Learning Outcomes and Writing Expectations

SCIENTIFIC INQUIRY

Approved by the Liberal Studies Council, Spring 2006

Goals and Learning Outcomes:

Below are listed the learning goals and outcomes for the Science Inquiry Domain. Each goal is listed followed by learning outcomes associated with the goal. Most of this document conforms to the National Science Education Standards.

1. Students will understand the major principles guiding modern scientific thought. Students will demonstrate a mastery of the science content knowledge of their SID courses.

2. Students will know that science, technology, and math serve as mechanisms for inquiry into the nature of the universe. Students will:
   a. identify questions that can be answered through scientific investigations
   b. design and conduct a scientific investigation to test a scientific hypothesis
   c. use appropriate tools and techniques to gather, analyze, and interpret data to support or refute a scientific hypothesis
   d. develop descriptions, explanations, predictions, and models using evidence
   e. describe relationships between evidence and explanations using critical and logical thinking
   f. recognize and analyze alternative explanations and predictions
   g. communicate scientific procedures and explanations
   h. use mathematics in all aspects of scientific inquiry

3. Students will understand and appreciate the interrelationships among science, technology and math. Students will:
   a. use technology and mathematics to identify a problem or design a solution to a problem
   b. give examples of how science and technology inform and influence each other
4. Students will understand and appreciate the role of science in society and in their lives. Students will:
   a. provide examples of how science and technology impact our lives, and how social needs and concerns impact our development of technology and scientific investigation
   b. develop positive attitudes towards science, technology, and mathematics
   c. establish an ongoing experiential/service-learning interest in science, technology, and mathematics

5. Students will understand the nature of science, technology, and mathematics. Students will:
   a. provide examples of the abuse of science, including the representation of unfalsifiable claims as science and other forms of pseudoscience,
   b. explain the strengths and limits of scientific inquiry
   c. explain the difference between evidence and inference, and the provisional nature of scientific explanations by providing examples of how our understanding of the workings of the world has changed in the past,
   d. explain the difference between probability and certainty, and describe what is meant by uncertainty in the context of science, technology, and mathematics

Writing Expectations:

Writing is integral for communicating ideas and progress in science, mathematics and technology. The form of writing in these disciplines is different from most other fields and includes, for example, mathematical equations, computer code, figures and graphs, lab reports and journals. Courses in the SI domain must include a writing component where that component takes on the form appropriate for that course (eg, lab reports, technical reports, etc.)