E-mission: Target Moon

Image retrieved from: http://www.e-missions.net

Hempfield School District
Heather Grimm & Rae Ann Smith

Our Mission: Target Moon

http://scienceblogs.com

The Setting (http://www.e-missions.net/)

"The year is 2035. NASA and its international partners built a permanent base on the Moon. The main lunar base includes a living area and laboratory. Not far away, lunar astronauts and engineers are building a mine. The mine will extract oxygen and helium-3 to export back to Earth.

Two comets are discovered to be passing by Earth, and [it appears that] one or both of the comets may impact the Moon near the lunar base. Students must work to calculate the location the comets may impact, and the area of collateral damage. Students must also evacuate lunar base occupants before the impact. "

Considerations & Date Selection

- Grade level recommendation
  - Allowing learners of many levels to participate
- Math skills needed
  - State standards alignment
  - Curricular alignment
- Countdown to Mission
  - Date Selection
  - PSSA's
  - Pre-teaching needed

http://www.e-missions.net

Mission Timeline

8 Weeks Prior to Mission	Missions reviewed, Target Moon selected, mission date reserved
4 Weeks Prior to Mission	Resources printed, preteaching began, room layout considered
2 Weeks Prior to Mission	Participant selection, pre-mission briefing
1 Week Prior to Mission	Dry run through the mission, ironing out the "kinks" and finalizing teams

Choosing From the Many Resources

- Lesson plans
- Worksheets
- Forms/Letters for role-playing

http://www.e-missions.net/targetmoon/

Grouping Our Students

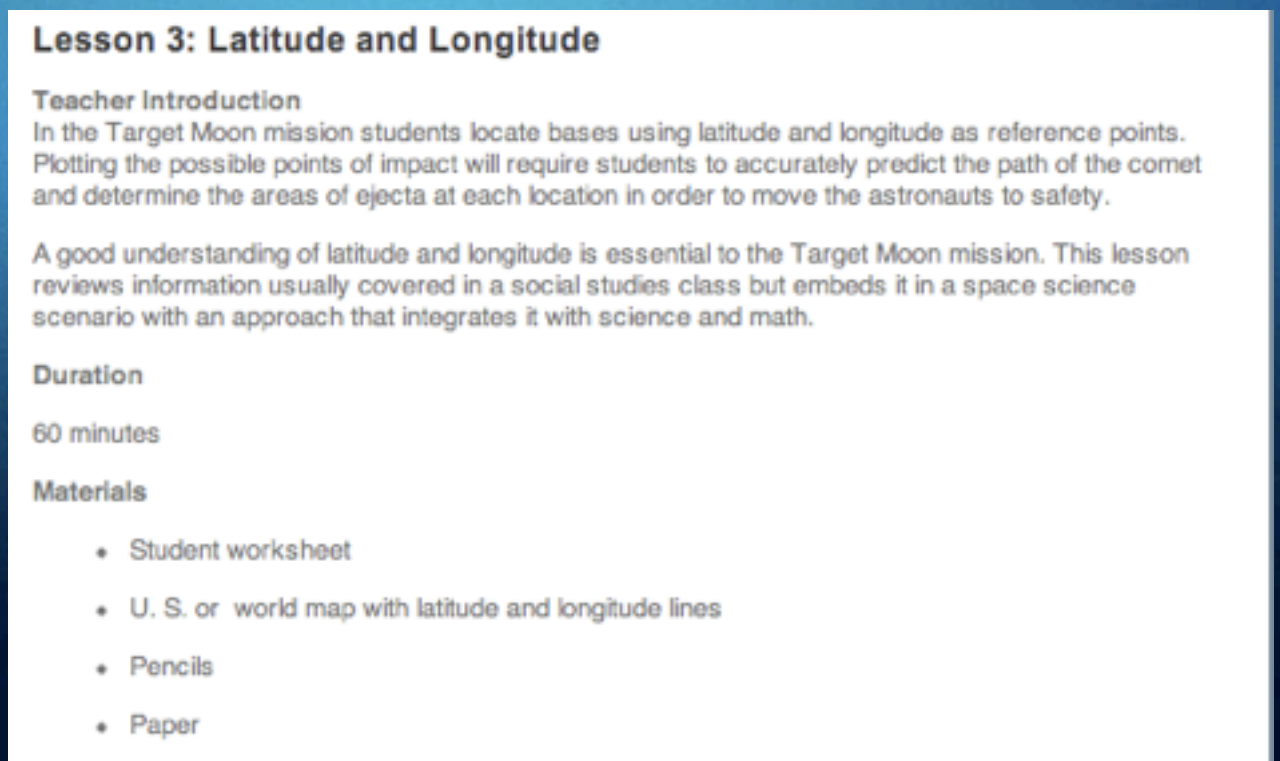
Students were jigsawed by ability and interests.

