

## HUMAN NEEDS IN SPACE

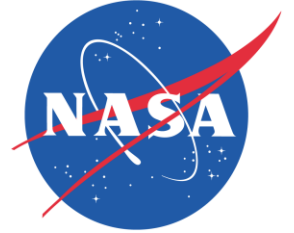
(Adapted from Discovery Education Science Textbook)



Like you, astronauts are curious about space.

When did you first notice outer space? What did you think and what questions did you have? Curious people have **gazed** into the sky for thousands of years **seeking** answers. This search for answers was an important factor that led scientists to develop an American space program.

NASA is the National Aeronautics and Space Administration. NASA **runs** the United States' space program. Scientists working for NASA have **launched** many missions into space to advance human knowledge. NASA scientists search for answers to



questions we have about space.

Some of NASA's missions involve sending humans into space. Humans can make difficult observations, measurements, and analyses. Humans also have **bravery** and creativity. These qualities can help astronauts solve problems that may occur in space. NASA scientists know that for humans to travel through space, astronauts have basic needs. Astronauts must have oxygen, food, water, and rest. These needs are usually simple to meet on Earth; to meet these needs in space is very complicated.



Human needs must be met for astronauts to live in space.



NASA space shuttle

The gases in space cannot **support** human life. In fact, most of space contains no gases at all—it is what scientists call a vacuum. Spacecrafts must provide their passengers with oxygen to breathe. Spacecrafts carry their own sources of oxygen and nitrogen. These gases are circulated throughout the spacecraft to provide similar air to the one we breathe on Earth.

Astronauts must also carry their entire food supply when they travel to space. When humans first traveled to space, they carried freeze-dried food on their missions. The astronauts would add water to the food to eat it. NASA has worked to improve the menu for astronauts. Travelers in space can now eat a lot of foods, including soups, crackers, and fruits.



Freeze dried food for astronauts



Astronauts may suffer from bone loss

All the food on the menu must meet the health needs of the astronauts. Although it's important that the food is healthful and tasty, it's also important that the food is **appropriate** for space. Food needs for humans are a little different in space. According to Vickie Kloeris, a NASA food specialist, "Astronauts must consume little salt." Bone loss is a problem that every astronaut experiences, and eating too much salt can make this problem worse.

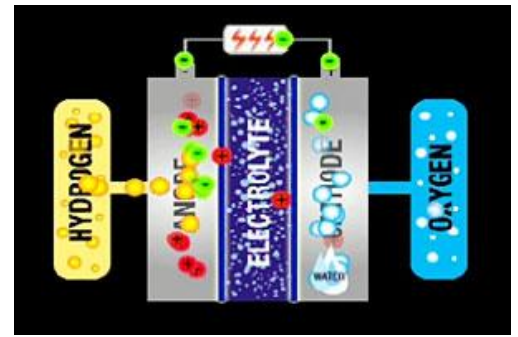
NASA has a creative way to provide water for space missions. To create electricity for spacecrafts, NASA uses a fuel cell. Fuel cells convert hydrogen gas into electricity. Water is created when the hydrogen is converted to electricity. The spacecraft uses the electricity, and the astronauts use the water. Astronauts must be careful to conserve water and recycle it whenever possible.



Astronauts sleeping bags

Rest is important for all human bodies. It is little harder to go to bed on a spacecraft. Because there's no sunset in space, most astronauts wear **blindfolds** to block the sun. There is also no gravity in space. Astronauts sleep in special sleeping bags that are strapped down. The straps keep the bags from bumping into objects on the spacecraft.

Meeting human needs is more difficult in space than on Earth. To NASA, the effort is valuable—after all, the best way to learn about space is to explore it.



An example of a fuel cell