

Google data analytics professional course

Week - 1

Communicating your data insights

Course content

- Data visualization
- Data visualizations with Tableau
- Stories about your data
- Developing presentations and slideshows
- Course Challenge

Understand data visualization

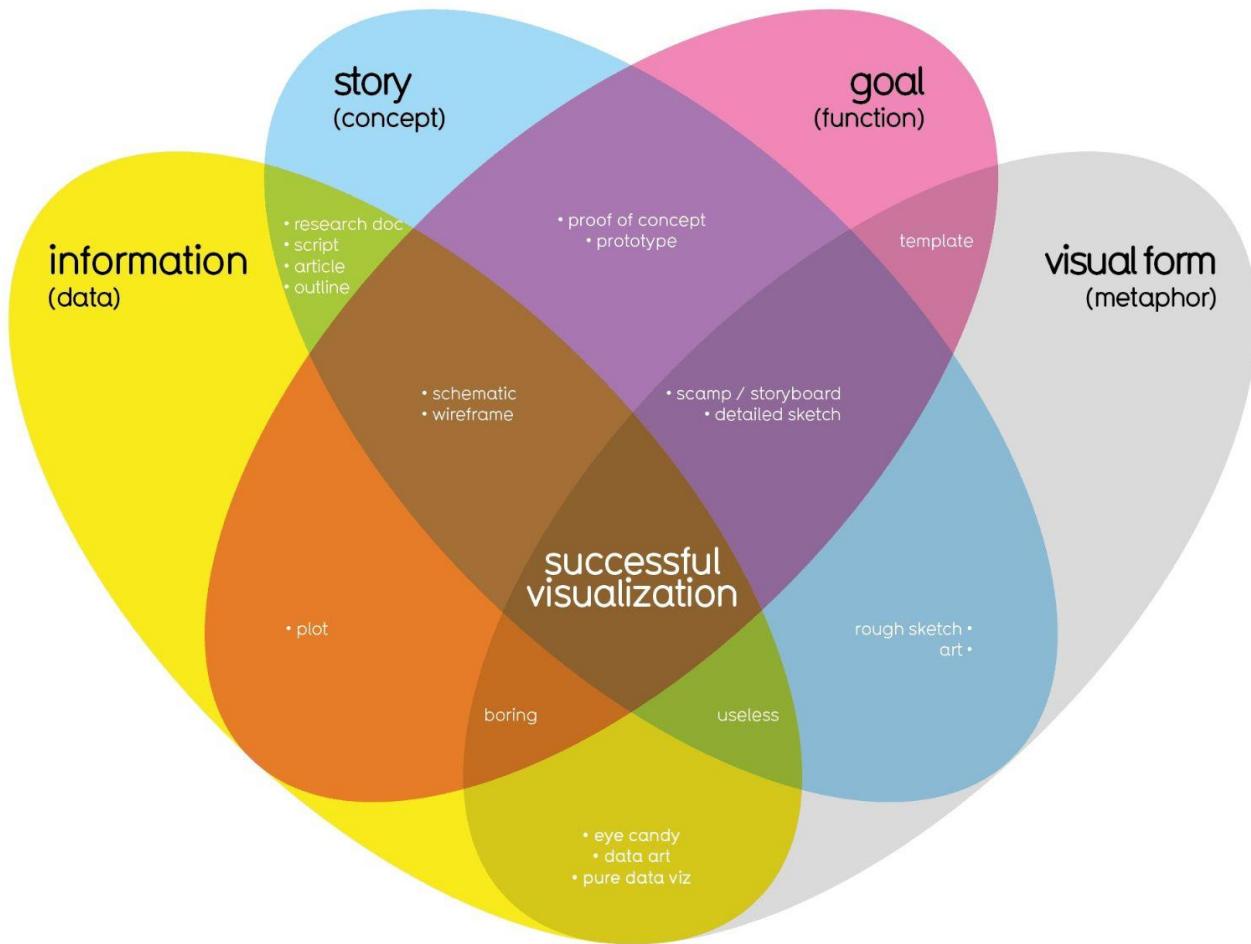
Why data visualization matters

It will convey the whole data analysis process in a single picture within a minit.

During data visualization a diagram must contains

- Goal
- Story (concept)
- Information (data)
- Visual form

What Makes a Good Visualization?

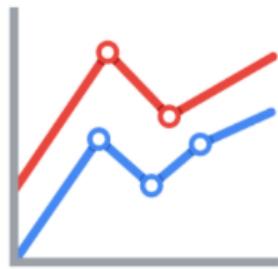


Effective data visualizations

- <https://www.informationisbeautiful.net/visualizations/what-makes-a-good-data-visualization/>
- https://junkcharts.typepad.com/junk_charts/junk-charts-trifecta-checkup-the-definitive-guide.html

Marks are basic visual objects like points, lines, and shapes. Every mark can be broken down into four qualities.

1. Position - Where a specific mark is in space in relation to a scale or to other marks



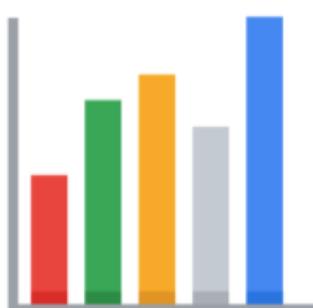
2. Size - How big, small, long, or tall a mark is



3. Shape - Whether a specific object is given a shape that communicates something about it

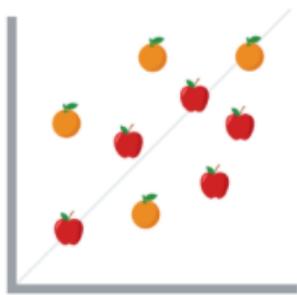


4. Color - What color the mark is

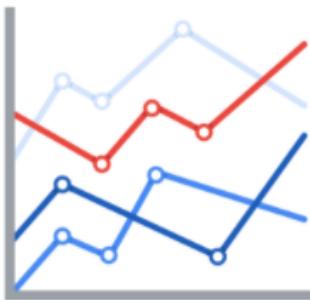


Channels are visual aspects or variables that represent characteristics of the data. Channels are basically marks that have been used to visualize data. Channels will vary in terms of how effective they are at communicating data based on three elements

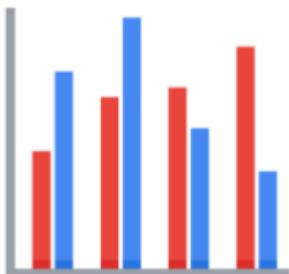
1. **Accuracy** - Are the channels helpful in accurately estimating the values being represented?



2. **Popout** - How easy is it to distinguish certain values from others?



3. **Grouping** - How good is a channel at communicating groups that exist in the data?



Design principles

- Choose the right visual
- Optimize the data-ink ratio
- Use orientation effectively
- Color
- Numbers of things

Optimize the data-ink ratio

The data-ink entails focusing on the part of the visual that is essential to understanding the point of the chart. Try to minimize non-data ink like boxes around legends or shadows to optimize the data-ink ratio.

Use orientation effectively

Make sure the written components of the visual, like the labels on a bar chart, are easy to read. You can change the orientation of your visual to make it easier to read and understand.

