MINISTRY OF HIGHER AND SECONDARY SPECIAL EDUCATION OF THE REPUBLIC OF UZBEKISTAN

KARSHI ENGINEERING-ECONOMICS INSTITUTE

DEPARTMENT OF FOREIGN LANGUAGES

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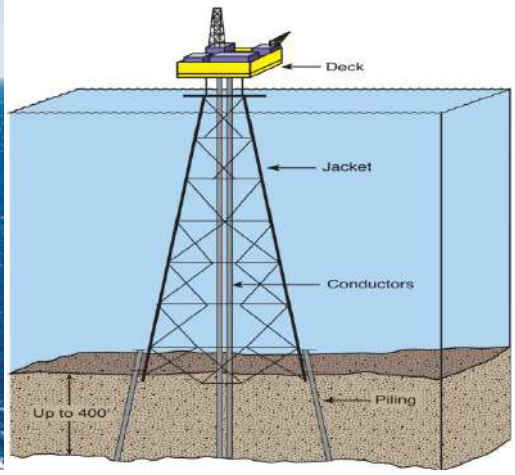
ENGLISH FOR PETROLEUM ENGINEERING-2

Study manual

PRACTICAL USE ENGLISH

FOR 60721800 – "OIL AND GAS BUSINESS" STUDENTS

(*THE SECOND-YEAR STUDENTS OF OIL AND GAS FACULY*)



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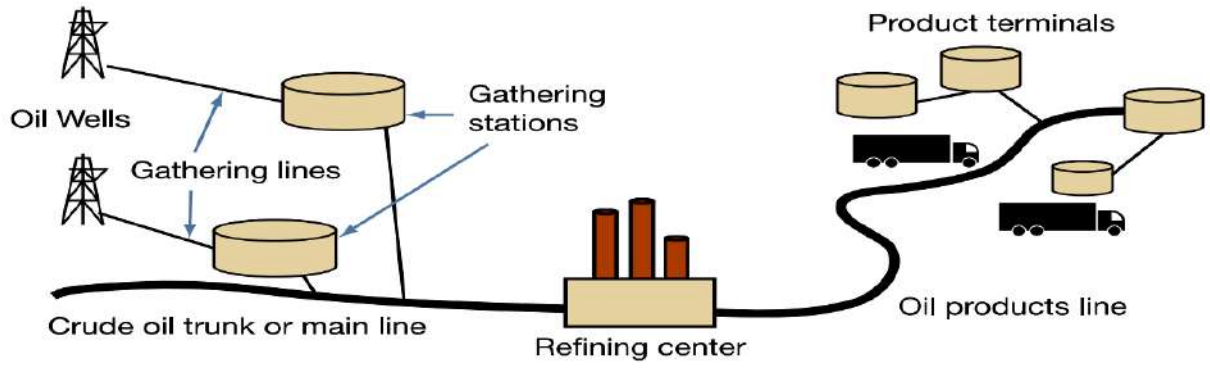
This study manual on English is developed for the second-year students of Oil and gas faculty specialty of 60721800 – "Oil and gas business". It consists of fifteen lessons which are based on the Curriculum of the subject. Futhermore, current manual is aimed at teaching English for oil and gas to the students that is crucial for their future career. For this purpose, the manual contains lots of specialized texts on each lesson, active vocabulary in business sphere and full of intriguing listening and reading tasks. The main purpose of this manual is to enchance student's oil and gas studies to improve their language skills by learning on their major in education.

Ingliz tili bo'yicha ushbu o'quv qo'llanma Neft va gaz fakultetining 60721800 - "Neft va gaz ishi" ixtisosligi ikkinchi kurs talabalarining amaliy mashg'ulotlarida ingliz tili fanidan foydalanish uchun ishlab chiqilgan. O'quv qo'llanma fan o'quv dasturiga asoslangan bo'lib, o'n beshta darsdan iborat. Bundan tashqari, ushbu qo'llanma talabalarga kelajakdagi faoliyati uchun juda muhim bo'lgan ingliz tilini o'qitishga qaratilgan. Shu maqsadda qo'llanmada har bir darsga bag'ishlangan ko'plab maxsus matnlar, neft va gaz sohasiga oid terminlar va tinglash hamda o'qib tushunish uchun juda qiziqarli vazifalar mavjud.

Qo'llanmaning asosiy maqsadi – talabalarning neft va gaz yo'nalishidagi bilimlarini takomillashtirish, ularning ta'lim sohalariga tayanib, ularning til malakalarini oshirishdir.



PREFACE

Nowadays, learning foreign languages, including English, is essential in every sphere. The role and influence of English in today are gaining a higher speed in the world as well as in Uzbekistan. The main factors for this phenomenon include expanding communication with the world. Thee importance of the English language has been increasing in all aspects of Uzbek people's life. Currently, in the Republic of Uzbekistan great attention is given to the radical reorganization of the educational system that will give an opportunity to raise it to the level of modern standards. According to the "Education Act" of our country, students who study at any state institutions sholud get aimed level before graduating. For this reason, intended materials should lead students to get target level. In nonlinguistic institutions, ESP is taught and assigned target level is B2 for the second-year students. Current developed manual will help 60721800 – "Oil and gas business" students become B2 level which is arranged in educational standards.

The manual focuses on the integration method, that is the organization of exercises based on listening, reading, speaking and writing skills of all language skills which is crucial in learning a foreign language. The texts presented in the lessons are enriched with facts and statistical analysis of the world's oil and gas industry. In its turn, this informs students about what is happening in the world community. Alternatively, students can learn logical and informational analysis through situations in texts and tasks. There is also a special set of exercises using telecommunications and computer technology.

This manual is designed so that teachers can work through various types of strategies with students, use the general activities and sample academic lessons to practice the tasks being taught, and then have the students turn to their outside readings (e.g., academic texts, journals) to put into practice the knowledge that they are obtaining.

CONTENTS

Lesson 1 Picking up oil from storage tanks

Warm up!

Task 1 Read the following questions and discuss them in groups.

1 Where is oil stored?

2 How does oil get from storage to a tanker?

Vocabulary tasks:

Task 2 Translate the active vocabulary of the lesson into Uzbek and learn it by heart.

divert, strapping crew, perfect, sealed, circumference, storage tanks, offloading line, gauged, meter prover, seller, buyer, disputes, benefits, accurate, truck driver

Task 3 Fill in the blanks with the correct words and phrases from the word box.

diverted	strapping crew	perfect	sealed	circumference

1) The _____ needs to measure the storage tank.
2) The tank is tightly _____ so no contaminants get inside.
3) It is hard to take a _____ measurement.
4) What is the _____ of the storage tank in inches?
5) The water was _____ away from the area.

Task 4 Read the sentence pairs. Choose where the words best fit the blanks.

1 storage tank / meter prover

A) The _____ is ful of petroleum.

B) The buyer used a _____ to measure the oil.

2 buyer / seller

A) The _____ is raising the price per barrel of oil.

B) The _____ agreed to pay the company $1000.

3 offloading line / gauged

A) The tank was _____ already.

B) The driver connected the _____ to the truck.

Reading tasks:

Task 5 Read the Memo (eslatma) and translate it into Uzbek.

Memo:

To: *Tanker Truck Drivers* ***From:*** *Superintendent Greg Peters*

RE: *Picking up Oil* ***Date:*** *January 15*

It is not difficult to pick up oil from storage tanks. Just carefully follow the instructions below:

1) All tanks must be sealed and gauged. A strapping crew measures the circumference of the tank. Be sure to get the measurement.

2) Divert oil into your truck's tank. Use the offloading line.

3) Do your own measurement of the tank. Find out how much oil you have. Write down the amount.

4) Check the meter prover. Make sure the measurement is correct.

No measurement is ever absolutely perfect. However, always follow these steps. This benefits the seller as measurements, there are fewer disputes.

Task 6 Read the memo again and choose the correct answers.

1 What is the purpose of the memo?

A) to give instructions for picking up oil

B) to explain common mistakes when picking up oil

C) to describe how to use a meter prover

D) to compare buyers' and sellers' tasks where picking up oil

2 Who measures the tank's circumference?

A) the buyer **B)** the truck driver **C)** the strapping crew **D)** the seller

3 Which of the following is not mentioned in the memo?

A) Storage tanks need to be gauged.

B) Strapping crews use offloading lines.

C) Drivers need to record measurements.

D) Measurements are not expected to be perfect.

Task 7 Read the text. Are these sentences true (T) or false (F)? Correct the false statements.

1 The smallest tank we have is 34,000 gallons. (T / F) __*largest*___

2 The longest bullet tank is 18 meters. T / F

3 The pressure in the bullet tanks is lower than in the fuel oil tanks. T / F

4 The nearest rig is 45 kilometres away. T / F

This facility is bigger than our others. In fact, it is the biggest facility we have. These tanks are for kerosene. They are much smaller than the tanks we use for the other fuel oils. The largest tank we have is 34,000 gallons. Here it is on the right. Here you can see the bullet tanks, which we use for LPG. The longest we have is 18 meters. The shortest is 6 meters. The pressure in the LPG tanks is normally around 5 bar. This is much higher than in the fuel oil tanks. Propane and butane are both heavier than air, so leaks can be a problem. The gas does not go away. The refinery is not far, only 3 kilometers from here. The closest rig is 35 kilometers away. The furthest is 150 kilometres.

Grammar review: Comparing things

We use an **adjective** to describe a noun. *This is a **big** facility.*
We use a **comparative** to compare two things. *This facility is **bigger** than our others.*
We use a **superlative** to compare three or more things. *This is the **biggest** facility we have.*

Short adjectives:	close	closer	the closest
	great	greater	the greatest
Adjectives ending in *–y:*	heavy	heavier	the heaviest
	easy	easier	the easiest
Long adjectives:	important	more/less important	the most/least important
Irregular adjectives:	good	better	the best
	bad	worse	the worst
	far	further	the furthest

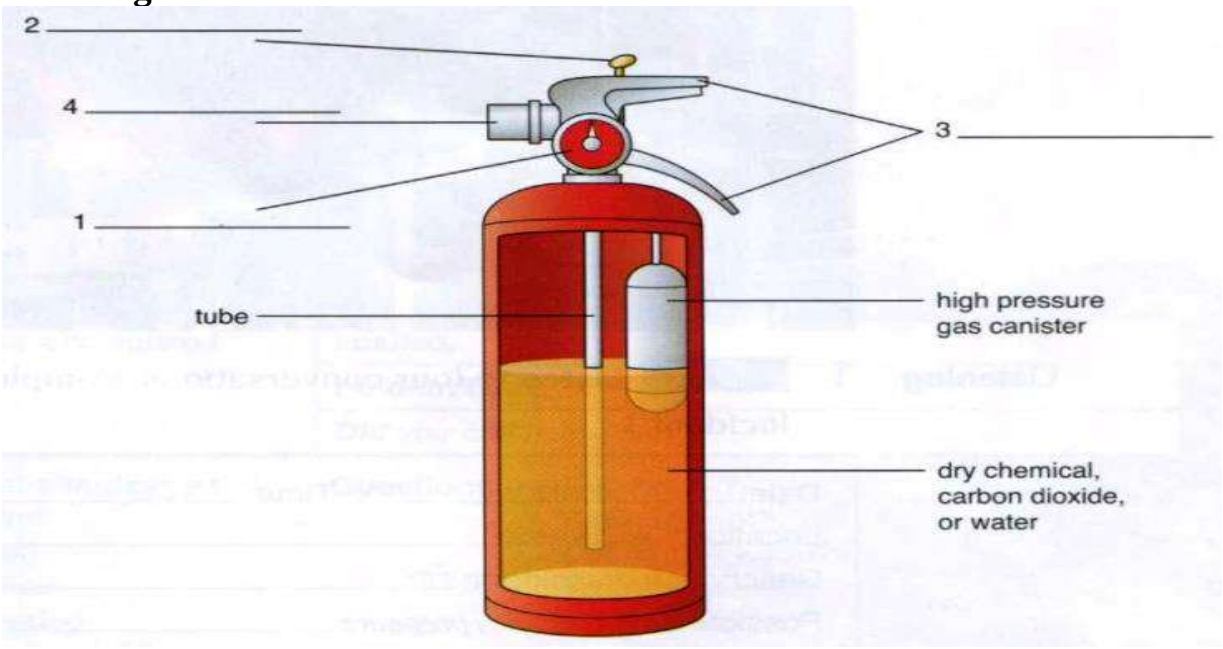
Task 8 Read the information about the three storage facilities. Then complete the sentences.

