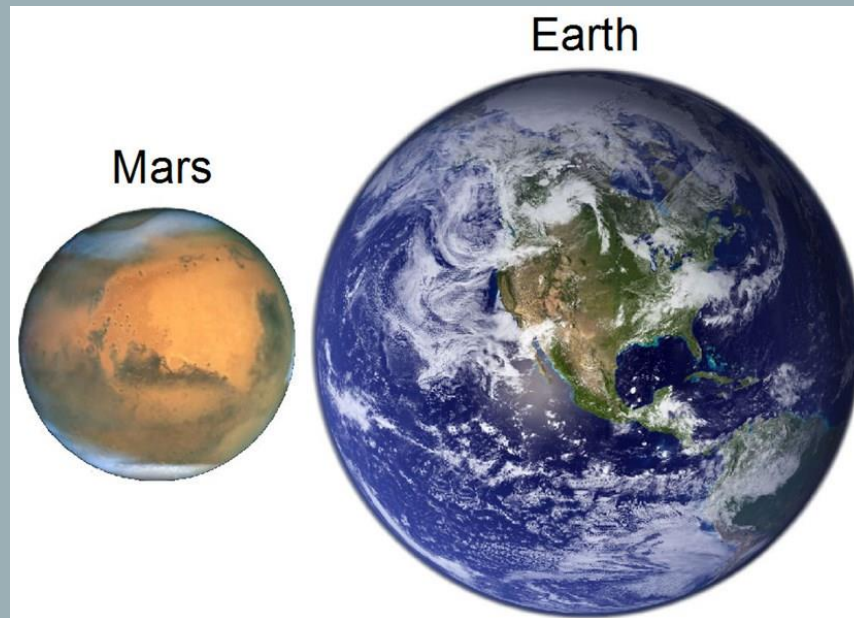


GEOLOGY ON MARS

Unit 1 - Chapter 1-2

Comparing Rocky
Planets

1.2: Observing the Surfaces of Mars and Earth



Warm-Up – 1.2.1

Log on to Amplify – Geology on Mars – Chapter 1.2

- In a moment, you will watch a video made by other students about the Earth system. *A system is a set of interacting parts forming a complex whole.*
- What systems can you think of? List one or two examples of things that you think might be systems.

LATE WORK TICKETS

AMPLIFY CLASSWORK UPDATE

NAME _____

PERIOD _____

TODAY'S DATE _____

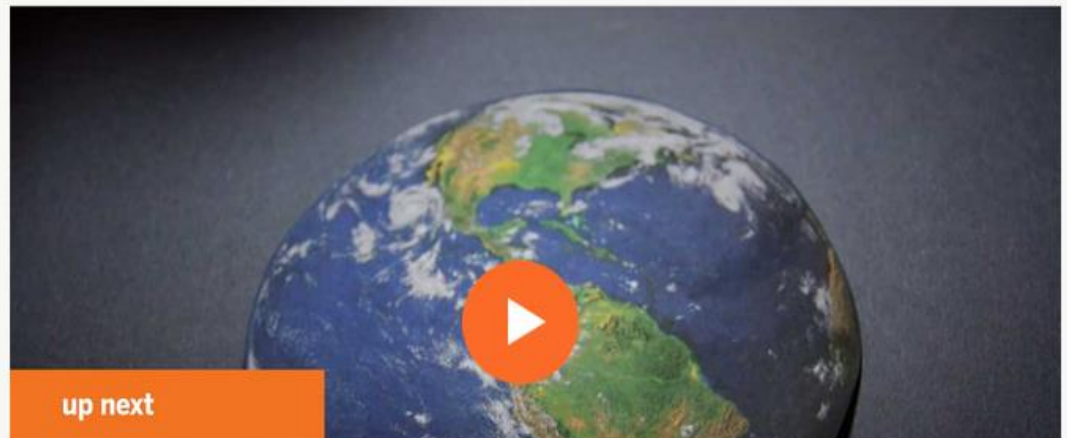
UNIT _____ LESSON _____

ACTIVITY(IES) _____

UPDATED SCORE _____

VIDEO – EARTH AS A SYSTEM

- We will watch a video that explains the answer to the question *How is Earth a system?*
- *As you watch, think about ideas and questions you might have about the Earth system.*
- *Be ready to share with your table and the class.*



"The Earth System"

Unit Question

How can we search for evidence that other planets were once habitable?

The similarities between the Earth and Mars systems have prompted scientists to look for evidence of past habitability on Mars.

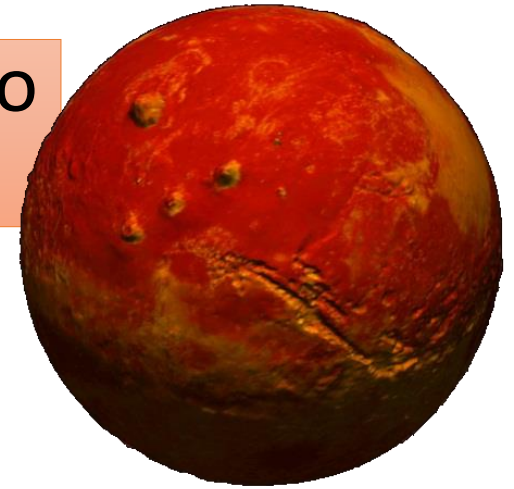
MARS – Was it ever habitable?

