



Science/Operations Expert Instructions

Science/ operations experts play a very important role in this mission. The data you collect for each site determines the success of the mission. Here's what you do:

1. Calculate the area of each site chosen by the navigation experts (see Overview of Teams diagram, 1a).
2. Record the hematite density for each visited site on the sci/ ops report form.
3. Assign each site a rating, with 1 being the best and 3 the worst.
4. Give the report form to the communications experts (see Overview of Teams diagram, 2).

You need to do two things to prepare for mission day:

1. Complete some math practice problems similar to the ones you'll see on mission day.
2. Complete a mini-mission with your class. A mini-mission is a smaller version of the real mission. It gives you some practice for the real mission. For your role you need to follow the tutorial that teaches you to use the science/ operations tool. You'll use the same tool on mission day; only the sites and data will change. The tool is shown below.

Mini-mission Science/ Operations Tool

On mission day, access the science/ operations tool at the following website:

<http://www.e-missions.net/flashcom/mars>

Select your team name and "Science/ Operations" from the dropdown menus. The mission commander will give you the password to log in.

The screenshot shows the MARS Science/Operations Center interface. On the left is a 'Map of Martian Surface' with a color-coded hematite density scale (1 to 100 kg/km²). Below the map is a table for recording data:

| SITE | AREA | HEMATITE | RATING |
|------|------|----------|--------|
| a | | | |
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |

Below the table is a 'SITE RATING' field and a 'SUBMIT RESULTS' button. On the right is a 'TARGET ZONE MAP' showing a triangle with side lengths 2.9, 3.2, and 2.8 km. Below the map are two calculation sections:

AREA OF THE TRIANGLE
 $\frac{\text{Height} \times \text{Base}}{2} = \frac{\quad \text{km} \times \quad \text{km}}{2} = \quad \text{km}^2$

TOTAL AMOUNT OF HEMATITE
 $\text{Area} \times \text{Density} = \quad \text{km}^2 \times 2 \frac{\text{kg}}{\text{km}^2} = \quad \text{kg}$

Callouts point to: 'Map of Martian Surface', 'Geometric Tools' (a panel with icons for circle, square, triangle, and rectangle), 'Site Image' (the target zone map), and 'Formulas' (the calculation sections).