*`install.packages("ggplot2")` then load it in using `require("ggplot2")`. After that, each time you start an R session and want to use ggplot2, call it into the session with `require("ggplot2")`.*

**```{r}**

if (!require("ggplot2")) {

install.packages("ggplot2")

stopifnot(require("ggplot2"))

}

trees <- read.csv("ggplot2\_trees.csv", row.names=1)

**```**

*##qplot*

*`qplot()` means "quick plot." Specify the dataset, the variables for each axis, and the "geometry" of a boxplot.*

**```{r}**

qplot(data = trees, x = species, y = dbh, geom="boxplot")

**```**

*##ggplot*

*`ggplot()` initializes a ggplot object and gives us a bit more control than qplot (more details below). After the object is initialized, the geometry "layer" can be added to the plot.*

**```{r}**

ggplot(data = trees, aes(x = species, y = dbh)) + geom\_boxplot()

**```**

##`aes()` and `geom\_SOMETHING()`

`aes()` describes the "aesthetics" of the visuzalization. It determines how the data is encoded on the graph. `geom\_SOMETHING()` layers the geometry on the graph. Certain geometries require or ignore certain aesthetics.

**```{r}**

ggplot(data=trees, aes(x=dbh)) + geom\_density()

ggplot(data = anscombe, aes(x = x1, y=y1)) + geom\_point() + geom\_smooth() + geom\_line()

ggplot(data = anscombe, aes(x = x1, y=y1)) + geom\_point() + geom\_smooth(method="lm") + geom\_line()

ggplot(data = mtcars, aes(x=mpg, y=qsec, color=factor(cyl), shape=factor(gear))) + geom\_point()

**```**

*##`facet\_wrap()` and `facet\_grid()`*

*`facet\_wrap()` and `facet\_grid()` create multiple graphs on the same plot. A formula is passed to create the facets. (In R's formula notation, `.` indicates all other columns in the dataframe)*

**```{r}**

ggplot(data = mtcars, aes(x=mpg, y=qsec, color=factor(cyl))) + geom\_point() + facet\_grid(.~gear)

ggplot(data = mtcars, aes(x=mpg, y=qsec, color=factor(cyl))) + geom\_point() + facet\_grid(carb~gear)

ggplot(data = mtcars, aes(x=mpg, y=qsec, color=factor(cyl))) + geom\_point() + facet\_wrap(carb~gear)

**```**

*##Axes labels, scales, and limits*

*Axes titles can be added with `xlab()` and `ylab()`. Main titles can be added with `labs(title= "Title Text")`. Scale transformations can be done to (most) variables in `aes()` and the limits can be set. Limits can also be set for x without a transformation by using `scale\_x\_continuous()` or `scale\_x\_discrete()`, similarly for y and other aesthetics.*

**```{r}**

ggplot(data = trees, aes(x = species, y = dbh)) + geom\_boxplot() + ylab("Diameter") + xlab("Species") + labs(title="Some trees are bigger than others")

ggplot(data=trees, aes(x=dbh)) + geom\_density() + scale\_x\_sqrt(limits=c(0, 50))

**```**