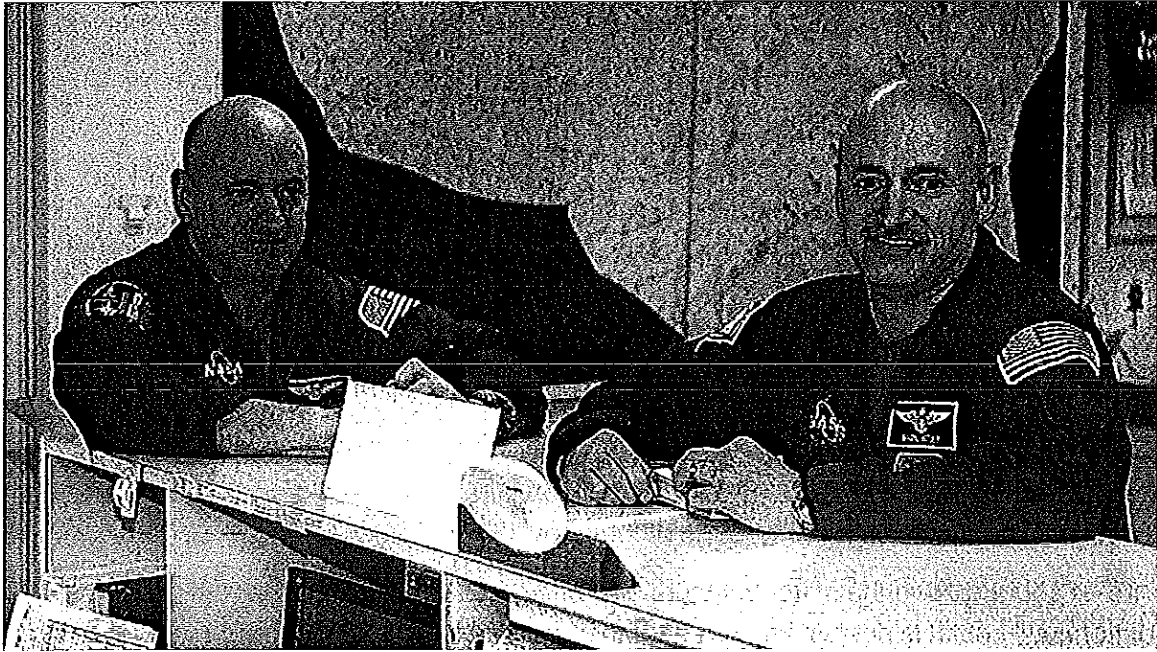


# Twin astronauts to help scientists learn to keep brains sharp in space

By Philadelphia Inquirer, adapted by Newsela staff on 04.01.15  
Word Count **829**



NASA astronaut Scott Kelly (left) and his twin, former astronaut Mark Kelly, are pictured in the check-out facility at Ellington Field near NASA's Johnson Space Center in Houston on May 6, 2008. Photo: NASA

PHILADELPHIA — Astronaut Scott Kelly is about to take off from Kazakhstan to spend a year aboard the International Space Station. If he is like some space travelers, he may temporarily feel a bit foggy, confused or out of place once he is in orbit.

Scientists have not had much luck learning about this problem with their usual tests, so now they are trying something new.

## **One Twin Is Down-To-Earth**

While Kelly is in space, researchers from the University of Pennsylvania will compare his mental performance with test results from someone whose brain is about as similar to Kelly's as you can imagine. They will be studying Mark, his twin brother. Mark will take all the same tests, but he will stay behind on Earth the whole time.

This mental foginess project is one of 10 studies of the Kelly twins that NASA has approved for this mission. Scientists from other organizations will tackle a variety of topics during the year Scott Kelly spends in space. Some will explore the way space changes his immune system and others will examine bacteria in his intestines. All of it will be compared with test results from his brother, a retired astronaut.

The goal of the studies is to get a better idea of what happens to the human body during longer missions. Eventually, NASA will use the information to prepare astronauts for missions to Mars, which will last between 2 1/2 and three years.

## **A Whole Year In Space**

Mathias Basner is leading the University of Pennsylvania research team. He says NASA has lots of information about astronauts who have spent six months in space. Information about a one-year trip like Kelly's is much harder to find because only a few astronauts have ever stayed in space that long.

While in space, astronauts can suffer from all sorts of health issues. They often have trouble sleeping and breathing air that contains higher levels of carbon dioxide than we breathe on Earth.

Weightlessness can also become a problem for astronauts. It weakens the bones and causes fluids to pool in unusual parts of the body.

"It's all about getting the astronaut there and back, healthy," said Basner. He says the astronauts' health is not just important for their own sake. It also has to do with protecting the robotic arms and other high-tech equipment that they operate. In a risky environment like space, even a tiny mistake can create big problems.

## **One-Of-A-Kind Twins**

Comparing twins has always been popular in other areas of science, but twin astronauts are a rare find. The Kelly brothers' DNA is almost exactly the same, since DNA is passed on from parents to children. That means that, if Basner's team notices any differences in their health, it probably has something to do with whether they are in space or on the ground.

Of course, Basner's team can't really prove anything just by looking at one set of twins, but this study could still help scientists know where to look for answers. It will also give them information they can compare to test results from future missions.

Basner thinks researchers might even find out that some of the 10 twin studies are related. For example, changes in the bacteria that live in Scott Kelly's intestines might have something to do with how well he does on the mental foginess tests.

Of all the studies, measuring mental foginess in space seems to be one of the most challenging. Basner said most of the tests available to his team were actually made to study significant brain injuries, not short periods of confusion. The tests were also developed for regular people, not astronauts, who are especially healthy and intelligent.