- Comet Tracking Team
  - Graphing, Velocity
- Moon Mapping Team
  - Latitude/Longitude, Grids
- Crisis Management Team
  - Evacuations, Recommendations
- Communications Team
  - Oral, Written Live Chat
- One Addition!
  - The "Press"
    - Pictures, News Writing, Video, Live Interviews

Image courtesy of www.lumaxart.com

Class Skills Review

- Latitude and Longitude lesson
- Probability



Lesson 3: Latitude and Longitude

Teacher Introduction
In the Target Moon mission students locate bases using latitude and longitude as reference points. Plotting the possible points of impact will require students to accurately predict the path of the comet and determine the areas of ejecta at each location in order to move the astronauts to safety.

A good understanding of latitude and longitude is essential to the Target Moon mission. This lesson reviews information usually covered in a social studies class but embeds it in a space science scenario with an approach that integrates it with science and math.

Duration

60 minutes

Materials

- Student worksheet
- U. S. or world map with latitude and longitude lines
- Pencils
- Paper

Class Skills Review

- Latitude and Longitude lesson
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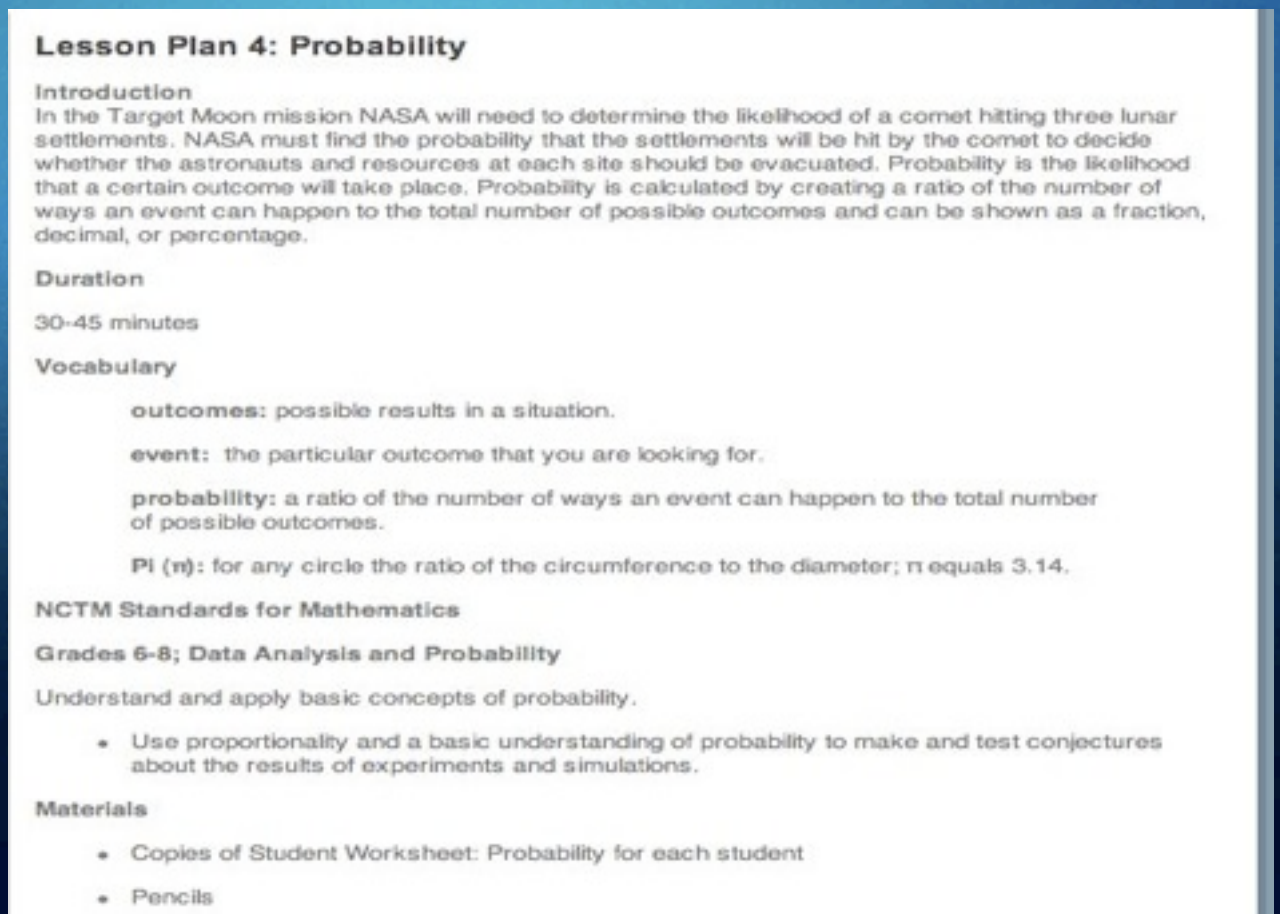

