Will Human Life on Earth Come to an End?

Photograph of Jules Verne

In 1993 science-fiction writer Kim Stanley Robinson published *Red Mars*, the first of his Mars trilogy. *Red Mars* is set in the year 2026. At the beginning of the novel, the spacecraft Ares departs. Aboard the Ares, the space colonists are bound for Mars.

The voyage to Mars is portentous. On Earth, corporations are coming to dominate global governance. Nation states still fly their flags, but they owe their allegiance to the transnational corporations. The "trans-nats," as the transnational corporations are called, are the real agents of the global economy. They have the power and ability to extract natural resources from the earth. The increasing competition among trans-nats and growing human population means more and more resources are being removed. This situation threatens the feasibility of life on the planet.

Robinson played out this idea over the course of three books. By the end of *Red Mars*, a world war has erupted on Earth. The second book in the trilogy, *Green Mars*, documents the terraforming of the red planet. (Terraforming is a science-fiction term for adapting another planet or moon into a planet that can sustain life in the same way Earth can. This process involves creating an appropriate biosphere, atmosphere, and surface topography on the new celestial body.) The third book in the trilogy, *Blue Mars*, picks up at the stage when the terraforming has allowed for water to exist on Mars. Life on Mars is now truly possible. By the end of the book series, humanity has acquired the skills and technology to spread its civilization throughout the solar system.

Robinson is an American writer. The Mars trilogy is his best-known work. Robinson is also an active outdoorsman. Themes of ecological sustainability run throughout his work, as do questions of social justice. He has won numerous awards within the science-fiction community. Fans of Robinson's, and especially the Mars trilogy, have long been waiting for a film adaptation of the series.

Robinson's idea of moving human civilization to Mars is creative. Still, the idea of the imperative for space colonization has been around for centuries. As long as man has been able to imagine a frontier, he has wanted to conquer it. This is no less true for the space outside our planet.

The German astronomer and mathematician Johannes Kepler discovered the laws of planetary motion in the 17th century. (Kepler was the first person to calculate the orbit of Mars.) Kepler exchanged letters with his Italian colleague Galileo Galilei. In a letter dated from 1610, Johannes Kepler wrote to Galileo: "As soon as somebody demonstrates the art of flying, settlers from our species of man will not be lacking. Given ships or sails adapted to the breezes of heaven, there will be those who will not shrink from even that vast expanse."

Kepler was, of course, correct. As soon as men could get off the earth, they did. For Kepler, the obstacle was only technological. Indeed, it took a long time to master the technology. The technological discoveries were aided by men of both science and letters.

Jules Verne, considered to be the father of the science-fiction genre, predicted a human voyage to the moon in his 1865 novel, *From the Earth to the Moon*. For the story, Verne calculated many of the details of rocket propulsion, a technology that was in its infancy in 1865. What is remarkable to many contemporary scientists is the accuracy with which Verne computed his rocket's mechanics. He also placed the rocket's point of departure in Florida, and very near the site of the Kennedy Space Center.

Technical details aside, thus far, the impetus for space exploration had been romantic. It was Verne's literary successor, H. G. Wells, who imagined a more pressing need for getting man off the planet. In a lecture at the Royal Institute of London in 1902, the author prophesied a need for man to leave the earth:

> It is conceivable that some great unexpected mass of matter should presently rush upon us out of space, whirl sun and planets aside like dead leaves before the breeze, and collide with, and utterly destroy every spark of life upon this earth. It is conceivable, too, that some pestilence may presently appear, some new disease that will destroy not 10 or 15 or 20 percent of the earth's inhabitants as pestilences have done in the past, but 100 percent, and so, end our race. And finally there is the reasonable certainty that this sun of ours must someday radiate itself toward extinction.

The threats of asteroids or plagues were theoretical. Wells could imagine the end of the earth, but he did not believe it would occur. Instead he imagined life would extend into the cosmos. In *The Outline of History* (1920) he writes that "Life, forever dying to be born afresh,

forever young and eager, will presently stand upon this earth as upon a footstool, and stretch out its realm among the stars."

In the 20th century, writers, scientists, and philosophers started to advocate space colonization for ecological and political reasons. This new call for space colonization envisions scenarios in which the human population has made life on Earth unfeasible. The argument starts from the supposition that resources on Earth are scarce. Population pressure will inevitably strain these resources. What's more, the competition for some of these resources—energy, water, food—will lead to global conflict. (As we have seen, Robinson's Mars trilogy picks up this theme.)

It is in this sense that the imperative for space colonization becomes more urgent. No longer is it a romantic quest for human fulfillment. Instead it is a matter of survival for both the planet and humankind. This belief is not limited to the dreams of science-fiction writers.

Krafft Arnold Ehricke was a rocket propulsion engineer and the designer of the D-1 Centaur rocket stage. Ehricke defined something called the "extraterrestrial imperative." In his view, it is the responsibility of humanity to colonize space in order to guarantee the survival of the species. Ehricke wasn't exactly an environmentalist, but he did define the extraterrestrial imperative in ecological terms:

> One of the most thoughtless statements, parroted ad nauseam ever since rational concern for our environment exploded into an emotional syndrome, calls man the only animal that soils its own nest. Every animal soils its nest with the products of its metabolism if unable to move away. Space technology gives us for the first time, the freedom to leave our nest at least for certain functions, in order not to soil it.

