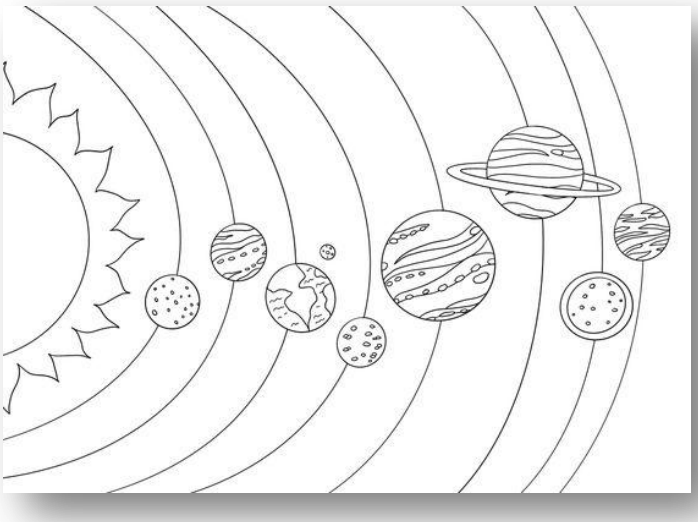
Université Mohammed V
Faculté des Sciences, Rabat
Cellule de Langues et Terminologie

SPACE READING COMPREHENSION WORKSHEETS

Master Sciences et Technologies de l'Espace

By

Pr. Karima SALAH-EDDINE



School year 2020 /2021

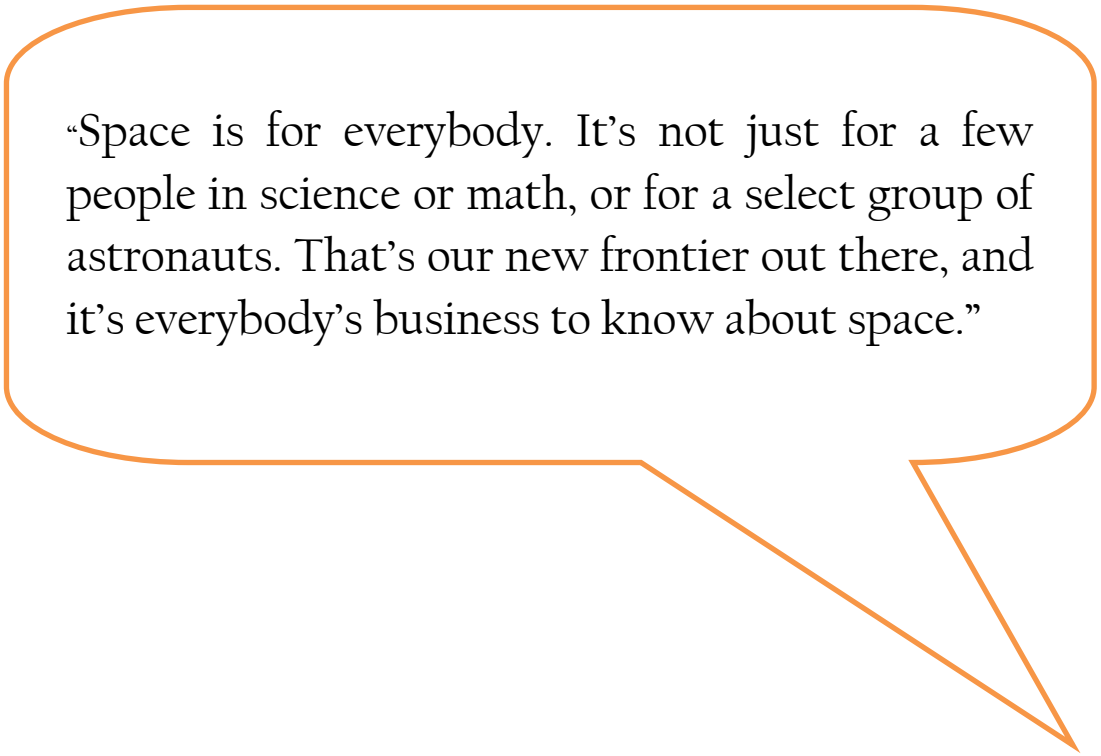
English for University Space Science Students is a specialized language course designed for non-native English-speaking students studying space science at Faculty Of Sciences, Mohamed V university. The course is designed to enhance students' language proficiency in English while simultaneously improving their understanding of space science concepts and terminology.

