

Title: Bugs, Giraffes, Elephants and More

Level: Elementary Grades

Connections to Common Core Standards:

Grade 4 Measurement & Data

4. Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Solve problems involving addition and subtraction of fractions by using information presented in line plots.

Mathematical Practice:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.

Supplies Needed:

Rulers in cm./inches and meter/yard sticks. Provide access to the internet or resources to look up typical lengths if needed.

Launch:

Make sure that the students have made line graphs. Collect some data from the students and make a line graph. Look at a number line divided in quarter lengths and make sure the students can read the lengths.

Explore:

Students should work with a partner to research and make decisions. Make sure they discuss all options. If they are having trouble making decisions they could use the research materials to help investigate sizes.

Summary of the Mathematics:

Students will learn that $\frac{1}{2} = \frac{2}{4}$. They will be able to create and interpret line graphs. The final steps will ask them to calculate with fractions and lead into basic statistics that will be used at the next grade level.

Extensions:

Students could research a property that is measured to the nearest quarter of a unit and create their own line graph.

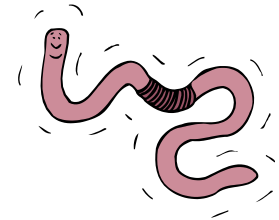
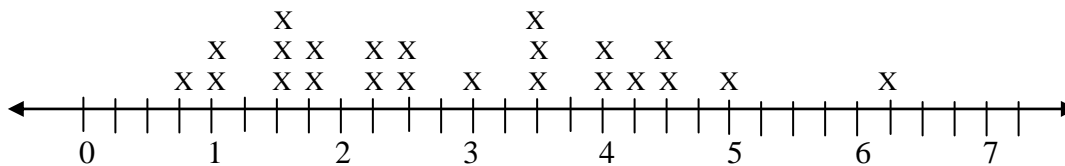
Bugs, Giraffes, Elephants and More (Pre-Activity)

Width of My Pencil: Ask students to get out a ruler and measure the length of one of their pencils to the nearest quarter of an inch. Have the students select pencils that they have been using so there will be variability. Check the measurement with their partner and then put the measurement on the board where all the students will have access to it. After arranging the data from least to greatest, the group will create a line graph to the quarter of an inch. Time should be spent discussing how it is created, what the data means and how it can be interpreted. Possible questions; If we were to select two pencils and placed them end to end what are some of the lengths we could obtain? What is the shortest length? What is the longest? What length came up the most (mode)? What is the difference between the longest and shortest pencil (range)? Why do you think there are so many different lengths?

In Our Class: Pair the students and ask them to select two items in the classroom that are less than one foot long. Each of the partners should measure the item to the nearest quarter of an inch. Once they have agreed on the length they should put the name and length on the board. Partners should then work together to create their line plot of the data. Partners could then compare their plots with another pair of students. Each pair would then create question for the other students in the class to answer based on the line plot. Spend time sharing and answering the questions.

Read my Line Plot: Share the line plot with the class. Ask them to write down the value of all of the numbers on the plot and then answer the following questions.

Length of My Earthworm in Inches

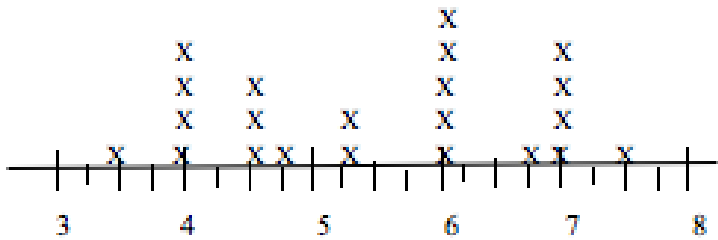


1. How many worms were measured?
2. List all the lengths of the worms?
3. What was the shortest worm? The longest worm?
4. What is the difference between the longest and shortest worm?
5. List 3 different lengths you could get if you were to put two worms end to end and measure. Show your work.
6. Why are they so different?

