
UNIT 13 “MINERAL OIL”

Structure

- 13.0 Objectives
 - 13.1 Reading Comprehension
 - 13.1.1 Study Guide
 - 13.1.2 Reading Passage
 - 13.1.3 Glossary
 - 13.1.4 Comprehension Questions
 - 13.2 Vocabulary
 - Suffixes
 - 13.3 Grammar and Usage
 - Present Simple Tense
 - 13.4 Writing
 - Defining
 - 13.5 Let Us Sum Up
 - 13.6 Answers to the Exercises
-

13.0 OBJECTIVES

In this unit our aim is to give you practice in reading comprehension by (a) setting a passage dealing with Mineral oil, (b) giving a glossary of difficult words (c) asking questions relating to comprehension of the passage, (d) identifying the false statements and correcting them. In the vocabulary section, we have set exercises asking you to find (a) words and phrases which mean the same as the words given, (b) match words with their meanings, (c) and add correct suffixes to the words given. The section on grammar and usage gives you practice in (a) the use of some models expressing different degrees of certainty and (b) the simple present tense. The section on writing gives sufficient practice in writing definitions. Apart from this you have been given a model description of how sulphur is extracted. You are expected to write a paragraph on how oil is obtained from the oil fields.

13.1 READING COMPREHENSION

13.1.1 Study Guide

The reading passage describes how oil has transformed man's life on earth. It traces its history and origin and discusses the difficulties involved in obtaining oil from the oilfields. It also describes how the crude oil is refined to petrol, paraffin etc. Lastly, it discusses the future of mineral oil, if oil-driven engines are replaced by engines driven by atomic power.

After you have read the passage once, read it again with the help of glossary given at the end of the passage, and then answer all the questions. Check your answers with those given by us at the end of the unit.

13.1.2 Reading Passage

Mineral Oil

To the ordinary man, one kind of oil may be as important as another. But when the politician or the engineer refers to oil, he almost always means mineral oil, the oil that drives tanks, aeroplanes and warships, motor-cars and diesel locomotives; the oil that is used to lubricate all kind of machinery. This is the oil that has changed the life of the common man. When it is refined into petrol it is used to drive the internal combustion engine. To it we owe the existence of the motorcar, which has replaced the private carriage drawn by the horse. To it we owe the possibility of flying. It has changed the methods of warfare on land and sea. This kind of oil comes out of the

earth. Because it burns well, it is used as fuel and in some ways it is superior to coal in this respect. Many big ships now burn oil instead of coal. Because it burns brightly, it is used for illumination; countless homes are still illuminated with oil-burning lamps. Because it is very slippery it is used for lubrication. Two metal surfaces rubbing together cause friction and heat; but if they are separated by a thin film of oil, the friction and heat are reduced. No machine would work for long if it were not properly lubricated. The oil used for this purpose must be of the correct thickness; if it is too thin it will not give sufficient lubrication, and if it is too thick it will not reach all parts that must be lubricated.

The existence of oil wells has been known for a long time. Some of the Indians of North America used to collect and sell the oil from the wells of Pennsylvania. No one, however, seems to have realised the importance of this oil until it was found that paraffin-oil could be made from it; this led to the development of the wells and to the making of enormous profits. When the internal combustion engine was invented, oil became of worldwide importance.

What was the origin of the oil, which now drives our motorcars and air-craft? Scientists are confident about the formation of coal, but they do not seem so sure when asked about oil. They think that the oil under the surface of the earth originated in the distant past, and was formed from living things in the sea. Countless billions of minute sea creatures and plants lived and sank to the seabed. They were covered with huge deposits of mud; and by processes of chemistry, pressure and temperature were changed through long ages into what we know as oil. For these creatures to become oil, it was necessary that they should be imprisoned between layers of rock for an enormous length of time. The statement that oil originated in the sea is confirmed by a glance at a map showing the chief oilfields of the world; very few of them are far distant from the oceans of today. In some places gas and oil come up to the surface of the sea from its bed. The rocks in which oil is found are of marine origin too. They are sedimentary rocks, rocks that were laid down by the action of water on the bed of the ocean. Almost always the remains of shells, and other proofs of sea life, are found close to the oil. A very common sedimentary rock is called shale, which is a soft rock and was obviously formed by being deposited on the seabed. And where there is shale there is likely to be oil.

