National Aeronautics and Space Administration

Mars Mini Globes

Mars ♂

The red planet **MARS** has inspired wild flights of imagination over the centuries, as well as intense scientific interest. Whether fancied to be the source of hostile invaders of Earth, the home of a dying civilization, or a rough-and-tumble mining colony of the future, Mars provides fertile ground for science fiction writers, based on seeds planted by centuries of scientific observations.

We know that Mars is a small rocky body once thought to be very Earth-like. Like the other "terrestrial" planets—Mercury, Venus, and Earth—its surface has been changed by volcanism, impacts from other bodies, movements of its crust, and atmospheric effects such as dust storms. It has polar ice caps that grow and recede with the change of seasons; areas of layered soils near the Martian poles suggest that the planet's climate has changed more than once, perhaps caused by a regular change in the planet's orbit. Martian tectonism—the formation and change of a planet's crust—differs from Earth's. Where Earth tectonics involve sliding plates that grind against each other or spread apart in the seafloors, Martian tectonics seem to be vertical, with hot lava pushing upwards through the crust to the surface. Periodically, great dust storms engulf the entire planet. The effects of these storms are dramatic, including giant dunes, wind streaks, and wind-carved features.

Scientists believe that 3.5 billion years ago, Mars experienced the largest known floods in the solar system. This water may even have pooled into lakes or shallow oceans. Yet the central question about Mars remains: where is the water? Where did the ancient flood water come from, how long did it last, and where did it go? At the present, Mars is too cold and its atmosphere is too thin to allow liquid water to exist at the surface for long. We know that some water exists today frozen in the polar ice caps, and enough water exists to form ice clouds, but the quantity of water required to carve Mars' great channels and flood plains is not evident on the surface today. Recent images from NASA's Mars Global Surveyor spacecraft suggest that underground reserves of water may break through the surface as springs. Unraveling the story of water on Mars is important to unlocking its past climate history, which will help us understand the evolution of all planets, including our own. Water is also believed to be a central ingredient for the initiation of life; the evidence of past or present water on Mars is expected to hold clues about past or present life on Mars, as well as the potential for life elsewhere in the universe. And, before humans can safely go to Mars, we need to know much more about the planet's environment, including the availability of resources such as water.

Mars has some remarkable geological characteristics including: the largest volcanic mountain in the solar system, Olympus Mons (27 km high and 600 km across); volcanoes in the northern Tharsis region that are so huge they deform the planet's roundness; and a gigantic equatorial rift valley, the Valles Marineris. This canyon system stretches a distance equivalent to the distance from New York to Los Angeles; Arizona's Grand Canyon could easily fit into one of the side canyons of this great chasm.

Mars also has two small moons, Phobos and Deimos. Although no one knows how they formed, they may be asteroids snared by Mars' gravity.

Significant Dates

1965—Mariner 4 made first close-up pictures of the surface during flyby.
1969—Mariner 6 and Mariner 7 flybys resulted in high resolution images of the equatorial region and southern hemisphere.
1971—Mariner 9 became first satellite to orbit another planet.
1973—U.S.S.R. Mars 3 and Mars 5 first attempt to land on Mars.
1976—U.S.A. Vikings 1 and 2 orbited Mars. Viking Lander 1 provided first sustained surface science. Viking Lander 2 discovered water frost on the surface.
1988—U.S.S.R. probe Phobos returned detailed pictures of Phobos.
1996—Launch Mars Global Surveyor and Mars Pathfinder.
1997—Mars Pathfinder lands on Mars. Sojourner Rover explores Ares Vallis area for 3 months.
1997—Mars Global Surveyor maps the surface of Mars from orbit.
present

Fast Facts

Namesake	Roman God of War
Distance from Sun	
Maximum	249 million km
Minimum	206 million km
Distance from Earth	
Maximum	399 million km
Minimum	56 million km
Rotational Period	24.6 hours
Equatorial Diameter	6,786 km
Equatorial Inclination to Ecliptic	25º.2
Gravity	38% of Earth's
Atmosphere	
Main Component	Carbon Dioxide
Pressure at Surface	4–8 millibars (vs 1,013 on Earth)
Temperature Range	-143ºC to +17ºC
Moons (2)	Phobos (Fear), 21 km mean diameter Deimos (Panic), 12 km mean diameter
Rings	None
Orbital Eccentricity	0.093
Orbital Inclination to Ecliptic	1º.85
Magnetic Field Density	Localized at surface; not global.

