

Science in Context Master Syllabus

Cluster

Quantitative and Scientific Reasoning

Courses in this cluster prepare King’s graduates to be scientifically literate members of society. Over time, the quest for truth and understanding has led inquisitive people to ponder questions about the physical world and society and to discover – through the process of hypothesis, experiment, and observation – the rules, both simple and complex, that govern natural and social phenomena. In this vein, the overarching goals of the courses within this cluster are to inspire students to be curious about the world around them and to provide the mathematical and analytical tools necessary to draw sound conclusions from observations and evidence. From the study of the matter in the universe, the organization of matter into complex living organisms and ecosystems, and the effects of human behavior and organization on the physical world and each other, students will ultimately form connections between the governing principles of scientific inquiry and our human experience within the natural and social worlds. The foundational knowledge developed in the Quantitative and Scientific Reasoning cluster will enable students to identify scientific issues underlying national and local decisions and to utilize their skills of quantitative and scientific analysis to respond in meaningful and ethically responsible ways to issues of contemporary importance to society.

Core Goal Served in this Category

Goal 5: To advance our students scientific reasoning and literacy

Core Learning Outcomes

A student successfully completing a course in Science in Context will be able to

1. Demonstrate familiarity with theories and research methods in the natural and social sciences, including qualitative and quantitative interpretations and analyses (Core Goal 5.1)
2. Critically assess sources and claims to test their validity from a scientific and quantitative perspective (Core Goal 5.2)
3. Demonstrate knowledge of discoveries and trends in the natural and social sciences (Core Goal 5.6)

Catalog Description

In the Science in Context courses, students will have the opportunity to build upon their existing scientific knowledge. Courses in this category may offer students a broad introduction to an unfamiliar discipline or may provide a detailed topical investigation into a more familiar one. The Science in Context course teaches students to explore new areas of scientific knowledge, to

draw connections with other academic disciplines, especially within the Core Curriculum, to examine contemporary issues and topics, and to evaluate how science shapes our everyday lives.

Intangibles / Aspirations / Other Category-Level Elements

In addition to the outcomes assessed in this category, other Core outcomes might be developed and addressed by various courses in Science in Context. Skills, competencies, and dispositions relevant to the subject of science might also be cultivated in this category.

- Recognize how science influences human activities
- To help students develop the foundational skills and competencies of written and oral communication, quantitative reasoning, and critical inquiry and analysis (Goal 1)
- Wonder, ponder, and ask thoughtful and insightful questions (Core Goal 7.1)
- Probe for deeper understanding and meaning (Core Goal 7.5)

Teaching Methods and Assessment

Students will be required to complete:

- A quantitative and qualitative evaluation and interpretation of relevant scientific data (Learning Outcome 1)
- A project (written, oral or both) in which students complete an evaluation of a contemporary scientific study or issue. (Learning Outcome 2 and 3)

Texts

Instructors should select a textbook appropriate for the topical nature of the course.

Additional Information / Resources for Instructors

Courses

NSCI 171: Descriptive Astronomy

The study of the nature of the universe and our place in it. Topics include the nature of astronomy as a science, its historical development, a comparative study of the bodies in our solar system and other solar systems, the life cycle of stars, the large-scale structure of the Universe, and the connection between the cosmos and humanity. Sections may occasionally run with an emphasis on astrobiology and the search for life in the Universe.

NSCI 172: Chemistry in Context

An introduction to the basic principles of chemistry and their relevance to society. This course will expand the chemistry knowledge of those students who have already been introduced to chemistry and will also be easily comprehensible to newcomers to the subject. The historical development of the fundamental principles of chemistry will be explored to lead up to current

issues that are important to everyone like energy generation, medicines, and nutrition. Special topical sections may include The Chemistry of Beer, the Chemistry of Cooking, etc.

NSCI 173: Contemporary Biology

A study of selected issues in contemporary biology. Topics may include world hunger as an ecological problem, the impact of genetic technology on medicine, and the biological and ecological problems of toxic and hazardous wastes. Special topical sections may include The Biology of Stress, The Science of Drug Addiction, etc.

NSCI 174: The Environment and Natural Resources

A study of the principles and issues of environmental science associated with natural resource use and abuse. The course will survey our reliance on natural resources relating to food, water, energy, economic and agricultural products, waste disposal, and human health. Emphasis will be given on making choices that minimize environmental abuse.

NSCI 175: Dinosaurs and the Science of Paleontology

Dinosaurs, their biology, evolution, and extinction will be the primary focus of this course. The scientific method as used by paleontologists for understanding dinosaurs as once living animals will be stressed. The course will examine fundamental geological and biological techniques, and the philosophical foundations of these practices that bring us a reliable understanding of past events. The course will cover such topics as geologic time, radioactive dating, plate tectonics, fossilization, and skeletal anatomy, as well as critical examination of evidence for two major events in dinosaur history; their extinction by cometary impact and the origin of birds.

NSCI 176: Forensic Biology

A study of the diverse fields of forensic biology and the education, training, and specialization involved in doing actual forensic science. Topics include, but are not limited to: sample collection, documentation of evidence, forensic anthropology, serology, DNA analysis, and factors affecting decomposition. Students may be required to complete several laboratory or field based projects.

NSCI 177: Conceptual Physics

An introductory course on elementary physics covering topics such as motion, mechanics, energy, electromagnetism, light, sound, atomic and nuclear physics. The course will be descriptive, conceptual, and will include nearly no math. Special topical sections may include The Physics of Superheroes, The Physics of Warfare, The Physics of Toys, etc.

NSCI 178: Forensic Science

An introduction to scientific principles and their practical applications to forensic problems with a focus on the analysis of evidence in legal cases. Topics include comparisons of toolmakers, firearms, fingerprints, trace evidence, drugs, and bloodstains. Proper techniques of evidence collection and handling are discussed from both legal and scientific viewpoints, as well as the advantages and limitations of presently utilized methods of analysis.

NSCI 179: Health and the Human Body

An introduction to nutrition principles necessary to promote a healthy lifestyle. The course will examine nutrients (proteins, carbohydrates, fat, vitamins, water, and minerals), the physiological processes used to digest, absorb, and utilize them, and their relation to contemporary issues healthy body weight, physical performance, and various diseases such as heart disease, diabetes, cancer, and osteoporosis.

NSCI 180: Modern Materials

A survey of how different materials work, how they are made and how they affect human society. Since the industrial revolution, and especially during this century, there has been a veritable "materials revolution," ushering in cements, high-performance alloys, polymers, composites, semiconductors, and superconductors. Like the Stone Age and Iron Age before us, future historians may refer to our age as the Age of Silicon, after the material which forms the basis of the devices which power our advanced electronic systems.

NSCI 181: Sustainable Energy and the Environment

An exploration of our wide range of traditional and renewable energy sources and how these options impact our environment and society. Students will be exposed to the complex and compelling ethical issues raised by global, national and local changes in how we produce and use energy. In addition, students will gain the knowledge necessary to be articulate in career, community, and personal arenas regarding renewable energy resources.

NSCI 190: Special Topics in Natural Science

An investigation of selected topics that focus on some aspect of natural science and its application to the way we think and the way we live.