Geologists, scientists who study rocks, indicate the likely places to the oil drillers. In some cases oil comes out of the ground without any drilling at all and has been used for hundreds of years. In the island of Trinidad the oil is in the form of asphalt, a substance used for making roads. Sir Walter Raleigh visited the famous Pitch Lake of Trinidad in 1595; it is said to contain nine thousand million tonnes of asphalt. There are probably huge quantities of crude oil beneath the surface.

The king of the oilfield is the driller. He is a very skilled man. Sometimes he sends his drill more than a mile into the earth. During the process of drilling, gas and oil at great pressure may suddenly be met, and if this rushes out and catches fire the oil well may never be brought into operation at all. This danger is well known and steps are always taken to prevent it.

There is a lot of luck in drilling for oil. The drill may just miss the oil although it is near; on the other hand, it may strike oil at a fairly high level. When the drill goes down, it brings up soil. The samples of soil from various depths are examined for traces of oil. If they are disappointed at one place, the drillers go to another. Great sums of money have been spent, for example in the deserts of Egypt, in 'prospecting' for oil. Sometimes little is found. When we buy a few gallons of petrol for our cars, we pay not only the cost of the petrol, but also part of the cost of the search that is always going on.

When the crude oil is obtained from the field, it is taken to the refineries to be treated. The commonest form of treatment is heating. When the oil is heated, the first vapours to rise are cooled and become the finest petrol. Petrol has a low boiling point; if a little is poured into the hand, it soon vaporizes. Gas that comes off the oil later is condensed into paraffin. Last of all the lubricating oils of various grades are produced. What remains is heavy oil that is used as fuel.

There are four main areas of the world where deposits of oil appear. The first is that of the Middle East, and includes the regions near the Caspian Sea, the Black Sea, the Red Sea and the Persian Gulf. Another is the area between North and South America, and the third, between Asia and Australia, includes the Island of Sumatra, Borneo and Java.

The fourth area is the part near the North Pole. When all the present oil fields are exhausted, it is possible that this cold region may become the scene of oil activity. Yet the difficulties will be great, and the costs may be so high that no company will undertake the work. If progress in using atomic

power to drive machines is fast enough, it is possible that oil-driven engines may give place to the new kind of engine. In that case the demand for oil will fall, the oilfields will gradually disappear, and the deposits at the North Pole may rest where they are forever.

(From Power and Progress, Longman)

13.1.3 Glossary

mineral	: substance (not vegetable or animal) got from the earth by mining, especially, one that has a constant chemical composition. Coal, iron, oil are examples of minerals.
diesel locomotives	: diesel railway engine.
lubricate	: put oil or grease into machine parts to make them work easily
internal combustion engine	: the engine in which the power is produced by the explosion of gases or vapours inside the engine.
owe	: to be indebted as a source.
carriage	: vehicle, especially one four wheels, pulled by a horse or horses, for carrying people.
illuminated	: given light to
film	: coating or covering
paraffin oil	: oil obtained from petroleum, coal, etc. used as a fuel (in lamps, heating and cooking stoves)
enormous	: huge
originate	: have its beginning
creatures	: animals
billion	: In U.K., France and USA, a thousand millions.
minute	: very small
bed	: bottom of the sea, a river, lake etc.
deposits	: layers of solid matter left-behind (often buried in the earth) after having been naturally accumulated.
chemistry	: combination of substances
imprisoned	: kept
glance	: quick look
oil-fields	: areas where petroleum is found
marine	: of the sea
sedimentary rocks	: the examples of these rocks are : slate, sandstone, limestone.
remains	: what is left; the left overs
shells	: hard covering of some animals (e.g. oysters, lobsters, snails)
shale	: soft rock that splits easily into layers
asphalt	: dark coloured, tarry substance used for making roads

