Share Data Through the Art of Visualization

★ **Visualize Data**

Bar graphs

Use size contrast to compare two or more values

Line graphs

Help your audience understand shifts or changes in your data

Pie charts

Show how much each part of something makes up the whole

Maps

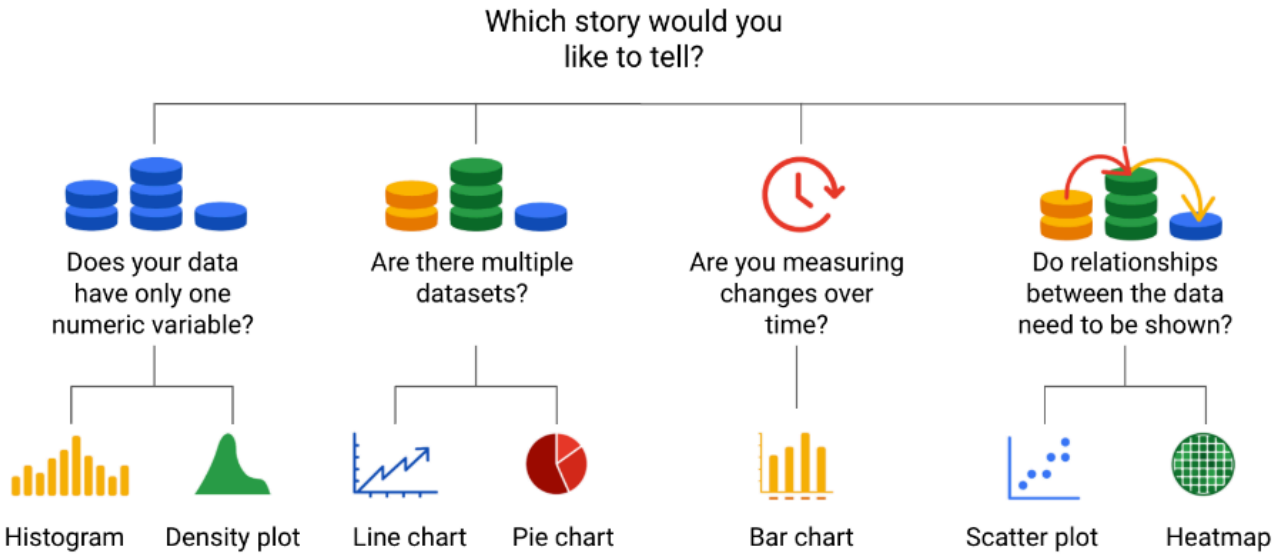
Help organize data geographically

Histogram

A chart that shows how often data values fall into certain ranges

One of your biggest considerations when creating a data visualization is where you'd like your audience to focus

Decision tree example



The elements of art

- Line
- Shape
- Color
- Space
- Movement

Nine basic principles of design

There are nine basic **principles of design** that data analysts should think about when building their visualizations.

Over time

Ex: Clicks since Jan 2020

Line

Bar

Stacked Bar

Area

Between objects

Ex: Mobile vs. Desktop traffic

Ordered Bar

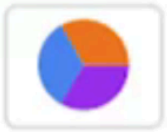
Ordered Column

Grouped Bar

Composition

Ex: What percentage of our traffic comes from each platform?

Stacked Bar



Pie

Donut

Treemap

Stacked Area

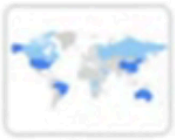
Relationships

Ex: How has clicks increased with increased spend?

Scatterplot

Bubble

Column/Line



Heatmap

Four elements of successful visualizations

The Venn diagram by David McCandless identifies four elements of successful visualizations:

- **Information (data):** The information or data that you are trying to convey is a key building block for your data visualization. Without information or data, you cannot communicate your findings successfully.
- **Story (concept):** Story allows you to share your data in meaningful and interesting ways. Without a story, your visualization is informative, but not really inspiring.
- **Goal (function):** The goal of your data visualization makes the data useful and usable. This is what you are trying to achieve with your visualization. Without a goal, your visualization might still be informative, but can't generate actionable insights.
- **Visual form (metaphor):** The visual form element is what gives your data visualization structure and makes it beautiful. Without visual form, your data is not visualized yet.

Design thinking is a process used to solve complex problems in a user-centric way. User-centricity means considering the user and their needs first.

