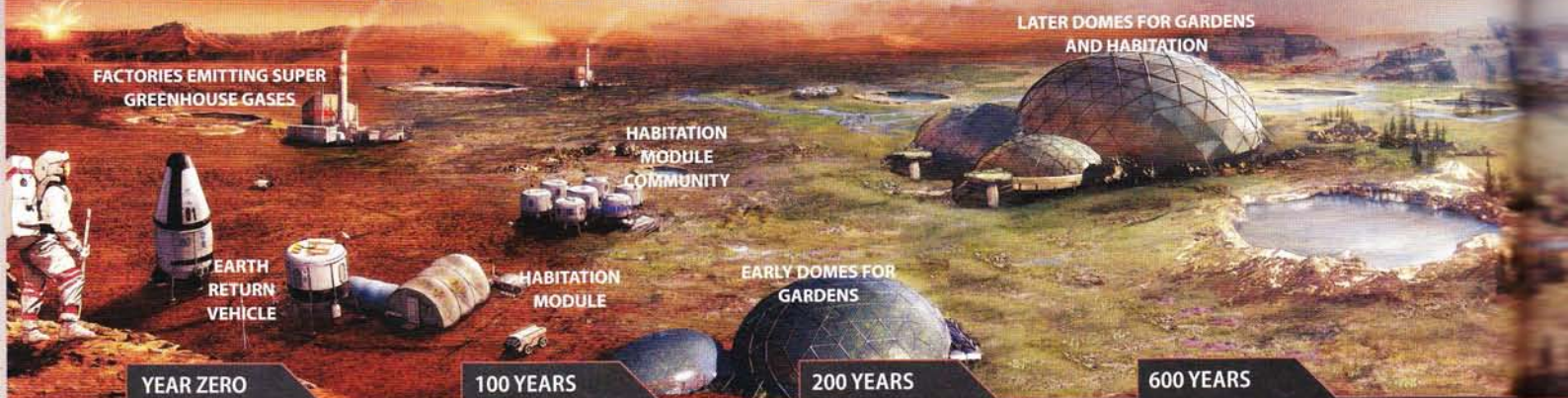


# 10b Life on Mars?



YEAR ZERO

**1** THE THOUSAND-YEAR project might begin with a series of eighteen-month survey missions. Each crew making the six-month journey from Earth to Mars would add a small habitation module to the base.

100 YEARS

**2** AN EARTH-LIKE ATMOSPHERE could be made. First, the carbon dioxide which is now frozen in the ice would be released. Maybe mirrors could focus sunlight on the ice to do this.

200 YEARS

**3** WITH ENOUGH carbon dioxide, the temperature would go up and rain would fall. Algae and microbes could survive and transform the rocky surface.

600 YEARS

**4** FLOWERING PLANTS could be introduced when the microbes had created soil. This would add oxygen to the atmosphere. Forests might even grow.

## Life on Mars?

### Making the red planet go green

If we tried to, could we really transform the frozen surface of Mars into something more friendly – a place where humans could live? And equally importantly, should we?

The first question has a clear answer: Yes, we probably could. Most of the work in 'terraforming', says NASA planetary scientist Chris McKay, would be done by life itself. 'We wouldn't have to build Mars, just modify its atmosphere,' McKay says. 'If we warmed it up and threw in some seeds, plants would grow there.'

Enthusiasts such as Robert Zubrin, president of the Mars Society, dream of Martian cities. Zubrin, an engineer, believes civilisation cannot succeed without limitless expansion. He also thinks that if we transformed Mars – a horrifying idea to some – we might learn to manage our limited Earth better. But if I was an astronaut, I wouldn't be keen on that six-month journey!

## Reading

**1** Work in pairs. Do you think these statements are true (T) or false (F)? Find the answers on the webpage.

- 1 Mars is bigger than Earth.
- 2 Earth is hotter than Mars.
- 3 Earth is closer to the sun than Mars.
- 4 Martian days are longer than Earth days.

**2** Look at the picture. Answer the questions.

- 1 What process does the picture illustrate?
- 2 Why is it red on the left and green on the right?
- 3 What is the purpose of the structures shown?

**3** Read the captions (1–4). Match the captions with the stages in the process (a–d).

- a changing the atmosphere
- b introducing simple organisms
- c setting up places to live
- d creating conditions for plants to grow

**4** Read the text *Life on Mars?* and look at the picture again. Answer the questions.

- 1 How long would it take to transform the environment on Mars?
- 2 What is the key to the process?
- 3 What would be the benefits of transforming Mars?

**5** Work in groups. Discuss the statements.

- 1 'I think we'll need to colonise other planets if we don't change our habits on Earth.'
- 2 'I don't think the ideas described here will work.'
- 3 'I'd like to live on Mars.'

