Alignment to New York State Learning Standards For Mathematics, Science, and Technology

Standard 1: Mathematical Analysis, Scientific Inquiry, Engineering Design.

1.1 Mathematical Analysis

1.1.1 Abstract and symbolic representations are used to communicate mathematically.

1.1.2 Inductive and deductive reasoning are used to communicate mathematically.

1.1.3 Critical Thinking skills are used in solving mathematical problems.

1.2 Scientific Inquiry

1.2.1 Develop explanations of natural phenomena

1.2.2 Testing explanations, designing a plan of study

1.2.3 Observation, measurement, analysis, evaluation

1.3 Engineering Design

1.3.1 Process of designing models and developing technological solutions.

Standard 2: Information Systems

2.1 Retrieve, process, and communicate information.

2.2 Knowledge of impacts and limitations of systems

2.3 Awareness of positive and negative societal impacts of technology.

Standard 3: Mathematical Reasoning, Number and Numeration, Operations, Modeling, Measurement, Uncertainty, Patterns/Functions

3.1 Use mathematical reasoning to analyze, conjecture, gather information.

3.2 Understand multiple use of numbers, to communicate mathematically.

3.3 Use various mathematical operations

3.4 Use mathematical modeling to present, communicate, and correct information

3.5 Use both metric and English units.

3.6 Use of estimation, probabilities.

3.7 Recognize patterns and functions.

Standard 4: Science

4.1 *Physical Setting*

4.1.1 Earth and celestial phenomenon described by principles of relative motion and perspective.
4.1.2 Many phenomena involve interactions of air, water, land.
4.1.3 Matter made up of particles of observable characteristics.
4.1.4 Energy exists in many forms
4.1.5 Energy and matter interact through forces that result in change in motion.

4.2 *Living Environment*

4.2.1 Living things are both similar and different from each other and non living things.
4.2.2 Organisms inherit genetic information.
4.2.3 Individual organisms and species change over time.
4.2.4 Life is sustained through reproduction and development.
4.2.5 Organisms maintain dynamic equilibrium that sustains life.
4.2.6 Plants and animals depend on each other and their physical environment.
4.2.7 Human decisions and activities impact the physical environment.

Standard 5: Technology

5.1 Engineering design is a process used to develop technological solutions
5.2 Technological tools should be selected based on safety, cost, availability, appropriateness, and environmental impact.
5.3 Computers have greatly increased human productivity.
5.4 Technological systems are designed to achieve specific results and produce outputs.
5.5 Technology has been the driving force behind societal evolution from agriculture to industrial to information based.
5.6 Technology can have positive and negative impacts and humans have a responsibility to constrain or promote technological development.
5.7 Project management is essential to ensure profitability, quality, safety, being on schedule and within budgets.

Standard 6: Interconnectedness

- **6.1** Thinking systems help people recognize interrelationships and commonalities within and between systems.
- **6.2** Models can be used in analysis, explanation, interpretation, or design
- **6.3** Units of measure and relative order provide ways of dealing with ranges and changes in behavior and design of systems.
- **6.4** Equilibrium is due either to lack of change or balance between opposing forces.
- **6.5** Identifying patterns is important, is necessary for making predictions.
- **6.6** Trade-offs are often necessary to arrive at solutions.

Standard 7: Interdisciplinary Problem Solving

- **7.1** Math, Science, and Technology are used together to make decisions and solve problems.
- **7.2** Interdisciplinary problem solving involves effective work habits, gathering and processing information, generating and analyzing ideas, realizing ideas, making connections, and presenting results.

Team By Team Analysis of Standards Correlation

Communication

The Communication Team addresses the standards in the following manner:

Standard 2: Information Systems:
By serving as a conduit of information between teams.

Standard 5 Technology:
By utilizing audio transmission and reception equipment.

Standard 7: Interdisciplinary Problem Solving:
By serving as the communication link between all of the teams.

MEDICAL

The Medical Team addresses the standards in the following manner:

Standard 1: Analysis, Inquiry, and Design:
By utilizing the skills of observation, measurement, analysis and evaluation needed to conduct all tests at this station.

Standard 2: Information Systems:
By effectively using the tools at the medical station (computers, thermometers, heart rate monitor).

Standard 3: Mathematics:
By performing auditory and visual reaction testing on crew members.
By calculating averages, graphing, and interpreting data.

Standard 4: Science:
By performing auditory and visual reaction testing on crew members.

Standard 5 Technology:
By effectively using the tools at the medical station (computers, thermometers, heart rate monitor).

Standard 6: Interconnectedness:
By the collection of medical data on crew members provided by the various tests performed at this station, the medical team is able to identify patterns and show relationships between environmental conditions and performance.

Standard 7: Interdisciplinary Problem Solving:
By working cooperatively with all other teams to ensure the success of the mission and the health and safety of the crew.

ISOLATION

The Isolation Team addresses the standards in the following manner:

Standard 1: Analysis, Inquiry, and Design:

By using formulas to perform calculations and analyze data concerning the nature and condition of hazardous materials.

Standard 2: Information Systems:

By reading the scales of measurement tools such as graduated cylinders, electronic balances, and Geiger counters and communicating their readings using computer technology.

Standard 3: Mathematics:

By utilizing various mathematical formulas to calculate scientific results and by using a variety of scientific tools with which to measure.

Standard 4: Science:

By testing the physical properties of matter such as density, mass, and radioactivity.

Standard 5 Technology:

By using computers and robotics.

Standard 7: Interdisciplinary Problem Solving:

By working cooperatively with all other teams to ensure the success of the mission and the health and safety of the crew.

