Data Visualization: Tableau

DITI Consultants: Emily Sullivan and Sara Morrell

ENGW 3307 Advanced Writing in the Disciplines
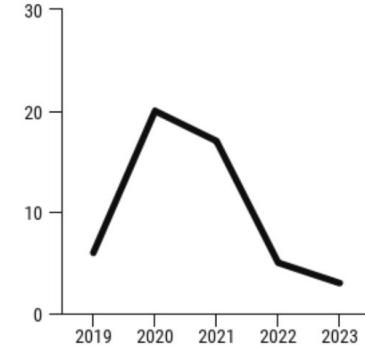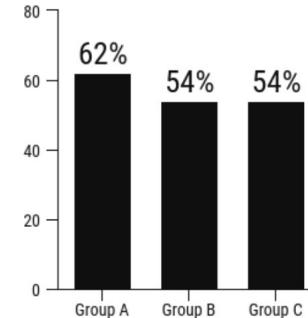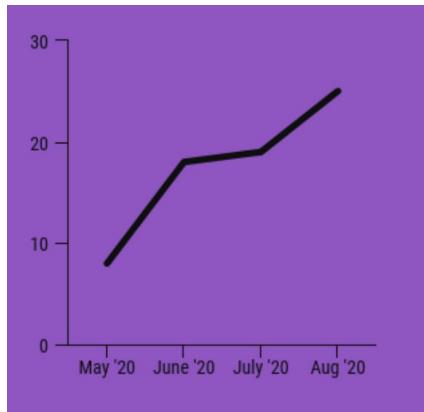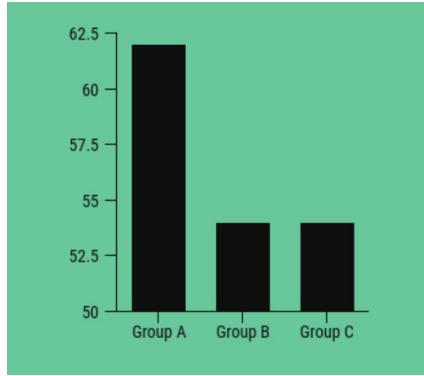
Prof. Karina Sembe

Spring 2026

Digital Integration Teaching Initiative

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Quantitative Data Visualization

- What are some issues with the visualizations on the left compared to those on the right?
- What other mistakes have you seen before?
- What might be difficult about making visualizations?
- How have you created charts, graphs, or other data visualizations before?

Workshop agenda

- Objectives
- Example Project: Boston 1920 Women's Voter Register
- Important Vocabulary
- Tableau Introduction
- Tableau Project and Data Visualization Tutorial
- Creating your own data visualization
- Concluding discussion
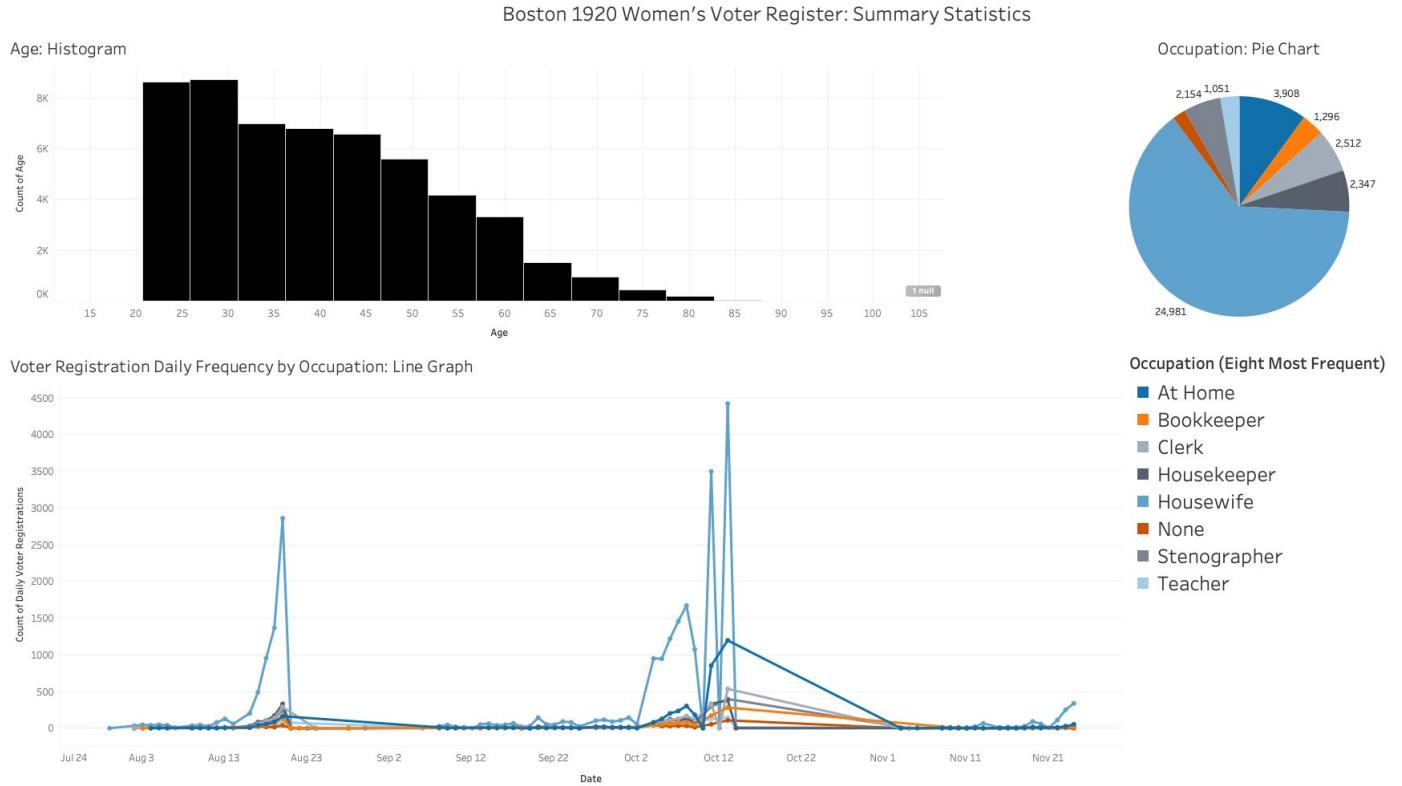
Slides, handouts, and data available at **bit.ly/sp26-engw3307-tableau**

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during the presentation!*

Example Project: Early Women Voters

- Research question: How can we summarize the age and occupation characteristics of early women voters in Boston?
- Data collection: [Boston 1920 Women's Voter Register](#)
  - [License](#): Open Data Commons Public Domain Dedication and License
  - [Classification](#): Public Record
- Data analysis and results: Age histogram, occupation pie chart, registration time series
- Results: Most women were young and identified as housewives
- These descriptive results could help lay the foundation for a larger project and suggest additional analyses

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Example Project Data Visualization

This example project visualizes data from the [Boston 1920 Women's Voter Register](#)

Boston 1920 Women's Voter Register: Summary Statistics

Age: Histogram

Occupation: Pie Chart

Voter Registration Daily Frequency by Occupation: Line Graph

Occupation (Eight Most Frequent)
- At Home
- Bookkeeper
- Clerk
- Housekeeper
- Housewife
- None
- Stenographer
- Teacher

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Important questions

- What do you need to know about your data to help inform your project?
- How can you align data manipulation with your research priorities and questions?
- What visualizations will provide the clearest picture to you and your audience?

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Important vocabulary

- **Data source**: The data you import into Tableau (e.g. Excel spreadsheet or CSV file)
- **Dimension**: A qualitative value that can be used to categorize your data (e.g. Occupation, Date)
- **Measure**: A quantitative aggregated value (e.g. Count)
- **View**: A data visualization or summary "in a worksheet or dashboard"
- **Filter**: A filter that controls which portions of the data are shown
- **Group**: A user-created combination of items in a field
- **Dashboard**: A collection of data visualizations and summaries

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Tableau Introduction
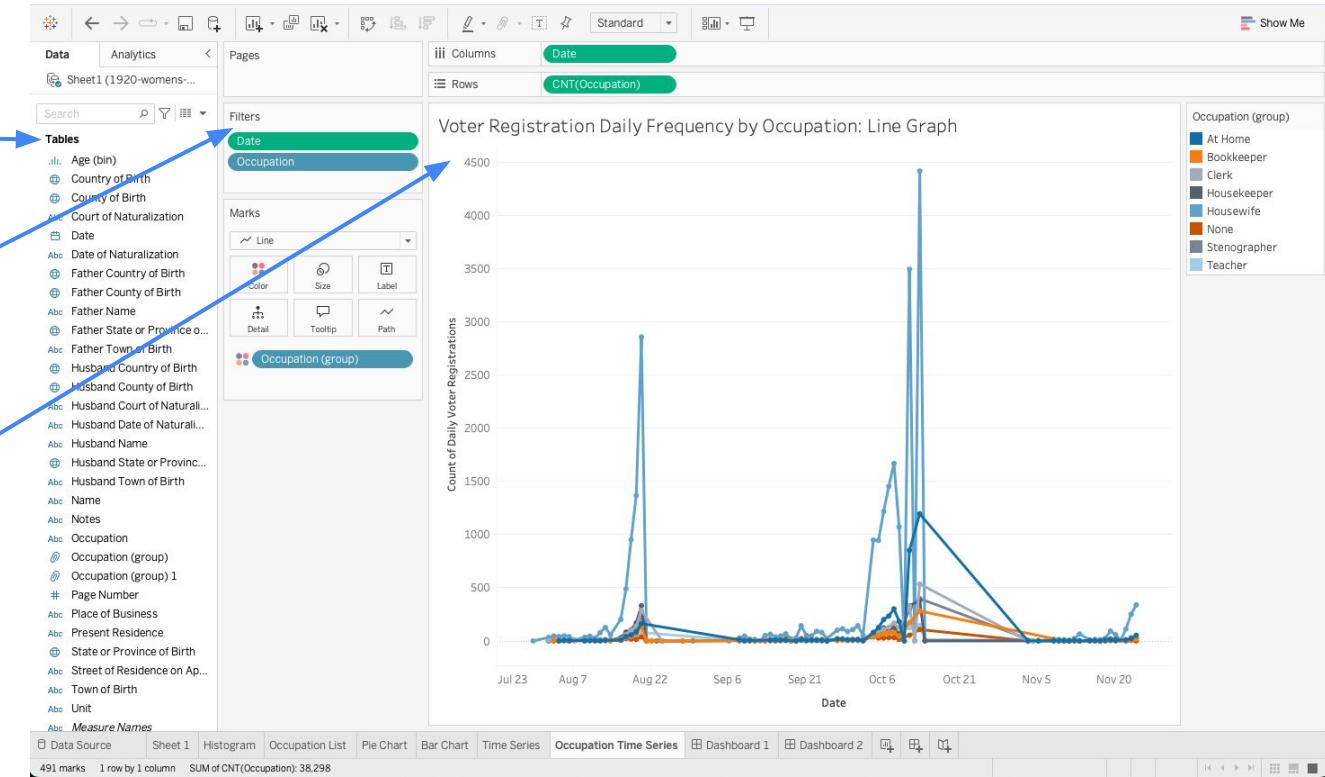
Feel free to ask questions at any point during the presentation!