What to avoid

- Cutting off the y-axis
- Misleading use of a dual y-axis
- Artificially limiting the scope of the data
- Problematic choices in how data is binned or grouped
- Using part-to-whole visuals when the totals do not sum up appropriately
- Hiding trends in cumulative charts
- Artificially smoothing trends

Further readings

- https://www.ted.com/talks/david_mccandless_the_beauty_of_data_visualization?language=en#t-150183
- <https://artscience.blog/home/the-mccandless-method-of-data-presentation>
- <https://informationisbeautiful.net/>
- <https://informationisbeautiful.net/beautifulnews/>
- <https://www.amazon.com/Street-Journal-Guide-Information-Graphics/dp/0393072959>

The beauty of visualizing



- The data visualization catalogue:
https://datavizcatalogue.com/#google_vignette
- The 25 best data visualizations:
<https://visme.co/blog/best-data-visualizations/>
- 10 data visualization blogs:
<https://www.tableau.com/learn/articles/best-data-visualization-blogs>
- Information is beautiful:
<https://informationisbeautiful.net/wdvp/gallery-2019/>
- Data studio gallery:
<https://datastudio.google.com/gallery?category=visualization>

Engage your audience

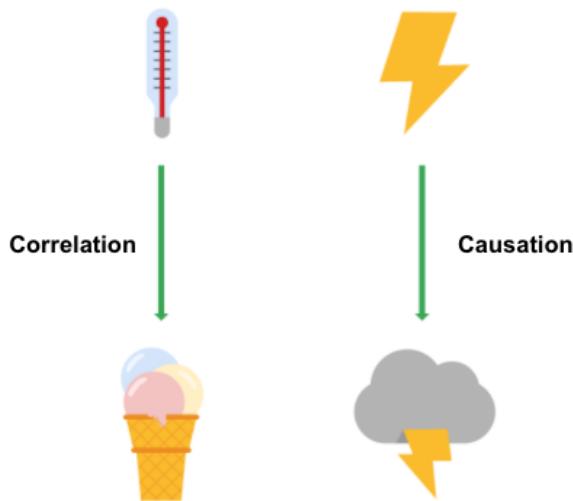
A recipe for a powerful visualization

Types of Graphs

- Time Series chart
- Histogram
- Bar chart
- Correlation charts

Correlation and causation

- **Correlation** in statistics is the measure of the degree to which two variables move in relationship to each other.
- **Causation** refers to the idea that an event leads to a specific outcome.

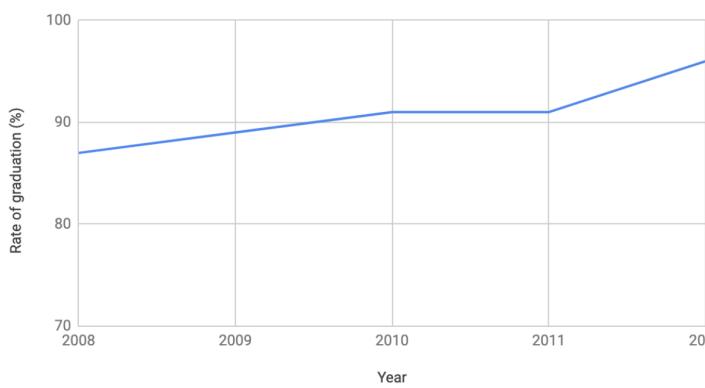


- <https://towardsdatascience.com/correlation-is-not-causation-ae05d03c1f53>
- <https://www.khanacademy.org/test-prep/praxis-math/praxis-math-lessongtp--praxis-math--lessons--statistics-and-probability/a/gtp--praxis-math--article--correlation-and-causation--lesson>