The course curriculum is tailored to the specific needs of space science students and covers a wide range of topics, including astronomy, astrophysics, planetary science, remote sensing, and space exploration. Through the course, students will develop the language skills necessary to effectively communicate about these complex topics in academic and professional settings.

The course is delivered through a variety of activities, including lectures, discussions, group work, and interactive activities. Students will engage in various language tasks such as summarizing technical information and giving presentation. Additionally, students will have the opportunity to practice their language skills through simulations and role-plays of real-life scenarios.

The course will also cover important academic skills such as critical thinking, research, and referencing, which are essential for success in university-level space science courses. Students will learn how to effectively search for and evaluate sources, use academic language, and avoid plagiarism.

Overall, English for University Space Science Students is an intensive language course designed to equip students with the language and academic skills necessary to succeed in their space science studies and future careers. By the end of the course, students should be able to communicate in English about technical concepts with precision and clarity, produce written assignments with accuracy and coherence, and engage in academic discourse with confidence.



Christa McAuliffe[1]

SUSTAINABLE DEVELOPMENT GOALS

[1] A high school teacher, **Christa McAuliffe** made history when she became the first American civilian selected to go into space in 1985. https://www.biography.com/scholars-educators/christa-mcauliffe

Sustainable Development Goals (SDGs) are a universal set of 17 goals, 169 targets, and over 200 indicators adopted by the United Nations in 2015. The SDGs aim to end poverty, protect the planet, and ensure prosperity for all. The SDGs build on the successes of the Millennium Development Goals (MDGs) and go beyond them by addressing the root causes of poverty.

SDGs cover a wide range of interconnected issues, including poverty, hunger, health, education, gender equality, clean water and sanitation, affordable and clean energy, decent work and economic growth, industry, innovation and infrastructure, reduced inequalities, sustainable cities and communities, responsible consumption and production, climate action, life below water, life on land, peace, justice and strong institutions, and partnerships for the goals.

To achieve the SDGs, all countries need to work together and take action in five key areas: people, planet, prosperity, peace, and partnerships (5Ps). Each of the SDGs includes specific targets and indicators that measure progress towards the goal.

The SDGs are not just the responsibility of governments, but of everyone. Governments, businesses, civil society, and individuals all have a role to play in achieving the SDGs. The private sector, for example, can contribute by investing in sustainable business practices, and individuals by taking actions such as reducing their carbon footprint or supporting ethical and sustainable products.

The SDGs represent a significant shift in how the world approaches development. Rather than focusing solely on economic growth, the SDGs recognize the importance of social, environmental, and economic sustainability. They aim to create a world where people can live healthy and fulfilling lives without degrading the natural resources that support those lives.

One of the key principles of the SDGs is leaving no one behind. This means that the SDGs are designed to address the needs of the most vulnerable and marginalized populations, including women and girls, people living in poverty, people with disabilities, and indigenous communities. To achieve this, the SDGs prioritize the most pressing development challenges and seek to create sustainable and inclusive solutions.

The SDGs also emphasize the need for international cooperation and partnerships. Achieving the SDGs requires action at all levels, from local to global, and collaboration between governments, civil society, and the private sector. The SDGs recognize that no single actor can achieve sustainable development on their own and that partnerships and collaboration are essential for success.

The SDGs are not just a framework for action, but also a tool for measuring progress. The SDG indicators provide a common language for tracking progress and identifying areas where more action is needed. They also encourage transparency and accountability, with regular reporting and reviews of progress.

