

Student Name: (First Name) _____ (Last Name) _____

Period: _____

Date: _____

Writing a Good Scientific Explanation

Writing a good scientific explanation is an important skill to learn and use. Being able to write a good scientific explanation will allow you to communicate your findings, answer and explain phenomenon, and use academic language. A good scientific explanation has three different parts to it. These parts are a CLAIM, the EVIDENCE, and your REASONING. We call this model C.E.R. or Claim, Evidence, Reasoning. Below you will see an explanation for these three parts.

- **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. Uses appropriate and sufficient disciplinary core ideas (concepts, theories, laws) to describe how or why each piece of evidence supports the claim.

In class you have used this model and written scientific explanations like this. However, you didn't yet know that you were using this model. For your Density and Plate Tectonic Centers you had to answer questions about how density explains why the crust floats as well as how the different sections of the crust (plates) interact with each other. For your answer you had to go through your center work and highlight/ underline evidence to use in your explanation. Then you wrote an answer to the questions (a CLAIM), and had to include EVIDENCE in your answer as well as justify/ defend, or explain, how your evidence supports your claim (REASONING).

You have been practicing using the C.E.R. model and didn't even know it. Since we will be using this model a lot this year this homework will give you examples of this model in use as well as let you practice using it yourself. Below you will see examples of scientific explanations and questions for you to practice using the C.E.R. model.

Claim – Evidence – Reasoning: Examples

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)

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)

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).

- Rank the three samples of student work from strongest (1) to weakest (3) considering the quality of the C-E-R components. Write the number you ranked each example next to the explanation.
- Describe the criteria you used to rank the student writing.

Claim – Evidence – Reasoning: Practice

Question -- What causes some earthquakes to have more destructive power than others? How do you know?

Data:

Location of Earthquake	Destructive Power at the Epicenter (center of the earthquake) (Scale: 0 to 12)	Average Yearly Crust Temperature 1 mile below Surface (F°)	Harness of Ground Material
Earthquake A	8	77	Soft
Earthquake B	8	65	Soft
Earthquake C	7	59	Hard
Earthquake D	6	53	Hard
Earthquake E	5	51	Very Hard

Main Science Ideas:

- Earthquakes travel through the Earth in waves. The waves begin at the focus, which is where the earthquake starts underground.
- The epicenter is directly above the focus on the Earth's surface.
- More powerful earthquakes happen when the focus of the earthquake occurs in soft ground material, because the earthquake waves can travel more easily through soft ground.

Use the boxes below to construct your scientific explanation for the question above. Use the data to find evidence and use the Main Science Ideas for your reasoning. You need three pieces of evidence with reasoning for each one.

Claim	Evidence	Reasoning
	1.	1.
	2.	2.
	3.	3.

