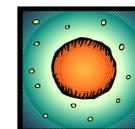


# COMPARING EARTH & MARS

How much do YOU know about the Red Planet and the Blue Planet?



For more info  
see FAQ  
on p. 40

EARTH ⊕

MARS ♂

Distance from Sun	93 million miles (150 million kilometers)	Ranges from 216 million km to 264 million kilometers (see activities pp. 26-27)
Size of Planet (Diameter)	7,926 miles (12,756 kilometers)	4,222 miles (6,794 kilometers) About 1/2 of Earth
Composition	Molten metal core, rocky outer crust	Possibly molten metal core, rocky outer crust
Length of Year	365.25 days (1 year)*	687 Earth days (About 2 Earth years)
Length of Day	24 hours	24 hours, 37 minutes
Moons	One: <i>Moon</i> Probably formed billions of years ago from debris left by a giant impact with Earth.	Two: <i>Phobos</i> and <i>Deimos</i> Possibly captured asteroids*
Water/Ice	Abundant: 70% of Earth's surface is covered by liquid water. Ice caps of frozen water exist at the poles. Also clouds, fog and water vapor in atmosphere.	No liquid water at the surface. Mars is an extremely dry world at present, but does have water in the form of polar caps, ice clouds and ice fog. Large amounts of frozen water lie just beneath the surface near the poles and perhaps elsewhere.
Atmosphere*	Mostly nitrogen (78%) and oxygen* (21%). Some water vapor and other trace gases.	95% carbon dioxide*. Mars has very little oxygen and a very thin atmosphere, so humans would need spacesuits to breathe there.
Weather	Clouds, wind, rain, thunderstorms, hurricanes	Wind, dust storms (some global), ice clouds, fog
Average Surface Temperatures	59° Fahrenheit (15° Celsius)	- 81° Fahrenheit (- 63° Celsius)
Soil	Rocky, sandy and some fertile soil, containing organic material. Organic materials contain carbon and are associated with life.	Mostly rocky and sandy. Some areas appear to have frozen water in the soil. No <u>known</u> organic material.

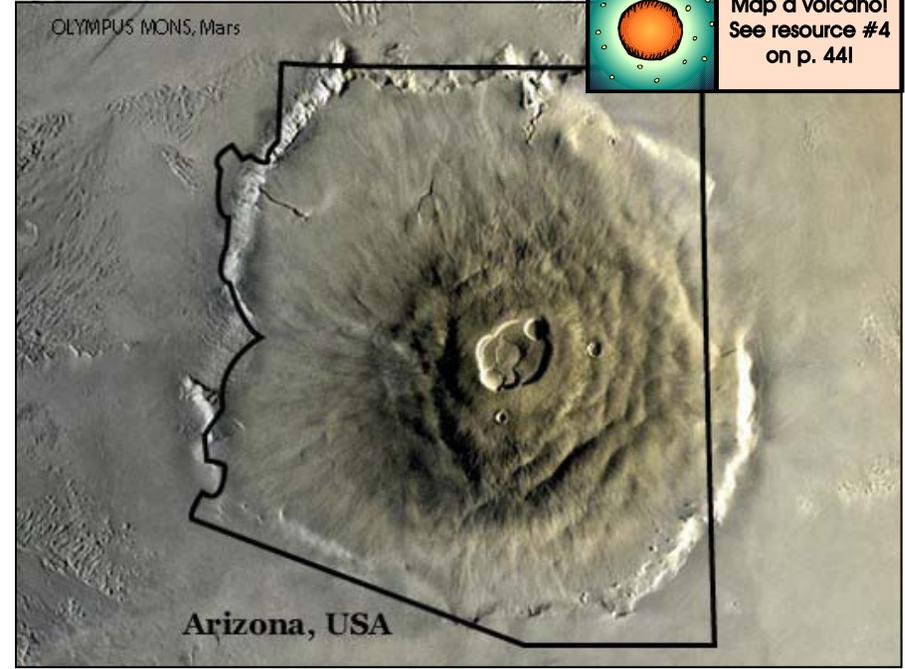


# GIGANTIC FEATURES OF MARS

Mars is a smaller planet than Earth, but it has some awesome gigantic features!