Sir Walter Raleigh	:	English admiral and historian of Elizabethan times, born in 1552 and executed by James I in 1618.
pitch lake	:	black lake
tons	:	measure of weight (2,240 lb in Britain: 2000 lb in the U.S.A)
crude	:	unrefined
skilled	:	trained; experienced
process	:	action; course
traces	:	marks, signs etc, showing that something has been present
prospecting	:	searching
gallons	:	measure for liquids
refineries	:	places, building etc., where something is refined
treated	:	put (a substance) through a process (in manufacture, etc.)
condensed	:	changed to a liquid
fuel	:	material for burning (eg. wood, coal, oil uranium)
exhausted	:	used up completely
undertake	:	agree to do

13.1.4 Comprehension Questions

Exercise 1

Answer the following questions:

1. List examples from the passage to show that mineral oil has changed the life of the common man.
2. Why is mineral oil used as a fuel?
3. What were the consequences of the discovery that paraffin oil could be made from mineral oil?
4. What, according to scientists, did oil originate from?
5. Mention the stages and processes that preceded the formation of oil
6. Is there any evidence to show that oil had its beginning in the sea?
7. In what way are the geologists helpful to the drillers?
8. What did Sir Walter Raleigh learn about the method of getting oil from the ground?
9. Why is the driller of an oilfield called the king ?
10. How does the driller decide whether he should continue drilling in a particular place?
11. How is the crude oil made fit to be used as petrol?
12. Why does petrol vapourise very fast ?
13. How is paraffin made?
14. Why has the cold region near the North Pole not become the scene of oil activity ?
15. What may reduce the oil demand ?

True and False Statements**Exercise 2**

Read the following statements carefully. Then mark each one as true or false. Correct the false statements.

1. There is no difference between coal and oil as fuels.
2. Oil is used as a lubricant because it is very thick.
3. It was only after it was realised that paraffin oil could be made out of mineral oil, mineral oil began to be considered very important.
4. Scientists are not as sure about how oil originated as they are about coal.
5. It was essential for living creatures to be kept in the rocks for a long time before they could become oil.
6. There are no oilfields away from the oceans.
7. Where there is a shale rock, there is bound to be oil.
8. It is sometime possible to get oil out of the ground.

13.2 VOCABULARY**Exercise 3**

Find words or phrases in the passage that mean the following:

1. a railway engine
2. a horse driven vehicle meant for carrying people.
3. fighting
4. light
5. coating
6. animals
7. the left overs
8. dark coloured, tarry substance used for making roads
9. searching
10. layers of solid matters, naturally accumulated

Exercise 4

Match each word in the left hand column with the word nearest in meaning to it in the right hand column. You will have two meanings left over.

Column A	Column B
1. mineral	a. process of burning
2. combustion	b. oiling for greasing a machine
3. fuel	c. substance got from the earth by mining
4. lubrication	d. Have one's beginning
5. friction	e. bottom (of the sea, river or lake)
6. bed	f. material for burning
7. originate	g. rubbing of one thing against another
8. island	h. very old
	i. a piece of land surrounded by water
	j. Painful

Exercise 5**Suffixes**

The ending - 'ist' in 'geologist' and 'scientist' refers to the people who are associated with the study of the earth's history and science respectively. Similarly, there are other endings such as -an, -ian, -er, and -or used for this purpose.

Add the correct endings to the following words listed under subject making slight changes in the spellings where necessary. The first one has been done for you.

Subject	People associated with the study of the subject
1. Botany	Botanist
2. Physics	_____
3. Mathematics	_____
4. Chemistry	_____
5. Biology	_____
6. Psychiatry	_____
7. Archaeology	_____
8. Astronomy	_____
9. Climatology	_____
10. Technology	_____
11. Meteorology	_____
12. Geography	_____
13. History	_____
14. Drug	_____
15. Philosophy	_____
16. Translation	_____

13.3 GRAMMAR AND USAGE**Exercise 6**

Look at the use of the modal may in the following sentences from the reading passage:

1. To the ordinary man, one kind of oil may be as important as another _____
2. During the process of drilling, gas and oil at great pressure may suddenly be met _____
3. The drill may just miss the oil although it is near;
4. When all the present oilfields are exhausted, it is possible that this cold region may become the scene of oil activity _____

The modal **may** in all these sentences expresses a very moderate level of certainty. In addition to this modal there are other modals which are used frequently in scientific English. All of them express different degrees of certainty. The following diagram shows degrees of certainty expressed with modal verbs.

