Mapping Unknown Surfaces
Student Version

Adapted from "Mapping Unknown Surfaces" from the American Museum of Natural History web site located at www.amnh.org/rose/mars/mapping.html

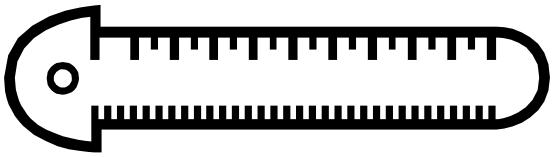
Why should your team do this activity?

We always want to know what the surface of a planet is like. Sometimes we can't see it, like in the case of Venus. On Venus, a thick cloud layer covers the surface of the planet. Sometimes on Mars, massive dust storms can obscure the surface in the same way. Other times, we can see the surface and take a picture of it. But these images are two-dimensional. We have no definite information on depth. To find out the high and low points of a planet's surface, scientists use radar to map the landscape. A spacecraft orbiting the planet beams radar down to the surface and then measures how long it takes for the reflection to come back. A shorter time means a higher surface; a longer time means a lower surface. In this way, we can create a three-dimensional picture of the landscape.

In this activity, you will be given a hidden landscape. You will take "radar" measurements to create a three-dimensional map of a planet's surface. Using this data, you will then determine if there is a safe landing site for a spacecraft and construct a topographical map.

The Necessities

- ★ Hidden Landscape *(your teacher will provide the landscape)*
- ★ Thin wooden skewers with centimeter markings *(your teacher will provide these)*
- ★ Data sheet
- ★ Pencil
- ★ Idaho TECH Lab Notebook



Directions

1. Insert a skewer straight down into a hole until it will not go down any further.
2. Read the measurement for how far down the skewer went.
3. Write each measurement on the data sheet near the dot that corresponds to the hole you measured. Be consistent about where you write your data – always below the dot, or always to the right of the dot, etc. Let each member of the team take several measurements.
4. After you take measurements for all the holes, examine your data. Is there a square area that is 2 holes by 2 holes where all the measurements are the same or differ by no more than 1 centimeter? Would this be a safe landing spot for a spacecraft?
5. Now draw lines connecting equal measurements to create a topographic map of your surface (have your teacher show you an example).
6.
7. Remove the top of the landscape box. Are all of the features of the landscape represented on your map? Which did you miss? Why? Record your thoughts in your Lab Notebook.