Tableau Overview

Data

Data formatting

Data visualization

Feel free to ask questions at any point during the presentation!

Strengths and Limitations

- Strengths
  - User-friendly drag and drop interface
  - Free student version
  - Has browser-based web version
- Weaknesses
  - Cannot export visualizations from desktop version without making them public (but can screenshot)
  - Cannot save work in the browser-based version without publishing publicly
  - Is [proprietary](#) (not open source), owned by Salesforce

Publicly Sharing Data: Terms of Service

- By publicly sharing content, you give Salesforce and its users the right to "use, distribute, reproduce, modify, adapt, publish, translate, publicly perform and publicly display such Content (in whole or in part) and to incorporate such Content into other works in any format or medium now known or later developed"(See Tableau Terms of Service).
- You are also indicating that the data is public and unrestricted and that you have the right to grant such use.

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Open Source Alternatives

- Open source alternatives are free and may provide improved transparency in data analysis
- Popular Tableau alternatives include:
    - [Apache Superset](#)
    - [Graphic Walker](#)
    - [Redash](#)
- However, they can be more difficult to get started with so today we will be focusing on Tableau

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Download Student Version
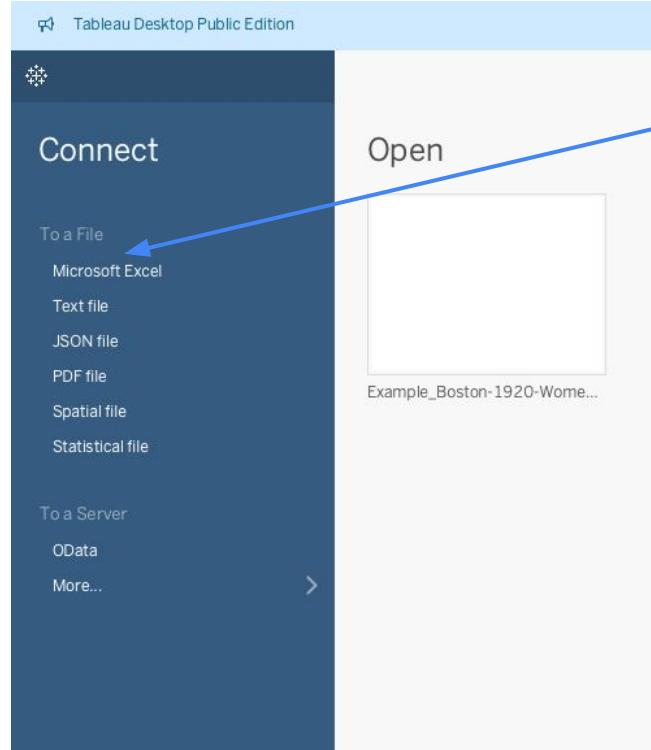
- Go to https://www.tableau.com/community/academic
- Select **I'm a student** > **Get Tableau for Free**
- Enter information with Northeastern email
- Click **Download the app**
- For more information see this handout on downloading Tableau
- These slides are available on GitHub, so you don't need to worry about following along right now. If you encounter any issues, we can work through these during the practice time.

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Importing Data

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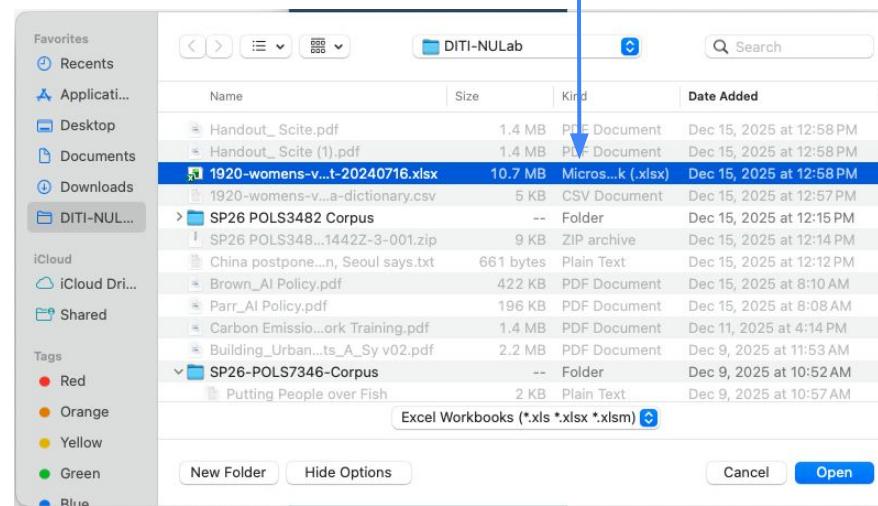
Dataset

- [1920 Women's Voter Register Dataset](#): "The Women's Voter Register Dataset is created from Election Department registers used to register women voters in 1920 after the passage of the 19th Amendment. The dataset contains information about newly registered women voters including name, address, place of birth, occupation, place of work, naturalization information, and closest male relative. This dataset is in progress and is updated periodically as additional voter registers are transcribed" ([Analyze Boston](#)).
- [Data Dictionary](#): Contains descriptions of each field.
- For other Boston datasets check out https://data.boston.gov/.

Import Data

Select the format your data is in

Select your data file and click **Open**

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Review Data

Check that the expected number of fields (columns) and rows were imported
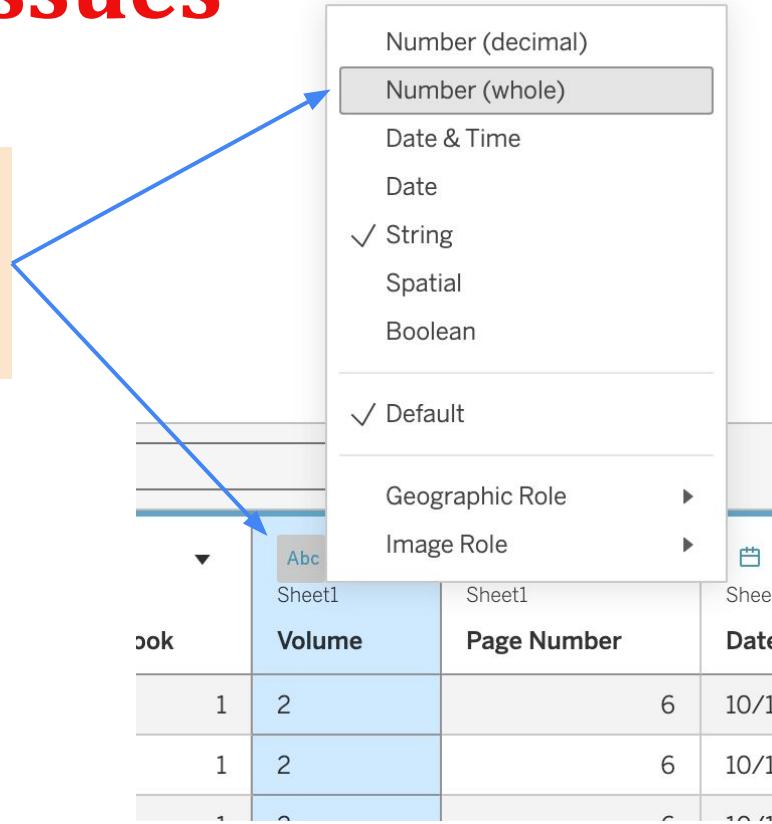
Check the data type for each field

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Cleaning Data

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Correct Data Type Issues

To correct the data type, click the data type icon, then select the correct type from the menu

Number (decimal)

Number (whole)

Date & Time

Date

✓ String

Spatial

Boolean

✓ Default

Geographic Role ▸

Image Role ▸

	Abc		🗓
	Sheet1	Sheet1	Sheet
ook	**Volume**	**Page Number**	**Date**
1	2	6	10/1
1	2	6	10/1
1	2	6	10/1