	Al Gabar Oil Depot	**Yakunst Tank Farm**	**Hangdong Terminal**
Built	1962	1998	2001
Distance to refinery	3 km	120 km	27 km
Capacity	33 million litres	32 million litres	54 million litres
Number of tanks	27	44	60

l Gabar is ___older____ (old) than Yakunst.
2 Al Gabar is _____ (old) depot in the table.
3 Yakunst is _____ (far) from a refinery.
4 Al Gabar is _____ (close) to a refinery than Hangdong.
5 Hangdong has _____ (large) storage capacity.
6 Hangdong has _____ (great) number of tanks.

Listening tasks: Health and safety: Fire safety

Track 1: **Task 9 Listen to the description and label the diagram of a fire extinguisher.**



Task 10 ***Listen track 1 again and correct these sentences.***

1 The fire extinguisher contains dry chemical, carbon dioxide and water. *or*
2 The safety pin is under the pressure gauge.
3 The nozzle is on the right.
4 The tube is outside the container.
5 The gas canister is above the tube.

Task 11 ***Look at the chart. Underline the words for parts of a fire extinguisher. Match them to the labels in the diagram above in Task 9.***

Speaking tasks:

Task 12 Practise in pairs. Take turns to explain how to use a fire extinguisher. Use the words in the box.

pull	**aim**	**squeeze**	**sweep**

Task 12 Practise in pairs. Describe a petroleum product but do not name it. Your partner has to guess what it is.

A: This product is black. You drive on it.
A: No. It's in the road.
A: Yes.
B: Is it a tyre?
B: Is it asphalt?

Task 13 Work with partner, act out the roles, then switch roles.

Use language such as:

Hi, my name is..... *Nice to meet you. I'm.....*
So, I'll measure.....

Student A: You are a truck driver. Talk to Student B about:

- ❖ who you are and what company you work for
- ❖ which storage tank you are getting oil from
- ❖ what you need to do first

Student B: You are an oil field worker. Answer Student A's questions.

Writing tasks:

Task 14 Use the memo and the conversation from Task 13 to fill out the frequently asked questions sheet.

Oil Pick-ups

Frequently Asked Questions

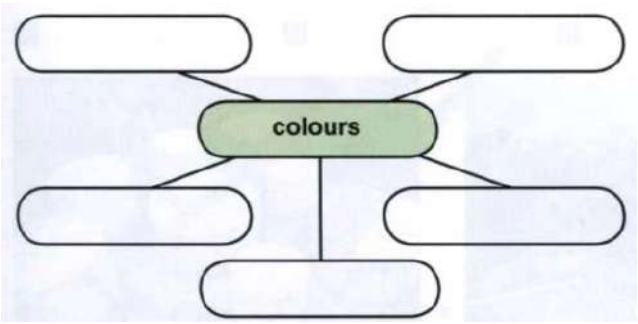
Q: Who measures the oil in the storage tank?
A: _____

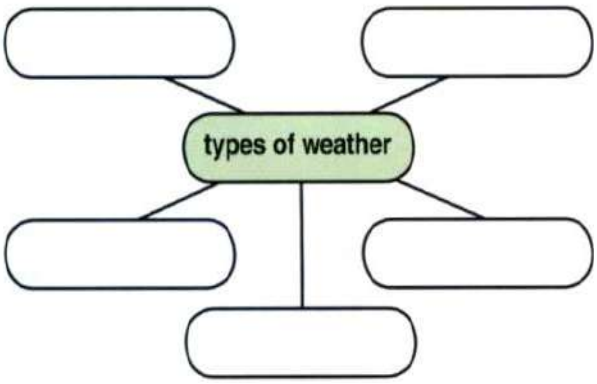
Q: Who measures the oil next?
A: _____

Q: What happens after the oil is measured?
A: _____

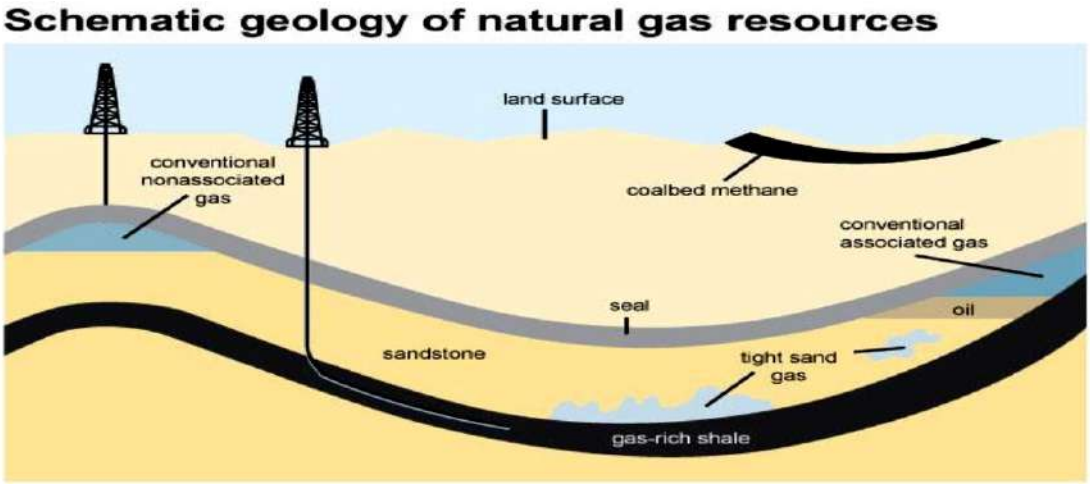
Q: What does the truck driver use to get the oil into his/her truck?
A: _____

Complete each of these word spiders





Lesson 2 Natural gas



Warm up!

Task 1 Match sentences 1-5 with pictures a-e.

1 The Tupolev Tu-155 transport aircraft can be powered by Liquefied Natural Gas.

2 Gas-fired power stations generate electricity.

3 Some cities fuel buses with natural gas because it burns cleanly.

4 Homes all over the world use natural gas for cooking and heating.

5 Natural gas is used to make ammonia for fertilizer. Fertilizer is food for plants.

Task 2 Answer the questions.

1 How is power generated in your country?

2 Do you use gas for cooking? How does the gas get to your home?

3 Are there any gas-powered cars or buses in your town or city?

Task 3 Complete the sentences using the list.

NH_3 *CH_4* *LNG*

1 Natural gas is mostly _____ -methane.

2 _____stands for liquefied natural gas.

3 The chemical symbol for ammonia is _____.

Vocabulary tasks: Gas production and distribution

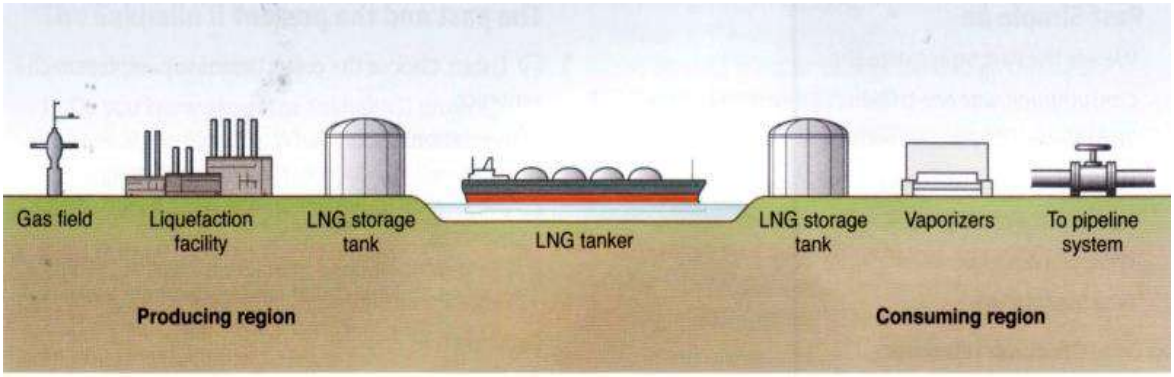
Task 4 Translate the active vocabulary of the lesson into Uzbek language and learn it by heart.

above-ground, cuboid, cylindrical, horizontal, vertical, ammonia, vapour, vaporize liquid, spherical underground, liquefied natural gas (LNG), methane, consume, liquefy, to transport;

Task 5 Complete the table.

verb	noun (process)	noun (substance)
vaporize	vaporization	1
liquefy	liquefaction	2
3	production	product
consume	4	
5	storage	
transport	6	
7	pipe	

Task 6 Look at the picture. Use words from 1to complete the sentences.



1 The gas field *p*_____ gas.

2 It comes out of the ground as a *v*_____.

3 The liquefaction facility *l*_____ the gas.

4 The gas is now a *1*_____ .It goes into the tanks.

5 The tanks *s*_____ the gas.

6 Tankers *t*____ the liquid gas from the producing region to the consuming region.

7 The gas goes from the tanker into tanks for *s*_____

8 The vaporizers *v*_____ the gas.
9 The pipeline system *p*_____ the gas to consumers.
10 Homes, businesses, power stations, and so on *c*_____ the gas.

Task 7 Look at the picture again. Complete the sentences using the words in the list.

consumption liquefaction pipes product
transportation vaporization production

1 _____ happens in the consuming region.
2 _____ happens between the gas field and the storage tanks.
3 Fertilizer _____ uses natural gas.
4 In the tanker, the _____ is liquid.
5 _____ is the final step in the process.
6 In the picture, a tanker is used for gas _____.
7 The gas travels to consumers through _____.

Reading tasks: The Sakhalin II Project

Task 8 Read the text and translate it into Uzbek.

The Sakhalin II Project

The Sakhalin II project takes gas and oil from the Piltun-Astokhoskoye and Lunskoye fields. It's Russia's first liquefied natural gas plant and one of the biggest oil and gas developments in the world. Production is about 9.6 million tonnes of natural gas per year. The two fields probably contain 500 billion m^3 of natural gas reserves. There are two 100,000 m^3 LNG tanks at Prigorodnoye. Each tank has an inner tank and an outer tank. The inner tank is steel, and the outer tank is concrete. The tanks' storage temperature is -165 °C. The tanks should be safe even in a big earthquake. Sakhalin II supplies about 8% of global LNG. Work will continue there for 30-40 years. Pipes carry the gas from the fields to the natural gas liquefaction facilities in Prigorodnoye, Sakhalin.

Tankers take the LNG from the terminal at Prigorodnoye to Japan and other East Asian consumers. Sakhalin's first gas shipment to Japan was in April, 2009. It was 145,000 m^3. The receiving terminal was in Sodegaura, near Tokyo.

Task 9 Answer the questions from the text.

1 How many other LNG plants are in Russia?
2 How much gas comes from Sakhalin II?
3 Where is the liquefaction plant?
4 How much was in the first shipment to Japan?
5 What materials are in the two LNG tanks?
6 What environmental danger is mentioned?

Task 10 Read the given passage and write T (true) or F (false) at the end of the sentences.

1 Biogas comes from underground reserves.
2 Biogas is mostly methane.
3 Electricity and gas are easy to get in Rwanda.
4 A lot of Rwandans are farmers.
5 Rwanda is planning 300 biogas plants.