While progress has been made towards achieving the SDGs, there is still a long way to go. Many countries and regions continue to face significant development challenges, including poverty,

inequality, and environmental degradation. Additionally, the COVID-19 pandemic has exacerbated existing vulnerabilities and highlighted the need for urgent action to achieve the SDGs and build more resilient and sustainable societies.

Comprehension Questions:

1. What are the SDGs?
2. What are the five key areas that need to be addressed to achieve the SDGs?
3. Who is responsible for achieving the SDGs?
4. What is the main focus of the SDGs?
5. What does it mean to leave no one behind in the context of the SDGs?
6. Why is international cooperation and partnerships important for achieving the SDGs?
9. What challenges do countries and regions still face in achieving the SDGs?

Vocabulary Exercises:

What is the meaning of the following words in the context of the text?

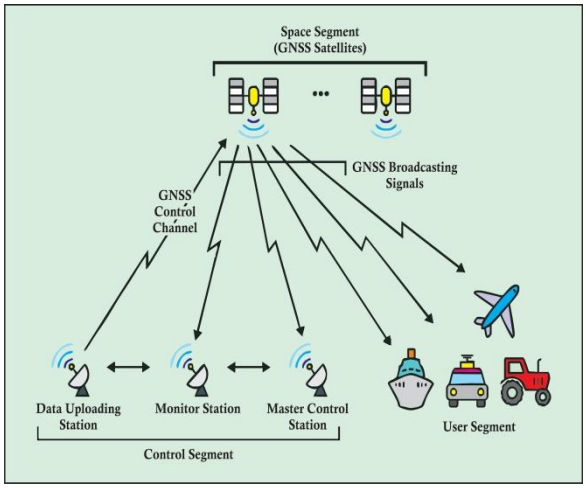
'Prosperity' ‘interconnected’, 'ambitious', 'sustainability', 'inclusive', 'transparency', 'interdependent', 'empowerment', 'resilient'.

“You are floating through space on a giant rock that circles a ball of fire, next to a moon that moves the sea. And you don’t believe in miracles?”

Unknown

GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS)

Global Navigation Satellite System (GNSS) is a technology that uses a network of satellites to provide positioning, navigation, and timing services to users worldwide. The most well-known GNSS is the Global Positioning System (GPS), developed by the United States government in the 1970s and made available for civilian use in the 1980s.



The GPS system consists of a constellation of satellites orbiting the Earth, ground control stations, and GPS receivers. The satellites transmit signals that are picked up by GPS receivers, which use the signals to calculate their location, velocity, and time. The GPS system is used in a wide range of applications, from navigation systems in cars and smartphones to precision agriculture, surveying, and aviation.

In addition to GPS, there are other GNSS systems in operation, including GLONASS (Russia), Galileo (European Union), BeiDou (China), and NavIC (India). These systems use similar technology to GPS and provide similar services, but with differences in coverage, accuracy, and reliability.