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View Data

Select new worksheet

Drag and drop fields into the rows or columns to view

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Filter Data

Tableau provides several different filtering capabilities.
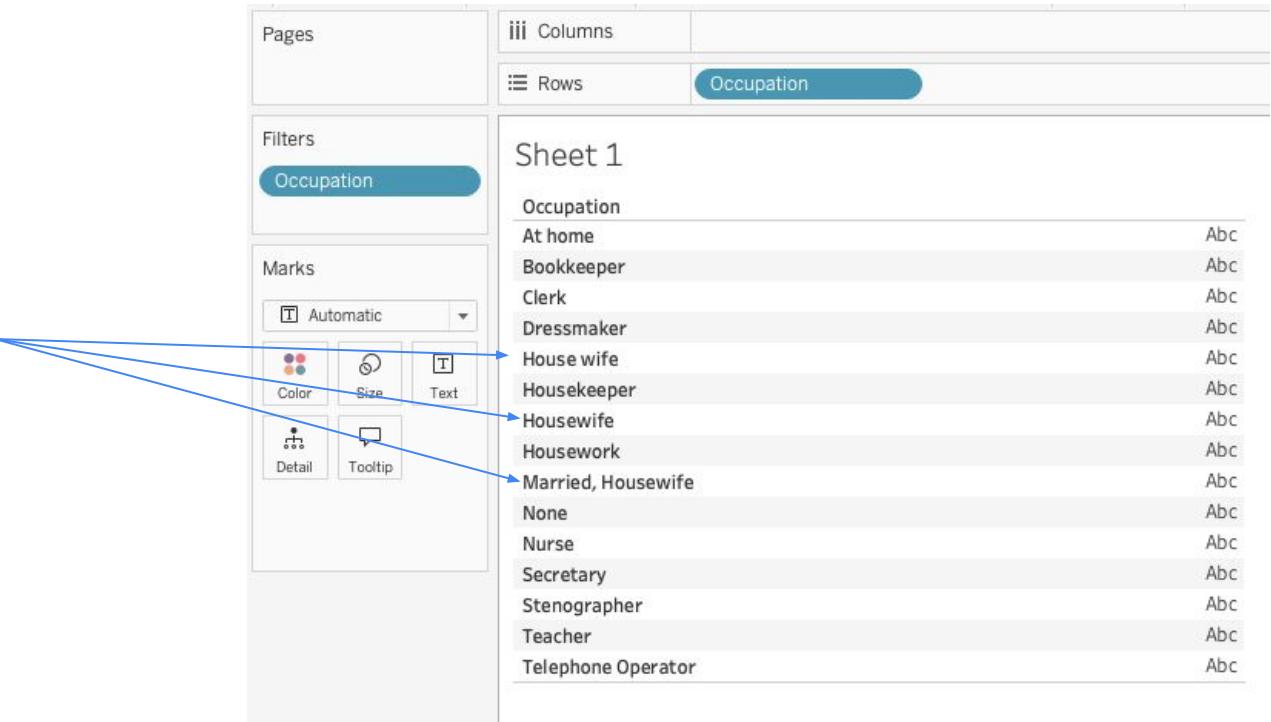
To filter a specific field drag it into the **Filters** section

To filter for the most frequent values select **Top** in the filter options

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View Filtered Data
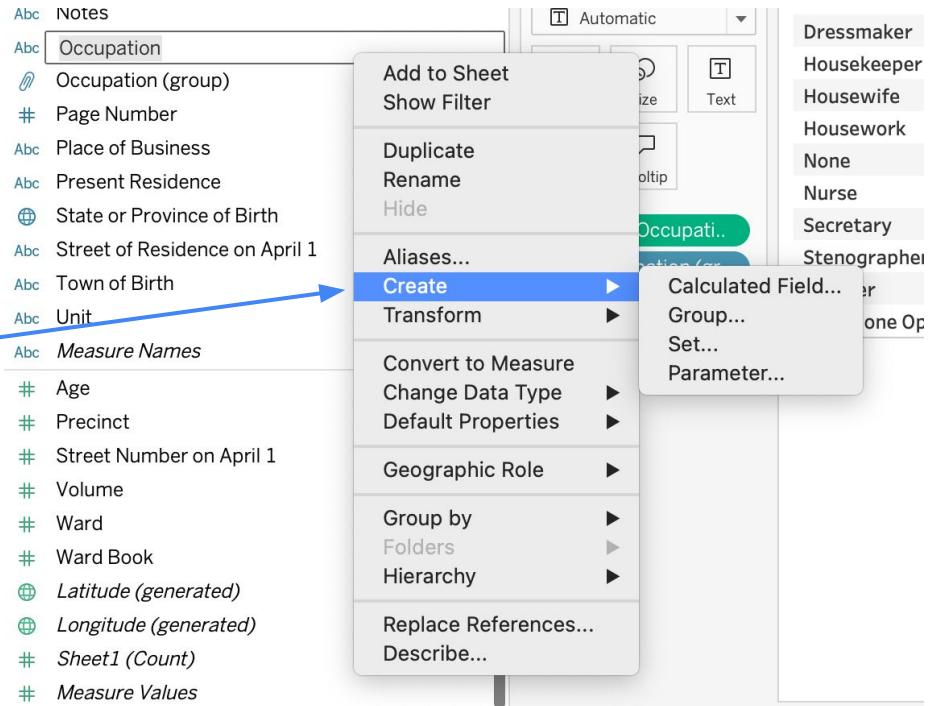
Note duplicates, or other issues

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Create Group

You can create a group to address duplicate values in a field.
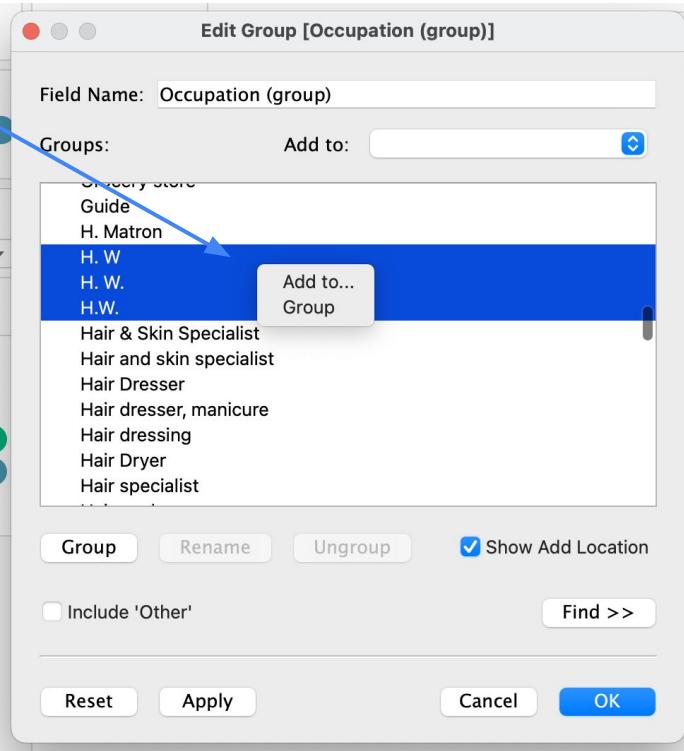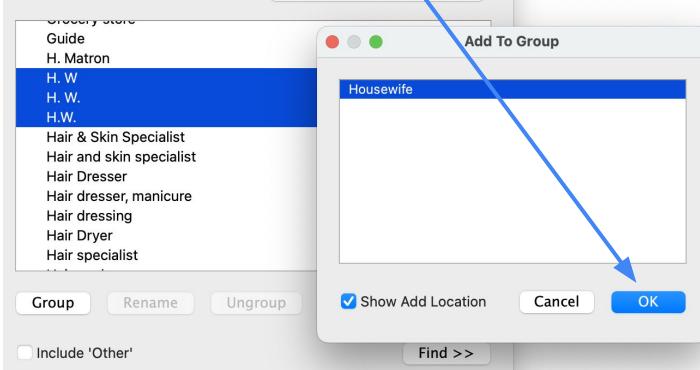
Select field > **Create** > **Group**

Feel free to ask questions at any point during the presentation!

Add to Group
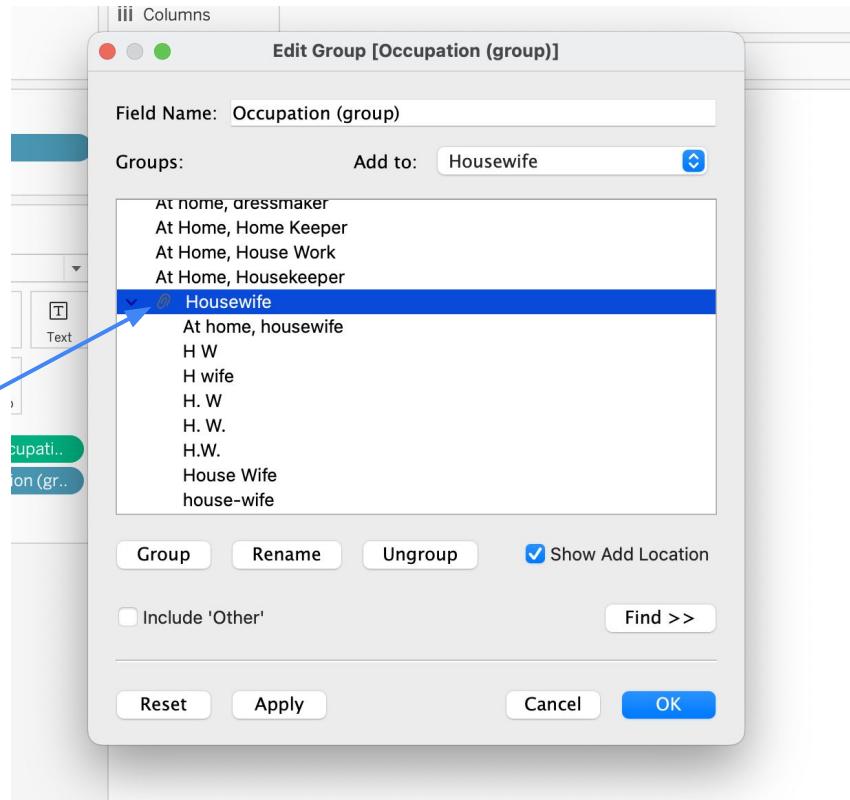
Select values > **Add to...** or **Group** (for a new group)

