

Standards



The education activities that have been created to accompany the map have the intent of inspiring students in the areas of science, technology, engineering, the arts and mathematics (STEAM). However, we also believe that great projects and activities, just like our life experiences, cut across many discipline areas. They require students to research, communicate, work together, and utilize social studies, language arts, and other skill-sets in the process. As such, they address big ideas in the Next Generation Science Standards (NGSS), the International Standards for Technology in Education (ISTE), the American Society for Engineering Education Corporate Member Council – K-12 STEM Guidelines for All Americans (ASEE), the National Council of Teachers of Mathematics (NCTM), Common Core English Language Arts Standards and the National Curriculum Standards for Social Studies (NCSS), among others. Since much of what is addressed crosses many different disciplines and skill-sets, it becomes nearly impossible to map out every standard met. In an effort to provide as much guidance as possible in many different content areas, the “bigger picture” is presented in several standards areas in order to help educators find the best fit for these activities within often-required educational standards. Depending on the depth and breadth of the activities conducted in each situation, specific standards alignment is left to the educator to decide. Below is a framework to get started.

The Next Generation Science Standards have identified the major Crosscutting Concepts that are addressed by Giant Moon Map activities. These include:

1. *Patterns.* Observed patterns of forms and events guide organization and classification, and they prompt questions about relationships and the factors that influence them.
2. *Cause and effect: Mechanism and explanation.* Events have causes, sometimes simple, sometimes multifaceted. A major activity of science is investigating and explaining causal relationships and the mechanisms by which they are mediated. such mechanisms can then be tested across given contexts and used to predict and explain events in new contexts.
3. *Scale, proportion, and quantity.* In considering phenomena, it is critical to recognize what is relevant at different measures of size, time, and energy and to recognize how changes in scale, proportion, or quantity affect a system’s structure or performance.
4. *Systems and system models.* Defining the system under study--specifying it boundaries and making explicit a model of that system--provides tools for understanding and testing ideas that are applicable throughout science and engineering.
5. *Energy and matter: Flows, cycles, and conservation.* Tracking fluxes of energy and matter into, out of, and within systems helps one understand the systems’ possibilities and limitations.
6. *Structure and function.* The way in which an object or living thing is shaped and its substructure determine many of its properties and functions.
7. *Stability and change.* For natural and built systems alike, conditions of stability and determinants of rates of change or evolution of a system are critical elements of study.

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The International Standards for Technology in Education has identified seven standards that can be addressed through the use of Giant Moon Map activities. These include:

1. *Empowered Learner*: Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences.
2. *Digital Citizen*: Students recognize the rights, responsibilities and opportunities of living, learning and working in an interconnected digital world, and they act and model in ways that are safe, legal and ethical.
3. *Knowledge Constructor*: Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.
4. *Innovative Designer*: Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.
5. *Computational Thinker*: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.
6. *Creative Communicator*: Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.
7. *Global Collaborator*: Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.

American Society for Engineering Education Corporate Member Council – K-12 STEM

Guidelines for All Americans have identified five dimensions which are addressed by the Giant Mars Map activities:

1. **Engineering Design**: All American will apply concepts of engineering design to solve problems.
2. **Engineering to Science, Technology, and Mathematics**: All Americans will be able to apply concepts of science, technology, and mathematics to engineering processes and problems.
3. **Nature of Engineering**: All Americans will be creative and innovative in their thought process and actions.
4. **Communication and Teamwork**: Americans will be able to use effective communication and teamwork skills to acquire information and convey outcomes to a variety of stakeholders.

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The National Council of Teachers of Mathematics has identified Process Standards that can be addressed by Giant Moon Map activities. These include:

1. Problem Solving
2. Communication
3. Connections
4. Representations

Common Core English Language Arts Standards have identified Anchor Standards. Giant Moon Map activities are written to require students to practice the following:

Comprehension and Collaboration
Presentation of Knowledge and Ideas

National Curriculum Standards for Social Studies have identified ten themes. The themes are closely interconnected in nature. The Giant Mars Map activities address the following themes:

3. People, Places and Environments
6. Power, Authority, and Governance
8. Science, Technology, and Society

ShareSpace Education is interested in documenting specific standards that teachers address at their grade levels. We ask that as you use these lessons and create your own that you share information with us through the on-line evaluation documents that can be accessed through Data Collection links on the [Moon and Mars Map Education Activities](https://sharespace.org/education/mars-maps/mars-map-curriculum/) page at <https://sharespace.org/education/mars-maps/mars-map-curriculum/>