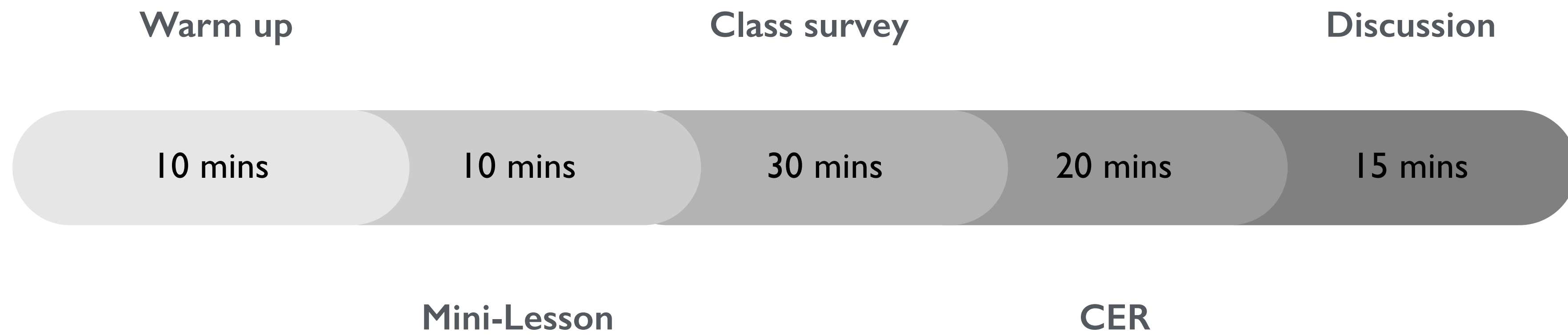


Statistics CER

Using critical thinking to evaluate claims,
evidence and reasoning in statistics

Objective

Students will use measures of central tendency to evaluate CERs for validity and reliability.



Let's Review:

How do we calculate measures of central tendency and what can we use them for?

Complete the worksheet to remind yourself of the process!

Mean - Median - Mode - Range

How do we calculate mean, median, mode and range?

Mean

Add all of the numbers and divide by N (# of items)

Median

Find the middle point- Even number? Find average of middle points.