DATA

The Data Team addresses the standards in the following manner:

Standard 2: Information Systems:
By serving as a conduit of information between teams.

Standard 5 Technology:
By utilizing computer and printer technology to transmit and receive information between teams.

Standard 7: Interdisciplinary Problem Solving:
By serving as the communication link between all of the teams.

LIFE SUPPORT

The Life Support Team addresses the standards in the following manner:

Standard 1: Analysis, Inquiry, and Design:
By using formulas to perform calculations and analyze data concerning the environmental conditions aboard the spacecraft, electrical generating systems, and water quality.

Standard 2: Information Systems:
By reading the scales of measurement tools such as thermometer, hygrometer, Barometer, ammeter and TDS meter and communicating their readings using computer technology.
By using a microscope to estimate field of view for measurement of microscopic organisms.

Standard 3: Mathematics:
By utilizing various mathematical formulas to calculate scientific results and by using a variety of scientific tools with which to measure.

Standard 4: Science:
By testing the physical properties of matter such as pH, mass, and physical properties of energy conversion.

Standard 5 Technology:
By using ammeters, solar cells, and meteorological instruments and communicating their data using computers.

Standard 6 Interconnectedness:
By graphing the results of solar energy generation experiments, relationships and patterns can be identified.

Standard 7: Interdisciplinary Problem Solving:
By working cooperatively with all other teams to ensure the success of the mission and the health and safety of the crew.

NAVIGATION

The Navigation Team addresses the standards in the following manner:

Standard 1: Analysis, Inquiry, and Design:
By engaging in computer simulations which model landing and course correction maneuvers.

Standard 2: Information Systems:
By using computer simulations to generate data necessary for the navigation of the spacecraft.
By using internet and cd-rom to gather data for informed decisions on colony selection.

Standard 3: Mathematics:
By using latitude and longitude to locate topographic features on the Martian surface.

Standard 4: Science:
By using a computer simulation of apogee and perigee to generate course correction data.

Standard 5 Technology:
By using computer programs and simulations to generate appropriate navigational data.

Standard 6 Interconnectedness:
By combining the use of computer simulations and mathematical calculations to produce charts essential for the navigation of the spacecraft.

Standard 7: Interdisciplinary Problem Solving:
By working cooperatively with all other teams to ensure the success of the mission and the health and safety of the crew.

PROBE

The Probe Team addresses the standards in the following manner:

Standard 1: Analysis, Inquiry, and Design:
By using a team problem solving approach to correct errors in probe construction.

Standard 2: Information Systems:
By using computers, audio transmission and reception equipment, and electrical components to construct a probe and to analyze its components.

Standard 3: Mathematics:
By reading decimals and percentages to identify a suitable site for colonization of Mars.

Standard 4: Science:
By analyzing seismic data on Mars and Earth to identify safer sites for colonization of Mars.

Standard 5 Technology:
By using computers, electrical components, and audio transmission and reception devices to construct, test, launch, and retrieve a probe.

Standard 6 Interconnectedness:

By observing, describing, and analyzing the electrical systems of the probe, and by selecting an appropriate site for colonization based on given criteria and data collected by the probe.

Standard 7: Interdisciplinary Problem Solving:

By working cooperatively with all other teams to ensure the success of the mission and the health and safety of the crew.

REMOTE

The Probe Team addresses the standards in the following manner:

Standard 1: Analysis, Inquiry, and Design:

By observing, measuring, and utilizing the formula for calculating density to identify rock and soil samples.

Standard 2: Information Systems:

By using computers to communicate with their teammates.

By using a dichotomous key to classify rock samples.

Standard 3: Mathematics:

By using mathematical calculations to determine density and by using electronic balances, compass, and graduated cylinders to identify rock and soil samples.

Standard 4: Science:

By observing some of the visible physical properties of rock and soil samples and by testing them for magnetism.

Standard 5 Technology:

By using the glove box to maintain the sterile environment necessary to accurately measure the properties of Mars rock and soil samples.

Standard 7: Interdisciplinary Problem Solving:

By working cooperatively with all other teams to ensure the success of the mission and the health and safety of the crew.

Challenger NYS MST Standards Correlation Matrix

Standards	Com	Med	Iso	Ls	Data	Nav	Probe	Rem	Extra
1. Math Analysis, Science Inquiry, Engineering Design									
1.1.1 Math Analysis			X					X	X
1.1.2									
1.1.3			X						X
1.2.2 Sci. Inquiry									
1.2.2									
1.2.3		X		X				X	
1.3.1Engin. Design				X		X	X		
2. Information Systems									
2.1	X	X	X	X	X	X	X	X	X
2.2			X	X		X			X
2.3									
3. Mathematics									
3.1									
3.2							X		
3.3			X	X				X	X
3.4						X			X
3.5		X	X	X				X	X
3.6									
3.7			X						X
4. SCIENCE									
4.1.1						X			
4.1.2							X		
4.1.3			X	X				X	X
4.1.4				X					X
4.1.5				X		X		X	X
4.2.1 LIVING ENVIRONMENT		X							
4.2.2									
4.2.3			X						
4.2.5			X						
4.2.6									
4.2.7									
5. Technology									
5.1									
5.2	X	X	X	X	X	X	X	X	X
5.3	X	X	X	X	X	X	X	X	X
5.4							X		X
5.5									
5.6									
5.7									
6. Interconnectedness									
6.1				X		X	X		X
6.2							X		X
6.3		X		X					X
6.4									
6.5		X		X			X		
6.6				X				X	
7. Interdisciplinary Problem Solving									
7.1		X	X	X		X	X	X	X
7.2	X	X	X	X	X	X	X	X	X