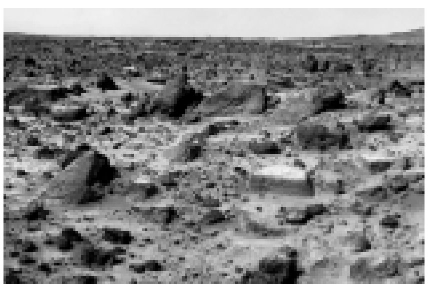
Mars: A Time Of Discovery

Interest in Mars, the fourth planet from the Sun, began long before people were able to send spacecraft to the Red Planet. Even early astronomers were able to see Mars' brightness and position changes in the sky. With the invention of powerful telescopes, scientists were able to see the surface of Mars for the first time. Today, we send robotic missions to Mars to study its surface. These missions have shown us that Mars' solid surface is much like that of Earth. Mars missions will launch about every two years, to gain a better understanding of Mars' geologic history and search for evidence of past or present life.

***Attention Teachers**: This wallsheet presents summaries of classroom-appropriate activities to help students grasp basic concepts about Earth and Mars and their place in the Solar System. The full lesson plans with student pages are available online at* **http://mars.jpl.nasa.gov/classroom/teachers.html**. *Mars images can be found at http://photojournal.jpl.nasa.gov and http://mars.jpl.nasa.gov/gallery/index.html. Most of the Mars images on this poster were taken by the Mars Orbiter Camera (MOC) on the Mars Global Surveyor (MGS) spacecraft, and can be found at http://www.msss.com.*

Surface Features

Mars can be compared with Earth in many ways. Both planets have north and south polar ice caps, volcanoes, rocks, canyon systems, flood plains, wind, weather, and dirt. Scientists use Earth as a working laboratory in understanding Mars. By studying places on Mars where water appears to have flowed across the surface in ancient times, scientists are unlocking the history of Mars when liquid water seemed abundant. Scientists reviewing pictures of Mars' surface during the Mars Pathfinder mission in 1997 noted that surface rocks at the Pathfinder landing site appear to lean in the same direction. In the photograph (above), many rocks appear to be pointing to the right. This same feature occurs on Earth where large amounts of water have flooded across the surface, and so scientists believe this area on Mars was formed by flooding. This indicates that Mars had large amounts of water on its surface sometime in its past.



The Mars Pathfinder landing site.

Where Are the Martians?

"Life has been found on Mars" — true or false? This is a question scientists are trying to answer. The question of life on Mars has been the topic of many scientific debates. We think that liquid water, an essential ingredient for life on Earth, once flowed on the surface of Mars. The current absence of surface water is most likely due to Mars' thin atmosphere as well as its low atmospheric pressure. Future missions to Mars will include lander vehicles responsible for collection of soil and rock samples that will be studied for the presence of ancient life forms. Future landing sites will include places on Mars that once had water, perhaps lakes or rivers. Today's students are the scientists of the future. You or one of your classmates could be the first person to look at samples returned from Mars, or perhaps even the first human to walk on the surface of Mars!

These students visiting a spacecraft "clean room" may be future Martians.

Why Do We Care?

Why do people have an interest in planetary science, and what kind of technology do we gain from space travel? For example, science and technology have been aided by the advancements made in space science. NASA has developed materials for space travel that are lightweight, yet extremely strong. These materials can also be used in manufacturing and electronics industries on Earth. Helping to make life better on Earth and exploring the unknown are some of NASA's greatest achievements. By studying other worlds, we learn more about our own world.

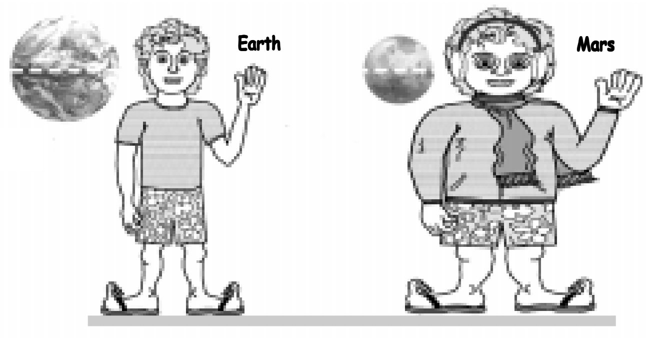
Front of poster: *The image of Earth was taken by the GOES-7 weather satellite in August 1992. Hurricane Andrew can be seen in the Gulf of Mexico. NASA's Mars Global Surveyor spacecraft pictured the Red Planet in April 1999, showing clouds over the great volcanoes, the "Grand Canyon" of Mars (below center), and the north polar ice cap. Earth and Mars are shown at their correct relative sizes.*

EW-2001-02-009-JPL

Quick Mars Facts

Temperature and Surface Pressure

If you could stand at Mars' equator, the surface temperature would change from 21 degrees Celsius (70 degrees Fahrenheit) at your feet to 0 degrees Celsius (32 degrees Fahrenheit) at the top of your head. This difference in temperature would make it feel like summertime at the bottom half of your body and wintertime at



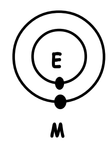
The average surface sure of Mars is 8 m approximately 1/100 that of Earth. Because of Mars' low surface pressure, you would need a space suit if you visited Mars. Otherwise, your internal organs would push out against your skin, making you look like a very large marshmallow — or worse!

