#### NCTM National Mathematics Standards Grades 9-12 As Addressed by Challenger's e-Mission: Space Station Alpha

### Mathematics Life Skills

The mathematics addressed by Space Station Alpha emphasize several important factors identified in the NCTM standards:

- Curriculum which is both broad and deep
- Helping students to become more autonomous and yet more able to work with others
- Developing students' personal and intellectual competencies for the workplace and postsecondary education
- Provides a means to encounter new ways of analyzing data
- Builds on student prior knowledge—helping them to learn more-varied and moresophisticated problem-solving techniques
- Increases students' abilities to visualize, describe, and analyze situations in mathematical terms
- Develops increased abilities in justifying claims and proving conjectures
- Encourages students to provide carefully reasoned arguments in support of their claims
- Provides practice in making and interpreting oral and written claims to communicate effectively while working with others
- Develops facility with such technological tools as spreadsheets, data-gathering devices, computer algebra systems, and graphing utilities
- Facility with technological tools to analyze data
- Provides experience in making connections and solving problems from a wide range of contexts
- Helps students to learn to adapt flexibly to changing needs
- Helps students to be better prepared for changes in the workplace that increasingly demand teamwork, collaboration, and communication
- Helps students to develop a much richer understanding of mathematics and its applications when they can view the same phenomena from multiple mathematical perspectives by weaving together different content strands across both science and math
- Provides enriched curricula in heterogeneous classes to help students seek different levels of understanding.
- Helps students learn new ways of thinking from their peers

### Mathematics Content Standards Addressed

Instructional programs should enable all	
students to-	In grades 9–12 all students should—

# Numbers and Operations

Understand numbers, ways of representing	• [	Develop a deeper understanding of very large and
numbers, relationships among numbers,	V	very small numbers and of various
and number systems	r	representations of them; (2)

Compute fluently and make reasonable estimates Algebra	<ul> <li>Develop fluency in operations with real numbers, using mental computation or paper-and-pencil calculations for simple cases and technology for more-complicated cases. (1)</li> <li>Judge the reasonableness of numerical computations and their results. (1)</li> </ul>
Understand patterns, relations, and	• Analyze functions of one variable by
Tunctions	asymptotes, and local and global behavior; (2)
Use mathematical models to represent and	• Draw reasonable conclusions about a situation
understand quantitative relationships	being modeled. (3)
Analyze change in various contexts	• Approximate and interpret rates of change from graphical and numerical data. (1)
Measurement	
Understand measurable attributes of objects and the units, systems, and processes of measurement	• Make decisions about units and scales that are appropriate for problem situations involving measurement. (3)

# **Problem solving standard**

- Build new mathematical knowledge through problem solving; (3)
- Solve problems that arise in mathematics and in other contexts; (3)
- Apply and adapt a variety of appropriate strategies to solve problems; (3)
- Monitor and reflect on the process of mathematical problem solving. (3)

# **Communication standard**

- Organize and consolidate their mathematical thinking through communication; (3)
- Communicate their mathematical thinking coherently and clearly to peers, teachers, and others; (3)
- Analyze and evaluate the mathematical thinking and strategies of others; (3)

# **Connections standard**

- Recognize and use connections among mathematical ideas; (3)
- Understand how mathematical ideas interconnect and build on one another to produce a coherent whole; (3)
- Recognize and apply mathematics in contexts outside of mathematics. (1)