



Grammar:**Reading:**

Why should we explore space
 Destination Mars
 Valuable by-products of space research
 Interesting facts about spin-offs

Listening:**Video:****Writing:****Essential vocabulary**

altitude, n	eternal, a	launch, v	probe, n	spin-off, n
boost, v	equation, n	modify, v	reconnaissance, n	species, n
carry out, v	geostationary orbit	mission, n	remote, a	suit, v
celestial, a	habitable, a	opportunity, n	result in/from, v	venture, n/v
collaboration, n	in charge of	overweigh, v	rocketry, n	versatile, a
destination, n	last, v	permanent, a	rover, n	wonder, v

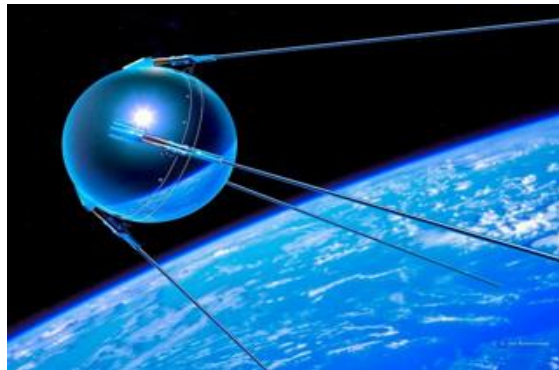
MODULE 12

“Imagination will take you everywhere” – Albert Einstein

12.1

1 - Guess the words in the picture

Things found in space are:



Check your answers: Milky Way/Andromeda's nebula, planets, a rocket, a satellite, a comet, a



Do you know the order of the planets in the Solar System? If not, the following mnemonic rule might help you to remember it: «My Very Educated Mother Just Served Us Nachos»

2 - Answer the questions:

- What comes into your mind when someone says “Space Exploration”? (use appropriate adjectives)
- What are the greatest achievements in space exploration in your opinion?
- Can you remember the names of people who contributed greatly into space research?
- Do you believe that there is life on other planets? Do you think that humans will ever go and live on other planets?
- *Why do you think space exploration is important*

3 - Watch the video “Space Exploration” and compare the main ideas given in it with your answers.

4 - Work in small groups of two or three. Ask your group-mates what would happen if..., then give your own answer:

e.g. - What would you do if you met an alien?

- If I met an alien I would ask him/her about the most advanced technologies they use.

- That’s right, **but if I** met an alien I would try to learn his language and would just talk with him/ her.

1. If I were a scientist in rocketry...
2. Had I an opportunity to design a...
3. If the missions to Venus were possible...
4. If I could grow potatoes on Mars...
5. If the atmosphere on Mars wasn’t rarefied (разреженный)...
6. If I were a crew member on the ISS...
7. Had the governments invested to space research more...
8. If people were able to colonize Mars...
9. Had I spoken to Tsiolkovsky...
10. Were a space lift built from the Earth to a geostationary orbit...
11. What if Russia had never launched the Sputnik?
12. What if no one had ever tried to break the sound barrier?
13. What if you were offered an opportunity to ride on the Space Shuttle?

5 - Answer the questions.

1. How is the space exploration carried out?
2. Why are many space missions suited to telerobotic?
3. What are the most important reasons for space exploration?
4. What do you know about Konstantin Tsiolkovsky?
5. Why is the ISS one of the most ambitious and successful projects?
6. What was the ISS designed for?
7. How could future space exploration benefit people?

6 - Read and translate the following international words from the text “Why Should We Explore Space?”

satellite [ˈsætəlait], extraterrestrial [ɪkstrɪtəˈrestriəl], robotic [rəʊˈbɒtɪk], commercial [kəˈmɜːʃəl], telecommunication [ˈtelɪkəmjuːnɪˈkeɪʃn], prestige [preɪˈtiːʒ], nation [neɪʃn], strategic [strəˈtiːdʒɪk], colonization [kəˈlɒnəɪˈzeɪʃn], permanent [ˈpɜːmənənt], autonomous [ɔːˈtɒnəməs], interplanetary [ɪntəˈplænɪtəri], Universe [ˈjuːnɪvɜːs], astronaut [ˈæstrənɔːt], meteorology [miːtjəˈrɒlədʒɪ], individual [ɪndɪˈvɪdʒəəl], Saturn [ˈsætən], Uranus [jʊˈreɪnəs], Neptune [ˈneptjʊːn], Earth [ɜːθ], Mars [mɑːz], Venus [ˈviːnəs], Mercury [ˈmɜːkjʊəri], Copernicus [kəʊˈpɜːrnikəs], Galileo Galilei [galiˈleːo galiˈleɪ]

7 - Read and learn the pronunciation of the words from text “Why Should We Explore Space?”

