

# M12 Problem Set: Simple Linear Regression for TAs

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We conducted an experiment to investigate the potential relationship between temperature variations and plant growth. We measured the height of specific plant species across a range of temperatures. Perform a simple linear regression to explore this relationship. Use the variables: **loght** and **temp**.

Assume that the data is normal (normally distributed).

1. What is the response variable?
2. What is the explanatory variable?
3. Since regressions can help model scenarios, determine the regression equation for the (log) plant height as a function of temperature.
4. Summarize: Write a concise one paragraph summary of this analysis. Remember that any summary should include the following:
  - a. Statement of the research hypothesis or study objectives.
  - b. Brief summary of methods (one sentence or less).
  - c. Statement of the statistical results (including type of test and shorthand: R-squared= obtained value, p = 0.xxx).
  - d. Description of any differences, if meaningful, along with an interpretation of why these results make sense (or don't make sense).

#1. Import libraries and load packages

```
library(tidyverse)
library(dplyr)
library(readxl)
```

#2. importing our data

```
Plant_height <- read.csv(file = "Plant_height.csv", header = TRUE)
```

#3. Run a Simple Linear Regression

```
model <- lm(loght ~ temp, data = Plant_height)
summary(model)
```

```
##
## Call:
## lm(formula = loght ~ temp, data = Plant_height)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.97903 -0.42804 -0.00918  0.43200  1.79893
##
```

```
## Coefficients:
##           Estimate Std. Error t value Pr(>|t|)
## (Intercept) -0.225665   0.103776  -2.175   0.031 *
## temp         0.042414   0.005593   7.583 1.87e-12 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.6848 on 176 degrees of freedom
## Multiple R-squared:  0.2463, Adjusted R-squared:  0.242
## F-statistic: 57.5 on 1 and 176 DF,  p-value: 1.868e-12
```

Reference: <https://environmentalcomputing.net/statistics/linear-models/linear-regression/>