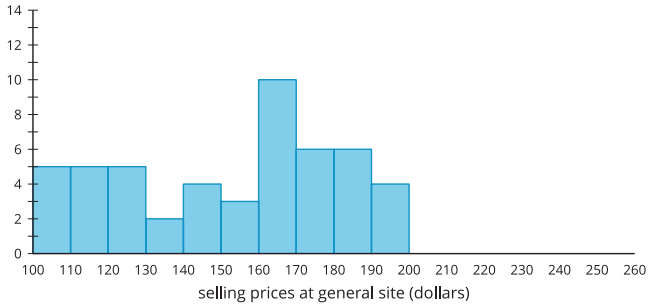
Unit 3 Family Support Materials

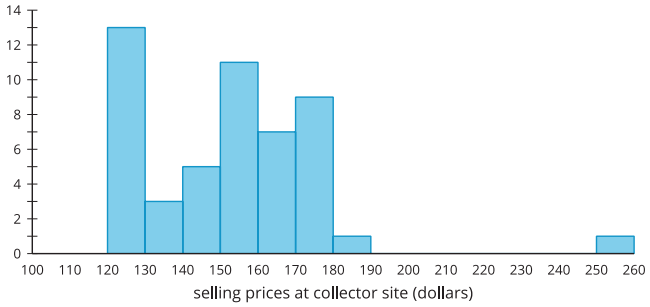
One-Variable Statistics

In this unit, your student will be learning about analyzing data. Statistics can help us recognize trends in what is typical, as well as how far from typical something needs to be before we look into reasons why.

For example, imagine you discover that your student has a childhood toy that is actually worth a lot of money from toy collectors. If your student is willing to sell it, what is a good price for the toy, and where should you sell it?

You find two sites where you could auction the toy: One is a site for toy collectors, and one is a general online site for selling items. After doing some research, you come across two histograms showing the price paid when other people sold this toy, as well as some statistics about the prices.





General site:

- Average price: $152.32
- Standard deviation: $28.60

Collector site:

- Average price: $152.68
- Standard deviation: $23.91

The first thing you may notice is that one of the toys on the collector site sold for between $250 and $260. An extremely high value like this can be called an “outlier” and should be investigated to understand why it is so different. In this case, the toy was in its original box and signed by the toy maker. Although we don’t usually like to throw out data, it doesn’t make sense to include that value when comparing to our toy, so you might take out that value to get new statistics. This changes the average price at the collector site to $150.51 and the standard deviation to $18.65.

Next, you might notice that the prices for the general site are more spread out than those at the collector site. This spread can be represented with a value called the “standard deviation.” The

general site has a much larger standard deviation, indicating that its prices are more spread out. For you, that means you are more likely to sell your toy for near the average price on the collector site, while on the general site you might sell it for a significantly higher or lower than average price.

Here is a task to try with your student:

A football coach is considering adding one of two running backs to the team. Some statistics for the number of yards gained on each run for each player are given. Which player should the coach choose? Explain your reasoning.

Running back A:

- Mean (average): 5.4 yards
- Standard deviation: 2.41 yards

Running back B:

- Mean (average): 4.2 yards
- Standard deviation: 0.32 yards

Solution:

Either running back can be a good choice for the team depending on what the coach is looking for.

- Running Back A gets more yards per run on average, but the average run distance is a lot more variable (based on the standard deviation). This means that Running Back A sometimes has really long runs and sometimes very short (or even negative) runs. Running back A will likely be more exciting to watch, but could also be frustrating to watch when the needed yards aren't gained.
- Running Back B gets fewer yards per run on average, but the average run distance is a lot less variable (based on the standard deviation). This means that Running Back B is more consistent and gets close to 4 yards on every play when allowed to run. Running Back B will likely be less exciting to watch, but can be relied on to get consistent gains.