Add values and select **OK**

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View Group

Group members are indented

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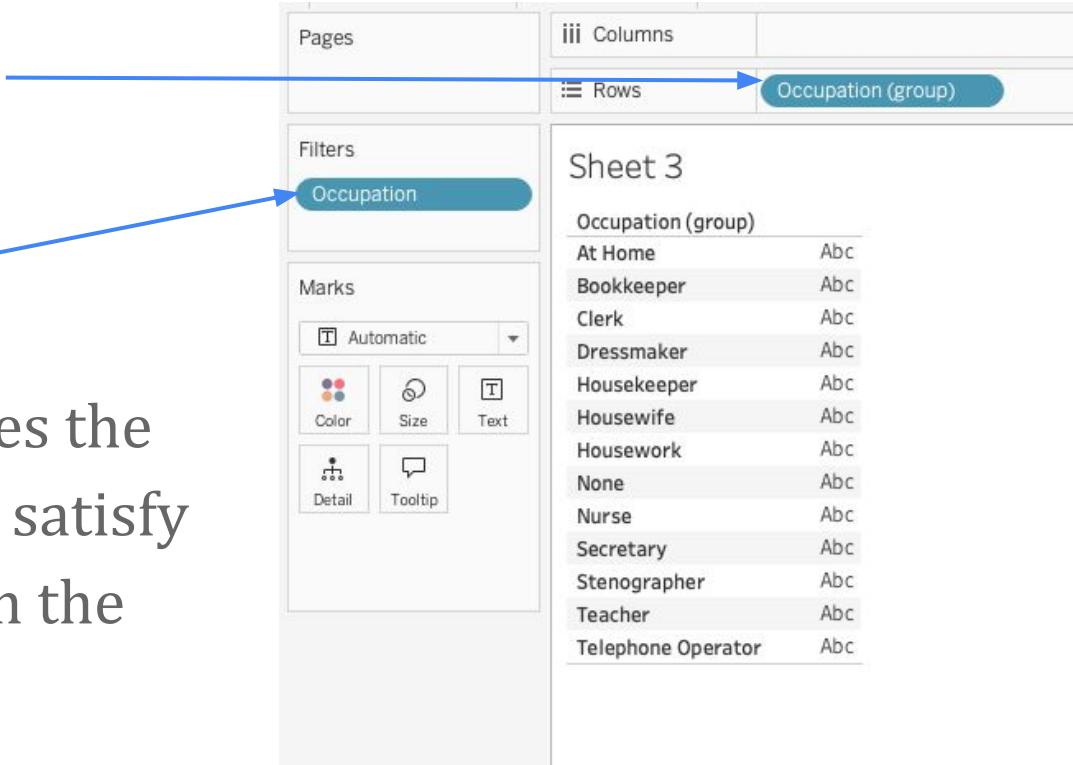
View Cleaned Data

Use the group field

Apply the filter

Note that the filter overrides the group: only the values that satisfy the filter will be included in the total group count.

Visualizing Data

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Create a New Worksheet

Click the New Worksheet icon in the lower left

To rename, double click and type the new name

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Create Visualization: Histogram

Drag and drop fields into **Columns** and **Rows**

Select **Measure**

Under **Show Me**, select **Histogram**, then click **Choose for me**

*Feel free to ask questions at any point during the presentation!*
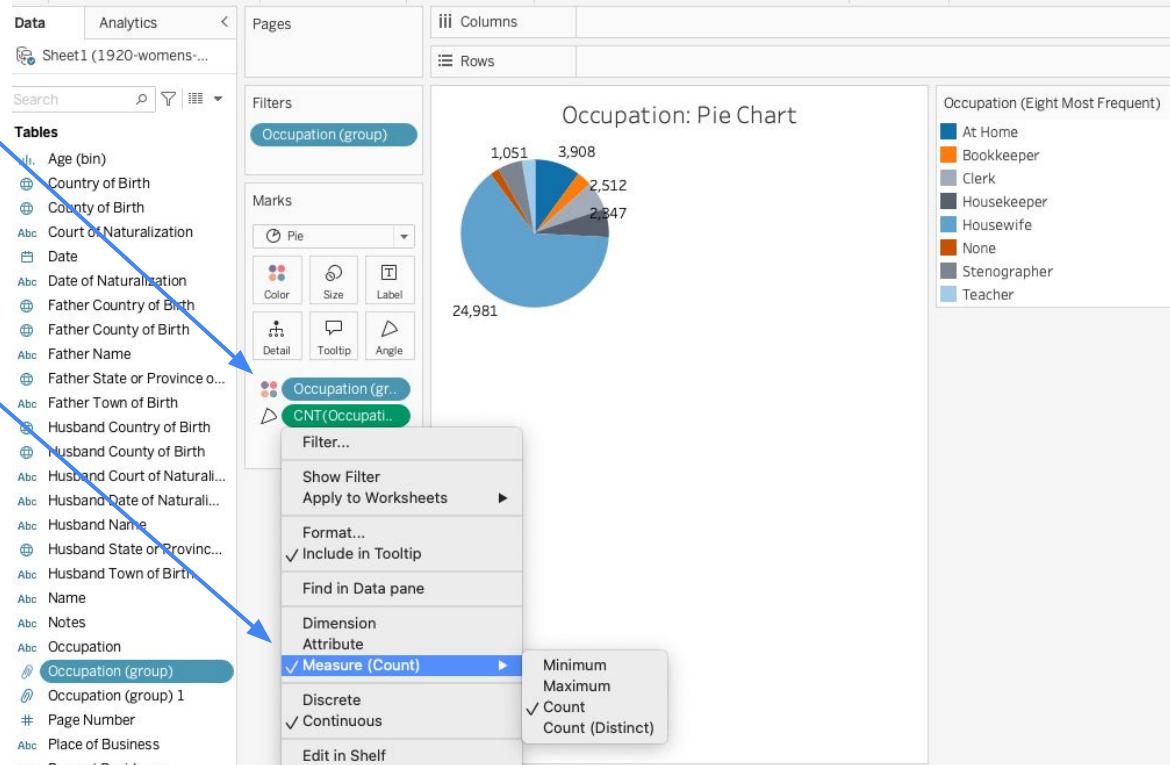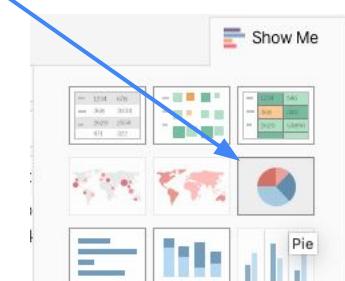
Create Visualization: Pie Chart

Drag and drop fields into **Marks**

Select **Measure**

Select **Pie** under **Show Me**

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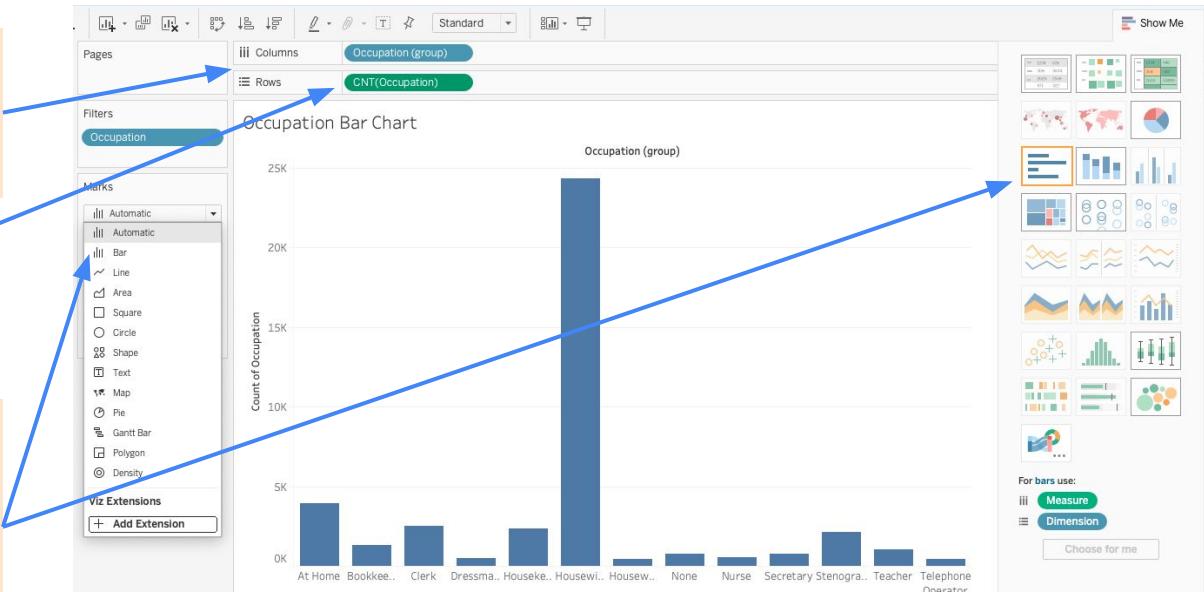
Create Visualization: Bar Graph

