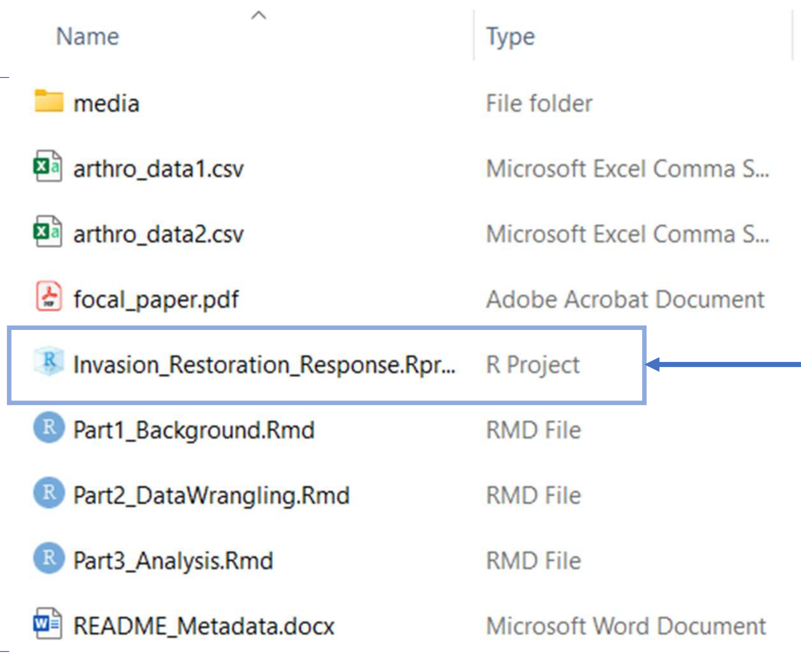
Important Note on Lesson Files

All the files needed for the student lesson are contained in the InvastionRestorationResponse.zip file. **All** the archived content in the .zip file should be extracted to a single folder, which will serve as the working directory within Rstudio.

It is easiest to access the lesson by opening the **.Rproj file**. This should automatically set the appropriate folder as the working directory, ensuring that the datasets are loaded and that images are viewable within the Rstudio interface. All other files will be accessible from within the “Files” tab in the RStudio interface.

Student files contained in *InvasionRestorationRespones.zip*



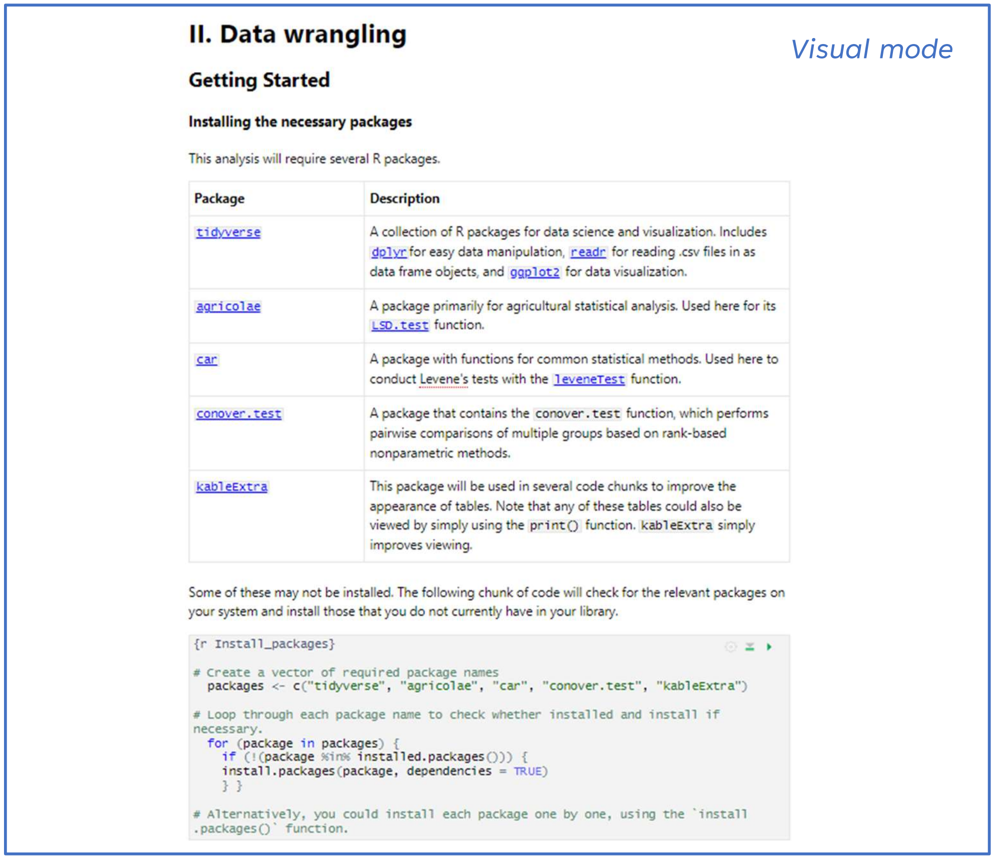
Name	Type
media	File folder
arthro_data1.csv	Microsoft Excel Comma S...
arthro_data2.csv	Microsoft Excel Comma S...
focal_paper.pdf	Adobe Acrobat Document
Invasion_Restoration_Response.Rpr...	R Project
Part1_Background.Rmd	RMD File
Part2_DataWrangling.Rmd	RMD File
Part3_Analysis.Rmd	RMD File
README_Metadata.docx	Microsoft Word Document

Students should access lesson by opening this file.

