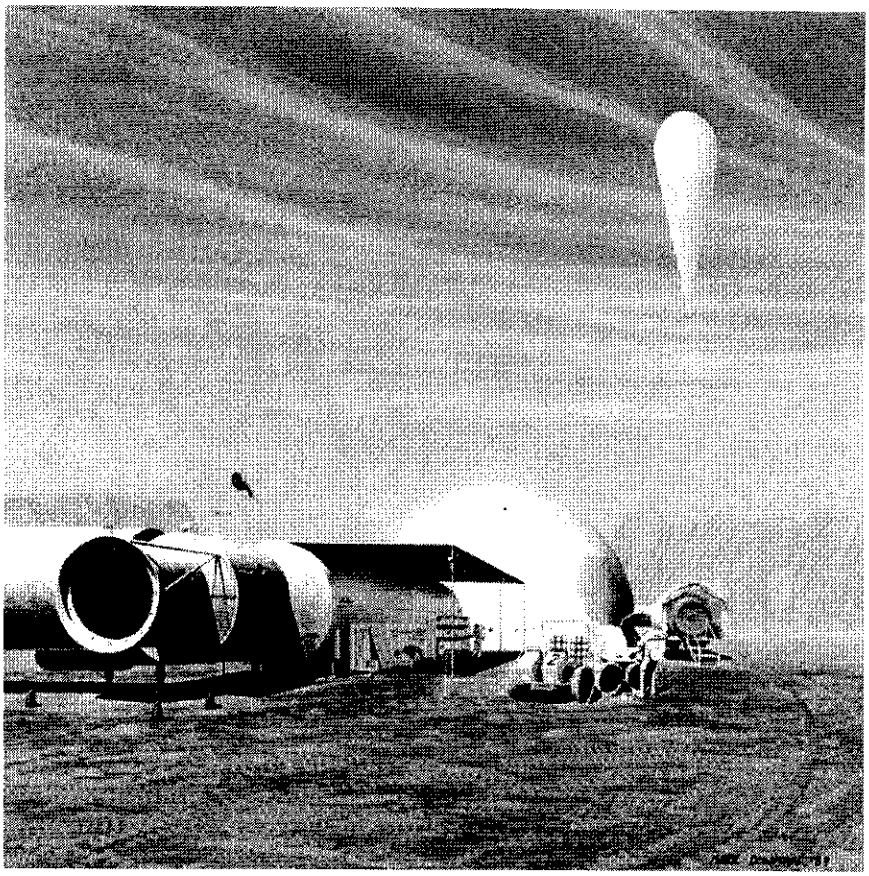
Build a Mars Habitat!



This artwork is just one idea of what a Mars outpost might look like. It shows a habitat module, a rover, and an inflatable habitat. The balloon carries instruments for studying Mars weather. NASA is not yet planning a human expedition to Mars. This image was produced by Mark Dowman of John Frassanito and Associates for NASA.

When humans finally land on Mars, they will have to stay quite a while, since Mars and Earth are too far apart most of the year for a spaceship to make the journey in a reasonable time. Unfortunately, there are no hotels on Mars! The Mars explorers from Earth will have to build their own home. A home that must contain everything for survival in an environment unfriendly to life is often called a *habitat*. A habitat will definitely be needed on Mars!

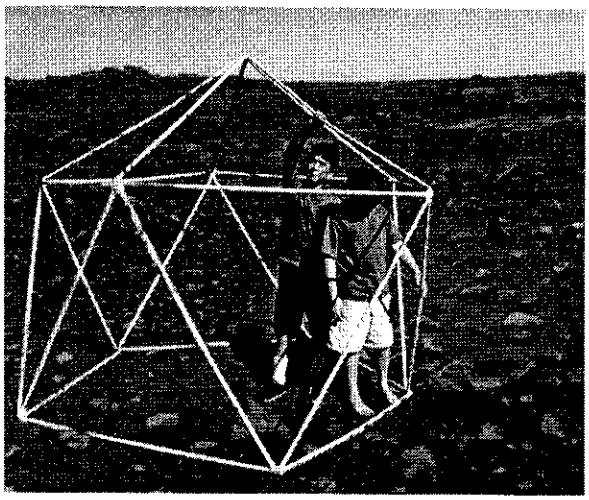
There is only 1/100th as much air on the surface of Mars as on the surface of Earth (gasp!). Even if the air were 100 times thicker, you still couldn't breathe it, because it contains hardly any oxygen. And the average temperature on Mars is about 67° F *below zero*! Brrrrr!

So a Mars habitat for humans will have to be very, very sturdy and robust. It will have to be air tight, so the inside can be pumped up with breathable air without exploding or leaking. The habitat will have to be heated to keep the Mars explorers warm. It will need a water recycling system, a power generating system, and food storage and preparation facilities.

The materials to build the Mars habitat should be lightweight, since they will have to be boosted out of Earth's gravitational field using rockets. The heavier the load, the more rocket fuel is required. The habitat will have to be sent to Mars in pieces and assembled by the Mars explorers once they arrive. So it should be fairly easy to put together, since the Mars explorers will be working in space suits.

This material was provided through the courtesy of the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

You can be a Mars explorer too. Practice by building your own Mars habitat*. Pretend you are an astronaut working with your team mates on Mars to build your new home.