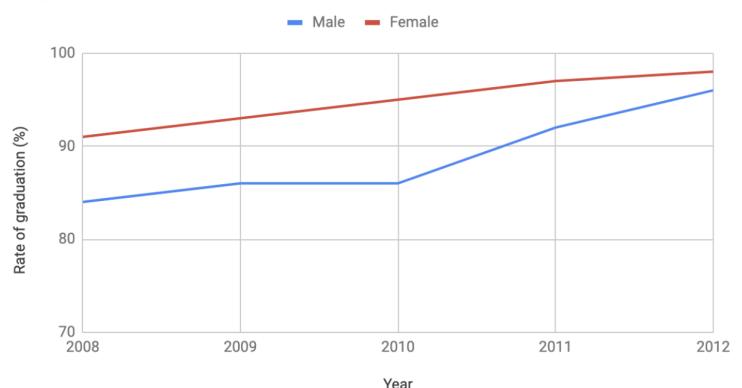
The wonderful world of visualizations

Line chart

High School Graduation Rates



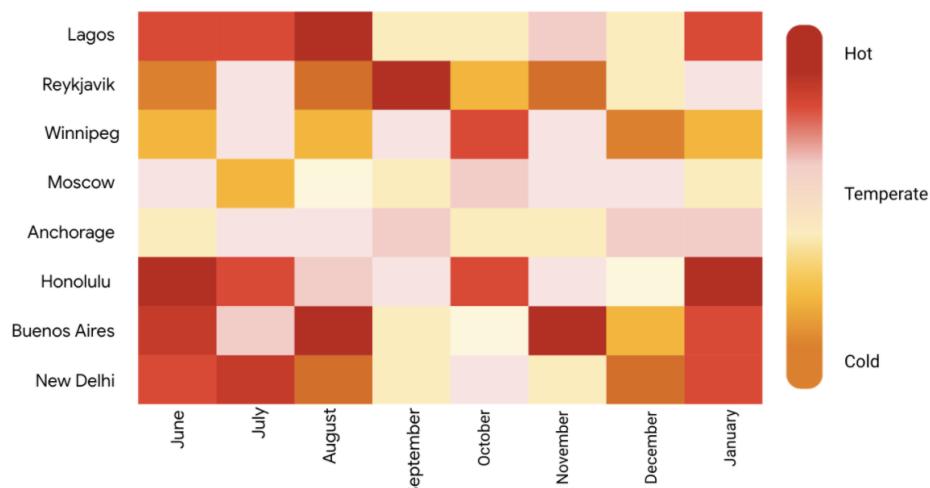
High School Graduation Rates



Column chart

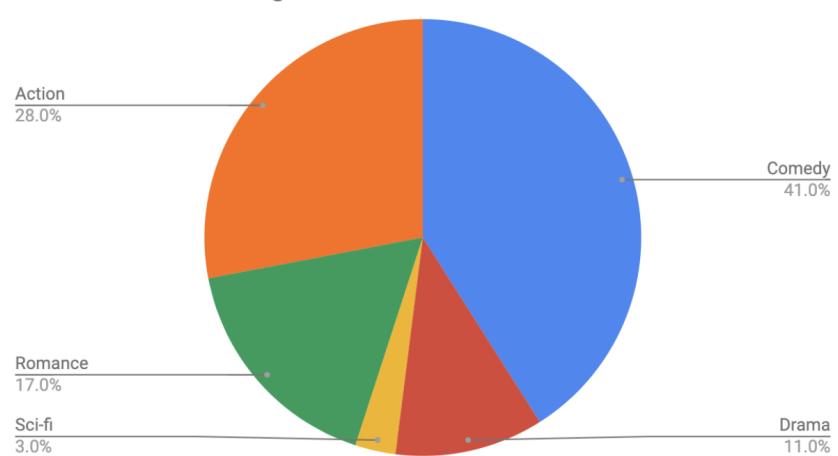


Heatmap



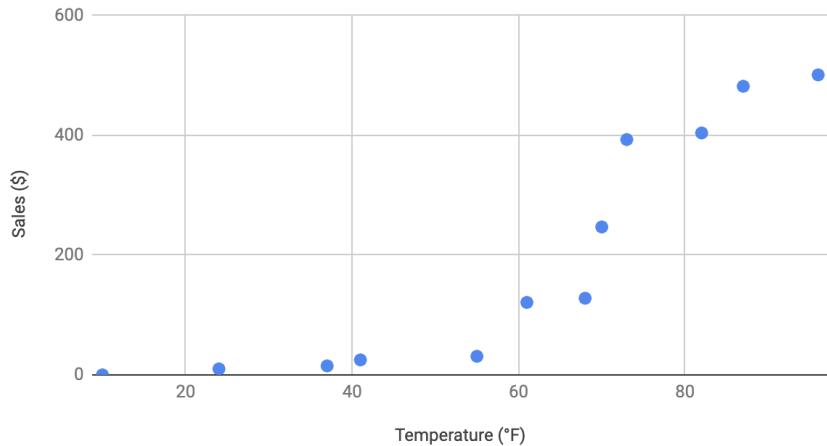
Pie chart

Favorite Movie Categories

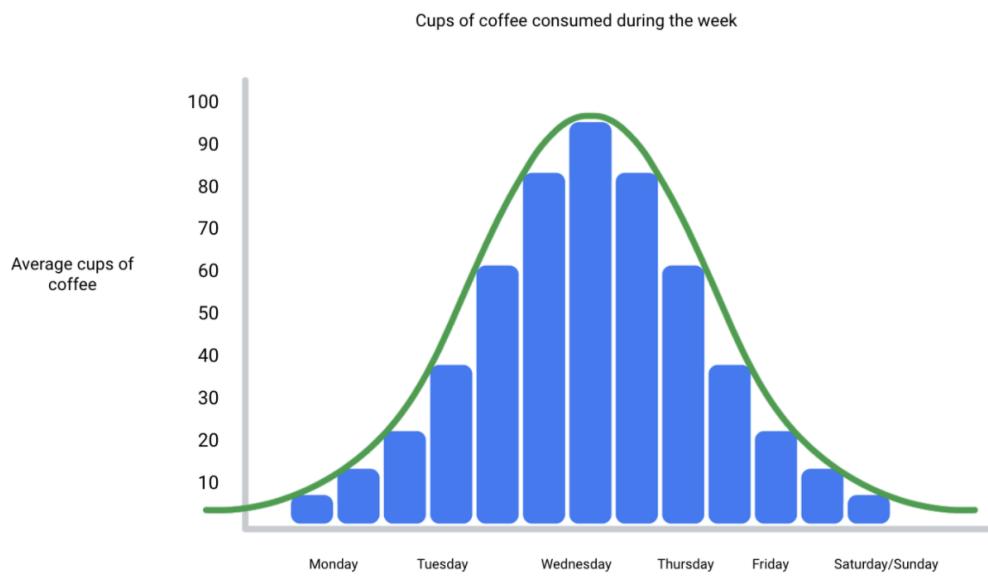


Scatter plot

Total Ice Cream Sales

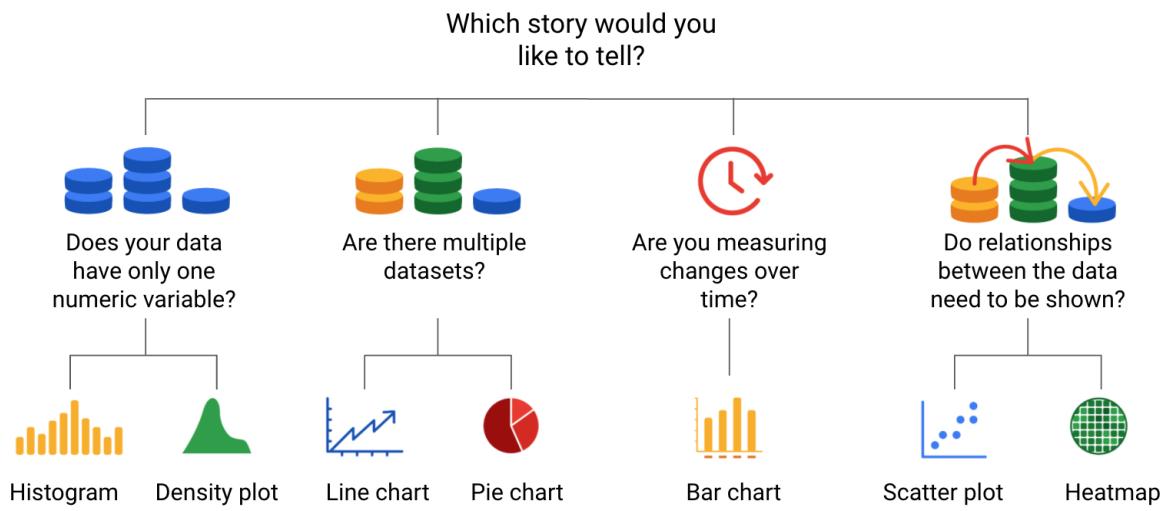


Distribution graph



Data grows on decision trees

Decision tree example



A **decision tree** is a decision-making tool that allows you, the data analyst, to make decisions based on key questions that you can ask yourself.

- <https://www.data-to-viz.com/>
- <https://www.youtube.com/watch?v=C07k0euBpr8>

Design data visualizations

The elements of art

- *line*,
- *shape*,
- *color*,
- *space and*
- *Movement*

Principles of design

Nine basic principles of design



Balance



Emphasis



Movement



Pattern



Repetition



Proportion



Rhythm



Variety



Unity

Data visualization impact

Data composition

It's achieved by combining the individual parts of a visualization and displaying them together as a whole.

Data is beautiful

Refer pdf's " M6_W1_Data is beautiful.pdf "

Design thinking and visualizations

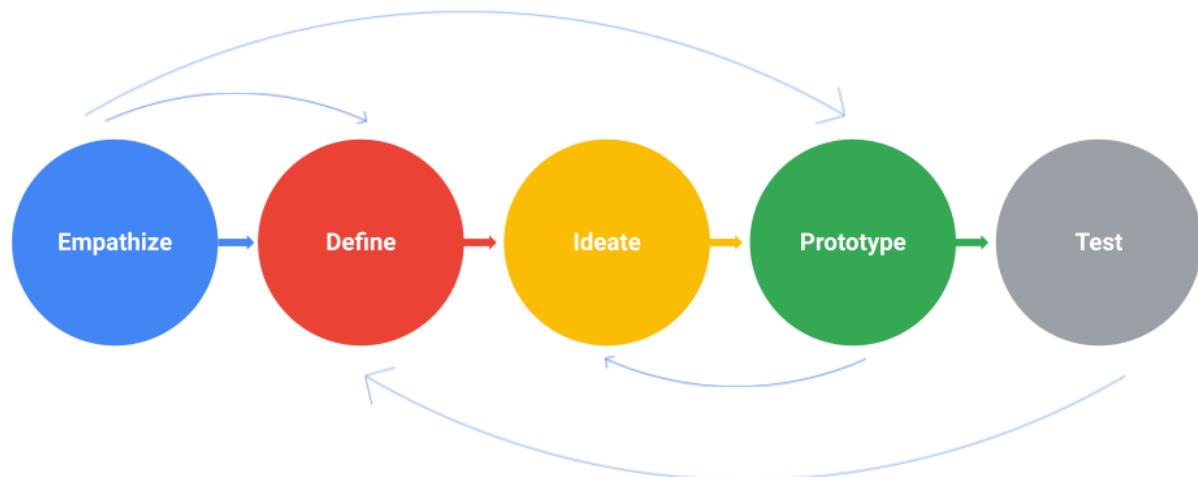
Design thinking

Design thinking is a process used to solve complex problems in a user-centric way.