Visual Mode in RStudio

The code editor pane in Rstudio has two different interfaces that users can choose between, ‘visual’ mode and ‘source’ mode. It is **strongly encouraged** that visual mode be used as the default throughout this lesson. The Markdown files contain considerable formatting. The use of visual mode will make the user experience smoother and more visually appealing.

Below are the visual and source mode views of the same section of one of the markdown files.



II. Data wrangling

Getting Started

Installing the necessary packages

This analysis will require several R packages.

Package	Description
`tidyverse`	A collection of R packages for data science and visualization. Includes `dplyr` for easy data manipulation, `readr` for reading .csv files in as data frame objects, and `ggplot2` for data visualization.
`agricolae`	A package primarily for agricultural statistical analysis. Used here for its `LSD.test` function.
`car`	A package with functions for common statistical methods. Used here to conduct Levene's tests with the `leveneTest` function.
`conover.test`	A package that contains the `conover.test` function, which performs pairwise comparisons of multiple groups based on rank-based nonparametric methods.
`kableExtra`	This package will be used in several code chunks to improve the appearance of tables. Note that any of these tables could also be viewed by simply using the `print()` function. `kableExtra` simply improves viewing.

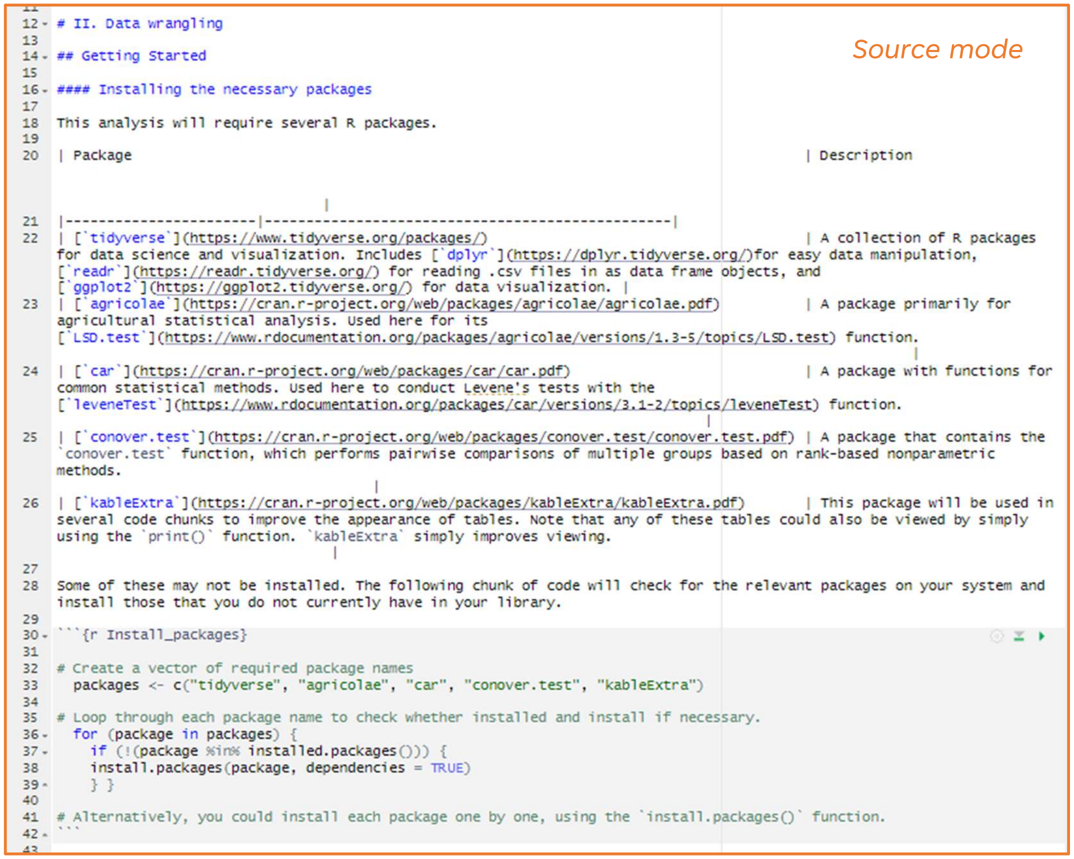
Some of these may not be installed. The following chunk of code will check for the relevant packages on your system and install those that you do not currently have in your library.

```
{r Install_packages}

# Create a vector of required package names
  packages <- c("tidyverse", "agricolae", "car", "conover.test", "kableExtra")

# Loop through each package name to check whether installed and install if
necessary.
  for (package in packages) {
    if (!(package %in% installed.packages())) {
    install.packages(package, dependencies = TRUE)
    } }

# Alternatively, you could install each package one by one, using the `install
.packages()` function.
```



~~~
# II. Data wrangling

## Getting Started

#### Installing the necessary packages

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| Package                                                                      | Description

                                    |
