Introduction to Data Visualization

Host

Location

Date

Time

**Feedback form:** link to a survey

**Course materials**: <https://carpentries-incubator.github.io/intro-data-viz/>

**Data for this lesson**: <https://datadryad.org/stash/downloads/file_stream/24074>

**This notes document**: link to the shared document

**Instructors/Helpers:**



**Learners:**



# 

# The importance of message

Instructor:

Section material: <https://carpentries-incubator.github.io/intro-data-viz/00-importance-of-message.html>

## What is a chart?

## Purpose of a chart

## Components of a chart

### Prepare the data

Resources for learning more about cleaning and tidying data:

* The Data Carpentry Ecology [Data in Spreadsheets](https://datacarpentry.org/spreadsheet-ecology-lesson/) lesson offers step-by-step instructions for managing, cleaning, and tidying tabular data to prepare it for analysis
* Broman, K. W., & Woo, K. H. (2018). Data organization in spreadsheets (e3183v2). PeerJ Inc. <https://doi.org/10.7287/peerj.preprints.3183v2>
* Wickham, H. 2014. “Tidy Data.” Journal of Statistical Software 59 (10). 10.18637/jss.v059.i10<http://dx.doi.org/10.18637/jss.v059.i10>

### The Role of Tables

#### Table 1.1: a table of made-up data

|  |  |
| --- | --- |
| **Average Monthly Temperature (°F)** | **Daily Walks per Dog** |
| 30 | 0 |
| 35 | 1 |
| 45 | 1 |
| 55 | 2 |
| 65 | 3 |
| 78 | 2 |
| 80 | 2 |
| 88 | 1 |
| 70 | 3 |
| 60 | 3 |
| 45 | 1 |
| 35 | 0 |

#### Discussion 1

Take 1 minute to read Table 1.1 and discuss it with your neighbor. How easy or difficult is it to understand the data? What patterns can you detect? Write your conclusions here:

### From Table to Chart

#### Figure 1.1: X and Y axes on a Cartesian plane:



#### Figure 1.2: A line chart made from the data in Table 1.1

A graph showing the temperature of the day

Description automatically generated

#### Discussion 2

Take 1 minute to view the chart in Figure 1.2 and discuss it with your neighbor. How easy or difficult is it to understand the data? What patterns can you detect? Write your conclusions here:

## Chart Message

### Challenge 1.1: Identify a chart message

Choose the sentence that best describes the relationship depicted in the chart in Figure 1.2. Mark your answer with a + next to your choice:

1. Dogs get fewer daily walks during seasonal temperature extremes.
2. Monthly average temperature varies during the year.
3. Dogs get between 0 and 4 walks daily.

## Importance of Chart Message

## Feedback on this section:

Link to survey

# Graphical elements of a chart

Instructor:

Section material: <https://carpentries-incubator.github.io/intro-data-viz/01-graphical-elements.html>

## Graphical elements and visual properties

### Challenge 2.1: Visual properties

Match the name of the visual property to the figure that depicts it. Record your answers below the table of figures if you like. You can see a bigger version of each figure on the lesson page:   
<https://carpentries-incubator.github.io/intro-data-viz/01-graphical-elements.html#graphical-elements-and-visual-properties>

#### Visual Properties

1. Position on a common scale
2. Position on non-aligned scales
3. Length
4. Direction
5. Angle
6. Size (Area)
7. Size (Volume)
8. Curvature
9. Shading (black, white, and gray)
10. Color

#### Figures

|  |  |
| --- | --- |
| **Figure 2.1** | **Figure 2.2** |
| **Figure 2.3** | **Figure 2.4** |
| **Figure 2.5** | **Figure 2.6** |
| **Figure 2.7** | **Figure 2.8** |
| **Figure 2.9** | **Figure 2.10** |

#### Your answers:

2.1:

2.2:

2.3:

2.4:

2.5:

2.6:

2.7:

2.8:

2.9:

2.10:

### Discussion 2.1: Chart types and their components

Spend three minutes with your neighbor talking about chart types you often see and which graphical elements and/or visual properties they include. Share your answers below:

## Better visual representations

### Graphical Elements

### Visual Properties

### Shading and Color

#### Discussion 2.2: Shading and Color

Questions to ask when including shading or color in a chart:

* How many categories am I working with?
* Are my colors accessible?
* What assumptions are my colors making?
* How will my chart be distributed?

Let’s talk briefly about these questions and why they can help us make better charts.

## Support your chart’s message

### Challenge 2.2: Practice choosing better charts

Based on what you just learned about how different visual properties can be better or worse at facilitating accurate perception, look at the chart use cases below. For each chart use case, put the example charts in order from better to worse.  
You can see a bigger version of each figure on the lesson page:   
<https://carpentries-incubator.github.io/intro-data-viz/01-graphical-elements.html#support-your-charts-message>

#### Use Case 1: Chart that depicts parts of a whole

|  |  |  |
| --- | --- | --- |
| Figure 2.11 2D Pie Chart | Figure 2.12 3D Pie Chart | Figure 2.13 100% Bar Chart |

##### Your answers:

Better:

Middle:

Worse:

#### Use Case 2: Chart that compares two categories over time

|  |  |  |
| --- | --- | --- |
| Figure 2.14: 2D Line Chart | Figure 2.15: 3D Line Chart | Figure 2.16: 2D Area Chart |

##### Your answers:

Better:

Middle:

Worse:

#### Discussion:

In the use cases above, did your opinion about which chart was better or worse differ from the advice on visual properties? If so, how?

## Feedback on this section

Link to survey

# Identify and interpret the message

Instructor:

Section material: <https://carpentries-incubator.github.io/intro-data-viz/02-Identify-and-Interpret-the-message.html>

Feedback on this section: Link to survey

# Communicating the message

Instructor:

Section material: <https://carpentries-incubator.github.io/intro-data-viz/03-communicating-the-message.html>

Feedback on this section: Link to survey

# More feedback!

What questions do you have about anything in this lesson?

Please give us your thoughts on the workshop as a whole:

Link to survey