



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 scientists who work for the National Aeronautics and Space Administration (NASA). Have questions about space? Send them to brilliant@usbnc.org (with your name and age).



Proxima Centauri is the closest star to Earth, and it's over four light-years away! That's about 25 trillion miles (40 trillion km)—like circling Earth a billion times!

What would you guys do if there were aliens? —Dahbi, age 11

Hi, Dahbi,

In order for humans to be the only intelligent life that has ever existed, the odds of civilizations forming on other Earth-like planets would have to be one in 10 billion trillion. That's a one with 22 zeroes after it.

Given our current knowledge, it would be irrational to claim that our civilization is the only one in the universe. So if astronomy and math are telling us there are aliens, what do we do? We keep observing and learning.

The closest star to us (Proxima Centauri) is four light-years away. Just to receive a radio message from aliens and transmit a reply would take at least eight years, and that's if we have next-door neighbors. Any aliens alive today are likely hundreds of light years from Earth. I don't expect first contact to happen in my lifetime, but if it did, I hope it would be a unifying force for humanity, would inspire humility in us, and would excite us and give us hope.

—George

BACH IN TIME

American Neil Armstrong was an engineer, test pilot, and astronaut. In 1969, he was the first person to walk on the moon. He and his two fellow astronauts, Buzz Aldrin and Michael Collins, launched in a spacecraft called:

A 0 0 11





Astronaut Peggy Whitson was the commander for a spacewalk at the International Space Station in 2007.

Are spacesuits comfortable? –Ruhiyyih, age 10

Hi, Ruhiyyih,

I wouldn't say our current spacesuits are comfortable. They're designed to protect astronauts from extreme environments. We wear orange-colored launch and entry suits (we call them pumpkin suits). They're designed to protect us in case of a loss of pressure in the Space Shuttle, when we're flying into space (launch), when we're returning from space (entry), and in the event we have to leave the vehicle during

flight (egress) and parachute onto land or water. Hence the suit is brightly colored for rescue teams to find us and is designed with floatation devices and insulation to protect us in icy water.

The EVA (extravehicular activity) spacesuit (the white one) is designed for crew members who leave the vehicle in space and conduct a spacewalk. It has to be pressurized just like the launch and entry suit, so the astronaut can breathe oxygen, and to prevent the blood from boiling in the vacuum of space. Because it's pressurized, the suit is very stiff, and it's very hard to move your arms, legs, and fingers. It requires a lot of energy to conduct a six to seven-hour spacewalk, and it's very tiring. Also, because the spacesuits have to be thermally insulated, the astronauts can be overheated. That's why they require a liquid-cooled undergarment to prevent overheating.

We'll have to design new spacesuits for humans to live and work on Mars, because the environment on Mars is much different than Earth and space.

– Charlie



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.



CHARLIE CAMARDA is our guest contributor for this issue. He flew on the return-to-flight mission of Space Shuttle Discovery in 2005. He traveled 5.8 million miles during his two weeks in space. He's now the Senior Advisor for Engineering Development at NASA's Langley Research Center.

COSMIC QUIZ

Which Mars Rover has driven the farthest?

- 1) Indy 500
- 2) Curiosity
- 3) Opportunity
- 4) Sojourner
- 5) X-Wing Starfighter

