animals in a row.
- 3. Include a key showing that each full picture represents ten pets and each half picture represents five.
- 4. Be sure to add labels and a title.

ADD SOME ART AND A SPUNKY TITLE TO CREATE A PET-FRIENDLY INFOGRAPHIC.



Now let's try a pie chart using percentages. A percentage is a way of expressing a fraction when the whole is 100 equal parts. Each segment of the pie chart represents a percent of the whole, or a number out of 100. The total segments must add up to 100. A percentage is followed by the percent sign: %.

Assume there are 100 kids signed up for a town athletic program. The program director has asked everyone to select one of four sports. The choices are basketball, swimming, soccer, and track. The number of kids who signed up for each of the choices is posted. The number is also shown as a percent. For example, 40 out of 100 is the same as the fraction $\frac{40}{100}$, which is 40%.



SOCCER ALL THE WAY!

SPORT	NUMBER OF KIDS	FRACTION	PERCENT
SOCCER	40	<u>40</u> 100	40%
TROJCK	30	<u>30</u> 100	30%
BOJKETBOLL	20	20 100	20%
SWIMMING	10	<u>10</u> 100	10%
TOTOLS	100	<u>100</u> 100	100%
THAT'S A LOT OF KIDS. AND A LOT OF FUN!			





2. Divide the circle into ten equal parts. Each part represents 10%. 3. Use four different colors to show the percentages for each sport.

4. Be sure to add labels and a title.

Show the results by creating a pie chart.



Which sport has the most participation?



Swimming is just half of basketball's percent.

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You can tell how the sports Compare just by looking at It.



Line graphs

Line graphs can show things that change over time, like the number of miles traveled during a trip, temperature changes throughout the seasons, or the rising population of a town or city over a number of years. They can be helpful in showing patterns and predicting trends. Suppose your family is going to visit your cousins. You really want to see them, but it takes the better part of the day to get there.



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First you'll have to collect data. You can check the distance traveled for each one-hour leg of the trip on the car's odometer. Then make a table or chart with three columns, one for time period, one for the approximate distance traveled each hour, and one for the total distance traveled.

The total distance is calculated by adding each new hour's miles to the previous hour's total trip distance.

Ti me Peri od	Hourly Distanc e in miles	Total M iles Traveled
8:00 - 9:00	40	40
9:00-10:00	60	100
10:00-11:00	40	140
11:00-12:00	60	200
12:00 - 1:00	0	200
1:00 - 2:00	50	250
2:00 - 3:00	70	320
3:00 - 4:00	30	350

Your chart might look something like this:





1. Make a big L shape. In line graphs, the horizontal line on the bottom is called the x-axis, and the vertical line on the side is called the y-axis.

- 2. List the hours from 8:00 a.m. to 4:00 p.m. along the x-axis and the miles from 0 to 350 at fifty-mile intervals with tick marks for every ten miles on the y-axis.
- 3. Use the data you collected to make a graph. Mark the points on the graph and then connect them with lines. You may want to use a ruler.
- 4. Be sure to add labels and a title.

Let's use a piece of graph paper for this one.

> Add some art and a spunky title to create a zippy Infographic.



why is the line between 2:00 and 3:00 steeper than the line between 3:00 and 4:00?



Where is the line flat? Why?



The steeper our line, the faster we're going!



NING 22

Great data is available throughout each day

Here are examples from preschool – primary

grades:







THE VERY



Choosing their favorite fruit from the story.



Choosing their favorite fruit from the story. -Only 8 students -Pick top 2



Choosing their favorite fruit from the story.



Notice and Wonder should be occurring at each step of this activity.

2-column graph "How can we organize this?





What do you notice?

What do you wonder?



What is happening here? Notice the perspectives.



What is happening here? Notice Jon's hand.



I also had a 3column chart and suggested it might help.

Then I ask about how many types of fruits there were (6), and how to improve our chart.







Final Product

What questions might be asked here?

Notice and Wonder should be occurring at each step of this activity.



Favorite color post-it note



Same 8 students.

Choose your favorite color post-it.



Students placed their post-it.

How did the graph change between these two pictures?





Favorite Vehicle



Pictograph & Bar Graph

Students chose their two favorite vehicles.

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I suggested a chart with 4 columns.



We talked about equality of space and how to make it easier to read visually.

This was NOT an easy conversation...

- I should have allowed students time to play with the vehicles.
- 2. We were all too close to the action.





I suggested a chart that was already broken into cells.

I place the 4 vehicles at the bottom to show where to place their chosen vehicles.



Notice: Whose hands are moving the vehicles around?





FI





I printed this circle from an online search. My plan was to place the vehicles either inside the circle, on the circle, or outside the circle.









Goal: Count, compare foods, and collect data.

What to do:

- Put one tablespoon of yogurt on your plate. Add 1/4 teaspoon of maple syrup and mix.
- On another part of your plate, put one tablespoon of yogurt. Add 1/8 teaspoon of dried dill and garlic powder and mix.
- · Use tongs to pick up:
 - · 1 celery stick
 - 2 apple slices
 - · 3 bell pepper strips
 - · 4 cucumber slices
 - 5 carrot circles
- Taste each type of food by itself and with each of the dips.
- · Compare and talk about the dips.
 - · Which dip did you like best?
 - · What words do you think describe the dips?

38

202

8%8

3%8

- · How are the dips similar?
- · How are they different?
- · Which of these foods was your favorite? Why?
- · Place a tally mark on the chart next to your favorite food.
- · Predict which food the taste testers will like best.

Tally Marks Preschool (age 3-5)

Family Math Night at a preschool.

6 stations. This one involved graphing.



Family Math Night at a preschool.

First: Read the book *Bee-bim Bop!* as a family.







Family Math Night at a preschool.

Make a tally mark to show your favorite food.





Things got more relaxed as the evening progressed.



Things got more relaxed as the evening progressed.

Consider, what might a bar graph have looked like?

Alternate make a dip and have them taste that also.





Line Graph: 2nd Grade

















Teacher comments:

- "Fun to ask students to comment on what they notice both about the trends, but also what they 'see'."
- I hadn't done any line graphs, it has all been bar graphs and pictographs."
- "The students were excited to be a part of the data. They would come into class and want to immediately want to talk about what they wore."
- "I liked seeing them predict the trends by talking about weather."

Organize Data

Infographics

Collect Data Create Graph



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Special Follow-Up Announcement:

- As an attendee, you are invited to create your own data collection project with your students.
- The result should be a graph or chart that is incorporated into an Infographic.
- If you would like to submit a project, please use this link.
- If you have questions, write to Jon Dueck at jdueck@fcoe.org.
- The first 50 respondents will receive a free copy of *Show and Tell! Great Graphs and Smart Charts* for your submission.
 - Our apologies, shipping is only available within the United States.
 - Deadline: October 20, 2023

Thank you!