Drag and drop fields into **Columns** and **Rows**

Select **Measure**

Under **Marks**, select **Bar**, or under **Show Me** select **Horizontal Bar**
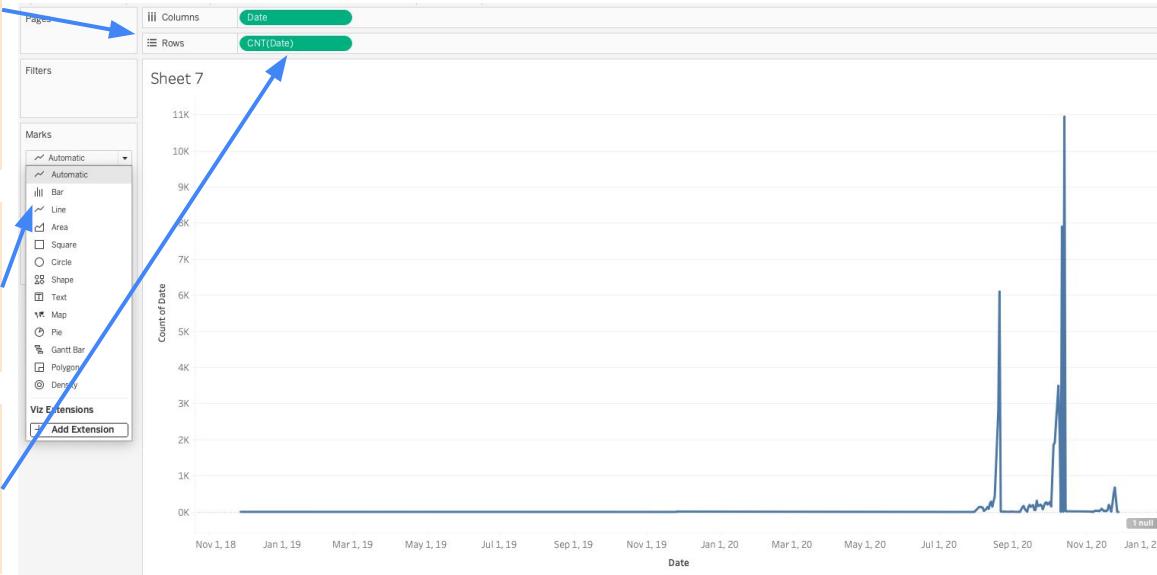
To change between vertical and horizontal bars, switch the items in **Columns** and **Rows**

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Create Visualization: Line Chart
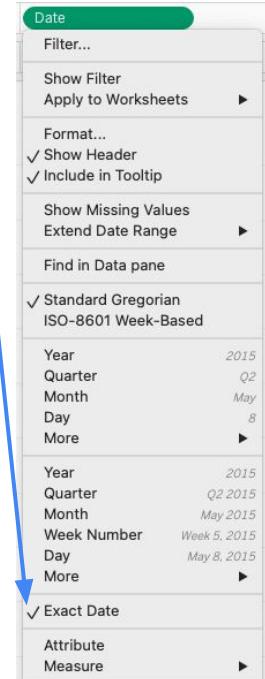
Drag and drop fields into **Columns** and **Rows**

Under **Marks**, select **Line**

Select **Measure**
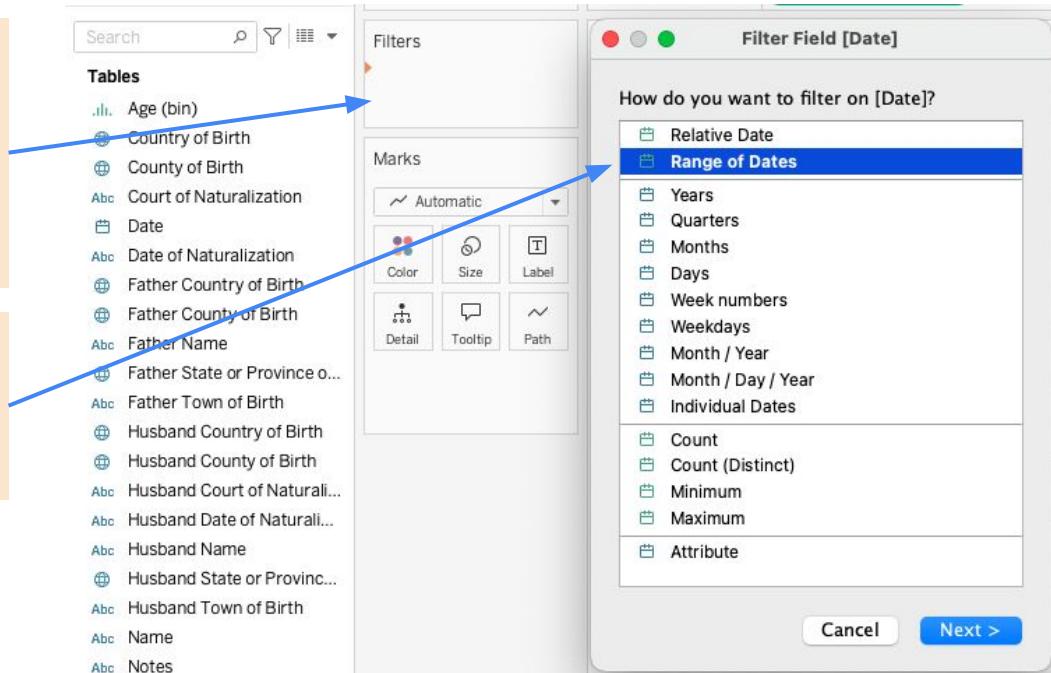
For time series select **Date** > **Exact Date**

Feel free to ask questions at any point during the presentation!
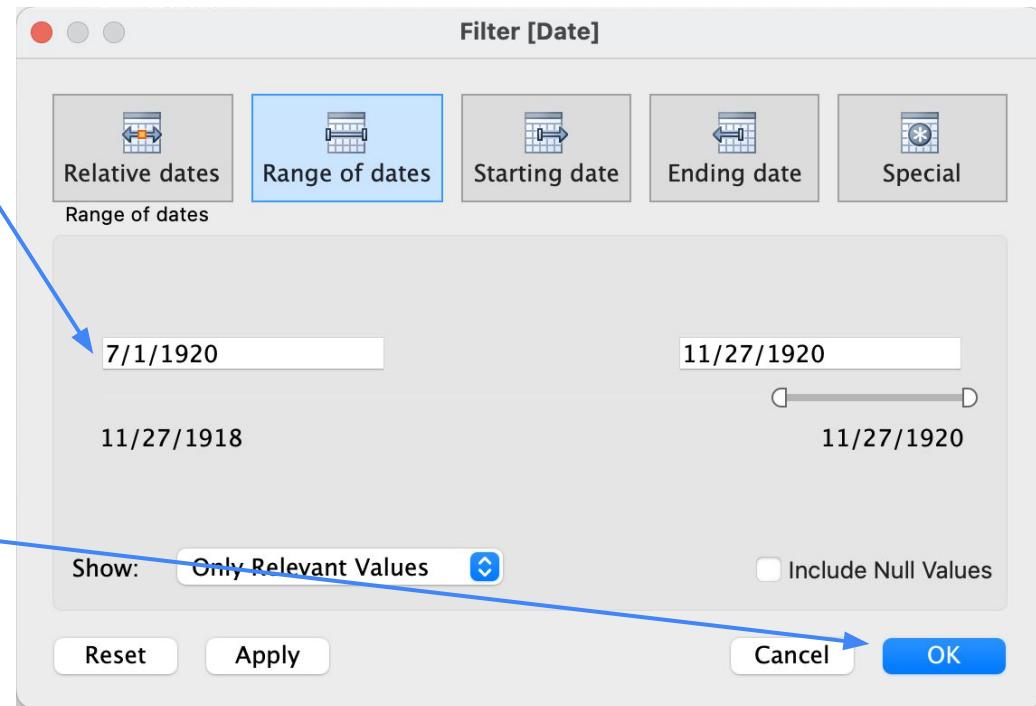
Filter Dates

Drag and drop the field you want to filter on (here, **Date**) into **Filters**

Select **Range of Dates** and click **Next >**

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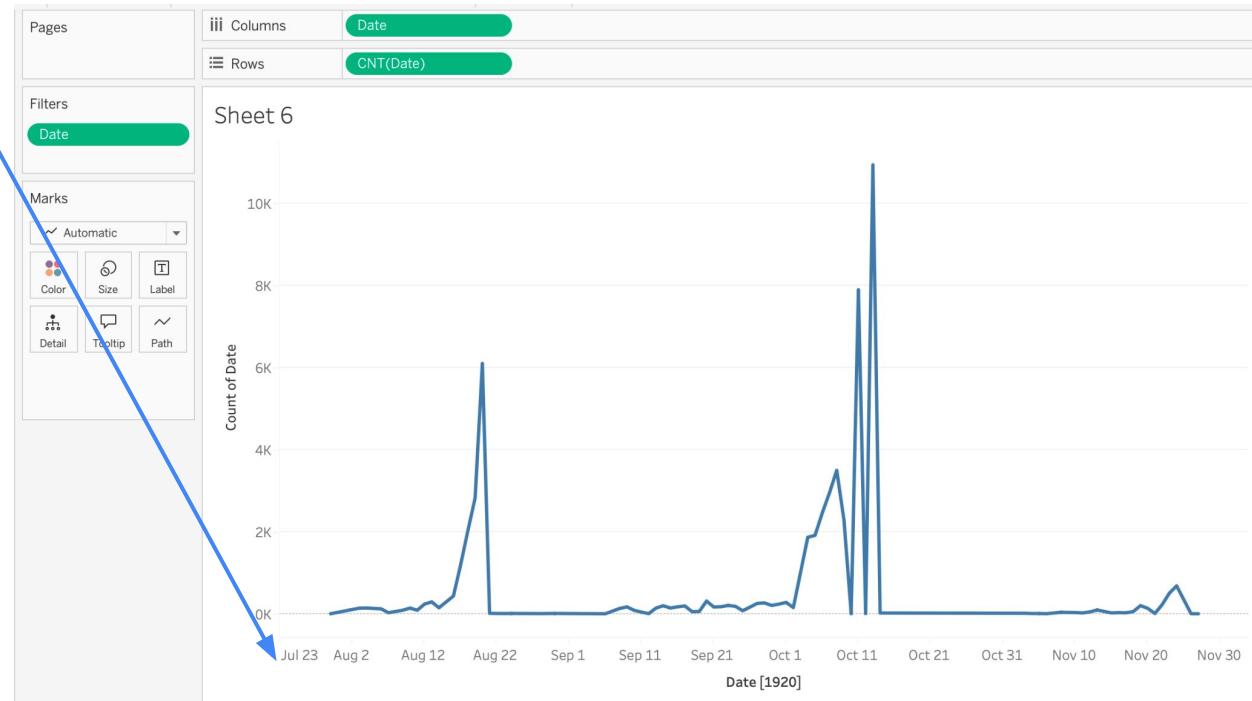
Filter Dates: Select Dates