Atmospheric Composition

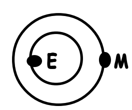
The air of Mars is mainly carbon dioxide (95%). Only 0.1% of the atmosphere is oxygen. Earth's air is 21% oxygen, 0.035% carbon dioxide, and 78% nitrogen.

Distance to Mars

If you could travel the minimum distance from Earth to Mars at 60 miles per hour (average car driving speed), it would take 66.5 years to get to Mars! Light travels at a speed of 670,000,000 miles per hour, allowing a light particle to get to Mars from Earth in 5 minutes when Earth and Mars are at their closest.



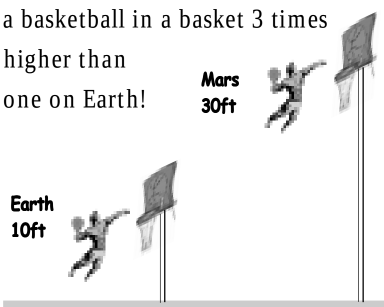
Minimum distance from Earth to Mars is ~56,000,000 km (35,000,000 miles)



Maximum distance from Earth to Mars is ~399,000,000 km (249,375,000 miles)

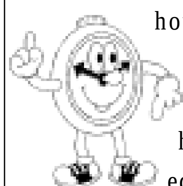
Gravity

The gravity on Mars is approximately 1/3 that of Earth. That would allow a person on Mars to dunk a basketball in a basket 3 times higher than one on Earth!



Time

One Mars solar day (a sol) lasts 24 hours and 40 minutes, compared with Earth's day of 24 hours. One Mars year equals 687 Earth days, or 1.88 Earth years.



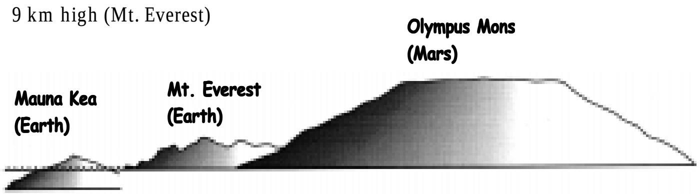
How old would you be on Mars?

12 years old on Earth / 1.88 = 6.4 years old on Mars

Compare Mountains and Canyons on Mars and Earth

Olympus Mons volcano on Mars versus Mt. Everest and Mauna Kea Hawaiian volcano on Earth:

27 km high (Olympus Mons)
10 km high (Mauna Kea)
9 km high (Mt. Everest)

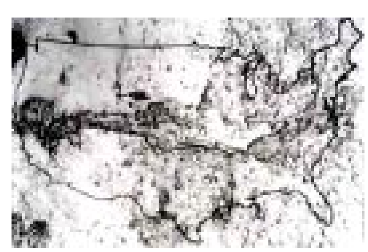


Valles Marineris canyon on Mars compared with the United States and the Grand Canyon:

4000 km long by 7 km deep
(Valles Marineris)

4000 km long (United States)

400 km long by 1.8 km deep
(Grand Canyon)

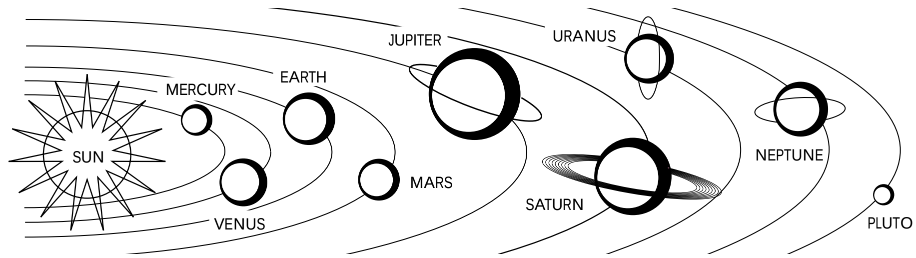


How Far Away Is Mars?

How far is Mars from Earth? Because the Solar System is so large and the distances between planets are so great, scientists developed a special way to measure distances in the Solar System. The astronomical unit (AU) is the unit of measure for planetary distances, with one AU — 150 million kilometers (93 million miles) — representing the average distance from the Sun to Earth. Mars is 1.5 AU from the Sun. Knowing this, can you calculate the distance from Earth to Mars in AU, in miles, and in kilometers?

Is this diagram of the Solar System to scale?

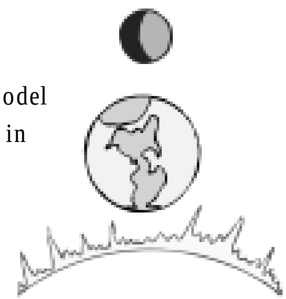
What changes would you make to it?



