

CHAPTER 4

Space Exploration

In this chapter, you will

- read about space exploration,
- learn how to use the scanning strategy for better comprehension of the reading passage,
- increase your knowledge of adjectives in English grammar,
- learn about the role of the concluding sentence in a paragraph, and
- learn some technical and semi/technical vocabulary.

Space Exploration



TUNE IN FOR THE READING

Reading Strategy 4: **SCANNING**

Scanning is a strategy used for locating details and specific pieces of information in a piece of text without reading everything. Learning to use your hands while scanning is also very helpful in locating specific information. When your hand moves down a list of names, you see not only the name your finger is pointing to, but also the names above and below. Let your eyes work for you when searching for information. Keep the concept of *keywords* in mind while scanning. Use scanning technique to find out what each of the following dates and numbers refer to.

1957	
1970s	
3500	
1986	

Visual Hints

Look at the following pictures. Try to match each picture with the relevant word from the box below.

Surveillance

Satellite

Astronaut

a



b



c





READING



A Brief History of Space Exploration

Humans have dreamed about spaceflight since *antiquity*. The Chinese used rockets for ceremonial and military purposes centuries ago, but only in the latter half of the 20th century were rockets developed that were powerful enough to overcome the force of *gravity* to reach orbital *velocities* that could open space to human exploration. As often happens in science, the earliest practical work on rocket engines designed for spaceflight occurred *simultaneously* during the early 20th century in three countries.

/æn'tɪk.wə.ti/

/'græv.ə.ti/
/və'la:.sə.tiz/

/,saɪ.məl'teɪ.ni.əsli/

In the 1930s and 1940s, Nazi Germany saw the possibilities of using long-distance rockets as weapons. Late in World War II, London was attacked by 200-mile-range V-2 missiles, which *arched* 60 miles high over the English Channel at more than 3,500 miles per hour.

/ɑ:r.tʃt/



After World War II, the United States and the Soviet Union created their own *missile* programs. On October 4, 1957, the Soviets launched the first artificial satellite, Sputnik 1, into space. Four years later on April 12, 1961, Russian Lt. Yuri Gagarin became the first human to orbit Earth in Vostok 1. His flight lasted 108 minutes, and Gagarin reached an altitude of 327 kilometers (about 202 miles).

/'mɪs.əl/

The first U.S. satellite, Explorer 1, went into orbit on January 31, 1958. In 1961 Alan Shepard became the first American to fly into space. On February 20, 1962, John Glenn's historic flight made him the first American to orbit Earth.

/ˈæs.trə.nɑ:t/

‘Landing a man on the moon and returning him safely to Earth within a decade’ was a national goal set by President John F. Kennedy in 1961. On July 20, 1969, *astronaut* Neil Armstrong took “a giant step for mankind” as he stepped onto the moon. Six Apollo missions were made to explore the moon between 1969 and 1972.

During the 1960s unmanned spacecraft photographed and probed the moon before astronauts ever landed. By the early 1970s, orbiting communications and navigation satellites were in everyday use, and the Mariner spacecraft was orbiting and mapping the surface of Mars. By the end of the decade, the Voyager spacecraft had sent back detailed images of Jupiter and Saturn, their rings, and their moons.

/kru:d/

Skylab, America’s first space station, was a human-spaceflight highlight of the 1970s, as was the Apollo Soyuz Test Project, the world’s first internationally *crewed* (American and Russian) space mission.

In the 1980s, satellite communications expanded to carry television programs, and people were able to pick up the satellite signals on their home dish antennas. Satellites discovered an ozone hole over Antarctica, pinpointed forest fires, and gave us photographs of the nuclear power-plant disaster at Chernobyl in 1986. Astronomical satellites found new stars and gave us a new view of the center of our *galaxy*.



/ˈgæl.ək.si/

/rɪˈlaɪ.əns/

In April 1981, the launch of the space shuttle Columbia lead to a period of *reliance* on the reusable shuttle for most civilian and military space missions. Twenty-four successful shuttle launches fulfilled many scientific and military requirements until January 1986, when the shuttle Challenger exploded after launch, killing its crew of seven.