Design thinking for visualization improvement

Design thinking for data visualization involves five phases:

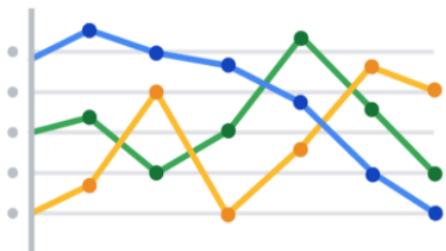
1. **Empathize**: Thinking about the emotions and needs of the target audience for the data visualization
 2. **Define**: Figuring out exactly what your audience needs from the data
 3. **Ideate**: Generating ideas for data visualization
 4. **Prototype**: Putting visualizations together for testing and feedback
 5. **Test**: Showing prototype visualizations to people before stakeholders see them.
- <https://dataconomy.com/2019/05/three-critical-aspects-of-design-thinking-for-big-data-solutions/>
 - <https://www.engineer.io/insights/data-and-design-thinking>



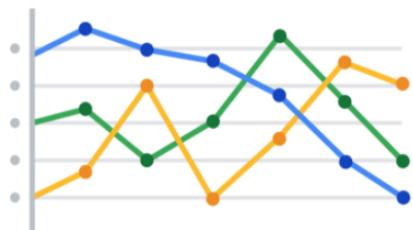
Explore visualization considerations

Headlines, subtitles, and labels

Average Rents in the Tri-City Area



Average Rents in the Tri-City Area
Oceanside, Vista and Carlsbad



Average Rents in the Tri-City Area
Oceanside, Vista and Carlsbad



Accessible visualizations

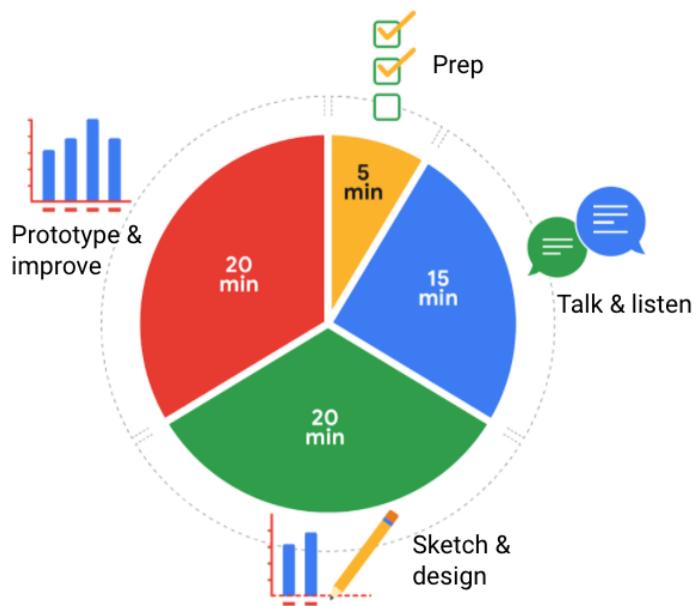
Color Blindness

<https://www.nei.nih.gov/learn-about-eye-health/eye-conditions-and-diseases/color-blindness>

Web Accessibility Guidelines v1.0 Foundations - Overview

<http://web-accessibility.carnegiemuseums.org/design/color/>

Designing a chart in 60 minutes



Week-2

Get started with Tableau

- **#:** Numeric data
- **Abc:** String data
- **Globe:** Geographic data
- **Calendar:** Date data
- **Calendar with a clock:** Date and time data

All about tabula basics

Create visualizations in Tableau

Self-Reflection: Selecting visuals and charts

- **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.

Work with multiple data sources

Linking data in Tableau (Refer video)

Tableau resources for combining multiple data sources

- https://help.tableau.com/current/pro/desktop/en-us/datasource_prepare.htm
- https://help.tableau.com/current/pro/desktop/en-us/joining_tables.htm
- https://help.tableau.com/v2020.2/pro/desktop/en-us/datasource_dont_be_scared.htm
- https://help.tableau.com/current/online/en-us/datasource_relationships_learnmorepage.htm
- https://help.tableau.com/current/pro/desktop/en-us/multiple_connections.htm
- <https://kb.tableau.com/articles/howto/combining-start-and-end-dates-into-a-single-axis>

Week-3

Use data to develop stories

Data storytelling steps

- Engage your audience,
- Create compelling visuals, and
- Tell the story in an interesting way

Effective data stories

Setting context

- How does the visualization help set the context?
- How does the visualization help clarify the data?
- Do you notice data visualization best practice?

Analyzing variables

- How does the visualization perform against the five-second rule?
- How does the visualization help clarify the data?
- Do you notice data visualization best practice?

Drawing conclusions

- How does the visualization help make a point?
- How does the visualization help clarify the data?
- Do you notice data visualization best practice?

Additional resources

- <https://www.nugit.co/what-is-data-storytelling/>
- <https://www.analyticsvidhya.com/blog/2020/05/art-storytelling-analytics-data-science/>
- <https://www.gartner.com/smarterwithgartner/use-data-and-analytics-to-tell-a-story>
- <https://www.thinkwithgoogle.com/marketing-strategies/data-and-measurement/tell-meaningful-stories-with-data/>

Use Tableau dashboards

A **dashboard** is a tool that organizes information from multiple data sets into one central location for tracking, analysis, and simple visualization through tables, charts, and graphs.