Get the full lesson plans at http://mars.jpl.nasa.gov/classroom/teachers.html

Activity #1

Earth, Moon, Mars Balloons



Learning Goals

Students will construct a scale model of the Earth–Moon–Mars system in terms of planetary size and distance. In addition, students will make a scale model of Mars relative to Earth, and discover how far one might have to travel to visit the most Earthlike planet in our Solar System.

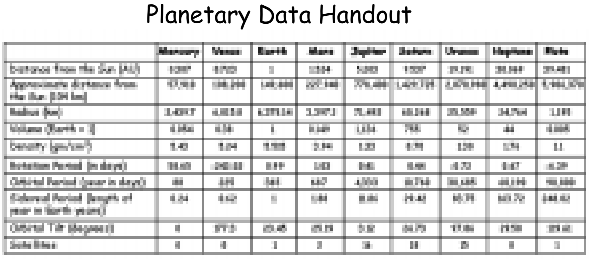
National Science Education Standards

Standard D: Earth in the Solar System

Overview

Groups of students will inflate three balloons that represent Earth (blue), Mars (red), and the Moon (white). They are given the size of one of the balloons to scale and are asked to find the scale of the other two balloons. After creating the scale models, students are asked to find the relative distances between each of the celestial objects. This is a good introduction to any study involving Mars or Mars colonization.

Planetary Data Handout



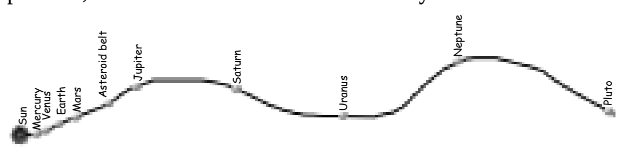
Sample

Activity #2

Solar System Bead Distance

Learning Goals

Students will understand the distances between the Sun, the planets, and small bodies in the Solar System.



Students will be able to create a model demonstrating the scale distances of the Solar System using astronomical units that have been converted to a scale of 1 astronomical unit (AU) = 10 centimeters.

National Science Education Standards

Standard D: Earth in the Solar System

Overview

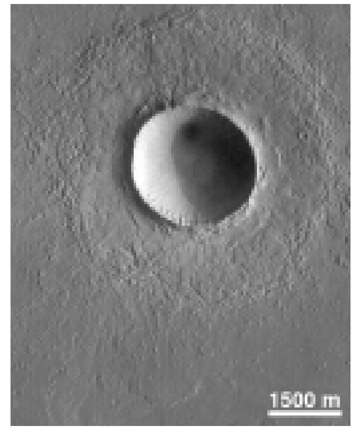
Students will take a piece of string that is 4.5 meters long (for younger students, the string can be pre-cut). They will convert the distance of the planets from the Sun, using a data sheet, from astronomical units (AU) to centimeters. From this information, they will construct a representation of the Solar System on the string using colored beads.

Planetary Distance Key

Planet	AU	Color
Sun	0.0 AU	yellow
Mercury	0.4 AU	solid red
Venus	0.7 AU	cream
Earth	1.0 AU	clear blue
Mars	1.5 AU	clear red
Asteroid belt	2.8 AU	black
Jupiter	5.0 AU	orange
Saturn	10.0 AU	clear gold
Uranus	19.0 AU	dark blue
Neptune	30.0 AU	light blue
Pluto	39.0 AU	brown

Why Does Mars Have Craters?

Similar to our Moon, Mars' surface is covered with thousands of impact craters. Craters tell us a lot about Mars. For instance, the northern Martian hemisphere has very few craters compared with the southern hemisphere. Why do you think this is the case? What kind of processes on Earth would cause land to look smooth or rough? Which of these processes do we see occurring on Mars? Even if we do not see them now, is it possible that these processes occurred some time in the past? These are the types of questions that scientists ask about the Martian surface. Wait until you find out what they've discovered!



NASA's Planetary Photojournal
I.D. no. PIA02084
NASA/JPL/MSSS

Get the full lesson plans at http://mars.jpl.nasa.gov/classroom/teachers.html

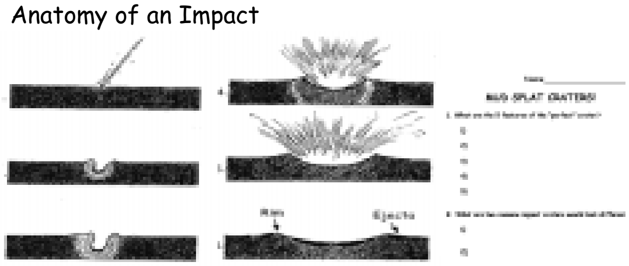
Activity #3

Mud Splat Craters

Learning Goals

Students will learn how craters are formed through the identification of the different cratering processes and the different features that impactors can form.

