

# Data Visualization Notes

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## Data Visualization Notes

This is a starter RMarkdown template to accompany *Data Visualization* (Princeton University Press, 2019). You can use it to take notes, write your code, and produce a good-looking, reproducible document that records the work you have done. At the very top of the file is a section of *metadata*, or information about what the file is and what it does. The metadata is delimited by three dashes at the start and another three at the end. You should change the title, author, and date to the values that suit you. Keep the **output** line as it is for now, however. Each line in the metadata has a structure. First the *key* (“title”, “author”, etc), then a colon, and then the *value* associated with the key.

## This is an RMarkdown File

Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.

When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. A *code chunk* is a specially delimited section of the file. You can add one by moving the cursor to a blank line choosing Code > Insert Chunk from the RStudio menu. When you do, an empty chunk will appear:

```
cat(' Hello world!', '\n', 'This is XXX from Towson University.', '\n')
```

```
## Hello world!  
## This is XXX from Towson University.
```

Code chunks are delimited by three backticks (found to the left of the 1 key on US and UK keyboards) at the start and end. The opening backticks also have a pair of braces and the letter `r`, to indicate what language the chunk is written in. You write your code inside the code chunks. Write your notes and other material around them, as here.

## Before you Begin

To install the tidyverse, make sure you have an Internet connection. Then *manually* run the code in the chunk below. If you knit the document it will be skipped. We do this because you only need to install these packages once, not every time you run this file. Either knit the chunk using the little green “play” arrow to the right of the chunk area, or copy and paste the text into the console window.

```
## This code will not be evaluated automatically.  
## (Notice the eval = FALSE declaration in the options section of the  
## code chunk)  
  
my_packages <- c("tidyverse", "broom", "coefplot", "cowplot",  
  "gapminder", "GGally", "ggrepel", "ggridges", "gridExtra",  
  "here", "interplot", "margins", "maps", "mapproj",  
  "mapdata", "MASS", "quantreg", "rlang", "scales",  
  "survey", "srvyr", "viridis", "viridisLite", "devtools")  
  
install.packages(my_packages, repos = "http://cran.rstudio.com")
```

## Set Up Your Project and Load Libraries

To begin we must load some libraries we will be using. If we do not load them, R will not be able to find the functions contained in these libraries. The tidyverse includes ggplot and other tools. We also load the socviz and gapminder libraries.

Notice that here, the braces at the start of the code chunk have some additional options set in them. There is the language, `r`, as before. This is required. Then there is the word **setup**, which is a **label** for your code chunk. Labels are useful to briefly say what the chunk does. Label names must be unique (no two chunks in the same document can have the same label) and cannot contain spaces. Then, after the comma, an **option** is set: `include=FALSE`. This tells R to run this code but not to include the output in the final document.

When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
gapminder
```

```
## # A tibble: 1,704 x 6
##   country      continent  year lifeExp      pop gdpPercap
##   <fct>        <fct>    <int>  <dbl>    <int>    <dbl>
## 1 Afghanistan Asia      1952   28.8  8425333    779.
## 2 Afghanistan Asia      1957   30.3  9240934    821.
## 3 Afghanistan Asia      1962   32.0 10267083    853.
## 4 Afghanistan Asia      1967   34.0 11537966    836.
## 5 Afghanistan Asia      1972   36.1 13079460    740.
## 6 Afghanistan Asia      1977   38.4 14880372    786.
## 7 Afghanistan Asia      1982   39.9 12881816    978.
## 8 Afghanistan Asia      1987   40.8 13867957    852.
## 9 Afghanistan Asia      1992   41.7 16317921    649.
## 10 Afghanistan Asia      1997   41.8 22227415    635.
## # ... with 1,694 more rows
```

The remainder of this document contains the chapter headings for the book, and an empty code chunk in each section to get you started. Try knitting this document now by clicking the “Knit” button in the RStudio toolbar, or choosing File > Knit Document from the RStudio menu.

## Check your working directory

```
getwd()
```

```
## [1] "C:/Users/pchri/Math647"
```

## Interactive Map

```
{r play_with_map, include=FALSE} #if (!require('leaflet',character.only = TRUE)) install.packages("lea
#
```

```
{r} #library(leaflet) #m <- leaflet() #m <- addTiles(m) #m <- addMarkers(m, lng=-76.605949,
lat=39.390572, popup="MATH 647, Towson University") #m #
```

Look at Data

Get Started

Make a Plot

Show the Right Numbers

Graph Tables, Make Labels, Add Notes

Work with Models

Draw Maps

Refine your Plots