Live and static insights



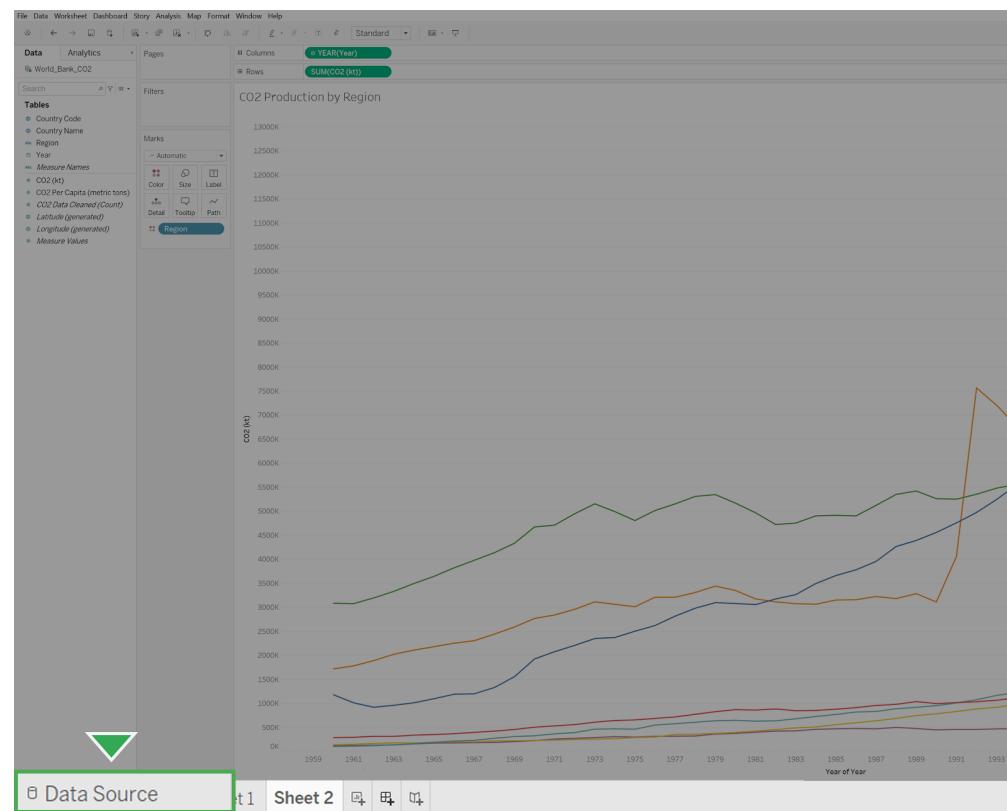
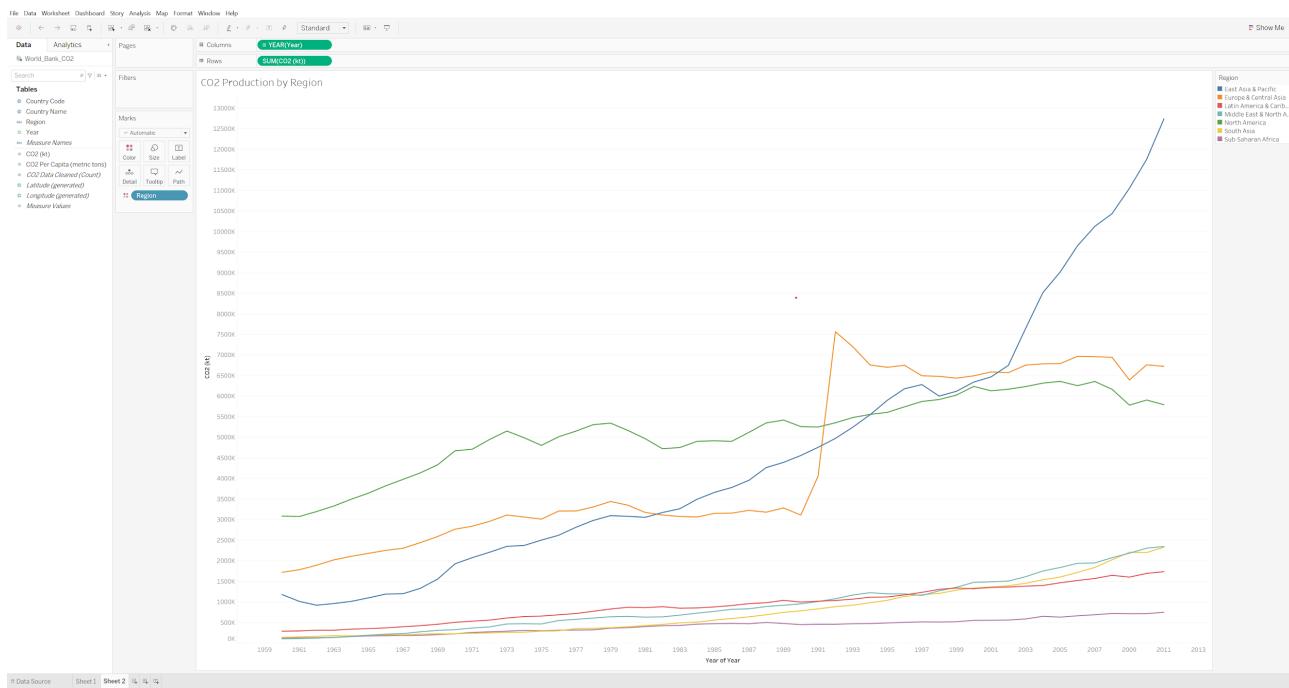
Identifying whether data is live or static depends on certain factors:

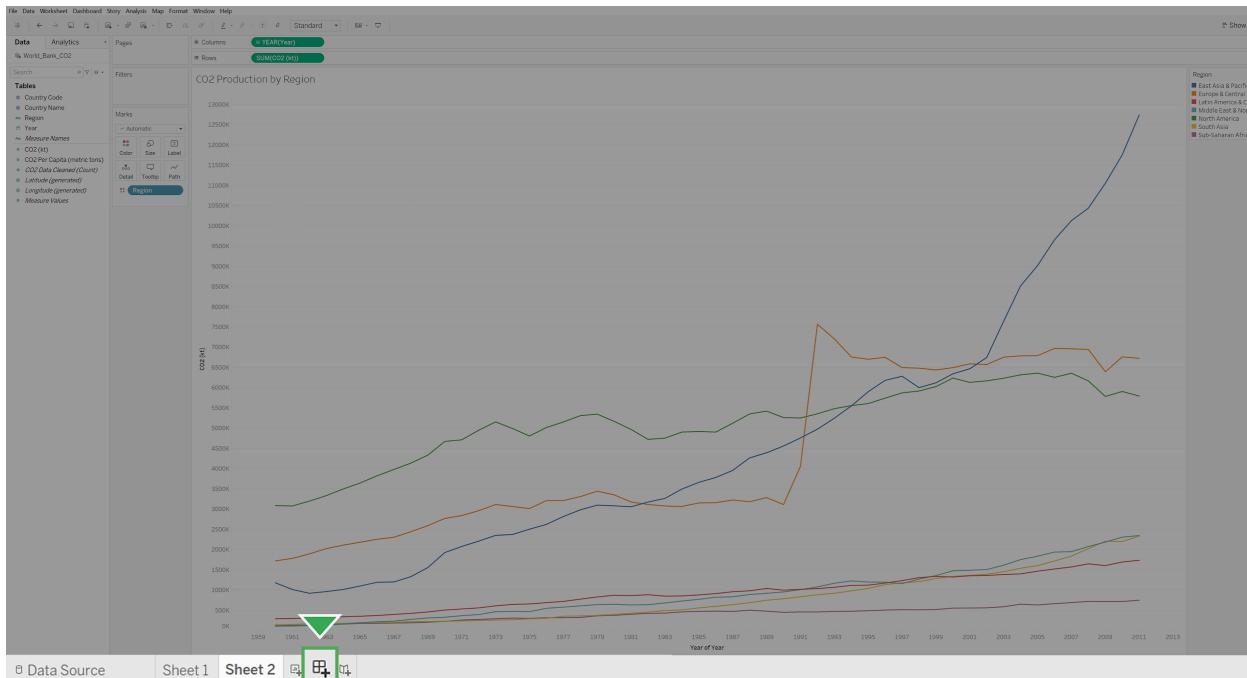
- How old is the data?
- How long until the insights are stale or no longer valid to make decisions?
- Does this data or analysis need updating on a regular basis to remain valuable?

