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# GNM

## general natural sciences & mathematics

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### GOALS

Science is the study of the natural laws governing the physical universe.

The primary reasoning and logical process underlining science is the “scientific method.” The scientific method includes the observation of events and processes, the formation of testable hypotheses, the design and execution of experiments to test the hypotheses, and the development of theories which attempt to explain the facts derived from observations and experimentation. Science is self-corrective; it does not assume an ultimate set of pre-conceived truths. In the final analysis, however, science derives successive approximations of the truth because science operates within the limitations of the natural or physical world. Science is only one way of studying the universe; it is not the only way.

The ultimate goal of a GNM course is to share the nature and processes of science with our students. To this end, GNM courses may share common content with program courses but GNM courses do not simply provide an introduction to a discipline or a diminished version of a program course. Whereas program courses are often serial links in long chains of knowledge and provide students with an implicit sense of science in general, GNM courses are explicitly concerned with giving students a complete experience which represents the scope of natural sciences and mathematics. The scope of a GNM course thus must allow for the integrated exploration of messages that are usually omitted, abbreviated, or accumulated over many semesters in program courses.

### TYPES OF COURSES

Probably no one GNM course will attempt to communicate all of the messages; however, a GNM course must explore at least one of the following four messages.

1. On the nature of science: What is science and what is not science, and why; contrasting science as a way of knowing with nonscientific or pseudoscientific views of the universe; successive approximations of the truth; model making; open-ended questions; cultural and intellectual relationships; the limitations and potential of science; scientific philosophy.
2. On the nature of scientists: Observers, experimenters, synthesizers, model builders, real people.
3. On the process of doing science : The scientific method, induction versus deduction, experiments, testable hypotheses, development of theories, self-correction, aesthetics, creativity, chance, reductionism and synthesis.
4. On the skills of scientific practice: Questioning, experimentation, communication, analysis, synthesis.