Anatomy of an Impact



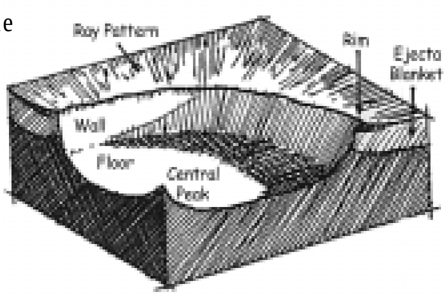
Sample Crater Impact Data

National Science Education Standards

Standard A: Abilities necessary to do scientific inquiry
Standard F: Natural hazards

Overview

Students will create a crater similar to those seen on the Martian surface. This engaging activity is a fun way to look at the feature of the impact crater. Students can change the shape and size of the impactor to observe the differences in each crater. This lesson is best done outside.



An illustration of the features of a crater.

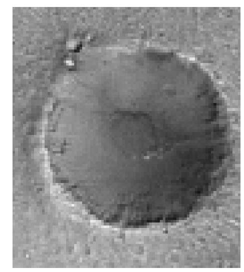
Crater illustrations from CRATERS! *by William K. Hartmann with Joe Cain. Reprinted with permission, National Science Teachers Association, Arlington, VA.*

Activity #4

Creating Craters

Learning Goals

Students will learn how to create their own impact craters, and discover the differences that a variety of impactors make on the shape and size of the resulting impact.



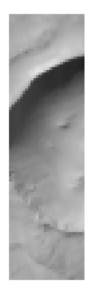
"Big Crater," Mars Pathfinder landing site, MGS MOC–23703/ Release No. MOC2-46C (4/15/98).
NASA/JPL/MSSS

National Science Education Standards

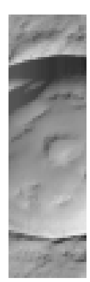
Standard A: Abilities necessary to do scientific inquiry
Standard F: Natural hazards

Overview

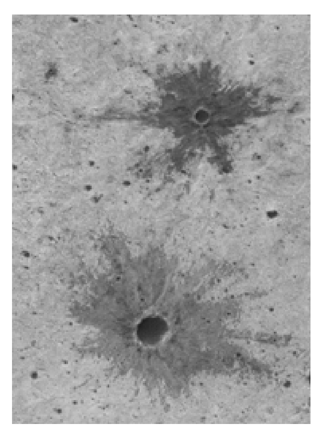
Students will fill a tray with a layer of flour and a thin top layer of tempera paint. They will find the mass of each of three objects and determine which one creates the largest or deepest impact crater. They will demonstrate the variety of craters produced by varying the velocity of the impactor, and finally, they will demonstrate how the size of an impactor affects the diameter of the crater.



NASA's Planetary Photojournal, I.D. no. PIA02018.
NASA/JPL/MSSS



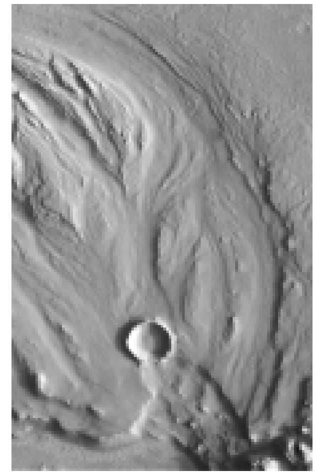
NASA's Planetary Photojournal, I.D. no. PIA02019.
NASA/JPL/MSSS



MGS Release No. MOC2-96 (3/18/99).
NASA/JPL/MSSS

Was There Water on Mars?

Water — on Earth it is essential for life as we know it. During our exploration of the Solar System, we seek to answer the question, "Is there life on other planets?" Scientists have studied the surface of Mars and continue to look for clues in determining whether water is or has been present. Under current conditions, liquid water on the surface of Mars would quickly freeze into ground-frost, or disappear into the atmosphere, sometimes forming ice-crystal clouds. The surface of Mars tells us a different story about its past. From spacecraft photos, it appears that there was a lot of liquid water in Mars' past. Photographs of the Martian surface show giant canyon systems and apparent flood zones like those found on Earth.



A fluid-scoured surface in the Hrad Vallis system. The fluid is presumed to have been water. MGS Release No. MOC2-154 (7-20-98).
NASA/JPL/MSSS

Get the full lesson plans at http://mars.jpl.nasa.gov/classroom/teachers.html

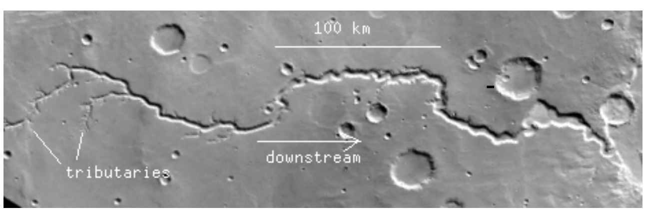
Activity #5
Are There Floods on Mars?

