CONNECT to the MOON

Grades 5-8 Seeing the Moon: Using Light to Investigate the Moon

A Series of Inquiry Activities to Accompany the Chandrayaan-1 Moon Mineralogy Mapper Instrument

National Science Education Standards Related to the Moon

	Seeing the Moon: 1A Experimenting with Color Filters	Seeing the Moon: 1B Making Observations of Spectra	Seeing the Moon: 1C Introduction to the ALTA Reflectance Spectrometer	Seeing the Moon: 1D Spectrometers in Action	Seeing the Moon: 2A Observing the Moon	Seeing the Moon: 2B Remote Analysis of the Moon	Seeing the Moon: 3B Lunar Treasure Hunt
CONTENT STANDARD A: SCIENCE AS INQUIRY							
Abilities Necessary to Do Scientific Inquiry							
Abilities to do Inquiry: Develop descriptions, explanations, predictions, and models using evidence							
Abilities to do Inquiry: Use appropriate tools and techniques to gather, analyze, and interpret data.							
Abilities to do Inquiry: Communicate scientific procedures and explanations							
Abilities to do Inquiry: Recognize and analyze alternative explanations and predictions							
Mathematics is important in all aspects of scientific inquiry.							
Technology used to gather data enhances accuracy and allows scientists to analyze and quantify results of investigations.							
Scientific explanations emphasize evidence, have logically consistent arguments, and use scientific principles, models, and theories.							
Asking questions and querying other scientists' explanations is part of scientific inquiry. Scientists evaluate explanations by examining and comparing evidence, identifying faulty reasoning, and suggesting alternative explanations for observations.							
Scientific investigations sometimes result in new ideas and phenomena for study, generate new methods or procedures for an investigation, or develop new technologies to improve the collection of data.							
CONTENT STANDARD B: PHYSICAL SCIENCE							
Transfer of Energy							
Light interacts with matter by transmission (including refraction), absorption, or scattering (including reflection). To see an object, light from that object – emitted by or scattered from it – must enter the eye.							

The Sun is a major sources of energy for changes on the Earth's surface. The Sun loses energy by emitting light. A tiny fraction of that light reaches the Earth, transferring energy from the Sun to the Earth. The Sun's energy arrives a light with a range of wavelengths.							
CONTENT STANDARD D: EARTH AND SPACE SCIENCE							
Structure of the Earth System							
Landforms are the result of a combination of constructive and destructive forces.							
Earth in the Solar System							
The Earth is the third planet from the Sun in a system that includes the Moon, Sun, eight other planets and their moons, and smaller objects such as asteroids and comets. The Sun, an average star, is the central and largest body in the solar system.							
CONTENT STANDARD E: SCIENCE AND TECHNOLOGY							
Understandings about Science and Technology							
Science and technology are reciprocal. Science helps drive technology, as it addresses questions that demand more sophisticated instruments and provides principles for better instrumentation and technique. Technology is essential to science because it provides instruments and techniques that enable observations and tools for investigations, inquiry, and analysis.							
CONTENT STANDARD F: SCIENCE IN PERSONAL AND SOCIAL PERSPECTIVES							
Science and Technology in Society							
Science influences society through its knowledge and world view. Scientific knowledge and procedures influence the way many individuals think about themselves, others, and the environment….							
Technology influences society through its products and processes … Social needs, attitudes, and values influence the direction of technological development.							
Science and technology have advanced through contributions of many different people, in different cultures, at different times in history. Science and technology have contributed enormously to economic growth and productivity among societies and groups within societies.							
CONTENT STANDARD G: HISTORY AND NATURE OF SCIENCE							
Science as a Human Endeavor							
Women and men of various social and ethnic backgrounds – and with diverse interests, talents, qualities, and motivations – engage in the activities of science, engineering, and related fields such as the health professions. Some scientists work in teams, some alone, but all communicate extensively with others.							
Science requires different abilities depending on such factors as the field of study and the type of inquiry. Science is very much a human endeavor and the work of science relies on basic human qualities such as reasoning, insight, energy, skill, and creativity – as well as scientific habits of mind, such as intellectual honesty, tolerance of ambiguity, skepticism, and openness to new ideas.							

Nature of Science							
Scientists formulate and test their explanations of nature using observation, experiments, and theoretical and mathematical models. Although all scientific ideas are tentative and subject to change and improvement in principle, for most major ideas in science, there is much experimental and observational confirmation. … Scientists do and have changed their ideas about nature when they encounter new experimental evidence that does not match the existing explanations.							
In areas where active research is being pursued and in which there is not a great deal of experimental or observational evidence and understanding, it is normal for scientists to differ with one another about the interpretation of the evidence or theory being considered …							
It is part of scientific inquiry to evaluate the results of scientific investigations, experiments, observations, and theoretical models, and the explanations proposed by other scientists …