e::MISSION SPACE STATION ALPHA

Lesson 13: Pre-Mission Preparation I

Preparatory Readings

LP #	Unit 1: Mission Bfg/ App Process
Mission Briefing	
1	The Mission
1	We Need You
1	Space Station Alpha
opt	Verizon
How to Apply	
2	Apply Today
2,3	Personal Essay
2,3	Class Activity: Station Systems
opt	Mission Patch

LP #	Unit 2: Space Weather
4	Specialist Orientation
Chapter 1	
4	Here Comes the Sun
4	Inside the Atom
5	Sheer Magnetism (Hands On)
5	Dr. Z: Inside the Sun

LP #	Unit 3: Radiation Health
Chapter 2	
7	New Frontiers & New Dangers
8	Electromag Rad: Taming the Wild Energies
7	Do You Want the Recipe?
7	In the Kitchen with Poly
7	Measuring Exposure to Radiation
Enrichment Activities	
7	Ready, Aim, Mutate! (Hands On)
7	Sweet Dreams are Made of These (Hands On)
7	Are You Too Hot? (Hands On)

LP #	Unit 4: Power Systems
Chapter 3	
9	The Energy Supply Problem
9	Rechargeable Batteries
10	All About Power
10	Emergency Procedures
10	Practice Ex: Power on the SS (Hands On)
Enrichment Activities	
10	Electrical Current Mag Field (Hands On)
10	Electrical Circuit: Quick Guide (Hands On)
10	Nailing Down Energy (Hands On)
10	A Shocking Discovery (Hands On)
10	Electrolysis (Hands On)
10	It's Electric (Hands On)

LP #	Unit 5: Life Support
Chapter 4	
12	How I Discovered Air
12	A Weighty Discovery
12	Living in a Bubble
12	Breathing on the Space Station

LP #	Unit 6: Pre-Mission Prep
13	Overview of Teams
13	Mission Directives
13	Classroom Setup
Team Preparation Introductions	
13	STORM Team Overview
13	Radiation Team Overview
13	Power Team Overview
13	Life Support Team Overview
13	Communications Team Overview

Other Homework Due: *Mission Specialist's Log entry for Life Support Unit*

Subject

"Data Processing" for the e-Mission; assignment of team tasks; discussion of team assignments; review of team "tools" and information.

Description of Student Activities

This class begins with a step-by-step walk-through of the data processing steps for the e-Mission. Ample time should be allowed for this activity.

The balance of the class is to be used for team building, assignment of tasks, and discussion of team assignments during the e-Mission.

Duration

30 min. Students process data.
15 min. Teams get organized

Materials

Each student should have:

- a calculator
- a pencil with eraser
- Team prep materials packet

(Optional) H2O Practice Data Tracking Worksheet for whole class

Main Topics

1. Scientists generate tables to record and process raw data.
2. Scientists generate tables to prepare data to observe trends, interpret results, and make projections.
3. Scientists generate graphs to record data, observe trends, interpret results, and make projections.

Outcomes

1. The students will generate tables to convert raw data into meaningful information.
2. The students will generate graphs to convert raw data into meaningful information.
3. The students will compare the use of tables and graphs.
4. Students will use data to make a series of calculations.

Special Comments

Please proceed slowly. Make sure that **all** students understand each step of the process before proceeding to the next step. This exercise can be a valuable learning experience in science and math. Even though all students will not be working on their team's table or graph during the e-Mission, all students will benefit from the exercise.

Procedure

(30 min.)

1. Teams do data processing. Step-by-step walk-through of the table and graphing exercise. The outline for this interactive lecture is attached.

(15 min.)

2. Individual roles and team assignments. This activity will be continued during Lesson 14, following the DATA Race. Have the students read their team's "Mission Day Instructions," discuss who should assume which role, and review the questions the team should be able to answer in preparation for their e-Mission assignment.

