



# Directive: Mapping the Moon with WALL•E



**Recommended for Grades K-4**

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# Digital Learning Network (DLN)

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A DLN interactive videoconferencing event is a one time connection that allows students to experience NASA first-hand. Each event features an integrated educational package of grade-appropriate instruction and activities centered around a 50 minute videoconference<sup>a</sup>. Students participate in a Question and Answer session with a NASA Education Specialist or a NASA Subject Matter Expert.

## Overview

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Many students have the misconception that NASA only sends astronauts to space, when in reality, NASA has 58 science missions concurrently taking place this year in addition to the Space Shuttle and the International Space Station (ISS). This module will introduce students to a few of upcoming NASA missions, with a focus on NASA's efforts to Return to the Moon with the Lunar Reconnaissance Orbiter (LRO) and the Lunar Crater and Observation Sensing Satellite (LCROSS). Be forewarned, for this module may actually make your students laugh when WALL•E tries to help tell NASA's story.

**Grade Levels: K-4<sup>b</sup>**

**Focus Question:** *What keeps NASA busy when not sending astronauts into space? What do we want to study when we send a satellite to the Moon?*

**Instructional Objectives:**

- **Engage:** The student will describe familiar images of objects in space.
- **Explore:** The student will understand two careers at NASA and how the careers work together.
- **Explain:** The student will identify a new NASA science mission and its objectives to accomplish.
- **Elaborate:** The student will relate a surface map of the North America to a major objective of NASA's mission to the Moon.
- **Evaluate:** The student will explain the importance of finding solid water (ice) at the poles of the Moon.

**a** *This particular event is only 30 minutes long.*

**b** *If you have 4<sup>th</sup> graders who understand how to build a graph, we recommend you register for the longer version (50 minutes), which includes a graphing activity to meet those mathematical standards.*

# National Standards

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## **National Science Content Standards:**

### *Science as Inquiry*

- Abilities necessary to do scientific inquiry
- Understandings about scientific inquiry

### *Earth and Space Science*

- Objects in the sky

### *Science and Technology*

- Abilities to distinguish between natural objects and objects made by humans
- Understandings about science and technology

### *History and Nature of Science*

- Science as a human endeavor

## **National Technology Content Standards:**

- Characteristics and scope of technology – development of technology

# Sequence of Events

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## **Pre-Videoconference Activity:**

What does the surface of the Moon look like? Is it flat? Does it have mountains or craters? Lead a discussion with your students so they may understand lunar surface features. Have students look at photos of the Moon from [lpod.wikispaces.com](http://lpod.wikispaces.com) and see the differences in the surface features of the Moon. Define and identify craters, maria and mountains of the lunar surface. Questions to explore with students are: Which side of the Moon has more craters? Why are lunar maria darker than other surface features? Where did the Apollo missions land on the Moon?

## **During the Videoconference:**

Simply assist the host by selecting students to answer the questions being asked.

## **During the Videoconference:**

This event is an introduction to missions accomplished at NASA with the help of an animated character. We highly recommend that you do not inform the students too much information about this event and allow the students to simply have fun. Please keep the microphone open to optimize the amount of interaction between the students and the host.

## **Post Videoconference Activity:**

Have students interview an older relative or family friend that was old enough to experience the Apollo missions to the Moon from 1969-1972. Some sample questions to ask:

*Did you watch the first Apollo mission on TV or on the radio?*

*What was your reaction to seeing a man walk on the Moon?*

*Do you think the Apollo missions were enough, or should we explore the Moon more?*

Afterwards, ask students to share their videoconference experience with the interviewed person and explain why NASA wants to go back to the Moon. Have students discuss with what role they would like to play when NASA establishes a community on the Moon. Ask your students: Do you want to help build the habitat? Maintain the air quality within the habitat? Grow plants within the habitat? Study the lunar environment? What jobs do you and your family member think important within this new community?