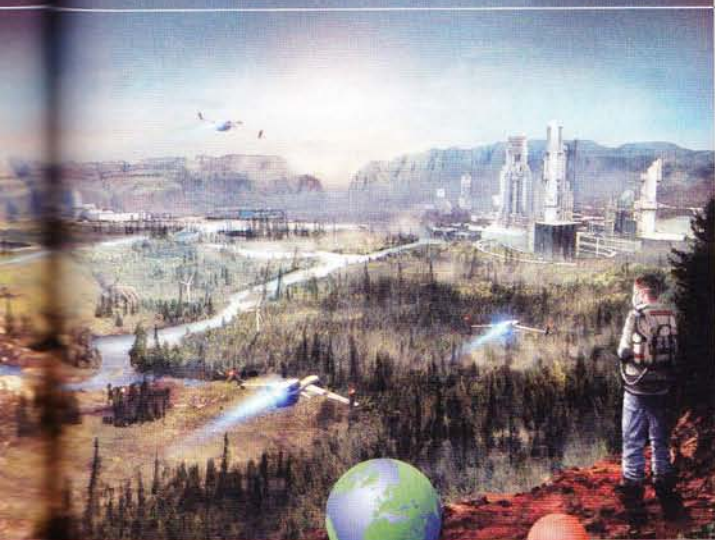
### ▶ WORDBUILDING suffixes -ful, -less

We can add *-ful* to the end of a noun to mean 'with' and *-less* to mean 'without'.

a *painful* injection  
a *limitless* expansion

For further information and practice, see Workbook page 129.





|                               | EARTH          | MARS           |
|-------------------------------|----------------|----------------|
| ROTATION PERIOD (DAY)         | 23.0 HOURS     | 24.6 HOURS     |
| REVOLUTION PERIOD (YEAR)      | 365.2 DAYS     | 686.9 DAYS     |
| AVERAGE TEMPERATURE           | 150°C          | -630°C         |
| AVERAGE DISTANCE FROM THE SUN | 150 MILLION KM | 230 MILLION KM |

## Grammar second conditional

- 6 Look at these sentences from the text. Which verbs are used to make the second conditional?

- If we warmed it up and threw in some seeds, plants would grow there.
- But if I was an astronaut, I wouldn't be keen on that six-month journey!

- 7 Look at the sentences in Exercise 6 again. Choose the correct option.

- The second conditional refers to situations in the past / the present or the future.
- The second conditional refers to improbable / real situations.

### ▶ SECOND CONDITIONAL

|                   |                               |                          |
|-------------------|-------------------------------|--------------------------|
| If + past simple, | would<br>could (not)<br>might | infinitive<br>without to |
|-------------------|-------------------------------|--------------------------|

For further information and practice, see page 88.

- 8 Look at the grammar box. Find the patterns in the text and the picture. What is the difference between *would*, *could* and *might*?
- 9 Look again at statement 1 in Exercise 5. Why is the first conditional – and not the second conditional – used?

- 10 Complete the questions. Then answer the questions using information from the text and the picture.

- If we \_\_\_\_\_ (have) to transform Mars, what \_\_\_\_\_ (be) the first stage?
- How long \_\_\_\_\_ it \_\_\_\_\_ (take) for astronauts to reach Mars?
- \_\_\_\_\_ it \_\_\_\_\_ (be) possible to change the atmosphere on Mars?
- What \_\_\_\_\_ (happen) if the ice on Mars \_\_\_\_\_ (melt)?
- How \_\_\_\_\_ the temperature \_\_\_\_\_ (change) if the amount of carbon dioxide \_\_\_\_\_ (increase)?
- What \_\_\_\_\_ we \_\_\_\_\_ (learn) from changing the environment on Mars?

- 11 Complete the sentence with your own ideas. Then work in pairs. Compare your sentences.

we could ...

If we transformed Mars, people would ...

it might ...

- 12 Work in two pairs in a group of four.

Pair A: Make a list of positive aspects of these situations.

Pair B: Make a list of negative aspects.

- living in a 'habitation module' on Mars
- leaving Earth for a colony in space
- being an astronaut on a long space voyage
- being an astronaut on the International Space Station
- going on a space-tourism trip into the Earth's orbit

- 13 Compare your ideas in your group. Which experience would be the best / the worst?

*If you lived in a habitation module, you'd be safe from any danger.*

*Yes, but your life would be very restricted.*

## Speaking

- 14 Work on your own. Think of a new place to live. Note down five reasons why you'd like to live there. Then work in groups. Take turns to tell your group the reasons, but don't say the place. Can they guess before you give all of the reasons?

*I'd love to live in beep. I'd go to all the local football matches.*

*Well, I'd like to live in bzzz. If I lived in bzzz, I'd never be cold again.*

- 15 Think about your answers to the questions. Then tell the class.

- If you could start a new life, what things would you change – and how?
- What would you miss about your 'old' life?