Wonder [ˈwʌndə], wandering [ˈwɒndərɪŋ], ancient [ˈeɪnfənt], venture [ˈvenʃə], eternally [ɪˈtɜːnəli], reconnaissance [riˈkɒnɪs(ə)nɪs], habitable [ˈhæbɪtəb(ə)l], celestial [siˈlestjəl], rover [ˈrəʊvə], species [ˈspiːʃiːz], equation [ɪˈkweɪʃn], outweigh [aʊtˈweɪ], probe [prəʊb], suit [sjuːt], crew [kruː], settlement [ˈsetlmənt], launch [lɔːnʃ]

Vocabulary:

to gaze (v) –вглядываться	to suit (v) – подходить, соответствовать, быть пригодным
to wonder (v) – интересоваться, желать знать	rather than - скорее чем; не столько ... сколько
wandering - мерцающий	prominent (adj) – выдающийся
venture (v) - отважиться, рискнуть	to result in/from (v) – приводить к, иметь результатом/ являться результатом
cradle (n) - колыбель	to figure out (v) – вычислять, понимать, постигать
eternally (adv) - постоянно	to manage to do (v) – суметь сделать что-либо
reconnaissance (n) – разведка, расследование	to outweigh (v) – перевесить, оказывать большее значение
habitable (adj) – пригодный для жилья	profound (adj) – основательный, глубокий
essential (adj) – необходимый, неременный	to replenish (v) – пополнять
extraterrestrial (adj) - внеземной, находящийся за пределами Земли	to commit oneself to (v) – посвящать себя чему-либо

8 - Read the text and be ready to discuss it

«The Earth is the cradle of the mind-but one cannot eternally live in a cradle».
K. Tsiolkovsky

Why Should We Explore Space?

People have gazed up at the night sky for thousands of years and wondered what the countless wandering points of light were. Improved technology means we can observe and explore further into the Universe. Just as ancient explorers travelled across uncharted lands and oceans to see what was there, modern explorers venture into space. By studying space, scientists can discover what is out there, find out how the Universe began, and learn more about Earth.

Space exploration is the ongoing discovery and exploration of celestial structures in outer space. While the study of space is **carried out** mainly by astronomers with telescopes, the physical exploration of space is conducted both by unmanned robotic probes and manned spaceflight. Spaceflight is also used in commercial activities like space tourism and satellite telecommunications, reconnaissance and other earth observation satellites. Space stations and manned spacecraft in orbit are also **satellites**. Many space missions are more suited to telerobotic rather than crewed operation, due to lower cost and risk factor. Outer planets such as Saturn, Uranus and Neptune are too distant to

reach with current crewed spaceflight technology, so **scientists** suggest that telerobotic probes (landers and rovers) should be the only way **to explore** them.

There are many reasons for space exploration. The most important reasons are advanced scientific research, national prestige, unity of different nations, development of military and strategic advantages and the interest of humans to learn more about outer **space**. It is **essential** that space exploration should give people an **opportunity** to discover new, habitable worlds, which could allow our species to survive beyond the lifespan of this planet. Space colonization would be the **permanent** autonomous human settlements outside Earth on extraterrestrial objects such as Moon or Mars.

Space research has a long history and is based on the works of prominent scientists from all over the world. Galileo Galilei and Nicolaus Copernicus were the first who wanted to reach out for the stars. But only in the XX century thanks to the revolutionary works of Konstantin Tsiolkovsky people realized that interplanetary travel could be a possibility. Without ever launching a single rocket himself, Tsiolkovsky was the first **to figure out** all the basic equations for **rocketry**. His ideas were followed by a number of very important works in the field of astronautics, which in its turn resulted in creation of powerful spacecraft, capable of moving into and out of gravitational fields and even staying in the orbit for a long time.

