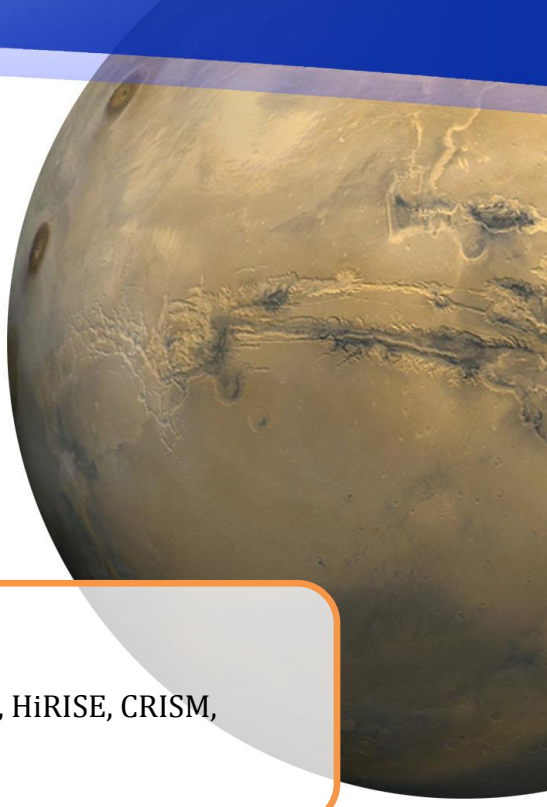
# Lesson 1: Welcome to Earth and Mars




**Summary**
This introduction will expose students to Mars imaging software platforms so that students may become familiar with their navigation and imagery products.


**Learning Goals**

**Students will be able to:**

- Navigate and use both Google Mars and JMARS.
- Become familiar with imagery collections available (e.g., HiRISE, CRISM, THEMIS) via the above software programs.

**Context for Use**
This learning module is meant for adaptation in an introductory earth science course and/or planetary science course. The *In-Class Activities* can be easily adapted for homework when desired.

**Description and Teaching Materials**
*In-Class Activity*

In-Class Activity 1: Mars Analogs

*Homework/Lab*

Homework 1: Google Mars
Homework 2: Exploring Gale Crater
Homework 3: JMARS- Mawrth Vallis "Potential landing site"
Homework 4: Meet the Scientist- Who studies Mars?
Homework 5: Having fun with Mars programs

**Teaching Notes and Tips**

1. Before assigning Homework 1 or 2 spend some time exploring both Google Mars and JMARS with the students for a "first pass" exposure.

**Assessment**

- Methods of assessment are within each individual *In-Class Activity* and *Homework*.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# Mars for Earthlings

**References and Resources**

1. Image File: Welcome to Earth and Mars
2. JMARS Website: http://jmars.asu.edu/
3. Google Earth Free download: http://www.google.com/earth/index.html

# Mars for Earthlings

***Homework 3***
Intro to Mars_MFE
*JMARS- Mawrth Vallis "Potential landing site"*

**Objective:** To navigate, learn and utilize the tools offered within the software JMARS.

**Introduction**: In order to complete this lab the students need to register and download JMARS:

1. Go to webpage: http://jmars.asu.edu/
2. Click: Create New Account
3. Enter desired account information
4. Click: Request New Account (page should prompt them to check their email for password and further instructions)
5. Check email and click on link (or enter the link into their browser)
6. Click login and change password. The account should last 6 months.
7. Click on "Download JMARS" tab
8. Under section "JMARS Public Downloads" click "Cross-platform Java Webstart Installer"
9. Open installer: When JMARS opens the students will need to enter username and password.

For information about the software and great tutorial videos, go to https://jmars.mars.asu.edu/videotutorials. Make sure to watch Tutorial 1 to gain a brief introduction to the layout and use of the JMARS software. Alternatively, go to the JMARS homepage and explore the options under the "Tour of the JMARS user interface" and "Tour of the JMARS Layers" panels. Have fun exploring Mars and other planetary bodies.

*Intro to JMARS*
Have students open JMARS using their email/password. JMARS functions very much like the layers in Photoshop or GIS in order to view different image sets.

1. In the Layer Window, choose and press the button "Add New Layer" in the Main tab (other tabs at this point are: MOLA Shaded Relief NE, Lat/Lon Grid).
    a. Add the layer Nomenclature. With this layer open, the students can navigate to any feature on Mars by name.
    b. Activate/Open the Nomenclature tab. Keep all default boxes checked. Select Vallis in the *Selected Landmarks Types* menu.
    c. In the *Navigation* Menu select Vallis for *Landmark Type* and Mawrth Vallis for *Landmark*.
    d. Then press the *Go-To* button below. The software will automatically find and zoom to this location and label it.

e. What are the coordinates of Mawrth Vallis (place cursor/arrow over the red marker; the default color for the marker)?
f. Observe the terrain; have students explain why they think this area was considered as a landing site for MSL Curiosity (they may play around with the Zoom in the upper right of the viewing window, default is always 32).

2. Exploring Mawrth Vallis' relationship to other major Mars geologic/geographic features.

   Add a new layer: Choose by Instrument → MOLA → MOLA Shaded relief/Colorized Elevation → View Graphic data. **note, if students are having trouble seeing the labels, move the Nomenclature label to the top of the layer window.

   a. How does the colorized data help the students?

   b. Where is Mawrth Vallis in relationship to Vallis Marineris (they may need to using the Nomenclature tab to find Vallis Marineris)?

      Do they think these features are the same? Why or why not?

   c. Where is Mawrth Vallis in relationship to the large expanse of "blue space" in the Martian Northern Hemisphere?

      How could the students potentially interpret the 'blue space?' What about Mawrth Vallis?

3. Exploring the mineralogy of Mawrth Vallis.

   There are several methods to explore the mineralogy of the Martian surface in JMARS. We will only explore one. *Note: Make sure you can see the Mawrth Vallis label. If not, drag the Nomenclature layer to the top of the Layer Window.

   Using TES Mineral Maps: Add New Layer → Maps by Instrument → TES Mineral Map → Now select the following maps separately and explain their: spatial coverage, resolution and abundance of that mineral.

   a. TES Hematite

   b. TES Basalt Abundance

   c. TES Carbonate Abundance (Bandfield 2002)