Static data involves providing screenshots or snapshots in presentations or building dashboards using snapshots of data. There are pros and cons to static data.

Live data means that you can build dashboards, reports, and views connected to automatically updated data.

Build a dashboard in Tableau





New Workbook (Tableau Public)

File Data Worksheet Dashboard Map Format Help

← →

Dashboard Layout

Device Preview

Size

Desktop Browser (100...)

Sheets

Sheet 1

Sheet 2

Add sheets here

Drag and drop or double-click from the list on the left.

Objects

Horizontal Blank

Vertical Navigation

Text Download

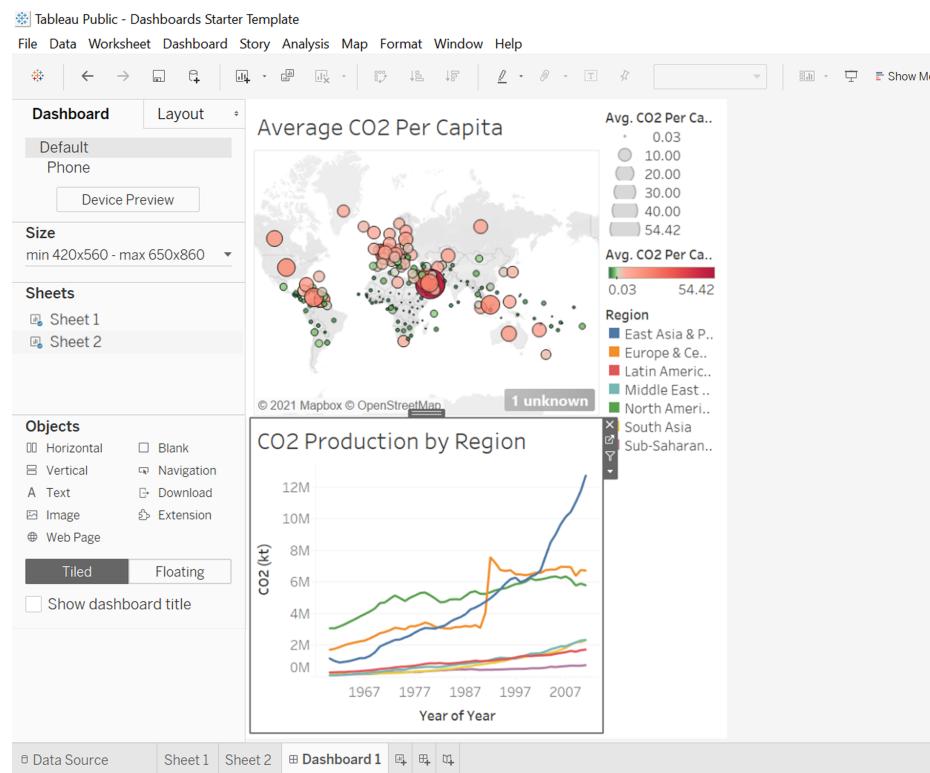
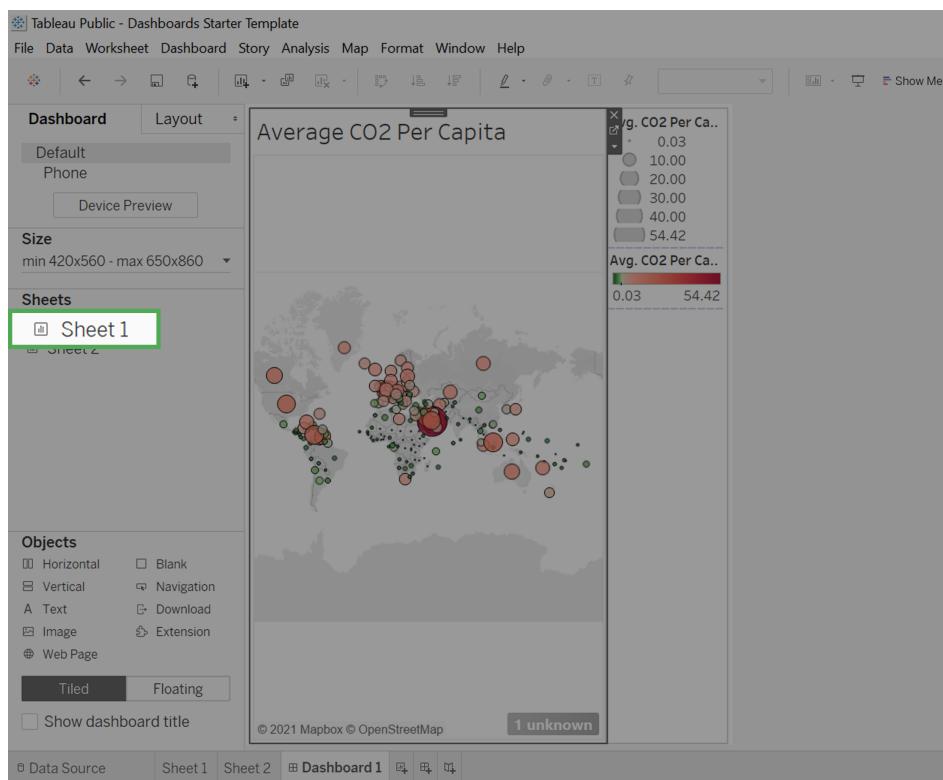
Image Extension

