

# PLANETARY SOCIETY KIDS

ICY PLANET

Neptune

ON THE BACK



## Why Is Mars Orange?

You can make your own Mars rock-inspired rusty red chemical reaction.

If you have the equipment, you can do an extra bit of experimenting—a bonus investigation.

Here's what you need:

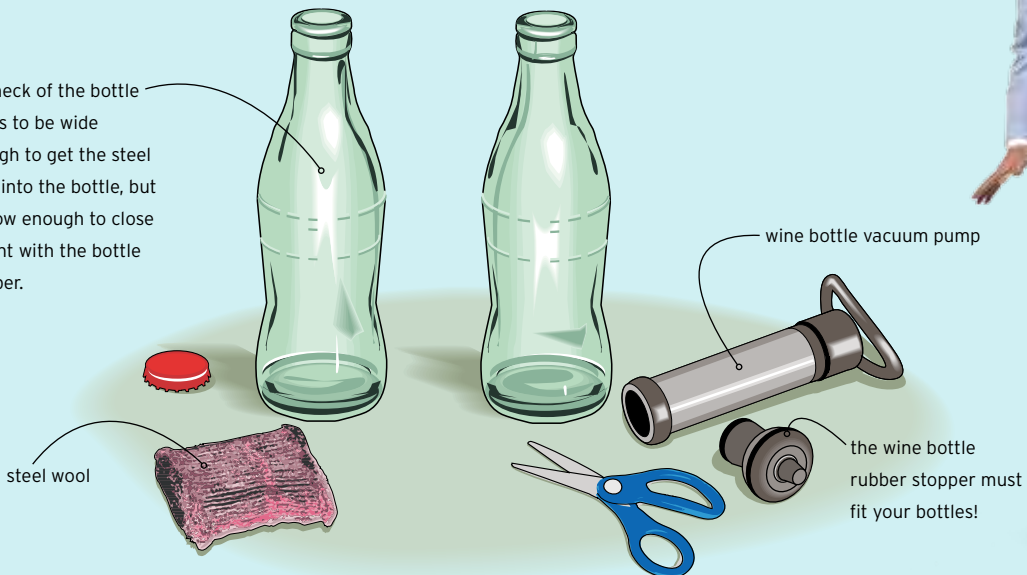
- A steel-wool scouring pad
- One or two small glass soda bottles

Bonus investigation apparatus:

- Wine bottle vacuum pump (available at department and kitchen gadget stores)
- Wine bottle vacuum rubber stopper
- Scissors



The neck of the bottle needs to be wide enough to get the steel wool into the bottle, but narrow enough to close it tight with the bottle stopper.



*continued inside...*

continued from front...

# Rusty Mars



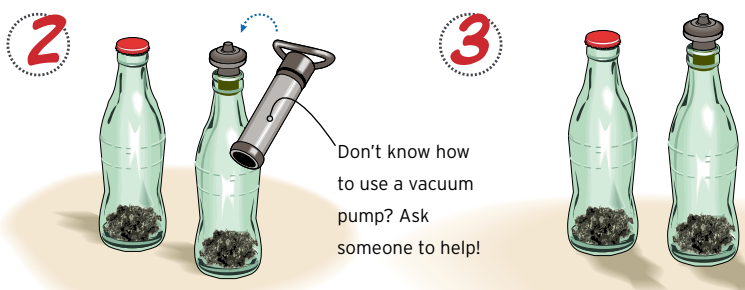
Make sure the steel wool is good and wet!

Here's what you do:

- ▶ Rinse the steel wool so that the soap is completely washed away; leave it wet.
- ▶ Cut the steel wool pad in half with scissors.
- ▶ Put a piece of wet steel wool in a bottle.
- ▶ Put the cap on and set the bottle in the Sun.

For the bonus investigation:

- ▶ Put a second piece of wet steel wool in a second glass bottle.
- ▶ Using the vacuum plunger and vented stopper, pull as much air as you can out of that bottle.
- ▶ Set that bottle out in the Sun.



Don't know how to use a vacuum pump? Ask someone to help!

### WHAT YOU'LL SEE:

The steel-wool pad in a bottle left open to the air will rust in a day or so. Oxygen in the air combines with iron in the steel to form iron oxide—rust. Experiments like this lead us to believe that iron in Mars' rocks has combined with oxygen in its air. The whole planet turned a pale orange. That happened about three billion years ago. Now there is hardly any oxygen in the Martian air. Wild!

