Mars Mosaic
Student Version

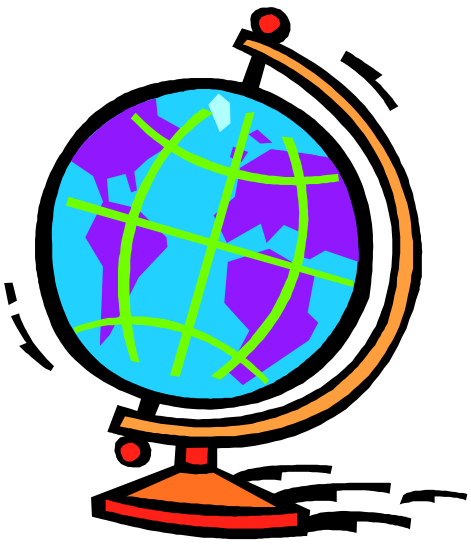
Why Should Your Team Do This Activity?

When a satellite is sent to orbit Mars, one of its missions involves taking thousands of pictures of the planet's surface. Instead of keeping the pictures separate, scientists at NASA will put the pictures together like puzzle pieces to create what we call a **mosaic** – a larger image, or picture, made from combining several smaller images. This allows the scientists to view a larger area of the surface using one picture mosaic, rather than by flipping through hundreds of smaller images. The only problem in creating a mosaic is that the pictures they take and put together are flat, or two-dimensional, and we know that Mars is round, or three-dimensional! In order to find the best landing spots for the Rovers and better describe the landscape, scientists need to be able to construct a three-dimensional "globe" using the two-dimensional mosaics they create. This is exactly what you will be doing today!

In this activity, you will learn how scientists at NASA take two-dimensional mosaics and use them to create a globe of Mars. You will also be comparing distances across a flat wall map to help you see how flat maps and globes show the same places in slightly different ways. When you are done, your team will have your very own Mars globe!

The Necessities:

- ★ Wall map of the Earth
- ★ Globe of Earth
- ★ Mars mosaic *(see pages 67-68)*
- ★ 5" Styrofoam© ball
- ★ Yardstick
- ★ Glue
- ★ Scissors
- ★ String *(at a minimum, string should be the width of the wall map)*
- ★ Idaho TECH Lab Notebook



Directions

1. Using your wall map of Earth and the piece of string, estimate the distances between the following places by comparing how much string it takes to get from one place to the other and then measuring that distance using your yard stick. Use the map's mileage legend to estimate the mileage between locations in order to complete the table below.

Locations	**Ft / Inches**	**Est. Mileage**
Boise, Idaho, USA and Orlando, Florida, USA		
Paris, France, and Honolulu, Hawaii, USA		
Tokyo, Japan and Seattle, Washington, USA		
Anchorage, Alaska, USA and Seattle, Washington, USA		
Anchorage, Alaska, USA and Moscow, Russia		

2. Now, rank the distances from 1-5, with 1 being the shortest distance, and 5 being the longest distance.
   _____ Boise, Idaho, USA and Orlando, Florida, USA
   _____ Paris, France, and Honolulu, Hawaii, USA
   _____ Tokyo, Japan and Seattle, Washington, USA
   _____ Anchorage, Alaska, USA and Seattle, Washington, USA
   _____ Anchorage, Alaska, USA and Moscow, Russia

3. Now, using your globe of the Earth, estimate the distances between the same places and rank them again based on your measurements from the globe. Enter mileage in the table below if your globe has a mileage legend for you to use.

Locations	**Inches**	**Est. Mileage**
Boise, Idaho, USA and Orlando, Florida, USA		
Paris, France, and Honolulu, Hawaii, USA		
Tokyo, Japan and Seattle, Washington, USA		
Anchorage, Alaska, USA and Seattle, Washington, USA		
Anchorage, Alaska, USA and Moscow, Russia		

   _____ Boise, Idaho, USA and Orlando, Florida, USA
   _____ Paris, France, and Honolulu, Hawaii, USA
   _____ Tokyo, Japan and Seattle, Washington, USA
   _____ Anchorage, Alaska, USA and Seattle, Washington, USA
   _____ Anchorage, Alaska, USA and Moscow, Russia

What Did You Find?

- Did you rank the locations in the same way when you used the wall map and then the globe?
- If you take the two ends of your wall map and bring them together to form a cylinder, does it look like globe? Why or why not?
- Do Anchorage and Moscow look closer together, further apart or the same on the wall map or the globe?
- How are these two ways of representing the same places different?

On to Mars!

Using the picture mosaic of Mars taken by NASA satellites below, cut out the mosaic pieces, and glue the pieces to your Styrofoam© ball to make a three-dimensional Mars globe "mosaic" of your own. As you do this, think about why the pieces are shaped the way they are.

- Why can't NASA scientists create their own globe by gluing a large, continuous image around the ball?
- Do the images line up perfectly, or do they overlap some?
- Why do you think that is?

To better understand what types of pictures NASA combines to create mosaics, your team should complete the "What on ~~Earth~~ Mars?" activity. Once images are taken, scientists also look for mountains and valleys using radar in order to determine more about the landscape – much like your team can do in the "Mapping Unknown Surfaces" activity.

If you want to create another Mars globe, your team can use a slightly different NASA image located at **photojournal.jpl.nasa.gov/catalog/pia02992**