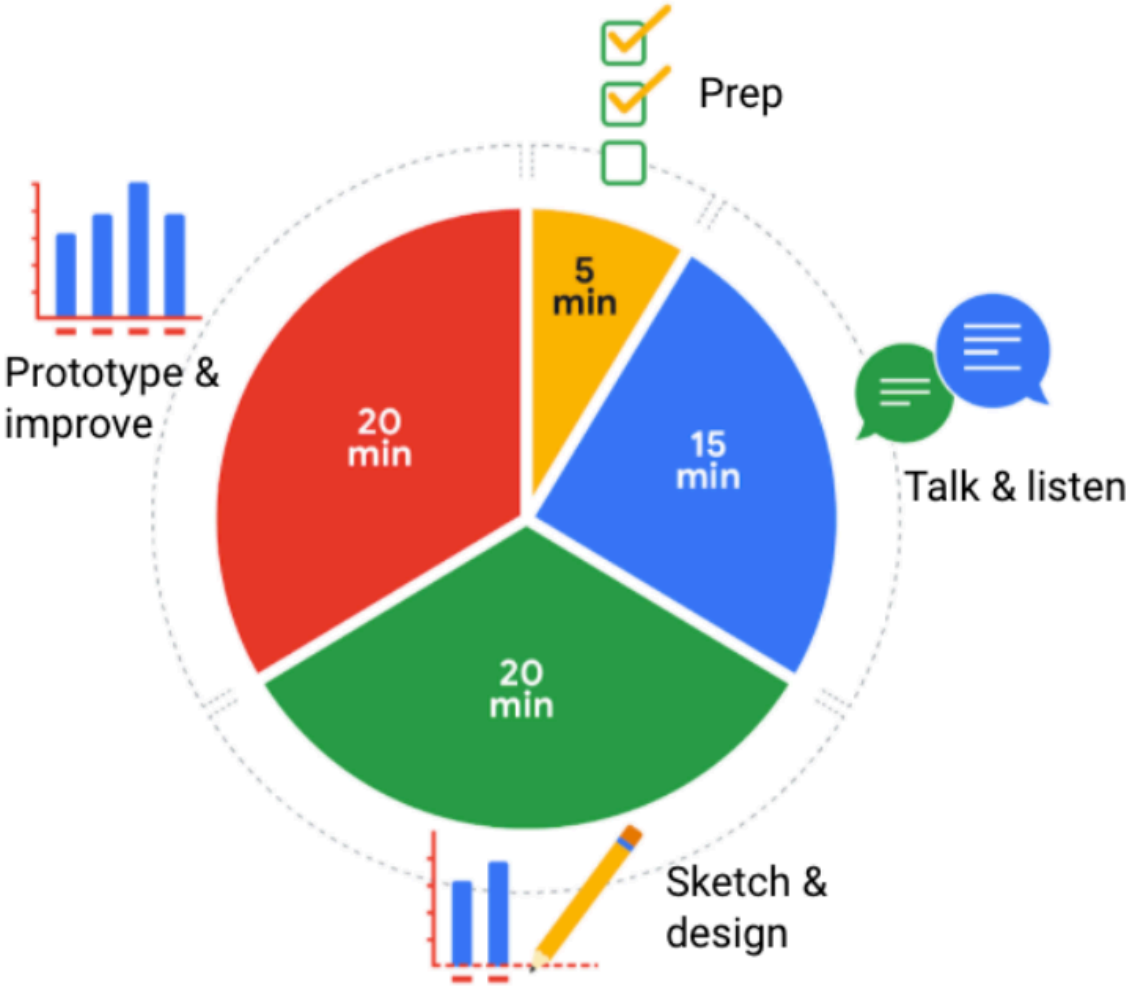
Design thinking for data visualization involves five phases:

1. **Empathize:** Thinking about the emotions and needs of the target audience for the data visualization
2. **Define:** Figuring out exactly what your audience needs from the data
3. **Ideate:** Generating ideas for data visualization
4. **Prototype:** Putting visualizations together for testing and feedback
5. **Test:** Showing prototype visualizations to people before stakeholders see them

