

# Science

Taught by Shawn LaBounty

**Coarse Goals:** The goal of this course will be to gain a knowledge, and appreciation of the field of science. The ultimate goal is to give a lifelong way of thinking about the world: to be able to deduce an unknown (be it a problem, phenomena, of other unknown), and rationally figure understand that unknown with scientific reason. We will look at figuring out what the best way to approach an unknown, and talk about how to solve it. During the course of this class we will cover many of the science standards that are required for fourth-sixth graders, however this class will not be limited by these standards. We will instead focus our efforts on real world examples, and base our observations on the standards of science.

**Course Description:** This course will be based in the classroom. The course will start by covering basic principles and the origins of modern science. We will then discuss fields of science. We will look at real world examples of science at work, and will look at how people are using science in our community today.

**Documentation:** This course will be graded by essays, tests, and by keeping track of their observations while in the field.

Syllabus:

## Section 1: Science overview

- Scientific method
- Fields of Science
- Important people in science

## Section 2: The use of science today.

- Useful everyday Science
- Looking at Scientists in our community
- Scientific Field Trips

## Section 3: Making Science part of our lives

- Personal Scientific observations about our world
- Personal Scientific Research
- Science Project

# Scientific Method

Characterizations: (observations, definitions, and measurements of the subject of inquiry)

Hypotheses: (theoretical, hypothetical explanations of observations and measurements of the subject)

Predictions: (reasoning including logical deduction from the hypothesis or theory)

Experiments: (tests of all of the above)

ESSAY 1: Pick out one of the founders of a branch of science i.e. Sir Isaac Newton, Albert Einstein, Copernicus, ect. Write a summary of this persons life, and how it shaped the field of science that they were involved with.

## Branches of Science

Natural science is a branch of science that seeks to elucidate the rules that govern the natural world by applying an empirical and scientific method to the study of the universe. The term natural sciences is used to distinguish it from the social sciences, which apply the scientific method to study human behavior and social patterns; the humanities, which use a critical, or analytical approach to the study of the human condition; and the formal sciences, such as mathematics and logic, which use an a priori, as opposed to factual methodology to study formal systems.

### Physical science

Physical Science is an encompassing term for the branches of natural science and science that study non-living systems, in contrast to the life sciences. However, the term "physical" creates an unintended, somewhat arbitrary distinction, since many branches of physical science also study biological phenomena.

### Physics

Physics (from Ancient Greek: φύσις physis "nature") is a natural science that involves the study of matter<sup>[3]</sup> and its motion through spacetime, along with related concepts such as energy and force.<sup>[4]</sup> More broadly, it is the general analysis of nature, conducted in order to understand how the universe behaves.<sup>[5][6][7]</sup>

Physics is one of the oldest academic disciplines, perhaps the oldest through its inclusion of astronomy.<sup>[8]</sup> Over the last two millennia, physics was a part of natural philosophy along with chemistry, certain branches of mathematics, and biology, but during the Scientific Revolution in the 16th century, the natural sciences emerged as unique research programs in their own right.<sup>[9]</sup> Certain research areas are interdisciplinary, such as biophysics and quantum chemistry, which

means that the boundaries of physics are not rigidly defined. In the nineteenth and twentieth centuries physicalism emerged as a major unifying feature of the philosophy of science as physics provides fundamental explanations for every observed natural phenomenon. New ideas in physics often explain the fundamental mechanisms of other sciences, while opening to new research areas in mathematics and philosophy.

## **Chemistry**

Chemistry (the etymology of the word has been much disputed)<sup>[10]</sup> is the science of matter and the changes it undergoes. The science of matter is also addressed by physics, but while physics takes a more general and fundamental approach, chemistry is more specialized, being concerned with the composition, behavior (or reaction), structure, and properties of matter, as well as the changes it undergoes during chemical reactions.<sup>[11]</sup> It is a physical science which studies various substances, atoms, molecules, crystals and other aggregates of matter whether in isolation or combination, and which incorporates the concepts of energy and entropy in relation to the spontaneity of chemical processes.

Disciplines within chemistry are traditionally grouped by the type of matter being studied or the kind of study. These include inorganic chemistry, the study of inorganic matter; organic chemistry, the study of organic (carbon based) matter; biochemistry, the study of substances found in biological organisms; physical chemistry, the study of chemical processes using physical concepts such as thermodynamics and quantum mechanics; and analytical chemistry, the analysis of material samples to gain an understanding of their chemical composition and structure. Many more specialized disciplines have emerged in recent years, e.g. neurochemistry the chemical study of the nervous system (see subdisciplines).

## **Earth science**

Earth science (also known as geoscience, the geosciences or the Earth sciences) is an all-embracing term for the sciences related to the planet Earth.<sup>[12]</sup> It is arguably a special case in planetary science, the Earth being the only known life-bearing planet. There are both reductionist and holistic approaches to Earth sciences. The formal discipline of Earth sciences may include the study of the atmosphere, hydrosphere, oceans and biosphere, as well as the solid earth. Typically Earth scientists will use tools from physics, chemistry, biology, chronology and mathematics to build a quantitative understanding of how the Earth system works, and how it evolved to its current state.

## **Life science**

Life science comprises the branches of science that involve the scientific study of living organisms, like plants, animals, and human beings. However, the study of behavior of organisms, such as practiced in ethology and psychology, is only included in as much as it involves a clearly biological aspect. While biology remains the centerpiece of life science, technological advances in molecular biology and biotechnology have led to a burgeoning of specializations and new, often interdisciplinary, fields.

## **Biology**

Biology is the branch of natural science concerned with the study of life and living organisms, including their structure, function, growth, origin, evolution, distribution, and taxonomy.<sup>[13]</sup> Biology is a vast subject containing many subdivisions, topics, and disciplines.