

## 1. Tactile Friction: Building a Relationship

Up until this point, we have only analyzed one variable at a time. In the real world, however, scientific inquiry often does not operate in isolation. In Chapter 5, we transition from observing single variables to exploring **relationships**. We are now asking the fundamental question of bivariate data: Does a change in an Explanatory variable ( $x$ ) reliably predict a change in a Response variable ( $y$ )?

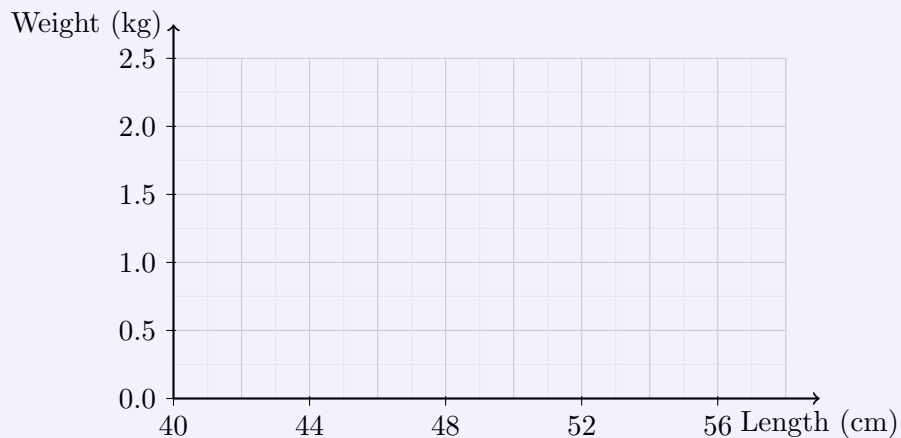
### Reflection: The Snowy River Mini-Audit

Below is a sample of 10 adult platypuses. Your goal is to visualize the relationship between their body length and weight.

Platypus	Length ( $x$ , cm)	Weight ( $y$ , kg)
1	54	2.0
2	50	1.6
3	43	1.0
4	43	1.1
5	43	0.6
6	54	1.6
7	47	1.2
8	45	1.2
9	49	2.0
10	47	1.2

**Task 1:** Plot these 10 points on the grid below.

**Task 2:** Use a ruler to draw what you think is the “Best Fit Line” through the center of the cloud.



**Task 3:** Using the line you just drew, predict the weight of a platypus that is **52 cm** long:

\_\_\_\_\_ kg.

## 2. Scaling Up: The `plot()` Function

Plotting 10 dots by hand builds our biological intuition, but the full `PlatypusData2` dataset contains hundreds of adults. To see the true cloud of the entire Catchment, we must transition our hand-drawn logic into R.

### Reflection: Textbook Dive: Section 5.1

**Read Section 5.1 in your textbook** to see how R generates scatterplots. The simplest way to build a scatterplot in R is to use the `plot(x, y)` syntax, passing the two specific columns you want to visualize.

**Task 4:** In the real world, you cannot just guess what the data engineers named their columns! Access the Catchment Data Dictionary from the Course DropBox. The file is titled

`statypus_research_and_data_guide.txt`.

Find the exact column names used in `PlatypusData2` for body length and weight.

Length Variable: \_\_\_\_\_ Weight Variable: \_\_\_\_\_

**Bill the Statypus says:** Hold your horses! Before you open your script to test that code, make sure you have loaded our new Chapter 5 environment. Look at the beginning of Chapter 5 in your textbook to find the exact command to download the new workspace. Run that in your console first so R actually knows what `PlatypusData2` is!

### Reflection: The Catchment Cloud

**Task 5:** Look at Section 5.1 in `r.statypus.org` and then open an R script. Use the textbook to find code to generate the full scatterplot. Compare this true population cloud to the 10-point sample you graphed by hand on the previous page. What similarities or differences do you notice?

**Sally the Statypus says:** Be careful with the order! Inside the `plot()` function, the Explanatory variable ( $x$ ) comes first, followed by a comma, and then the Response variable ( $y$ ). It perfectly matches the  $(x, y)$  coordinate pairs you are used to reading in math class! Just remember to use the `$` operator to tell R exactly which variables you want from a dataframe.