One of the most ambitious and successful project of this kind is the International Space Station (ISS) which has been in **continuous** use for 15 years. Its first component was launched into orbit in 1998. But before the ISS could serve as a home beyond Earth, it had to be built. ISS components were launched by Russian Proton and Soyuz rockets as well as American space shuttles. There were many interconnected parts from so many countries that it was impossible to predict how they would interact. It was also very important that all of these elements should fit together and work exactly as planned. The engineers managed to fulfil their task. The station works as if it was a unique complex assembly and serves as a microgravity and space environment research laboratory in which crew members **carry out experiments** in biology, physics, astronomy, meteorology, and other fields. The station is designed for testing space craft systems and equipment required for missions to the Moon and Mars.

You might ask, why do people spend so much time, investments and effort on space research when there are so many problems on Earth that haven't been solved yet. It is because all the possible benefits outweigh the costs that governments and companies spend on this industry. Future space exploration could have a profound effect on humanity. A better understanding of our place in the universe could change long standing beliefs. Space mining could help replenish Earth resources or provide new minerals. Colonization of other worlds might even save humanity itself. So, in the end, we should commit ourselves to it, because it can benefit us, as individuals and as species, in unexpected ways.

9 - Based on the information from the text and your own knowledge, decide whether these statements are true (T), false (F), or the information is not given (NG).

1. Space exploration means investigation of interplanetary or interstellar space, its properties, biology and the bodies that exist within it.
2. Space research is carried out by astronauts during their missions.
3. Space travel without science is tourism.
4. Outer planets like Venus and Jupiter could be reached with current crewed space flight technology.
5. Tsiolkovsky was the first to launch a rocket into space.

6. The ISS is an international endeavor (попытка, стремление) of global collaboration, with more than 220 astronauts from 17 countries visiting the ISS since 2000.
7. The ISS was designed for testing space craft systems and equipment for missions to the Moon and Mars.
8. The possible benefits from exploring space outweigh the risks and money spent on this industry.

10 - Work with a partner. Take turns to ask and answer the questions, using information from the text. Use the question words like what, which, how, why, who etc.

Example:

- Question: What does the term “space exploration” refer to?
- Answer: It refers to...

11 - Find terms/words in the text corresponding to the following definitions.

1. a person who studies the physical world (n)
2. man-made device put in orbit round a planet (n)
3. travel into or through an area in order to learn about it (v)
4. a test, trial; an act or operation for the of discovering something unknown or of testing a principle, supposition(n)
5. to do or complete something, especially that you have said to do(v)
6. the area beyond the earth around the planet and stars (n)
7. to find something by thinking, to find a solution for, calculate (v)
8. the branch of science that deals with rockets and rocket propulsion (n)
9. necessary, most important (adj)
10. an occasion or situation that makes it possible to do something that you want to do, or the possibility of doing something (n)
11. lasting for a long time or forever (adj)
12. profit, gain (n)
13. sort, type (n) (pl. unchanged)



12 - Watch the video “A History of Space Exploration” and say what events happened in 1961, 1969, 1977, 1986, 1998, 2003, 2010, 2012.

13* - Fill in the gaps in the text below with the words from the box in their correct form:

Carry out	scientist	explore	experiment	be created	satellite	presence
	discover	can exist	not find	analysis	send	

(1) _____ have already (2) _____ (3) _____ (4) _____ the surface of Mars, and (5) _____ (6) _____ to see if they can (7) _____ any signs of life. So far, they (8) _____ any, but the (9) _____ of rocks from Mars has confirmed that they (10) _____ by the (11) _____ of water and wind. In other words, life (12) _____ in the past.

***time-consuming exercise**

14 - Combine the two parts from the table to make one sentence:

1. Space exploration	a. _____ are more suited to telerobotic rather than crewed operation due to lower cost and risk factor.
2. Many space missions	b. _____ for testing space craft systems and equipment.
3. It is essential that	c. _____ a microgravity and space environment research laboratory.
4. Tsiolkovsky's ideas were	d. _____ space exploration should give people an opportunity to discover new, habitable worlds.
5. The ISS serves as	e. _____ is the ongoing discovery and exploration of celestial structures in outer space.
6. The station is designed	f. _____ because the benefits of it outweigh all the possible risks and money spent in this field.
7. We should explore space	g. _____ followed by a number of very important works in the field of astronautics.

15 - Highlight all the benefits of space exploration mentioned in the text. Start to fill in the table below, giving reasons for and against space research. Add some more after watching the movie and listening to audio files:

Pros	Cons