



YALE NATIONAL INITIATIVE

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Curriculum Units by Fellows of the National Initiative
2007 Volume VII: The Science and Technology of Space

Introduction

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The title of this seminar was sufficiently broad to encompass topics ranging from Astronomy, to Astrophysics, Solar System, Physics, Mathematics, History of Space Exploration, to Life in the Universe. The curriculum units developed reflected such a variety of topics, as well as a variety of grade levels targeted.

The unifying thread of each curriculum unit was that Space played a role in the advances of the topics addressed. For example, two of the units address the topic of the origin of the chemical elements following vastly different teaching techniques. Although the primary relevant field is Nuclear Astrophysics, the space program was critical in separating the role of primordial nucleosynthesis from that of stellar nucleosynthesis in building up the elements found in the Universe. Similarly, many of the basic properties of the objects in the Solar System, addressed by several curriculum units, were only established with the help of space probes. Also, the search for life outside planet Earth, currently apparently dominated by radio astronomy, does in fact rely fundamentally on the space program, both for the in-situ search for primitive living organisms within the Solar System, as well as for the search of Earth-like planets around stars within our galactic neighborhood. Finally, many of the basic principles of Mechanics can be illustrated by events and devices used in the space program, such as micro-gravity, the rocket effect, etc.

To evaluate the objectives and topics of each curriculum unit and assess its relevance to your own teaching, it is necessary to examine the synopsis of each unit individually. There you will find sufficient information to address the level of the targeted students, as well as the key elements of local and/or national standards that the unit addresses.

It has been a prevalent feeling of most Fellows of this seminar that astronomical and space topics are great motivators for students who do not typically see the relevance of Physics, Mathematics, Chemistry or other sciences to their own lives. In these units you see one or more of these sciences at work, demonstrating that they are not merely abstract manipulations without a point. This compendium of units, as well as those corresponding to similar seminars, should assist science teachers to convey to their students why the effort required to master these subjects is a worthwhile undertaking.

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