/ˈskedju:ld/

The Challenger tragedy led to a reevaluation of America’s space program. The new goal was to make certain a suitable launch system was available when satellites were *scheduled* to fly. Today this is accomplished by having more than one launch method and launch facility available and by designing satellite systems to be compatible with more than one launch system.

The Persian Gulf War proved the value of satellites in modern conflicts. During this war allied forces were able to use their control of the “high ground” of space to achieve a decisive advantage. Satellites were used to provide information on enemy troop formations and movements, early warning of enemy missile attacks, and precise navigation in the featureless desert terrain. The advantages of satellites allowed the coalition forces to quickly bring the war to a conclusion, saving many lives.

/səˈveɪ.ləns/

Space systems will continue to become more and more integral to homeland defense, weather *surveillance*, communication, navigation, imaging, and remote sensing for chemicals, fires and other disasters.



A. Recalling Information. Choose the best option for the following items.

1. It could be inferred that
 - a) The Chinese were the first to launch rockets into space.
 - b) There were no space rockets before 1950.
 - c) Earliest work on space rocket engines occurred in different countries at the same time.
 - d) Human's interest in space is not recent.
2. Which item is NOT correct?
 - a) Nazis were the first to use rockets for military purposes.
 - b) V2 missiles could hit targets as far as 300 kilometers away.
 - c) The Nazi missiles in World War II could go as high as 90 Kilometers.
 - d) Nazis had started work on rockets years before World War II.
3. It is NOT true that
 - a) The US and the Soviet Union had a very strong competition in their space programs.
 - b) Russia was ahead of the US in many spaceflights.
 - c) It took Americans 8 years to carry out their plan for stepping on the moon.
 - d) Armstrong's flight was America's first attempt to study the moon.
4. Which item is correct?
 - a) The best use of communication satellites were made in the 1980s.
 - b) The first satellites were launched in the late 1950s.
 - c) By 1970s, Russia and the US had some started cooperation rather than competition.
 - d) By the early 1970s, spacecrafts were probing different planets in the galaxy.
5. Which item is NOT correct?
 - a) In the early 1980s, NASA started using the same shuttles more than once.
 - b) The Challenger explosion made NASA revisit its plan for its space program.
 - c) In the 1980s, NASA made its satellites compatible with more than one launching systems.
 - d) The Persian Gulf War was the first example of the applications of satellites in modern conflicts.

B. Statement Accuracy. Decide if the following statements are True (T), False (F), or Not Given (NG).

1. Nazis were the first in modern days to use rockets for military purposes.
2. John Glenn's historic flight made him the first human to orbit Earth.
3. Over time, space exploration changed competition to cooperation between the US and Russia.
4. The Mariner Spacecraft had sent back images of Jupiter by the end of the late 1970s.
5. The Challenger accident was a turning point in America's space program.
6. The International Space Station is a symbol of cooperation in space exploration among countries.



MATCH IT UP

Go through the text and find a word or phrase which is synonymous to the words underlined in the following sentences.

1. Since ancient times, scientists have been interested in unification of human knowledge of nature.
2. Are you supposed to press these two buttons at the same time?
3. The Tyson-Douglas fight was one of the most memorable events in boxing history.
4. Rescue teams have now determined the location of the ship.
5. The Secretary of State is examining claims of election fraud.
6. Even during war, life must go on for non-militants.
7. The terrorists had been kept under constant watch by our officers.
8. Can this peace settlement bring an end to years of combat?
9. This mission needs to be carried out in secret.
10. Write a comprehensive account of what happened during that period of the activity.



What is an adjective?

Adjectives modify or describe nouns, pronouns, or other adjectives. Adjectives can describe:

- feelings or qualities: *They are **honest**.*
- nationality or origin: *I heard a **French** song.*
- a thing's characteristics: *The knife is **sharp**.*
- age: *He is a **young** man.*
- size and measurement: *She is a **tall** woman.*
- color: *Shirin wore a **red** shirt.*
- what something is made of: *The table is **wooden**.*
- shape: *I sat at a **round** table.*
- a judgment or a value: *Grammar is **complicated**.*

Where do adjectives appear in a sentence?