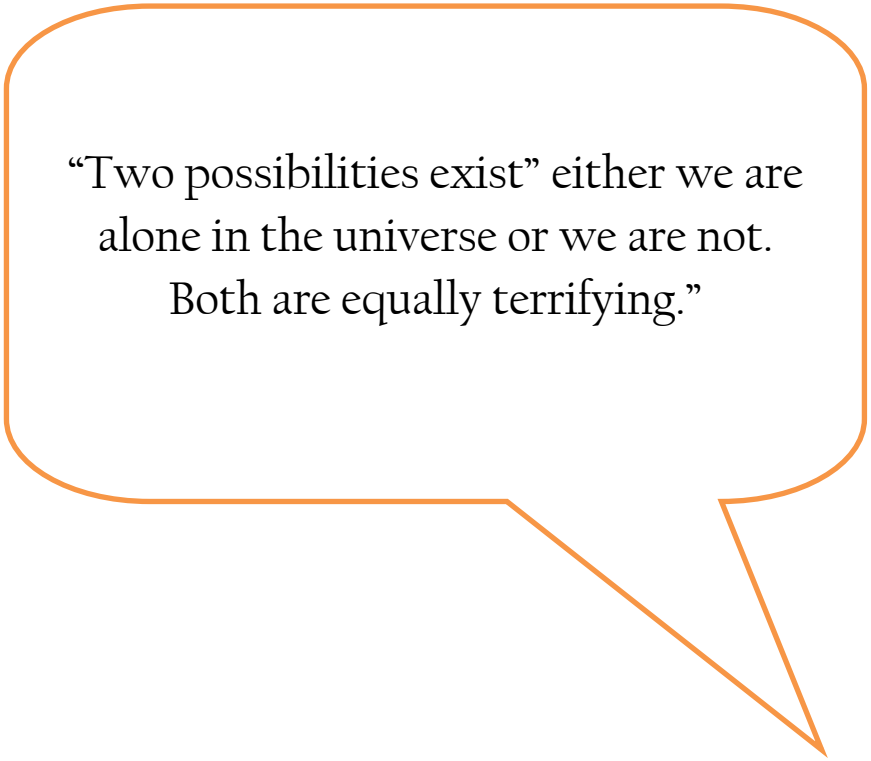
The use of GNSS technology has become increasingly important in today's world, with applications ranging from consumer electronics to critical infrastructure. However, GNSS signals can be affected by interference, jamming, and other factors, which can result in inaccurate or unavailable positioning information. To address these issues, researchers and industry experts are exploring ways to improve GNSS performance and reliability, such as through the use of multiple GNSS systems, backup systems, and enhanced signal processing techniques.

a. Interference	i. The act of disturbing or disrupting something
b. Trilateration	ii. The transmission of radio signals that interfere with the reception of other signals
c. Multipath	iii. The use of multiple signals to calculate a location
d. Cyber attack	iv. The deliberate use of technology to damage or disrupt computer systems

Choose the best word to complete the sentence:

The use of GNSS technology has become increasingly important in today's world, with applications ranging from consumer electronics to _____ agriculture.

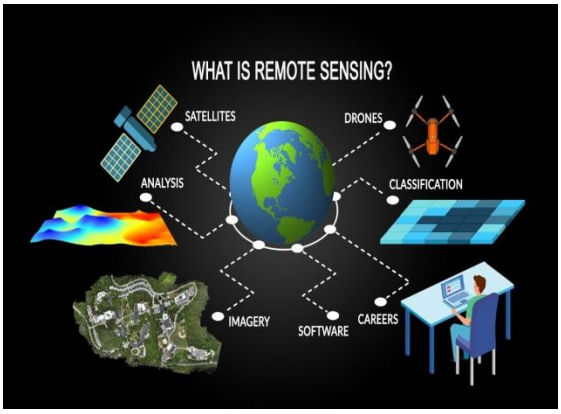
a. precise b. imprecise c. accurate d. inaccurate



Arthur C. Clark[2]

[2] **Sir Arthur Charles Clarke** was an English science-fiction writer, science writer, futurist inventor, undersea explorer, and television series host. https://en.wikipedia.org/wiki/Arthur_C._Clarke

REMOTE SENSING



https://gisgeography.com/remote-sensing-earth-observation-guide/

Remote sensing refers to the use of various technologies to gather information about the Earth's surface and atmosphere without physically touching it. It has a long history, dating back to the mid-19th century, when photography was invented.

The first aerial photograph was taken in 1858 by French photographer and balloonist Gaspard-Félix Tournachon, better known as Nadar. Over the following decades, balloons, kites, and even pigeons were used to take photographs from above.

In the 1920s, airplanes began to be used for aerial photography on a larger scale, and in the 1950s, the development of radar technology made it possible to use remote sensing for meteorological purposes. This led to the development of weather satellites in the 1960s, which provided a new level of understanding of weather patterns and global climate change.