   Teachers: Crisis Management Team and Communications Team members should be selected at the end of this period and given their packets to read as homework.

A number of "tangential" topics may occur to you during this lesson. Remember, time is of the essence.

In your teacher materials are two articles that will help you prepare for the e-Mission:

Tips for a Successful Mission
Description of Mission Day Events

(Optional) You may want to use copies of H2O Practice Data Tracking Table Worksheet for the whole class to review instead of having teams do their own data the first time through. Do this if you are working with younger students, or if the idea of reviewing multiple data tables simultaneously may be too much for them to understand.

Homework for Lesson 14

Read your team's Reference Guide and other materials. Study your Mission Log entries to recall key facts that will prepare you for the mission.

Lecture Outline: Teams' Data Processing

1. **Seat class by teams**.
    - Each student should have a clear desk except for a calculator, pencil/eraser, and the following printed materials from the team preparation packets:
        A. One set of practice data (see team prep materials packet)
        B. Data tracking tables (Point out that each team has two different sets of data tables and graphs. Have students on each team start with only one table. They should select X-Ray, TEPC 1, Battery Reserve, or Oxygen, depending upon their team.)
        C. Data tracking graphs
        D. Sample Report Forms
2. **Practice Data**: Discuss. Have one member from each team identify his or her team's practice data. (Note: Some students may need to be reminded of the difference between *rows* and *columns*.)
3. **Tables:** Have students record their first set of practice data, first row, first two columns of the table.
4. **Tables:** Discuss. Each column has a header and an alphabetical letter. Some columns have a computation in the second row. Explain to the students the relationship between the raw data and the alphabetical letter, and the computation in column three. Have them compute the data for the third column. Read the correct data entry from your "master" copy for all 4 tables.
5. **Graphs:** Discuss. Ask the students to identify the x-axis and state what it represents - time. Discuss the time intervals. Point out that during the mission they will receive information every five minutes and that 5 minutes during the simulation represents 15 minutes on their graphs. Point out and discuss the importance of using labels when talking about scientific phenomena. Discuss the y-axis. Select a student from each team to describe what their y-axis represents. Remember, there are 4 different graphs. Have the students enter the first point on the graph from their first set of raw data.
6. **Tables**: Ask all students to complete the first row of their tables by doing the computations in the second row of each column. Suggest that the members of the team compare their answers for the entire first row of data *after they are all finished*. Troubleshoot. Check each team's work against your "master" copy.
7. **Practice Data**: Explain to the students that even though during the e-Mission the raw data will arrive every 5 minutes, all computations must be completed *in 2 to 3 minutes*. Time must be available for the team to discuss the situation, suggest a course of action, if necessary, and create a report for the Communications Team. That is why they are practicing. The table and graph work is only a small part of their assignment.
8. **Tables and Graphs**: Have the students complete the second row of their tables AND create a second data point on their graphs. Troubleshoot: answer questions, compare answers with your "master" tables and graphs.
9. **Graphs and Critical Levels:** Each set of data has "critical levels." These levels may be transferred to the students' graphs. For instance, the Storm Team can transfer the proton and X-ray critical levels to their graphs by making and labeling and drawing light lines at the correct point on the y-axis, parallel to the x-axis. For the Life Support Team, oxygen and carbon dioxide have critical levels, etc.
10. **Time Test**: Have the students complete a third row of data and enter one final point on their graphs. The team finished first can raise its hands when all members have finished both table and graph.
11. **Report form**: Have all students fill in a report form. Check each report against your "master" copies.
12. **Graphs and tables:** Discuss and compare the "stories" told by graphs and tables. The students should be able to tell a story from the three sets of raw data and compare the information from their tables and graphs in terms of "time to criticality." Discuss the two ways, table computation and graph slope can be used to determine "time to criticality."
13. **Data Processing Race**: Inform the students that at the beginning of the next class there will be a race to see which team is the fastest at processing raw data and returning *accurate* reports.