Learning Goals

Students will perform tasks that demonstrate their knowledge of inquiry science in a real-life context by using a Mars data set. The students will analyze the data in the same way that scientists do.

National Science Education Standards

Standard A: Understanding about scientific inquiry
Standard B: Motions and forces
Standard F: Natural hazards

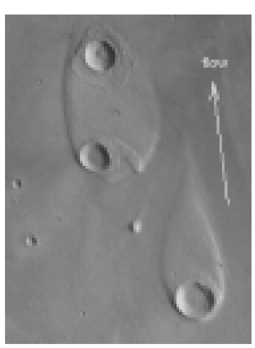


Nirgal Vallis. MGS Release No. MOC2-24A (6-22-00).
NASA/JPL/MSSS

Overview

Students will examine the Ares Vallis flood channel on Mars, the Mars Pathfinder landing site. They will analyze the features around the landing site and try to determine if a giant flood occurred that created the visible land features. Students will write a story explaining how features in Ares Vallis support the idea that there were catastrophic floods on Mars.

The end of Ares Vallis showing streamlined islands near the Mars Pathfinder landing site.



Activity #6
Is There Water on Mars?

Learning Goals

Students will analyze actual data and images to assess whether there is currently liquid water on Mars.

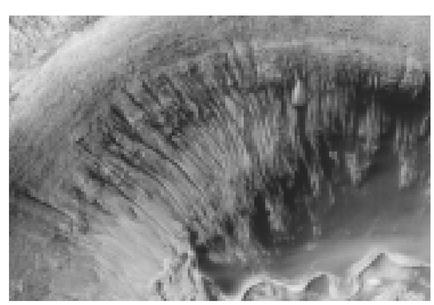
Nanedi Vallis. Image size is 9.8 by 15 km; the canyon is ~2.5 km wide. MGS Release No. MOC2-73 (1/8/98).
NASA/JPL/MSSS

National Science Education Standards

Standard A: Abilities necessary to do scientific inquiry
Standard F: Natural hazards

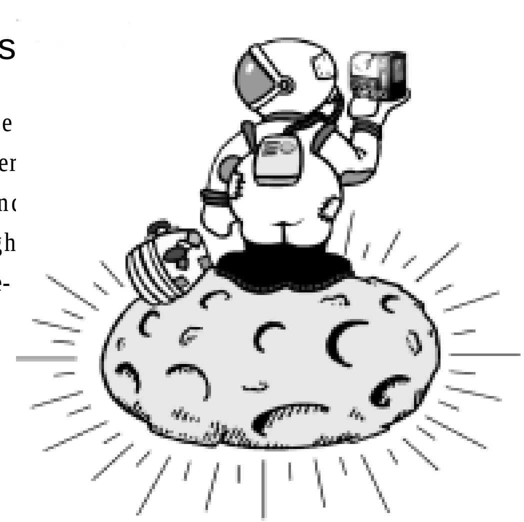
Overview

The Viking and Pathfinder missions collected temperature and pressure data from the Martian surface. In this activity, students study that data to find that the pressure at the Martian surface is so low that no liquid water can exist. Given this fact, they are then required to explain the existence of water-related features on Mars.



Channeled aprons in a small crater within Newton Crater. MGS Release No. MOC2-242A, mosaic of images Jan–May 2000.
NASA/JPL/MSSS

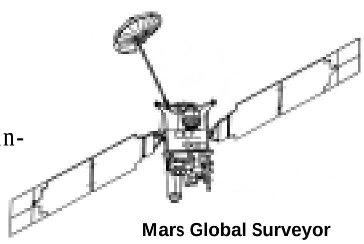
What Are Mars' Mineral Mysteries



What types of rocks and minerals make up the surface of Mars? This is one of the scientists have been interested in answering about the Red Planet. Scientists obser tian surface by using orbiting spacecraft, and they study Martian meteorites founc Earth. Scientists can learn about rocks by looking at the heat energy (infrared ligh coming off the surface of Mars. Each rock gives off different amounts of heat, depending on what kind of mineral it contains. By comparing Martian rocks with Earth rocks, scientists have been able to 1) discover some of the minerals that make up the surface of Mars; 2) determine what types of geological events have occurred (floods, volcanism, etc.); and 3) get an idea of types of materials are present on Mars that humans may be able to use once we land there.

Get the full lesson plans at http://mars.jpl.nasa.gov/classroom/teachers.html

Activity #7
Good Vibrations!



Mars Global Surveyor

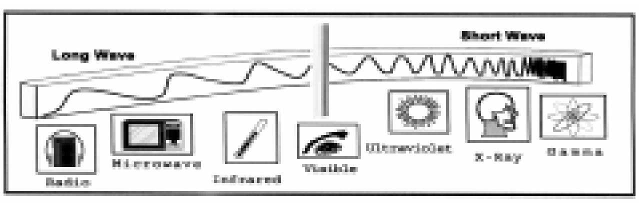
Learning Goals

Students will learn how infrared (heat) data are collected during a Mars mission and what information we can learn from the data.