The use of remote sensing continued to evolve in the following decades. In the 1970s and 1980s, Landsat satellites were launched, which allowed scientists to study changes in the Earth's surface over time. In the 1990s, the development of the Global Positioning System (GPS) made it possible to accurately pinpoint locations on the Earth's surface, which further expanded the use of remote sensing.

Today, remote sensing is used in a wide range of applications, including land use planning, agriculture, forestry, natural resource management, and disaster response. Remote sensing technologies include aerial photography, LiDAR (Light Detection and Ranging), radar, and satellite imagery, among others.

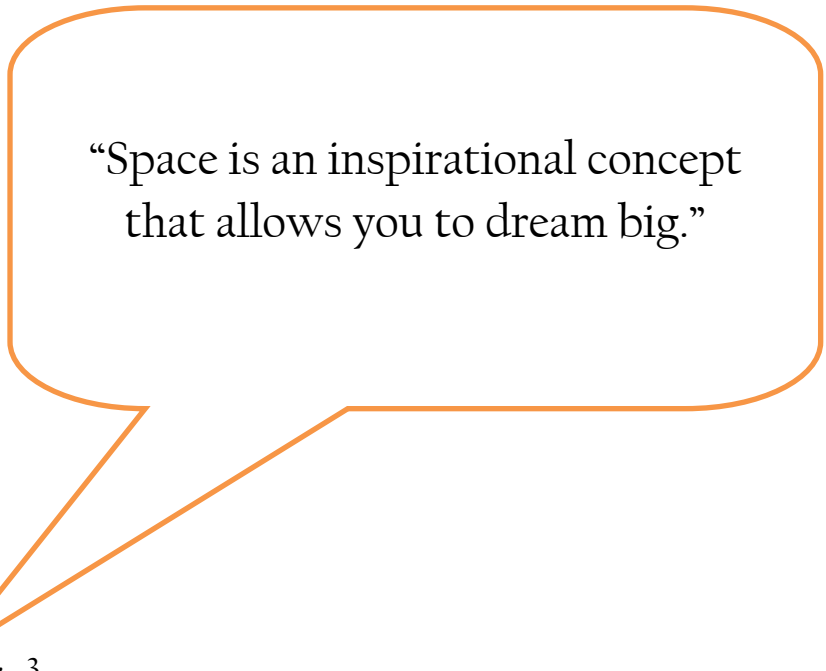
Comprehension exercises:

1. What is remote sensing?
2. Who was the first person to take an aerial photograph, and when was it taken?
3. What technologies were used to take photographs from above before airplanes were used?
4. How did the development of radar technology impact remote sensing?
5. What were Landsat satellites used for, and when were they launched?

Vocabulary exercises:

what do the following terms refer to?

"remote sensing." "meteorological." "GPS." "LiDAR.""



Peter Diamandis[3]

[3] Peter H. Diamandis is a physician, engineer, best-selling author, and entrepreneur who has started 17 companies. He earned degrees in molecular genetics and aerospace engineering from MIT and holds an M.D. from Harvard Medical School.

IMPORTANCE OF SPACE STUDIES FOR DRYNESS

Space studies, also known as space exploration, have played a critical role in our understanding of the universe and our planet. One important area that has benefited greatly from space studies is the study of dryness. Dryness, or aridity, refers to the state of being dry, having little or no moisture, and is a major challenge in many parts of the world, particularly in arid and semi-arid regions. Space studies have contributed to our understanding of dryness in a number of ways. First, satellites and other space-based instruments have allowed scientists to monitor and map the distribution and severity of dryness across the globe. By collecting data on factors such as rainfall, soil moisture, and vegetation cover, scientists can create detailed maps that show where dryness is most severe and where it is improving or worsening over time.

Source : https://www.alamy.com/stock-photo/globe-earth-dryness.

