

Read Ch. 1.3, pp. 10-13

- Read the following sentence starters and descriptions. Identify and label each as “C” for claim, “E” for evidence or “R” for Reasoning.
  - R  Based on this evidence, ...
  - R  Includes one or more scientific principle.
  - E  According to the text/video...
  - R  This is important because...
  - E  The data show...
  - C  This shows that...
  - E  Information gathered from hands-on investigations, reading, videos, interviews...
  - E  The author wrote...
  - C  If..., then...
  - C  From the reading I know that...
  - R  Answers the key question.
  - E  The graphic showed...
  - R  Therefore,...
  - R  Because...
  - R  Ties together claim and evidence.
  - R  Shows how or why data supports claim.
  - C  Consists of one sentence.
  - R  All this proves that (restate your claim) because...
  - E  Information from a reliable source.
  - R  Use key words and ideas provided in the question as you write this.
- Use the CER framework to make a claim about a topic familiar to you (this can be non-scientific such as who is the greatest athlete in a sport or best guitarist), provide evidence, and explain why and/or how that evidence supports the claim (reasoning). Be as specific as you can.

CLAIM: **Class discussion**

EVIDENCE:

REASONING:
- What is a scientific method?

**A systematic approach used in scientific study to answer questions that are scientific in nature..**
- Define and explain the following terms:
  - Hypothesis  
**Tentative explanation based on observations; must be falsifiable**
  - Experiment  
**Set of controlled observations designed to test a hypothesis; must be reproducible**

- c) Data (define, then describe types) **Observations or results**
  - Qualitative: descriptive, subjective
  - Quantitative: numerical, measured
- d) Variables (define, then describe types) **Observed data that change**
  - Independent—you control (x-axis);
  - Dependent—you measure, changes in response (y-axis)
- e) Control **An experiment where the independent variable is held constant**
- f) Conclusion. Explain CER.
  - **Claim:** What the evidence supports; may restate the hypothesis/beginning question.
  - **Evidence:** Data & Calculations in support of hypothesis. Must be relevant and complete.
  - **Reasoning:** How/why does the evidence support it? What scientific principles apply? Is data accurate/precise? Must be correct and complete. Shows understanding.
- g) Theory  
Explanation *strongly supported (not proven)* by many experiments. *Why* a system works the way it does.
- h) Law  
Concise description of how, not why, something works. Often mathematical equations or models.

5. You are asked to study the effect of temperature on the volume of a balloon. The balloon's size increases as it is warmed. What is the independent variable? Dependent variable? What factor is held constant? How would you construct a control?  
The temperature; the size of the balloon; the amount of air in the balloon; use an identical balloon kept at room temperature.
6. A report in the media states that a specific diet will protect individuals from cancer. However, no data are reported to support this statement. What is missing from the CER model?  
There is no supporting evidence (E) or scientific principles (R).