

# Assignment 5: Data Visualization

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## OVERVIEW

This exercise accompanies the lessons in Environmental Data Analytics on Data Visualization

## Directions

1. Rename this file `<FirstLast>_A02_CodingBasics.Rmd` (replacing `<FirstLast>` with your first and last name).
2. Change “Student Name” on line 3 (above) with your name.
3. Work through the steps, **creating code and output** that fulfill each instruction.
4. Be sure to **answer the questions** in this assignment document.
5. When you have completed the assignment, **Knit** the text and code into a single PDF file.

The completed exercise is due on Friday, Oct 14th @ 5:00pm.

## Set up your session

1. Set up your session. Verify your working directory and load the tidyverse, lubridate, & cowplot packages. Upload the NTL-LTER processed data files for nutrients and chemistry/physics for Peter and Paul Lakes (use the tidy `[NTL-LTER_Lake_Chemistry_Nutrients_PeterP` version) and the processed data file for the Niwot Ridge litter dataset (use the `[NEON_NIWO_Litter_mass_trap_Processe` version).
2. Make sure R is reading dates as date format; if not change the format to date.

```
# 1
getwd()
```

```
## [1] "/Users/isaacbenaka/Desktop/Fall 2022/872 - Data Analytics/EDA-Fall2022"
```

```
library(tidyverse)
```

```
## -- Attaching packages ----- tidyverse 1.3.2 --
## v ggplot2 3.3.6      v purrr   0.3.4
## v tibble  3.1.8      v dplyr  1.0.10
## v tidyr   1.2.1      v stringr 1.4.1
## v readr   2.1.2      v forcats 0.5.2
## -- Conflicts ----- tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
library(lubridate)
```

```
##  
## Attaching package: 'lubridate'  
##  
## The following objects are masked from 'package:base':  
##  
##    date, intersect, setdiff, union
```

```
library(cowplot)
```

```
##  
## Attaching package: 'cowplot'  
##  
## The following object is masked from 'package:lubridate':  
##  
##    stamp
```

```
PeterPaul.chem.nutrients <- read.csv("./Data/Processed/NTL-LTER_Lake_Chemistry_Nutrients_PeterPaul_Proc  
  stringsAsFactors = T)  
Litter <- read.csv("./Data/Processed/NEON_NIWO_Litter_mass_trap_Processed.csv")  
# 2  
class(Litter$collectDate)
```

```
## [1] "character"
```

```
Litter$collectDate <- as.Date(Litter$collectDate, format = "%Y-%m-%d")  
class(PeterPaul.chem.nutrients$sampldate)
```

```
## [1] "factor"
```

```
PeterPaul.chem.nutrients$sampldate <- as.Date(PeterPaul.chem.nutrients$sampldate,  
  format = "%Y-%m-%d")
```

## Define your theme

3. Build a theme and set it as your default theme.

```
# 3
```

## Create graphs

For numbers 4-7, create ggplot graphs and adjust aesthetics to follow best practices for data visualization. Ensure your theme, color palettes, axes, and additional aesthetics are edited accordingly.

4. [NTL-LTER] Plot total phosphorus (**tp<sub>ug</sub>**) by phosphate (**po<sub>4</sub>**), with separate aesthetics for Peter and Paul lakes. Add a line of best fit and color it black. Adjust your axes to hide extreme values (hint: change the limits using **xlim()** and/or **ylim()**).

# 4

5. [NTL-LTER] Make three separate boxplots of (a) temperature, (b) TP, and (c) TN, with month as the x axis and lake as a color aesthetic. Then, create a cowplot that combines the three graphs. Make sure that only one legend is present and that graph axes are aligned.

Tip: R has a built-in variable called `month.abb` that returns a list of months; see <https://r-lang.com/month-abb-in-r-with-example>

# 5

Question: What do you observe about the variables of interest over seasons and between lakes?

Answer:

6. [Niwot Ridge] Plot a subset of the litter dataset by displaying only the “Needles” functional group. Plot the dry mass of needle litter by date and separate by NLCD class with a color aesthetic. (no need to adjust the name of each land use)
7. [Niwot Ridge] Now, plot the same plot but with NLCD classes separated into three facets rather than separated by color.

# 6

# 7

Question: Which of these plots (6 vs. 7) do you think is more effective, and why?

Answer: