

# Learning Targets

## Statistical Inferences

### Lesson 1: Being Skeptical

- I can decide if a study is good or bad based on evidence.
- I can recognize the difference between a survey, observational study, or experimental study.
- I understand why randomization is important in the design of a study.

### Lesson 2: Study Types

- I can describe the different purposes for each type of study design (survey, observational study, or experimental study).
- I can recognize the difference between a survey, observational study, or experimental study.
- I understand that my choice of the design for a study will impact what questions I can answer.

### Lesson 3: Randomness in Groups

- I recognize that the way I choose a sample matters, and that random samples have less bias.

### Lesson 4: Describing Distributions

- I can describe a distribution using the characteristics of its shape, center, and spread.
- I can use the standard deviation to describe the variability in a distribution.

### Lesson 5: Normal Distributions

- I can calculate a relative frequency and create a relative frequency histogram.
- I know that a normal curve is defined using the mean and standard deviation.

## Lesson 6: Areas in Histograms

- I can calculate a proportion of a set of data that matches a shaded area in a histogram.
- I recognize the patterns of proportions that occur in distributions that are approximately normal in shape.

## Lesson 7: Areas under a Normal Curve

- I can use the mean and standard deviation of a normally distributed data set to estimate intervals when given a proportion.
- I can use the mean and standard deviation of a normally distributed data set to estimate proportions.

## Lesson 8: Not Always Ideal

- I can justify a mathematical claim using evidence.
- I know how to use mathematical evidence to find the difference between when outcomes are unfair or due to random chance.
- I understand why it's important to be skeptical of data that seems unfair.

## Lesson 9: Variability in Samples

- I can estimate the margin of error using the mean and standard deviation.
- I understand that sample means and proportions can be representative of the overall population.
- I understand that sample means and proportions vary.

## Lesson 10: Estimating Proportions from Samples

- I can estimate the margin of error using standard deviation.
- I know that a larger margin of error means more variability, and I should be less confident in my estimate of the population mean.
- I know that a smaller margin of error means more variability, and I can be more confident in my estimate of the population mean.
- I understand that different samples from the same population can still have different statistics.

## Lesson 11: Reducing Margin of Error

- I can describe why a larger sample size usually leads to a smaller margin of error.
- I understand that sample size influences the size of the margin of error for a data set.

## Lesson 12: Estimating a Population Mean

- I can calculate the mean and standard deviation of sample means and use the information to estimate the margin of error.
- I understand that sample means that are normally distributed follow the same pattern as sample proportions.

## Lesson 13: Experimenting

- I can find the difference between two treatment means and use a randomization distribution to determine whether or not the result occurred by random chance.
- I understand why randomization is important in the design of a study.

## Lesson 14: Using Normal Distributions for Experiment Analysis

- I can calculate the difference in means between two groups.
- I can justify whether there is evidence for a statistical claim by using proportions in the normal distribution.
- I understand that the difference in means can be modeled by a distribution that is approximately normal in shape.

## Lesson 15: Questioning Experimenting

- I can use a randomization distribution to determine whether or not a treatment was the cause of the results of an experiment, or if the results are due to the random assignment of the groups.
- I understand why it is important to question the results of an experiment.

## Lesson 16: Heart Rates

- I can conduct an experiment and analyze the results.
- I can justify when the claims of an experiment are due to a treatment or to the random assignment of groups.
- I know why it is important to question the validity of the claims of an experiment.