Unit Rate CER

Using critical thinking to evaluate claims, evidence and reasoning with unit rates

reboot
elevating critical thinking

Overview

Ratios and proportional relationships have a variety of real world applications, including rate (such as speed).

This lesson incorporates ratios and proportional relationships with physical activity and the completion of a CER (Claim/Evidence/Reasoning) with students evaluating each other's work using critical thinking strategies.

Objective

Students will use **unit rate** calculations to determine average speed. We will use our data to **write and evaluate CERs** with an emphasis on **critical thinking.**

Activities
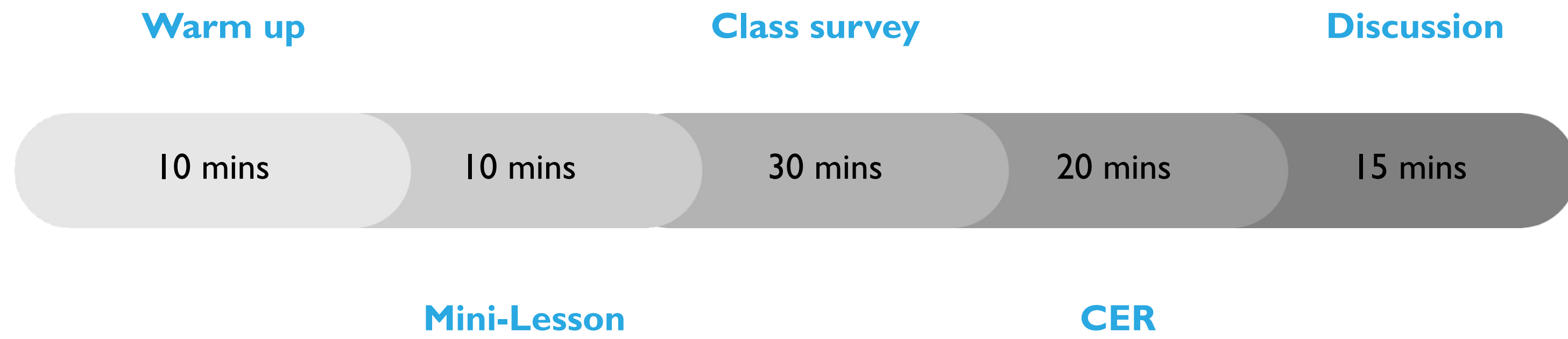
Let's Review:

How do we calculate unit rate and what can we use it for in the "real world"?

Vocabulary

Unit

an agreed standard of measure, such as weight, length, time

Rate

a comparison of two related quantities, often the second quantity is time.

Unit rate

how much of something per one unit of something else; also known as the constant of proportionality (k)

Proportional

When quantities have the same **relative** size, they have the same ratio.

Unit Rate

Unit rate tells how many units of the first quantity correspond with 1 unit of a second quantity.

Identify what two values are being compared, then use division.

Common unit rates

Miles per hour

Meters per second

Dollars per gallon

Dollars per hour

Variables

Independent variables (x) are the CAUSE (manipulated).

Dependent variables (y) are the EFFECT (measured). We will call unit rate k.

k = y/x

Let's check out the MathAntics take on unit rate!

Unit Rate Calculation

Step 1

Determine distance around school in feet and miles.

Step 2

Walk around school.

Step 3

Record time taken to walk around school.