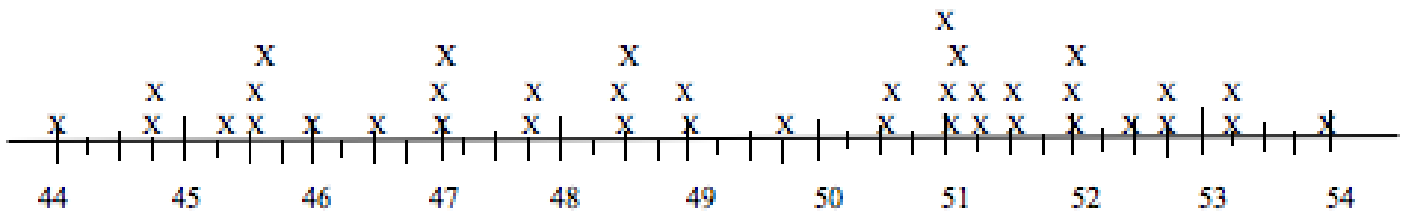
Bugs, Giraffes, Elephants and More

Look at the five line plots below. Each graph shows something from the data collected in a fourth grade class.

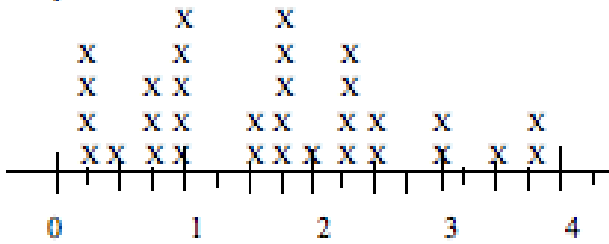
Graph 1



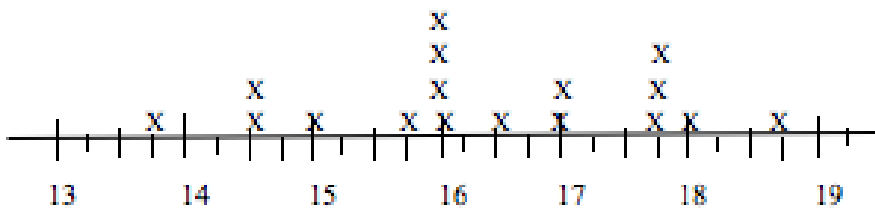
Graph 2



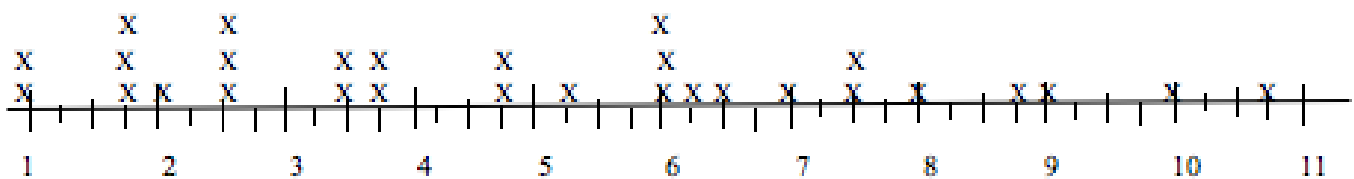
Graph 3



Graph 4



Graph 5



1. Which of the graphs do you think shows:

- a. The length of bugs in centimeters collected on the last field trip? _____
- b. The height of adult giraffes in feet? _____
- c. The height of fourth graders in inches? _____
- d. The weight in tons of adult elephants? _____

2. Explain why you think the graph you picked for c is the one that shows the heights of fourth graders.

3. Why do you think that other graphs **don't** show the fourth graders heights?

4. Which graph was not used? _____ What data do you think is shown? Explain.

5. Look at graph 4.

- e. How many individuals are represented? _____
- f. What is the largest measured individual? _____
- g. What is the smallest? _____
- h. Find the difference between the largest and the smallest? _____
- i. What value has the most individuals? _____ How many? _____

6. Look at graph 1.

- j. How many individuals are represented? _____
- k. What is the largest measured individual? _____
- l. What is the smallest? _____
- m. Find the difference between the largest and the smallest? _____
- n. What value has the most individuals? _____ How many? _____