Looking for evidence of past liquid water.

- Mars is currently a dry planet with no large bodies of water, such as lakes or oceans.
- Scientists have found water ice at Mars's poles.
- Mars could have looked different in the past.
- The search for signs of past liquid water is important for understanding whether Mars was ever habitable.
- On Earth, flowing water shapes the land in particular ways.
- Planetary geologists are looking at satellite images of Mars for similar features.
- This can be used as evidence that liquid water once flowed on Mars.

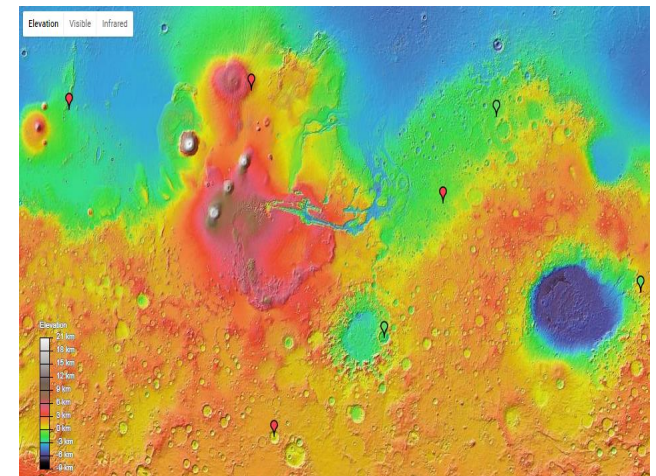


You will be examining images of Mars to look for evidence of past liquid water.



Google Mars:

- Over the past 50 years, scientists have used different instruments and cameras that they've placed on satellites, landers, and rovers to collect information about the surface of Mars.
- An interactive map called Google Mars will allow us to directly examine the information that has been collected about Mars's surface.





