

**Division of Natural Sciences
Science and Scientific Method Element**

**General Education Program
Pacific Lutheran University**

Framing Language and Program Goals

The Division of Natural Sciences fulfills a two-fold purpose, preparing its majors for careers as science professionals and providing all students the grounding in the scientific awareness vital for being a citizen in the modern world and participating in a democracy.

To meet this first purpose, the six departments in the division offer rigorous programs in biology, chemistry, geosciences, physics, mathematics, and computer engineering. Inquiry-based learning is emphasized in laboratories, research courses, and capstone projects. The division-wide undergraduate research program supports one-on-one investigations with faculty in which students are immersed in all aspects of actually “doing” science.

To meet the second purpose, both major and non-major courses address the basic philosophy and methodologies of science. This encourages the awareness of the limitations of science as well as an appreciation for its benefits. Courses also attempt to place science and technology in its larger socio-cultural context, connecting developments in one discipline with those in another and with influences outside the sciences.

General Education Element Description

Exploring Nature and Number

These courses invite exploration of the natural world around and within us and provide expression of our human inclination to order what we see and to think in quantitative terms.

Science and Scientific Method

Scientists make observations and study the observations of others. They imagine explanations for what they observe (create hypotheses) and design experiments or other means to test those explanations. They sharpen and deepen their explanations based on experimental results. This laboratory-rich course is an invitation to be a scientist for awhile—to learn to apply scientific thinking to solve problems.

General Education Learning Outcomes

These objectives are related to the integrative learning objectives of knowledge and critical reflection. Although these are general statements, it is expected that the work will focus on the content of the particular course that a student chooses. In addition of the

following objectives, the objectives for course that satisfy the Natural Sciences requirement also apply.

By completing a course that focuses on science and scientific method, students will be able to do the following:

1. Use scientific knowledge and observations of the natural world to show how explanations and conceptual models can be derived from such evidence.
2. Recognize and explain how hypotheses or meaningful questions can be developed from observations of the natural world.
3. Explain the principles of designing experiments or observational strategies and, when feasible, carry out such experiments or observations.
4. Recognize and describe how analyses are done in order to show that experimental data or observations support hypotheses, or alternatively, lead to revisions.
5. Demonstrate technical, safety, and communication skills at a level of sophistication appropriate for the course.

Alignment to the ILOs:

Knowledge Base

- A broad knowledge of the basic liberal arts and sciences
- An understanding of the interconnections among these basic liberal arts and sciences that provide the broad framework for living with the complexities of life.

Critical Reflection

- Select sources of information using appropriate research methods, including those employing technology, and make use of that information carefully and critically.
- Consider issues from multiple perspectives
- Evaluate assumptions and consequences of different perspectives in assessing possible solutions to problems.
- Understand and explain divergent viewpoints on complex issues, critically assess the support available for each, and defend one's own judgements.