Biogas can come from organic matter, for example rotting plants and animal waste. When these things rot and there is no oxygen, they make methane. I live in Rwanda, near the centre of Africa. We're a very poor country. Most people here have no electricity and no gas. But we are improving our country. Most people here live by farming. Most people in the countryside have cows, so in fact, we have plenty of animal waste.

We are making small biogas plants. They can make gas from animal waste. The dung from two or three cows is enough to make gas for cooking and lighting for one house. We now have more than 300 biogas plants around the country, and we're building more.

I am happy making life better here. And we are doing this with waste. Amazing!

Listening tasks: The past and the present

Track 2: Task 11 Listen. Choose the correct word to complete each sentence.

Conversation 1

1 The meeting was *yesterday / this morning*.

2 The new operations manager *was / wasn't* at the meeting.

3 The new operations manager is / *was* at the Ras Tanura refinery.

Conversation 2

4 They *are / were* busy.

5 There *is / was* a big problem.

6 The level gauge was / wasn't faulty.

Conversation 3

7 They *are / were* on their way to the warehouse.

8 The cable trays *are / aren't* ready.

9 It *was / wasn't* on the materials report.

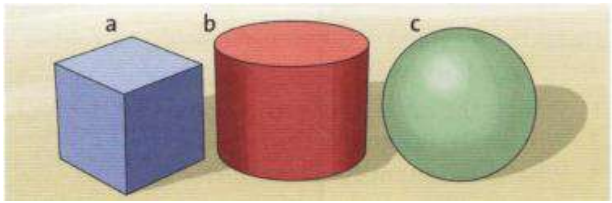
Task 12 Number the sentences. 1 = now, 8 = the longest time ago.

a) There was a meeting yesterday.
b) He was at Ras Tanura from 2000 to 2008.
c) We're busy.
d) There was a big problem this morning.
e) The cable trays were ready last Friday.
f) I was in Dubai last month.
g) He was in Ecuador last year.
h) Consumption was one trillion ml in 1970

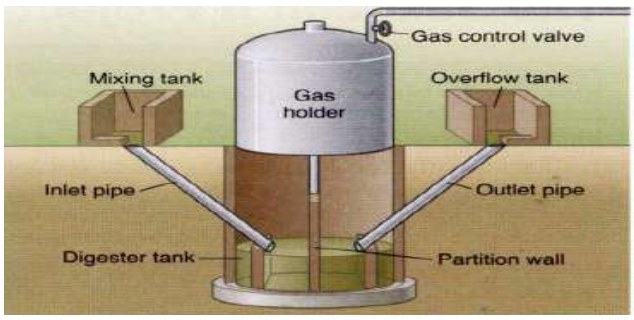
Speaking tasks: Describing equipment

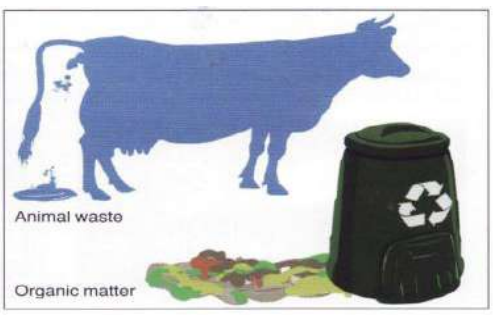
Task 13 Match the shape with the name.

1) a cylinder 2) a sphere 3) a cube

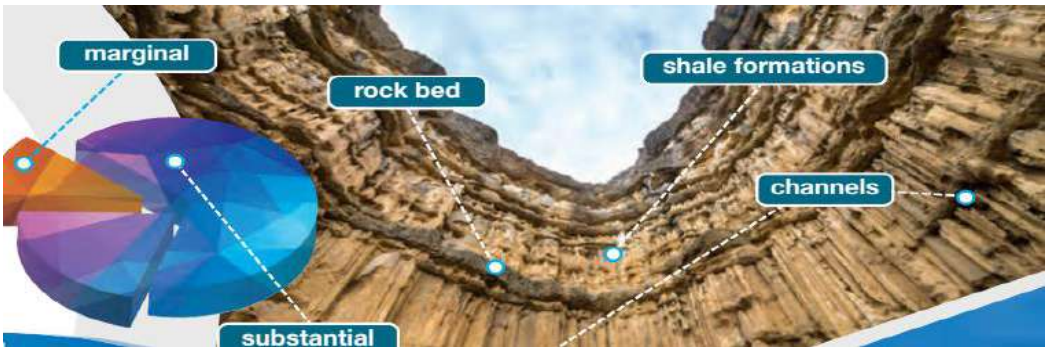


Task 14 Look at the pictures of the biogas plant. Describe the equipment.





Lesson 3 Shale gas



Warm up!

Task 1 Work in groups, talk about these questions.

1 What is shale gas?

2 How does fracturing rock beds make it easier to extract natural gas?

Vocabulary tasks:

Task 2 Translate the active vocabulary of the lesson into Uzbek and learn it by heart.

hydrochloric acid, hydraulic fracturing, shale gas, cost-effective, substantial, shale formations, channel, to create, inexpensive, to extract, rock beds, chemical additives, disposed, marginal;

Task 3 Read the sentence pairs. Choose the sentence that uses the underlined part correctly.

1 A) Accessing <u>rock beds</u> requires costly drilling.

B) The used up <u>channels</u> need to be disposed of.

2 A) <u>Hydrochloric acid</u> exists underground in large formations.

B) <u>Chemical additives</u> were injected into the rock bed.

3 A) Shale gas is no longer a <u>marginal</u> energy source.

B) The cost of the chemical additives is <u>fracking</u>.

Task 4 Match the words or phrases (1-7) with the definitions (A-G).

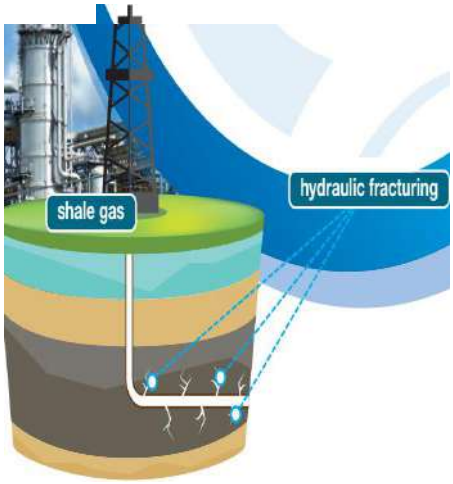
1 ___ hydrochloric acid
2___ hydraulic fracturing
3 ___ shale gas
4___ cost-effective
5 ___ substantial
6 ___ shale formations
7 ___ channel

A) something that is inexpensive in regards to the money spent on it to obtain a result
B) a collection of fine grained sedimentary rock that traps natural gas
C) a corrosive liquid used to create wider channels in rock beds
D) being very important
E) an opening that runs through something
F) natural gas that is trapped in shale formations
G) a drilling process that uses chemicals and water to break up rock.

Reading tasks:

Task 5 Read the given passage and translate them into Uzbek.

Making the most of shale gas



The natural gas industry is at an all-time high. This is largely due to shale gas. Before, extracting gas from shale formations was expensive. Also, shale gas was considered a marginal source of natural gas. However; hydraulic fracturing (fracking) combined with horizontal drilling has changed that. Shale gas is now a substantial source of natural gas. Drilling for shale gas is more cost-effective than before. Fracking takes place in a drilled well. Chemical additives like hydrochloric acid are injected under high pressure into the rock bed. The pressure cracks the rock. The chemicals widen the cracks and create channels. Natural gas escapes through the channels into the well. From there, it is extracted to the surface.

Task 6 Read the passage and mark the following gaps as true (T) or false (F).

1 _____ In the past, shale gas was not cost-effective to extract.
2 _____ Fracking is another name for hydrochloric fracturing.
3 _____ A drill creates channels in the shale rock bed.

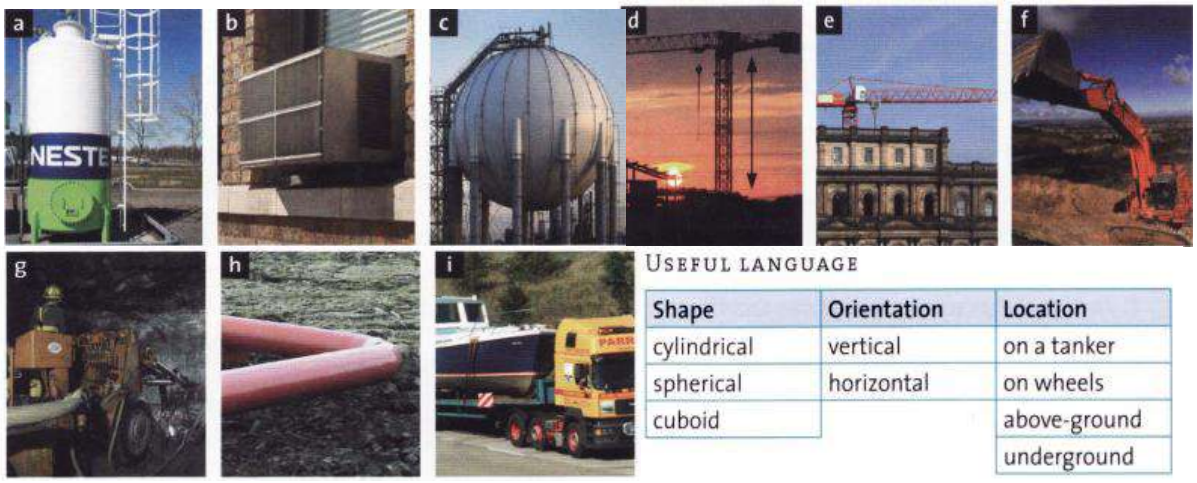
Listening tasks:

Track 3: Task 7 Match each description with a picture. Listen and check.

1) It's above-ground. __f___
2) It's cuboid. _____
3) It's cylindrical. _____
6) It's on a truck. _____
7) It's spherical. _____
8) It's underground. _____

4) It's horizontal. _____ 5) It's at a *90 0* angle._____

9) It's vertical. _____

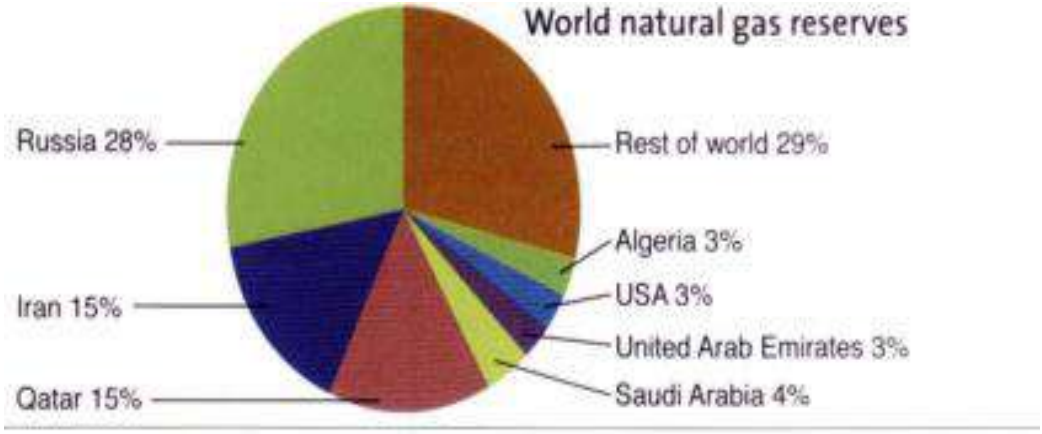


USEFUL LANGUAGE

Shape	Orientation	Location
cylindrical	vertical	on a tanker
spherical	horizontal	on wheels
cuboid		above-ground
		underground

Speaking task:

Task 8 Look at the given diagram and discuss it in groups.

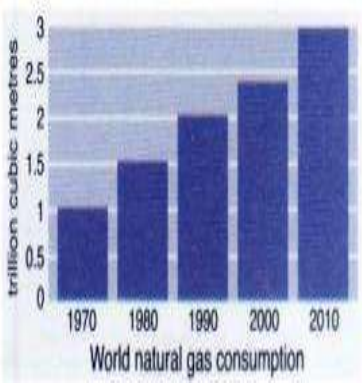


Number talk: Talking about a bar chart

Task 9 Can you say these numbers in words?

1) 1970 (year) 2) 2002 (year) 3) 1.5trillion m 3 4) 2,000,000,000 m

Task 10 Look at the chart. Complete the sentences with numbers.



1) 2000 consumption was a little less than _____ trillion cubic meters.

2) Consumption in 1970 was _____ m^3.

3) 1980 consumption was higher than_____ consumption.

4) Consumption in _____ was 2,000,000,000,000 m^3

Grammar Review: Past Simple *be*

We use the Past Simple like this: *Consumption was one trillion cubic meters in 1970. They were in China last month. We weren't busy yesterday. I wasn't at work last week. Were you busy last week? Was the ship late?*

Task 11 Write sentences in the Past Simple.

1) The gas is stored in tanks. _____
2) Ahmed isn't late. _____
3) She's in Saudi Arabia. _____
4) Ian and Matt aren't in the office. _____
5) I'm in the workshop. _____
6) You aren't in Russia. _____
7) We aren't busy. _____
8) The gas isn't liquid. _____
9) Klaus is in Germany. _____
10) She isn't from Qatar. _____

Task 12 Make questions in the Past Simple.

1) you / a student / last year?
2) your friends / at your house / last week?
3) your teacher / at work / last Saturday?
4) you and your classmates / at the library / last night?

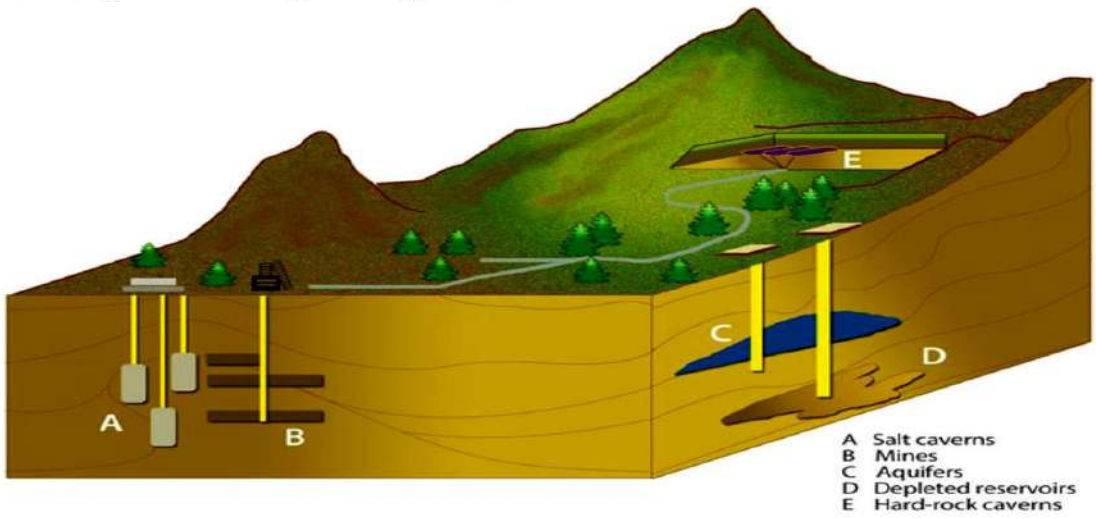
Task 13 Answer the questions.

USEFUL EXPRESSIONS: last Monday, last month, in 2000, last week, this morning, yesterday

1 When were you busy? 2 When was your last holiday?
3 When were you ten years old? 4 When were you at a res

Task 14 Look at the picture and describe it.

Types of underground natural gas storage facilities



Lesson 4 Hydrogen sulfide Exposure

Warm up!

Task 1 Work in groups, talk about these questions.

1 What are the characteristics of hydrogen sulfide gas?

2 What effects can exposure to hydrogen sulfide have on a person's health?

Vocabulary tasks:

Task 2 ***Translate the active vocabulary of the lesson into Uzbek and learn it by heart.***

Hydrogen sulfide, exposure, toxic, flammable, sour gas, odorless, dizziness, death, headaches, unconscious, inhaling, asphyxiation, to render, precaution, irritation, self-contained breathing apparatuses (SCBA), to prevent, to depend on, to install;

Task 3 Read the sentence pairs. Choose which word or phrase best fits each blank.

1) hydrogen sulfide / self-contained breathing apparatus

A) Before entering an enclosed space workers should test it for _____.

B) A _____ can provide a worker with a decent supply of air.

2) flammable / odorless

A) Before gas companies add a scent to it, natural gas is_____.

B) People should not smoke near natural gas because it is _____.

Task 4 Match the words (1-8) with the definitions (A-H).

1 ___ toxic

2 ___ inhale

3 ___ sour gas

4___ headache

5 ___ exposure

6 ___ dizziness

7 ___ unconscious

8 ___ asphyxiation

A) a pain in a person's head

B) poisonous to organisms

C) natural gas with high H2S amounts

D) unaware and unable to sense anything

E) to breathe something in

F) the inability to breathe due to lack of oxygen

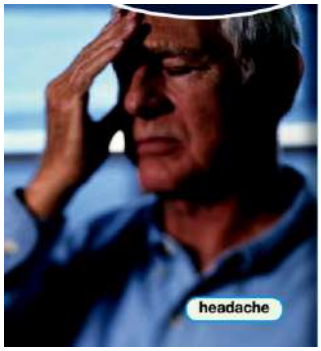
G) a state of being in contact with something

H) a condition that makes people think they are falling

Reading tasks:

Task 5 ***Read the given passage and translate them into Uzbek.***

The Dangers of Hydrogen Sulfide: What is hydrogen sulfide?



Hydrogen sulfide, or H2S, is a toxic gas. It is often found with petroleum and natural gas. When natural gas contains large amounts of hydrogen sulfide, it is called sour gas. It is colorless, flammable, and smells like rotten eggs in low concentrations. However, at high concentrations, it can smell sweet or be completely odorless.

What are the effects of exposure to hydrogen sulfide? The health effects of hydrogen sulfide depend on its concentration. Exposure to low concentrations can cause irritation, dizziness and headaches. High concentrations of H2S can render a person unconscious. Inhaling high concentrations of the gas can also result in asphyxiation and death.

How can natural gas companies prevent exposure to hydrogen sulfide? Companies should take a variety of precautions to prevent hydrogen sulfide exposure. Many places require gas field workers to certify in H2S safety procedures. Workers should monitor air in potentially hazardous areas before entering. Whenever possible, companies should install ventilation systems in these areas. If ventilation is impossible, workers should wear self-contained breathing apparatuses (SCBA).

Task 6 ***Read the passage and mark the following gaps as true (T) or false (F).***

1 ___ Hydrogen sulfide doesn't have a smell in low concentrations.
2 ___ A small concentration of H2S can make a person lose consciousness.
3 ___ Many gas field workers are required to learn H2S safety procedures.

Listening tasks:

Track 4 Task 7 Listen the track and complete the dialogue.

A: Haven't seen you for a long time. Has ….. happened? Where have you been?
B: I have just returned from the conference on……..
A: I have never heard about such gas.
B: I'm surprised. In our country they have already begun the……of these deposits.
A: Is that really a …… source of raw material? Are the reserves rich?
B: Certainly they are. They are more than the summary reserves of…...., oil, natural gas.
A: How does it look like?
B: It looks like …….. ice.
A: Can it be practically realized?
B: Naturally, but the most difficult part in the practical realization of the huge perspectives for the usage of …… is the exploitation of hydrate deposits.

Speaking task:

Task 8 Work in groups. Read the given sentences and Give your own idea.

1 Gas hydrates were discovered by H. Davy in 1811 and the early classical contribution to our knowledge of gas hydrates was made by Faraday, Rooseboom and others.
2 Russian scientists have detected about 30 pools that could contain natural gas hydrates.
3 The maximum depth of hydrate formation ranges from about 5500 metres near the southern end of Yamal Peninsula to over 1200 in the Viluy basin and over 1600 metres towards the lower reaches of the Lena River.

Task 9 Health and safety: Warning signs: Here are some PPE signs. Match the instructions to the pictures.

Grammar Review : Must and Mustn't

We use **must** or **mustn't** +infinitive for instructions that are compulsory.

Example: You must wear a helmet. You mustn't (must not) smoke here.

Task 11 Write warnings using *must* or *mustn't.*

1 *You must turn off your phone.*

2 *You mustn't use your phone.*

Task 12 Look at these signs. Write what they mean.

Example:

1 You must wear a helmet.

Lesson 5 Robots and natural gas

Warm up!

Task 1 Work in groups, talk about these questions.

1 What are a few advantages of using robots to perform work in natural gas fields?

2 Why might someone want to use a remote controlled machine instead of an automated robot?

Vocabulary tasks:

Task 2 ***Translate the active vocabulary of the lesson into Uzbek and learn it by heart.***

robots, advantage, remote control, operator, efficiency, unmanned, productivity, efficiency, repetitive, adapted, human intelligence, cost-efficient, withstand, to harvest;

Task 3 Fill in the blanks with the correct words or phrases from the word bank.

WORD BANK

robots advantage remote control operator efficiency technology

1 Thanks to the new machinery, the well is now running at peak _____.

2 The company needs to hire and train a new _____to run this machine.

3 A worker may be able to drill for gas from far away using a(n) _____.

4 As current _____ improves, many industries become more productive.

5 The main _____ of automation is that work gets done without paying out salaries.

6 Companies can now use _____ to perform work too dangerous for humans.

Task 4 Read the sentence pairs. Choose which word or phrase best fits each blank.

1) automation / productivity

A) Some people think that _____will eliminate the need for human workers.

B) Upgrading technology often saves money and increases _____.

2) programs / adapt

A The company needs to _____its methods to make better use of current technology.

B The inventor _____the robots to perform a larger range of functions.

3) unmanned / repetitive

A) We hope to develop a(n) _____ rig that could be used in hazardous locations.

B) Many people dislike work that seems overly _____ .

Reading tasks:

Task 5 ***Read the given text and translate them into Uzbek.***

Robots and natural gas (*A lecture by Dr. Alan Duncan*)

On May 7, the National Oil and Gas Museum will be hosting a lecture by Dr. Alan Duncan. Duncan, a roboticist, is famous for specializing robots for industrial purposes. Duncan will be discussing the potential applications of robots in the natural gas industry. New technology has always played an important role in the industry, and automation is no different.

According to Duncan, using robots to harvest natural gas has many advantages. For instance, robots can be used in places where people cannot. Specialized robots can withstand deep sea pressures and high temperatures. It may even be possible to program them to work an entirely unmanned rig. Such rigs would be cost-efficient, as they would not require facilities for people.

Duncan also suggests that robots can increase the productivity and efficiency of existing natural gas fields. Work performed by robots may nicely supplement that done by humans. Robots can quickly and efficiently perform repetitive jobs that workers dislike. The same technology could be used even in cases where human intelligence is necessary. Many robots could be adapted so that a human operator directs them by remote control.

If you are interested in these topics, please attend this lecture. Admission is free.

Task 6 ***Read the passage and mark the following gaps as true (T) or false (F).***

1 ____ Eventually, robots may allow natural gas rigs to function without people.
2 ____ Using robots alongside human workers would improve productivity.
3 ____ Robotic technologies would be unusable for jobs that require human intelligence.

Listening tasks:

Track 5 Task 7 Listen to the track and complete the gaps.

1. Natural gas either occurs together with_____ or forms separate deposits of gas alone.
2. Either of these _____ can be used in this analysis.
3. Natural gas may be used either as _____ or heat in our everyday life.
4. Most of natural gas we may use as a fuel for the _____ of both heat and energy.
5. _____ of both animal and vegetable remains over a period of many centuries without air is the source of natural gas.
6. Both the _____ and volume of a gas can be changed.
7. Both characteristics of the state of a gas are very _____ for the experiments.
8. Homogeneous materials may be classified either into compounds and elements or into _____.
9. Natural gas either occurs together with oil or forms _____ deposits of gas alone.
10. The state of a gas is characterized both by pressure-temperature and _____.

Grammar Review : Forming measurement questions

If we use a noun for asking a question about a measurement we use ‘what’.

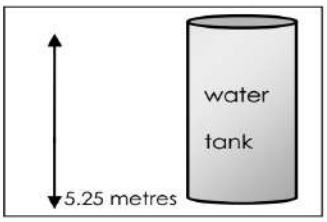
Question: *What is the* + dimension + *of* + something?
Answer: *The* + dimension + *of the* + something + *is* + number + measurement
Q: What is the depth of the oil well?
A: The depth of the oil well is 300 metres.
Q: What is the height of the derrick?
A: The height of the derrick is 60 metres.

If we use an adjective for asking about a measurement we use ‘how’.

Question: *How* + adjective + *is* + subject
Answer: Subject + *is* + number + measurement + adjective.
Q: How long is this room? – length
A: This room is five metres long.
Q: How long was the meeting? - length of time
A: The meeting was two hours long.
Q: How deep is the oil well? – depth

A: The well is 300 metres deep.
Q: How tall are you? – height
A: I am 180 centimetres tall.
Q: How high is this room? – height
A: The room is 3 metres high.
Q: How far is the airport? – distance
A: The airport is 15 kilometres away.

Task 8 Write two questions and two answers about the water tank. Use 'depth' and 'deep'.



1. Q: .....
   A: .....

2. Q: .....
   A: .....

Task 9 Complete the questions using 'how'.

1. ..... (length of time) will you be away?
2. ..... (distance) is Baucau from Dili?
3. ..... (depth) is the water well in your village?
4. ..... (height) is the derrick on the oil rig?
5. ..... (height) are you?
6. ..... (width) is the river.
7. ..... (length of time) have you worked here?
8. The river where we go swimming is very..... (depth).
9. How..... (depth) is it?
10. ..... (distance) is the bank from the hotel?

Speaking task:

Task 8 Work in groups. Read the given sentences and Read the service report. Tell T (true) or F (false).

Power Products: **SERVICE REPORT**	
Oak Street Farstow Kent Tel: 446-7230	Date 5 Feb Site BR Farstow Refinery Request No 513
Client: Bay Refinoil Address King Industrial Estate, Farstow Contact Jim Purley Tel 337-2.901 Description Leaky valve on discharge hose in bulk tanker	

loading area bay 3. valve damaged. replaced valve. Working OK.
Start time: 8.15 Finish time: 10.30 Technician: *Phil Jones* Client signature: *Gim Purley*

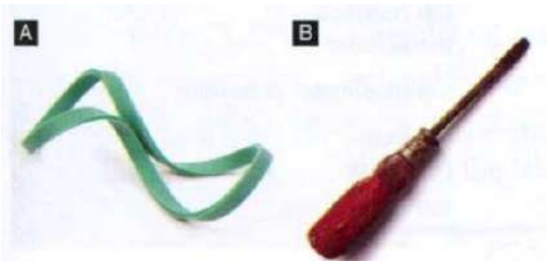
1 The discharge hose was damaged.
2 There was a problem with a valve.
3 The technician repaired the hose.
4 The technician replaced the valve.
5 The technician finished the job.
6 The equipment now works properly.
7 Power Products is the client.

Task 9 Match the words with the definitions.

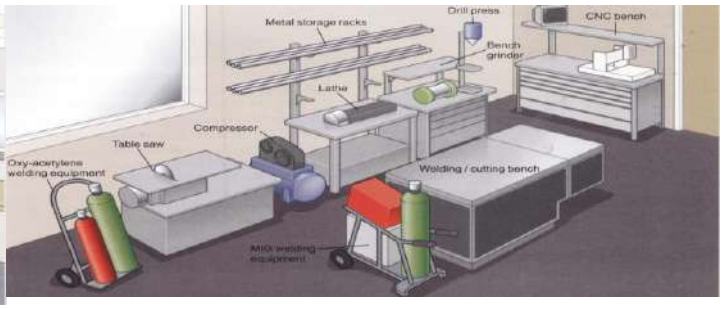
1 client	a) a person who services and maintains machinery
2 technician	b) a person or company who receives a service
3 contact	c) at a company, the person who is responsible for talking to people outside the company about a certain job

Task 10 Match the sentences to the pictures.

1 Metal rusts.
2 Rubber stretches.
3 Warning: corrosive materials.
4 This jacket is water-resistant.
5 Ice melts at room temperature.



LESSON 6 WORK OPERATIONS



Warm up! Task 1 Look at these two workshops.

Which one is ……..

1 neat and tidy? **2** messy? **3** safer?

In which workshop is …….

1) it easy to lose tools? **2)** easy to find tools? **3)** easy to work?

Task 2 Read the workshop rules. For each rule, find an example in picture a where the rule has been broken.

Workshop Rules

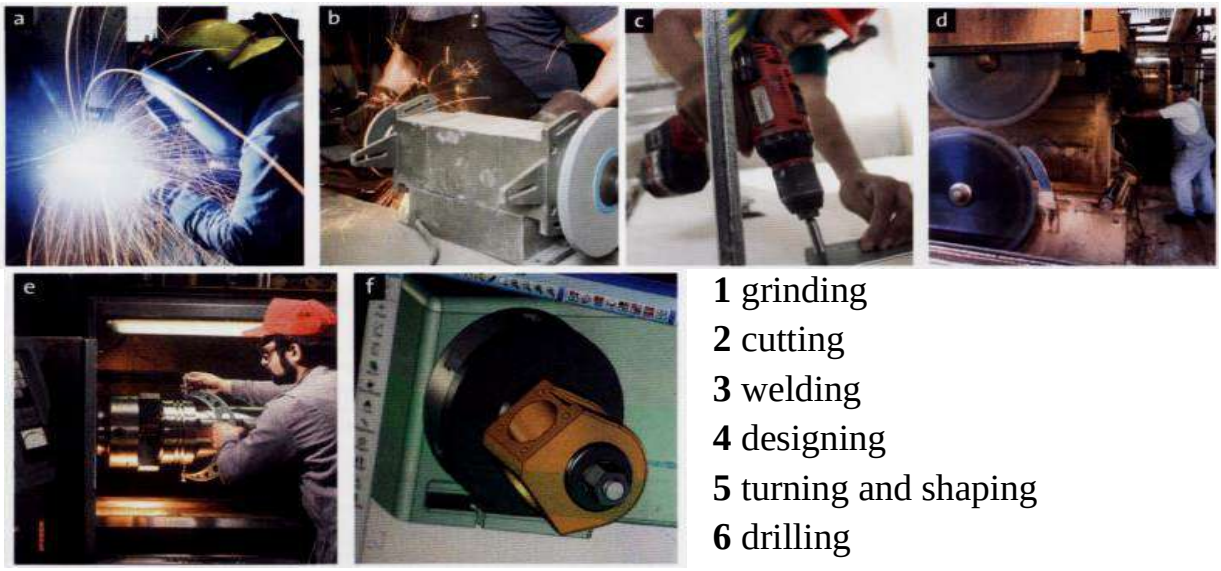
- ✓ Keep the floors tidy and dry.
- ✓ Keep the workbenches clean.
- ✓ Put tools away when you've finished a job.
- ✓ Don't block the exit.
- ✓ When you leave, turn off the lights and all of your equipment.

Vocabulary tasks:

Task 3 Translate the active vocabulary of the lesson into Uzbek and learn it by heart.

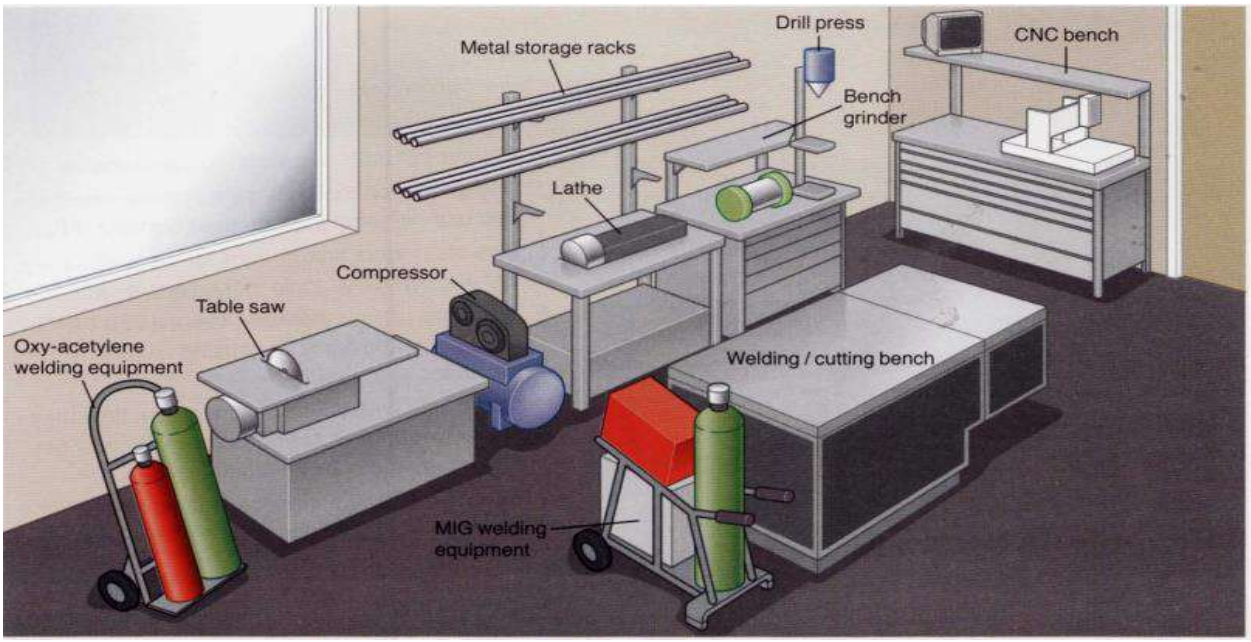
broken, cluttered, messy, precision, tidy, budget, containment, micron, schedule, responsibility, workbench, maintain, manage, organize, replace;

Task 4 Power tools and their functions: Match each function with a picture.



1 grinding
2 cutting
3 welding
4 designing
5 turning and shaping
6 drilling

Task 5 Work in pairs. Can you match each function above with a power tool or tools in the workshop picture below?



Complete the table using the words from picture above.

Tool	Function
oxyacetylene equipment	welding and cutting metal
t_____ [1] saw	cutting wood and metal
lathe	t_____ [2] and shaping metal
storage rack	s_____ [3] pieces of metal
bench g _____ [4]	grinding
drill press	d_____ [5]
CNC bench	d_____ [6] and making metal parts
cutting and welding b_____ [7]	working on cutting and welding jobs
MIG equipment	w_____ [8]

Work in pairs. Take turns asking and answering questions.

EXAMPLE:

A: *What do you do with oxyacetylene equipment?*

B: *We weld and cut metal.*

Reading tasks: Managing the workshop

Task 6 Read the given text and translate them into Uzbek.

Smart workshop management

A workshop manager's day is filled with problems: broken equipment in difficult locations; expensive repairs on small budgets; people working closely together using powerful tools and equipment. There will always be problems, but smart workshop management can make work easier, quicker, and safer.

