

# Lesson 2: Exploring One Column

## Overview

Students will practice making conclusions from charts and learn to use the Data Visualizer in App Lab to make create two different kinds of charts a bar chart, and a histogram. The lesson begins with a quick prompt to review the reasons charts are useful for looking at data. Students then practice reading a bar chart and review the kinds of questions it is and is not useful for answering. Afterwards they build different bar charts in the Data Visualizer and discuss why some are or are not useful. Afterwards they learn how to make histograms for building charts in instances where bar charts may not be useful. Students record their work on an activity guide. The lesson concludes with a brief review of what they learned.

## Purpose

This lesson introduces students to the Data Visualizer tool in App Lab as well as two important chart types, a bar chart, and a histogram. Students will build skills in using this tool and reading data that they will continue to develop throughout the unit.

In the Wrap Up of this lesson students are introduced to the Data Analysis Process, a set of steps that can be used to use data to answer questions. Students will continue to refer to this process throughout the remainder of the unit.

## Standards

Full Course Alignment

### CSP Conceptual Framework

- **DAT-2** - Programs can be used to process data, which allows users to discover information and create new knowledge.

### CSTA K-12 Computer Science Standards (2017)

- **DA** - Data & Analysis

## Agenda

**Warm Up (5 minutes)**

**Activity (35 minutes)**

**Reading a Bar Chart**

**Making Bar Charts**

**Reading a Histogram**

## Objectives

Students will be able to:

- Create a bar chart and a histogram in App Lab's data visualizer
- Draw conclusions by reading bar charts and histograms
- Explain the reasons that someone would create either a bar chart or a histogram in order to explore a single column of data

## Preparation

- Try using the Data Visualizer yourself to make some of the charts students will create as part of completing the lesson

## Links

**Heads Up!** Please make a copy of any documents you plan to share with students.

For the teachers

- **CSP Unit 9 - Data** - Slides

For the students

- **Data Visualizer in App Lab - Part 1** - Video
- **Exploring One Column** - Activity Guide

## Teaching Guide


### Warm Up (5 minutes)

 **Discuss:** *Why do people make visualizations out of data?*


Have students brainstorm silently on their own, then have them share with neighbors, and finally have them share out with the room.

**Discussion Goal:** This discussion should be quick to kick off today's activity. Students spent the previous class making visualizations and looking at data sets, but they didn't think about how to make visualizations with the data. Try to quickly guide conversation towards some of the takeaways on the following slide, then move on to the day's activity.

### Remarks

 When looking at the datasets on App Lab, the table format may be familiar to you. You may have seen data layed out and organized in a spreadsheet. Once the data is organized, we can now find trends and patterns. This is where visualizations are useful!

People make visualizations for a number of reasons. They help humans see lots of data at once and help us find patterns that might otherwise be "invisible". Today we're going to learn how to make two new types of visualizations.

 **Display:** Display the slide showing the Data Analysis Process. Students will continue to refer to this throughout the unit, including at the end of today's lesson. Simply make students aware of it as a framework and then quickly move on to the main activity.

### Activity (35 minutes)

#### Reading a Bar Chart

 **Discuss:** *Which of these questions does this chart answer? Be ready to discuss with a classmate.*

Run a short discussion, asking students to share which of the five questions they believe could be answered with the chart. Students should hopefully notice:


- Only question 1 and 3 could be answered by the chart
- They may have additional questions about how the chart was created or what it means. Hold those questions for the following slide

 **Display:** Show the following slide introducing bar charts and how they are used

#### Making Bar Charts

 Watch the video **Data Visualizer in App Lab - Part 1**

 **Distribute:** Give students access to **Exploring One Column** ideally in digital form.

 **Do This:** Have students go to the data visualizer and recreate the chart they just examined together. Use this as an opportunity to make sure every student understands how to use the visualizer.

**Do This:** Have students complete side one of the activity guide, making a bar chart for each column in the Dogs table and deciding if it is useful or not. They will also need to paste in one chart they find is useful and answer a pair of discussions.

💡 Teaching Tip

**Fill Out the Activity Guide Digitally:** The Data Visualizer allows students to quickly copy and paste visuals into documents and slide shows. If at all possible in your classroom environment, have students complete this activity guide digitally.

**Discuss:** *Optionally discuss the different columns that students chose as useful.*

**Discussion Goal:** Use this discussion for two purposes. First, use it to build a shared comfort with what a bar chart shows. Have students share out which charts they think are useful and what pieces of information they read from them. Remind students that bar charts are particularly good at finding how common a value is in a column. The second goal is to prepare students to see the value of a histogram. Many bar charts are not at all useful because they have too many unique values. Using a histogram to group these values can help make more useful charts.

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Making Bar Charts and Histograms

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## Reading a Histogram

**Display:** Show the slide explaining why some bar charts are not useful.

**Discuss:** *In the Visualizer make a "Histogram" for "Max Weight" with a "Bucket Size" of 20.*

- Which of these makes it easier to understand the data?
- What do you think the "histogram" is doing to visualize the data differently?

Discuss how the histogram seems to be displaying the data differently from the bar chart.

**Discussion Goal:** Use this discussion to start exploring the differences between a bar chart and a histogram. For example, students should note that there seem to be "fewer but wider" bars in the histogram. They should also notice that values are sorted correctly. This makes the chart overall easier to read.

**Display:** Show the slide explaining what a histogram is useful for


**Discuss:** *Have students complete side 2 of their activity guide.*

Optionally have students share out the results of their work on side 2 of the activity guide.

**Discussion Goal:** Use this discussion to have students share out how they are designing histograms based on the columns in the dogs data set. Things to look for:

- Students are only creating histograms for numeric columns
- Students are picking columns that have a number of unique values
- Students are picking good bucket sizes to group their data in a way that makes it possible to interpret
- Students are correctly reading charts to understand what they are showing


## Wrap Up (5 minutes)

 **Discuss:** Which steps of the Data Analysis Process did you see in today's activity? Where did you see them?

Have students share their reflections and lead a quick discussion about where they saw each step.

**Discussion Goal:** This is the first opportunity for students to talk through the Data Analysis Process, a framework they will return to many times throughout this course. Use this discussion to review some key points

- Students in today's lesson may not have "cleaned and processed" data but they should've seen every other step.
- Students answered questions and carefully made conclusions
- Students created visualization and used them to find patterns.
- Students chose the datasets that would best answer their question. In other instances they might've gone off to find the data themselves but the Data Library in App Lab helps avoid them needing to do that.

 **Review:** Review the key takeaways from the lesson

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## Assessment: Check For Understanding

*Check For Understanding Question(s) and solutions can be found in each lesson on Code Studio. These questions can be used for an exit ticket.*

**Question:** Why would someone make a histogram instead of a bar chart?



Check For Understanding