If you were able to rig up the second bottle, wait a couple of days and pull the vented stopper out. You'll hear the rush of air. The pad in the bottle that has had the air pulled out will not have rusted nearly as much. Leave this bottle out for another day, then compare it to the first bottle. When there was less oxygen, there was less rust. It's science here and science on Mars.

**Have more fun learning about space at [planetary.org/kids](http://planetary.org/kids)**

**BELOW** Iron in Mars' rocks combined with oxygen in the air (sometime back in history) to make the terrain orange! This color panorama shows a 360-degree view of Curiosity's landing site, including

the highest part of Mount Sharp visible to the rover. That part of Mt. Sharp is approximately 12 miles (20 kilometers) away from the rover. It took 140 photos stitched together to make this panoramic image.



Experiment Illustrations: Dave Merrill; panorama: NASA/JPL-Caltech/MSSS; Rover illustration: NASA/JPL-Caltech



**DON'T FORGET!**

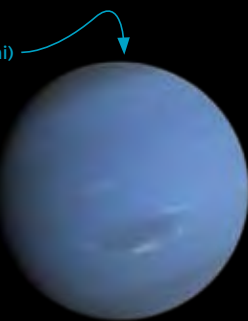
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The whole family can learn about space science together.

# Neptune

*The great icy planet in the outer reaches of our solar system*



Size comparison:  
Neptune's diameter: 49,528 km (30,775 mi)  
Earth's diameter: 12,756 km (7,926 mi)



## DID YOU KNOW THAT...

- ▶ Neptune is 30 times as far from the Sun as Earth is?
- ▶ It orbits so slowly that it's made just one trip around the Sun since its discovery in 1846?
- ▶ Small amounts of methane in the uppermost atmosphere are what give Neptune its deep blue color?
- ▶ Neptune and Uranus are almost exactly the same size, composition, and color?
- ▶ Neptune is roughly 20 times as massive as Earth and roughly one twentieth as massive as Jupiter?
- ▶ Neptune's atmosphere is made mostly of the same stuff as Jupiter's, including hydrogen, helium, methane, ammonia, and water?
- ▶ Neptune has a much lower percentage of hydrogen and helium and a higher percentage of methane, ammonia, and water than Jupiter?
- ▶ Scientists call Neptune and Uranus "ice giants" rather than "gas giants" because they're made mostly of stuff that forms ices in the outer solar system: methane, ammonia, and water?
- ▶ But Neptune's "ices" actually exist in a high-pressure liquid ocean that's a scorching several thousand degrees?
- ▶ There's an Earth-sized rocky core inside Neptune, at the bottom of that hot methane ocean?
- ▶ Most of the planets that we've discovered around other stars are approximately the size of Neptune?

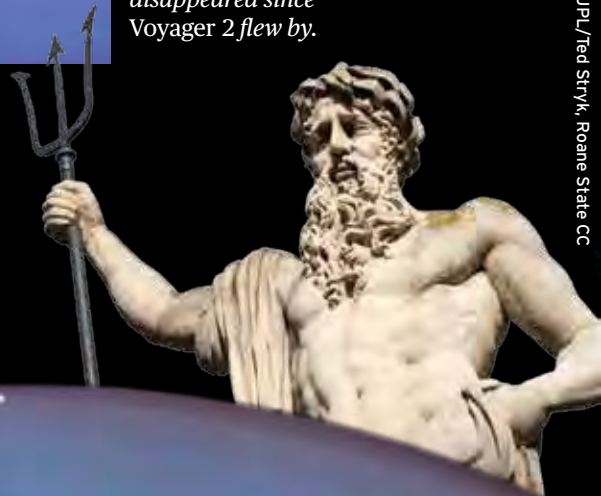


**LEFT** Neptune has blue skies and white clouds, like Earth—but Neptune's blue color comes from methane gas, and its clouds from methane crystals.

**BELOW RIGHT** Neptune was named after the Roman god of the ocean – the deep – because Neptune was in the “deep” reaches of space. Only later – when photographs of the planet got better – did we realize that the planet was the same color as the ocean!



**LEFT** Neptune's Great Dark Spot is actually a hole in Neptune's clouds. The Dark Spot wasn't a permanent feature like Jupiter's Red Spot – it has disappeared since Voyager 2 flew by.



*This view of the moon Despina eclipsing and transiting Neptune is composed of four frames captured nine minutes apart. Despina has been brightened in this photo or we would not be able to see it. The black dots are the moon's shadow on Neptune.*

Images: globe: NASA/JPL/color processing by Björn Jönsson; clouds: NASA/JPL; transit: NASA/JPL/Ted Stryk, Roane State CC