Appendix 1: National Science Standards

STANDARD: As a result of activities in grades K-12, all students should develop understanding and abilities aligned with the following concepts and processes:

1. Systems, order, and organization (Mapping Mars, identifying geological features)
2. Evidence, models, and explanation (Develop a question to answer for HiRISE suggestion site)
3. Constancy, change, and measurement (Calculations of spatial resolution)
4. Evolution and equilibrium (Understanding Mars history)
5. Form and function (Mapping Mars, identifying geological features)

Content Standards Grades K-4

CONTENT STANDARD A: As a result of activities in grades K-4, all students should develop

1. Abilities necessary to do scientific inquiry (Developing a plan to select HiRISE target)
2. Understanding about scientific inquiry (Getting involved in the HiRISE analysis)

CONTENT STANDARD D: As a result of their activities in grades K-4, all students should develop an understanding of

1. Properties of earth materials (Differences between Earth and Mars)
2. Objects in the sky (Mars)

CONTENT STANDARD G: As a result of activities in grades K-4, all students should develop understanding of

1. Science as a human endeavor (Involvement in a larger scientific program)

Content Standards Grades 5-8

CONTENT STANDARD A: As a result of activities in grades 5-8, all students should develop

1. Abilities necessary to do scientific inquiry (Developing a plan to select HiRISE target)
2. Understanding about scientific inquiry (Getting involved in the HiRISE analysis)

CONTENT STANDARD D: As a result of their activities in grades 5-8, all students should develop an understanding of

1. Earth in the solar system (Similarities and differences between Earth and Mars)

CONTENT STANDARD G: As a result of activities in grades 5-8, all students should develop understanding of

1. Science as a human endeavor (Involvement in a larger scientific program)
2. Nature of science (Learn the scientific process through involvement in real Mars research)
3. History of science (Learn about the evolution of missions to Mars)

Teaching Standards

TEACHING STANDARD A: Teachers of science plan an inquiry-based science program for their students. In doing this, teachers

1. Develop a framework of yearlong and short-term goals for students.
2. Select science content and adapt and design curricula to meet the interests, knowledge, understanding, abilities, and experiences of students.
3. Select teaching and assessment strategies that support the development of student understanding and nurture a community of science learners.
4. Work together as colleagues within and across disciplines and grade levels.

TEACHING STANDARD B: Teachers of science guide and facilitate learning. In doing this, teachers

1. Focus and support inquiries while interacting with students.
2. Orchestrate discourse among students about scientific ideas.
3. Challenge students to accept and share responsibility for their own learning.
4. Encourage and model the skills of scientific inquiry, as well as the curiosity, openness to new ideas and data, and skepticism that characterize science.

TEACHING STANDARD C: Teachers of science engage in ongoing assessment of their teaching and of student learning. In doing this, teachers

1. Use multiple methods and systematically gather data about student understanding and ability.
2. Analyze assessment data to guide teaching.
3. Guide students in self-assessment.

TEACHING STANDARD D: Teachers of science design and manage learning environments that provide students with the time, space, and resources needed for learning science. In doing this, teachers

1. Make the available science tools, materials, media, and technological resources accessible to students.
2. Identify and use resources outside the school.
3. Engage students in designing the learning environment.

TEACHING STANDARD E: Teachers of science develop communities of science learners that reflect the intellectual rigor of scientific inquiry and the attitudes and social values conducive to science learning. In doing this, teachers

1. Display and demand respect for the diverse ideas, skills, and experiences of all students.
2. Structure and facilitate ongoing formal and informal discussion based on a shared understanding of rules of scientific discourse.
3. Model and emphasize the skills, attitudes, and values of scientific inquiry.