Visualization components	Guidelines	Style checks
Headlines	- **Content**: Briefly describe the data - **Length**: Usually the width of the data frame - **Position**: Above the data	- Use brief language - Don't use all caps - Don't use italic - Don't use acronyms - Don't use abbreviations - Don't use humor or sarcasm
Subtitles	- **Content**: Clarify context for the data - **Length**: Same as or shorter than headline - **Position**: Directly below the headline	- Use smaller font size than headline - Don't use undefined words - Don't use all caps, bold, or italic - Don't use acronyms - Don't use abbreviations
Labels	- **Content**: Replace the need for legends - **Length**: Usually fewer than 30 characters - **Position**: Next to data or below or beside axes	- Use a few words only - Use thoughtful color-coding - Use callouts to point to the data - Don't use all caps, bold, or italic
Annotations	- **Content**: Draw attention to certain data - **Length**: Varies, limited by open space - **Position**: Immediately next to data annotated	- Don't use all caps, bold, or italic - Don't use rotated text - Don't distract viewers from the data

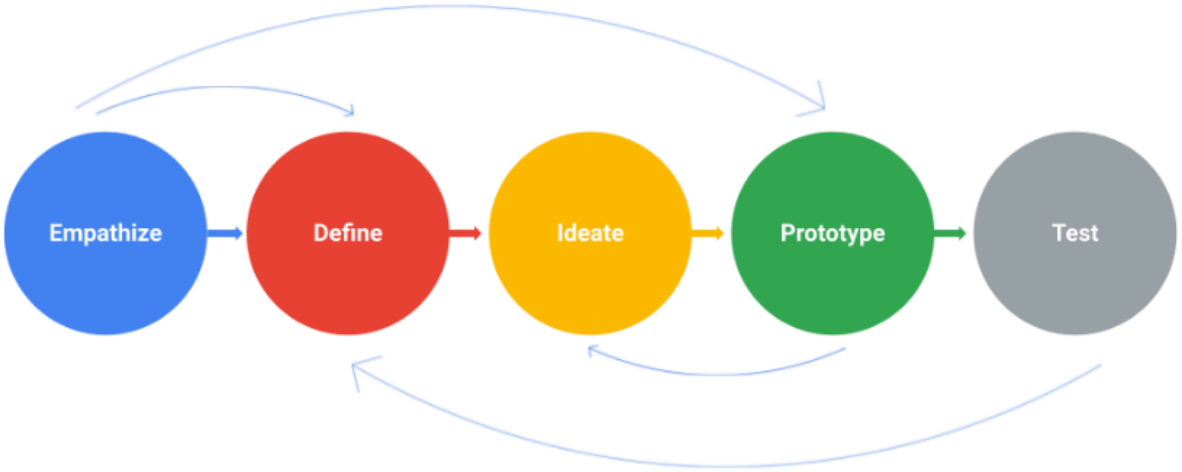
Ways to make data visualizations accessible:

- Labeling
- Text alternatives
- Text-based format
- Distinguishing
- Simplify



Steps to Make Great Visualizations:

- **Empathize**: Think about the emotions and needs of the target audience.
- **Define**: Understand the audience's needs, problems, and insights.
- **Ideate**: Use your findings from the previous phases to begin to create data visualizations.
- **Prototype:** Start putting it all together. In this case, you can put your findings into a presentation or dashboard.
- **Test**: Check that your prototype is effective. In this case, you can show your visualizations to team members before the presentation.



Once you're done customizing your chart, review your choices to ensure that your visualization is easy to understand.

- Do you think your audience will fully understand what they are observing within five seconds?
- Will they understand the key takeaway you're trying to communicate after another five seconds?
- Did you use the most clear and communicative visualization style for your data?

If the answer to any of these questions is no, try different visualization styles and design choices. Experiment with colors, shapes, and chart types to find what makes it easier or harder to understand the message you are trying to convey.

★ Create data visualizations with Tableau

Tableau

A business intelligence and analytics platform that helps people see, understand, and make decisions with data

Diverging color palette

Displays two ranges of values using color intensity to show the magnitude of the number and the actual color to show which range the number is from

So far, you have considered a few rules about what makes a helpful data visualization:

- **Five-second rule:** A data visualization should be **clear, effective, and convincing** enough to be absorbed in five seconds or less.
- **Color contrast:** Graphs and charts should use a **diverging color palette** to show contrast between elements.
- **Conventions and expectations:** Visuals and their organization should align with **audience expectations** and **cultural conventions**. For example, if the majority of your audience associates green with a positive concept and red with a negative one, your visualization should reflect this.
- **Minimal labels:** Titles, axes, and annotations should use as **few labels** as it takes to make sense. Having too many labels makes your graph or chart too busy. It takes up too much space and prevents the labels from being shown clearly.