**VALLES MARINERIS**

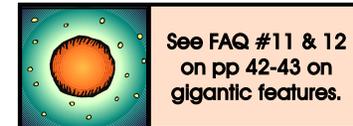
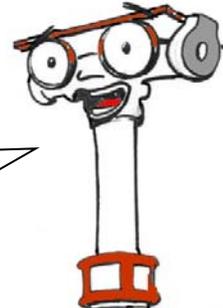


**OLYMPUS MONS**

**Valles Marineris\*** is the largest canyon system in the Solar System. If it were on Earth, it would stretch across the USA.

**Olympus Mons** is the largest volcano in the Solar System. Its base is about as large as the state of Arizona, and its summit is higher than the tallest mountain on Earth.

How big do you think the Grand Canyon of Arizona would appear in the image on the left? How big would it be in the image on the right?

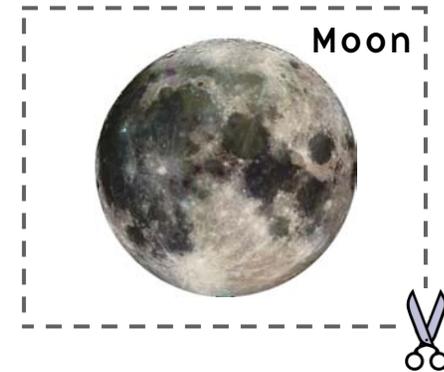




**CHECK OUT THE FREQUENTLY ASKED QUESTIONS  
ABOUT MARS ON PAGE 40!**

# COMPARE THE SIZES OF MARS, EARTH, AND MOONS

These images show the relative sizes of Earth and its Moon.



Make a scale model of how far the Moon is from Earth:

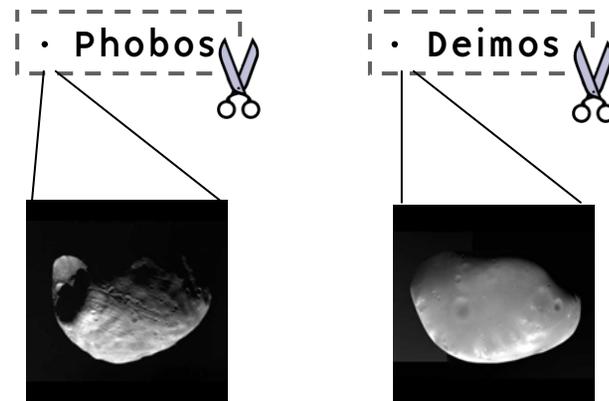
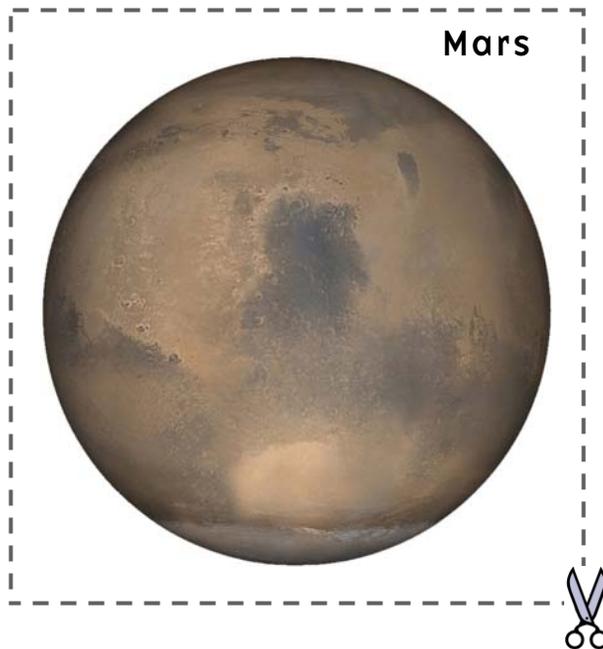
- Cut out Earth and the Moon.
- Place them 3.8 meters (12 ½ ft) apart.

## Where did the Moon come from?

The width of the Moon is about 1/4 of Earth's diameter. It is thought to have formed from material ejected from Earth by a tremendous collision early in our planet's history. The object that hit Earth was destroyed, but was probably about the size of Mars.