Ten top tips:

- ❖ Keep the workbenches clean and clear. A clean workshop is safer. It makes workers more productive.
- ❖ Keep the floors clean and dry.
- ❖ Create safety zones around large tools. The person who is using the tool can be inside the line. Others must stay outside the line.
- ❖ Use good lighting over work areas.
- ❖ Always put tools away after using them.
- ❖ Use guards on tools. Be sure that workers have and use personal protection equipment (PPE).
- ❖ Give clear work instructions for working safely. Tell workers what to do and how to do it.
- ❖ Take care of your workers. Maintain all machinery and tools. Stop using unsafe machines or tools.
- ❖ Spend time with your workers. Learn how they work. Everyone works differently. You may get some good ideas by watching.
- ❖ Watch for possible hazards. Use equipment and materials that can keep your workers safe.

A clean, organized workshop prevents problems.

Task 7 Find words in the text that mean.

1) able to do a lot of work
2) an area where only one person may work
3) part of a tool that protects workers' fingers, hands, eyes, etc.
4) a danger or risk.

Task 8 Match the opposites.

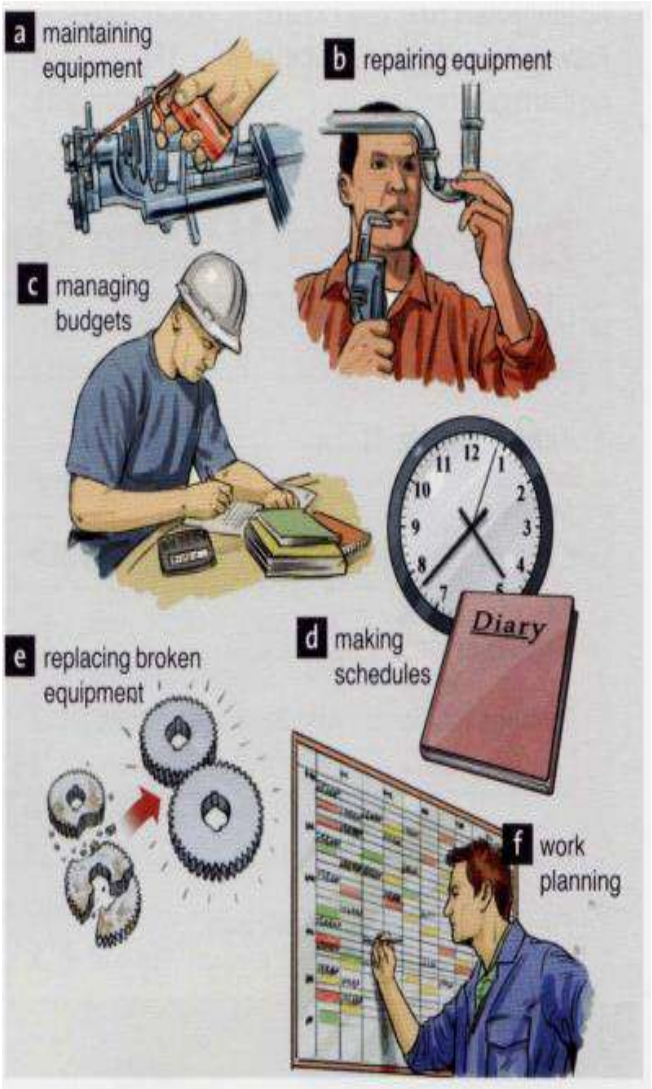
1) organized	a) dirty
2) clean	b) disorganized
3) clear (instructions)	c) cluttered
4) clear (workbench)	d) unsafe
5) safe	e) unclear

Task 9 Read the text and mark the following gaps as true (T) or false (F).

1 ____ A cluttered workshop is safer. It makes workers more productive.
2 ____ A clean, organized workshop causes a lot of problems.
3 ____ Give exact work instructions for working safely. Tell workers what to do and how to do it.

Listening tasks: Workshop responsibilities

Task 10 Match each workshop responsibility with an explanation



1 dealing with money
2 organizing times and dates
3 making broken things work
4 taking care of machines, for example oiling them
5 organizing people, equipment, and jobs
6 taking out damaged parts and putting in new parts

Task 11 Listen the Track 6 Which responsibility (a-f above) are they talking about in each conversation?

1 _____
2 _____
3 _____
4 _____
5 _____
6 _____

Grammar Review : Present Perfect Tense

Positive

I / You / We / You / They have ('ve) checked the pressure.

He / She / It has ('s) checked the pressure.

=subject +have / has + past participle

Negative

I / You / We / You / They have not (haven't) checked the pressure.

He / She / It has not (hasn't) checked the pressure.

= subject + have / has + not (haven't / hasn't)+ past participle

Questions

Have I / you / we / you / they checked the pressure?

Short answers

Yes, I have. *No, I haven't.*

Has he / she / it checked the pressure?

Yes, he has. *No, he hasn't.*

= Have / Has + subject + past participle

Many past participle forms are irregular and need to be learned individually. For example: *be, go,* and *take.*

Verb	Past Simple	Past participle
be	was, were	been
go	went	been, gone
take	took	taken

We use the Present Perfect to talk about:

• recent actions

We've taken out the old switch and put a new one in.

They haven't repaired the faulty lights.

Have you done the maintenance check?

• our lives up t o now, often with *ever* in the question form :

Have you ever worked in Kuwait? - Yes, I have. I worked there last year. / No, I haven't.

We don't use the Present Perfect to talk about a completed action. With the Present Perfect, there is always a link with the present

Task 12 Use the cues. Make Present Perfect sentences.

1 you finish welding? _____

2 we do the grinding _____

3 you and Ahmed paint it? _____

4 we not paint it _____

5 they build the base? _____

6 they not finish base _____

7 they check the inside? _____

8 Simon check inside _____

9 they not repair the valve _____

Speaking task: Precision measurements

Task 13 How do you say it? Read the words aloud.

1 mm – one millimeter

2 mm – two millimeters

l µm – one micron

2 µm – two microns

0.001 mm – point oh oh one millimeters

0.025mm – point oh two five millimeters

± plus or minus

Task 14 Read the information. Answer the questions.

- 1mm = 1,000 µm
- l µm = 0.001 mm
- A CNC milling machine has a tolerance of ± 25µm.
- The width of a human hair is 100 µm.
- The diameter of a pinhead is 1mm.
- The length of a normal mosquito is 10 mm.

1) What is one hundred microns?
2) What is plus or minus twenty-five microns?
3) What is one millimeter?
4) What is about one centimeter?
5) How much is one micron in millimeters?
6) How much is one millimeter in microns?

Task 15 Match the pictures with the measurements.

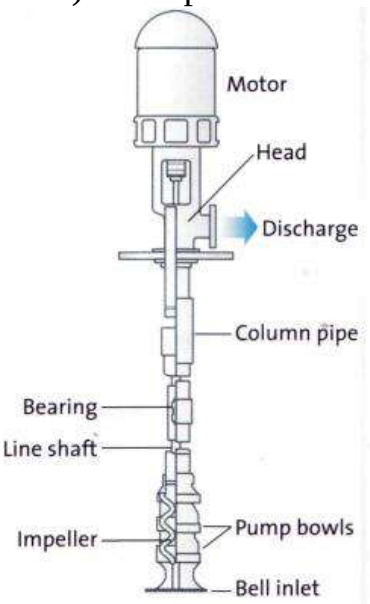
3-8 µm 5mm 100 µm 10 mm

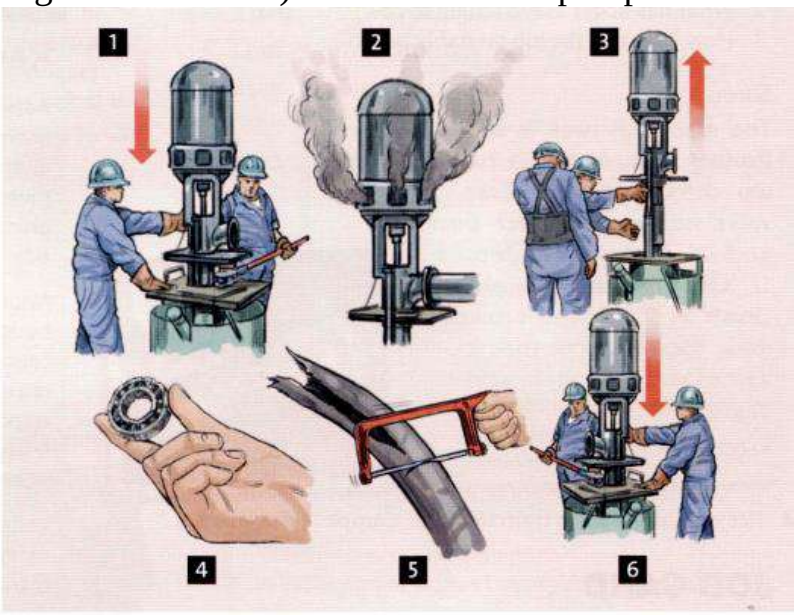
LESSON 7 REPAIRS AND MAINTENANCE

Warm up!

Task 1 Work in pairs. Match the sentences with the pictures.

a) We repaired the hose.
b) The pump stopped working.
c) We installed the pump.
d) We reinstalled the pump.
e) We replaced the bearing.
f) We removed the pump.





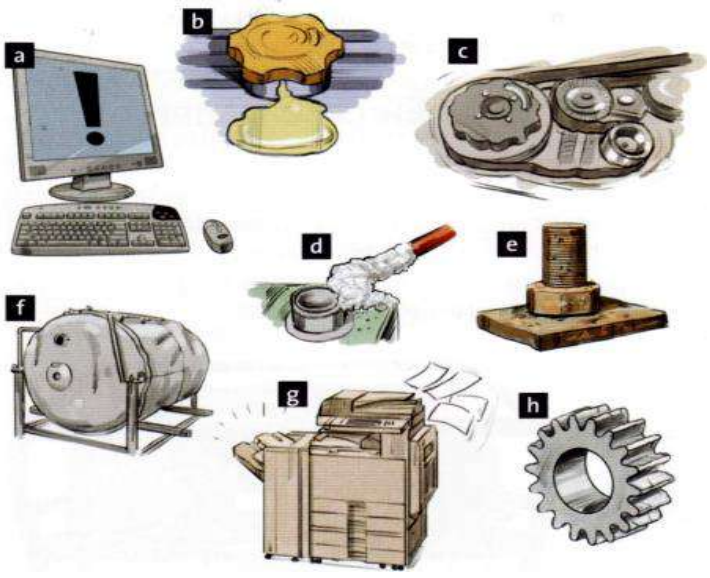
Vocabulary tasks: Problems and solutions

Task 2 Translate the active vocabulary of the lesson into Uzbek and learn it by heart.

belt, bolt, gear, maintenance, troubleshooting, reinstall, remove, damaged, bent, corroded, frozen, jammed, rusted, split, worn;

Task 3 Look at the pictures. Find the things.

1) a belt
2) a bolt
3) a computer
4) a copier
5) a gear
6) a cap
7) a tank
8) a wire



Task 4 Match the sentence halves to describe the pictures.

1) The wires	a) is worn.
2) The tank	b) are corroded.
3) The computer	c) is jammed.
4) The copier	d) is leaking.
5) The bolt	e) is loose. So it's noisy.
6) The gear	f) is rusted.
7) The belt	g) is frozen. The system is down.
8) The cap	h) is damaged. There's a big dent in it

Reading tasks: Routine maintenance

Task 5 Read the given passage and translate them into Uzbek.

I'm an electrician. I work on anything and everything electrical in the oil industry. I help to install, maintain, and repair electrical wiring, fixtures, and control equipment. This includes troubleshooting when things go wrong. A lot of my work is outdoors. I work in all kinds of weather. Sometimes I work in very high places. During any working week, I use all of my personal protective equipment (PPE): hard hat, safety glasses with side shields, safety shoes, safety gloves, hearing protection, fire retardant clothing, safety harness, and breathing apparatus. I also use a special insulating rubber matting. I can stand or sit on it when I work. It reduces the risk of shock. Electricity creates two main hazards. The first is electrocution. If electricity enters your body, it can burn you badly or kill you. The other hazard is sparks.

