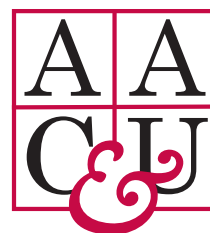




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SCIENTIFIC REASONING RUBRIC

DEFINITION

Scientific Reasoning is an adherence to a self-correcting system of inquiry and a reliance on empirical evidence to describe, understand, predict, and control natural phenomena.

FRAMING LANGUAGE

This rubric has been designed for the evaluation of work that addresses scientific reasoning in a substantive way. A person who is competent in scientific reasoning will demonstrate the ability to: generate an empirically evidenced and logical argument; distinguish a scientific

argument from a non-scientific argument; reason by deduction, induction, and analogy; distinguish between causal and correlational relationships; and recognize methods of inquiry that lead to scientific knowledge.

GLOSSARY

The definitions that follow were developed to clarify terms and concepts used in this rubric only.

- **Conclusions:** A synthesis of key findings drawn from research/evidence.
- **Limitations:** Critique of the process or evidence.
- **Implications:** How inquiry results apply to a larger context or the real world.
- **Empirical:** Originating in or based on observation or experience.
- **Deduction:** Deriving of a conclusion by reasoning.
- **Induction:** Inference of a generalized conclusion from particular instances.
- **Analogy:** Resemblance in some particulars between things otherwise unlike.
- **Causal:** Expressing or indicating cause.
- **Correlation:** A relation existing between phenomena or things or between or between mathematical or statistical variables which tend to vary, be associated, or occur together in a way not expected on the basis of chance alone.

SCIENTIFIC REASONING VALUE RUBRIC

for more information contact value@aacu.org

Evaluators are encouraged to assign a zero to any work sample or collection of work that does not meet benchmark (cell one) level performance.

	Capstone 4	Milestones 3 2		Benchmark 1
Argument or Topic selection: Generating an empirically evidenced and logical argument	Identifies a creative, focused, and manageable argument or topic that addresses potentially significant yet previously less-explored aspects.	Identifies a focused and manageable/doable argument or topic that appropriately addresses relevant aspects.	Identifies an argument or topic that while manageable/doable, is too narrowly focused and leaves out relevant aspects.	Identifies an argument or topic that is far too general and wide-ranging as to be manageable and doable.
Existing Knowledge, Research, and/or Views: Distinguishing a scientific argument from a non-scientific argument	Synthesizes in-depth information from credible and relevant sources representing various points of view/approaches.	Presents in-depth information from credible and relevant sources representing various points of view/approaches.	Presents information from credible and relevant sources representing limited points of view/approaches.	Presents information from non-credible and irrelevant sources representing limited points of view/approaches.
Methodology: Recognizing methods of inquiry that lead to scientific knowledge	All elements of the methodology or theoretical framework are skillfully developed. Appropriate methodology or theoretical frameworks may be synthesized from across disciplines or from relevant subdisciplines.	Critical elements of the methodology or theoretical framework are appropriately developed, however, more subtle elements are ignored or unaccounted for.	Critical elements of the methodology or theoretical framework are missing, incorrectly developed, or unfocused.	Inquiry demonstrates a misunderstanding of the methodology or theoretical framework.
Analysis: Reasoning by deduction, induction, and analogy	Organizes and synthesizes evidence to reveal insightful patterns, differences, or similarities related to focus. Demonstrates elegant ability to reason by deduction, induction, and analogy.	Organizes evidence to reveal important patterns, differences, or similarities related to focus. Demonstrates appropriate ability to reason by deduction, induction, and analogy.	Organizes evidence, but the organization is not effective in revealing important patterns, differences, or similarities. Demonstrates limited ability to reason by deduction, induction, and analogy.	Lists evidence, but it is not organized and/or is unrelated to focus. Demonstrates no ability to reason by deduction, induction, and analogy.
Conclusions, Limitations and Implications: Distinguishing between causal and correlational relationships	States a conclusion that is a logical extrapolation from the inquiry findings limitations and implications. Demonstrates advanced ability to distinguish between causal and correlational relationships.	States a conclusion focused solely on the inquiry findings. The conclusion arises specifically from and responds specifically to the inquiry findings limitations and implications. Demonstrates appropriate ability to distinguish between causal and correlational relationships.	States a general conclusion that, because it is so general, also applies beyond the scope of the inquiry findings limitations and implications. Demonstrates limited ability to distinguish between causal and correlational relationships.	States an ambiguous, illogical, or unsupportable conclusion from inquiry findings limitations and implications. Demonstrates no ability to distinguish between causal and correlational relationships.