Lesson Plan 4: Probability

Introduction
In the Target Moon mission NASA will need to determine the likelihood of a comet hitting three lunar settlements. NASA must find the probability that the settlements will be hit by the comet to decide whether the astronauts and resources at each site should be evacuated. Probability is the likelihood that a certain outcome will take place. Probability is calculated by creating a ratio of the number of ways an event can happen to the total number of possible outcomes and can be shown as a fraction, decimal, or percentage.

Duration

30-45 minutes

Vocabulary

outcomes: possible results in a situation.

event: the particular outcome that you are looking for.

probability: a ratio of the number of ways an event can happen to the total number of possible outcomes.

Pi (π): for any circle the ratio of the circumference to the diameter; π equals 3.14.

NCTM Standards for Mathematics

Grades 6-8; Data Analysis and Probability

Understand and apply basic concepts of probability.

- Use proportionality and a basic understanding of probability to make and test conjectures about the results of experiments and simulations.

Materials

- Copies of Student Worksheet: Probability for each student
- Pencils

Introducing the Mission to the Students

Emission Intro Presentation

Introducing the Mission to the Students

Teams Video

Introducing the Mission to the Students

Teams Video

Dry Run

Lesson Plan 5: Preparing for Mission Day

Overview

Students will run an activity, called a “mini mission,” using practice data.

Recommended Preparation

- Assign students to a team. Do not assign the Communications Team roles yet, because these students will not have much to prepare. Instead, wait until the day before the mission and assign the roles to two students who have not taken on heavy team roles. Give these students the Communications Team instructions and ask them to read it as homework. Make sure your choice for Data Officer includes a student who can type well.
- For homework before this class, students should read:
  - Overview of Teams
  - Their team’s instructions

Duration

10-15 minutes: Organize the students into teams and give directions

30-45 minutes: Run the mini-mission

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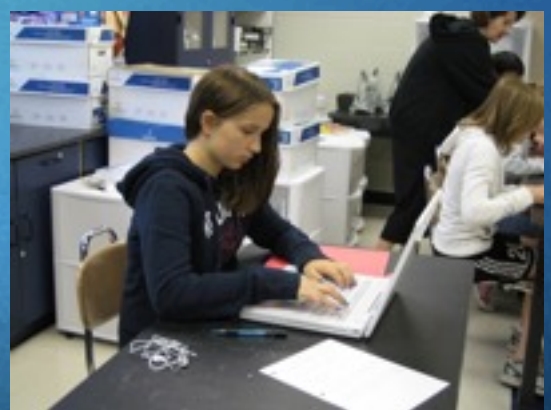
Mission Day!

Student Podcast introducing mission



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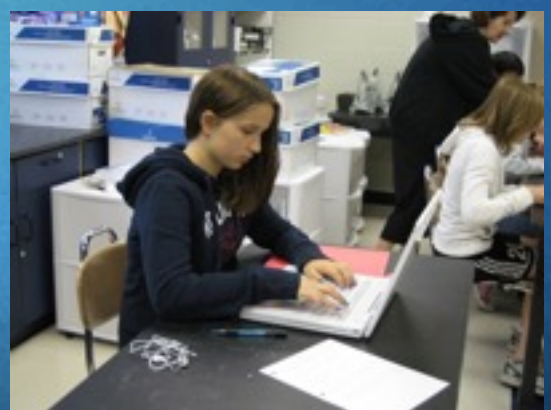
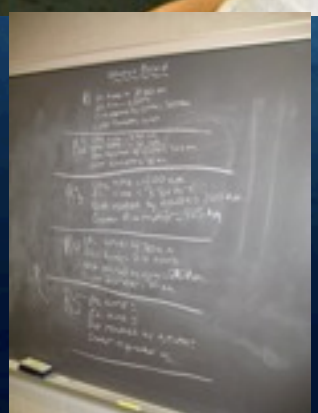


Mission Day!

