

**ACE 4** Use scientific methods and knowledge to pose questions, frame hypotheses, interpret data, and evaluate whether conclusions about the natural and physical world are reasonable.

	<b>Exemplary</b> 4	<b>Acceptable</b> 3	<b>Developing</b> 2	<b>Deficient</b> 1
<b>Use Scientific Knowledge</b>	Demonstrate knowledge of appropriate background information from texts and incorporates relevant information from primary literature.	Demonstrates knowledge of appropriate background information from texts.	Demonstrates familiarity with background knowledge, but with gaps that limit ability to ask appropriate questions.	Lacks the background knowledge and context to ask appropriate questions.
<b>Pose Questions</b>	Poses questions that can be investigated and that are within the context of existing knowledge. In addition these questions are differentiated into hierarchical levels.	Poses questions that can be investigated and that are in the context of existing knowledge.	Poses questions that can be investigated, but lack connections to existing knowledge.	Cannot frame appropriate questions that can be investigated using scientific methods.
<b>Frame Hypotheses</b>	States a clear and relevant hypothesis logically related to existing knowledge, clearly describes alternative hypotheses, and identifies experimental predictions.	States a clear and relevant hypothesis that is logically related to existing knowledge but does not describe alternative hypotheses and does not make experimental predictions.	A relevant hypothesis is stated, but it is not logically related to existing knowledge.	Hypothesis does not logically address the stated question.

<b>Interpret Data</b>	Interprets data utilizing quantitative analysis, and forms data into tables or figures with interpretation appropriate to the question.	Forms data into tables or figures with interpretation appropriate to the question but does not conduct any quantitative analysis of data.	Forms data into tables or figures but without interpretation of these.	Does not interpret data when it is provided in a table or figure.
<b>Evaluate Whether Conclusions are Reasonable</b>	Relates results to the initial question and to background knowledge; broadens results to an appropriate scope of inference, including an estimate of error or uncertainty.	Relates results appropriately to the initial question and to background knowledge but does not describe the scope of inference for results and does not estimate uncertainty.	Relates results to the initial question but does not also relate these to background knowledge.	Does not reach conclusions that relate to the main question.