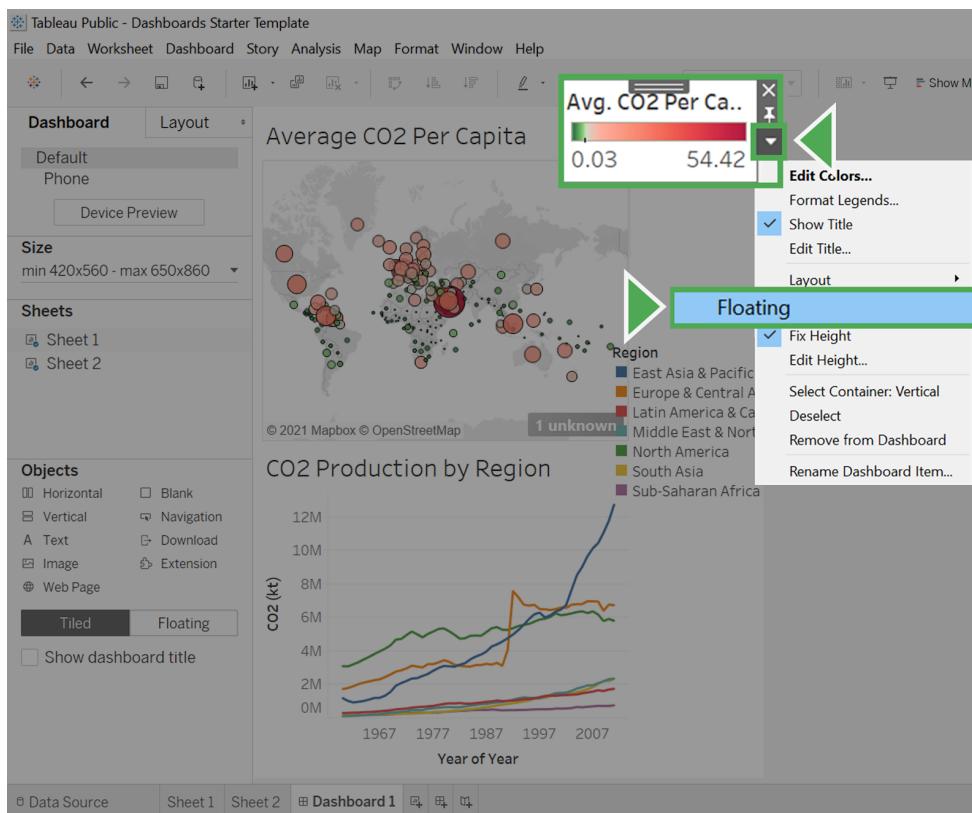
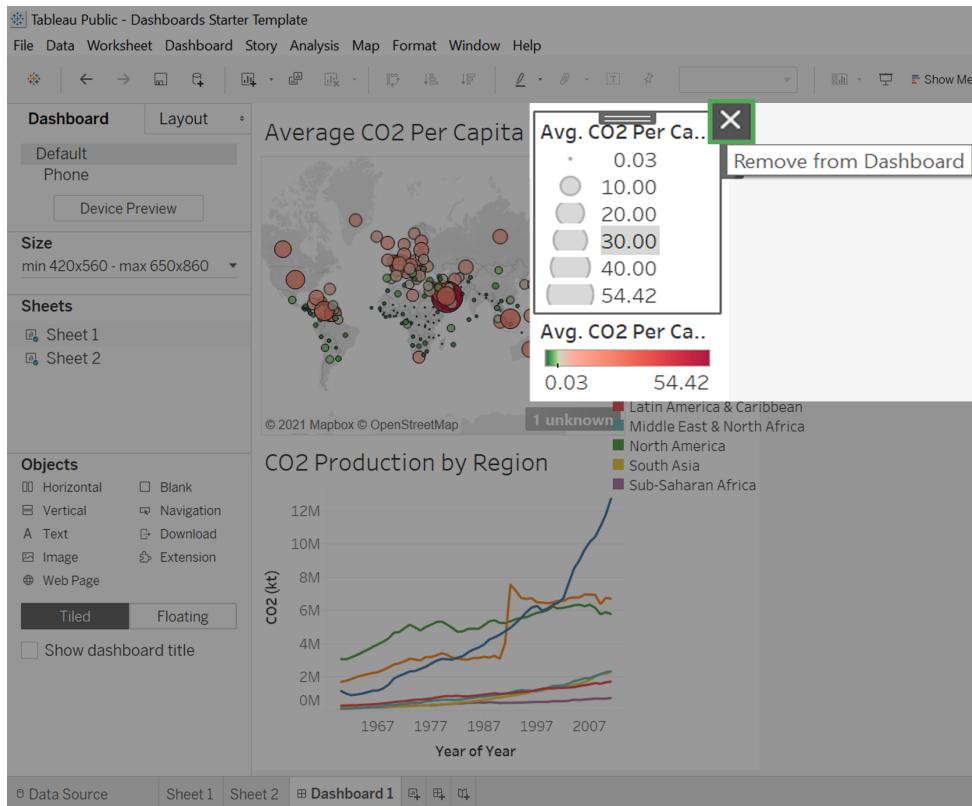
Web Page

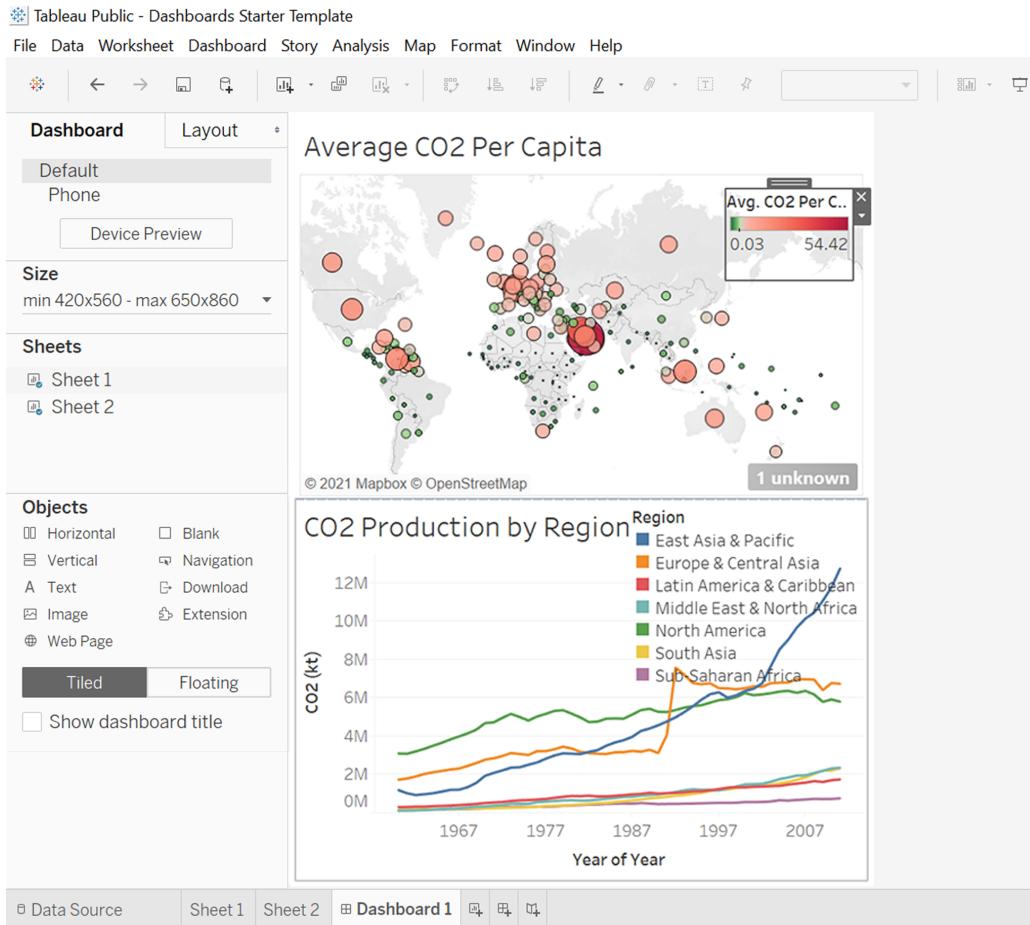
Tiled Floating

Show dashboard title

Data Source Sheet 1 Sheet 2







Hands-On Activity: Creating, filtering, and customizing charts in spreadsheet

- <https://support.google.com/docs/answer/63824>
- <https://support.microsoft.com/en-us/office/create-a-chart-from-start-to-finish-0baf399e-dd61-4e18-8a73-b3fd5d5680c2>
- <https://guides.lib.umich.edu/c.php?g=283162&p=1886446>

Sharing data stories

Compelling presentation tips

You share with your stakeholders needs

- Characters,
- A setting,
- A plot,
- A big reveal, and an
- Aha moment

Characters

The characters are the people affected by your story.

A setting

which describes what's going on, how often it's happening, what tasks are involved, and other background information about the data project that describes the current situation.

A plot

The plot, sometimes called the conflict, is what creates tension in the current situation. This could be a challenge from a competitor, an inefficient process that needs to be fixed, or a new opportunity that the company just can't pass up.

