

# HiRISE

High Resolution Imaging Science Experiment

# FOR TEENS!



## IMAGING MARS AT HIGH RESOLUTION ON MARS RECONNAISSANCE ORBITER

### FIVE FACTS ABOUT HiRISE

1. HiRISE will be taking pictures of Mars at very high resolution, which means that we will be able to see things on the surface of Mars that are as small as your school desk, about 3 feet across.
2. Most of the pictures will be in black and white, but the center 20% of some pictures will be taken in color.
3. About 1000 stereo pairs (2 images taken at slightly different angles) will be taken that will allow us to make 3-D images of Mars. This will let us know how rough the surface is, which is important for deciding on landing sites for future missions!
4. HiRISE can take pictures containing 28 Gb of data in only 6 seconds! That would be like filling an iPod in only 60 seconds!
5. The pictures from Mars will be returned to Earth in roughly 15 minutes depending on how far away the Mars Reconnaissance Orbiter (MRO) is at the time. The data travels at the speed of light through a set of antennas called the Deep Space Network!



Picture of the HiRISE camera as it is being built by an engineer at Ball Aerospace & Technology Corp. Photo credit: NASA/JPL/Ball Aerospace



### HOW CAN YOU GET INVOLVED?

HiRISE is called the "People's Camera" because everyone is encouraged to participate in choosing sites on Mars to photograph and help analyze the images. This means you can work with the scientists to collect valuable information about Mars! First you will need to learn a bit about Mars. Take the quiz and do the crossword puzzle on the back to test your skills. There is a list of books on the back that might help, or you can look at the websites listed to the right. Then you can go to the "HiWeb" site to tell us where you think we should take pictures of Mars, and/or go to the "Clickworkers" website to help us analyze the images. You can always ask a parent, guardian or teacher to help. And you can find more games, comics, and puzzles at the <http://hirise.seti.org/epo/> website!

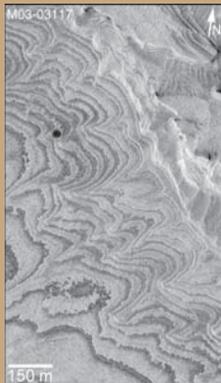
#### Websites to visit

- To learn more about HiRISE (HiWeb): <http://marsoweb.nas.nasa.gov/HiRISE/> <http://hirise.lpl.arizona.edu>
- For HiRISE games, activities, curriculum materials and to learn how to suggest a target: <http://hirise.seti.org/epo/>
- For local Arizona public outreach and info about the HiRISE Operations Center (HiROC): <http://hiroc.lpl.arizona.edu/>
- To analyze images using Clickworkers: <http://clickworkers.arc.nasa.gov>
- For more information about Mars: <http://marsprogram.jpl.nasa.gov> (Click on "Mars for Kids" for games)
- To learn more about MRO: <http://marsprogram.jpl.nasa.gov/mro/>

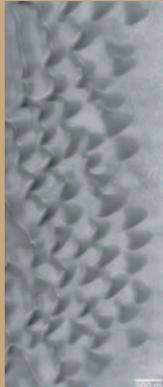
Left: Artist's drawing of the HiRISE camera on MRO taking a picture of the Martian surface.

# QUIZ

1. >> What are all of these squiggly lines?



- A) Stream beds
- B) Fractures in the Martian surface
- C) Layers of rocks that have been eroded and exposed



<< 2. These geologic landforms are also seen on Earth.

- A) Craters
- B) Sand dunes
- C) Hills



3. >> What are the dark streaks in this photo?

- A) Rover tracks
- B) Dust devil trails
- C) Alien motorcycle tracks



<< 4. What type of geologic feature is this?

- A) Volcano
- B) Plateau
- C) Impact crater

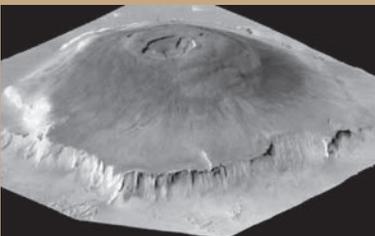


<< 5. Why does this image suggest there was once liquid water here?