If you do X, Y	will/will not must/cannot may/may not might/might not could	Happen	100 % 50% 40% 0%
----------------	---	--------	---------------------------

Note : 'Will' expresses a fact, 'must' expresses a conclusion.

Fill in the blanks using any of the modals listed above :

1. If progress in using atomic power to drive machines is fast enough, the oil-driven engines _____ give place to the new kind of engine.
2. Death _____ occur if body temperature exceeds 43oC

3. If fuel is dirty, it _____ choke the fuel valves.
4. Cars _____ not be parked in front of the entrance.
5. Distress signals must always be repeated, because the first one _____ heard or seen.
6. A compass needle _____ always point towards magnetic north.
7. If a person touches a live wire carrying 440V AC, he _____ be electrocuted.
8. Soldiers _____ obey orders.

Exercise 7

Present Simple Tense

In scientific English the main verbs of sentences are usually in the present simple tense. The reason being that scientific text book contain information about the present state of scientific knowledge. They describe experiments showing how this knowledge can be obtained. About a third of all scientific statements have **is** or **are** as the main verb.

e.g. The maximum speed of this car is 140 kilometers per hour.

Modern bridges are often several kilometers long.
A hexagon is a plain figure with six sides.

The other common verb in scientific statements is the main verb have.
Isosceles triangles have two equal angles.
If a plane figure has three straight sides, it is a triangle .

Present simple tense is used for general statements:

Water freezes at 0°C.
Sound travels at a speed of 333 meters a second.
Wood floats on water

It is also used for factual statement and observations :

This ring weighs 120 grams
This factory employs 100 workers.
This loaf of bread costs Rupees 3 only.

It can be used in description of experiments :

The current passes along the wire.
The temperature rises until it reaches 100oC ,but after that it remains constant.

Rewrite the following passage after putting the verbs in brackets into the correct forms:

About four-fifths of the atmosphere (consist) of nitrogen. The remainder (be) mostly oxygen. The other five gases (be) very rare and, infact,(make up) less than 1 percent of the total atmosphere. Although these gases (be) rare, at least two of them (have) common uses in the field of electrical lighting. Electric light bulb usually (contain)argon. Neon (be) also useful because it (give) out light when an electrical current (pass) through it.

13.4 WRITING

Exercise 8

Defining

In scientific description it is frequently necessary to define, or give a definition of certain words. The following is a very common way of writing definitions in English.

Aluminium is a metal which is produced from bauxite.

An engineer is a person who designs machines, buildings or public works.

A catalyst is a substance which alters the rate at which a chemical reaction occurs.

Definitions are often completed by a passive relative clause. Here is an example.

A pump is a machine which is used for transferring a liquid or a gas from one place to another.

The phrase 'which is used for' is very common in definitions. It is possible to use a reduced relative clause and write the above definition as below :

A pump is a machine used for transferring a liquid or a gas.

There may be a preposition before wh-word.

A telephone is a device through which the human voice is transmitted to a distance.

Geometry is a branch of mathematics in which the properties and relations of lines, angles, surfaces and solids are studied.

There are two ways of writing scientific definitions which do not make use of relative clauses at all. Look at the following examples:

A square is a plane figure with four equal sides and four right angles. ----

Cement is a powder with the property of setting into a hard mass after it has been mixed with water.

Now write definitions for the following concepts :

1. a thermometer: _____
2. a telescope : _____
3. a drill : _____
4. a microphone : _____
5. a pentagon : _____
6. a dye : _____
7. a tape recorder : _____
8. a baro meter : _____
9. a gas cooker : _____
10. asphalt : _____

Exercise 9

Read a description of how sulphur is extracted.

In some part of the world sulphur deposits lie too deep to be mined in the ordinary way. However, in about 1900 an American engineer called Herman Frasch developed a process for extraction of this deep lying sulphur. The Frasch process depends on the fact that the melting point of sulphur is only a little above the boiling point of water. The process consists of three basic operations. First, a large amount of water is super heated; in other words, the water is heated under pressure to above its normal boiling point. Secondly, this superheated water is pumped down the well so that it melts sulphur. Finally, the molten sulphur is pumped to the surface.