Student Interviews during the mission



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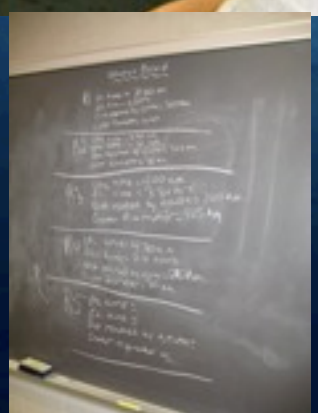

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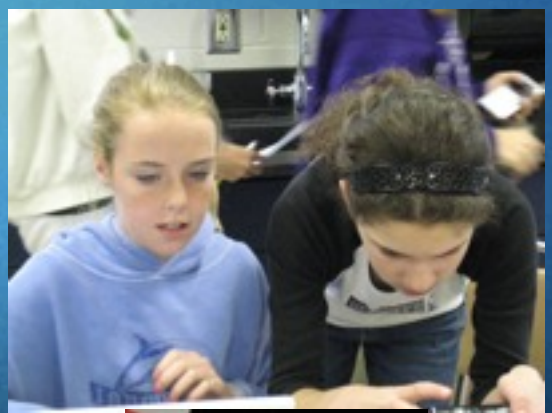

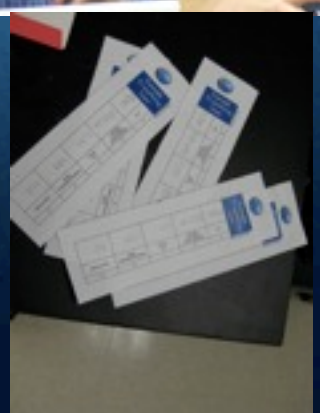

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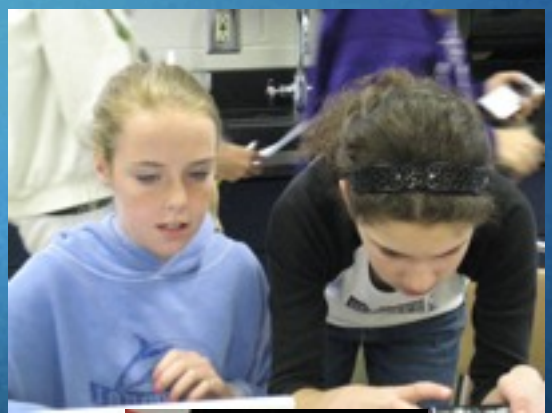

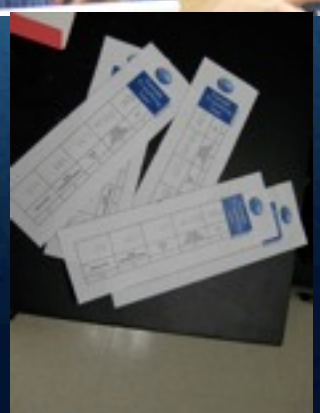

Student Reflections

Podcasts, pictures and an article on district Technology Blogs

Black Knight's E-Mission Experience

By Sarah and Elizabeth

Ready to go by 9:10 on this early Friday morning. Nervousness is filling the room. Stress might be visiting the teams as they are working. The word "over" is ringing in my ears. Mrs. Smith says there will be lots of commotion once the mission starts....Now.

30 astronauts, 3 moon bases, only one moon, and KC2035. What will happen? A smaller comet by KC2035 is the latest info. No one knows for sure what it will do, but it will probably hit the moon along with KC2035. The Communications Team thinks if all the teams do their jobs correctly, everything will be all right. They also will communicate to Mission Control by a chat room and videoconference. The Moon Mapping Team will find the possibilities of danger to the lunar bases with all their math skills. The Comet tracking Team will find the time of impact and how far the ejecta will expand. The Crisis Management Team is trying to find ways to evacuate the astronauts.

http://einstein.hempfieldsd.org/smith/
http://einstein.hempfieldsd.org/videoconferencing/page/2/

Reference

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