

KEY CONCEPT OVERVIEW

This topic focuses on data distributions (data sets) that are skewed (i.e., the tail is toward the smaller or larger value). Students will use the **median** as a measure of center and the **interquartile range (IQR)** as the measure of variability to describe these data distributions. Students calculate the values in the five-number summary (minimum, **lower quartile**, median, **upper quartile**, and maximum) of a data distribution in order to make a **box plot** and to interpret and compare data distributions.

You can expect to see homework that asks your child to do the following:

- Use data presented in a table or a dot plot to calculate the mean, median, and IQR of a data set.
- Create a data set with a specified number of values that satisfies certain characteristics, such as where the IQR is equal to the range (maximum minus minimum).
- Given a set of data, analyze the effect that adding certain values to the data set would have on the IQR.
- Analyze the differences between data represented in a dot plot and other data represented in a box plot.
- Given a dot plot or a set of data, determine the values in the five-number summary and use those values to create a box plot.
- Describe the center and spread (variability) of a box plot and use a box plot to answer real-world questions.

SAMPLE PROBLEM (From Lesson 15)

The maximum speeds of selected birds are given in the table.

a. Describe the variability in the birds' speeds. Explain your reasoning.

It looks like the maximum speeds of the birds vary significantly since they go from 60 mph to 242 mph.

b. Determine the five-number summary for the speeds in the data set. What does the five-number summary tell you about the distribution of speeds for the data set?

Five-number summary: Min = 60, Q1 = 76, Median = 97.5, Q3 = 105.5, Max = 242

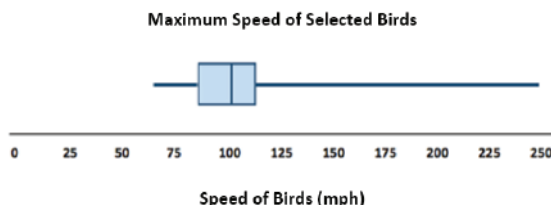
The summary gives me a sense of the range, or span, of the speeds (maximum speed minus minimum speed) and how the speeds are grouped around the median.

Maximum Speeds of Selected Birds

| Bird | Speed (mph) |
|----------------------------|-------------|
| Peregrine falcon | 242 |
| Swift | 120 |
| Spine-tailed swift | 106 |
| White-throated needle tail | 105 |
| Eurasian hobby | 100 |
| Pigeon | 100 |
| Frigatebird | 95 |
| Spur-winged goose | 88 |
| Red-breasted merganser | 80 |
| Canvasback duck | 72 |
| Anna's hummingbird | 61.06 |
| Ostrich | 60 |

SAMPLE PROBLEM *(continued)*

c. Use the five-number summary to make a box plot for the data set.



d. Write several sentences describing the speeds of the birds.

Answers will vary. One bird listed in this table has a very high maximum speed (i.e., the falcon, at 242 mph). Three-fourths of the birds fly slower than 106 mph, and the slowest bird flies 60 mph.

Additional sample problems with detailed answer steps are found in the *Eureka Math Homework Helpers* books. Learn more at GreatMinds.org.

HOW YOU CAN HELP AT HOME

You can help at home in many ways. Here are some tips to help you get started.

- Challenge your child to create a data set with seven or more values, in which the minimum is 5, the range is 20, and the median is 16 (e.g., 5, 7, 10, 16, 19, 22, 25 or 5, 5, 15, 16, 21, 24, 25).
- Invite your child to create a data set with at least 10 values and then determine the five-number summary. (See Sample Problem.) Have your child sketch a box plot to represent the data and describe the variability and center of the data. Ask, “What information does the interquartile range give you about the data?” (It tells you how spread out the data are.)

TERMS

Interquartile range (IQR): A measure of variability for skewed data distributions that describes how spread out the middle 50 percent of the data are. The IQR is calculated by subtracting the lower quartile (Q1) from the upper quartile (Q3) of a data set (i.e., $IQR = Q3 - Q1$).

Lower quartile: The median of the bottom half of the values in a data set.

Median: A measure of center in a skewed data distribution. If the data set has an odd number of values, the median is the middle number after ordering the values from least to greatest. If the data set has an even number of values, the median is halfway between the two middle values. For example, if the two middle values in a data set are 7 and 11, the median is 9.

Upper quartile: The median of the top half of the values in a data set.

MODELS**Box Plot**