Regions
Spacecraft
Stories

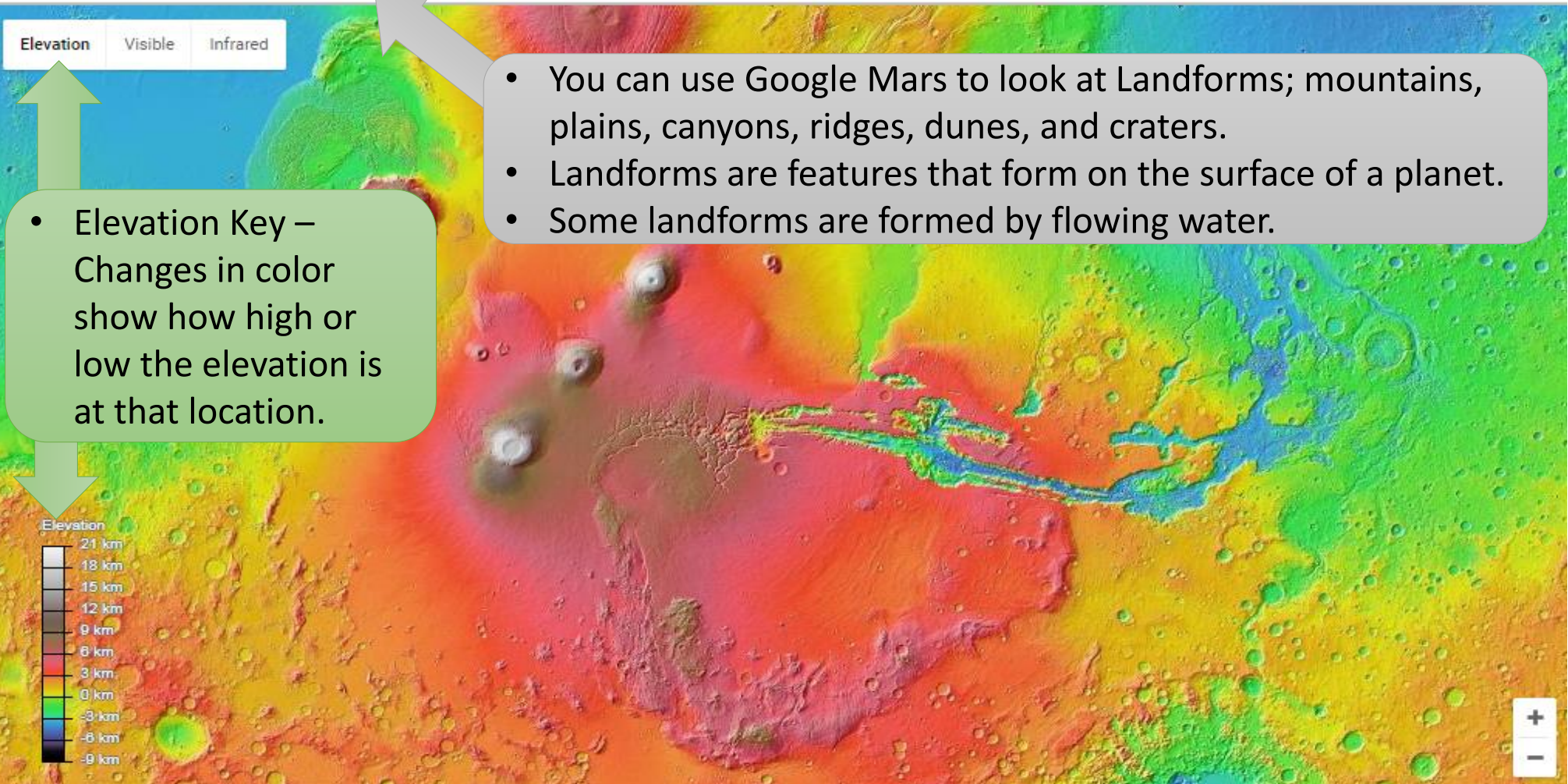
Mountains
Canyons
Dunes

Plains
Ridges
Craters

Link
this
view

View Mars with
Google Earth

About

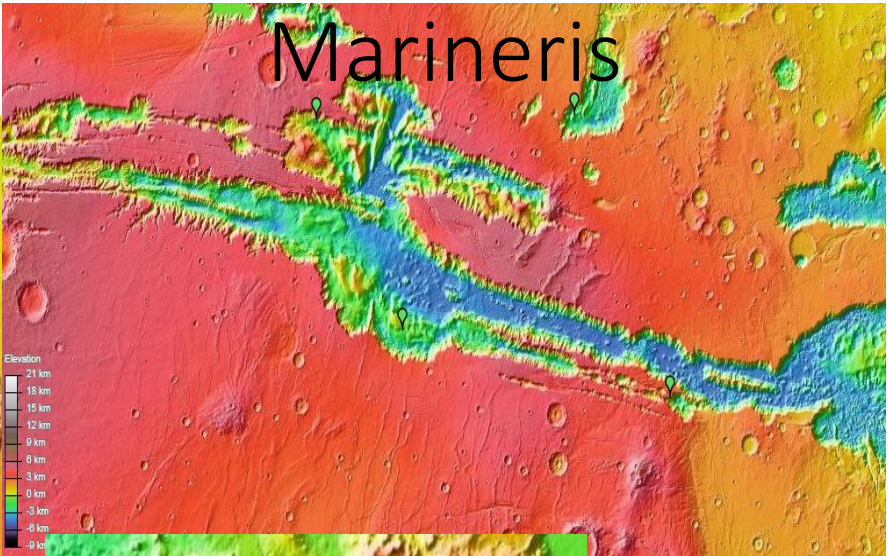


• Elevation Key – Changes in color show how high or low the elevation is at that location.

- You can use Google Mars to look at Landforms; mountains, plains, canyons, ridges, dunes, and craters.
- Landforms are features that form on the surface of a planet.
- Some landforms are formed by flowing water.

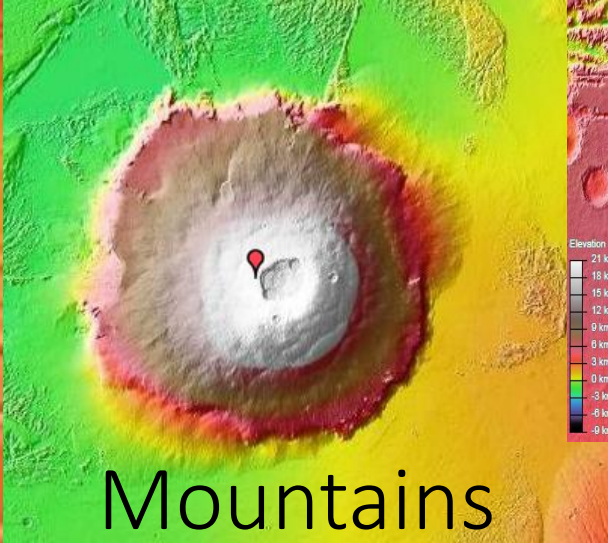
Canyons - Valles

Marineris



Mountains

Olympus Mons



Craters

Happy Face Crater



The Search for Landforms on MARS.

- Currently Mars has no bodies of liquid water, but that does not mean that water did not exist in the past.
- Even when scientists find a landform on Mars that looks like it *could* have been formed by flowing water, it is difficult to be certain.



- On Mars, there are many volcanoes that have erupted in the past.
- Flowing lava can change the shape of the land in ways that are similar to flowing water.

Exploring Google Mars

1. With your partner, use Google Mars to explore landforms that could have been formed by flowing water or flowing lava.
2. Share what you find with your partner, using the following sentence starters.
 - I think this landform was formed by . . .
 - I think this because . . .

VOCABULARY

Landform: a feature that forms on the surface of a planet, such as a mountain, channel, or sand dune

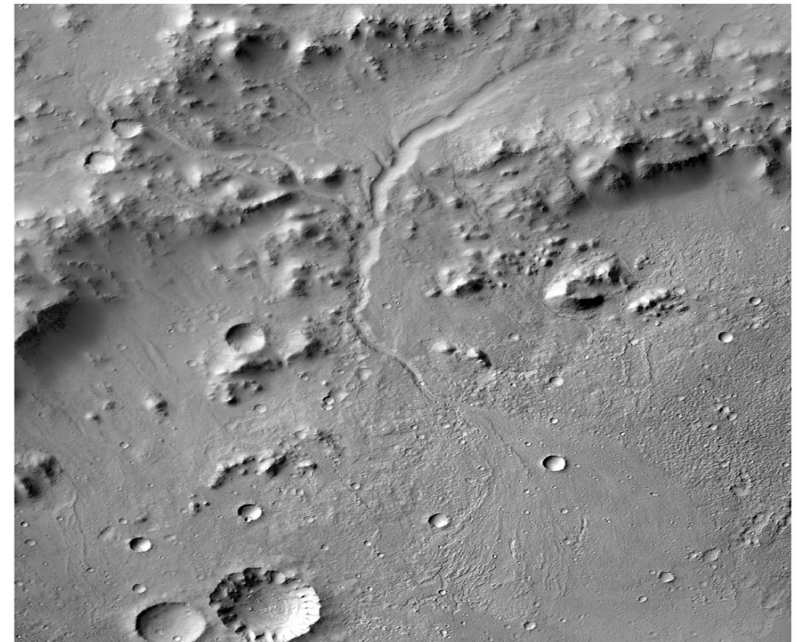
- What are some examples of landforms you found during your exploration of Google Mars.
- A specific landform that you will be paying special attention to in this unit is a channel.

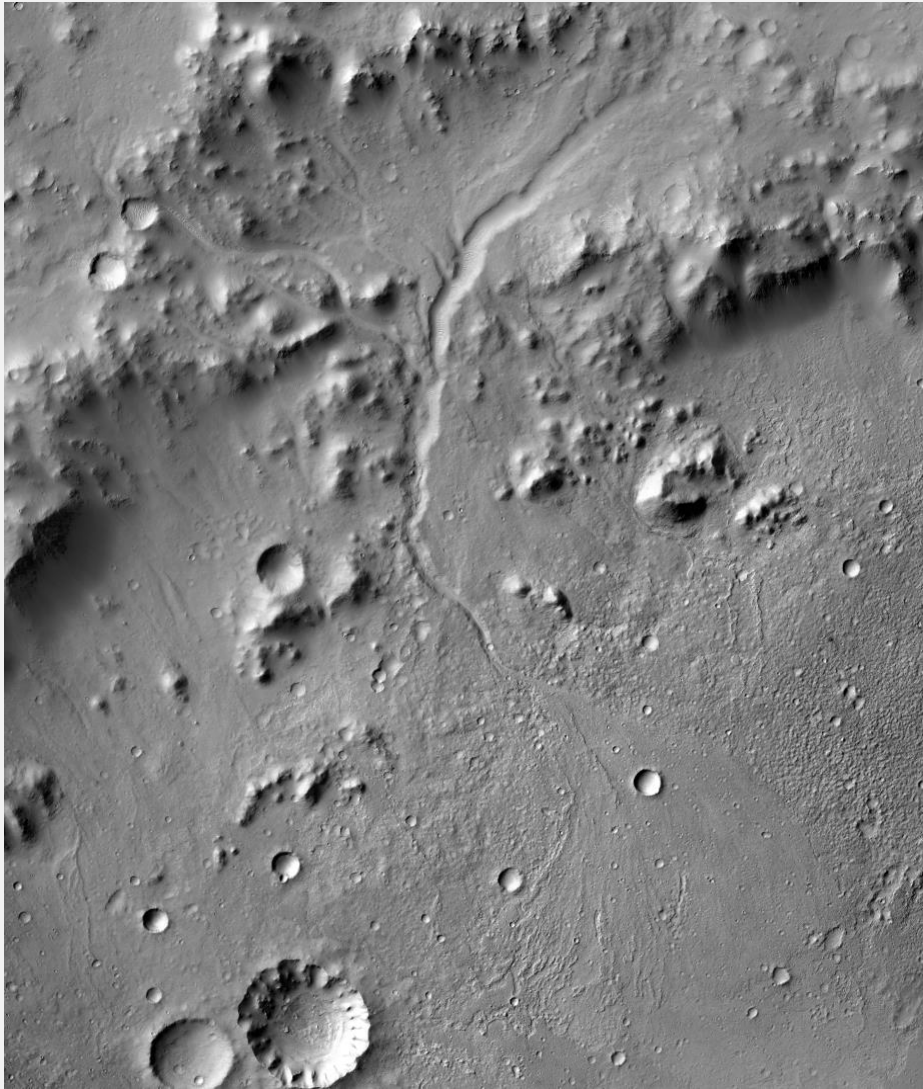
VOCABULARY

Channel: a long, narrow groove that forms where water, lava, or other liquid flows.

- Some of you may have seen channels when exploring Google Mars.

Channel on Mars





CHANNEL ON MARS

- This is a channel that geologists found on the surface of Mars.
- The Universal Space Agency is very interested in this channel and finding out what formed it.
- This channel could provide evidence that Mars once had flowing water—a key condition for life to exist.
- As student planetary geologists, you will help the Agency figure out what formed this channel.

Chapter 1 Question:

What geologic process could have formed the channel on Mars?

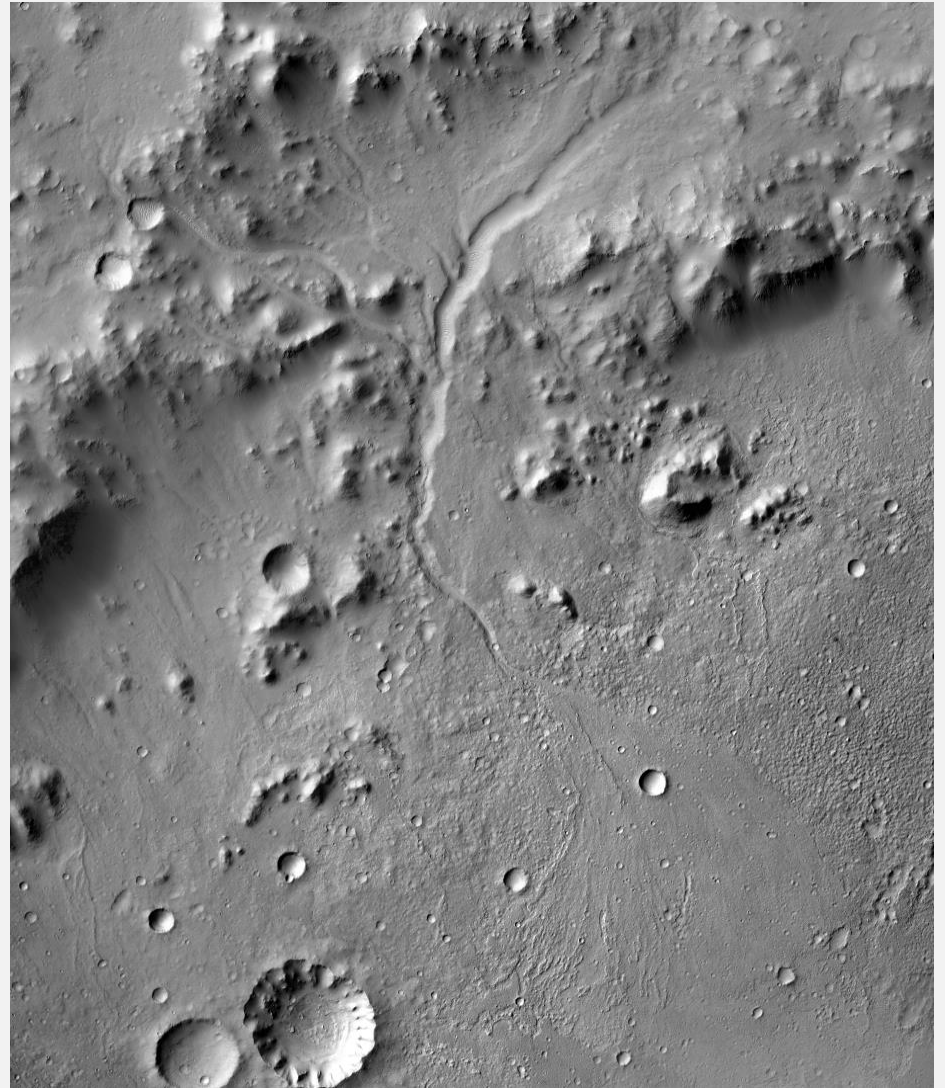
PAIR - SHARE

What are your initial observations about this channel?

This landform was likely formed by either flowing water or flowing lava.

In order to determine which, we need to learn more about what happens when water and lava flow on Earth.

You will use what we have learned to help determine what formed the channel on Mars.



VOCABULARY

Geologic Process: an event or series of events that causes changes in the geosphere, such as flowing water or flowing lava

- When you explored Google Mars, you were looking for landforms that could have been formed by flowing water or flowing lava. Flowing water and flowing lava are examples of geologic processes.

Geologic Processes on Earth

- Scientists use their understanding of Earth to help them determine how geologic processes, such as flowing water or flowing lava, form landforms on other rocky planets.
- Now we will take a closer look at the types of landforms formed by flowing lava and flowing water on Earth.

Flowing Water



Flowing Lava



Geologic Processes on Earth: Landform Formed by Flowing Water



Okavango River, Botswana, Africa

The hydrosphere covers over 70% of Earth's surface and can change the shape of Earth's geosphere in many ways. Flowing water can form many different types of landforms, including river channels.

Geologic Processes on Earth: Landform Formed by Flowing Lava



Lava flow, Hawaii, United States

Flowing lava from a volcanic eruption can change the shape of the geosphere by forming many different landforms. This landform was formed by flowing lava and is called a lava channel.

Aerial Images of Earth taken by airplanes

- Scientists use aerial images to study how geologic processes change Earth's surface over time.
- You will use these images to see how flowing water and flowing lava change the shape of Earth's geosphere.



Observations of Landforms on Earth

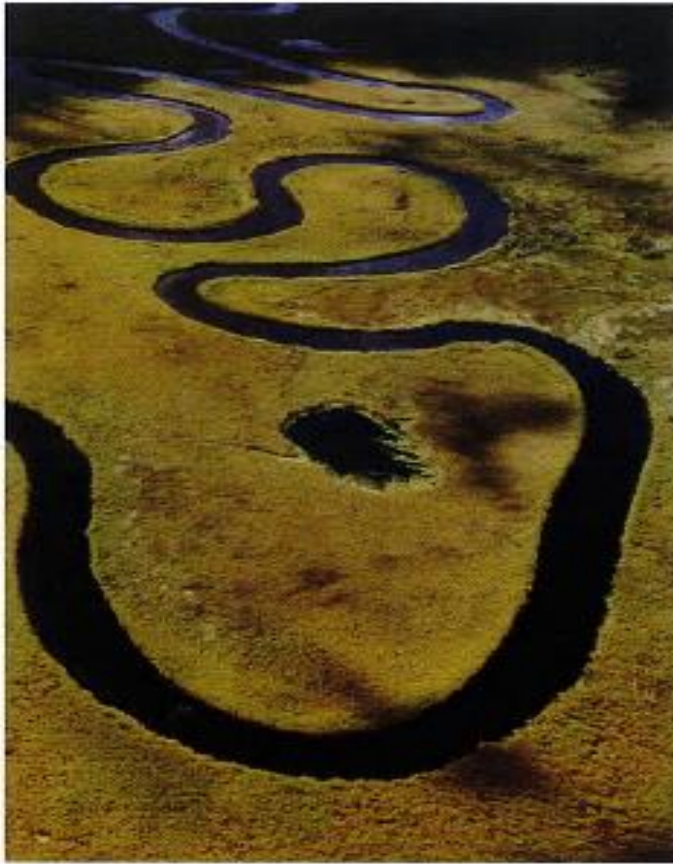
1. With your partner, closely examine each of the landforms on the Geologic Processes Cards.
2. In the middle column of the table below, describe the shape of the landforms formed by each geologic process.
3. In the last column, record any other interesting observations or questions you have about the landforms.

Word Bank

straight	wide	branching	triangular
curved	narrow	merging	square
gnarled	spread out	loopy	circular

Geologic Process	Describe the shape of the landforms formed by this geologic process.	Record other observations or questions about the landforms formed by this geologic process.
Flowing water	Write here...	Write here...
Flowing lava	Write here...	Write here...

Geologic Process: Flowing Water



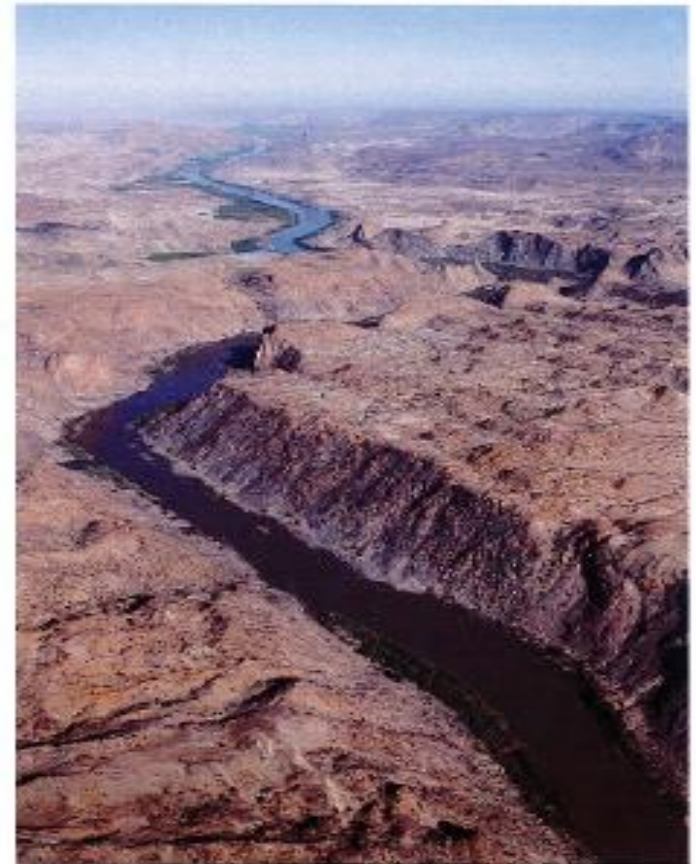
Okavango River, Botswana, Africa



Elevation (ft)
250 500 750 1,000
Madre de Dios River, Amazon



River in the Altai Mountains, Russia

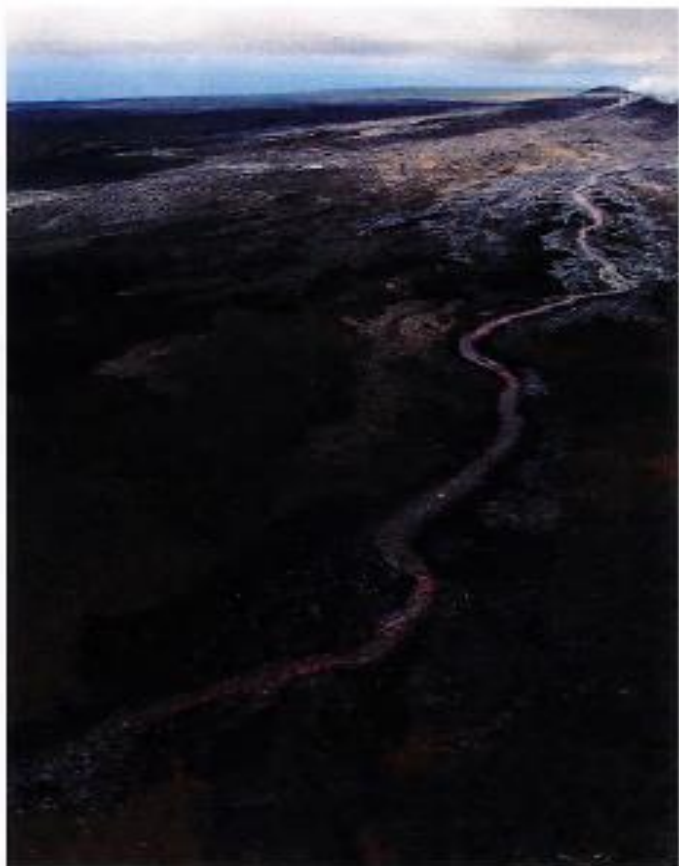


Orange River, South Africa

Geology on Mars—Geologic Processes Cards—Lesson 1.2—AMP615582.09-GOM
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Geologic Process: Flowing Lava



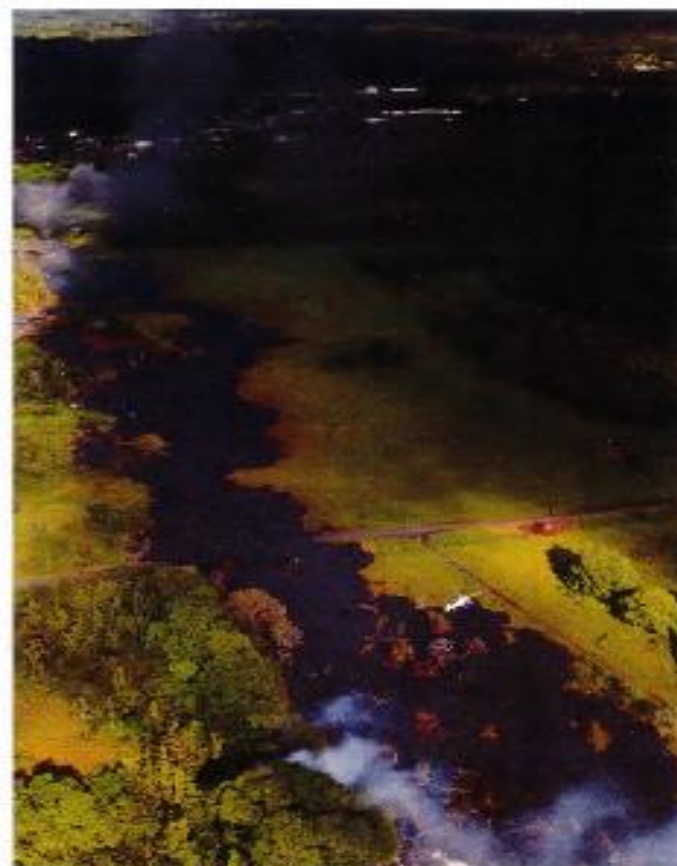
Hawaii, United States



Iwate Prefecture, Japan



Colima, Mexico



Hawaii, United States

Geology on Mars—Geologic Processes Cards—Lesson 1.2—AMP615582.09-GOM
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EXAMPLE



- In this image, I notice that the landform formed by the flowing water in the river is narrow and curved.
- This should be recorded in the middle column of the table.
- Anything else you notice about the shape of this landform?
- Share your ideas with a partner.

Geologic Processes on Earth: Landform Formed by Flowing Water

- Notice that there are smaller landforms that branch off from the main channel.
- Record this in the last column.
- Remember...these images are aerial images and show large sections of Earth's surface.



1.2.4 – Observing the Surface of Earth

- **You will work in pairs**
- **Each pair has one set of Geologic Processes Cards**
- Discuss your observations about the images on the cards.
- Record your observations on 1.2.4 in the table of observations.

Be ready to share what you noticed and recorded about the images of the landforms with the class.

Let's discuss similarities and differences

- Some geologic processes form landforms that look similar. How are the shapes of the landforms in the images of flowing **water** similar?
- How are the shapes of the landforms in the images of flowing **water** different?



Okavango River, Botswana, Africa

Let's discuss similarities and differences

- Some geologic processes form landforms that look similar. How are the shapes of the landforms in the images of flowing *lava* similar?
- How are the shapes of the landforms in the images of flowing *lava* different?



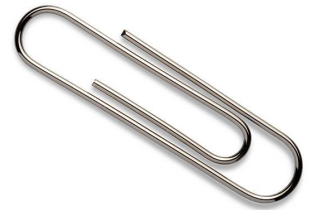
Lava flow, Hawaii, United States



Key Concept

When landforms on different rocky planets look similar, it is evidence that they may have been formed by the same geologic process.

We can investigate processes on Earth to understand processes on other rocky planets.



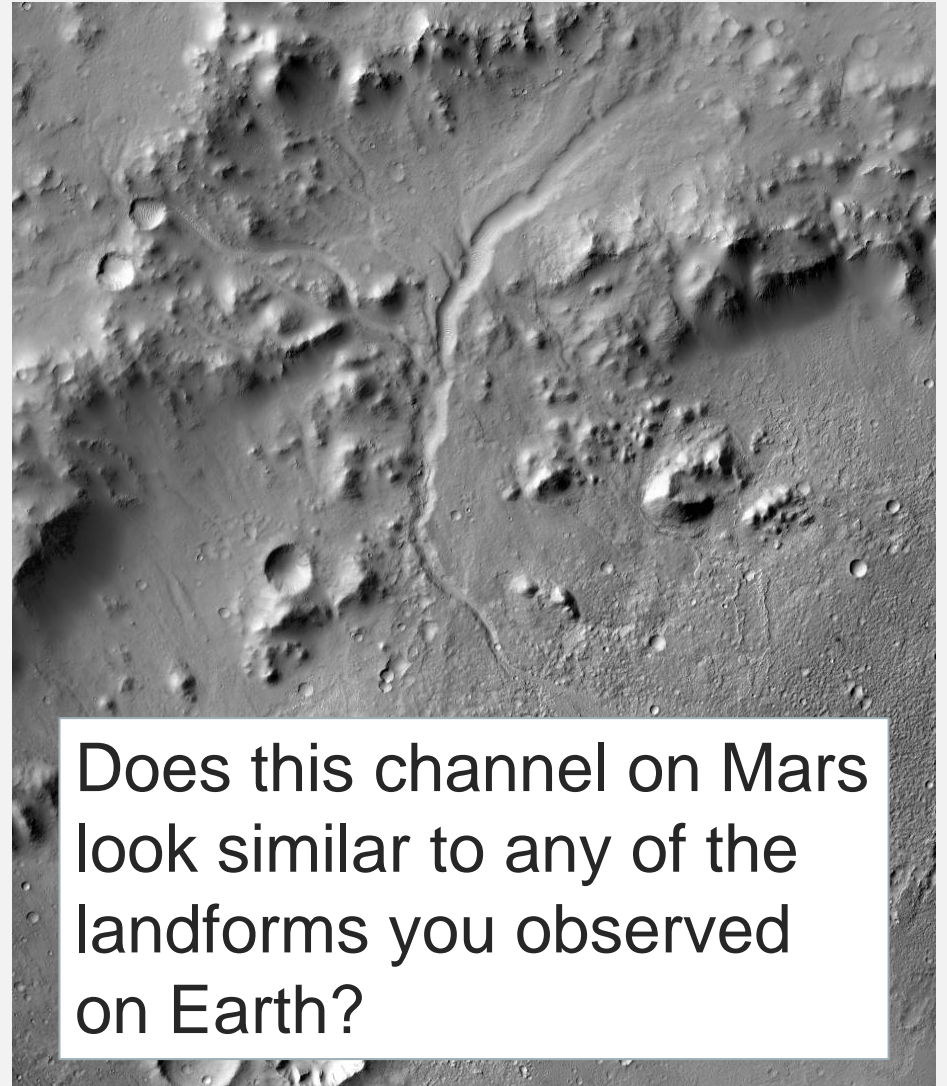
Clip your cards back together.

CHANNEL ON MARS

We now have new information to help answer the unit question.

What geologic process could have formed the channel on Mars?

Think about flowing water and flowing lava that formed the landforms you just observed.



Does this channel on Mars look similar to any of the landforms you observed on Earth?

CHANNEL ON MARS



Based on the similarities between the channel on Mars and landforms on Earth, either geologic process could have caused the channel on Mars to form.

We will need more evidence about these possible causes.

We will use information gathered by NASA to learn more about the channel on Mars and determine which geologic process may have formed it.



VOCABULARY

I.1 Vocabulary

- *habitable,*
- *rocky planet*
- *system*

I.2 Vocabulary

- *channel,*
- *geologic process*
- *landform*