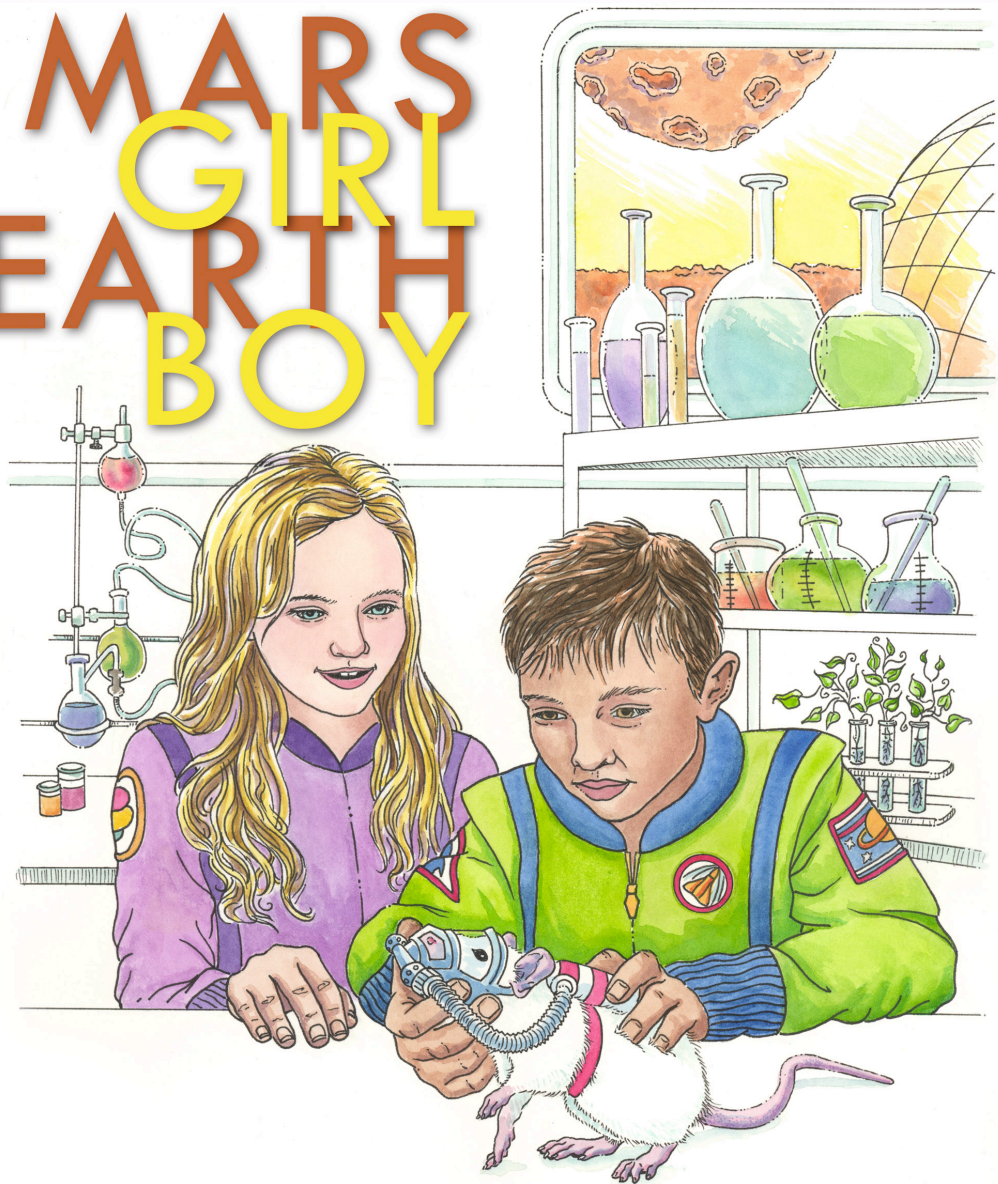


# ACTIVITIES GUIDE

## MARS GIRL EARTH BOY



BASED ON A NOVEL WRITTEN BY  
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## For Ages 8-12

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## Introduction and Story Synopsis

### Introduction

### Activities Objectives

The activities in this activities guide are meant to be a companion to the novel *Mars Girl Earth Boy* as it relates to science and the language arts. A great resource for teachers in the classroom, homeschoolers, and parents!

### Story Synopsis (from the back cover of the book)

*Mars Girl Earth Boy* is a celestial coming-of-age adventure story about Marietta, the first human born on Mars. She is an active member of Mars Base I, whose 20-year mission is to settle the planet. One of the challenges is to alter the atmosphere of the Red Planet, making it more conducive to human life. But large-scale success has evaded them due to their inability to find enough water. It's now the year 2045 and Commando Ernesto Cardenas of the United Nations Aerospace Administration has just arrived with his wife and young son Ernie to audit the Base's efforts and decide its fate.

