Lesson 1 – Mission Briefing *(required)*

Background

For this required lesson, students find out about the scenario for their simulated e-Mission. They are introduced to the setting of the mission and the projected rescue attempt. They also find out about the Specialist Teams which they join to help rescue the lost ship and astronauts.

NASA astronauts train for both routine space maintenance tasks and specialized laboratory or exploration investigations by using simulations. Simulations allow the astronauts to perfect difficult techniques under space-like conditions. They also allow the astronauts to trouble-shoot the tasks to greatly reduce the risk of error in space.

"Practice makes perfect" is never more evident than in NASA space work. In their mission work, students can see this work ethic in action and realize that their Mission Day performance on Moon, Mars, and Beyond tasks is better because of their efforts in the classroom during pre-mission preparation.

Scenario

The year is 2080 and exploratory outposts have been formed on the moons of the four gaseous planets: Jupiter, Saturn, Uranus, Neptune, and Pluto. Colonies of hardy pioneers are living on settlements in an effort to study the resources available on each planet.

The mission begins with the launch of a supply spaceship traveling on a routine voyage from the Moon to a Martian base. Students are in Mars Mission Control and are in constant communication with the Flight Director at Earth Mission Control.

Then, something happens! Earth Mission Control receives an urgent message from the spacecraft traveling to Mars. One of the spaceships further out in the solar system must be experiencing problems with their communications equipment. They have not been heard from in four days. They appear to be lost and may need to be rescued.

- Where is the lost ship?
- What payload will you need to rescue the astronauts?
- How will you communicate with the ship and the other outposts?

Teams

Students join one of six teams:

- Communication
- Uranus

- Jupiter
- Neptune
- Saturn
- Pluto

Each team has the following Mission Specialists:

Transmissions Specialists – These specialists receive information from near their planet about where the lost ship has been each day. The information is encoded (written in code) and students must decode the message to get the information, record it on the Problem-Solving Chart, and pass it along to Mission Control.

Greek symbols = Words

Circular symbols = Individual letters

Math equations = Words

Navigation Specialists – Students plot the location of each planet on an x,y coordinate graph. They also plot the location of "unknowns" in the outer system and plot the course of the ship to determine where the ship could be now. The Navigation Specialists work with the Transmissions Specialists to identify the present location of the lost ship.

Cargo Specialists – These students calculate the cargo needs for the rescue trip to and from their planet. They must calculate the cargo needs for the astronauts going on the rescue and for the additional astronauts they bring back.

Cargo needs include food, water, oxygen, and the packing crates necessary to pack the cargo.

Teacher Notes and Hints

- Spending enough time reviewing the mission scenario saves time later on. Students who know the "big picture" catch on more quickly to the point of each mission lesson.
- There is usually a great deal of "buy in" for this mission; students know they are trying to save a lost ship and two astronauts. By the end of the mission, they all celebrate finding the ship!
- You can take advantage of this enthusiasm in class. The more "buy-in," the more they will want to work and master the tasks they need to succeed.
- Match your students to the Specialist tasks as much as possible.
    - Communicators need good reading skills to read the messages to Mission Control.
    - Transmissions Specialists should not be easily distracted; they need to focus on the lines of symbols to decode the messages.

- Cargo Specialists need to calculate the food, water, oxygen, and packing crates needed for the rescue.

- Consider allowing the students to use calculators to check their work. For a third grade class, make sure they know how to use the calculator.

- Work as many of the mission lessons as possible. Identify the skills your students may need to master and reinforce their mastery by using these lesson plans.
- You may want to create mission folders for each of the students. Have the students keep all their mission work in these folders. They can refer to the descriptions of the teams and specialists if needed, and they can keep any assigned homework or worksheets in the folder. You can also use the folder for assessments.

Skills and Objectives

Students will be able to:

- Learn out about the Moon, Mars, and Beyond Mission scenario
- Understand the basic goals of the mission
- Answer questions about the mission using the student worksheet and student review sheet
- Become familiar with the introductory vocabulary of the mission

Activity Overview

In this activity, students become familiar with the scenario of the Moon, Mars and Beyond Mission. They read the story-line of the mission and find out about the teams and specialist positions needed to save the lost ship. Students become familiar with introductory mission terminology and complete a review sheet to reinforce the details of the mission setting and goals.

