

REMOTE SENSING: MARS

BRIEF DESCRIPTION: Students will interpret and answer questions about images of Mars taken from orbiting spacecraft (Mars Global Surveyor, Mars Odyssey, Mars Express, Viking) and from the two rovers on the surface of the planet.

A TEAM OF UP TO : 2

APPROXIMATE TIME: 50 minutes

THE COMPETITION: Given spacecraft images of Mars, students will display their knowledge of the planet by identifying landscape features and by answering questions that call for analysis of the images. A knowledge of the geologic and climatologic history of Mars will be important to interpreting the images correctly. Also, a familiarity with the different types of landscape features on the planet will be essential. Features to be interpreted include (but are not limited to):

- 1) Volcanic landforms
- 2) Glacial landforms
- 3) Topographic features produced by erosion of running water
- 4) Landforms and sedimentation consistent with bodies of water existing on the surface for long periods of time.
- 5) Impact craters
- 6) Features produced by the deposition of wind-blown dust

SAMPLE QUESTIONS AND PROBLEMS: After observing the images, the students may be asked to:

- 1) Identify a specific topographic feature in an image;
- 2) Identify the process responsible for creating a specific topographic feature;
- 3) Determine the relative ages of different landscapes on Mars;
- 4) Determine the relative ages of different features within the same landscape;
- 5) Determine the direction from which the Sun is shining on the surface by observing shadows;
- 6) Determine the direction of prevailing winds at specific locations;
- 7) Determine the presence or absence of subsurface ice in a region by studying the morphology of craters and other topographic features;
- 8) Determine the direction that water was flowing across the Martian landscape;
- 9) Determine if a feature (such as a crater) is the product of volcanism or impact;
- 8) Given the size of a particular object (e.g., an impact crater with a diameter of 20 kilometers), determine the dimensions, surface area, or volume of other features (such as

the length of river systems, volume of volcanic cones (if given the height), surface area of “collapse terrains”, etc.).

RESOURCES:

To answer successfully the questions and problems posed by the images, students must have a working knowledge of the history of Mars and of the types of topographic features found on the surface of the planet. These topics are well-discussed in resources available online and in books published within the last 5 years.

Spacecraft Websites:

Mars Odyssey: mars.jpl.nasa.gov/odyssey

Mars Global Surveyor: marsprogram.jpl.nasa.gov/mgs

Mars Rovers: marsrovers.jpl.nasa.gov/home/index.html

Mars Express: www.esa.int/SPECIALS/Mars_Express

Viking: nssdc.gsfc.nasa.gov/planetary/viking.html