In a surprising twist, their survival and that of the Mars Base eventually comes down to the success of Marietta and Ernie as they take off on a wild, unauthorized exploration of a mysterious "pyramid" thought to hold the secret of life on Mars.

## Discussion Questions

Objective: To trigger discussion about the story and characters in *Mars Girl Earth Boy*.

- Summarize the story. What do you believe is the main idea?
- Marietta and her friends at Mars Base I try their best to show Ernie and his family the base's most impressive achievements and the natural beauty of their home planet. If Marietta were visiting you on Earth, what would you show her to impress her the most? What parts of Earth's landscape would you pick to show her?
- Ernie is confused at first when he discovers that Marietta does not understand his Earth humor and vocabulary. Have you ever met someone from another state or country that did not understand your customs or language, or traveled to a new place and been surprised by other traditions or ways of speaking? Tell about it.
- What did you expect Marietta, Ernie, and Ratty to find within the Mars "pyramid?" What did you think could have been written on the tablet before Muhammad deciphered it?

## Vocabulary

Objective: To define new vocabulary words and phrases. Discuss their meanings, or have readers look up definitions in the dictionary or online.

3-D printing  
Antarctica experiment  
crater  
electrolyzed  
electron Scanner  
halogen light  
iron oxide  
isolated confined environments  
LED light  
Mars reconnaissance orbiter  
mass  
meteorites  
Mons Olympus  
mylar  
ozone  
particle beam  
photosynthesis  
Plain of Cydonia  
plutonium  
radioactive  
rebreather  
Rosetta Stone  
schist  
seismic activity  
siesmograph  
solar panels  
sound detectors  
terra-forming  
ultralights  
Valles Marineris  
Viking 2  
Zero-G

## Fun Facts about Mars

Objective: To expand one's knowledge about the Red Planet.

- Mars is one-tenth of the Earth's Mass.
- Weight: Gravity is three times lower so balls will bounce three times higher on Mars.
- CO<sub>2</sub> is locked in polar ice caps on Mars. The gas is in the form of carbonate. If released, it would create a greenhouse gas. To create an atmosphere there we need the CO<sub>2</sub>. CO<sub>2</sub> is a problem on Earth but on Mars would create an atmosphere making it more habitable. Once created or pumped in, atmospheric warming could take place.
- Once an atmosphere is created the first organisms would be simple cells algae and bacteria. Then more advanced forms like lichen and mosses will appear.
- If you have carbon and nutrients like nitrogen and sulfur, life could emerge in the presence of water.
- Mars's small moons: Phobos and Deimos. Phobos (fear) and Deimos (panic) were named after the horses that pulled the chariot of Ares, the counterpart to the Roman war god Mars. (Source: space.com)
- Mars is the fourth planet from the Sun and last of the terrestrial planets and is around 227,940,000 km from the Sun. (Source: theplanets.org)
- The surface gravity of Mars is about 37 percent the gravity found on Earth. This means that on Mars you could in theory jump three times higher than you could on Earth. (Source: theplanets.org)
- With the exception of Earth, Mars is the most hospitable to life—a number of space missions are planning for the next decade the further increase our understanding of Mars and when it has the potential for extraterrestrial life, as well as whether it may be a viable planet for a colony. (Source: theplanets.org)
- Mars is the only other planet besides Earth that has polar ice caps. The northern cap is called the Planum Boreum, with Planum Australe in the south. Water ice has also been found under the Martian ice caps. (Source: theplanets.org)
- Valles Marineris is the largest canyon in the solar system, stretching 4,000 kilometers across the planet's surface. If you look at a picture of Mars taken from a telescope, you will see the giant gash that is Valles Marineris. (Source: planetsforkids.org)
- Mars is covered by craters from objects like asteroids and meteorites hitting the planet. Today, 43,000 such craters have been found and that only includes the large ones! (planetsforkids.org)
- Length of a Day – While a year on Mars might be almost twice as long as a year on Earth, the length of a day there is almost identical. A Martian day is 24 hours and 39 minutes long, less than an hour longer than a day on Earth. (planetsforkids.org)

## Mars Quiz

Objective: To find out how much you know about the Red Planet (answers on page 11).