This lesson is one of the most important in terms of student motivation. It sets the scene, creates the story, and helps your Mission Specialists prepare for their roles.

Vocabulary

Cargo – the goods or freight carried in a ship, airplane, or vehicle.

Code – a system of signals or symbols used for communication

Decode – to convert a code to a recognized message

Inner planets – the smaller rocky planets inside the asteroid belt; Mercury, Venus, Earth and Mars

Mission – a specific job or task to perform; a flight operation of an aircraft or spacecraft, as in a *space mission*

Navigation – the job of getting ships, aircraft, or spacecraft from place to place; the method of determining positions, courses, or distances traveled

Outer planets – the larger gaseous planets (and small, rocky Pluto) that are outside the asteroid belt; Jupiter, Saturn, Uranus, Neptune, and Pluto

Outpost – a frontier settlement

Payload – the load carried by an aircraft or spacecraft

Plot – to mark a location on a graph or map

Rescue – to save from danger

Resource – anything that can be used

Scenario – a story-line of a possible course of events or actions, especially when imagined.

Simulation – a practice activity which duplicates the actual situation as closely as possible.

Specialist – a person who is particularly knowledgeable about a certain job

Key Concepts

1. The Moon, Mars, and Beyond Mission is a simulation. A simulation is a practice activity which duplicates the actual situation as closely as possible.
2. The Moon, Mars, and Beyond scenario has a specific story-line which details the setting, goals, and tasks needed to be done for a successful mission.
3. The mission will incorporate reading, writing, and math skills along with science curriculum and problem-solving to accomplish mission goals.

Materials

- Student worksheets
- Student review sheet
- Pencil/Pen

Procedure

Prior to class

Decide how you will divide the students into planet teams. (You will need 6 teams: one team for Communication and one team for each of the five outer planets.)

In class

Distribute the Lesson 1 Student Worksheet.

Read the Mission Scenario with the students. Make sure the students understand the basic story-line of the mission and, particularly, the goal of the mission – to rescue the lost ship.

Allow enough time for student discussion and questions.

Explain to the students that each planet team will have members doing different tasks to locate and save the lost astronauts.

The members of each team are the "Specialists" described above: Transmissions, Navigation, and Cargo.

After you read the scenario and discuss the mission, distribute the student review sheet. (You can easily assess student understanding of the mission by reviewing their answers to the questions.)

Teacher Answer Sheet

Answer the following questions about your Moon, Mars, and Beyond Mission.

You may look at your Mission Worksheet for the answers, but try to answer as many as you can without looking!

Questions:

1. In what year does the mission occur?

   2080

2. Where are you when the mission starts?

   In Mars Mission Control

3. What is the main problem you will have to solve in this mission?

   An exploration vessel carrying two astronauts has not communicated with Earth Mission Control for four days; it may be lost and may need to be rescued.

4. What teams will work together on this problem?

   Communications Team, Jupiter Team, Saturn Team, Uranus Team, Neptune Team, and Pluto Team

5. Each team will have specialists working on different jobs. State what each specialist will be doing:

   Navigation Specialists:

   - *Chart the location of each planet*
   - *Plot the locations of "unknowns" in the outer solar system*
   - *Plot the course of the lost ship over five days*

   Cargo Specialists:

   - *Calculate the cargo needs for the rescue trip to and from the planet*
   - *Calculate the food, water, and oxygen needed for all astronauts*
   - *Calculate the number of packing crates needed to pack the cargo for the trip*

Transmissions Specialists:

- *Decode the symbols and equations used to send messages about the location of the lost ship*

6. Who will you be reporting to?

   Planet teams will report to the Communications Team.
   The Communications Team will report to Earth Mission Control.

7. What job do you think you would like to do to help save the astronauts? (You will have to apply for the job!)

   Answers will vary

Good Luck! Our astronauts are counting on you!!