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NASA GSFC Mars Orbiter Laser Altimeter

References

1) Mars Exploration: http://mars.jpl.nasa.gov/
2) Planetary Photo Journal: http://photojournal.jpl.nasa.gov/
3) Views of the Solar System: http://www.solarviews.com/eng/mars.htm
4) Stardate, The University of Texas of Austin, McDonald Observatory, 2609 University Ave., #3.118, Austin, TX 78712

LG-2000-10-481-HQ

Mars Digital Image Mosaic
in a "Flower Petal" Projection for Making Globes

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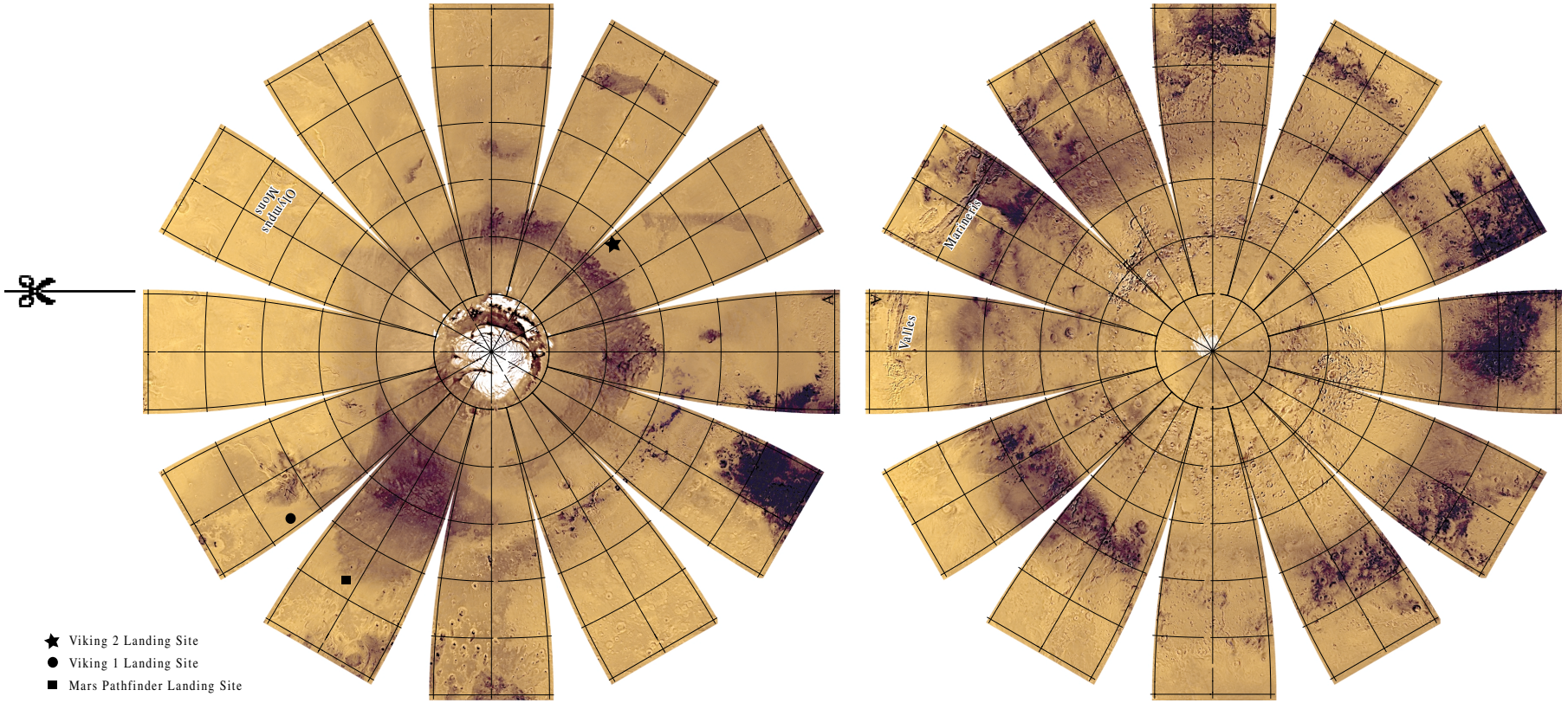
North Hemisphere

South Hemisphere



Instructions for constructing a tennis ball mini globe

1.) Cut out the north and south hemispheres. Make sure to remove all the white space surrounding the petals.
2.) After adding a small amount of glue to the center of the north hemisphere, glue it onto the tennis ball.
3.) Glue each petal down, starting at one end and proceeding in order around the tennis ball.
4.) Place a small amount of glue on the south hemisphere petal labeled with an 'A'. Line up this petal with the corresponding northern hemisphere petal which is also labeled with an 'A' and glue to the tennis ball.
5.) Glue down the center of the southern hemisphere.
6.) Glue each remaining petal down, starting next to the petal already in place and proceeding in order around the tennis ball.