Second, space studies have helped scientists understand the causes of dryness. For example, space-based instruments have allowed scientists to study the interactions between the atmosphere, oceans, and land surface that drive weather and climate patterns. By studying these interactions, scientists can identify the factors that lead to drought and other forms of dryness, and develop strategies to mitigate their impacts.

Finally, space studies have contributed to the development of technologies that can help people cope with dryness. For example, space-based instruments have been used to develop advanced irrigation systems that can help farmers in arid regions grow crops more efficiently. They have also been used to monitor groundwater supplies and develop strategies to conserve and manage water resources.

In summary, space studies have played a critical role in our understanding of dryness. By providing data on the distribution and severity of dryness, helping us understand the causes of dryness, and developing technologies to cope with dryness, space studies have helped improve our ability to manage this important challenge.

Comprehension Questions:

1. What is dryness and where is it a major challenge?

2. How have space studies contributed to our understanding of dryness?

3. What are some examples of technologies developed to cope with dryness?

Vocabulary Exercises:

A. Choose the word or phrase that best completes each sentence.

1. The state of being dry, having little or no moisture is called _____.

a) Waterlogging, b) aridity, c) humidity, d) precipitation

2. _____ have allowed scientists to monitor and map the distribution and severity of dryness across the globe.

a) Satellites and other space-based instruments, b) Weather balloons, c) Seismometers

d) Compasses

3. _____ have been used to develop advanced irrigation systems that can help farmers in arid regions grow crops more efficiently.

a) Satellites and other space-based instruments

b) Weather balloons

c) Seismometers

d) Compasses

B. Choose the word or phrase that is closest in meaning to the underlined word.

By collecting data on factors such as rainfall, soil moisture, and vegetation cover, scientists can create detailed maps that show where dryness is most severe and where it is improving or worsening over time.

a) decreasing, b) diminishing, c) improving, d) escalating

For example, space-based instruments have allowed scientists to study the interactions between the atmosphere, oceans, and land surface that drive weather and climate patterns.

a) relations, b) connections, c) interruptions, d) obstacles

By studying these interactions, scientists can identify the factors that lead to drought and other forms of dryness, and develop strategies to mitigate their impacts.

a) intensify, b) reduce, c) eradicate, d) exacerbate"

"Orbiting Earth in the spaceship, I saw how beautiful our planet is. People let us preserve and increase this beauty, not destroy it."

Yuri Gagarin[4]

SPACE TOURISM

[4] **Yuri** Alekseyevich **Gagarin** was a Soviet pilot and cosmonaut who became the first human to journey into outer space. https://en.wikipedia.org/wiki/Yuri_Gagarin

Space tourism refers to the concept of traveling to and experiencing space for leisure, recreation, or business purposes. This is a relatively new industry that has emerged with advancements in space technology and the increasing affordability of space travel.

https://www.nytimes.com/2011/03/01/science/space/01orbit.html

Space tourism can involve a variety of activities, including suborbital flights that offer a brief experience of weightlessness, orbital flights that offer extended views of the Earth and other celestial bodies, and even visits to space stations and other space habitats.

Some of the companies leading the development of space tourism include Virgin Galactic, Blue Origin, and SpaceX. These companies are working to make space travel more accessible to the general public by developing reusable spacecraft and reducing the cost of launches.

While space tourism is still in its infancy and is only accessible to a limited number of people, it is expected to grow in popularity in the coming years as more companies enter the market and technology continues to improve.
However, despite the potential for growth and excitement, space tourism also faces some significant challenges. One of the biggest challenges is safety. Space travel is inherently risky, and there have been accidents and fatalities in the past. Companies offering space tourism must take steps to ensure the safety of their customers and minimize the risk of harm.

Another challenge is regulation. The regulation of space tourism is still in its early stages, and there is not yet a clear international framework for overseeing the industry. This can create uncertainty and make it difficult for companies to operate effectively.