Range

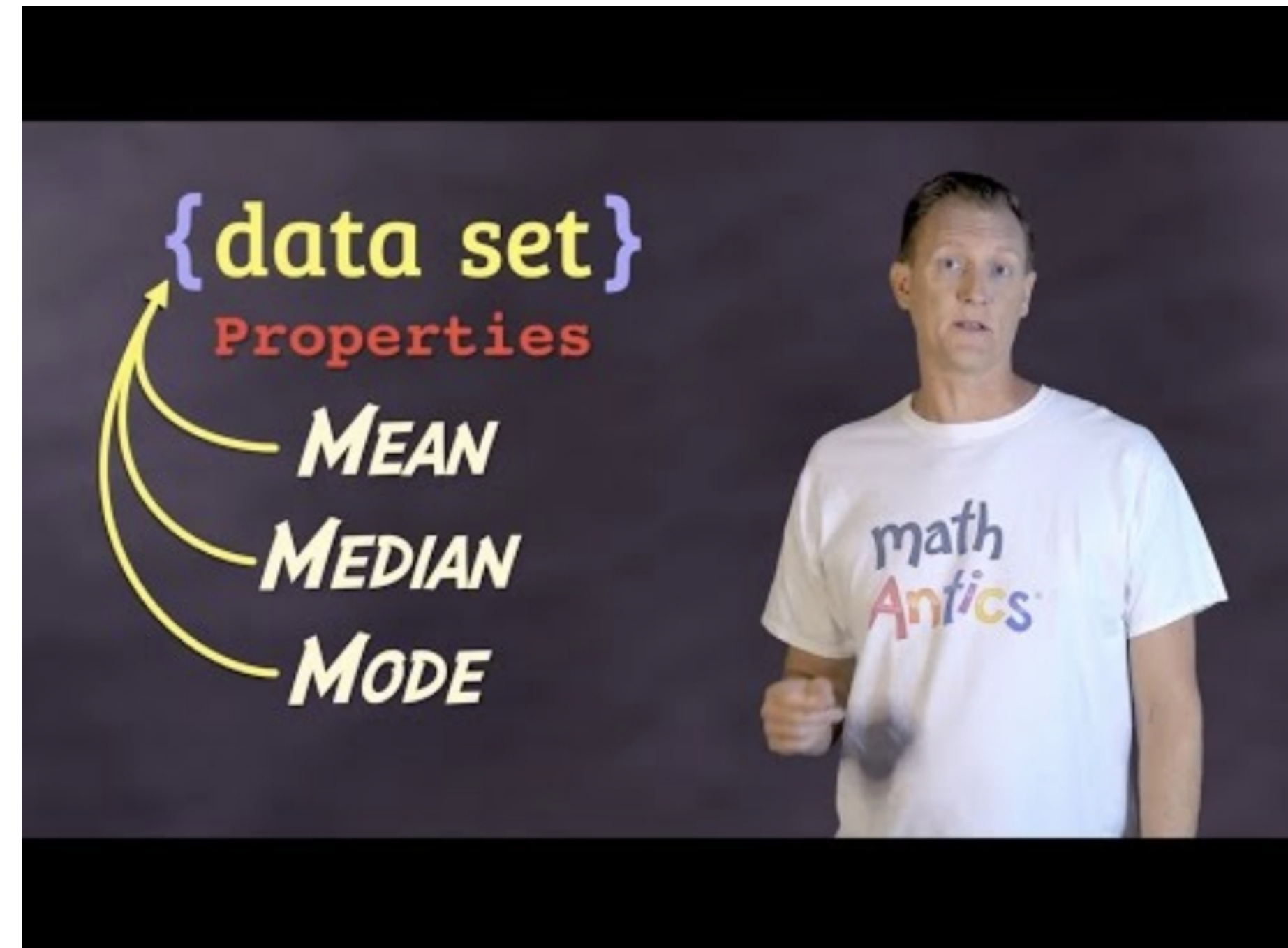
Find the difference from the lowest and highest point in the data.

Mode

Find the number that occurs the most. More than one? It's multi-modal.

Additional Review

Let's check out
the MathAntics
take on mean,
median and mode!



Class Survey

Step 1

Create a statistical question.

Step 2

Post questions on wall.

Step 3

Use data to compute mean, median, mode and range.

Statistical Questions

Have numerical answers

The answers can vary.

Examples

How old am I?

-Not statistical, only one answer.

How old are my classmates?

-Statistical, many possible answers

Data Collection

Once all papers are on the wall, we will line up and take turns putting our responses on each other's papers.

Be sure to give a clear numerical answer to the question.

Calculating Measures of Central Tendency

We will use measures of central tendency to understand the middle of our data set.

First: order your data points from the lowest point to the highest point.

Calculating Measures of Central Tendency

$$\text{Mean} = \frac{\text{Sum of All Data Points}}{\text{Number of Data Points}}$$

Mode

The number that occurs the most. If there is more than one, the data set is multi-modal.

