SPACE ACE

ASK A SPACE SCIENTIST

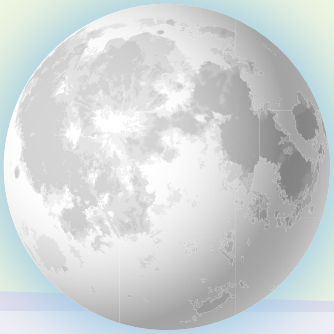
Our universe is full of mysteries, and some of the most mind-boggling are in space. Curious kids asked questions, and we sent them to two Bahá'í friends who work at the National Aeronautics and Space Administration (NASA). Have questions about space? Send them to brilliant@usbnc.org (with your name and birth date).

What makes the stars so bright that you can see them from Earth? – Paziano, age 8

Hi, Paziano,
Though stars seem to fill the night sky, they are *very* far away. We see only a small number of the more than 70 billion trillion stars that scientists estimate are close enough for us to observe. Each star is *massive*. Though our sun is just an average-sized star, you could fit more than 1.3 million Earths inside of it!

Stars are mostly hydrogen, and they shine so brightly because these hydrogen atoms deep inside the star are under such high pressure and temperature (millions of degrees!) that they fuse together to form another element–helium.

The energy released by fusion raises the temperature throughout the star. So we can see the stars because they are *big* and they are super *hot*!
–Steve



Why does the moon affect the ocean's waves?
– Ella, age 10

Hi, Ella,
Earth's gravity attracts the moon and keeps it in orbit around our planet. But the moon's gravity also attracts Earth. This attraction pulls on the water in the ocean, causing high and low tides you may have noticed at a beach. The tides are really very large ocean waves. Ocean waves you see breaking at the beach are mostly caused by the wind, but they're also affected by the tides.
–Steve

BACK IN TIME

Galileo Galilei discovered the four largest moons of this planet in 1610 with a homemade telescope. Since then, at least 46 more moons have been found orbiting the planet! Fill in the blanks to find its name:

_ U _ I _ E _

The four moons Galileo discovered were later named:

A) Rotini, Manicotti, Tortellini, Linguine
B) Ganymede, Europa, Callisto, Io
C) Luna, Amar, Mond, Bulan
D) Raphael, Donatello, Leonardo, Michelangelo

ANSWERS ON PAGE 36

Do *you* think there is life on other planets?
—Kai, age 14

Hi, Kai,
Bahá'ís believe the teachings of Bahá'u'lláh, who stated in the 1800s that "every fixed star hath its own planets, and every planet its own creatures, whose number no man can compute." Scientists confirmed in 2012 that every star hosts at least one planet.

Given that galaxies have an average of about 700 billion stars (our Milky Way has around 300 billion), and we estimate there are 100 billion galaxies in the part of the universe we can see, we know of about 70 billion trillion stars. That's 7 with 22 zeroes!

Our solar system has eight major planets and hundreds of dwarf planets. If we estimate each star has 10 planets, then we know of 700 billion trillion planets. Do you think that in a universe where all these uncountable stars and planets are made from the same elements (but combined in limitless ways), and these elements support life on Earth, it could be possible that life arose on only *one* planet?

I believe the universe was designed to generate life. While our solar system demonstrates life is rare and precious (since we've only found it on one planet here), there are enough stars for me to argue that the universe is teeming with life.
—George

COSMIC QUIZ

An Astronomical Unit (AU) is:
A) Equal to the distance between the sun and Earth
B) About 93 million miles (150 million km)
C) Currency used to pay astronauts
D) Both A and B

This answer is D. Our solar system is so huge that we measure distances in AU.

STEVE SCOTTI is a research engineer at NASA Langley Research Center in Virginia, U.S. He works to develop lighter, stronger materials and structures for aircraft and spacecraft. Watching the first astronaut launched into space inspired his interest in space exploration. He enjoys sharing his enthusiasm about science and space with kids.

GEORGE HATCHER is an avionics engineer at the Kennedy Space Center in Florida, U.S. He works on electrical systems of uncrewed rockets. He also studies planetary science at the University of Central Florida. Working for NASA is a dream come true for George. He's aspired to be an astronaut since he was three. He's one of 100 finalists in the Mars One Project, which aims to create a human settlement on Mars.

Images: NASA, Alhovik (moon), and Bobboz (solar system)