# COMPARE THE SIZES OF MARS, EARTH, AND MOONS

These images show the relative sizes of Mars and its two tiny moons.

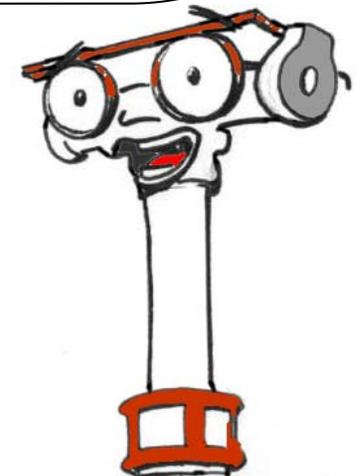


Phobos and Deimos: The tiny moons of Mars.  
At proper scale, they would be even smaller than the dots shown.  
Their names mean "fear" and "dread". Yikes!

Make a scale model of how far Phobos and Deimos are from Mars:

- Cut out Mars and its two moons.
- Place Phobos 9 cm (3 ½ in) from Mars.
- Place Deimos 23 cm (9 in) from Mars.

The Moon orbits Earth one time each month. Deimos orbits Mars in 30 hours. Phobos orbits Mars in just 7 hours. That's less than one Earth day!

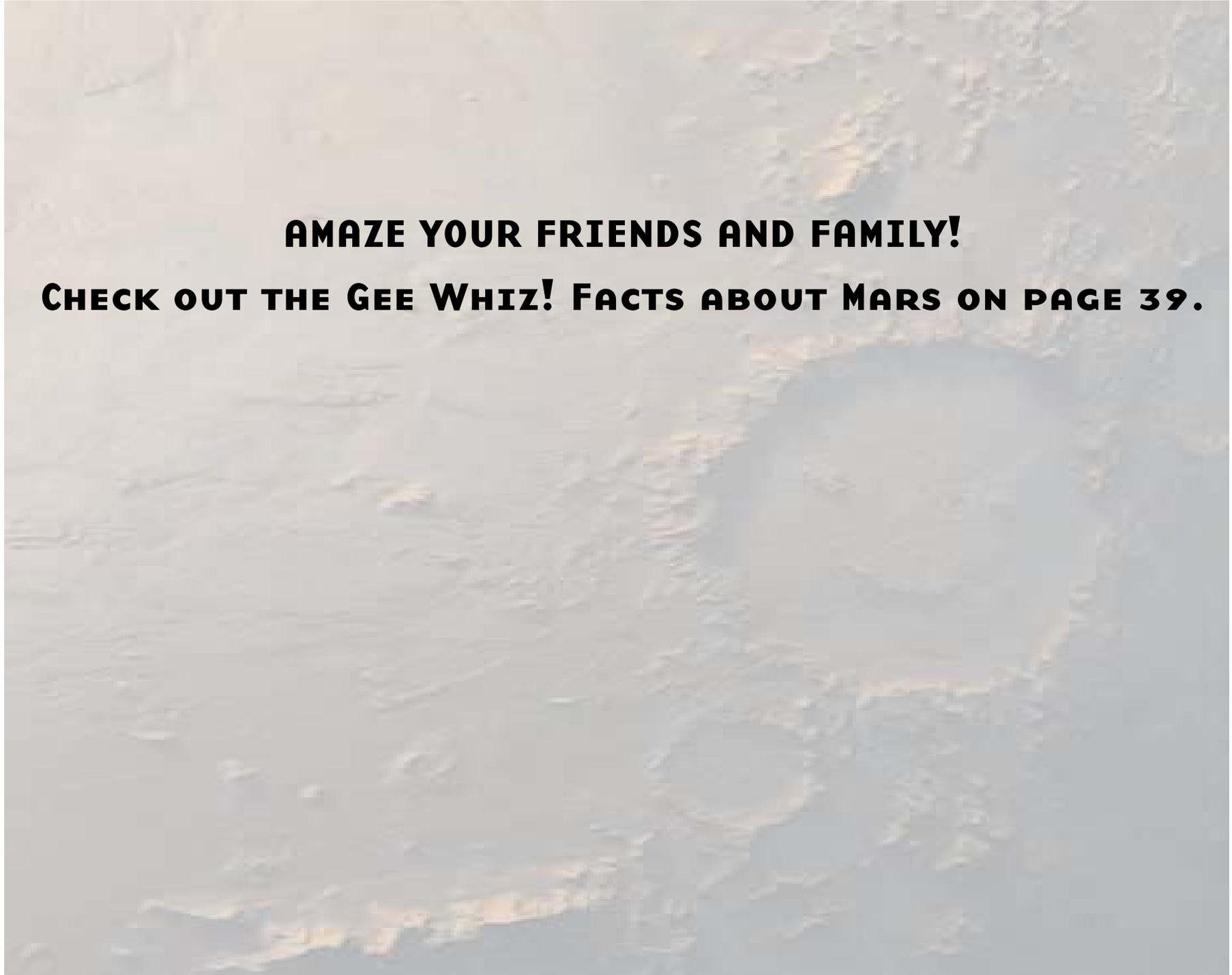


## Where did the moons of Mars come from?

The moons of Mars are mere specks compared to their planet. Phobos and Deimos are probably asteroids\* that were caught by the Red Planet's gravity.



For more info on the moons of Mars, check out FAQ #15 on p. 43!



**AMAZE YOUR FRIENDS AND FAMILY!**

**CHECK OUT THE GEE WHIZ! FACTS ABOUT MARS ON PAGE 39.**

# WHAT'S WRONG WITH THIS PICTURE OF MARS?

There are seven wacky things wrong with the picture below, things not possible to see on Mars.

Can you find and circle them? Why wouldn't you see these things?



**answers**

- Campfire - There is not enough oxygen\* for fires to burn on Mars.
- Woman Astronaut - Without her helmet and wearing cowboy boots, she is unprotected from the extreme cold and the thin, carbon dioxide\* air of Mars.
- Diving Boy - He has no spacesuit to protect him from the cold, thin, carbon dioxide atmosphere.
- Pool of Water - Liquid water would either freeze due to Mars' cold temperatures, or boil away due to its extremely thin atmosphere.