Use the slider or enter exact dates

Click **OK**

Filter [Date]

| Relative dates | Range of dates | Starting date | Ending date | Special |

Range of dates

7/1/1920   11/27/1920

11/27/1918   11/27/1920

Show: Only Relevant Values   ☐ Include Null Values

Reset   Apply   Cancel   OK

Feel free to ask questions at any point during the presentation!

Filter Dates: View Time Series
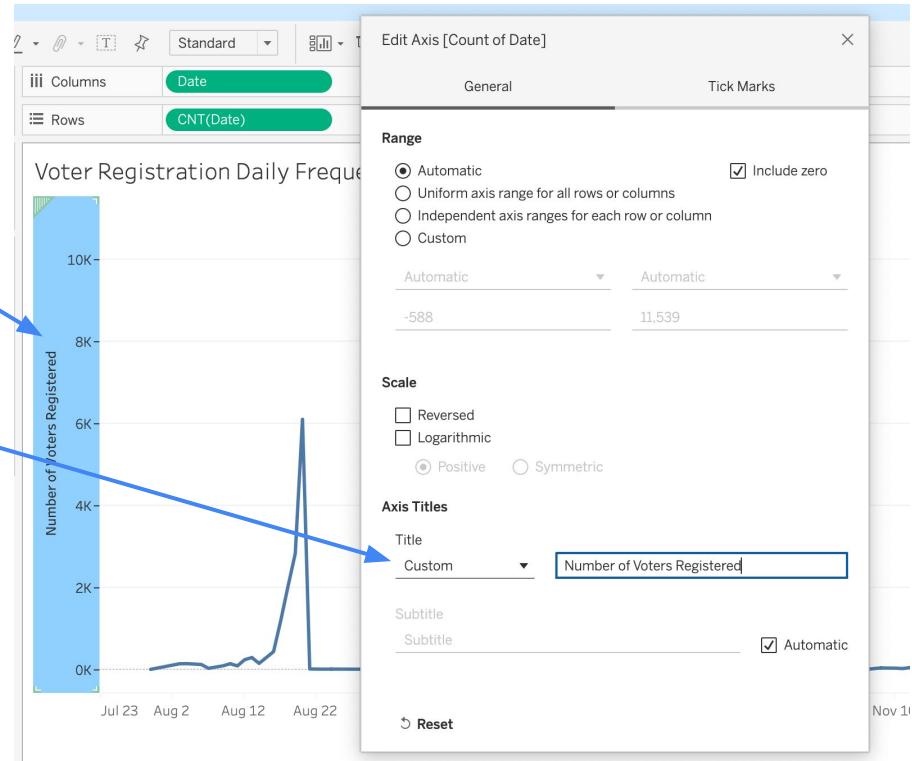
X-axis is now filtered for the selected dates

Feel free to ask questions at any point during the presentation!

Formatting: Axis Titles
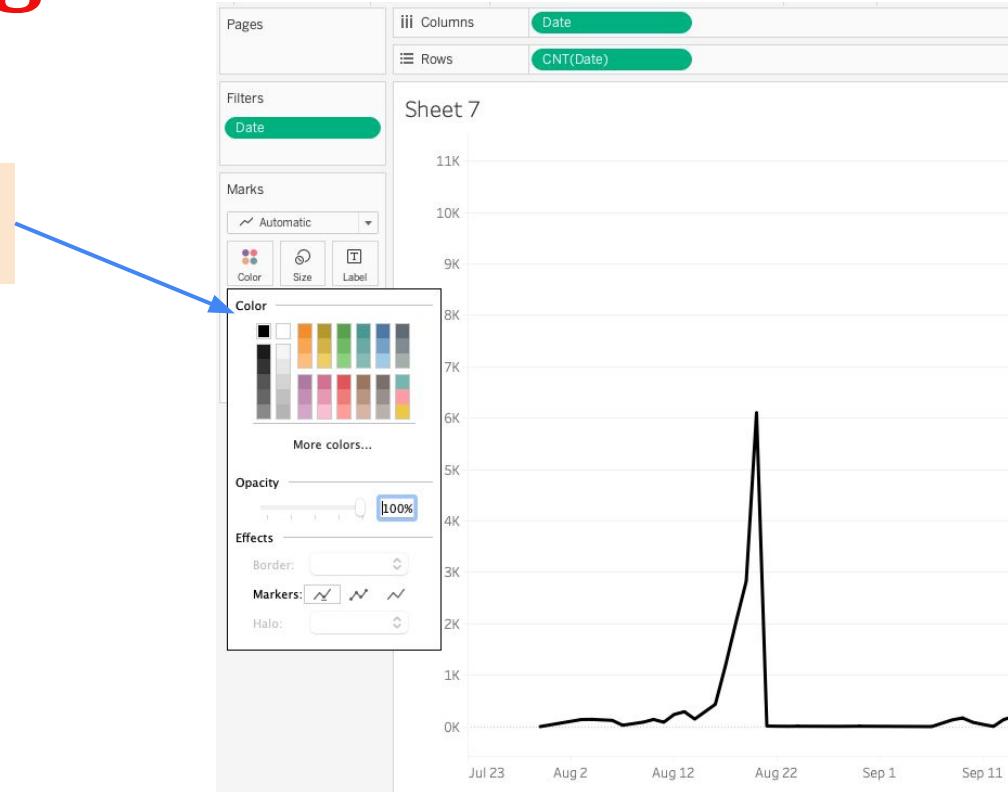
Double click on the axis

Enter the title

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Formatting: Single Color

Under **Marks** select **Color**

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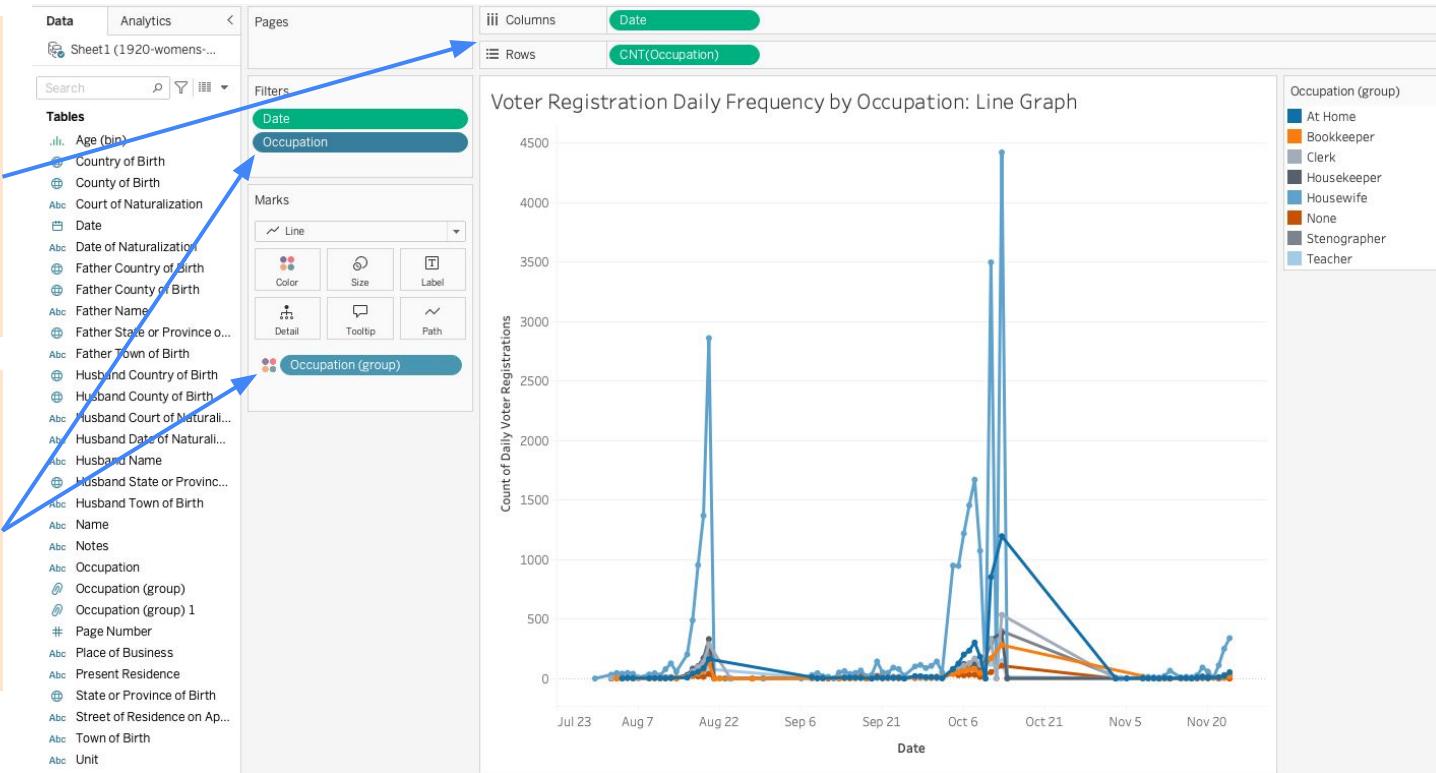
Integrating Multiple Fields