National Science Education Standards

Standard A: Understanding about scientific inquiry

Standard B: Transfer of energy



The Electromagnetic Spectrum

Overview

Students are given specific tasks relating to how infrared data collection on Mars can take place. This hands-on activity involves collecting data from a rotating planet and sending the data back to Earth to be analyzed. As a class, the students will interpret their findings and discuss the results.

Sample Data Sheet

Activity #8
Chips Off the Old Block

Learning Goals

Students will learn how scientists collect infrared mineral data from Martian meteorites. They will then compare data from Martian minerals with data from minerals found on Earth.

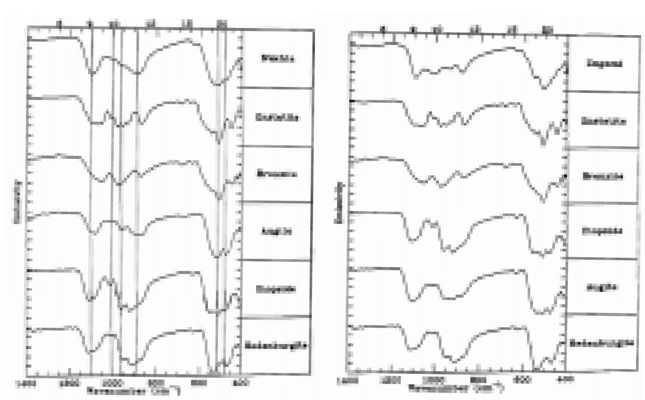
National Science Education Standards

Standard A: Abilities necessary to do scientific inquiry

Standard B: Transfer of energy

Overview

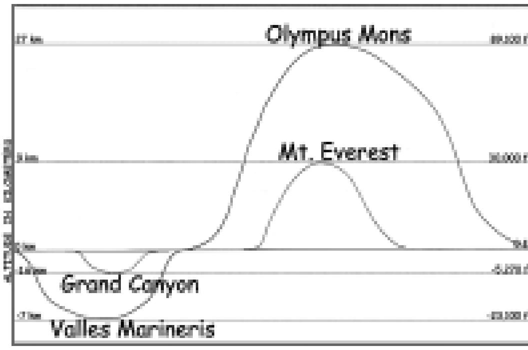
Students will examine actual infrared data from four Martian meteorites. Students will try to determine which of the given spectra (mineral fingerprints) are the most similar to one another. This is the same process that scientists use in analyzing spectral data taken from Mars and Earth to look for similarities.



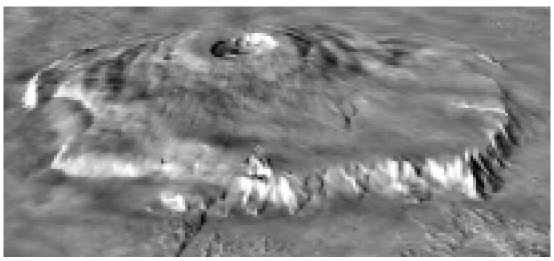
Sample Spectral Data

How High Are the Mountains?

Have you ever been to the base of Mt. Everest or to the Grand Canyon? These magnificent Earth features pale in comparison to what Mars has to offer. Olympus Mons, the largest known volcano in the Solar System, stands over 27 km (~90,000 ft) tall. This is about three times the height of Mt. Everest — a mere 9 km (~29,000 ft). Olympus Mons is characterized not only by its height, but also by its gently sloping volcanic cone. If you were looking down on Olympus Mons from a spacecraft, it would be the size of the state of Arizona! Mars is also home to the largest canyon system in the Solar System, Valles Marineris. The canyon is approximately 4,000 km (~2,500 miles) long, about equal in length to the entire United States (from San Francisco to Washington, DC). Today, Mars shows no signs of active volcanism or running surface water. However, in the past, both of these processes have contributed to the formation of these amazing Martian features.



Height and depth comparison of Olympus Mons (Mars), Mt. Everest (Earth), and Valles Marineris (Mars) with the Grand Canyon (Earth).



The Martian volcano Olympus Mons. NASA's Planetary Photojournal I.D. no. PIA02806.

Get the full lesson plan at http://mars.jpl.nasa.gov/classroom/teachers.html

Activity #9

High or Low — How Do We Know?

Martian sand dunes nicknamed "The Groovy Dunes of Herschel." MGS MOC Release No. MOC2-203 (1-31-00).
NASA/JPL/MSSS

Learning Goals

This lesson will give students an understanding of how information is gathered from other planets and the way scientists interpret this information. Students will learn about the surface of Mars and gain an understanding of how scientists learn about the Martian landscape. By using the same technique that scientists have used to map the surface of Mars, students will gain an understanding of scientific procedure.

