

# Our Ideas About Mars

Which mission should we send to Mars? What instruments does a spacecraft need for it?

What is Mars made of?

What mountains and other features does Mars have?

How big is Mars?

Is there water on Mars?

Where could we land a rover on Mars?

**Resolution**—the amount of detail in an image

**Physical Properties**—the shape and texture of a surface

**Composition**—what a surface is made of

**Criteria**—things a successful design needs to do

**Constraints**—limits on a design

**Scientist**—Scientists ask questions, test things out, make observations and measurements, and gather evidence to answer the questions.

**Engineer**—Engineers design things to solve problems.

**Technology**—Any object, system, or process designed by people to solve a problem

What is the best landing site for a Mars rover to search for past liquid water?

What evidence of life is there?  
Where is there water?  
What are the most interesting areas?

**Habitable**—able to support some form of life

What are landforms and how are they formed?

**Landforms**—the shapes on the surface of a planet

- Mountains
- River valleys—formed by water
- Hills
- Volcanoes
- Mesas
- Plateaus
- Lakes
- Ponds
- Alluvial fans—formed by water
- Deltas—formed by water
- Sand Dunes—formed by wind
- Lava Flows—formed by volcanoes

How can landforms help us choose a landing site on Mars?

#### Gale Crater

- River Valley—formed by water
- Alluvial Fan—formed by water
- Layered Rocks—maybe water
- Sand Dunes
- Craters

#### Jezero Crater

- Delta—formed by water
- River Valley—formed by water
- Lava Flow
- Canyon Rim
- Craters

Where is the safest place to land a rover?  
Can rovers go anywhere or are they limited?  
How big are the landforms?  
How much space does the rover need?

How can maps help us understand a planet's landscape?

How can topographic maps help us choose a safe and interesting landing site on Mars?

**Topography**—the shape of land in an area

**Topographic Map**—a representation of the shape of land in an area

**LiDAR**—Light Detection and Ranging

**Safe Landing Site:** flat area

**Interesting Landing Site:** landforms formed by water

Gale Crater	Jezero Crater
<ul style="list-style-type: none"><li>• Hills—Some slope</li><li>• Crater Floor—Flat</li><li>• Mountain—Steep</li></ul>	<ul style="list-style-type: none"><li>• Crater Floor—Flat</li><li>• Crater Rim—Steep</li></ul>

Which minerals are evidence of liquid water?  
What is the land made of?

How can measuring reflected light  
help us identify different minerals?

How can identifying minerals help us  
choose a landing site on Mars?

## Minerals

- In our diet
- Can be precious
- Crystals: salt, quartz, diamond

**Spectrum**—a range of colors

**Spectrometer**—a technology that  
measures a range of colors

### Gale Crater

- **Olivine**
- **Nontronite**—forms in water
- **Kieserite**—forms in water
- **Gypsum**—forms in water

### Jezero Crater

- **Olivine**
- **Pyroxene**
- **Kaolinite**—forms in water

Which landing site on Mars do we recommend, and  
why?