



SHOULD HUMANS Live on Mars?

Mars Project Pack

Ages 11-13



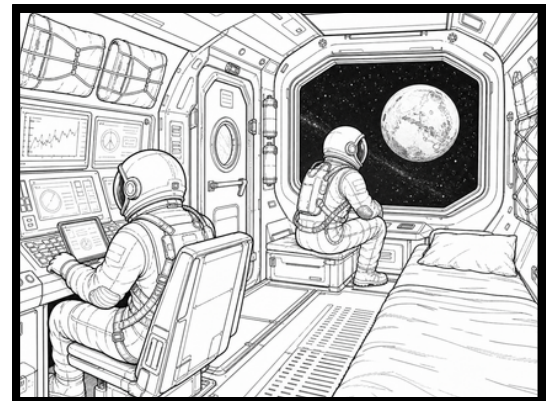
Should Humans Live on Mars?



For many years, Mars has captured human imagination. Its rusty red surface, enormous volcanoes and dry river valleys have made scientists wonder whether life once existed there. Today, Mars is no longer just a distant planet in the night sky. It has become one of the most serious possibilities for future human exploration.

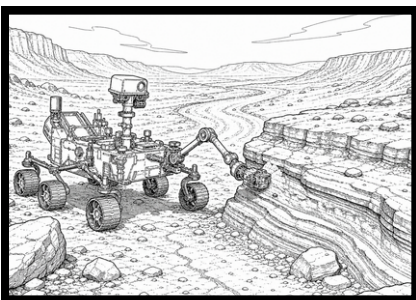
Mars is often described as the most Earth-like planet in our Solar System. It has seasons, polar ice caps and a day that is only slightly longer than a day on Earth. These similarities make Mars an interesting target for scientists who want to understand whether humans could one day survive beyond our own planet. However, calling Mars “Earth-like” can be misleading. The planet is still extremely hostile.

The atmosphere on Mars is very thin and is mostly made up of carbon dioxide. Humans would not be able to breathe without special equipment. Temperatures can fall far below freezing, and the planet is exposed to dangerous radiation from the Sun because it does not have a strong magnetic field like Earth. Even a simple walk outside would require a protective spacesuit.



Despite these challenges, some scientists believe that sending humans to Mars could lead to major discoveries. Robotic rovers have already found evidence that liquid water may once have flowed across the Martian surface. If Mars once had water, it may also have had the right conditions for life. Finding even tiny signs of ancient life would be one of the most important scientific discoveries in history.

Supporters of Mars exploration also argue that humans need to think about the long-term future of our species. Earth faces problems such as climate change, natural disasters and the possibility of future asteroid impacts. Some people believe that building settlements on another planet could help protect humanity if Earth ever became seriously threatened.



However, critics argue that this way of thinking is dangerous. They believe humans should focus on solving problems on Earth before trying to live somewhere else. A mission to Mars would cost billions of pounds, and some people argue that this money could be spent on healthcare, education, poverty or protecting the environment. They also worry that humans may damage Mars before fully understanding it.

There are also serious questions about the people who would travel there. A journey to Mars could take around seven months, depending on the position of the planets. Astronauts would have to live in a small spacecraft for a long time, far away from family, friends and help from Earth. Once they arrived, they would face isolation, danger and the pressure of surviving in an environment where one mistake could be fatal.

For now, Mars remains a place of possibility rather than a place to call home. It offers excitement, mystery and scientific promise, but it also presents enormous risks. The question is not only whether humans can live on Mars. It is whether they should.

Before you answer, track your evidence in the text. Use the colour key to show which reading skill you are using. Star readers do not just find an answer. They prove it!



- Yellow = facts you can retrieve directly**
- Blue = vocabulary clues**
- Green = inference clues**
- Pink = quotations to support an answer**
- Purple = viewpoint or opinion**

Try to highlight only the most useful words or phrases, not whole paragraphs.

1 Find and copy three physical features of Mars mentioned in the first paragraph.

2 What does “hostile” mean in paragraph 2?

3 Why might calling Mars “Earth-like” be misleading?

4 Find one quotation that supports this statement: Mars is not currently suitable for humans to live on without technology.

5 What is the effect of ending the text with a question?

6 Do you think the writer presents Mars exploration as more hopeful or more concerning? Explain as fully as you can using evidence from the text.

Tips for Parents



Before your child answers the questions, encourage them to go back to the text and highlight the evidence that helps them. This means finding the word, phrase or sentence that gives them the answer or clue.

This is an important comprehension skill because it teaches children to prove their answers using the text, rather than guessing or relying on memory.