### **Steppingstone To Mars?**

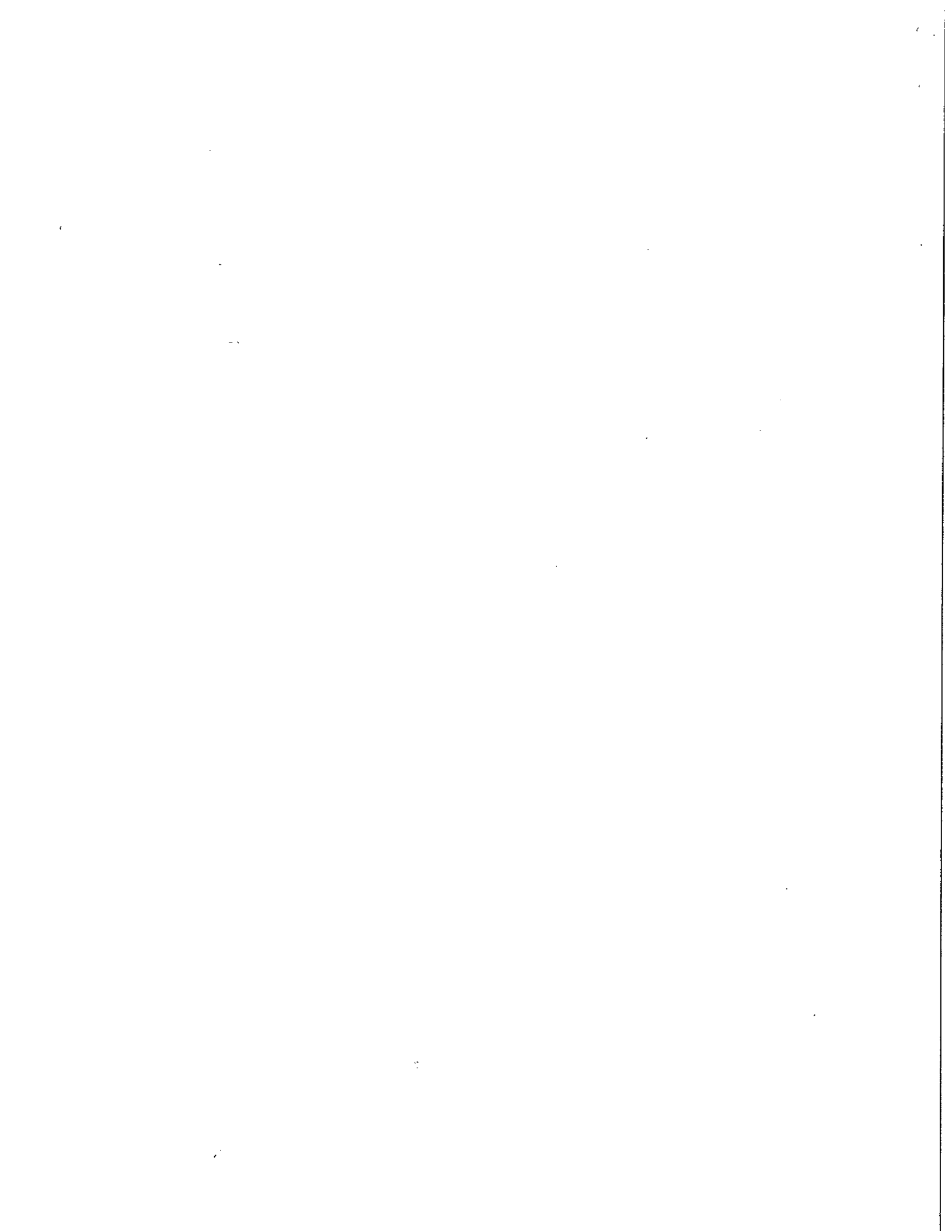
That's why Basner's team decided to make a new version of the test with harder questions. They hope it will become a useful tool that can help determine whether an astronaut needs more rest before taking on a dangerous task. Basner thinks the tests might even help other people with risky jobs, like pilots.

The 51-year-old Kelly twins have taken the new tests several times here on Earth. They will take them 11 times during the mission. Then, they will take the tests three more times after Scott Kelly lands.

The brothers have both been to the space station on previous missions, so they have a good idea just how difficult Scott Kelly's year in space might be.

They also know that a year at the space station will be far less dangerous than the Mars trip. The Mars mission could last up to three times as long and will require astronauts to enter a harsh environment full of harmful radiation.

That trip is still many years away, too far in the future for the twins to take part. But they will contribute to the mission just the same. Their test results will help scientists learn how to keep the Mars astronauts safe and ensure their mission is a success.



Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_\_\_

*Twin Astronauts to Help Scientists Learn to Keep  
Brains Sharp in Space (+17 points)*

1. **BEFORE** you read the article: Why do you think scientists want to study twins? (+1)
  
2. In the first paragraph, what does the word “foggy” mean? (+1)
  
3. **According to the article**, why do scientists want to study Scott Kelly’s twin brother? (+1)
  
4. In addition to the mental foggy, what else will the scientists being studying? (+2)
  - A.
  - B.
  
5. What will NASA use this new information for? (+1)
  
6. What health issues do astronauts have in space? (+4)
  - A.
  - B.
  - C.
  - D.

7. **Cite** why is it important to take good care of astronauts? (+1)

8. Specifically, why is comparing twins popular in science? (+1)

9. Which one of NASA's tests are the most challenging? Why? (+2)

10. What do you think happens when an astronaut can't pass the mental test? (+1)

11. Imagine yourself in space for a year, how do you think your body would change?  
Give 2 examples. (+2)

A.

B.