SASTA OLIPHANT SCIENCE AWARDS

SOUTH AUSTRALIAN SCIENCE TEACHERS ASSOCIATION

Highly Commended

Science Writing

Year 5-6

Charles Bruce

Lucindale Area School

ROWE SCIENTIFIC PTY. LTD. www.rowe.com.au

Australian Government
Department of Defence

Government of South Australia
Department for Education

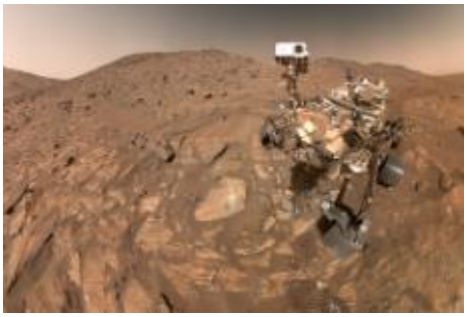
SASTA South Australian Science Teachers Association

Living on Mars: What would it take?

Mars, the red planet, is 228 million km from Earth and 4.6 billion years old. For centuries people have seen it in the sky thinking I will someday live there, but now it is closer to reality, but what would it take?

Getting to Mars

The first problem is the distance it is to get to Mars, as it is a 6-month trip there. People would need at least 500kg of food per passenger to get there, not counting on arrival. Another problem people would need to overcome is how to communicate from several million kilometres away if something went wrong, plus comforting the astronauts on their journey.



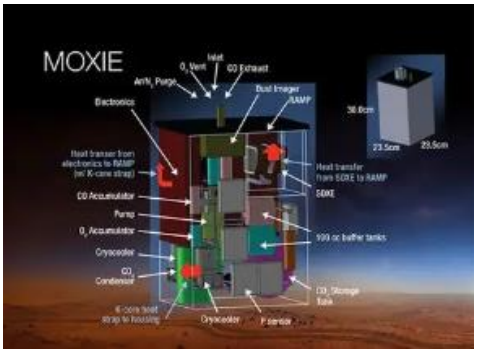
Mars - NASA Science Mars Rover on Mars

Shelter

On arrival to Mars, shelter will need to be made, so it will need to be made on Mars as transporting materials will be too expensive. Scientists believe that colonists will need to make shelter out of materials already on Mars, any habitable shelter on Mars will need to withstand intense radiation, freezing temperatures, and lack of oxygen. Some ideas are to build igloos out of the polar ice caps or make shelter dug into the Martian soil.

Oxygen

The Martian atmosphere of Mars consists mainly of carbon dioxide, which can't be breathed; reliable oxygen ventilation systems will be needed for survival. A piece of technology that will be vital on Mars is the MOXIE. The MOXIE device can convert carbon dioxide to oxygen. This is effective as the Martian atmosphere consists mainly of carbon dioxide.



The Moxie Mars Oxygen ISRU Experiment Instrument for Mars 2020 Rover is MOXIE - NASA Science

Food

On Mars a major concern will be food, as no animals will be brought to Mars. An astronaut's diet will be entirely vegan. Scientists believe that all food will be grown under cover as the radiation levels would result in mutated crops, that may not be safe or edible. Also, the soil on Mars consists of no bio-organisms to hold it together. Under the surface, the soil is believed to be greyish, as there are large amounts of iron in the soil. As a result, all food will have to be grown in a tank or through aquaculture, as bringing soil to Mars will be way too expensive and could contaminate the planet with foreign bacteria.

The Mars Suit

A major part of daily life will be the space suit. This vital piece of equipment will have to withstand radiation, be lightweight, and allow astronauts to use their fingers to fix equipment outside of the base. New spacesuits will be developed. Six different materials have been selected and attached to the Mar's rover, Perseverance. These selected materials are Ortho-fabric, Teflon, nGimat coated Teflon, Dacron, Vectran and Polycarbonate. Scientists are monitoring these materials to help decide which will be the best on a spacesuit on Mars. With all these materials, the estimated price of a mars suit will be $1 billion.

Solutions To Getting to Mars

A solution to traveling to and from Mars is the new rocket designed by Space X, called Starship. This rocket is designed to be reusable. Standing at 121m tall this rocket is fully reusable. This spaceship is the largest in the world and has a payload capacity of a whopping 100-150 tons. For the first stage of launch, Starship has a massive engine booster that is active until it reaches the edge of the atmosphere. It uses 7590 tons of force and contains 33 Raptor engines, each with 230 tons of force, with 20 positioned around the side and an additional 13 in the middle. During the second stage the booster falls off and returns to Earth to be reused, while the main part of the rocket continues to be powered by 6 engines, three raptor engines and 3 raptor vacuum engines, designed to work in the vacuum of space. Starships will be able to carry up to 100 people to Earth's orbit or to colonise on the Moon. Another essential part of Starship is in orbit refilling. This will happen with a Starship in orbit, minus the windows, to refill in orbit and continue with up to 100 tons to Mars. So, this space shuttle will be extremely cheap as it is fuelled on oxygen and methane which is substantially more eco-friendly than other fuels.

Starship Launching SpaceX - Starship

What would a civilisation on Mars look like?

A civilisation on Mars would probably look fairly different from on Earth, as all our power would come from solar panels or other ways people haven't thought of, as the sun is so far away. Colonists would never take your helmet off as your blood would boil, so if you stepped outside without a space suit on, that would be deadly. A significant difference would be where people live as most people would believe colonists would live in high tech space shuttles, but it is more likely that colonists will live underground. If people are going to live on Mars a couple of things will need to be made, fixed, and invented to make it possible.

Word Count: 799

Bibliography

Can Humans Live on Mars? What Would it Look Like? | EFK
Could we really live on Mars?
Could we grow food on Mars? UNE Sci Flicks chat with Dr Chris Guppy - University of New England (UNE)
NASA - Designer Plants on Mars - NASA
SpaceX - Starship