ACTIVITY: Mars Mapping Inquiry

Logistics:

Number of students: 10-30
Activity duration: 60-90 minutes
Location: Classroom with access to computers

Goal:

Students will:
- Compare the surface properties of Mars and Earth
- Identify how different surface features form on Mars
- Use mapping software to identify surface features on Mars where there is evidence of water

Grade 9 Academic Science Expectations
- D2.4 gather and record data, using an inquiry or research process, on the properties of specific celestial objects within the solar system
- D2.5 compare and contrast properties of celestial objects visible in the night sky, drawing on information gathered through research and using an appropriate format

Grade 9 Applied Science Expectations
- D2.3 use a research process to compile and analyse information on the characteristics of various objects in the universe
- D3.2 compare the characteristics and properties of celestial objects that constitute the solar system

Material:

3D glasses (1/person)
Computers (1/person)
Worksheet (1/person)
Printer (optional)

Preparation:

Make sure the computers have Google Earth installed.

Activity:

1. Present the PowerPoint presentation to the students (students will need 3D glasses for this presentation).

2. Ask students to open up Google Earth on their computers. To open Google Mars, click on View > Explore > Mars.
3. Under the Layers tab on the bottom left-hand corner, click the arrow beside Google Maps. This option shows the different ways to view the Mars surface. Of particular interest:
   a. The "Visible Imagery" shows a true-colour image of Mars.
   b. The "Colorized Terrain" shows a map that is coloured based on surface elevation.
   c. The "Daytime/Nighttime Infrared" is coloured based on the surface temperature during the day and night respectively. Bright regions are those that are warmer, and dark regions are those that are colder. Black strips indicate no data is available for that region.
4. Students should find three sites where they think there is good evidence of water (e.g., channels or deltas) and record the latitude (north-south position) and longitude (east-west position) indicated on the bottom banner.
5. Students will pick one of the three sites they selected to investigate further.
   a. Optional: Under part F of the worksheet, students can draw this site and include a legend, scale bar, and indicate which direction is north.
   b. Under the Layers tab, click on "Spacecraft Imagery". This option represents images taken by different cameras.
   c. Students will select "CTX Image Browser".
   d. Students will pick a CTX image at their location (or near their location if there is not one there) by clicking the orange box.
   e. Students will fill out the CTX Image ID, the date the image was taken, the location name (if there is one) and geographic coordinates.
   f. Students can save or print the image by clicking on "ASU data page" and selecting one of the image formats at the bottom of the ASU data page.
   g. Students will repeat steps c-f using a HiRISE image.
   h. Once students have saved/printed their image, they should indicate the image ID, provide a scale bar, and indicate which direction is north on the image.
6. Optional: Students can present their results to the class (a rubric is available on page 3).
7. Optional: Part G of the worksheet includes space for students to research a mission on Mars.

Room Layout:

No particular room layout is required for this activity. For the Google Mars activity, the presenter can choose to have students work individually or in groups and position the desks and chairs accordingly.

Presentation Rubric:

Mars Mapping and Rover Site Selection

Name(s):				

| Criteria | Level | | | |
	Always 4	Usually 3	Sometimes 2	Rarely 1
Knowledge				
Makes accurate observations and inferences about the proposed site.				
Inquiry				
Inferences are used to support the proposed landing site.				
Appropriate reasoning is provided for choosing the site. The site appears to be a logical choice based on reasons.				
Communication				
Sketches (or images) include appropriate labels.				
All information is presented in an organized and understandable way using appropriate terminology.				
Application				
Recognizes features that would indicate flow of a fluid (e.g., water).				

Comments: