3.4: Writing an Argument About the Channel on Mars
3.4: WRITING AN ARGUMENT ABOUT THE CHANNEL ON MARS

Warm-Up

- Read both arguments about the puddle. Pay attention to what makes one argument more convincing than the other.
- Then, answer the questions below the two arguments.

**Argument 1**
The water in the puddle that Claire observed evaporated. The highest temperature ever recorded at the location was 32°C (90°F), which could have been enough to cause water to evaporate. The presence of no such report of liquid water at the location for the two years since the puddle formed makes the argument even more convincing.

**Argument 2**
The water in the puddle that Claire observed evaporated. Since the highest temperature was 32°C (90°F), we know that it was a warm day. When water gets hot, it can change from liquid to gas. This is called evaporation. I think it is more likely that the water became so warm that it became water vapor (gas), and that the puddle evaporated in the first term of the year. It is possible for the water to form again in the second term of the year, as the temperature could have dropped.

1. Which argument is more convincing?
   - Argument 1
   - Argument 2

2. Why is the argument you selected more convincing?

Discuss why the argument you chose is more convincing.
Chapter 3 Question: How can we decide which geologic process formed the channel on Mars?

Reasoning Tool

Question: What geologic process could have formed the channel on Mars?
Claim: Flowing water formed the channel on Mars.

<table>
<thead>
<tr>
<th>Evidence</th>
<th>This matters because... (How does this evidence support the claim?)</th>
<th>Therefore, ... (claim)</th>
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Remember that the Reasoning Tool helps you pull apart each idea that you want to include in your argument, and make sure that you connect your evidence to your claim. This tool will help you prepare to write your argument today.

Your job is to use evidence to support your claims when you write, in order to convince your audience. You should think about the people who will be reading your arguments as you write. You are writing these arguments for the planetary geologists at the Universal Space Agency in order to explain your understanding of the evidence about the channel on Mars.
3.4.2 WRITING AN ARGUMENT ABOUT THE CHANNEL ON MARS

**Scientific Argument**

- **Question**: What geologic process could have formed the channel on Mars?
- **Claim**: A proposed answer to a question about the natural world.
- **Evidence**: Information about the natural world that is used to support or go against (refute) a claim.

The argument includes evidence.

The claim directly addresses the question being asked.

The evidence is connected to the claim through the process of reasoning.
A scientific argument . . .

- begins with a question.
- has a claim that proposes an answer to the question.
- has evidence that supports the claim.
- clearly explains how the evidence supports the claim (reasoning).
# Using the Reasoning Tool to Write a Scientific Argument

**Question:** What geologic process could have formed the channel on Mars?

**Claim:** Flowing water formed the channel on Mars.

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**State claim.**

Flowing water formed the channel on Mars.
# Using the Reasoning Tool to Write a Scientific Argument

**Question:** What geologic process could have formed the channel on Mars?

**Claim:** Flowing water formed the channel on Mars.

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**Describe evidence.**

My evidence is that the channel on Mars has a curved, branching shape just like channels formed by flowing water on Earth.
Using the Reasoning Tool to Write a Scientific Argument

Question: What geologic process could have formed the channel on Mars?
Claim: Flowing water formed the channel on Mars.

| Evidence | This matters because . . .
          | (How does this evidence support the claim?) |
|----------|------------------------------------------|
| Evidence Card A: Geologic Process: Flowing Water. In satellite and aerial images, channels formed by water on Earth have a curved, branching shape similar to the shape of the channel on Mars. | When landforms on different rocky planets look similar, it is evidence that they may have been formed by the same geologic process. |

| Evidence Card C: Flowing Water Model. In the Flowing Water Model, a channel remained in the sand after the water stopped flowing. | Flowing water formed the channel on Mars. |
| Evidence Card F: Image of Rock Near the Triangle-Shaped Landform. The same type of rock (made of pebbles and other cemented sediment) is found near the base of the channel on Mars and near channels on Earth that are formed by flowing water. |

This is important because when two landforms have a similar shape, they were likely formed by the same geologic process. This supports the idea that the channel on Mars was also formed by flowing water.
In order to be convincing in my argument, I know that next I need to be really clear when I explain why it matters that the shape of the channel on Mars is curved and branching.

As you are writing your argument, you may want to use one or more of these sentence starters to help you explain your thinking. Remember that in order to convince your audience, you are providing specific evidence and explaining why that evidence is supportive of your claim.

**Scientific Argument Sentence Starters**

- Describing evidence:
  - The evidence that supports my claim is . . .
  - My first piece of evidence is . . .
  - Another piece of evidence is . . .
  - Geologists found . . .

- Explaining how the evidence supports the claim:
  - If these are similar, then . . .
  - This is important because . . .
  - So, . . .
  - Since . . .
  - Based on the evidence, I conclude that . . .
  - This claim is stronger because . . .
What geologic process could have formed the channel on Mars?

• Use your Reasoning Tool from Lesson 3.3 to help you write an argument to answer this question.

• Refer to Components of a Written Scientific Argument in your Digital Resources and the Word Bank below, as needed.

• Be convincing; show the audience how your claim is clearly supported by the evidence.

What geologic process could have formed the channel on Mars?

• Use your Reasoning Tool from Lesson 3.3 to help you write an argument to answer this question.

• Refer to Components of a Written Scientific Argument in your Digital Resources and the Word Bank below, as needed.

• Be convincing; show the audience how your claim is clearly supported by the evidence.

Word Bank

<table>
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<th>landform</th>
<th>rocky planet</th>
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<td>geologic process</td>
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<td>reasoning</td>
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<tr>
<td>conglomerate rock</td>
<td>evidence</td>
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Craft your argument here!
A short video exposes students to the details of one Mars researcher’s work and the ways it is similar to their own investigation.

We will watch another video with Dr. Edgar, the planetary geologist we saw in the video during the first lesson of this unit.

She will explain how the work students have been doing is similar to the work she does as a planetary geologist.

Students should pay careful attention to similarities they notice between Dr. Edgar’s work and the work they did in this unit.
Return to the Unit Question: How can we search for evidence that other planets were once habitable?

In **Chapter 1**, we used information about Earth to learn about Mars. Scientists make comparisons between Earth and other rocky planets to learn more about which planets might have been habitable in the past. In **Chapter 2**, we used models to get evidence. Scientists use models to test their ideas and get evidence about processes that are difficult to observe. In **Chapter 3**, we evaluated evidence and constructed arguments about what formed the channel on Mars. Considering evidence and engaging in argumentation helps scientists decide on the most convincing answers to scientific questions.
Return to the Unit Question: How can we search for evidence that other planets were once habitable?

If liquid water did form this channel on Mars, what does that mean about the past habitability of Mars?

If there was once liquid water on Mars, that means it could have been habitable, since we know Mars has an energy source (the sun).
Reading "The Future of Mars Exploration"

- Find out what the next steps are in the search for evidence of habitability on Mars! Read and annotate the "The Future of Mars Exploration" article.
- Answer the question below, and then press NEXT to read a second article.

Humans have not yet visited Mars, but we have sent small robots called rovers there. A rover made these tire tracks on the surface of Mars and took this picture. NASA/JPL-Caltech/MS33

Would you be interested in being one of the first humans to explore Mars? Why or why not?
Reading "Canals on Mars?"

Scientists have been studying Mars for hundreds of years! To learn more about the ideas that scientists have had about Mars, read and annotate the “Canals on Mars?” article and then answer the questions below. Press HAND IN to submit your articles.