★ Craft data stories

Dashboard

A tool that organizes information from multiple datasets into one central location for tracking, analysis, and simple visualization

Dashboard filter

A tool for showing only the data that meets a specific criteria while hiding the rest

Data storytelling

Communicating the meaning of a dataset with visuals and a narrative that are customized for each particular audience

3 data storytelling steps

1. Engage your audience
2. Create compelling visuals
3. Tell the story in an interesting narrative

Spotlighting

Scanning through data to quickly identify the most important insights

What's the single most important thing I want my audience to learn from my analysis?

★ **Develop presentations and slideshows**

The framework of your presentation starts with your understanding of the business task

Hypothesis

The theory you're trying to prove or disprove with data

The McCandless Method

1. Introduce the graphic by name
2. Answer obvious questions before they're asked
3. State the insight of your graphic
4. Call out data to support that insight
5. Tell your audience why it matters

Present the possible business impact of the solution and clear actions stakeholders can take

"Keep the concepts that you're presenting as simple and straightforward as possible."

Messy data presentation

In the first video, watch and listen carefully for the specifi
preview:

- No story or logical flow
- No titles
- Too much text
- Inconsistent format (no theme)
- No recommendation or conclusion at the end

Good data presentation

In the second video, numerous best practices are applied to create a better
“good” presentation is so much easier to understand than the messy one! H

- Title and date the presentation was last updated
- Flow or table of contents
- Transition slides
- Visual introduction to the data (also used as a repeated theme)
- Animated bullet points
- Annotations on top of visuals
- Logic and progression
- Limitations to the data (caveats) - what the data can’t tell you

Presentation tips:

1. Channel your excitement
2. Start with the broader ideas
3. Use the five second rule
4. Preparation is key

Your audience

- Will not always see the steps you took to reach a conclusion
- Has a lot on their mind
- Is easily distracted

How you speak

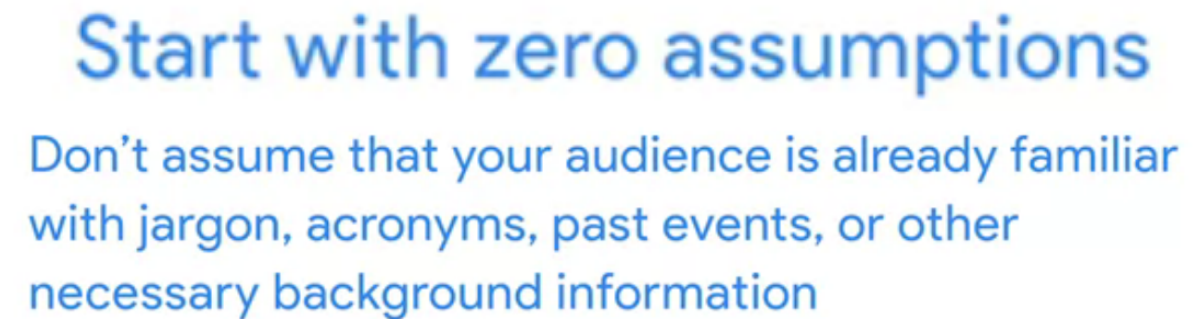
- Keep your sentences short
- Build in intentional pauses
- Keep the pitch of your sentences level

Presentation debrief

Presentations are a crucial part of communicating about your data effectively. By practicing presentation skills in advance, you can become comfortable with public speaking and master an integral part of the data analyst role.

One way to practice presenting is to learn from your past experiences. Think about a presentation you gave in the past. This might be a formal presentation in a professional setting or an experience from your personal life, such as a toast at a wedding. Reflect on how that presentation went and consider the following questions:

- What went well during your presentation? Based on what you've learned about giving presentations, which tips do you already practice?
- In what areas do you want to improve your presentation skills?
- What presentation skills do you want to learn more about? In what areas do you want to improve?



- Understand your stakeholder's expectations
- Make sure you have a clear understanding of the objective and what the stakeholders wanted

If you misunderstood your stakeholders' expectations or the project objectives, you won't be able to correctly answer their questions

A colleague test involves showing a presentation to coworkers who are unfamiliar with the subject matter in order to get their feedback.

Question & Answer Tips

- Listen to the whole question
- Repeat the question (if necessary)
- Understand the context
- Involve the whole audience
- Keep your responses short and to the point