Mars Topography
in a "Flower Petal" Projection for Making Globes

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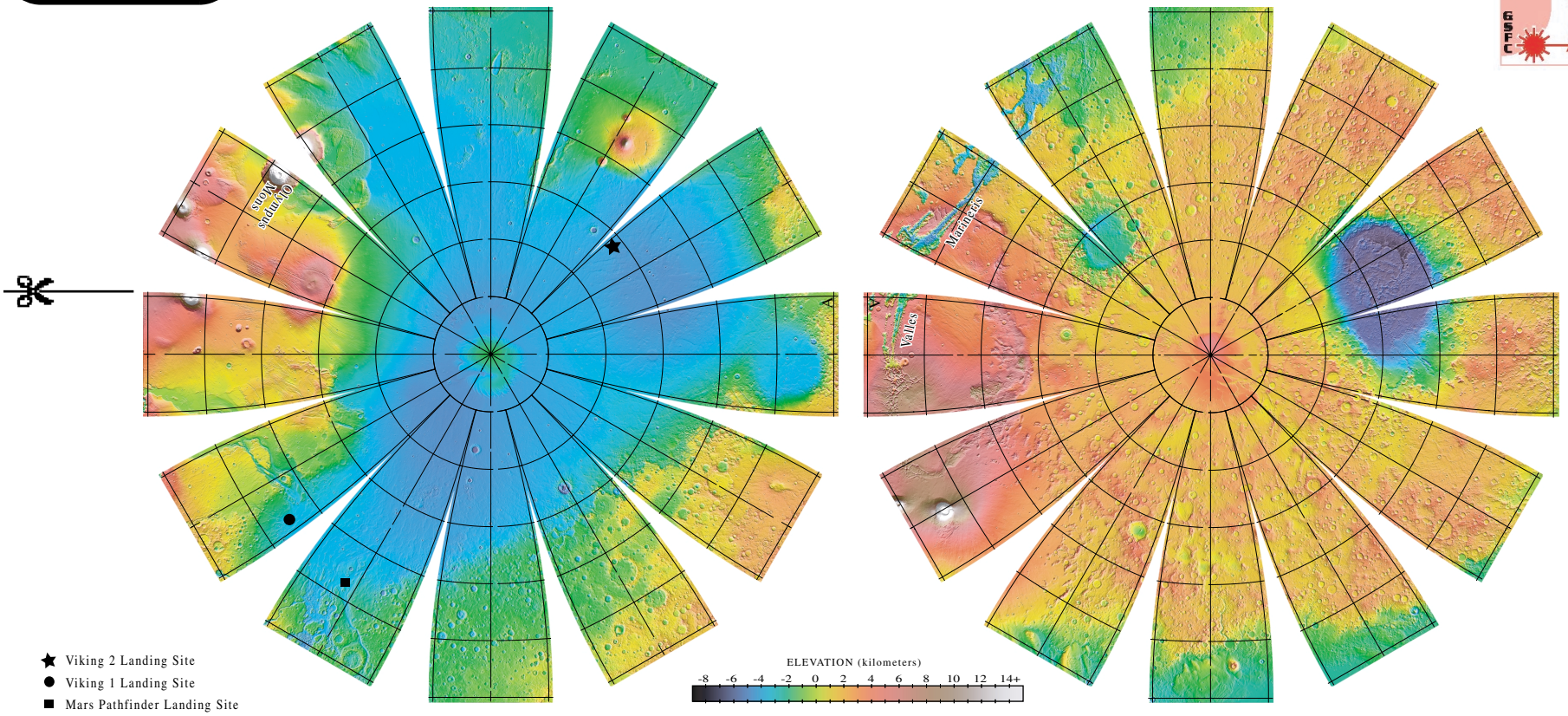
NASA

North Hemisphere

South Hemisphere

NASA GSFC Mars Orbiter Laser Altimeter



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