

Claim

Evidence

Reasoning

C-E-R Framework

McNeill & Krajcik (2012)



- **Claim**
 - a conclusion about a problem
- **Evidence**
 - scientific data that is *appropriate* and *sufficient* to support the claim
- **Reasoning**
 - a justification that shows why the data counts as evidence to support the claim and includes appropriate scientific principles



I CAN'T BELIEVE IT!

This Outrageous Truth About Green Gummy Bears Will
Destroy Your World

You think you have life figured out, and then, BAM!

Weird Food **Kills** Blood Pressure?



Shocking video reveals why America's top doctors claim this weird ingredient may stop Heart Disease dead in it's tracks.

marined3.com

[video]

Dermatologists Hate Her!



She is **51**
Looks **25**

Local mom exposes shocking
anti-aging secret. Learn the
\$5 trick to her stunning results.

LEARN THE TRUTH NOW

What is a Claim?

What is evidence?

What is reasoning?



- **Reasoning** – uses appropriate and sufficient disciplinary core ideas (concepts, theories, laws) to describe how or why each piece of evidence supports the claim.
- High quality reasoning provides both:
 - A link (why the evidence supports the claim)
 - Science idea (disciplinary core ideas)
- These logical connections make an argument stronger and clearer to understand

Physical Science Example: 4th grade



Question – Does an object's mass affect how quickly it falls?

No, mass does not affect how quickly an object falls. (Claim) In our experiment, the blocks had different masses, 20 g., 30 g., 44 g., 123 g and 142 g but the time for all five blocks to fall was about the same. It took between 1.5 and 1.8 seconds for them to fall. (Evidence) Since the blocks had different masses but took about the same time, I know that mass does not affect how quickly something falls. (Reasoning)

Biology Example: 6th grade



Question – What will happen to the shark population if the phytoplankton populations die out?

The shark population will die out. (Claim) The shark eats other fish such as the ocean fish and the lantern fish. The ocean fish and the lantern fish eat other organisms such as shrimp and copepods. The shrimp and copepods eat the phytoplankton. (Evidence) Phytoplankton are producers and they make their own food from the sun. All of the other organisms in the food web depend on the phytoplankton, even if they do not directly eat them. If the phytoplankton die, primary consumers (shrimp and copepods) will die because they will have no food which will cause the secondary consumers (ocean fish and lantern fish) to die, which will cause the shark to die. (Reasoning)

Physical Science Example: 7th grade



Question – What is air?

Air is matter. (Claim) I think air has mass because in the balloon experiment when we were comparing or weighting the deflated balloon to the balloon filled with air, the balloon filled with air weighted more (Evidence) This is because of mass. Mass means the amount of matter in something. The balloon which had air in it has more mass. (Reasoning) Another reason why I think air has mass is because in the syringe experiment, it was difficult to push the top of the syringe because the air was blocking it from going down (Evidence). The tiny little molecules were trapped in a small space and created more pressure. Air pressure made it difficult to push down because the air takes up space. It is made of matter and has mass. It is true that air is made of matter and has mass (Reasoning).

Evidence
[Describe data that supports the claim]

Reasoning
[Explain how the evidence supports the claim]

Claim
[State your position on the issue]

The diagram consists of four rows of boxes. The first two columns are labeled 'Evidence' and 'Reasoning', and the third column is labeled 'Claim'. Each row has a box in the Evidence column, a box in the Reasoning column, and a single large box in the Claim column. Arrows point from each Evidence box to its corresponding Reasoning box, and from each Reasoning box to the Claim box.

<u>Evidence</u> [Describe data that supports the claim]	<u>Reasoning</u> [Explain how the evidence supports the claim]	<u>Claim</u> [State your position on the issue]

Example Claims: Lets try one

1. Red Jellybeans are the best ones..
2. Television is the most important invention of the 20th Century.
3. Gas prices are lower in developing (ie third world) nations
4. Seafood-based diets are healthier for you.
5. Tea is the most popular drink in the world
6. Students studying math online do better than those studying math in the traditional classroom.
7. More young adults under the age of 30 are living with their parents today.
8. People are saving more money for retirement today.
9. Soccer is the most popular sport in the world
10. Taylor Swift is the greatest performer of all time.
11. Chicken soup is a good remedy for a cold.