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 space scientists. Have questions about space? Send them to us at brilliant@usbnc.org (with your name and age).

How could more women go into careers in science and space? –Natalie, age 12

The first time four women were in space at once, on the International Space Station in 2010 (left to right): Dorothy Metcalf-Lindenburger, Naoko Yamazaki, Tracy Caldwell Dyson, Stephanie Wilson

Hi, Natalie,

That is a really good question that many people are trying to answer. It's more broadly related to careers in STEM (Science, Technology, Engineering, and Math), as fewer than 25% of STEM jobs are held by women. Most astronauts have advanced degrees (master's and doctorate) in a STEM area, but there are so many exciting and rewarding career choices available to anyone with a college degree in STEM.

You are at the age when many girls who are good at science and math start to lose interest for a variety of reasons, including people's attitudes that girls shouldn't be in STEM, lack of role models (knowing women in STEM), and lack of exposure to STEM activities. If you're interested in STEM and want to pursue a career in space or another field, then go for it! Take as many math and science classes as you can, work hard, and don't let anyone or anything discourage you. Seek out people who will help and encourage you—teachers, guidance counselors, and classmates with similar interests.

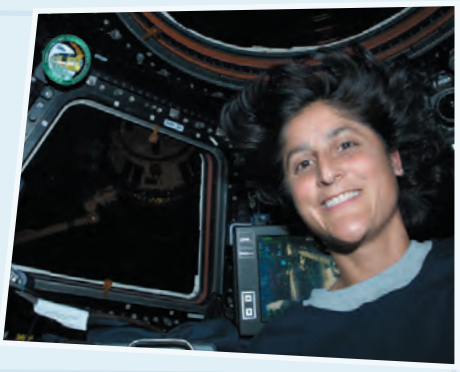
There are a lot of organizations and resources out there. Here are a few online resources: women.nasa.gov/a2i, www.engineergirl.org, and gc3.edc.org.

I wish you a wonderful future as a scientist or engineer. You could be the first astronaut to go to Mars! –Kim

BACK IN TIME

In 2007, astronaut Sunita Williams did this while orbiting Earth on the International Space Station (ISS):

A) Ran a marathon
B) Wrote a novel
C) Drew a comic strip
D) Composed an opera



ANSWERS ON PAGE 28

What is the life of a star like? —Tristan, age 14

Hi, Tristan,
A star around the size of our Sun goes through several stages in its life. It's "born" in a huge region of gas and dust that can be over 1,000 trillion miles across, called a nebula. Gravity attracts the matter in the nebula—mostly hydrogen—into a smaller region. It gets hotter when the atoms collide, as its density increases. At this stage, it's called a protostar.

When the center of the protostar reaches about 15 million degrees Celsius, nuclear reactions can start. Hydrogen fuses to form helium. This is the stage of our Sun now, and it can last 10 billion years. The light and heat we get from the Sun is due to hydrogen fusion reactions.

When all the hydrogen in the star is gone, the inner core—now mostly helium—shrinks further. It gets hot enough for the helium to fuse and form carbon. But the outer layers expand, and it's now called a red giant.

Eventually, the helium in the core runs out, and the outer layers of gas drift away. The core no longer generates energy by fusion, so it cools and shrinks to a few thousand miles in diameter. It's now called a white dwarf, and it cools until it emits almost no radiation. At this stage, it's considered "dead" and is called a black dwarf. But no black dwarf has ever been found. —Steve

One of the youngest star groups in our galaxy is in the Serpens Cloud Core, 750 light-years away.

COSMIC QUIZ

When an object enters Earth's atmosphere at incredible speed and creates a streak of light, it's called a:

A) Superflash
B) Shooting Star
C) Meteor
D) Speedrock
E) B and C

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. The first astronaut launch inspired his interest in space exploration, and he enjoys sharing his enthusiasm about science and space with kids.

KIM BEY is our guest contributor for this issue. She's a research engineer who worked at NASA Langley Research Center. She developed computer methods to predict heating and temperature on hypersonic vehicles, worked on the Space Shuttle Columbia Accident Investigation, and worked on the Return-to-Flight program, developing repair methods for the space shuttle's leading edge.

Images: NASA, NASA/JPL-Caltech/2MASS, Cylonphoto