- A) There is steam coming out of the crater
- B) These are gullies, probably created by water runoff
- C) These are alien motorcycle tracks and aliens need water to live

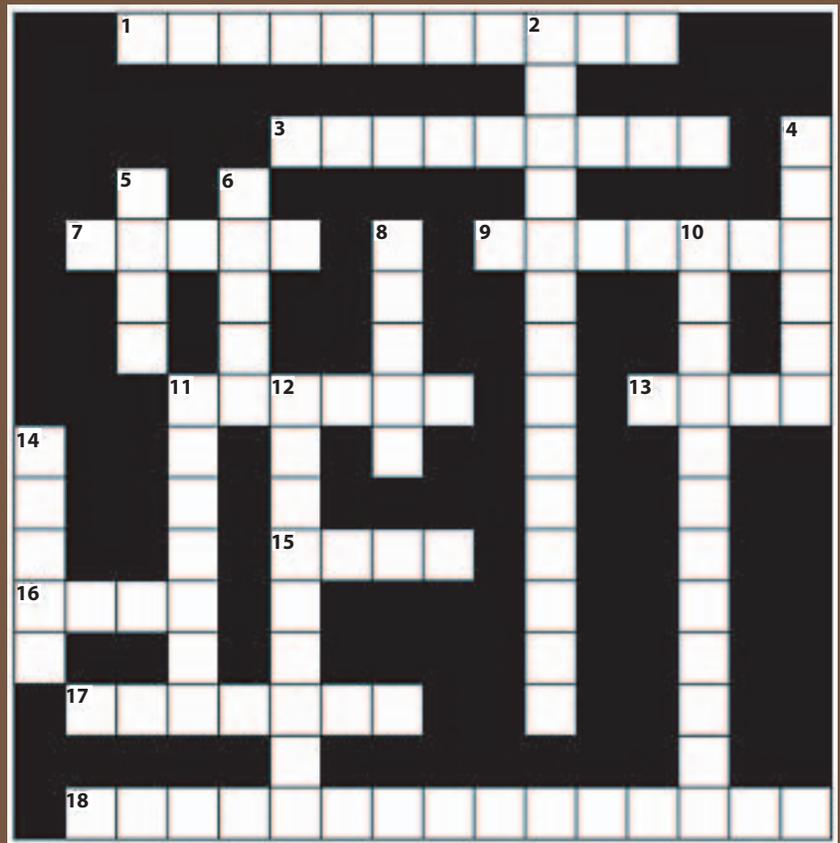
6. >> This volcano is very tall, but is also very flat.

- A) Arsia Mons
- B) Pavonis Mons
- C) Olympus Mons



## Books to Read

- Mission to Mars, by Franklyn Branley
- Water on Mars, by Michael H. Carr
- A Traveler's Guide to Mars, by William Hartman



### Down

2. Wide and deep flood feature on Mars formed by release of massive amounts of groundwater onto the surface in a relatively short time.
4. The name of the high resolution camera on the Mars Reconnaissance Orbiter.
5. The red planet.
6. Triangular shaped deposit formed when a river empties into an ocean or lake.
8. The icy regions in the far north and south of Mars.
10. Hole with raised rims on the surface of a solid body created by the high speed collision with an asteroid or comet.
12. Fast or slow movement of material down from a mountain or cliff by gravity.
14. A small ravine usually carved by water.

### Up

1. The largest volcano in the solar system is about 27 km (about 17 miles) high., about three times the height of Mount Everest. It is about 540 km (335 miles) wide and is ringed by steep scarps.
3. High winds over a large desert can produce these. Bad news for a camera trying to image the surface.
7. A key fluid for life.
9. A slowly moving river of ice.
11. A low area of land between hills or mountains, often carved by a river or a stream.
13. This hill on Mars was famous for a while because some people thought it looked like part of a human body. Actually it is an eroded mesa.
15. A hill of sand formed by the wind.
16. Molten rocks from a volcano.
17. Movement of soil and other materials by water, wind or ice.
18. The largest canyon system found in the solar system makes the Grand Canyon look small.

**Answers:** 1. (C) These are layers of rock on Mars that have been eroded and exposed, like you might see in the Grand Canyon on Earth. 2. (B) These are sand dunes in Proctor Crater, created by winds blowing sand from the east/northeast. 3. (B) Dust devils are spinning columns of wind that move across the landscape, pick up dust, and look somewhat like small tornadoes. Dust devils are a common occurrence in dry and desert landscapes on Earth and Mars. Each dust devil would leave a dark streak by removing bright dust from the terrain in its path, revealing a darker surface underneath. 4. (C) This is a crater formed when a meteorite crashed into the surface of Mars. This crater on Elysium Planitia is twice the diameter of Meteor Crater in Arizona. 5. (B) This image shows gullies on a crater wall, probably created by water runoff. This is similar to what you might see on a beach cliff or hill slope on Earth where water cuts little channels into the sand or soil. 6. (C) Olympus Mons is taller than three Mount Everests, but still has a very shallow slope of only about 2-5 degrees. All volcanoes on Mars have shallow slopes due to the lower surface gravity on Mars. **Crossword answers:** Down: 2. Outflow channel 4. HiRISE 5. Mars 6. Delta 8. Poles 10. Impact crater 11. Volcano 12. Landslide 14. Gully **Across:** 1. Olympus Mons 3. Dust storm 7. Water 9. Glacier 11. Valley 13. Face 15. Dune 16. Lava 17. Erosion 18. Valles Marineris