




1 Look at the pictures. What can you see? Where are the objects?

2 Listen and read.  114

The Mysteries of Mars



People have always been fascinated by Mars, and it has become one of the most explored planets in the Solar System. In the early 1600s, when the telescope was invented, astronomers looked up at the planet and wondered what it was like. Since then, as technology has grown, scientists have sent satellites to orbit Mars and robots to explore the surface. Over the centuries, they have discovered many things.

The Climate

Mars is known as the 'Red Planet' because it is covered in red dust. It has violent dust storms, so the surface is always changing. It is the second-smallest planet in the Solar System and fourth in line from the sun, which means it can get very cold. The highest temperature on Mars is about 25°C, but the lowest is around -120°C.

The Discovery of Water

Mars is in the middle of an ice age, so liquid water cannot exist on its surface at the present time. However, photographs show markings on the surface of the rocks. Scientists think these markings suggest there were rivers there. Perhaps this was because of melting ice, or perhaps there was rain and snow. Some scientists even believe a large ocean once covered the northern half of Mars.

The Surface

Mars has an interesting surface. Scientists think meteorites crashed onto Mars billions of years ago because it has many large craters. The largest crater is about 1800 km across. There are also mountains,

valleys and volcanoes. Olympus Mons is one of these volcanoes and is the highest mountain in the Solar System. It's around 21 km high, which is about three times higher than Mount Everest!



3 Read again and answer the questions.

- 1 Why is Mars called the 'Red Planet'?
- 2 What is Olympus Mons?
- 3 What was the name of the first spacecraft to land on Mars?
- 4 When did Curiosity land on Mars?

4 Discuss.

- 1 Do think space exploration is a good idea? Why (not)?
- 2 Do you think humans will ever land on Mars? Why (not)?

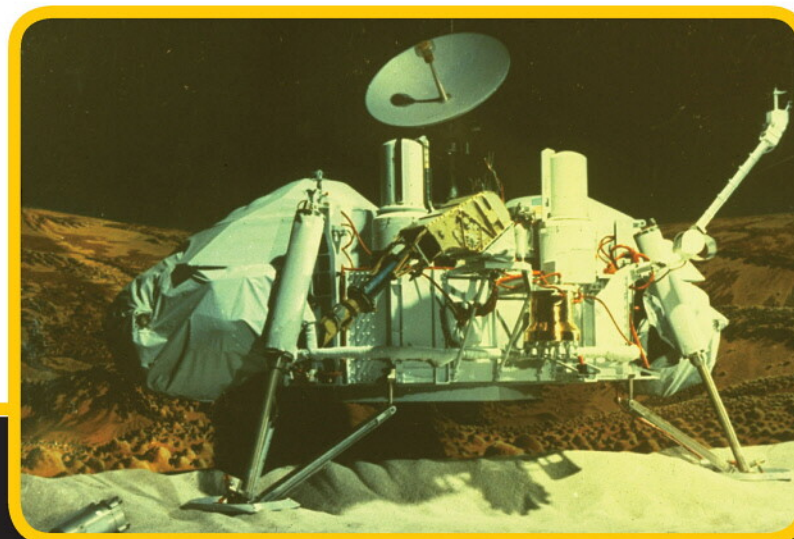
The Early Missions

The first missions to Mars began in the 1960s, when the Soviet Union and the US began sending spacecraft to orbit the planet. These spacecraft took photographs and collected information about many things. Some of them tried to land on the surface, but these attempts were unsuccessful.

Then, in July 1976, the first unmanned spacecraft landed on Mars. It was called Viking 1. In September, its twin, Viking 2, landed on a different part of the planet. These two spacecraft had computers that could record information around them and send it back to earth. However, the spacecraft could only stay in one place. So scientists weren't able to know what the whole of Mars was like.

In 1996, the Sojourner was launched. This craft was different from Viking 1 and 2 because it could move around, like a remote-controlled car. It was known as a

rover because it could travel across the surface without a human driver, and explore other areas. In 2004, two more rovers were launched and landed on Mars. These rovers were called Spirit and Opportunity. Unfortunately, Spirit has since become trapped and has stopped working, but Opportunity is still active. It continues to move, collect information, take photos and report back to earth.



The Landing of Curiosity

More recently, in 2012, NASA sent a new rover called Curiosity to Mars. This rover, which is the size of a car, has six wheels and is around 2.8 metres long. It can travel 200 metres per day. It has computerized equipment which can survey rocks, soil and dust. It has cameras which can send images back to earth. It is the biggest and most advanced rover yet. Its mission is to find out more about the climate and geology of Mars, and also to find out if there was once some kind of life there.