In addition, there are also concerns about the environmental impact of space tourism. Launching rockets and spacecraft into space requires significant amounts of fuel and can produce large amounts of greenhouse gas emissions. Companies in the space tourism industry must take steps to minimize their environmental footprint and ensure that their operations are sustainable.

Despite these challenges, many experts believe that space tourism has a bright future. As technology improves and more companies enter the market, it is expected that the cost of space travel will decrease and become more accessible to the general public. Some of the challenges facing the space tourism industry include safety, regulation, and environmental impact.

The regulation of space tourism is still in its early stages and there is not yet a clear international framework for overseeing the industry.
Some concerns about the environmental impact of space tourism include the production of greenhouse gas emissions from launching rockets and spacecraft into space.
Many experts believe that the future of the space tourism industry is bright, with improvements in technology expected to decrease the cost of space travel and make it more accessible to the general public.

Comprehension Questions:

1. What is space tourism?

2. What are some of the companies leading the development of space tourism?

3. What kind of activities can space tourism involve?

4. Why is space tourism expected to grow in popularity in the coming years?

5. What are some of the challenges facing the space tourism industry?

6. What is the current state of regulation in the space tourism industry?

7. What are some concerns about the environmental impact of space tourism?

8. What is the expected future of the space tourism industry?

Vocabulary:

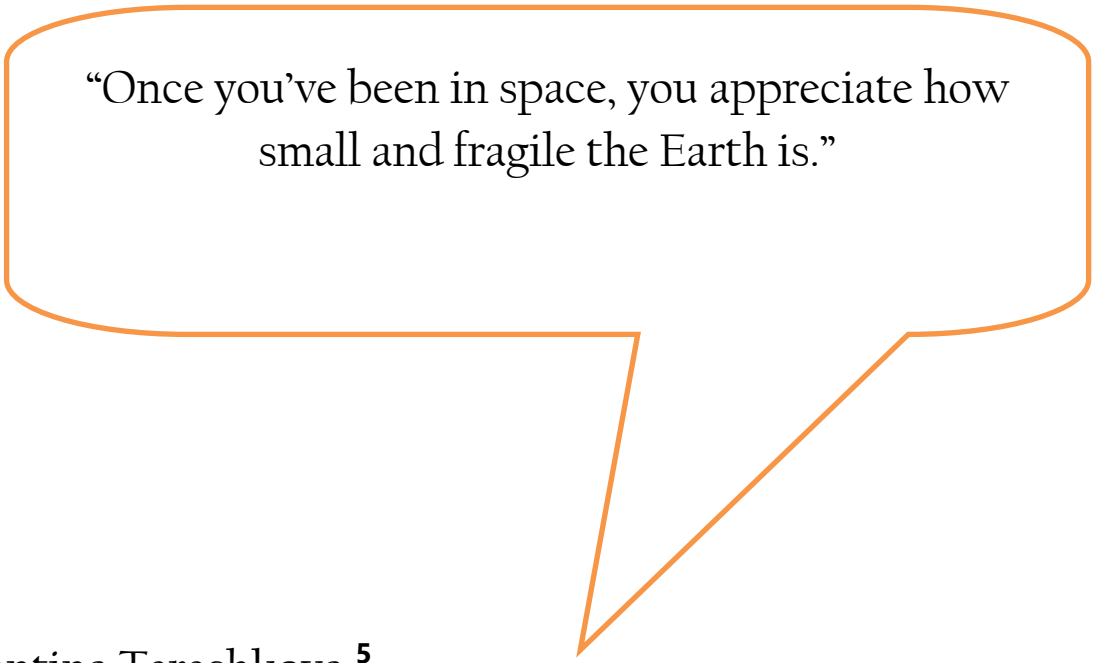
Suborbital flights:

Orbital flights:

Space stations:

Reusable spacecraft:

