

**D** Much more serious are the unseen consequences after months or years in space. With no gravity, there is less need for a sturdy skeleton to support the body, with the result that the bones weaken, releasing calcium into the bloodstream. This extra calcium can overload the kidneys, leading ultimately to renal failure. Muscles too lose strength through lack of use. The heart becomes smaller, losing the power to pump oxygenated blood to all parts of the body, while the lungs lose the capacity to breathe fully. The digestive system becomes less efficient, a weakened immune system is increasingly unable to prevent diseases and the high levels of solar and cosmic radiation can cause various forms of cancer.

**E** To make matters worse, a wide range of medical difficulties can arise in the case of an accident or serious illness when the patient is millions of kilometres from Earth. There is simply not enough room available inside a space vehicle to include all the equipment from a hospital's casualty unit, some of which would not work properly in space anyway. Even basic things such as a drip depend on gravity to function, while standard resuscitation techniques become ineffective if sufficient weight cannot be applied. The only solution seems to be to create extremely small medical tools and 'smart' devices that can, for example, diagnose and treat internal injuries using ultrasound. The cost of designing and producing this kind of equipment is bound to be, well, astronomical.

**F** Such considerations have led some to question the ethics of investing huge sums of money to help a handful of people who,

after all, are willingly risking their own health in outer space, when so much needs to be done a lot closer to home. It is now clear, however, that every problem of space travel has a parallel problem on Earth that will benefit from the knowledge gained and the skills developed from space biomedical research. For instance, the very difficulty of treating astronauts in space has led to rapid progress in the field of telemedicine, which in turn has brought about developments that enable surgeons to communicate with patients in inaccessible parts of the world. To take another example, systems invented to sterilize waste water on board spacecraft could be used by emergency teams to filter contaminated water at the scene of natural disasters such as floods and earthquakes. In the same way, miniature monitoring equipment, developed to save weight in space capsules, will eventually become tiny monitors that patients on Earth can wear without discomfort wherever they go.

**G** Nevertheless, there is still one major obstacle to carrying out studies into the effects of space travel: how to do so without going to the enormous expense of actually working in space. To simulate conditions in zero gravity, one tried and tested method is to work under water, but the space biomedicine centres are also looking at other ideas. In one experiment, researchers study the weakening of bones that results from prolonged inactivity. This would involve volunteers staying in bed for three months, but the centre concerned is confident there should be no great difficulty in finding people willing to spend twelve weeks lying down. All in the name of science, of course.



**Strategies:**  
**short-answer questions**

These focus on particular points. For each question, highlight the key words.

Go back to the part of the text where you remember this point being mentioned.

Read through that part for the key words, or words with similar meaning, and highlight them.

Read the question again and decide on your answer, taking care with your grammar and spelling.

**Strategies:**  
**yes/no/not given**

Scan the text for the sections where the topic of the question appears. The views expressed will probably be the writer's, unless there is reported or direct speech quoting somebody else.

Look for expressions with similar meanings to words in the statement.

Decide whether the writer agrees with the statement or not.

If you can't find any mention of the topic, 'not given' may be the answer.

Don't choose 'yes' or 'no' just because you believe it to be true.

## Questions 6 and 7

### Improve your skills: finding key information

Study Question 6 and answer the following.

- What is the key word?
- Where do you remember it first being mentioned in the text?
- Which word in the same paragraph has a similar meaning?
- What does this word tell you about the answer?

► Check your answers on page 40 before you continue.

*Answer the question below using NO MORE THAN THREE WORDS for each answer.*

- Where, apart from Earth, can space travellers find water? .....
- What happens to human legs during space travel? .....

## Questions 8–12

### Improve your skills: identifying the writer's views

- Find a sentence in the text about the topic of Question 8. Who says this?
- Match expressions in this sentence with these words. Remember that these expressions may not be the same part of speech as those in the statement.

obstacles	far into space	medical
sending people	now ... not	technological

- Find the paragraph relevant to Question 10. Who agrees with statement 10? How does the writer respond to this?

► Check your answers on page 40 before you continue.

*Do the following statements agree with the writer's views in Reading Passage 1?*

*In boxes 8–12 on your answer sheet write*

<b>YES</b>	<i>if the statement agrees with the views of the writer</i>
<b>NO</b>	<i>if the statement does not agree with the views of the writer</i>
<b>NOT GIVEN</b>	<i>if there is no information about this in the passage</i>

- The obstacles to going far into space are now medical, not technological.
- Astronauts cannot survive more than two years in space.
- It is morally wrong to spend so much money on space biomedicine.
- Some kinds of surgery are more successful when performed in space.
- Space biomedical research can only be done in space.