What on ~~Earth~~ Mars?
Student Version

Why should your team do this activity?
Photographs taken from orbit give us a closer look at the surface of Mars. Much of our knowledge about Mars was obtained by looking at and interpreting pictures, just like your team will do in this activity. If your team has completed the activities "Crater Creation," "Martianscape," or "The Winds of Change," you probably already know about some of the features that scientists use to interpret pictures of Mars. In this activity, your Engineering Team will learn a little more about such features before looking at pictures. Then your team will work together to examine pictures of Mars, discuss the features in each image, and hypothesize about what may have caused each feature.

The Necessities
- ★ 10 Martian photographs (In Teacher Version)
- ★ Data Table
- ★ Pen or pencil
- ★ Scratch paper
- ★ Idaho TECH Lab Notebook
- ★ Optional: colored pencils or markers

Background Information
Your team will need to know the following terms:

- ★ **impact crater** - a roughly circular hole created when something hits the surface. The floor of the crater is below the surrounding landscape. You may see a raised rim or deposits of debris ringing the crater.
- ★ **volcano** - a mountain formed by lava and/or erupted materials. A **volcanic crater** is a depression at the summit of a volcano. In contrast to craters made by impact, volcanic craters are above the surrounding plain.
- ★ **river valley** - a winding channel carved by water; may have multiple branches that make a pattern resembling a branching tree.
- ★ **river bed** - a type of river valley with a wider, flatter floor; may contain streamlined islands.
- ★ **dry lake bed** - an irregularly shaped depression.
- ★ **polygonal ground** - a surface pattern (wedges of polygonal shapes) generally attributed to the alternate freezing and thawing of soil layers containing water or ice. The size of the polygons is believed to be directly related to the thickness of the soil layer (i.e., thicker soils produce larger polygons). The implication for Mars: presence of liquid water at some time in the past.
- ★ **lava flow** - a place where magma broke out from underground onto the surface.
- ★ **sand dune** - a hill or ridge of wind-deposited sand.
- ★ **fracture** - a straight groove or line on the surface where rock has been broken.

★ **wind streak** - a dark streak; they have been interpreted as deposits of salt and coarse-grained particles from craters, but it seems the most widely accepted idea is that they are wind erosion features. This means the dark streaks are erosional zones - surfaces that have had fine-grained particles stripped away. The difference in brightness is probably due to a difference in the particles themselves. Generally, fine-grained materials are lighter-colored because they are weathered more rapidly than the larger particles. Alternatively, dark streaks are probably dark-colored, silt- and clay-sized particles deflated from the adjacent crater floor. Deflation is defined as the sorting out, lifting, and removal of loose, dry, fine-grained material by wind action. The orientation of the streaks indicates the direction of the wind at the time they formed. So differences in orientation may be due to local topographic influences on wind direction or to changes in wind patterns.

Directions

First, make sure your team has read through the background information. Understanding the boldface terms is crucial to completing this activity, so if you have any questions at all, ask your teacher for help. Remember that the Internet is a good source of information too.

Look through the ten images on the following pages. These images were taken during the Viking Orbiter missions to Mars (except Image 10). Try to answer the questions next to each image. **Remember that even NASA does not know everything about Mars, so be creative! Your ideas may be even better than what NASA has!** Record your answers in your Idaho TECH Lab Notebook. Also, record which features you see in each photograph in the table below *(the first image is already done for you!)*:

★ *If your team wants to, color code the pictures by coloring each feature a different color. For example, color all impact craters orange and all volcanoes/volcanic craters blue.*

	Image #1	Image #2	Image #3	Image #4	Image #5	Image #6	Image #7	Image #8	Image #9	Image #10
# of different features in photo	2	2	2	3	2	3	2	3	2	
Impact craters	X									
Volcanoes/ volcanic craters	X									
River valley										
River bed										
Dry lake bed										
Polygonal ground										
Lava flows										
Sand dunes										
Fractures										