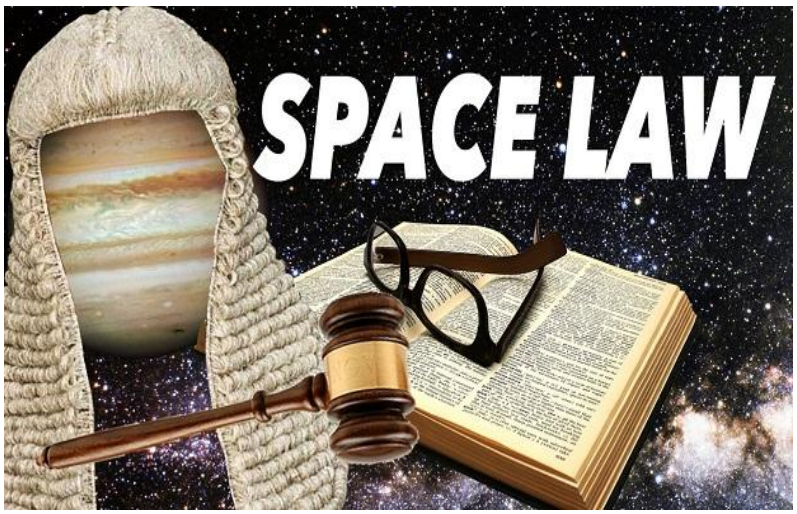
Celestial bodies:



Valentina Tereshkova [5]

[5] She is known for being the first and youngest woman in space, having flown a solo mission on the Vostok 6 on 16 June 1963. She orbited the Earth 48 times, spent almost three days in space, and remains the only woman to have been on a solo space mission.

NTERNATIONAL SPACE LAW



https://www.latestlaws.com/adr/call-for-papers/14th-international-seminar-on-exploring-new-frontiers-in-space-law-policy-and-property-rights-by-kerela-law-academy-187888

International space law refers to the set of legal rules and principles that govern human activities in outer space, including the moon and other celestial bodies. The main objective of international space law is to ensure the peaceful and safe use of outer space for the benefit of all humankind.

One of the cornerstone treaties of international space law is the Outer Space Treaty, which was signed in 1967 by more than 100 countries. This treaty sets forth the basic principles of space law, including the prohibition of weapons of mass destruction in outer space, the freedom of exploration and use of outer space by all nations, and the obligation of states to conduct their space activities in a manner that does not harm the interests of other states or of mankind as a whole.

Another important treaty in international space law is the Liability Convention, which sets out the rules for determining liability in case of damage caused by space objects, such as satellites or spacecraft. This treaty establishes the principle that a state is responsible for any damage caused by its space objects and that the affected state has the right to compensation.

International space law also addresses the issue of the peaceful exploration and use of the moon and other celestial bodies. The Moon Agreement, signed in 1979, sets forth the rules for the exploration and use of these bodies, including the principle of non-appropriation, which states that no nation can claim ownership of any part of the moon or other celestial bodies.

In conclusion, international space law plays a crucial role in ensuring the peaceful and safe use of outer space for the benefit of all humankind. These legal rules and principles help to prevent conflicts between nations and promote cooperation in space activities.

Comprehension Questions:

1. What is the main objective of international space law?

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2. What are the two cornerstone treaties of international space law?

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3. What is the Liability Convention about?

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4. What is the Moon Agreement about?

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5. What role does international space law play in ensuring the peaceful and safe use of outer space?

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Vocabulary:

Match the words with their definitions

1. Outer Space Treaty:
2. Liability Convention:
3. Moon Agreement:
4. Non-appropriation:
5. Celestial bodies:

A. a treaty that sets out the rules for determining liability in case of damage caused by space objects
B. a treaty signed by over 100 countries in 1967 that sets forth the basic principles of space law
C. objects in outer space such as the moon, planets, and asteroids
D. a treaty signed in 1979 that sets forth the rules for the exploration and use of the moon and other celestial bodies
E. the principle that no nation can claim ownership of any part of the moon or other celestial bodies