Sparks are generally hazardous, but especially in the oil and gas industry. If there is a spark in an area with flammable gas, of course there can be an explosion. I work very carefully and check everything. Is the electricity switched off? Am I using the right PPE? And other electricians check my work too. We look out for each other.

Task 6 Read the text. Which topics does Carlos talk about?

1 His education and training

2 His duties and responsibilities

3 The dangers of his work

4 The equipment he uses for troubleshooting

5 Safety on the job

Task 7 Read the paragraph above. For each word or phrase below, write T (time) or A (action).

1 routine maintenance _____ 2 long life _____

3 procedure _____ 4 number of hours

Portable Electric Generator

Routine maintenance is important for the generator's safe operation and long life. Routine maintenance is especially important in hot and dusty environments. The schedule at the right shows the procedures and frequency for basic maintenance. The generator's hour meter shows the number of hours that the generator has run.

Task 8 Tick (✓) the ideas that the text mentions about maintenance.

1) It can reduce accidents and injuries. ___

2) It can save time and money. ___

3) It can help a machine work well for many years. ___

4) Heat and dust can damage a machine. ___

Listening tasks: Planning the day's work

Name	Jobs
Frank Workshop manager	morning _____ 1 afternoon _____ 2
Eric Office manager	morning _____ 3 afternoon _____ 4
Carl Electrician	morning _____ 5 afternoon _____ 6
Bill Mechanic	morning _____ 7 afternoon _____ 8

Task 9 Listen the Track 7. Listen to Frank planning the day's work with his team. Write the jobs.

Listen again. Answer the questions.

1 How did the front office report their problem to Eric?

2 Carl may ask for help with the photocopier. Who will he ask?

3 Who has a problem with the generator?

4 When did Bill finish the repairs on the pump?

5 When did the new lights for the loading area a

Grammar Review : Will for Future

Positive

I / You / He / She / It / We / You / They ***will ('ll) check the reports***.

=subject + will *('ll)* + infinitive

Negative

I / You / He / She / It / We / You / They ***will not (won't) check the reports.***

=subject + will + *not (won't)* + infinitive

Questions

Will *I / you / he / she / it / we / you / they* ***check the reports?***

=*Will* + subject + infinitive

We use *will* when we:

• decide what to do, often in response to a particular situation :

This belt is *noisy. - OK, I'll tighten it.*

- The mechanic's coming to look at that part.

- I won't touch it until he gets here, then.

• talk about the future in general:

The new bearing will arrive tomorrow.

Will you be here for the meeting?

We often use *will* with future time expressions, such as *later*, *tomorrow*, *next* ...

I'll check the part again later.

We'll reinstall the pump tomorrow afternoon

Task 10 Complete the short conversations. Use the words in the list in each conversation.

will 'll won't

A: The belt is broken.

B: I _____ [1] replace it.

A: _____[2] you finish the job today?

B: No, I _____[3]

A: _____ [4] Khalid be here tomorrow?

B: No, he _____[5]. He _____[6] be here on Tuesday.

A: The gasket is damaged.

B: We _____[7] replace it.

A: _____[8] we have time tomorrow?

B: No, we _____[9].

Task 11 Say what you will do in each situation. Use *will.*

EXAMPLE: *'The belt's worn out.' I'll replace it.*

1 I need the angle grinder.

2 I can't lift this box.

3 I can't find my goggles.

4 I don't have time to write the repair report.

5 The batteries need to be replaced.

Writing task: Recording repairs

Task 12 Read the repair record. Put the notes in the correct place.

Checked belt tension

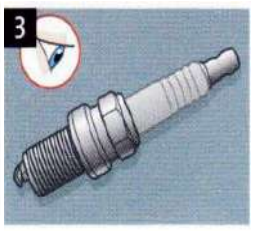
Checked oil level

Compressor making strange noise

Loose belt Tightened belt

REPAIR RECORD	Date: 9 April 20–
Item to repair: Portable air compressor	
Problem: _____ 1	
Troubleshooting notes _____ 2 _____ 3	
Cause: _____ 4	
Repair: _____ 5	

Task 14 Look at the pictures. Complete the repair record.



1 won't start

2 engine oil

3 spark plug

4 dirty

5 clean

REPAIR RECORD	Date: 9 April 20–
Item to repair: Portable generator	
Problem: _____ 1	
Troubleshooting notes _____ 2 _____ 3	
Cause: _____ 4	
Repair: _____ 5	

Do you know that?

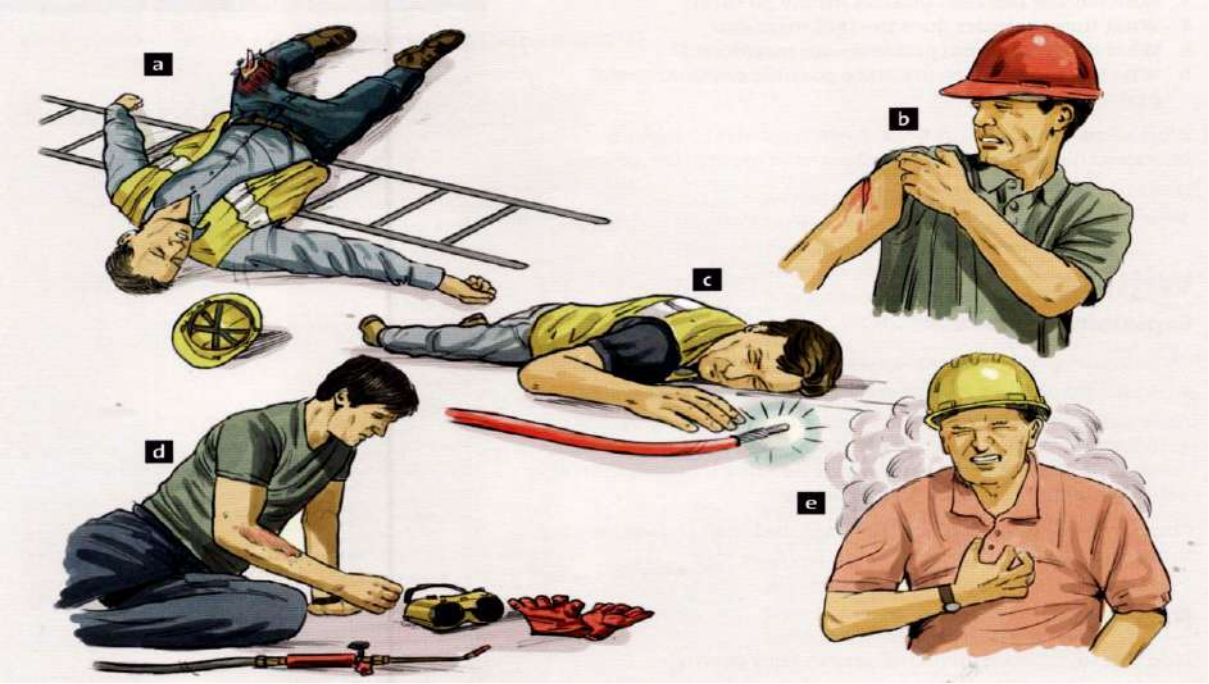
portable electric generator (n) a petrol powered machine that makes electricity, used to power lights and tools on sites with no other electrical supply.

give (someone) a hand (v) – help (someone)

LESSON 8 EMERGENCIES

Warm up!

Task 1 Look at the pictures. Have you had an experience like this? What happened?



Task 2 Match situations a-e above with descriptions 1-5.

1 He's having problems breathing. I think he breathed in some fumes.
2 He's cut his arm. He's bleeding.
3 He's broken his leg.
4 He's got a bad burn.
5 He's had an electric shock.

Task 3 Match each piece of advice with a description (1-5) in Task 2.

a) Pour cold water on it and call emergency services. Keep it very clean

b) Stop his leg from moving. Call emergency services.

c) Clean it. Then put a bandage on it.

d) Make sure the electricity is off before you touch him.

e) Gently move him to some fresh air. If you've got some oxygen, give it to him

Vocabulary tasks: Emergency vehicles and equipment

Task 4 Translate the active vocabulary of the lesson into Uzbek and learn it by heart.

ambulance, defibrillator, emergency shower, fire engine fire extinguisher, first aid kit, medical oxygen, stretcher, activate, assess, deal with, ensure, evacuate, react;

Task 5 Can you name these things?

Task 6 Match each name below with an item in Task 5.

1 fire extinguisher
2 first aid kit
3 ambulance
4 fire engine
5 stretcher
6 medical oxygen
7 emergency shower
8 defibrillator
9 SCBA (self-contained breathing apparatus)

Reading tasks: Dealing with accidents and emergencies

Task 6 Read the text and translate it into Uzbek.
When there's an accident…….

1 Assess the situation.

- ✓ Try to understand what has happened. Do this quickly and calmly.
- ✓ Check for danger. If something has injured somebody, will it also injure you?
- ✓ Never do something that will injure you. If you do, then there may be two injured people.

2 Make the area safe.

- ✓ Protect the injured person from danger.
- ✓ Be careful!

3 Assess the injured people and give emergency first aid.

- ✓ Assess each person.
- ✓ Help the people with the worst injuries first.
- ✓ Only treat an injured person if you are competent to do so.

4 Get help.

- ✓ Call emergency services or make sure that someone has called them.

Task 7 Match each action with a section (1-4) of the text.

a) I could see that he was burned, so I poured cold water on the burn.
b) I saw him lying on the floor. Then I saw that there was a broken power cable.
c) I used my mobile and phoned emergency services.
d) I switched off the electricity so I wouldn't get shocked

Task 8 Find words in the text for these definitions.

1) _____ (v) to judge and have an opinion about
2) _____(adv) in a quiet way, not excited or angry
3) _____ (v) to keep someone or something safe

Task 9 Complete the text. Use the words in the list.

Activate Call Ensure Remove Try

WHEN THERE'S A FIRE

_____ [1] people from danger if you can do it safely.
_____ [2] the doors are closed to stop the smoke and fire spreading.
_____ [3] the fire alarm.
_____ [4] emergency services.
_____ [5] to put out the fire or help people *leave* the area.

STAY CALM

Grammar Review: Past Continuous / *If / when / in case*

If / when / in case

•. We use *if* and *when* to talk about expected situations. We use *if* and *when* to talk about situations that we expect to happen. Of the two, *when* indicates greater probability

When someone is *sick* or *injured, I take care of them.* (= this is a situation that is quite common)

If there's a fire, we follow a fire-fighting plan. (= this situation doesn't happen on a regular basis)

• We use *in case* to talk about plans and preparations for possible emergencies.

We have *an evacuation plan* **in *case*** *we need* to *get everyone off the rig quickly*.

Past Continuous

Positive

I / He / She / It **was working.**

You / We / You /They were working.

= subject + ***was/ were + -ing*** form

Negative

I/ He / She / It **was not (wasn't) working.**

You / We / You / They **were not (weren't) working.**

=subject + ***was / were + not (wasn't / weren't) + -ing*** form

Questions; Short answers

Was I / he / she / it **working?** Yes, I **was.** No, I **wasn't.**

Were you / we / you / Yes, we **were** they **working?** No, we **weren't.**

=***Was / Were*** + subject + ***-ing*** form

We use the Past Continuous to describe something that was happening over a period of time in the past.

*The fire **was** burning fiercely.*

*I'm sorry. I **wasn't listening.***

***Were** you **training** to be a medic at the time of your accident?*

We often use the Past Continuous with the Past Simple to describe something that was happening when another action interrupted it.

He ***was working** on a ladder **when he fell off**.*

*Fortunately, I **wasn't walking** near the ladder **when** he **dropped** the toolbox.*

Were** they **working** at the refinery **when** the explosion **happened?

Task 10 Choose the correct words.

1 *When* / *In case* new employees start work, I train them.

2 We have a first aid kit *when* / *in case* someone gets hurt.

3 *If* / *In case* there's an accident, we need to complete a report.