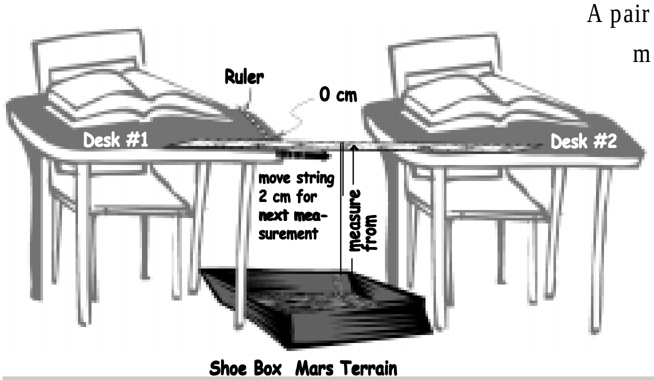
National Science Education Standards

Standard A: Abilities necessary to do scientific inquiry
Standard E: Abilities of technological design
Standard G: Nature of science

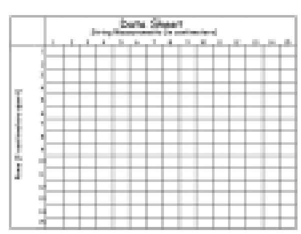
Valles Marineris, the Martian "Grand Canyon." NASA's Planetary Photojournal I.D. no. PIA00422.

Overview

A pair of students will build a Martian terrain model using common materials. Students imitate laser signals sent to the planet's surface using string and determine the distance between the spacecraft and the surface terrain. Using their data, students can graph and diagram the Martian land features.



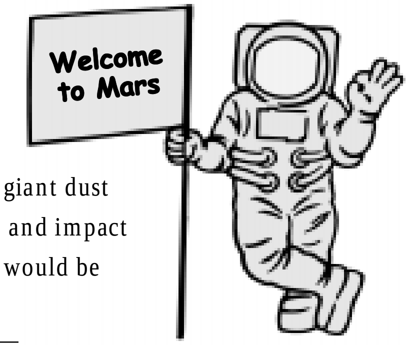
Students create a Martian terrain and map its features using common materials.



Students record data taken from their Martian terrain on the Student Data Sheet.

EW-2001-02-009-JPL

What Would It Be Like To Live on Mars?



It is sometimes hard to imagine what life would be like on another planet. Things we take for granted on Earth, such as the length of a day and a blue sky, would be different. On Mars, you would see two small moons (Phobos and Deimos) cross paths in the hazy, red-colored sky, and giant dust storms that at times cover the entire planet. The ground would be covered with boulders, dust, and impact craters. What types of things would we need to live on Mars? What are some other things that would be different on Mars? Are you ready to go?

Get the full lesson plans at http://mars.jpl.nasa.gov/classroom/teachers.html

Activity #10

Mars Calendar Project

Learning Goals

Students will learn how time is measured on Mars by creating a Martian calendar.

National Science Education Standards

Standard A: Understanding about scientific inquiry
Standard D: Earth in the Solar System

Overview

Students are grouped and given ideas on how the Martian calendar would differ from that of Earth's.

Ideas

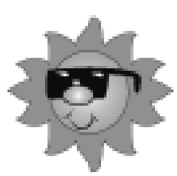
1. Mars rotates slightly slower than Earth — one Mars solar day, or sol, equals 24.6 hours or 24 hours, 40 minutes.

2. Mars orbits the Sun in 687 Earth days or 670 Mars sols.

3. Mars' rotational axis tilts towards the Sun at an angle of 25 degrees. Earth has a similar tilt of 23.5 degrees. This tilt causes the seasons on both planets.

4. Mars has two moons. Phobos travels around the planet 3 times in one sol. Deimos travels around Mars once every 30.3 hours.

From this information, the groups will design a Martian calendar. It is important to take into account such questions as:



- Will you use days, weeks, months?
- What makes a month a month on Mars?
- What will you call a month?
- Will there be a leap year? If so, when will it fall?
- What about Earth holidays? Mars holidays?
- When will the calendar begin (i.e., when is year "0")?

Activity #11

Interplanetary Travel Guide

Learning Goals

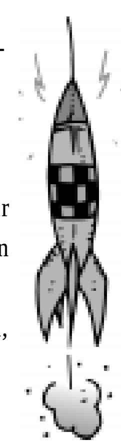
This activity will allow students to imagine that they are living on Mars and take the role of a travel agent who is trying to attract tourists to Mars.

National Science Education Standards

Standard A: Abilities necessary to do scientific inquiry
Standard D: Earth in the Solar System
Standard F: Personal health

Overview

The class is divided into six groups, and each is given a specific role to perform. These roles include: meteorologists, geologists, mission specialists, journalists/reporters, historians, and graphic designers. Collectively the class will create a travel guide for Terris T. Rialle, Director of Interplanetary Travel. The groups will research the Red Planet in their own specialty area. A team leader will share their information with the other groups. The class can present the travel guide in the form of a book, brochure, slide or computer presentation, mural, TV commercial, infomercial, or an interactive website. Your clients will need this information when they begin their vacation to Mars.



