



## 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 space scientists. Have questions about space? Send them to [brilliant@usbnc.org](mailto:brilliant@usbnc.org) (with your name and age).

**How many galaxies are there that we know of?** – Pari, age 15

Hi, Pari, Hubble Space Telescope data shows that there are at least two trillion galaxies in the part of the universe we can see. Galaxies contain anywhere from a few hundred million to a hundred trillion stars, so that means there are more stars in the observable universe than there are grains of sand on Earth! The next time you hold a handful of sand, try to imagine that each grain is a star with its own planets. Then try to imagine all the sand on Earth. And that's only the galaxies that we can see.

Space itself is expanding. A tiny fraction of a second after the Big Bang, the cosmos expanded far faster than the speed of light. We only see a section of the universe that's about 93 billion light-years across. We can never directly measure what's beyond, but there's no evidence that what we can see is the entire universe. It's possible that we only see a fraction of an infinite universe. In fact, 'Abdu'l-Bahá states, "the luminous bodies of the material universe are infinite." –George



The Cartwheel Galaxy, 500 million light-years away, is a ring galaxy. Astronomers think it formed when a small galaxy passed through a larger one. Clouds of dust and gas collapsed, and bright blue stars formed an outer ring.

**BACK IN TIME**

2019 is the 50th anniversary of people landing on the Moon in the Apollo 11 spacecraft! Astronaut Buzz Aldrin was the second person to walk on the Moon. Now he's an author and space exploration activist. On the Apollo 11 mission, he piloted the:

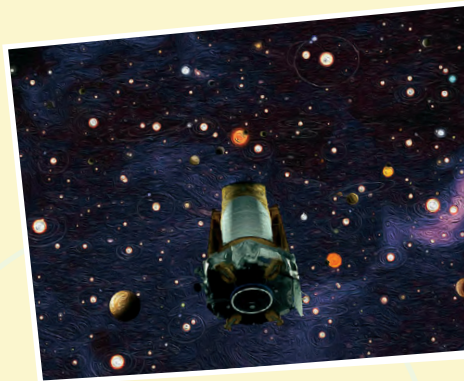
- A) Lunar rover
- B) Lunar module
- C) Moon pod
- D) Buzz-mobile





## What does Bahá'u'lláh say about space? – Maxine, age 13

Hi, Maxine,  
Bahá'u'lláh taught that science and religion are in harmony. A few of Bahá'u'lláh's writings explicitly talk about space, other planets, and life on these planets. These mysteries may be one way to look at this quote from Him: "Verily I say, the creation of God embraceth worlds besides this world, and creatures apart from these creatures." He also says, "Know thou that every fixed star hath its own planets, and every planet its own creatures, whose number no man can compute."



An artist's concept of NASA's Kepler space telescope, which discovered more than 2,000 planets outside of our solar system before it was retired in 2018.

Bahá'u'lláh's son, 'Abdu'l-Bahá, compares the universe to the human body: "all its parts are connected one with another and are linked together in the utmost perfection." He says, "so too are the parts and members of this endless universe connected with, and spiritually and materially influenced by, one another." It's reported that during his 1913 visit to Paris, he said that we should develop the technology to reach other planets. The Bahá'í writings also note, "'Abdu'l-Bahá stated there are other worlds than ours which are inhabited by beings capable of knowing God." Science may one day discover the answers to these mysteries. —Steve



**STEVE SCOTTI** is *Brilliant Star's* STEM Education Advisor and 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, and he enjoys sharing his enthusiasm about science and space with kids.



**GEORGE HATCHER** was an avionics engineer at the Kennedy Space Center in Florida, U.S., from 2004–2017. He worked on electrical systems of the space shuttle and uncrewed rockets. He also studied planetary science at the University of Central Florida. Working in avionics was 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.

## COSMIC QUIZ

When Apollo 11's astronauts landed on the Moon, they touched down on part of the surface called the Sea of Tranquility. It isn't a sea of water, but instead it's:

- A) A beach
- B) Hardened lava
- C) A concrete landing pad
- D) A soccer field