Similarly, Isaac Asimov, a giant of 20th century science-fiction, explored the idea in a speech at Rutgers University in the 1980s. He said that for those who view industrialization and its attendant pollution and degradation as the source of the planet's problems, the only solution at present is to give up industrialization. Asimov explained:

> This is something that we can't do; we have the tiger by the tail. We have 4.5 billion people on Earth. We can't support that many unless we're industrialized and technologically advanced. So, the idea is not to get rid of industrialization, but to move it somewhere else. If we can move it a few thousand miles into space, we still have it, but not on Earth. Earth can then become a world of parks, farms and wilderness without giving up the benefits of industrialization.

Since Asimov gave that speech at Rutgers, the world population has grown from 4.5 billion people to closer to 7 billion.

One of the most famous and respected scientists of the present day is Stephen Hawking. The theoretical physicist gave the idea of space colonization a boost in 2012. At a publicized lecture, Hawking pleaded for interplanetary travel. "I don't think we will survive another thousand years without escaping beyond our fragile planet," he said.

Hawking used the word “survive” and gave his estimate of a timeline, thus making the idea of space colonization sound urgent. This is a subject the physicist has given prior consideration. In a 2010 video, Hawking spoke at greater length on the subject. "Our population and our use of the finite resources of Planet Earth are growing exponentially, along with our technical ability to change the environment for good or ill. But our genetic code still carries the selfish and aggressive instincts that were of survival advantage in the past. It will be difficult enough to avoid disaster in the next hundred years, let alone the next thousand or million. Our only chance of long-term survival is not to remain inward looking on Planet Earth, but to spread out into space."

Despite the endorsement of one of humankind’s smartest minds, space colonization might sound like the stuff of fiction. But remember: the idea of space travel was just a fantasy in H. G. Wells’s time. One hundred years later, it became reality. Who can say how far away we are from space colonization and life on Mars? Should the time be calculated in years? In gallons of water? In acres of farmland?

Name: _____ **Date:** _____

1. What have scientists and science-fiction writers been thinking about for many years?

A) transnational corporations
B) space exploration and colonization
C) publicized lectures
D) terraforming, footstools, and videos

2. Pollution and limited resources on Earth are two problems mentioned in the passage. What is a possible solution to these problems?

A) A possible solution is for humans to leave Earth and live somewhere else.
B) A possible solution is for humans to become more aggressive and selfish.
C) A possible solution is for humans to extract more natural resources from Earth.
D) A possible solution is for humans to read *Red Mars* by Kim Stanley Robinson.

3. The idea of space exploration has been around for centuries.
What evidence from the passage supports this statement?

A) “In 1993 science-fiction writer Kim Stanley Robinson published *Red Mars*, the first of his Mars trilogy. *Red Mars* is set in the year 2026. At the beginning of the novel, the spacecraft Ares departs. Aboard the Ares, the space colonists are bound for Mars.”
B) “Robinson is an American writer. The Mars trilogy is his best-known work. Robinson is also an active outdoorsman. Themes of ecological sustainability run throughout his work, as do questions of social justice.”
C) "In a letter dated from 1610, Johannes Kepler wrote to Galileo: 'As soon as somebody demonstrates the art of flying, settlers from our species of man will not be lacking. Given ships or sails adapted to the breezes of heaven, there will be those who will not shrink from even that vast expanse.'"
D) “One of the most famous and respected scientists of the present day is Stephen Hawking. The theoretical physicist gave the idea of space colonization a boost in 2012. At a publicized lecture, Hawking pleaded for interplanetary travel.”

4. How have attitudes toward space colonization changed over time?

A) Some people now consider space colonization an impossible idea rather than a possible adventure.
B) Some people now consider space colonization a waste of money rather than a good idea.
C) Some people now consider space colonization a dangerous activity rather than a safe undertaking.
D) Some people now consider space colonization an urgent need rather than a possible adventure.

5. What is this passage mainly about?

A) the idea of space exploration and colonization
B) the Mars trilogy by Kim Stanley Robinson
C) competition for energy, water, and food on Earth
D) ecological sustainability and social justice

6. Read the following sentence: "Who can say how far away we are from space **colonization** and life on Mars?"
What does the word **colonization** mean?

A) the complete loss of natural resources
B) the act of writing about space exploration
C) the excitement of making a scientific discovery
D) the setting up of life in a new place

7. Choose the answer that best completes the sentence below.
Some people believe that the earth cannot continue to support its population; _____, they want humans to look for somewhere else to live.

A) as a result
B) such as
C) never
D) even though

8. What does Stephen Hawking say is the "only chance of long-term survival" for humans?

9. Why does Hawking believe that spreading out into space is necessary for human beings?

10. Is space colonization necessary? Explain why or why not, using evidence from the passage.