1. How many moons does Mars have?
  - a. 1
  - b. 2
  - c. 3
  - d. 4
  
2. What is the Olympus Mons?
  - a. The largest canyon on Mars
  - b. A rover that was unable to successfully land on Mars
  - c. The largest mountain on Mars
  - d. The largest Volcano on Mars
  
3. Where did the name Mars originate?
  - a. The planet was named after the Greek God of war
  - b. The planet was named after the Roman God of astronomy
  - c. The planet was named after the Roman God of war
  - d. The planet was named after the Greek God of astronomy
  
4. Mars is located how many planets away from the sun?
  - a. 1
  - b. 2
  - c. 3
  - d. 4
  
5. Like Earth, Mars has polar ice caps. What are they called?
  - a. The Valles Marineris
  - b. Planum Boreum
  - c. Planum Australe
  - d. Planum Ploreum
  
6. How many Earth days does it take Mars to orbit the sun?
  - a. 687
  - b. 678
  - c. 762
  - d. 643
  
7. How long is one day on Mars?
  - a. 23 hours 21 minutes
  - b. 24 hours 39 minutes
  - c. 24 hours 11 minutes
  - d. 25 hours 4 minutes

## Learn from the Experts

Objective: To study what astronauts and scientists can tell us about Mars.

- Christopher McKay: McKay is a planetary scientist at NASA's Ames Research Center. His research focuses on the study of planetary atmospheres and terraforming. Unlike the colonists on Mars Base I, McKay believes that we should explore other planets like Mars thoroughly for any signs of alien life before terraforming the planet to fit our own needs. Learn more about McKay and read some of his publications here: <http://spacescience.arc.nasa.gov/staff/chris-mckay>
- Buzz Aldrin: Aldrin was the second person to ever walk on the moon, following closely behind Neil Armstrong. More recently, Aldrin has proclaimed his support for a manned mission to Mars in the near future, as well as for colonization of the planet. Read his article about the subject published in the *New York Times* here: <http://nyti.ms/2d6hlGD>
- Mars Curiosity: Curiosity is rover that first landed on Mars in 2012 that continues to explore the Gale Crater on the planet's surface. As a part of NASA's Mars Science Laboratory Mission, the rover strives to investigate the climate and geology of Mars while also assessing the possibility of the current or previous existence of alien life. Read more about the rover and see recent updates here: <http://mars.nasa.gov/msl/>
- Scientist Lisa Messeri writes in the *New York Times* about the new discovery Proxima Centauri an exoplanet that could be like Earth. Recently we most desire to connect with a rather unremarkable ball of rock, ice and gas, for the simple but powerful reason that it reminds us of our home. To even claim the existence of an Earthlike planet is also to claim, rightly or wrongly, that we know and understand our planet. Despite a changing climate and an unsettled population, there is some essence of our planet that we can recognize and point to, saying, "that is us." Read the article here: <http://nyti.ms/2blEKBQ>



## Sustainability and the Blue Planet

Objective: To bring awareness of methods to help kids live more sustainably on Earth.

- Recycle plastic bags: Use bags more than once with your parents at the grocery store, or use them as garbage bags.
- At school be sure to recycle plastic, paper, and aluminum at lunch and in the classroom. Get involved with a recycling program at your school, or help to create a program of your own for the community.
- Ask parents to help create a compost pile for organic waste (like egg shells and banana peels). Use the compost as fertilizer for a garden.
- Reuse items like food containers and old clothes. Old containers and clothes can be repurposed or donated.
- Save Water. Take shorter showers and make sure to turn off the faucet when you are brushing your teeth.
- Make sure to turn off lights when no one is in the room and to turn off electronics when they are not in use.
- Encourage your family to generate less waste; some materials like Styrofoam and plastic can remain in landfills for years.
- Make sure to dispose of batteries and electronics properly. It can be dangerous to just throw them in the trash.
- Do you have some nifty ideas for reusing things rather than throwing them out? (e.g., using plastic netting and an old linen towel as a lettuce spinner and dryer.

## Journal Entries/Writing Prompts

Objective: To introduce the creative writing process.

- Design/ describe a piece of technology that you could invent to help the people of Mars Base I. Remember, supplies are difficult to come by on Mars and many things have to be reused and recycled. Your technology can focus on everyday life on the base, exploring the planet, communication with Earth, or any other useful project.
- Ernie sneaks his pet Ratty onto the ship with his family as they journey to Mars. If you could bring your own pet to space (or if you do not have a pet, your dream pet) how would you take care of them onboard a spaceship? What would you pack for them? When you finally reached Mars, how would they contribute to life on the colony?
- At first, Ernie and Marietta believe that aliens created the "pyramid" on Mars, based on Ernie's grandfather's journal. Create an alien species that could have built the pyramid on Mars. Describe the alien race, how they created the pyramid structure, and what they used it for.

## Answers to Mars Quiz

Answers: 1) b (named Deimos and Phobos), 2) d, 3) c, 4) d, 5) b & c, 6) a, 7) b

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