## Videoconference Outline

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- I. Welcome
- II. Introduction of Wall-E
- III. NASA Video, “Exploration Trailer”
- IV. LRO/LCROSS Mission Objectives
  - a. Mission Objective 1, creating a topographic map of the lunar surface
  - b. Mission Objective 2, searching for the presence of frozen water at the poles of the Moon.
- V. Conclusion
- VI. Q & A
- VII. Good-Bye

## Vocabulary

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**Data:** Facts, statistics, or items of information.

**Impactor:** An object that collides with a land surface.

**Instrument:** A device for controlling, measuring, or recording data.

**Orbit:** The path followed by a satellite.

**Relief:** The terrain, or various elevations, of a land surface.

**Remote Sensing:** The technique or process of obtaining data or images from a distance, as from satellites or aircraft.

**Satellite:** In the context of this module, a device designed to be launched into orbit around the Earth, another planet, the sun, etc.

**Surface:** The outer face, outside, or exterior boundary of a thing; outermost or uppermost layer or area.

**Topography:** the study of surface features. A topographic map shows changes in the elevation of surface features, such as mountains, valleys, plains and craters.

# Videoconference Guidelines

Teachers, please review the following points with your students prior to the event:

- Videoconference is a two-way event. Students and NASA presenters can see and hear one another.
- Students are sometimes initially shy about responding to questions during a distance learning session. Explain to the students that this is an interactive medium and we encourage questions.
- Students should speak in a loud, clear voice. If a microphone is placed in a central location instruct the students to walk up and speak into the microphone.
- Teacher(s) should moderate students' questions and answers.

## Teacher Event Checklist

Date Completed	Pre-Conference Requirements
	1. Print a copy of the module for your reference.
	2. Have the students complete the pre-assessment.
	3. Email questions for the presenter. This will help focus the presentation on the groups' specific needs.
	4. Review the Audience Guidelines listed above with your students.

	Day of the Conference Requirements
	1. The students are encouraged to ask the NASA presenter relevant questions about the videoconference event.
	2. Follow up questions can be continued after the conference through e-mail.

	Post - Conference Requirements
	1. Have the students take the Post-Assessment to demonstrate their knowledge of the subject.
	2. Teacher(s) and students fill out the event feedback.

# Pre and Post Assessment

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By a show of hands in the classroom, tally the number of answers for each question. Perform the assessment again after the videoconference and note any changes in students' understanding.

Question		Pre	Post
NASA's only mission is to send astronauts into space.	True False		
The NASA Space Shuttle Orbiter goes to the Moon.	True False		
Satellites collect data for scientists to study.	True False		
Humans were last on the Moon in 1989.	True False		
NASA will look for water in the Moon's lunar maria.	True False		
Scientists build NASA's spacecraft.	True False		
A topographic map shows where mountains and lowlands are on a surface.	True False		
NASA's satellites only study Earth.	True False		

## Answers

1. False (58 science missions)
2. False (only orbits Earth)
3. True
4. False (1972)
5. False (poles)
6. False (engineers)
7. True
8. False (satellites study lots of objects in the sky)

# NASA Education Evaluation

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Currently the Office of Education is undergoing a major system change for its on-line interface for education evaluation. The new website will be announced in the spring or summer of 2009. We may need a few minutes of your time before or after a DLN event to answer questions that we will need to record until the new system is up and running.

***But remember, to continue to receive these events for free, we need your feedback!***

## Additional Resources

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### **Moonlander Game:**

<http://nasaexplores.com/extras/apollo11/moonlander/moonlander.html>

### **Related LRO Activities:**

<http://lunar.gsfc.nasa.gov/forkids.html>

### **Educator's Guide: Exploring the Moon**

<http://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/Exploring.the.Moon.html>

### **Moon Lithograph:**

[http://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/Earths\\_Moon\\_Lithograph.html](http://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/Earths_Moon_Lithograph.html)

### **Lunar Photo of the Day:**

<http://lpod.wikispaces.com>

## Contributors and Developers

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Dr. Marci Delaney  
Brittany Hamolia  
Chris Smith  
Shane Keating  
Nathan Lang  
Erin McKinley

Goddard Space Flight Center  
Goddard Space Flight Center  
Goddard Space Flight Center  
Goddard Space Flight Center  
Johnson Space Center  
Johnson Space Center

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