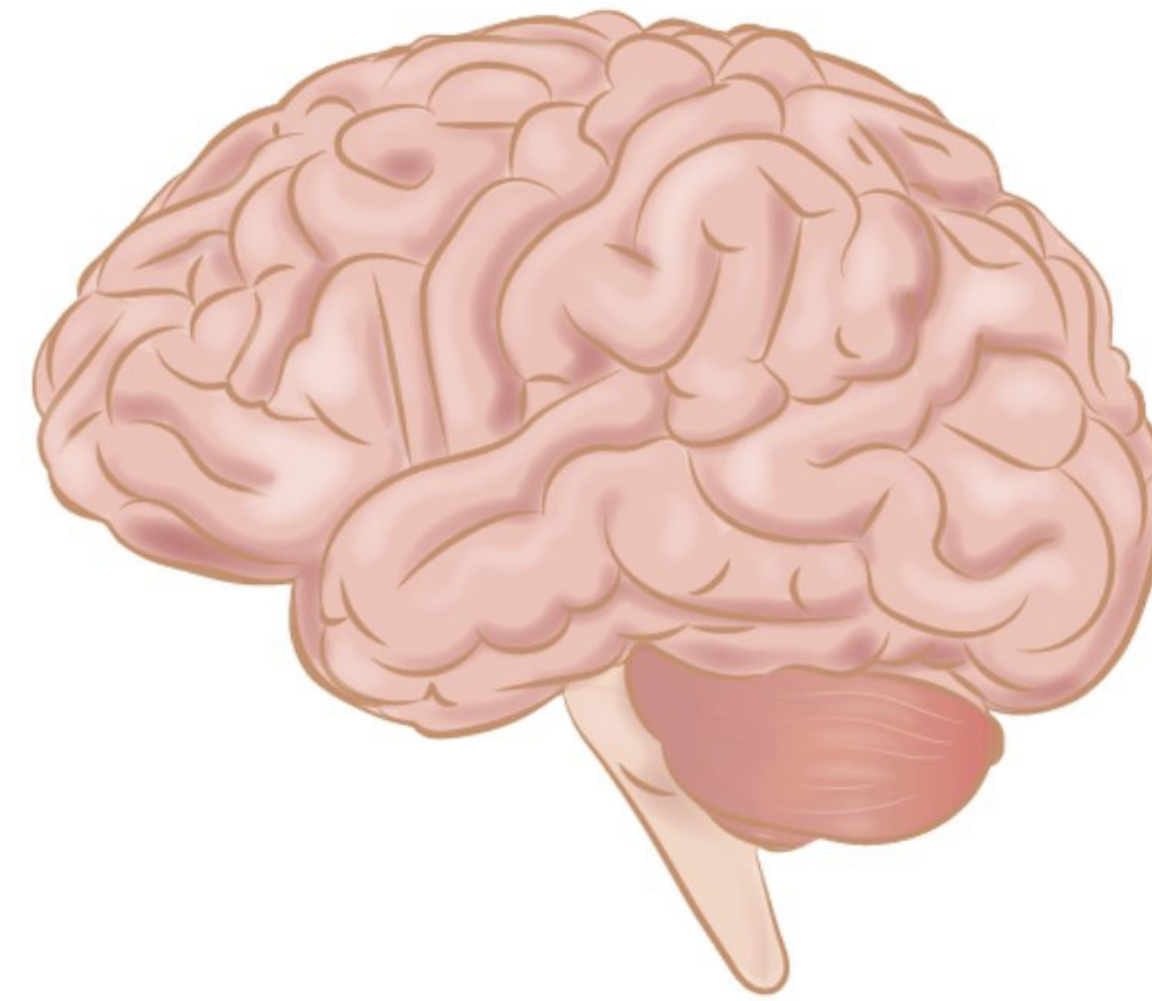
