

## STATS LECTURE

March 8<sup>th</sup> 2017

Don't be afraid. You can do this!

### Scientific Method:

→ Refers to the body of techniques for investigating phenomena, acquiring new knowledge, or correcting and integrating previous knowledge.

→ Testable hypothesis: in the form of a prediction.

(E.g.: the more you smoke, the higher chance of lung cancer)



## TYPES OF SCIENCE:

1. **Controlled experiments** → Classical scientific method
2. **Observational studies** → Collecting data (E.g.: abundance wildlife species)
3. **Modeling** { **Mechanistic**/model development: role of stats is in model testing

## TYPES OF DATA:

**Numerical** { **Continuous**: yield, weight

**Categorical** { **Binary**: 2 mutually exclusive categories (spray bugs and see how many die)  
**Ordinal**: categories ranked in order (count how animals and their species are in a forest)

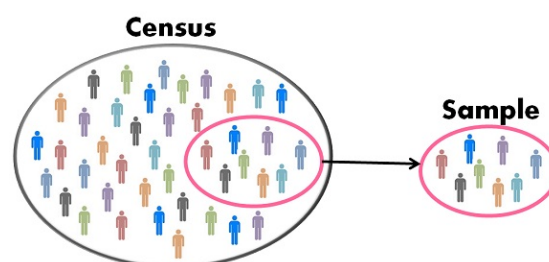
**Sample**: some out of total

**Population**: total (all)

**Random sample**: use samples to conclude the entire population

A small but well-chosen sample can accurately reflect the characteristics of the entire population from which it is chosen

**Census**: collection of data from (about) every member of the population



	(Population) Parameter	(Sample) Statistic
Proportion	$p$	$\hat{p}$
Mean	$\mu$	$\bar{x}$
Standard Deviation	$\sigma$	$s$