Helpful tips for struggling children

If your child is finding it tricky, try these steps:

1. Read one paragraph at a time, then pause and ask: What was this paragraph mostly about?
2. Use the colour key before writing the answer.
3. For retrieval questions, go back to the paragraph named in the question.
4. Highlight only the key words or phrase, not the whole paragraph.
5. For vocabulary questions, read the sentence before and after the tricky word.
6. For inference questions, look for clues and ask: What does this suggest?
7. For evidence questions, copy the words exactly from the text.
8. Use sentence starters such as: I know this because..., This shows..., The writer suggests...
9. For longer answers, use Point, Evidence, Explain.
10. Choose the evidence first, then write the answer.

Sentence Starters

1. Find and copy three physical features of Mars mentioned in the first paragraph.
Three physical features of Mars are _____, _____ and _____.
2. What does “hostile” mean in paragraph 2?
The word “hostile” means _____.
3. Why might calling Mars “Earth-like” be misleading?
Calling Mars “Earth-like” could be misleading because although _____, it is still _____.
4. Find one quotation that supports this statement: Mars is not currently suitable for humans to live on without technology.
A quotation that supports this statement is: “_____”.
5. What is the effect of ending the text with a question?
Ending the text with a question makes the reader _____. It suggests that _____.
6. Do you think the writer presents Mars exploration as more hopeful or more concerning?
Explain as fully as you can using evidence from the text.
I think the writer presents Mars exploration as more hopeful / concerning because the text says “_____”. This shows _____. Another piece of evidence is “_____”, which suggests _____.

Mark Scheme

Should Humans Live on Mars

Question	Answer	Evidence to Highlight	Marks
1	<p>Award 1 mark for each correct feature. Accept:</p> <ul style="list-style-type: none"> rusty red surface enormous volcanoes dry river valleys 	“rusty red surface, enormous volcanoes and dry river valleys”	3
2	<p>Award 1 mark for an answer that shows hostile means dangerous, harsh, unsafe or difficult to survive in. Accept:</p> <ul style="list-style-type: none"> dangerous, harsh, unsafe, difficult to live in, unfriendly to life and not suitable for humans 	“hostile”	1
3	<ul style="list-style-type: none"> 1 mark for recognising that Mars has some similarities to Earth. 1 mark for explaining that Mars is still very different, dangerous or unsuitable for human life. 	<p>“However, calling Mars ‘Earth-like’ can be misleading.” “The planet is still extremely hostile.” “Humans would not be able to breathe without special equipment.” “Temperatures can fall far below freezing” “dangerous radiation”</p>	2
4	<p>“Humans would not be able to breathe without special equipment.” “Even a simple walk outside would require a protective spacesuit.” “The atmosphere on Mars is very thin and is mostly made up of carbon dioxide.” “The planet is exposed to dangerous radiation from the Sun...”</p>		1
5	<p>1 mark for saying it makes the reader think.</p> <ul style="list-style-type: none"> 1 mark for saying it leaves the debate open or encourages the reader to form their own opinion. 1 mark for linking this to the issue of whether humans should live on Mars, not just whether they can. <p>Example full-mark answer: Ending with a question makes the reader think carefully about the issue. It leaves the debate open rather than giving one final answer. It also shows that the main question is not just whether humans are able to live on Mars, but whether it is the right thing to do.</p>	“The question is not only whether humans can live on Mars. It is whether they should.”	3
6	<ul style="list-style-type: none"> 1 mark for giving a clear opinion. 1 mark for using one piece of evidence. 1 mark for using a second piece of evidence. 1 mark for explaining how the evidence supports their opinion. <p>If they argue it is more hopeful Evidence pupils could highlight in pink/purple:</p> <ul style="list-style-type: none"> “Mars has captured human imagination” “one of the most serious possibilities for future human exploration” “major discoveries” “one of the most important scientific discoveries in history” “could help protect humanity” “excitement, mystery and scientific promise” <p>If they argue it is more concerning Evidence pupils could highlight in pink/purple:</p> <ul style="list-style-type: none"> “extremely hostile” “Humans would not be able to breathe without special equipment” “dangerous radiation” “far away from family, friends and help from Earth” “isolation, danger and the pressure of surviving” “one mistake could be fatal” “humans may damage Mars before fully understanding it” 		4

Design a Prototype for Life on Mars



Draw and label your prototype.

What problem does your prototype solve?

How does it help humans survive on Mars?

How could you further improve your design?

What materials or features does it need?

Design a Prototype for Life on Mars - Parent Guide



Ask the children to design something that would help humans survive on Mars.
They could choose one of these:

- a Mars habitat
- a Mars spacesuit
- a Mars rover
- a greenhouse for growing food
- a water recycling machine
- an oxygen maker

Sentence starters:

My prototype is called _____.