Step 4

Calculate Unit Rate

Step 5

Complete Unit Rate worksheet.
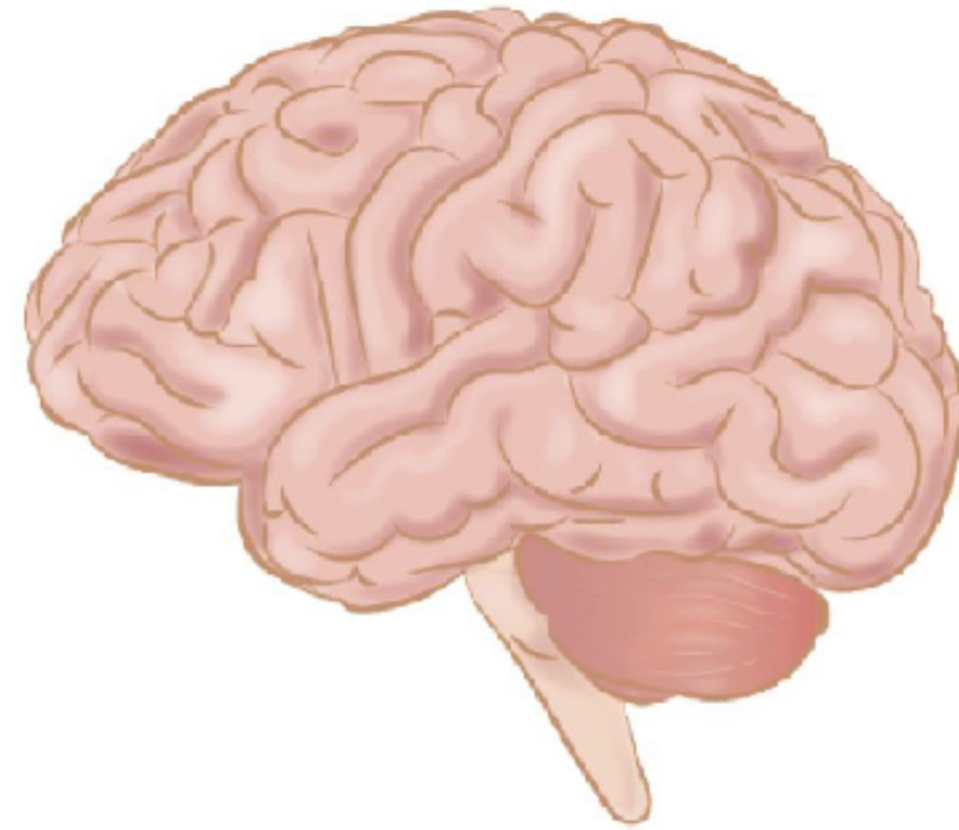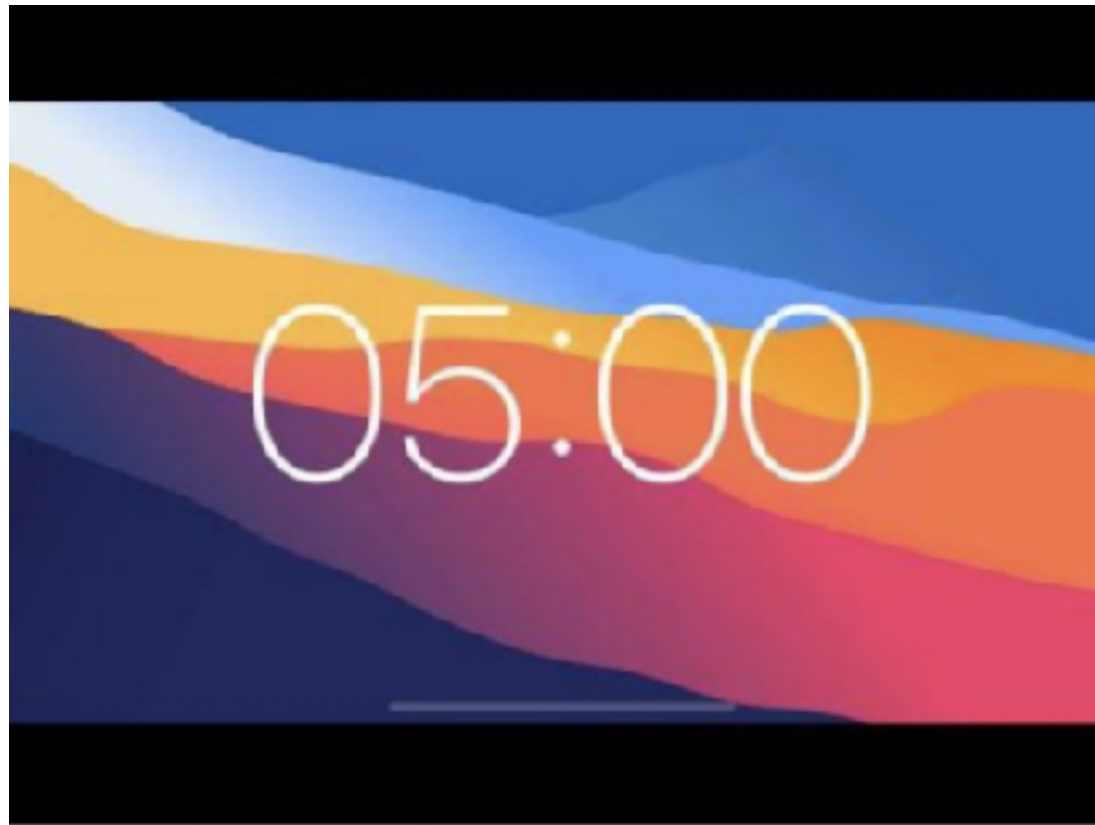
**Divide y by x to get unit rate.
For example, if y = 5 miles and x = 2**

hours: 5 miles/2 hours = 2.5 miles/hour

Calculating Unit Rate

Complete the table by substituting the value for x (time) into the formula to calculate distance.

Early finishers: attempt to write (and a test) an equation that relates time to distance using unit rate.

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.

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

Claim

Looking at your table, 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 (unit rate, time, distance), 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
Availability Bias	Things that come to mind easily are believed to be more accurate.	Bassett Hounds are more common than Vizslas in the United States. Just because Bassett Hounds are more familiar does not mean that there are more of them.
Sunk Cost Fallacy	We tend to follow through on something when we are invested in it, whether or not the costs outweigh the benefits.	The average walking speed of a human is ¼ mph. Even though I know I have reversed my numbers, I'll continue the same calculation because I don't want to start over!
Bandwagon Effect	We adopt behaviors/beliefs because many other people are doing the same.	Everyone in my group says that k = x/y, so I'm using that formula. Just because everyone else has embraced a certain idea/belief does not mean that it is correct.

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

Which fallacy do you see?

How can we correct it?

These are common fallacies in math that create errors in problem solving.

Critical thinking can help us catch our mistakes before we commit to them.

Can you think of any others?

How did we use critical thinking to help us evaluate our CERs?

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