Drag and drop fields into **Columns** and **Rows**

Drag and drop additional fields into **Filters** and **Marks**

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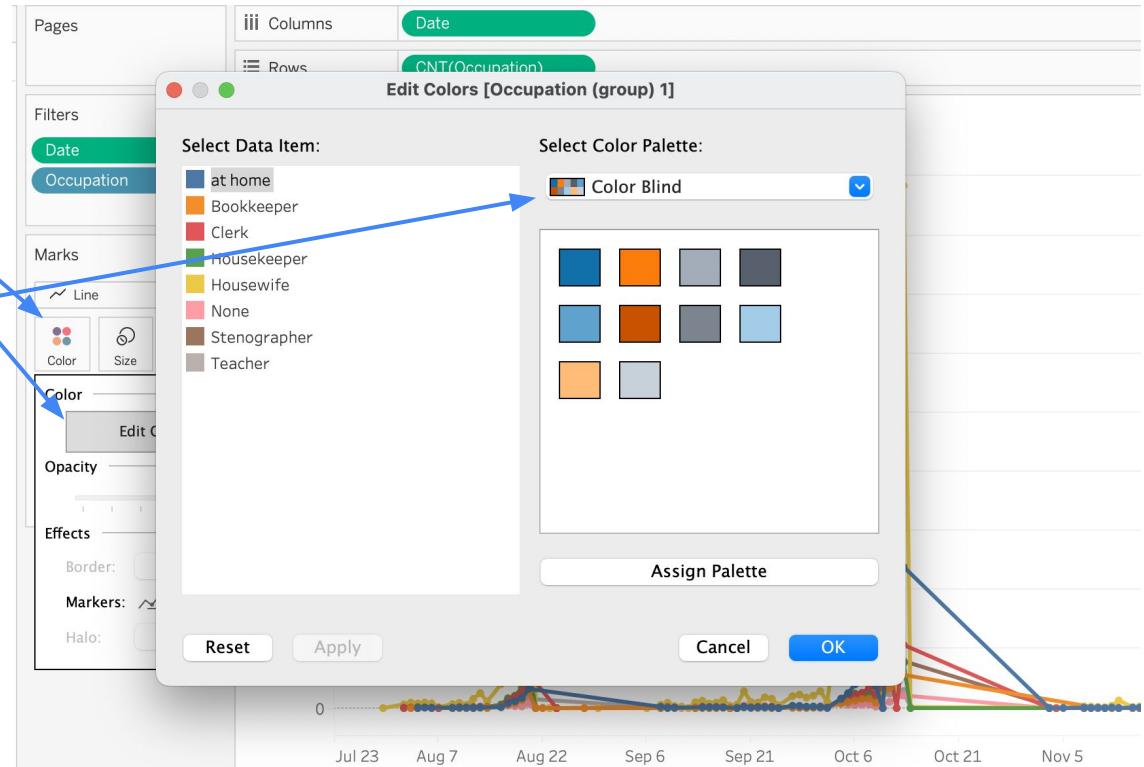
Select Color Palette

Select **Color** >
Edit Colors...

Select Color Palette
and click **OK**

For more information on accessible color schemes see [Easy colorblind-safe typesetting](#)

*Feel free to ask questions at any point during the presentation!*
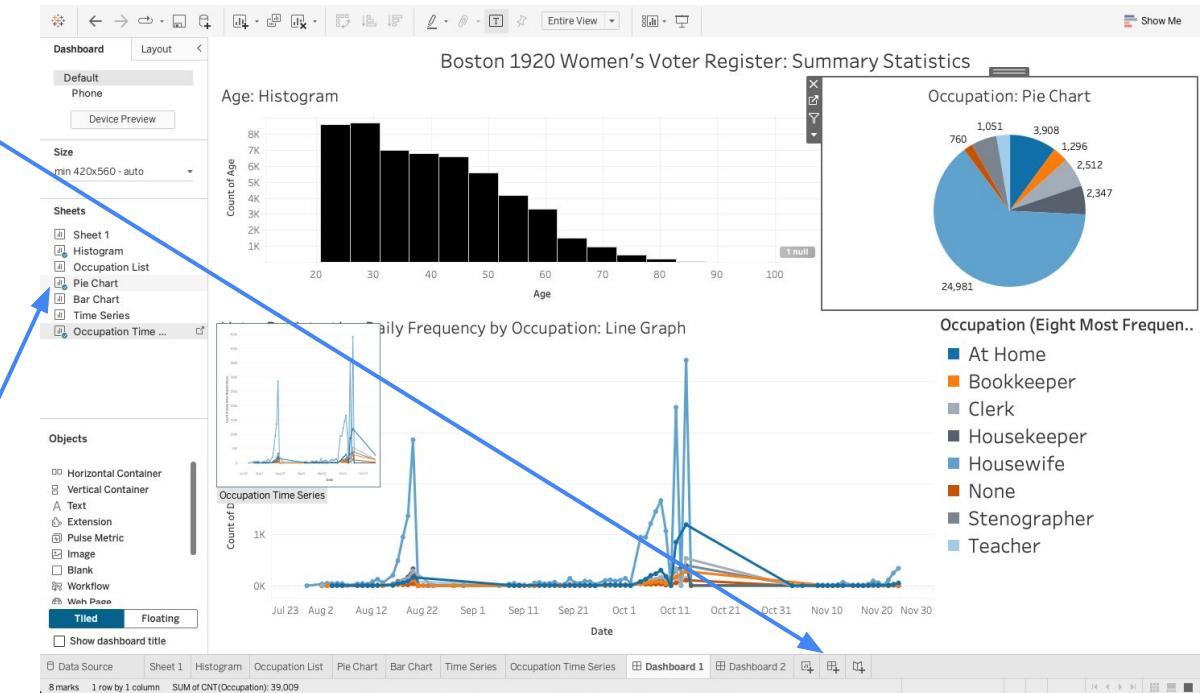
Create Dashboard

Once you have your visualizations, you can integrate them into a Dashboard.
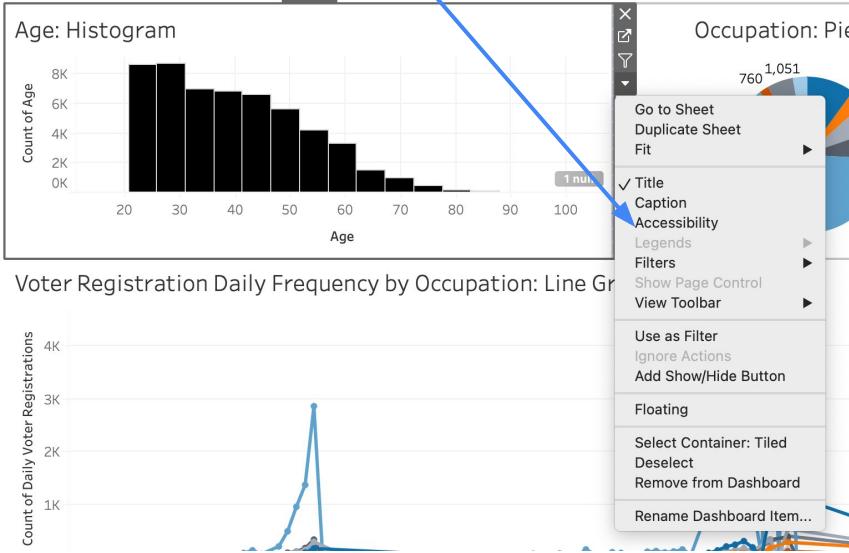
Click the dashboard icon to create a new dashboard

Drag and drop Sheets to add the visualizations to the dashboard
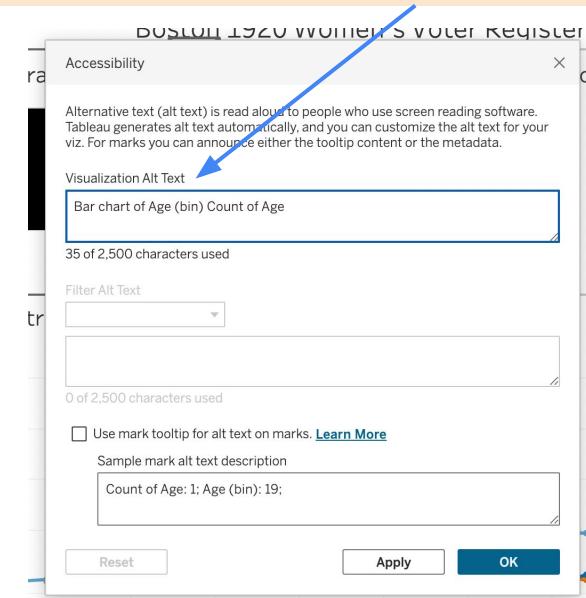
Adding Alt Text