It is designed to help astronauts _____.

One important feature is _____.

This would be useful because _____.

It would protect humans from _____.

I think this design would be successful because _____.

Useful vocabulary:

- prototype
- habitat
- insulation
- oxygen supply
- carbon dioxide
- radiation
- pressure
- solar panels
- recycled water
- temperature control
- airtight
- renewable energy
- survival
- atmosphere

They should connect their design choices to the conditions on Mars.

Encourage them to refer to:

- very cold temperatures
- thin atmosphere
- lack of breathable oxygen
- dangerous radiation
- isolation from Earth
- need for food, water and energy

Simple Success Criteria for Children

I have:

- explained what my prototype is
- described at least three important features
- explained how each feature helps humans survive
- used scientific or technical vocabulary
- linked my ideas to conditions on Mars
- organised my writing into paragraphs
- included a final sentence explaining why my design is useful
- checked capital letters, punctuation and spelling

Which Material Would Make the Best Mars Habitat Insulation?



If humans lived on Mars, they would need protection from freezing temperatures. A Mars habitat would need to keep warmth inside so astronauts could survive safely.

Different materials trap heat in different ways. Some materials allow heat to escape quickly, while others slow heat loss down.

Draw your experiment set up including labels.

Predict: Which material do you think will be the best insulator?

How will you make this a fair test?

Material Tested	Starting Temperature	Final Temperature	Temperature drop

Conclusion

Which Material Would Make the Best Mars



Habitat Insulation?

Instructions

You are going to test different materials to find out which one keeps heat in the best.

You could test:

- foil
- bubble wrap
- fabric
- cotton wool
- paper
- cardboard
- kitchen roll

Equipment

You will need:

- cups or small containers
- warm water
- thermometer
- different insulating materials
- elastic bands or tape
- timer
- measuring jug

Method

1. Wrap each cup in a different material.
2. Pour the same amount of warm water into each cup.
3. Measure and record the starting temperature.
4. Leave the cups for 10 minutes.
5. Measure and record the final temperature.
6. Work out how much heat was lost.
7. Compare your results.

Mission to Mars: Data Challenge



A team of scientists is planning a future mission to Mars. They need to understand the journey, the planet's conditions and the risks astronauts might face.

Use the information below to answer the questions.

Fact	Information
Average distance from Earth to Mars	225 million km
Closest distance from Earth to Mars	54.6 million km
Average spacecraft speed	28,000 km per hour
Length of one day on Mars	24 hours 37 minutes
Average temperature on Mars	-63°C
Lowest temperature on Mars	-125°C
Highest temperature on Mars	20°C
Time for message to travel one way	5 to 20 minutes

1 What is the difference between the closest distance and the average distance from Earth to Mars?

2 If a spacecraft travelled 28,000 km every hour, about how far would it travel in 10 hours?

3 How much colder is the lowest temperature on Mars than the highest temperature?

4 Why might a 20-minute message delay be dangerous for astronauts on Mars?

5 Which piece of data do you think is most important when planning a Mars mission?

Mission to Mars: Data Challenge



Mark Scheme

Question	Answer	Marks
1	<p>Calculation: 225 million km - 54.6 million km = 170.4 million km</p> <p>Award: 1 mark for correct subtraction method 1 mark for correct answer</p> <p>Answer: 170.4 million km</p>	2
2	<p>Calculation: $28,000 \times 10 = 280,000$ km Answer: 280,000 km</p>	1
3	<p>Calculation: $20^{\circ}\text{C} - -125^{\circ}\text{C} = 145^{\circ}\text{C}$</p> <p>Award: 1 mark for recognising they need to find the difference between 20°C and -125°C 1 mark for correct answer</p> <p>Answer: 145°C colder</p>	2
4	<p>Award up to 2 marks for a clear explanation. Accept:</p> <ul style="list-style-type: none">• astronauts could not get immediate help• instructions from Earth would be delayed• emergencies would be harder to manage• problems might get worse before Earth can respond• astronauts would need to make decisions alone <p>Example full-mark answer: A 20-minute delay could be dangerous because if there was an emergency, astronauts would not get immediate advice from Earth. They might have to solve serious problems by themselves.</p>	2
5	<p>Award: 1 mark for choosing a relevant piece of data 1 mark for explaining why it matters 1 mark for linking it to mission planning, safety, time, survival or communication</p> <p>Possible choices:</p> <ul style="list-style-type: none">• distance from Earth to Mars• spacecraft speed• temperatures on Mars• message delay• length of the day on Mars <p>Example full-mark answer: I think the temperature data is most important because astronauts would need protection from extreme cold. The lowest temperature is -125°C, so scientists would need to design habitats and suits that keep people warm and safe.</p>	3