Adjectives in English usually appear behind the noun or pronoun that they modify.

Adjective + Noun
fast care

Adjectives can also appear after *to be* and *sensing verbs* (e.g., *to seem, to look, to look, to taste, to feel, etc.*)

Adjective Degrees

1. *Positive (Absolute) Adjectives.* A positive or absolute adjective is a normal adjective including numbers, possessive adjectives (e.g., *my, your, his, our*), demonstratives (e.g., *these, this, those*), etc. used to describe, not to compare, a noun. For example: *The class is **hot**.*
2. *Comparative Adjectives.* Comparative adjectives are used to compare differences between the two objects they modify. They are used in sentences where two nouns are compared. The form of comparative adjectives depends on the number of syllables in the original adjective:



LANGUAGE FUNCTION: ADJECTIVES IN A NUTSHELL

Noun (subject) + verb + comparative adjective + *than* + noun (object)

One syllable adjectives: big + er *than*
Two syllable adjectives: happy + er (happier) *than*
more + modern *than*
Three or more syllables: more + important *than*

3. *Superlative Adjectives*. Superlative adjectives are used in sentences where a subject is compared to a group of objects. The form of superlative adjectives depends on the number of syllables in the original adjective:

Noun (subject) + verb + *the* + superlative adjective + noun (object)

One syllable adjectives: *the* big + est (the biggest)
Two syllable adjectives: *the* happy + est (the happiest)
the most + modern
Three or more syllables: *the* most + important

4. *Irregular Comparatives and Superlatives*. There are five adjectives with completely irregular comparative and superlative forms.

Adjective	Comparative	Superlative
good	better than	the best
bad	worse than	the worst
little	less than	the least
much	more than	the most
far	farther than further than	the farthest the furthest



1. The you study for these exams, the you will do.
a) hard – better
b) harder – more successfully
c) much – better
d) more – good
2. He spend a year in India and loves spicy food. The the food is, the he likes it.
a) hotter – more
b) hotter – much
c) hot – much
d) hot – more
3. Peter was laughing hard, but his wife was laughing even!
a) the hardest
b) hard
c) harder
d) harder than
4. My friend is never on time. He always arrives than the rest of us.
a) the latest
b) later
c) late
d) the most late
5. Please give me box.
a) the smaller
b) smaller than
c) smaller
d) the smallest
6. We want to make our city one of tourist destinations in the world.
a) the more popular
b) popular
c) the most popular
d) popular than
7. Don't read that book. It's interesting book I have ever read.
a) more
b) the most
c) the least
d) less

1. Do you think money is (important) good health?
2. This coat is (nice) that one.
3. Gas is so expensive! I want a (efficient) car.
4. Many people think modern life is (good) life in the past.
5. Communication is a lot (easy) it was 50 years ago.
6. The pollution in my city is much (bad) it used to be.
7. I prefer (hot) temperatures. That's why I love summer.
8. My new school is a little (far) my old one.

ADJECTIVE CONSTRUCTION



Like nouns and verbs, adjectives can be identified by specific suffixes. These suffixes are referred to as adjective making suffixes. The following chart lists the most common adjective-making suffixes.

Common Adjective-Making Suffixes and Examples			
-able/ible	visible, valuable	-ic	basic, sympathetic
-al	original, typical	-ing	boring, frightening
-ant	reliant, significant	-ish	Irish, stylish
-ary	primary, secondary	-ive	excessive, productive
-ed	bored, coordinated	-ous	ambiguous, enormous
-ent	efficient, persistent	-y	cheery, noisy, rainy
-ful	resourceful, stressful	-less	effortless, helpless
-ly	friendly, lovely	-ian	Iranian, African



ADJECTIVE CONSTRUCTION

Word	Adjective
amazement	
fame	
thrill	
differ	
spontaneity	
power	

1. This car is from any other car in the market.
2. The city is a World Heritage Site and is for its classical music.
3. His jokes seemed, but were in fact carefully prepared beforehand.
4. It is how long this man can hold his breath and work hard underwater.
5. It was a experience to see the boats afloat over the stream.
6. The radiation would be at least 50 times above normal, enough to kill exposed life.