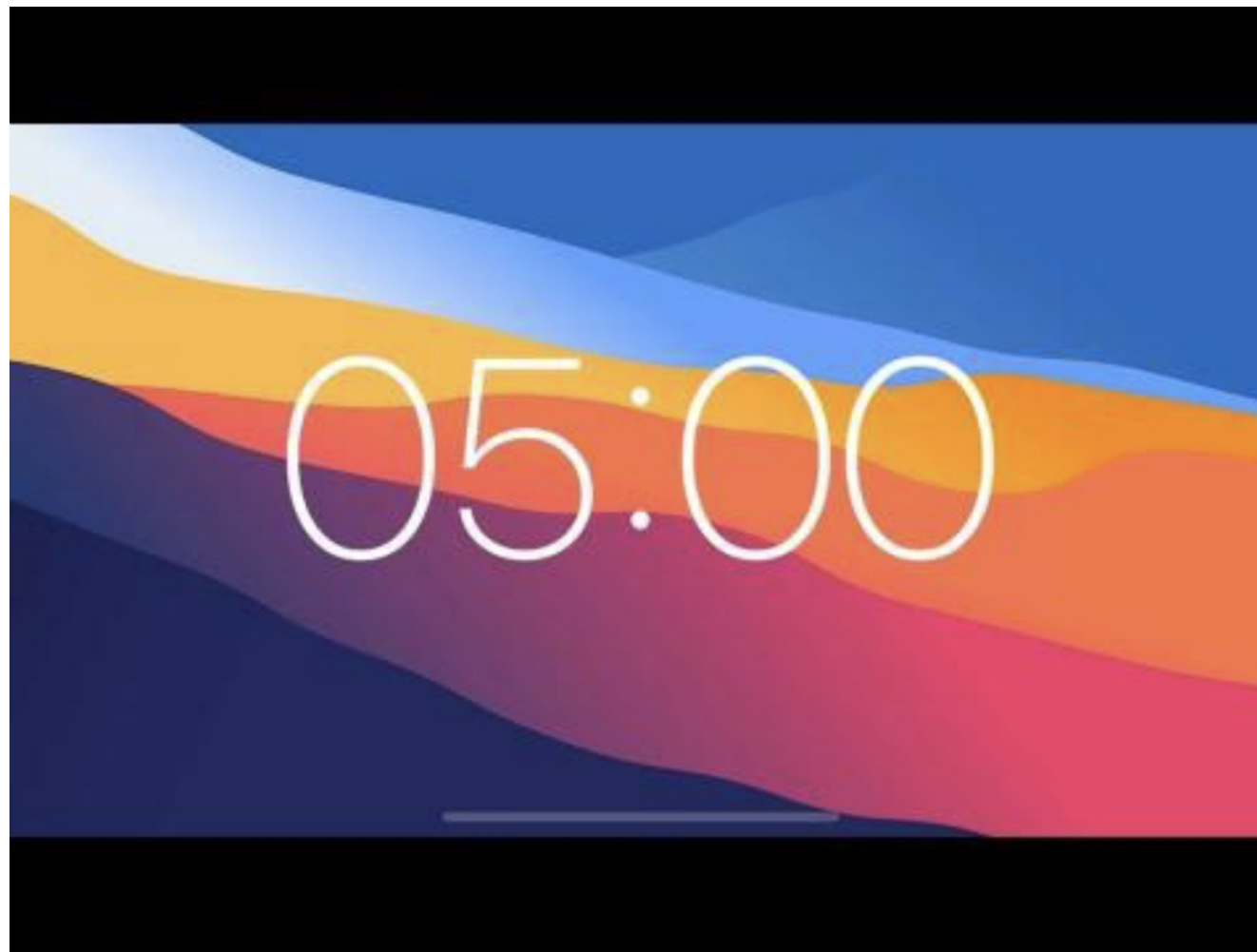
Median