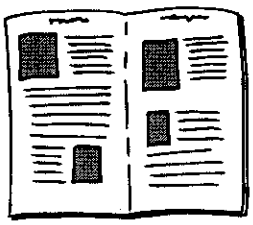


Materials to build one Mars habitat:

- √ 100 sheets of newspaper (use a paper with large pages—tabloid size is too small—and use the full square spread)
- √ Pencil
- √ Masking tape
- √ Scissors
- √ Yardstick
- √ Stapler
- √ Colored tissue paper (optional)
- √ Glue stick (optional)

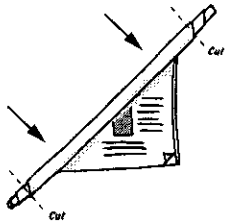
Constructing your Mars habitat:

1. Use four sheets of newspaper to build each log. Lay the sheets out flat, one on top of the other.



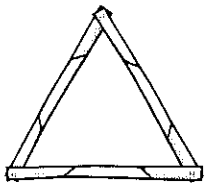
2. Set the pencil in the corner and roll across on the diagonal. Use the pencil to help you roll evenly, but don't try to make the logs as thin as the pencil. When you get to the opposite corner of the paper, you'll have a tube or log. Slip the pencil out and tape the log shut.

   Repeat this process until you have 25 logs. Then trim the ends a bit, making sure all the logs are the same length. They will be around 30 inches long.

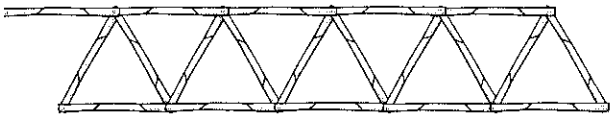


   Now you will need a big, open space in which to construct the habitat.

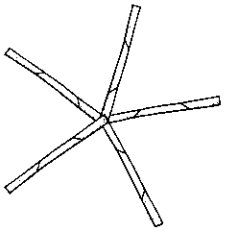
3. Staple three logs together to create a triangle. Repeat until you have five triangles.



4. Staple the five triangles to each other at their bottom corners. Add connecting logs across the top. Then raise the triangles, or walls, off the floor and staple the ends together to form a five-sided (pentagonal) structure. It helps to have a few people hold up the walls while another person staples.



5. Staple the remaining five logs together at the center to make a star.



Thanks to Family Fun *magazine for permission to use their Geodesic Dome idea for our Mars habitat.*

6. Staple the free ends of the star to the junctions of the triangles on the top of the base, and the structure will stand by itself.

7. To give the structure "solid" walls, smear glue onto the logs and gently press pieces of colored tissue paper onto the triangles. Don't forget to leave a door! You can rip or cut off the loose edges of the tissue paper.

Optional Larger Version
(shown in photo on Page 2)

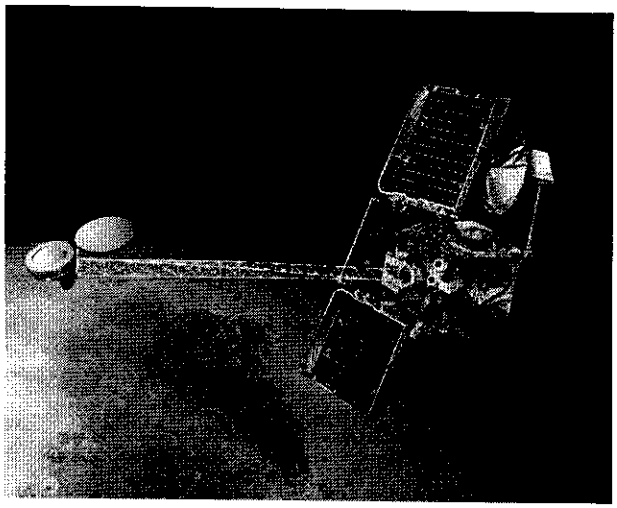
You can also build a larger version of the Mars habitat. Although large enough for a child to stand up in, it may not be as strong as the smaller version. For that reason, we suggest using 5 or 6 sheets of newspaper per log.

You will need 300 sheets of newspaper. Make 50 logs using 6 sheets for each log. Use two logs to make one longer log by sliding the end of one log into another and taping them together. Then trim the ends. Your logs will be about 56 inches long.

Assemble the habitat as for the smaller version. Note that you will probably need a large outdoor space to assemble the triangles for Step 3.

When will we get there?

The National Aeronautics and Space Administration (NASA) has already sent several successful robotic spacecraft to study Mars. These have been both orbiters and landers. The most recent mission to Mars is 2001 Mars Odyssey, which was launched April 7, 2001, and is due to arrive October 24, 2001. Mars Odyssey will orbit Mars for at least 3 years. The 2001 Odyssey will collect data on what chemicals and minerals make up the Martian surface. It will also provide vital information about potential radiation hazards for future human explorers.



Artist's idea of Mars Odyssey in orbit around Mars.

More Fun with Mars

Websites:

http://mars.jpl.nasa.gov
http://spaceplace.jpl.nasa.gov/mars_rocket.htm

Books:

Touchdown Mars! An ABC Adventure, by Peggy Wethered, Ken Edgett, and Michael Chesworth. For ages 4-8.

Mars Beckons: The Mysteries, the Challenges, the Expectations of Our Next Great Adventure in Space, by John Noble Wilford and Marty Asher. General audiences.

Facts to know for your trip to Mars:

Distance of Mars from Sun:	1-1/2 times farther than Earth
Length of Mars years:	687 Earth days
Length of Mars day:	24 hours, 37 minutes
Mass (amount of matter it contains):	About 1/10th of Earth's
Diameter (distance across):	About ½ of Earth's
Number of moons:	2 (Phobos and Deimos)
Surface gravity compared with Earth:	0.38 (If you weigh 100 pounds on Earth, you will weigh only 38 pounds on Mars)
Atmospheric pressure at Mars surface:	Only about 1/100th (or less) of Earth's
Main gases in atmosphere:	Carbon dioxide, with a bit of nitrogen, oxygen, and argon.
Time for a spacecraft to travel to Mars from Earth:	At least six months, depending on the positions of the two planets in their orbits around the Sun.