- Grazing Cow - Cows, like humans, need oxygen and protection from the Martian cold. A dairy cow on Mars is "udderly" ridiculous!
- Snail - Same goes for snails... no snail spacesuit means no air to breathe and no protection from the cold, thin atmosphere.
- Tree - Trees need carbon dioxide, which Mars air mostly is, but without liquid water, and with the freezing temperatures, trees cannot live.

# TRUE FOR EARTH OR MARS OR BOTH?

Each of the statements below is true, but some are only for one planet. Is it Earth or Mars? Use the facts in this Guide to help you decide! Place an "E" next to facts that are true for only Earth, and place an "M" next to facts that are true only for Mars. If it's true for both planets, place a "B" in the blank. Watch out, some are tricky!

**EARTH = E**

**MARS = M**

**BOTH = B**

1. \_\_\_\_ Has oceans of liquid water.
2. \_\_\_\_ Home to the largest volcano in the Solar System.
3. \_\_\_\_ Its atmosphere is mostly carbon dioxide\*.
4. \_\_\_\_ This planet has frozen polar caps.
5. \_\_\_\_ Fourth planet from the Sun.
6. \_\_\_\_ Has seasons.
7. \_\_\_\_ This planet is generally much colder.
8. \_\_\_\_ Takes 365 days to go around the Sun.
9. \_\_\_\_ This planet has a much thicker atmosphere.
10. \_\_\_\_ You would need a spacesuit to play outside here.
11. \_\_\_\_ Has mountains, valleys and volcanoes.
12. \_\_\_\_ People have been to this planet.
13. \_\_\_\_ This planet has two small moons.
14. \_\_\_\_ You would weigh less on this planet.
15. \_\_\_\_ Orbits the Sun.
16. \_\_\_\_ You would expect to find plants and animals here.



**ANSWERS:**

1-E, 2-M, 3-M, 4-B, 5-M, 6-B, 7-M, 8-E,  
9-E, 10-M, 11-B, 12-E, 13-M, 14-M, 15-B, 16-E