Find the middle #. If there are two, take the average of those #s.

Range

The difference between the highest and lowest data points.*

Brain Break



Writing a CER



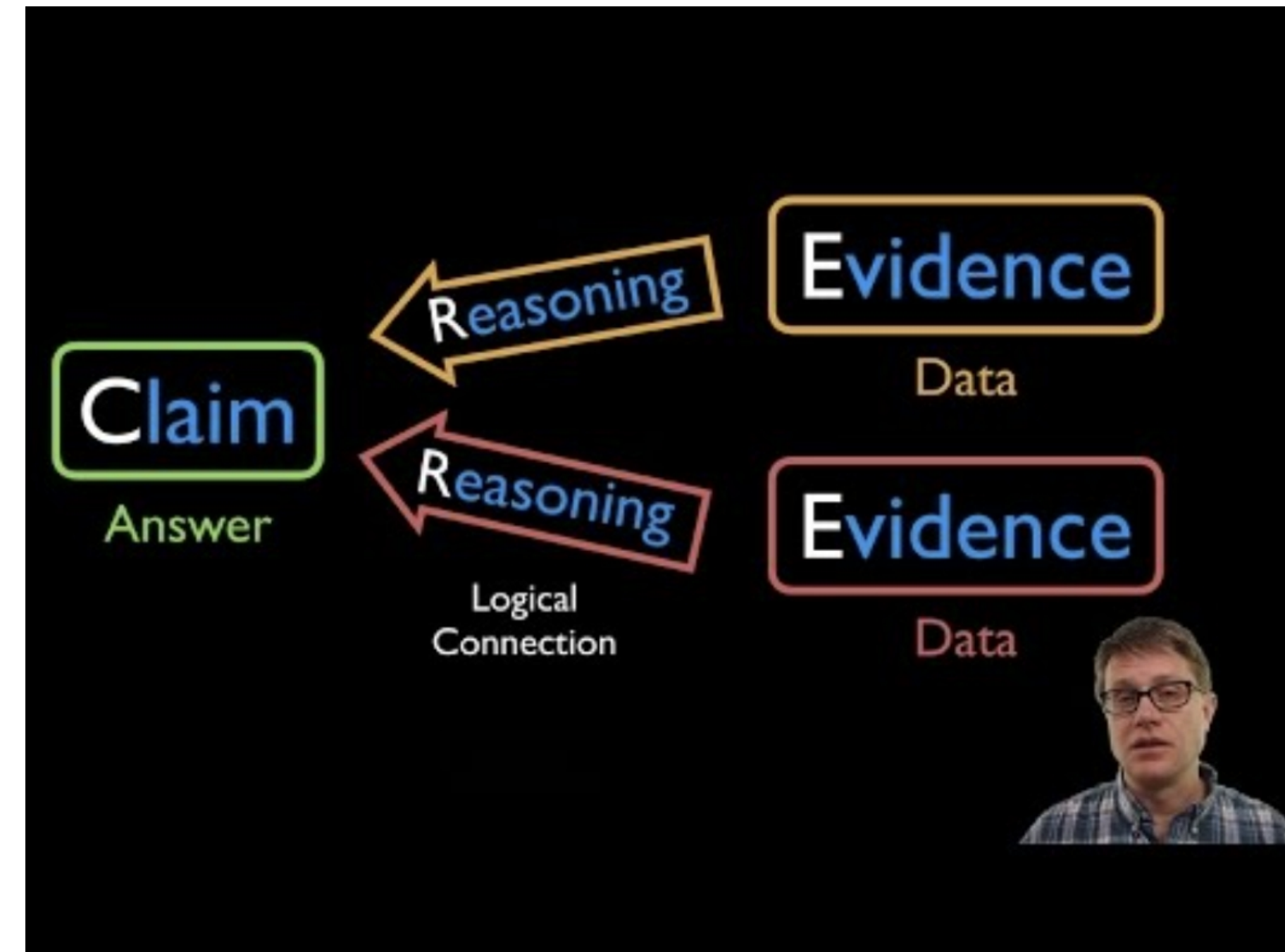
**What is the
claim?
evidence?
reasoning?**

CER Process

- Claim** My dad is a space alien.
- Evidence** He speaks a weird language, drinks green stuff, appearance (bike gear), and has a spaceship.
- Reasoning** The behaviors of my dad are the same as those of a space alien. Therefore my dad is a space alien.

CER Process: Additional Review

List examples of claims, evidence and reasoning based on this video.



Claim

Looking at your mean, median, mode and range, how can you summarize your data?

Discuss your strongest claim with a partner.

Claim

Using feedback from your partner, write down your claim as a complete sentence.

Evidence

Using your data (mean, median, mode, range), write a sentence that provides evidence for your claim.

Reasoning

Link your claim and your evidence together with reasoning.

Why does this evidence back your claim?

Fallacies of Logic

Type of fallacy

Definition

Example

Overgeneralization

Making a claim based on not enough evidence.

Middle school students prefer sweet food to salty food.
Sampling one class of middle schoolers is not enough data to generalize to ALL middle schoolers.

Confirmation Bias

Making a claim that is based on focusing on evidence that fits with our existing beliefs.

Our class prefers chocolate to vanilla.
Just because you and your friend group prefer something doesn't mean that this is representative of the entire group.

Ambiguity Effect

We avoid options that are unclear or missing information.

Our class will prefer brownies to dark chocolate tarts.
Just because brownies are a more familiar dessert to you doesn't mean this will be the preference of your group.

Class Discussion

Do you see any examples of these fallacies of logic in action?

Which fallacy do you see?

How can we correct it?

Closing

How did we use measures of central tendency to evaluate CERs for validity and reliability?

How can we use these strategies in the future...inside and outside of the classroom?

