Class activity: linear regression

Group members:

Instructions: Work with a neighbor on the following activity. I will collect the handout at the end of class, and it will be part of your class participation grade. You will be graded only on effort – it is ok if you don't finish all the questions, or get them all correct.

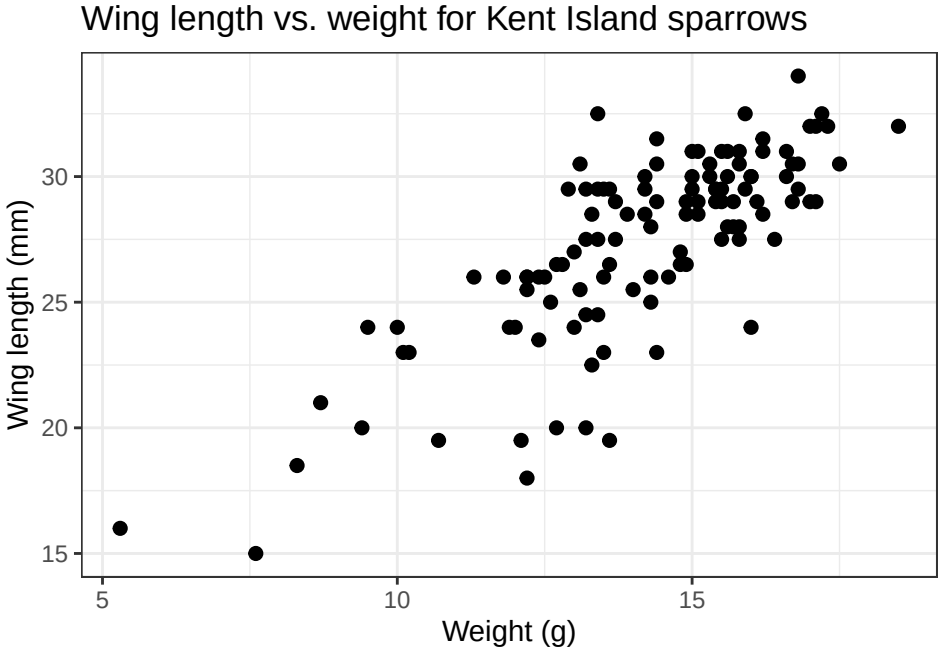
Sparrow data

In this activity, you will practice using and interpreting a fitted regression line. We will work with data on 116 sparrows, which were observed on Kent Island, New Brunswick. For each sparrow, we have information including:

- *Weight*: the weight of the sparrow (in grams)
- *WingLength*: the sparrow's wing length (in mm)

This data is included in the `Stat2Data` package (the R package for our class textbook).

Questions



1. Based on the plot, is linear regression an appropriate choice for modeling the relationship between weight and wing length?

We now fit a linear regression, with weight as the explanatory variable and wing length as the response. The equation of the fitted model is

$$\widehat{\text{wing length}} = 8.755 + 1.313 \text{ weight}$$

2. What is our estimated intercept, $\hat{\beta}_0$?

3. What is our estimated slope, $\hat{\beta}_1$?

4. What is the estimated wing length for a sparrow which weighs 15g?

5. What is the estimated wing length for a sparrow which weights 16g?

6. Compare your answers to exercises 5 and 6 – how much does the predicted wing length change when we increase weight by 1g?