Lesson 2: Posing a Big Question about Data

Overview

This unit presents concepts in data through spreadsheets, comma separated values (CSV), visualizations, cleaning data, and more. In this lesson, students will be reintroduced to data science and the importance of data to help formulate and answer questions about our world. Students will learn how to formulate a Big Question about data. Specifically, students will analyze the data from an assigned data set using a spreadsheet program. After reviewing their data set, students will pose their own Big Question about their assigned data set that will work to answer by processing and analyzing their data set in future lessons.

Purpose

The purpose of this lesson is to understand the importance of data to formulate and answer data-driven questions. Students will be given the opportunity to explore their assigned data set and pose their own Big Question about their data set. By the end of this unit, students will be able to answer this Big Question after processing and analyzing their data set for patterns and insight.

Agenda

Warm Up (20 min)
  Let's Talk! Posing a Big Question about Data
Activity (45 min)
  Let's Play! Meet Your Data Set
Wrap Up (15 min)
  Let's Talk! Why Do We Care?

Objectives

Students will be able to:

- Identify types of data questions and different kinds of analysis required
- Demonstrate the ability to explore data and formulate data questions on a data set
- Use computers to process information, find patterns, and test hypotheses about digitally processed information to gain insight and knowledge

Links

For the Students:

- One copy of the Meet Your Data Set - Activity Guide

For the Teacher:

- Sample survey for students when assigning data sets

- Data Sets Collection: Topic, CSV, ReadMe, Big Questions, Errors Key, Data Story

- Meet Your Data Set - Activity Guide Rubric

- Answer Key: Meet Your Data Set (MMA) - Activity Guide

- [Answer Key: Meet Your Data Set (CRIME) - Activity Guide](#)
- [Answer Key: Meet Your Data Set (FIFA) - Activity Guide](#)

English Learner Lesson Adaptation Footnotes:
[1] **English Learners:** English Learner version of activity guide—Meet Your Data Set - Activity Guide—available.

Teaching Guide

Warm Up (20 min)

Let's Talk! Posing a Big Question about Data

🎙️ *Remarks*

> Our world has so much data! Websites are tracking every click we make. Smartphones are tracking our locations and usage every second of every day. We even have wearable fitness devices and apps recording our heart rates, movements and exercises! This doesn't even scratch the surface of how much data is being collected everyday in our world.

Discussion Questions: The following can be used as potential discussion questions:

- What other things do we use everyday to collect data? How do we use this data in our lives?
- What can we do with all of this data? How can we use this data?
- What does this data tell us? What opportunities for improvement does the data allow us?

💬 **Discuss:** Allow students an opportunity to share their responses with the class.

🎙️ *Remarks*

> With all this data available to us, we can use it to help formulate and answer questions about it! We are becoming data scientists by looking for questions in data that we can actually answer by analyzing the data for patterns and insight.
>
> There are different types of data we can examine including quantitative and categorical. We can think of quantitative data as working with numbers and categorical data as working with categories. When working with data, we can come up with lots of different questions about it that require different types of analysis. Some of the questions we ask may be easy to answer such as looking for a specific value in our data (i.e., the movie rating for *Toy Story 4*) while other may require more analysis such as calculating a value across a row or column (i.e., the average movie rating for *Toy Story 4*) or finding patterns among various columns in the data (i.e., do people like *Toy Story 4* more or less as they get older → using the age of the rater column and rating column to answer this).
>
> The following is a data set of movie ratings on *Toy Story*. Review this data set and then determine what questions you can answer using it.

user id	movie	rating	date	age	occupation
67	Toy Story	3	9/27/1997	17	student
101	Toy Story	3	10/18/1997	15	student
347	Toy Story	4	12/9/1997	18	student
592	Toy Story	4	12/20/1997	18	student
620	Toy Story	5	3/15/1998	18	writer

642	Toy Story	5	1/24/1998	18	student
588	Toy Story	4	3/16/1998	18	student
618	Toy Story	4	3/31/1998	15	student
761	Toy Story	1	10/7/1997	17	student
632	Toy Story	3	11/13/1997	18	student
621	Toy Story	3	11/22/1997	17	student
887	Toy Story	5	12/6/1997	14	student
580	Toy Story	3	1/6/1998	16	student

Discussion Questions: Review the above data set and then determine which of the following questions you can answer using this data.

- What is Toy Story's average movie rating?
- What rating did Toy Story get on 9/27/1997?
- Do users who are younger (15 to 16) rate Toy Story higher?
- Do users like Toy Story 2 more than Toy Story?

💬 **Discuss:** Allow students an opportunity to share their responses with the class.

🎙 *Remarks*

Data is only as good as the questions you ask! When posing a Big Question about data, we need to make sure that we can actually answer it with the data we have in our columns and rows. We need to check to see whether we have examples of the answer to our Big Question in our data!

Now that we have a better understanding of posing a Big Question about data, you will be introduced to your assigned data set that you will be working with throughout the semester and formulate your own Big Question about it. Let's get started!

Activity (45 min)

Let's Play! Meet Your Data Set

🎙 *Remarks*

I have assigned you and a partner a data set regarding your responses and interests from a survey we took earlier. You can access this data set in the activity guide I will distribute to you. I want you to spend some time reviewing your data set and then pose a Big Question about it that you can answer using this data. Let me know if you need any help as you work through this activity. When you have finished this activity, I would like you to submit your completed activity

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guide. I will let you know if you are missing anything in your activity guide when you submit. Okay, get started!

Distribute: One copy of the following to each student:

- [1] Meet Your Data Set - Activity Guide   [30 mins]

As a class, review the overview of the activities as well as the expectations and necessary submissions for the activities as discussed in the **Remarks** above.

Support: Allow students time to work on the activity. As you circulate the classroom, assist any students that may have questions or issues that need to be resolved as they work through the activity.

Transition: As the class time comes to an end, try to bring students attention back to you to have a final discussion about data visualization.

Wrap Up (15 min)

Let's Talk! Why Do We Care?

🎙 *Remarks*

> I hope you all had fun exploring your data sets. I would like to have a quick discussion on data and posing Big Questions about data.

Discussion Questions: The following can be used as potential discussion questions during your wrap-up with students:

- What are some of the topics of your assigned data sets?
- What type of information did your data sets contain?
- Did you notice anything interesting about your data sets?
- What Big Questions do you want to ask about your assigned data sets?
- What do you think the answers to these Big questions will be?

💬 **Discuss:** Allow students an opportunity to share their responses with the class.

🎙 *Remarks*

> Great responses! I just want to reiterate what we have been saying for the entire class. Data and posing Big Questions about data are important in showing trends and patterns especially when we are trying to tell a data story about it. You all will be working towards creating your own data story about your assigned data sets this semester so it is very important to have a good grasp on this concept. We will be learning more about data visualizations in the next lesson. Make sure you have submitted your completed activity guide to me before you leave class. I will see you all in the next class where we will create our own infographics!