|----------------------|------------------------------------------------|
| [`tidyverse`](https://www.tidyverse.org/packages/)                         | A collection of R packages
for data science and visualization. Includes [`dplyr`](https://dplyr.tidyverse.org/)for easy data manipulation,
[`readr`](https://readr.tidyverse.org/) for reading .csv files in as data frame objects, and
[`ggplot2`](https://ggplot2.tidyverse.org/) for data visualization. |
| [`agricolae`](https://cran.r-project.org/web/packages/agricolae/agricolae.pdf)      | A package primarily for
agricultural statistical analysis. Used here for its
[`LSD.test`](https://www.rdocumentation.org/packages/agricolae/versions/1.3-5/topics/LSD.test) function.
                                                                                             |
| [`car`](https://cran.r-project.org/web/packages/car/car.pdf)                        | A package with functions for
common statistical methods. Used here to conduct Levene's tests with the
[`leveneTest`](https://www.rdocumentation.org/packages/car/versions/3.1-2/topics/leveneTest) function.
                                                                              |
| [`conover.test`](https://cran.r-project.org/web/packages/conover.test/conover.test.pdf) | A package that contains the
`conover.test` function, which performs pairwise comparisons of multiple groups based on rank-based nonparametric
methods.
                                             |
| [`kableExtra`](https://cran.r-project.org/web/packages/kableExtra/kableExtra.pdf)       | This package will be used in
several code chunks to improve the appearance of tables. Note that any of these tables could also be viewed by simply
using the `print()` function. `kableExtra` simply improves viewing.
                                         |

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# Alternatively, you could install each package one by one, using the `install.packages()` function.
```
~~~
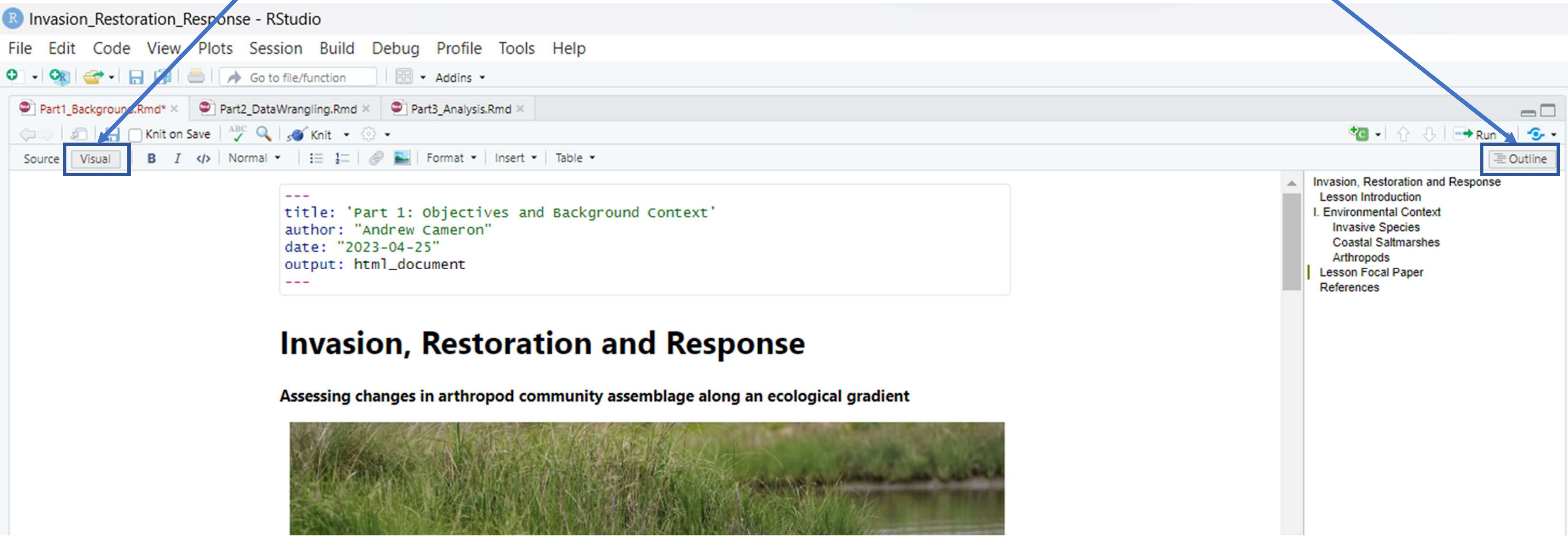

Click the ‘Visual’ button to access visual mode.

Once in visual mode, you can enable an interactive outline by clicking the “Outline” button.



```
---
title: 'Part 1: Objectives and Background Context'
author: "Andrew Cameron"
date: "2023-04-25"
output: html_document
---
```

Invasion, Restoration and Response

Assessing changes in arthropod community assemblage along an ecological gradient