Teacher Resources

Educators can download and print the full lesson plans at — http://mars.jpl.nasa.gov/classroom/teachers.html

Finding NASA Educator Materials

"How to Access Information on NASA's Education Program, Materials, and Services" is a guide to accessing a variety of NASA materials and services for educators. Copies are available through the ERC network, or electronically via NASA Spacelink.

NASA CORE

http://education.nasa.gov/core

NASA's Central Operation of Resources for Educators (CORE) was established for the national and international distribution of NASA-produced educational materials in audiovisual format. Educators can obtain a catalogue by contacting:

NASA CORE
Lorain County Joint Vocational School
15181 State Route 58
Oberlin, OH 44074-9799
Toll Free Ordering Line: (866) 776-CORE
Toll Free Fax Line: (866) 775-1401
E-mail: nasaco@leeca.org

NASA Television

http://www.nasa.gov/ntv/

NASA Television (NTV) features Space Shuttle mission coverage, live special events, live interactive educational shows, electronic field trips, aviation and space news, and historical NASA footage. Live feeds preempt regularly scheduled programming. For more information, contact:

NASA TV
NASA Headquarters
Code P-2
Washington, DC 20546-0001
Phone: (202) 358-3572

NTV Weekday Programming Schedules (Eastern Times)

Video File	NASA Gallery	Education File
12–1 pm	1–2 pm	2–3 pm
3 –4 pm	4–5 pm	5–6 pm
6–7 pm	7–8 pm	8–9 pm
9–10 pm	10–11 pm	11–12 pm
12–1 am	1–2 am	2–3 am

NASA Education Program

http://education.nasa.gov

NASA's Education Home Page is a cybergateway for the American education community, with information about education programs, NASA contacts, and resources.

Regional Educator Resource Centers (ERCs)

http://spacelink.nasa.gov/ercn/

ERCs offer access to NASA educational materials. NASA has formed partnerships with universities, museums, and other educational institutions to serve as regional ERCs in many states. A complete list of regional ERCs is also available through CORE.

NASA Spacelink

http://spacelink.nasa.gov

NASA Spacelink is a searchable "virtual library" in which local files and hundreds of NASA World Wide Web links are arranged in a manner familiar to educators. Special events, missions, and intriguing NASA websites are featured in Spacelink's "Hot Topics" and "Cool Picks" areas.

NASA's Education Products

http://spacelink.nasa.gov/products/

This website has a complete listing of NASA educational products.

NASA Educator Resource Center Network (ERCN)

To make additional information available, NASA has created the NASA ERCN. Educators may preview, copy, or receive NASA materials at these locations. Phone calls are welcome if you are unable to visit. The centers and the regions they serve are:

AK, Northern CA, HI, ID, MT, NV, OR, UT, WA, WY
NASA Educator Resource Center
Mail Stop 253-2
NASA Ames Research Center
Moffett Field, CA 94035-1000
Phone: (650) 604-3574

IL, IN, MI, MN, OH, WI
NASA Educator Resource Center
NASA Glenn Research Center
21000 Brookpark Road
Cleveland, OH 44135
Phone: (216) 433-2017

CT, DE, DC, ME, MD, MA, NH, NJ, NY, PA, RI, VT
NASA Educator Resource Laboratory
Mail Code 130.3
NASA Goddard Space Flight Center
Greenbelt, MD 20771-0001
Phone: (301) 286-8570

CO, KS, NE, NM, ND, OK, SD, TX
Space Center Houston
NASA Educator Resource Center for
NASA Johnson Space Center
1601 NASA Road One
Houston, TX 77058
Phone: (281) 244-2129

FL, GA, PR, VI
NASA Educator Resource Center
Mail Code ERC
NASA Kennedy Space Center
Kennedy Space Center, FL 32899
Phone: (321) 867-4090

KY, NC, SC, VA, WV
Virginia Air and Space Center
Educator Resource Center for
NASA Langley Research Center
600 Settlers Landing Road
Hampton, VA 23669-4033
Phone: (757) 727-0900 x.757

AL, AR, IA, LA, MO, TN
U.S. Space and Rocket Center
NASA Educator Resource Center for
NASA Marshall Space Flight Center
One Tranquility Base
Huntsville, AL 35807
Phone: (256) 544-5812

MS
NASA Educator Resource Center
Building 1200
NASA Stennis Space Center
Stennis Space Center, MS 39529-6000
Phone: (228) 688-3220

AZ and Southern CA
NASA Educator Resource Center for
NASA Dryden Flight Research Center
45108 N. 3rd Street East
Lancaster, CA 93535
Phone: (661) 948-7347

VA and MD's Eastern Shores
NASA Educator Resource Center
Visitor Center Building J-17
GSFC/Wallops Flight Facility
Wallops Island, VA 23337
Phone: (757) 824-2298

CA
NASA Jet Propulsion Laboratory
Educator Resource Center
Village at Indian Hill Mall
1460 East Holt Avenue, Suite 20
Pomona, CA 91767
Phone: (909) 397-4420

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