A big reveal

The big reveal, or resolution, is how the data has shown that you can solve the problem the characters are facing by becoming more competitive, improving a process, inventing a new system, or whatever the ultimate goal of your data project may be.

Aha moment

Aha moment is when you share your recommendations and explain why you think they'll help your company be successful.

Practice presenting

Create screenshots of your dashboard

Prepare a presentation

Create your slides

- <https://www.google.com/slides/about/>
- <https://www.microsoft.com/en-us/microsoft-365/free-office-online-for-the-web>
- <https://prezi.com/>

Record yourself

- <https://www.screencastify.com/>
- <https://www.techsmith.com/download/camtasia/>

Evaluating your presentation

Watch the video of your presentation. As you watch it, go through the following checklist. Each point is related to a best practice for presentations.

Do you:

- Use an attention-grabbing opening?
- Start with broad ideas and later talk about specific details?
- Speak in short sentences?
- Pause for five seconds after showing a data visualization?
- Pause intentionally at certain points?
- Keep the pitch of your voice level?
- Stand still and move with purpose?
- Maintain good posture?
- Look at your audience (or camera) while speaking?
- Keep your message concise?
- End by explaining why the data analysis matters?

Evaluate your slide deck

Next, it's time to evaluate your slide deck. Watch your video again. As you watch it, consider the following questions. Each question is related to a best practice for slide decks.

Do you:

- *Include a good title and subtitle that describe what you're about to present?*
- *Include the date of your presentation or the date when your slideshow was last updated?*
- *Use a font size that lets the audience easily read your slides?*
- *Showcase what business metrics you used?*
- *Include effective visuals (like charts and graphs)?*

Week-4

The art and science of an effective presentation

Weaving data into your presentation

McCandless Method

The McCandless Method moves from the general to the specific, like it's building a pyramid.

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

Review a slide presentation

While presenting your data follow this

- *Include a title, subtitle, and date*
- *Use a logical sequence of slides*
- *Provide an agenda with a timeline*
- *Limit the amount of text on slides. Your audience should be able to scan each block of text on your slides within 5 seconds*

- Start with the business task. Focus on the business task and frame the information in the context of the business task.
- Establish the initial hypothesis
- Show what business metrics you used
- Use visualizations
- Introduce the graphic by name
- Provide a title for each graph
- Go from the general to the specific
- Use speaker notes to help you remember talking points
- Include key takeaways

Step-by-step critique of a presentation

- Messy example of a data presentation
- Good example of a data presentation

Messy data presentation

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

Good data presentation

- 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

Identify presentation skills and practices

Self-Reflection: Examples of great presentations

The steps of the McCandless method include:

- *Introduce the graphic by name*
- *Answer obvious questions before they're asked*
- *State the insight of your graphic*
- *Call out data to support that insight*
- *Tell your audience why it matters*

Examples of great spoken presentations

- <https://www.youtube.com/watch?v=4OTPJZnBP8s>
- <https://www.youtube.com/watch?v=H14bBuluwB8>
- <https://www.youtube.com/watch?v=guXxy8LH2QM>

Guide: Sharing data findings in presentations

Refer PDF

"M6_W2_Additional insights on selecting the right data visualization.pdf"

Learning Log: Evaluate your presentation

Revisit your presentation

- *Re-record your presentation with the information you've learned during this course. Keep it as concise as possible so you can compare it to your previous version.*
- *Share the presentation with someone you know who might not be familiar with data analysis. Keep them in mind while you record*

your presentation, as it should be as simple and accessible as possible.

- *Ask them for their feedback. Did they find it engaging? Did they truly understand the concept that you explained?*
- *If it would be helpful to receive feedback in a formal way, print out the checklist you used last time (provided below) and give it to your audience.*

Presentation Evaluation Checklist:

- *Do I use an attention-grabbing opening?*
- *Do I start with broad ideas and later talk about specific details?*
- *Do I speak in short sentences?*
- *Do I pause for five seconds after showing a data visualization?*
- *Do I pause intentionally at certain points?*
- *Do I keep the pitch of my sentences level?*
- *Do I stand still and move with purpose?*
- *Do I have good posture?*
- *Do I look at my audience (or camera) while speaking?*
- *Do I keep my message concise?*
- *Do I end by explaining to my audience why the data analysis matters?*

slide deck:

- *Do I include a good title and subtitle that describe what I'm about to present?*
- *Do I include the date of my presentation or the date when my slideshow was last updated?*
- *Does my font size let the audience easily read my slides?*
- *Do I showcase what business metrics I used?*
- *Do I include effective visuals (like charts and graphs)?*

Caveats and limitations to data

Preparing for the Q&A

Before the presentation

1. Assemble and prepare your questions.
2. Discuss your presentation with your manager, other analysts, or other friendly contacts in your organization.
3. Ask a manager or other analysts what sort of questions were normally asked by your specific audience in the past.
4. Seek comments, feedback, and questions on the deck or the document of your analysis.
5. At least 24 hours ahead of the presentation, try and brainstorm tricky questions or unclear parts you may come across- this helps avoid surprises.
6. It never hurts to practice what you will be presenting, to account for any missing information or simply to calm your nerves.

During the presentation

1. Be prepared to respond to the things that you find and effectively and accurately explain your findings.
2. Address potential questions that may come up.
3. Avoid having a single question derail a presentation and propose following-up offline.
4. Put supplementary visualizations and content in the appendix to help answer questions.

Self-Reflection: Real-world objections

Responding to these questions and objections in a clear, concise, and polite manner is crucial to delivering an effective presentation.

Examples of objections

Consider the following situations where a data analyst delivers a presentation and receives an objection:

1. An analyst is presenting on the sales revenue of their company's new product: an autonomous vacuum cleaning robot. The analyst shows the steps they took for each part of the analysis. They are confident that they have explained each step very thoroughly, but a stakeholder is confused when the presentation is over. They share a concern that the analysis may be incomplete.
2. An analyst is presenting on the effectiveness of a new drug treatment for heartburn. They use data from an external private company that describes how common heartburn is in the United States. After the presentation, they receive an objection from their stakeholder about the data collected. The stakeholder is concerned that the source of the data may not be reputable, and is unsure about the credentials of the data's source company.
3. An analyst is presenting on the traffic patterns of a particular highway in their city. After extensive research and analysis, they conclude that Friday is the busiest day for commuters on that highway. One of the stakeholders, who commutes along that highway, disagrees and believes that Monday is the busiest day for traffic.

Listen, respond, and include

- Listen, Respond and include for the stakeholders questions.
- Finally, ask for feedback to improve yourself.

Quick Review

Week-1

How to put graphs

- ★ Venn diagram
- ★ Different types of plot
- ★ Different types of graphs
- ★ Correlation and causation
- ★ What graph have to use
- ★ The elements of art
- ★ Headings, Subtitles and labels

Week-2

- ★ Tableau
- ★ Rules for graphs
- ★ Multiple data set connections

Week-3

Tableau

Storytelling tips about the graph

- ★ What does the speaker do?
- ★ Whom and procedure or steps to tell story

Tableau dashboards

Share the findings

Week-4

- ★ How to tell the story using McCandless Method
- ★ Presentation skills
- ★ After storytelling the Questions arise for stakeholders, how to clear it?
- ★ Checklists

➤ **Graph Preparations.**

➤ **Narrate Story using the data.**

➤ **Answering the questions after storytelling.**

➤ **Check lists**