CONNECT to the MOON

Grades 5-8 Challenger Center Return to the Moon Activities

National Science Education Standards Related to the Moon

	Return to the Moon – Observing the Moon	Return to the Moon – Moon Phases	Return to the Moon – Distance to the Moon	Return to the Moon – How Far is Far?	Return to the Moon – Size Relationship Between the Earth and the Moon	Return to the Moon – Layers of the Moon	Return to the Moon – Moon's Crust, Mantle, and Core	Return to the Moon – Lunar Geology	Return to the Moon – Lunar Landforms and Contour Lines	Return to the Moon – Using Lunar Photos to Identify Geologic Features	Return to the Moon – Mining the Moon	Return to the Moon – M&M Moon Mining	Return to the Moon – Moon Maneuvers	Return to the Moon – Choose a Lunar Landing Site	Return to the Moon – Water on the Moon	Return to the Moon – Build an Astronaut Base	Return to the Moon – Settling the Moon	Return to the Moon – Energy, Power, and Photovoltaics
CONTENT STANDARD A: SCIENCE AS INQUIRY																		
Abilities Necessary to Do Scientific Inquiry	●	●		●	●			●	●	●	●	●	●	●	●	●	●	●
CONTENT STANDARD B: PHYSICAL SCIENCE																		
Transfer of Energy																		
Energy is a property of many substances and is associated with heat, light, electricity, mechanical motion, sound, nuclei, and the nature of a chemical. Energy is transferred in many ways.																●		●
Electrical circuits provide a means of transferring electrical energy when heat, light, sound, and chemical changes are produced.																		●
In most chemical and nuclear reactions, energy is transferred into or out of a system. Heat, light, mechanical motion, or electricity might all be involved in such transfers.																		●
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 C: LIFE SCIENCE																	
Populations and Ecosystems																	
For ecosystems, the major source of energy is sunlight. This energy is transferred by producers into chemical energy through photosynthesis. That energy then passes from organism to organism in food webs.																	
The number of organisms an ecosystem can support depends on the resources available and abiotic factors.																	
CONTENT STANDARD D: EARTH AND SPACE SCIENCE																	
Structure of the Earth System																	
The solid Earth is layered with a lithosphere, hot convecting mantle, and dense metallic core.																	
Landforms are the result of a combination of constructive and destructive forces.																		
Some changes in the solid Earth can be described as the “rock cycle.”																	
The atmosphere is a mixture of nitrogen, oxygen, and trace gases that include water vapor. The atmosphere has different properties at different elevations.																	
Water, which covers the majority of the earth's surface, circulates through the crust, oceans, and atmosphere in what is known as the "water cycle.".																	
Living organisms have played many roles in the earth system, including affecting the composition of the atmosphere, producing some types of rocks, and contributing to the weathering of rocks.																	
Earth’s History																	
The Earth processes we see today are similar to those that occurred in the past. Earth history is also influenced by occasional catastrophes, such as the impact of an asteroid or comet.																	
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.																		
Most objects in the solar system are in regular and predictable motion, Those motions explain such phenomena as the day, the year, phases of the Moon, and eclipses.																	

The Sun is the major source of energy for phenomena on the earth's surface, such as growth of plants, winds, ocean currents, and the water cycle. Seasons result from variations in the amount of the Sun's energy hitting the surface, due to the tilt of the Earth's rotation on its axis and the length of the day.																		
CONTENT STANDARD E: SCIENCE AND TECHNOLOGY																		
Abilities of technological design																		
Understandings about Science and Technology																		
Scientific inquiry and technological design have similarities and differences. Scientists propose explanations for questions about the natural world, and engineers propose solutions relating to human problems, needs, and aspirations. Technological solutions are temporary … technological solutions have side effects; and technologies cost, carry risks, and provide benefits.																		
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.																		
Perfectly designed solutions do not exist. All technological solutions have trade-offs, such as cost, safety, efficiency and appearance. Engineers often build in back-up systems to provide safety.																		
Technology designs have constraints. Some constraints are unavoidable, for example, properties of materials, or effects of weather and friction; other constraints limit choices in the design, for example, environmental protection, human safety, and aesthetics.																		
Technological solutions have intended benefits and unintended consequences. Some consequences can be predicted, others cannot.																		

CONTENT STANDARD F: SCIENCE IN PERSONAL AND SOCIAL PERSPECTIVES																		
Risks and Benefits																		
Individuals can use a systematic approach to thinking critically about risks and benefits …																		
Important personal and social decisions are made based on perceptions of benefits and risks.																		
Science and Technology in Society																		
Technology influences society through its products and processes … Social needs, attitudes, and values influence the direction of technological development .																		
Scientists and engineers work in many different settings …																		
CONTENT STANDARD G: HISTORY AND NATURE OF SCIENCE																		
Science as a Human Endeavor																		
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.