Describe in a paragraph how crude oil is obtained from the oilfields.

13.5 LET US SUM UP

In this unit we have given you practice in

- i) Understanding a science passage dealing with mineral oil.

- ii) Identifying and correcting the false statements.
- iii) Finding out words having similar meanings.
- iv) Suffixes - ist, -an, -ian, -er, and -or.
- v) Modals reflecting different degrees of certainty.
- vi) Simple present tense.
- vii) Writing definitions.
- viii) Writing a paragraph describing a process.

13.6 ANSWERS TO THE EXERCISES

Exercise 1

1. It is used as a fuel for driving tanks, warships, aeroplanes, motor cars, diesel locomotives, lubrication of all kinds of machinery; illumination; for making roads.
2. It burns well.
3. It led to the development of the oil wells and making of huge profits from it.
4. It originated from living things in the sea.
5. First, the sea creatures sank to the seabed. Then they were covered with huge deposits of mud. Finally, they went through several processes of chemistry, temperature and pressure.
6. Yes. The chief oilfields of the world show that oil had its beginning in the sea; secondly, the rocks in which oil is found are of marine origin.
7. They suggest to them the likely places of oil.
8. Sir Walter Raleigh learnt that oil could be got from the ground even without drilling it.
9. The driller is called the king because he decides and controls everything and takes all necessary steps to prevent any mishap.
10. He examines the samples of the soil from various depths, and if he finds some traces of oil in the samples of the soil, then he continues the drilling.
11. It is heated and the first vapours which rise are made to cool down and become the finest petrol.
12. It has a low boiling temperature.
13. It is made from the gas which is produced by crude oil on heating. This gas is condensed into paraffin.
14. The cost of getting the oil is very high.
15. The use of atomic power may produce a new kind of engine and this may reduce the demand for oil.

Exercise 2

1. False. Oil is better than coal because it burns better.
2. False. Oil is used as a lubricant because it is fairly thin and can reach all parts that need to be lubricated.
3. True.
4. True.
5. True.
6. False. Very few oilfields are away from the oceans.

7. False. Where there is shale rock, there is a possibility of oil being present.

8. True.

Exercise 3

- | | | | | |
|---------------|--------------|-------------|------------------|---------------|
| 1. Locomotive | 2. Carriage, | 3. Warfare, | 4. Illumination, | 5. Film, |
| 6. Creatures, | 7. Remains, | 8. Asphalt, | 9. Prospecting, | 10. Deposits. |

Exercise 4

1. c, 2. a, 3. f, 4. b, 5. g, 6. e, 7. d, 8. i.

Exercise 5

- | | | | |
|------------------|------------------|-------------------|-----------------|
| 1. Botanist | 2. Physicist | 3. Mathematician | 4. Chemist |
| 5. Biologist | 6. Psychiatrist | 7. Archaeologist | 8. Astronomer |
| 9. Climatologist | 10. Technologist | 11. Meteorologist | 12. Geographer |
| 13. Historian | 14. Druggist | 15. Philosopher | 16. Translator. |

Exercise 6

1. may, 2. will, 3. may, 4. must, 5. may not be, 6. will
7. will, 8. must.

Exercise 7

Consists, is, are, make up, are, have, contains, is, gives, passes.

Exercise 8

1. A thermometer is an instrument (used) for measuring temperature.
Or
A thermometer is an instrument which measures temperature.
2. A telescope is an instrument (used) for making distant objects appear nearer and larger.
Or
A telescope is an instrument which makes distant objects appear nearer and larger.
3. A drill is an instrument (used) for making holes in or through hard substances.
Or
As in 1 and 2 above.
4. A microphone is a device/instrument (used) for changing sound waves into electrical waves.
Or
As above
5. A pentagon is a plane figure with five sides
Or
A pentagon is a plane figure with five sides.
6. A dye is a substance which can change the colour of a material.
7. A tape recorder is a tool which records sound.
Or
A tape recorder is a tool (used) for recording sounds.
8. A barometer is a device which measures atmospheric pressure.
Or
A barometer is a device (used) for measuring atmospheric pressure.
9. A gas cooker is an apparatus used for cooking food.
10. Asphalt is a dark substance used for making roads.