

Is space exploration important, or should we focus on our own planet instead?

"When I orbited the Earth in a spaceship, I saw for the first time how beautiful our planet is. Mankind, let us preserve and increase this beauty, and not destroy it!" -Yuri Gagarin

"We are the first generation to feel the effects of climate change and the last generation who can do something about it." – Barack Obama

"It [the rocket] will free man from his remaining chains, the chains of gravity which still tie him to this planet. It will open to him the gates of heaven".-Wernher von Braun, (Rocket Engineer)

Overview

Humans have always been fascinated by what lies beyond our planet Earth. The study of the moon and stars has been something that has inspired mathematicians, scientists, philosophers and artists for thousands of years. The development of telescopes advanced our understanding significantly, but this knowledge and understanding has really accelerated since the dawn of the Space Age which began when Sputnik was launched in 1957 and continues to this day. The Space Race, spanning the 1960s, which was dominated by the USA and the USSR, accelerated developments even further. Whilst we are still learning incredible new facts about our solar system and beyond, the huge costs and resources required for space exploration cannot be ignored. As life on planet Earth is increasingly threatened by climate change and pollution, is it time to put all of our energy and resources into saving our own planet instead of exploring space?

Key questions to ask yourself

What was the Space Race and what did it achieve?
 How has space exploration influenced life on Earth?
 Why has humankind always been curious about what lies beyond planet Earth?
 Should we still prioritise space exploration?
 What are the challenges that need to be overcome on our own planet?
 How can space exploration benefit our own planet?
 What are some of the other key achievements in space exploration?
 What primary and secondary sources can I use to find out more about space exploration?
 Would I like to be involved in space exploration? Why/why not?

Language of a Scientist

orbit	To repeatedly travel around a star, planet or moon.
cosmonauts vs astronauts	During the Space Race, the rivalry between the US and the USSR led them to develop different names for their space explorers: 'sailor of the universe' (cosmo = universe, naut = sailor) USSR, 'sailor of the stars' (astro = stars, naut = sailor) USA
star	A fixed, luminous point in the night sky which is a large, remote incandescent body like the sun. In our solar system, the sun is the largest object, and accounts for 98% of the mass of the all of the objects in the solar system combined.
emissions	The act of sending out gas or heat. The term 'emissions' often refers to the release of CO2 gas and other gases and pollutants into our atmosphere.
solar system	The gravitationally bound system of the sun and the objects that orbit it (solar = sun).
satellite	An object, natural or manmade, that orbits a planet. Our moon is an example of a natural satellite. Sputnik was the first artificial satellite; it was launched by the USSR in 1957. Nowadays, there are thousands of satellites orbiting the earth, as well as other planets. They have a huge variety of functions, including gathering data about our weather and environment, enabling sat-nav technology and enabling internet and communication.
Carbon Dioxide (CO2)	Carbon dioxide (CO2) is an important heat-trapping (greenhouse) gas, which is released through human activities such as deforestation and burning fossil fuels.
irreversible	A change that cannot be undone, For example, burning wood will create charcoal and ash, and means that the wood is irreversibly changed. The opposite of this is a reversible change – like freezing water into ice, which can then thaw and return to its liquid form of water.
planet	A celestial body moving in an elliptical orbit round a star, big enough to have sufficient gravity to force it into a spherical shape and big enough that its gravity clears away any other objects near its orbit path.
moon	The Moon is Earth's only natural satellite. At about one-quarter the diameter of Earth, it is the largest natural satellite in the Solar System relative to the size of its planet, the fifth largest satellite in the Solar System overall, and is larger than any known dwarf planet. Its orbit of Earth takes 28 days (1 lunar month).

Language of a Historian

primary source	Primary sources are the raw materials of history — original documents and objects that were created at the time. Examples include diaries, journals, speeches, interviews, letters, memos, photographs and videos. Newspapers written at the time of an event are also a useful primary source. The space Race is a period in history that is rich in primary sources!
secondary source	A secondary source is a document or recording that discusses a primary source. Examples include textbooks, dictionaries and encyclopaedias. Newspaper and journal articles that look back at a historical event and analyse and comment on it are also secondary sources. If you researched and wrote a report on an historical event, such as the moon landing, your work would be a secondary source.
USSR (Union of Soviet Socialist Republics)	Established in 1921- 1991. A Russian-dominated States that eventually encompassed 15 republics including Russia, Ukraine, Uzbekistan and Kazakhstan. It was committed to the communism ideology and was also the USA's most powerful rival in the Space Race.
NASA	NASA is a U.S. government agency that is responsible for science and technology related to air and space.
irrefutable	Irrefutable is a fact that is definitely true, and impossible to deny or disprove. The opposite of this is a refutable fact, which can be proved to be false.
Moon Shot	In 1961 President John F. Kennedy challenged the nation to claim a leadership role in space and land a man on the Moon before the end of the decade. He wanted to ensure the 'free world' achieved this before the communist USSR.
Earthshot	The Earthshot Prize is awarded by the Royal Foundation to five winners each year for their contributions to environmentalism. It was first awarded in 2021 and is planned to run annually until 2030. Each winner receives a grant of £1 million to continue their environmental work.
Language of a Mathematician	
billion	1000 million.
gigatonne	A gigatonne is 1 billion tonnes, and is often used when discussing human carbon dioxide emissions. It is roughly the mass of all land mammals (other than humans) in the world. It's also roughly twice the mass of all of the people in the world.

Space Exploration Timeline

1957	1961	1962	1969	1970	1971	1990	2004
Sputnik, the world's first artificial satellite, is launched by the USSR	Yuri Gagarin from the USSR becomes the first human to go to space.	President Kennedy launches Moonshot and the Space Race between the USA and the USSR intensifies	Neil Armstrong becomes the first human to walk on the moon (USA).	First soft landing on another planet – Venus (USSR)	First space station launched (USSR).	First optical space telescope launched – Hubble Space Telescope.	First privately owned spacecraft to make a commercial flight past the boundary line of space.