The Future of Space Travel

Scientists have discovered a lot about Mars through satellites and different kinds of robots. However, they are working hard to improve technology. They hope that, one day, they will be able to send astronauts to walk upon the surface of the 'Red Planet', so that they can learn more about the mysteries of Mars.

Scientists also hope to develop ways to increase the number of people that can travel into space. It's already possible to pay thousands of dollars to book a place on a spacecraft and travel with astronauts. But, as more and more people are becoming interested, companies such as Virgin Galactic are planning to provide a space tourism service. Virgin Galactic is building a fleet of commercial spaceships, with the intention of making space travel a reality. And, as the demand increases, the price of tickets will become lower. Then, travelling in space, or even exploring other planets such as Mars, may become a reality for ordinary people.



1 Look at the pictures. What are the astronauts doing?

2 Listen and read.  115

The Diary of an **ASTRONAUT**

16th October

06.00

We had our usual wake-up call this morning. I didn't want to get up because I was really comfortable. Some people think that sleeping in space must be really uncomfortable, but it isn't! We sleep in sleeping bags in compartments and strap ourselves in so that we don't float around while we sleep. There is no gravity in space so, if something isn't tied down, it floats away! We also have eye masks and earplugs at night as it can be difficult to sleep because of the light and noise from the machines all around us. We usually have about eight hours of sleep but, last night, I only slept for about six hours. That's because I was staring out of the window at the views and taking pictures. It's amazing to see the earth and all the stars from up here.

When I was finally awake, I had a very quick wash. There isn't much water on a space station because we have to bring most of it from earth on the space shuttle. We use water for drinks and washing, but there isn't enough water for washing up, so we eat from food containers that we can throw away.

I had some bread and jam for breakfast. Some people think we only eat dry food in space, but this isn't true. We have lots of different types of food. Firstly, we have food that is ready to eat, like nuts and biscuits. Secondly, we have food that you have to add water to, like soup. We also have food from tins, such as fish and fruit. We drink from cartons and use straws so that the liquid doesn't float away and damage any of the machines. This is very important because, if liquid damaged the machines, it would be very dangerous in space!

After breakfast today, we did our usual cleaning jobs. It's really important that the space station is clean and tidy. This is because bits of rubbish can float away and damage the machines. All the rubbish we collect is taken back down to earth. After we had cleaned, we sat down and had our usual daily planning conference with Mission Control on earth. This is when we find out what work we have to do during the day.



3 Read again and answer the questions.

- 1 How does the astronaut sleep at night?
- 2 Who does the astronaut speak to every morning on earth?
- 3 Why did the astronaut go on a spacewalk?
- 4 How much exercise does the astronaut do every day?

4 Discuss.

- 1 Do you think exploring space is a good idea? Why (not)?
- 2 Would you like to be an astronaut? Why (not)?

08.00

My first job today was to go on a spacewalk to check for damage on the outside of the space station. First, I had to put on my spacesuit. Spacesuits are very important because they protect us from the dangers of being outside. Firstly, they protect us from extreme temperatures. Secondly, they protect us if we are hit by speeding objects in space. Thirdly, they provide the oxygen we need to breathe while we are in space. It takes about an hour to put on a spacesuit because you have to spend a lot of time checking for leaks or holes. But going on spacewalks is one of my favourite activities in space. It's such an amazing feeling to be floating out amongst the stars and the planets. Today, I didn't find any problems, so I was back inside the space station in time for lunch.

13.00

We usually have one hour for lunch and, today, we had soup and bread to eat, followed by some tinned fruit and some biscuits. After that, we cleaned up, had a rest and then got ready for the afternoon's work.

14.00

After lunch, I helped to repair a damaged satellite. We sometimes visit orbiting satellites when we need to repair them. We use the space shuttle's robotic arms to work on them, but we also sometimes pull them in so that we can work on them more slowly. We successfully repaired the damage and we will return the satellite to orbit tomorrow.

18.30

In the early evening, I did my exercise. Exercise is really important for us when we are in space. On earth, we are always using our bones and muscles to move against the force of gravity. In space, there is no gravity, so our muscles and bones don't need to work so hard! They can become very weak, so we do at least two hours of exercise every day on the exercise machines at the space station. If we didn't do any exercise, then our muscles might become so weak that we couldn't walk any more when we returned to earth!

After dinner, there was a meeting for the whole crew to discuss some of our plans for the rest of our stay at the space station. Then we had some free time. This evening, I listened to some music and wrote in my diary. I looked at the views and thought about how lucky I am to be an astronaut! It's brilliant!

