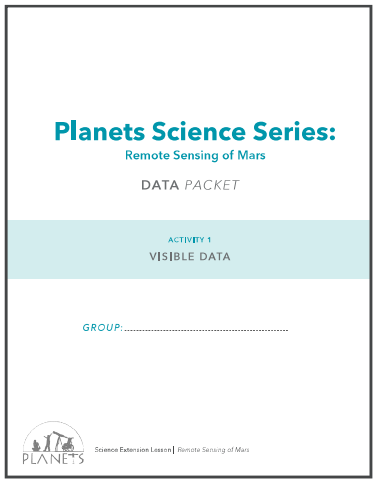
Activity 4: Choosing a Landing Site and Share Out (55 min)

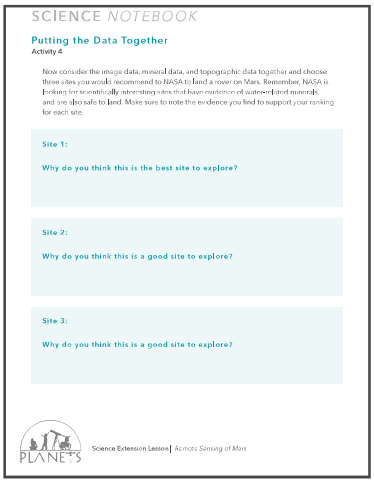
Overview

How can we choose a landing site that will meet our criteria? How can we share what we found out? In this activity, youth consider all the data they have collected during the previous activities to decide which location will be the most scientifically interesting, choose their landing site, and then present their findings to the class.

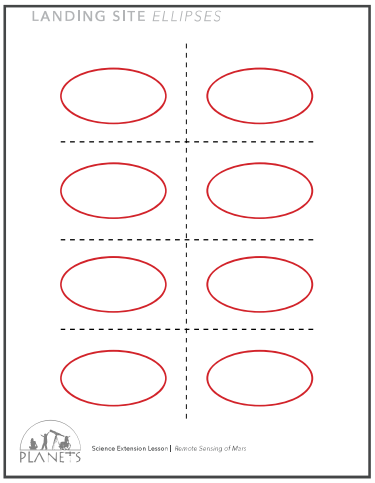
In this activity:



All Data Packets
1 per group



Science Notebook
1 per youth



1-2 ellipses per group

Introduction (5 min)

1. Let youth know that today they will need to consider all the data they have collected over the previous activities and choose the most scientifically interesting location for their landing site.

2. Let youth know that as they review their data, they should keep in mind that they will need to share their results with the class, so they should think about the evidence they use to make their decision and how they will explain their reasoning.

Prepare for the Presentation (15 min)

1. Ask groups to review their data by looking in their Science Notebooks at the three tables with sites ranked based on (1) Landforms visible in images, (2) Safety based on topography and images, and (3) minerals detected.

2. Have youth use pp. 10-11 in their Science Notebooks and the Landing Site Ellipses Sheet to help them prepare a presentation about the landing site they select. Let them know they will share their presentation with the class and invited guests, if it is possible to do so at your site.

3. As groups are working, help guide their thinking by asking:
   - » What evidence did you look at to help you choose your landing site?
   - » Which site do you think will be the most scientifically interesting? Why?
   - » What surprised you about working with the data?
   - » What is one thing you will remember about the exploration of Mars?

Tip: The presentation is a chance for youth to explain their thinking and reflect on what they learned about remote sensing throughout the unit. Youth can present and share in a variety of ways, including:

» Invite youth to rank the landing sites based on all the available information.

» Ask youth to write a compelling argument to NASA about which scientifically interesting site should be selected.

Share Out and Discussion (30 min)

1. Ask groups to share which site they determined to be the most scientifically interesting. As each group shares, ask them to refer to their Data Packets and provide examples of evidence that led to their recommendation and to explain their thinking. After each group presents, ask questions like:

   » What surprised you about working with the data?

   » What is one thing you will remember about Mars?

2. After all groups have shared, ask: Is there consensus on where to send a spacecraft that would be scientifically interesting and safe to land?

3. Discuss how landing at sites selected using remote sensing data allows scientists to learn as much as possible about Mars to help answer their questions. Sometimes, there are multiple sites that could be considered scientifically interesting, so the evidence scientists use to explain their reasoning is really important.

4. Congratulate youth on their excellent scientific work. Let them know that they have just followed a process very similar to what NASA scientists and engineers do when choosing landing sites!

Wrap Up (5 min)

1. Conclude the session by letting youth know what really happened when scientists and engineers had to choose a landing site for the Perseverance rover:

   » Gale Crater was the site chosen as the landing site for the NASA Curiosity rover, which landed there in 2012 and has been exploring ever since.

   - Exciting NASA video about the challenges of landing Curiosity at Gale crater: "Seven Minutes of Terror" - https://www.jpl.nasa.gov/video/details.php?id=1090
   - To learn more about the Curiosity rover and see pictures from inside Gale crater, visit: https://mars.nasa.gov/msl/

» Jezero crater was chosen in 2018 for the Perseverance rover.

- Jezero was chosen because deltas form in lakes and they are very good at concentrating and preserving evidence for past life.
- Perseverance will collect rock and soil samples from Jezero that may be retrieved by a later mission and returned to Earth for scientists to study in the laboratory.
- To learn more about the Perseverance rover, and see pictures from Jezero crater after the rover lands in February of 2021, visit: mars.nasa.gov/mars2020/

» Iani Chaos and Nili Fossae were both considered as landing sites but were ruled out. Iani Chaos was too rough, and although both sites have water-related minerals, they lacked water-related landforms.

Possible Landing Sites on Mars

» Gale Crater - Gale is an impact crater 96 miles (154 km) across. The middle of the crater contains an unusual mountain that is 3.4 miles (5.5 km) tall. The area being considered as a landing site is in the north western part of the crater and includes the crater floor and the foothills of the central mountain. Near the base of the mountain there are black sand dunes.

» Iani Chaos (ee-Ah-nee Kay-oss) – Iani is one of several "chaos" terrains on Mars, which are thought to form when a huge amount of underground water is released, causing giant floods and collapse of the area where the water was stored. The collapsed areas are called "chaos" terrains because they look jumbled and broken: chaotic. The possible landing site is in one small part of the Iani chaos.

» Jezero Crater (Jez-er-oh) – Jezero is a 30 mile (39 km) diameter crater, and the western part of the crater is being considered as a landing site. The western crater rim is eroded and a fan-shaped deposit extends out onto the crater floor. The floor itself has many small impact craters on it.

» Nili Fossae (Nee-lee Foss-eye) Trough – Nili Fossae is located in a large, long valley, called a "graben" or trough. The proposed landing site would be on the floor of this valley, near an area where the northwestern wall has been eroded.