WRITING ESSENTIALS

In this chapter, we will discuss the final layer in a paragraph i.e., the *concluding sentence*. A concluding sentence signals an important message to the reader: that the paragraph has come to an end. In other words, a concluding sentence closes the final thoughts about the topic sentence of the paragraph. So it is important not to mention any new information in the concluding sentence. There are a number of words that can be used at the beginning of a concluding sentence. These include:

In conclusion	Therefore	As expressed	Overall
As a result	Thus	Finally	Lastly
For this reason	In general		

An effective concluding sentence:

- reviews main points mentioned in a paragraph
- restates the topic sentence
- is usually found at the end of a paragraph
- does not introduce new ideas or topics

Look at the following paragraph. See how the writer signals the closure of the paragraph in the final sentence:

*The human body is a wonderful piece of work that nature has created. It is not beautiful like the body of a butterfly or peacock but it is shaped practically. It can do many types of work which other animals cannot. It is not strong like the body of a tiger. But in place of physical strength it has a big and sharp brain. By using this brain, the human physique has been able to overcome many of its limitations. By sitting in an airplane it flies faster than a kite, by riding a motorcycle it travels faster than a leopard, and by firing a machine gun it fights much better than a tiger. In spite of all this, the human body suffers from many diseases because it has a weakness for habits such as smoking, drinking and overeating. When it is healthy the body can give great pleasure but when it is sick it can cause great pain. **The wise man would always keep his body fit because a healthy mind can work only in a healthy body.***

WRITE IT UP (SELF PRACTICE)



These are mixed sentences of a paragraph. Put each sentence below in the correct place to form the paragraph. The topic sentence is *h*.

- a) Thirdly, because of financial problems, some students fail university classes.
- b) For example, students who have to take jobs don't have as much time to study, so they may fail classes.
- c) The first reason is that they fail because their academic background is weak.
- d) Finally, there are students who fail because their energies are not directed toward their classes.
- e) For example, one student might not have had enough mathematics course at high school, so he fails his university math class.
- f) The second reason is that most of the students don't understand the importance of regular attendance.
- g) Others may worry because they have too little money, and they may not be able to concentrate on their studies.
- h) There are some reasons why a lot of students fail in college.
- i) Because some students don't attend classes regularly, they may not be able to pass the test in class because they don't know the answers.
- j) In conclusion, due to all these problems, numerous students fail in college every year.
- k) For example, some of these students are not interested in college and they spend their day doing other things.



SEMI/TECHNICAL VOCABULARY SELF STUDY

Chapter 4 Word List. The main words in this chapter are listed here. You can check your vocabulary knowledge by providing relevant meaning(s) or synonyms for each.

Accomplish:	Long-distance:.....
Ally:	Map (v):
Altitude:	Military:
Antarctica:	Missile:
Antenna:	Mission:
Antiquity:	Navigation:
Arch (v):	Occur:
Artificial:	Orbit:
Astronaut:	Overcome:
Attach:	Per:
Available:	Pick up:
Ceremonial:	Pinpoint:
Civilian:	Possibility:
Coalition:	Power-plant:
Communication:.....	Precise:
Compatible with:.....	Probe:
Conflict:	Range:
Crew (n - v):	Reevaluation:
Decade:	Reliance:
Decisive:	Remote:
Defense:	Requirement:
Design:	Reusable:
Disaster:	Ring (n):
Exploration:	Rocket:
Facility:	Satellite:
Featureless:	Schedule:
Fulfill:	Shuttle:
Giant:	Simultaneously:.....
Gravity:	Spacecraft:
Highlight:	Spaceflight:
Homeland:	Step onto:
Integral:	Surveillance:
Land (v):	Terrain:
Latter:	Troop:
Launch:	Velocity:
Lead (v):	