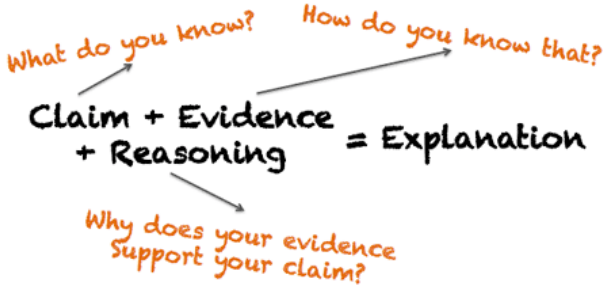
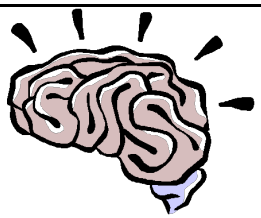
Scientific Explanations

CER = Claim + Evidence + Reasoning

CER is a format for writing EVIDENCE-BASED RESPONSES in science class. It allows you to think about your data in an organized, thorough manner.



		
CLAIM	**EVIDENCE**	**REASONING**
Your answer drawn from observations or results of an investigation	Scientific data and information that is *reliable, appropriate,* and *sufficient* to support the claim	A justification that shows how or why the data counts as evidence to support the claim and includes appropriate scientific principles

How to Use CER

I: Claim	**II: Evidence**	**III: Reasoning**
State a direct response to the question/prompt. *Helpful Hints:* Use key words and ideas provided in the question or prompt as your write your claim. Avoid opening with "I think" or "I believe".	**Provide reliable information from text/data that supports the claim.** *Helpful Hints:* Sentence starters: In the text… The text states… The data shows… One piece of evidence is… According to the passage…	**Tie together how the evidence supports the claim.** *Helpful Hints:* This portion must offer new insight, analysis, acknowledgement of connections between ideas, etc. Based on the evidence, I can conclude (rephrase your claim) because (your analysis).

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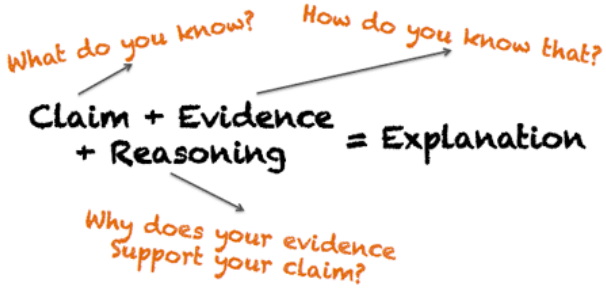

		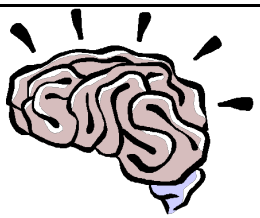
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MORE REASONING SENTENCE STARTERS:

The most logical conclusion we can draw from this evidence is that (rephrase claim) because (your analysis).

This is significant because (explain why in a way that directly relates to the claim).

The fact that (rephrase evidence) illustrates that (rephrase claim) because (your analysis).

(Rephrase evidence) matters because (give your reason). Thus, (rephrase claim) must be true because (your analysis).

All of this supports that (rephrase claim) because (your analysis).

Example #1 – Is air matter?

Claim: Air is matter.

Evidence: We found that the weight of the ball increases each time we pumped more air into it.

Reasoning: This shows that air has weight, one of the characteristics of matter.

Example #2 – What type of animal is this?

Claim: It is a mammal.

Evidence: The animal has hair.

Reasoning: A characteristic of mammals is having hair or fur, therefore this animal is a mammal because it has hair.

Example #3 – What are factors that affect plant growth?

Claim: The rate of pumpkin plant growth increases as the temperature increases.

Evidence: Our control group was growing at normal room temperature, while our experimental group was growing in a hot greenhouse for one week. Over the course of the week, we observed that the experimental plant was healthier looking, had more leaves, and grew taller than the control plant. The mass of the experimental plant increased from 10 g to 20 g, while the control plant increased from 10 g to 15 g. The experimental group grew from 14 cm to 18 cm (increase of 4 cm), and the control group grew from 12 cm to 14 cm (increase of 2 cm). The experimental plant got five new leaves and the control only got two new leaves.

Reasoning: Pumpkin plants are sensitive to the temperature of their surroundings. All plants grow best within a certain temperature range (some plants would actually grow better in at cool temperatures than warm temperatures). Maybe pumpkin plants originated in a habitat with a warm climate. Plants need energy to grow, and their energy comes from photosynthesis. Maybe pumpkin plants are able to do photosynthesis faster at warm temperatures, so they are able to grow more. I would have thought that the only factors influencing plant growth are water, sunlight, and soil nutrients, but this experiment illustrated that other factors can affect growth, too. I wonder if anything besides the temperature difference could affect the growth rate. Maybe there was more carbon dioxide in the greenhouse than the classroom. Maybe the glass window in the classroom filters out some kind of light that plants need, while the plastic greenhouse does not. There are some factors that we could not control, so I guess we don't know for sure that temperature was the ONLY difference.

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