DEFINITION B SCIENTIFIC INQUIRY AND THE NATURE OF SCIENCE

NOTE: This definition assumes the student is already proficient with the concepts and procedures described in the Washington State Grade Level Expectations for Science through Grades 9/10.

The student understands scientific inquiry and the nature of science.

COMPONENT	EVIDENCE of LEARNING
B.1 Demonstrate understanding of the differences between observation, hypothesis, theory and law.	• Make an hypothesis (or multiple hypotheses) based on an observation that includes a prediction with a cause-effect reason. • Demonstrate creativity and critical thinking to formulate and evaluate hypotheses. • Distinguish between testable and non-testable questions. • Understand the scientific definition of hypothesis, theory, and law. • Understand that a theory does not turn into a law.
B.2 Understand how to plan and conduct scientific investigations using proper data collection and observation methods. [See GLE 2.1.2]	• Use approximation when appropriate; recognize when accuracy and precision are important. • Accurately and thoroughly make and record observations. • Distinguish between inference and observation and understand their roles in scientific investigation. • Understand that predictions are inferential.
B.3 Synthesize a scientific explanation using evidence and data and defend it with logic, and if necessary revise the explanation to account for new evidence. [See GLE 2.1.3]	• Suggest alternative explanations for data and conclusions, and propose alternative hypotheses. • Accept that unexpected or ambiguous results are often part of the experimentation process.
B.4 Use physical, conceptual and mathematical models to represent and investigate objects, events, systems and processes. [See GLE 2.1.4]	• Create physical, conceptual, and/or mathematical models to represent and/or investigate objects, events, systems, and processes. • Evaluate how well a model describes or predicts the behavior of an object, event, system or process.
B.5 Using both oral and written skills, present and produce reports on scientific investigations, explanations of objects, events, systems, and processes. [See GLE 2.1.5]	• Summarize an investigation and discuss how the conclusions support or refute accepted scientific theories and laws. • Effectively communicate investigative results and conclusions.

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COMPONENT	EVIDENCE of LEARNING
B.6 Analyze scientific theories, methods and conclusions for validity and reliability. [See GLEs 2.2.1, 2.2.2 and 2.2.4]	• Recognize the importance of performing multiple trials to obtain reliable results. • Understand the limitations of an experimental design and its impact on the validity of conclusions. • Suggest additional experiments that could be performed to explain experimental data or conclusions. • Understand that constructive criticism about scientific investigations is useful and necessary. • Recognize science and pseudoscience and explain why a given concept is or is not scientific.
B.7 Understand how scientific knowledge is dynamic [See GLE 2.2.5]	• Know that science often involves the testing, evaluation and modification of theories based on the application of scientific methods. • Understand that the goal of scientific inquiry and investigation is to lead to a better understanding of the natural world.