Select the downward triangle for **More Options** > **Accessibility**
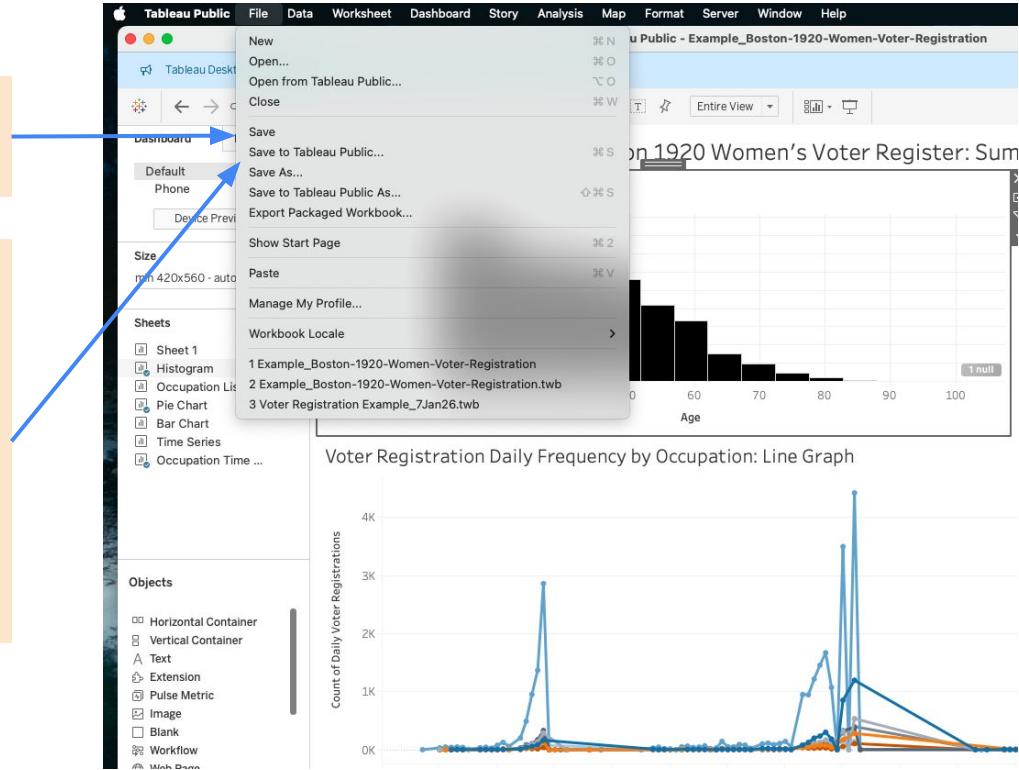
Fill in or edit **Visualization Alt Text**

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Saving
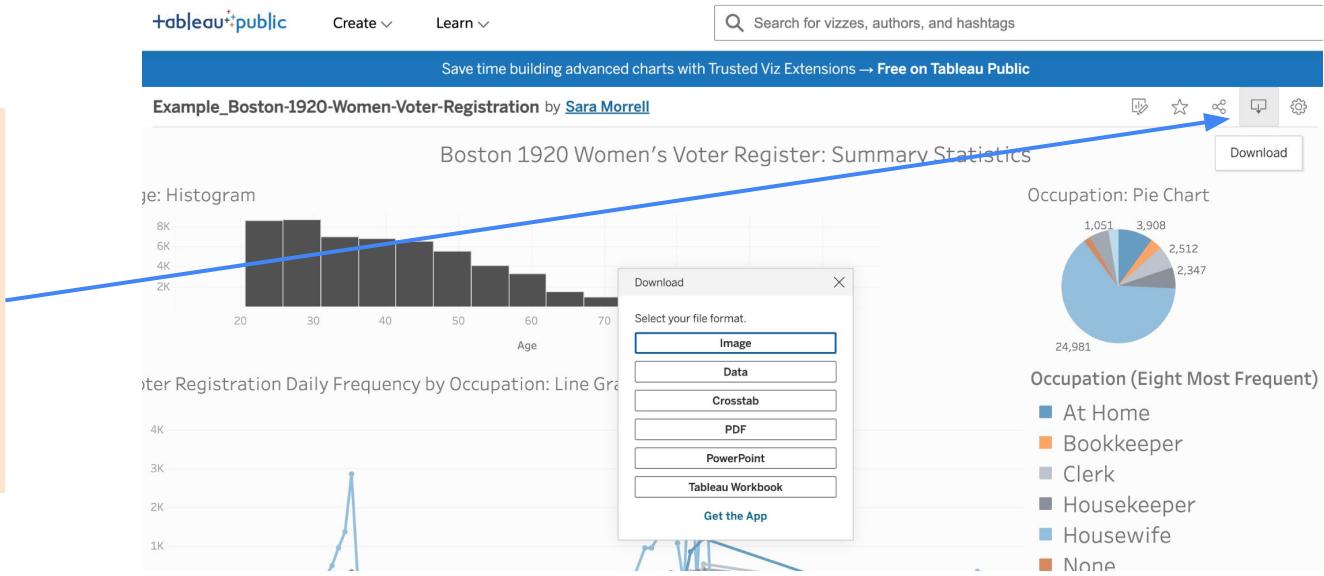
Select **File** > **Save** or **Save As...**

If your data and visualizations can be shared publicly, you can select **Save to Tableau Public**. This requires creating an account.

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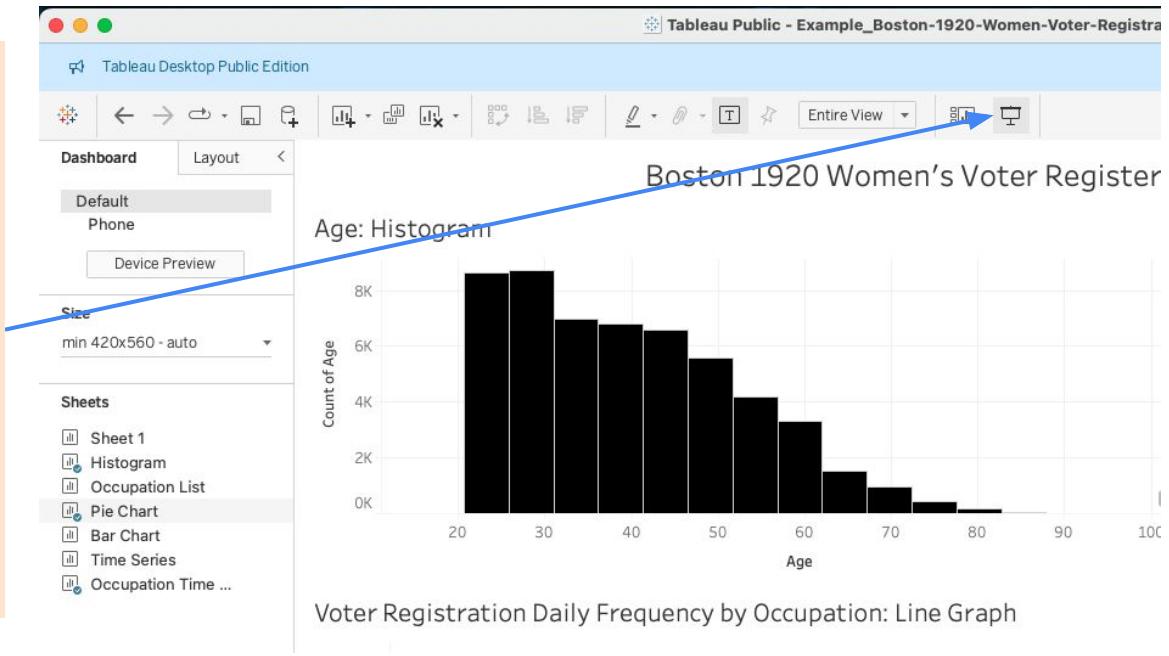
Exporting Visualizations (1/2)

If you have saved your work to Tableau Public, select **Download**

Feel free to ask questions at any point during the presentation!

Exporting Visualizations (2/2)

The free version of Tableau does not have an option to export without sharing publicly. To work around this limitation, you can go to **Presentation Mode** and take a screenshot.

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Demonstration

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Data Analysis and Visualization Steps

1. Importing data
2. Cleaning data
3. Creating visualizations
   a. Histogram
   b. Pie Chart
   c. Bar Graph
   d. Line Chart
4. Formatting visualizations (includes accessibility)
5. Saving and exporting

Student Guided Practice

Feel free to ask questions at any point during the presentation!

Your turn!

- If you do not have Tableau desktop downloaded, and your data can be shared publicly, you can try out the browser-based version: https://public.tableau.com/app/discover
- You can also download Tableau desktop here: https://www.tableau.com/academic/students
- Try importing your own data or the sample data into Tableau desktop (sample data at: bit.ly/sp26-engw3307-tableau-data)
- Try making a bar graph or line chart
  - Play with different filters and formatting options

Feel free to ask questions at any point during the presentation!

Post-exploration group discussion

- Any reflections about working on Tableau? Was anything weird/tricky?
- What types of data would you be interested in using in the future?
- How might you visualize that data?

Feel free to ask questions at any point during the presentation!

Further Resources

- [The Northeastern Tableau Community](#)
- [Learn data and analytics for free with Tableau | Certified Online Resources](#) from Salesforce
- [Knowledge Base](#) from Salesforce

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Thank you!

—Developed by Sara Morrell, Emily Sullivan, Ana Abraham, Chris McNulty, and Sean P. Rogers

- For more information on the DITI, please see: https://bit.ly/diti-about
- Schedule an appointment with us! https://bit.ly/diti-meeting
- If you have any questions, contact us at: nulab.info@gmail.com
- We'd love your feedback! Please fill out a short survey here: https://bit.ly/diti-feedback

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