

Making a Path to Mars 4th Grade

Amount of time for this lesson = 60 minutes

1. Standards and Safety and Materials:

A. Standards –

Technology: *Students understand the interaction of science, technology, and society.*

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| SC4.1.1 | <u>Characteristics of Organisms: Students describe observable characteristics of living things, including structures that serve specific functions and everyday behaviors.</u> |
| SC4.1.3 | <u>Organisms and Their Environments: Students show connections between living things, their basic needs, and the environments.</u> |
| SC4.2.1 | <u>Students research answers to science questions and present findings through appropriate means.</u> |

B. Safety Concerns: minimal safety concerns with regular class activity

C. Materials- current research materials on Mar, books containing geological photographs of the surface of Mars and Earth, computer with Internet access

2. Objectives:

A. Students will **determine** the similarities of Mars and Earth’s geological features.

B. Students will **create** a shuttle.

C. Students will **list** and **describe** the features of these planets that are useful in supporting life.

3. Connections, Misconceptions, and Crosscutting Concepts:

A. Real world connections: The difference in seasons, weather, and temperature. The Astronomy field of science.

B. Student background connections: The difference in seasons, similarities between places they have visited

C. Misconceptions:

1. Mars will appear as big as the moon
2. Mars supports intelligent life
3. Mars has oceans

D. Crosscutting Concepts: Science-Astronomy, Technology- Computer literacy, Engineering- understanding mans influence on science, Language Arts- paragraph writing using informative text

E. Academic Language: microorganism, centrifugal force, terraforming, astronomy, and microgravity

4. Catch/*Engagement*: Read A-loud

Living in Space

Larry Kettelkam. New York: Morrow Junior Books, 1993

Read about people who’ve lived in space and about space suits, space stations, and plans to send people to Mars and, some day, to other planets in other solar systems. Do you want to be one of these travelers?

5. Pre-test: Essential Question- What makes a habitable planet?

6. Activity/*Exploration*:

Part 1: Lecture

X – The teacher will tell students that they are going to **compare** Earth and Mars to find similarities between the two planets. The students will then begin by doing research to find information and **collect** pictures of geological features of both planets. They should start their research at the following websites: views of the Solar System: Mars Introduction, and views of the Solar System: Introduction to Earth.

Y - They should start their research at the following websites: views of the Solar System: Mars Introduction, and views of the Solar System: Introduction to Earth.

Part 2: Lab

M – Students will research to produce their worksheets of information.

N – – Procedure:

1. The teacher will instruct students to download the print pictures of geological features and formation on Earth and Mars. They can also find pictures in text references and photocopy them.
2. The teacher will have students **post** (list and describe) pairs of pictures of Earth and Mars side-by-side on a bulletin board in order to **compare** (determine) similar geological features and formations shared by both planets.
3. For each pair of pictures, students should **identify** (list and describe) the planet in each picture and **write** (list and describe) short description of the geological features being compared. Students should do further research to include in their descriptions explanations of how the features being compared. Students should do further research to include in their descriptions explanations of how the feature was probably formed and of how the feature may be useful for supporting on both planets.

Part 3: Reading

Living in Space

Larry Kettelkam. New York: Morrow Junior Books, 1993

Read about people who've lived in space and about space suits, space stations, and plans to send people to Mars and, some day, to other planets in other solar systems. Do you want to be one of these travelers?

Part 4: Discussion -Students will orally **list** and **describe** whether their planet is habitable using the evidence they found during their research.

7. Review/Essential Questions/*Explanation*:

- A. Low Level – Is your planet habitable?
- B. Middle Level –Label and describe the geographical features of your planet on a printed picture.
- C. High Level – Explain if your planet is habitable.

8. Assessments (Post-test)/*Evaluation*:

A. Formative: Discussion Questions

- 1 What geological evidence have scientists found on Mars that suggests that this planet once had, and may still have, large quantities of water?
- 2 Although scientists no longer believe that a Martian civilization lives on Mars, a recent discovery suggests that some form of life may have once inhabited the Red Planet. Describe the consequences for Earth, if life once existed on Mars. Debate the presence of life in other parts of the universe.
- 3 How would human beings on Earth benefit if it were possible to create a space colony on Mars in which humans could live?
- 4 Discuss whether our government should spend money to fund further exploration of Mars, or use that money to improve conditions here on Earth? Or should funds be made available for both purposes?

B. Post-test: Students will orally answer the essential question for the planet they chose to research.

C. Summative: You can evaluate your students on their descriptions using the following three-point rubric:

Three points: clearly and completely describes the geological feature being compared; includes plausible explanation of how the feature was probably formed; includes clear, accurate explanation of how the feature may be useful in supporting life; free of errors in grammar, usage, and mechanics

Two points: adequately describes the geological feature being compared; includes acceptable explanation of how the feature was probably formed; includes acceptable explanation of how the feature may be useful in supporting life; includes some errors in grammar, usage, and mechanics

One point: vague description of the geological feature being compared; implausible explanation of how the feature was probably formed; unclear explanation of how the feature may be useful in supporting life; many errors in grammar, usage, and mechanics

D. After review of the students three-point rubric and the answers to the essential question, the teacher will decide if the class will proceed on with the material in the unit.

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| 9. Timeline: | A. Catch | 2 min |
| | B. Pre-test | 3 min |
| | C. Activity – 4 parts | 40 min |
| | D. Review and Post-test | 8 min (Put as many sections as you need) |

10. Enrichment/*Elaboration*: **Construct a Shuttle**

Have students use tape, Velcro, glue, shoe boxes, paper towel tubes, plastic soda cans, and other household recyclables to **construct** (create) a model of the space shuttle. Instruct students to glue or tape together the parts that never separate and to use Velcro to hold together parts that will be jettisoned after liftoff (e.g., the fuel tank and rocket boosters).

11. IEP Accommodations/Differentiation/Diversity: Download pictures for the students and guide them through finding the geological features.