4 *When* / *in case* the fire alarm rings, we stop work immediately and evacuate the building.

5 We always have a fire extinguisher nearby *if* / *in case* there's a fire and we need to use it quickly.

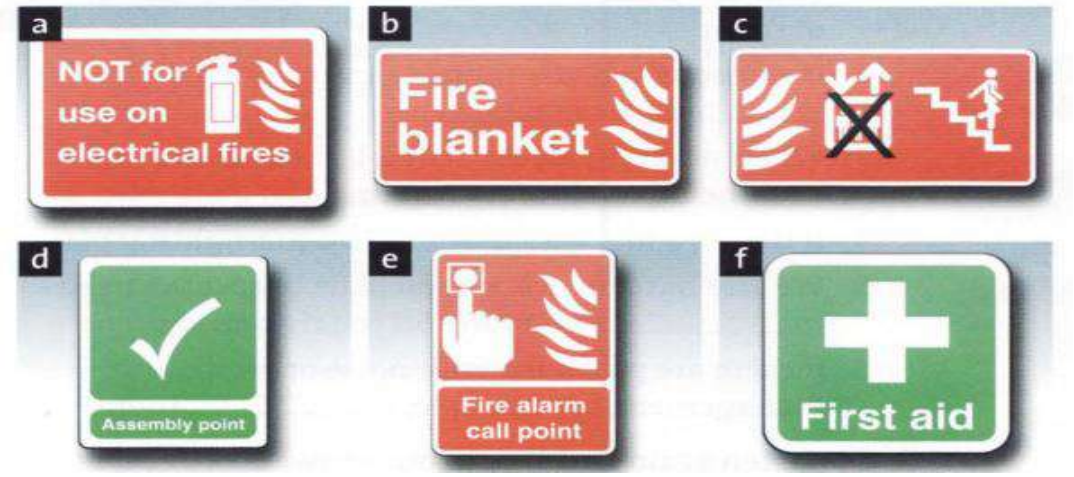
6 If / *In case* there's a problem, I try to deal with it quickly.

Task 11 Complete the sentences using your own ideas.

1 When I'm sick or injured, I ... _____.

2 If I have an English test, I _____.
3 If the fire alarm rings, we _____.
4 I try to save a little extra money in case _____.
5 When the weather is very hot, I_____.
6 I always carry my mobile phone in case _____.

Task 12 Make sentences to describe these signs. Use *if, when,* or *in case.*
EXAMPLE: *When there's an electrical fire, don't use this fire extinguisher.*



Task 13 Use the cues. Write sentences.
1 I (work) in Dubai last year.
2 We (not weld) yesterday when the fire started.
3 they (go) to the airport when the car broke down?
4 He (clean) the spark plugs.
5 *You* (not use) the hand guards.
6 she (use) her mobile phone when she was driving?
7 It (make) a strange noise so we turned it off.
8 I (not drive) the truck.

Task 14 Answer the questions about yourself.
1 What were you doing last Monday morning?
2 What were you wearing yesterday?
3 Who were you talking to before English class?
4 What were you using the computer for last month?
5 When were you studying?
6 Where were you sitting in English class last time?

LESSON 9 PETROCHEMICALS

Warm up!

Task 1 Look at the pictures. Can you name these products?

Task 2 Match the words with the pictures.

1 adhesives	4 plastics	7 rubber
2 fertilizer	5 carpeting	8 medications
3 paints	6 cosmetics	9 clothes

Task 3 Petrochemicals are chemicals made from petroleum and petroleum gas. They are used to make all of the products in the pictures. Can you say what other materials can be used for some of the products? Think about plants, animals, and minerals (things from the ground, for example iron, sand, etc.)

Vocabulary tasks:

Task 4 Translate the active vocabulary of the lesson into Uzbek and learn it by heart.

carbon black, molecule, monomer, plastics, polyethylene, polymer, requisition, supplier, inexpensive, man-made, plentiful, prehistoric, synthetic, to package, to specialize (in)

Task 5 Read the information and learn it.

composite fibre (n) - a thin, strong thread or string made from two or more other materials, for example polypropylene and polyethylene. Composite fibres are often made into fabric.

carbon fibre (n) - a very thin, strong thread or string, usually 0.005-0.010 mm in

diameter, made mostly from carbon molecules. Carbon fibres are made into very strong, light products

Spunbond is a fabric made from composite fibre.

Reading tasks: The history of petrochemicals

Task 6 Read the text and translate it into Uzbek.

From carbon black to PVC

Before oil and gas were freely available, people made everyday things from natural materials. Clothes were made from cotton, wool, and leather. Containers, for example bottles and cups, were made from metal, glass, and clay (soft earth that becomes hard when cooked). Paints and cosmetics were made from plants and minerals. One example of a natural product is carbon black. It's a colouring used in ink for writing and drawing and for paint. It is made by burning wood, oil, or other natural materials. It was discovered in prehistoric times, and it's commonly used today. The first petrochemical factory was built in 1872, and it made carbon black from natural gas. Carbon black wasn't a new product, but using a factory was a new way of making it. It became possible to make large amounts of it cheaply because natural gas was plentiful and inexpensive. At that time, carbon black was used to make ink, paint, and crayons. It is now used mostly to make car tyres.

In the early 1900s, the petrochemical business began to grow. There were a lot of oil refineries, and they created chemical by-products. Oil companies wanted to find ways to use these chemicals. Soon scientists and engineers learned to change the hydrocarbon molecules in coal, petroleum, and refinery by-products. From the 1920s to the 1940s, familiar man-made products like nylon, polystyrene, and polyvinyl chloride (PVC) were developed. Synthetic dyes, paints, and medicines were invented.

Today, petrochemical products are everywhere. They are very useful, but they also have some problems. People throw away a lot of plastic products because they are inexpensive. One problem with plastics is that generally they do not rot or break up like natural materials. Plastic bags are already polluting oceans and killing wildlife. They cannot easily be remelted and reused. Scientists and petrochemical manufacturers continue their work to develop safe and useful products.

Task 7 Read the text *From carbon black* to *PVC.* Choose the correct definition for each word.

1 carbon black
a) a fuel b) a colouring

2 in prehistoric times
a) a very long time ago b) recently

3 plentiful
a) dangerous b) easy to find

4 inexpensive
a) cheap b) hard to get

5 crayon
a) a type of tyre b) a drawing tool

6 by-product
a) an extra, unneeded product b) a flammable product

7 hydrocarbon molecule
a) petrochemicals b) tiny pieces of hydrogen and carbon

8 familiar
a) known by many people b) useful

9 synthetic
a) man-made b) natural

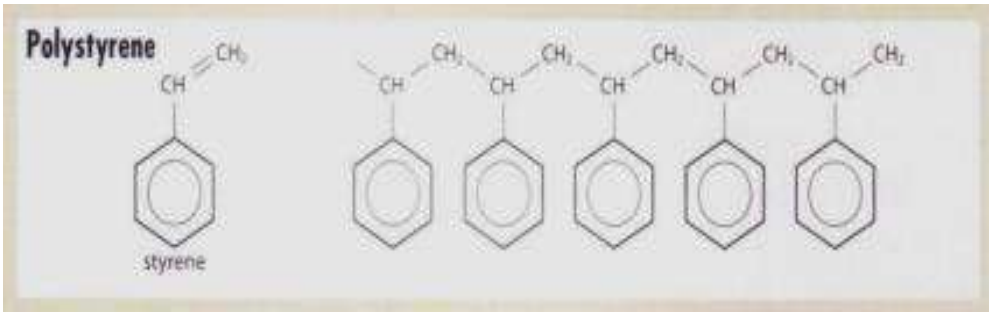
Task 8 Read the text again. Answer the questions.

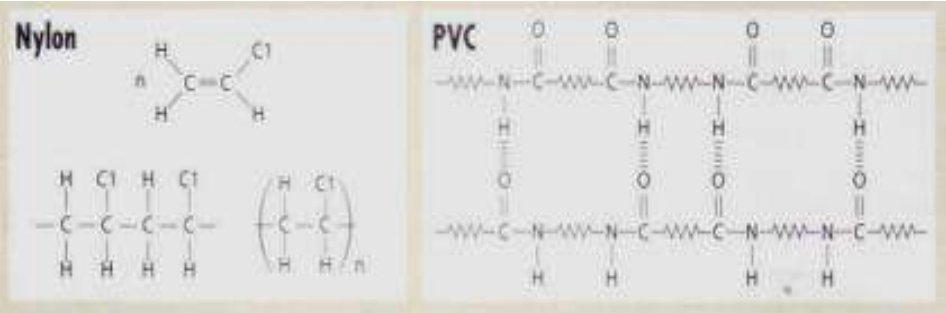
1 What natural clothing materials does the text talk about?
2 What did the first big petrochemical plant make?
3 Why did the petrochemical business grow?
4 When were a lot of synthetic materials developed?
5 What synthetic cloth does the text mention?
6 Why are plastics sometimes a problem?

Task 9 Read the text about polymers. Write T (true) or F (false).

Polymers

Nylon, polystyrene, and PVC are polymers. *Poly* means many, and *mer* means part. A polymer is many single molecules (called monomers) formed into a chain.





The first synthetic polymer - Bakelite - was first sold in 1909. It was used to make casings for radios and telephones, and also for kitchenware, jewellery, and toys. Not all polymers are synthetic. Many natural products, for example rubber, are polymers.

1 *Polymer* is another name for a single molecule.
2 Bakelite is a natural product.
3 Natural rubber is a polymer.

Grammar Review: *and, but, because*

and, but, because

• We use *and* to join two sentences. It shows that we are giving additional information.

It was discovered in prehistoric times.
It's commonly used today.
It was discovered in prehistoric times, and it's commonly used today.
The first petrochemical factory was built in 1872.
It made carbon black from natural gas.
The first petrochemical factory was built in 1872 and it made carbon black from natural gas.

• We use *because* to join two sentences. It shows why something happens or is true.

It became possible to *make large amounts of it cheaply Natural gas was plentiful and inexpensive.*
It became possible to *make large amounts of it cheaply because natural gas was plentiful and inexpensive.*
People throw away a lot of plastic products.
They are inexpensive.
People throwaway a lot of plastic products because they are inexpensive.

• We use *but* to join two sentences. It shows that the additional information may be unexpected.

They are very useful.
They also have some problems.
They are very useful, but they also have some problems.
Carbon black wasn't a new product.
Using a big factory was a new way of making it.
Carbon black wasn't a new product, but using a factory was a new way of making it.

Task 10 Complete the sentences. Use *and, but,* or *because.*

1 I was late this morning _____ I had a problem with my car.
2 We repaired the compressor yesterday, _____ it stopped working again this morning.
3 We started work at 9.00, _____ we finished at 4.00.
4 I want to go to the meeting, _____ I really don't have time.
5 We'll tidy up the workshop today _____ start work on the pump repair tomorrow.
6 I can't replace the lamp today _____ I haven't got a new one.

Task 11 Write three sentences for each set of sentences. Use *and, but,* or *because.* There is more than one correct answer in some cases.

EXAMPLE:

I took an umbrella. It wasn't raining.
I didn't take an umbrella. I wore my raincoat.
(and) I took an umbrella, and I wore my raincoat.
(but) I took an umbrella, but it wasn't raining.
(because) I didn't take an umbrella because it *wasn't raining.*

1 We called the medic. Juan injured his hand.
I cut my finger. It wasn't serious.
a) (and) _____
b) (but) _____
c) (because) _____

2 We replaced the gasket. We cleaned the spark plug.
It's running much better. It's making a funny noise.
a) (and) _____
b) (but) _____
c) (because) _____

3 We aren't using this tank. It's damaged.
We're using this tank. It isn't damaged.
a) (and) _____
b) (but) _____
c) (because) _____

Speaking: It's my job

Task 12 Read the text. Answer the questions.

Debbie Johnson

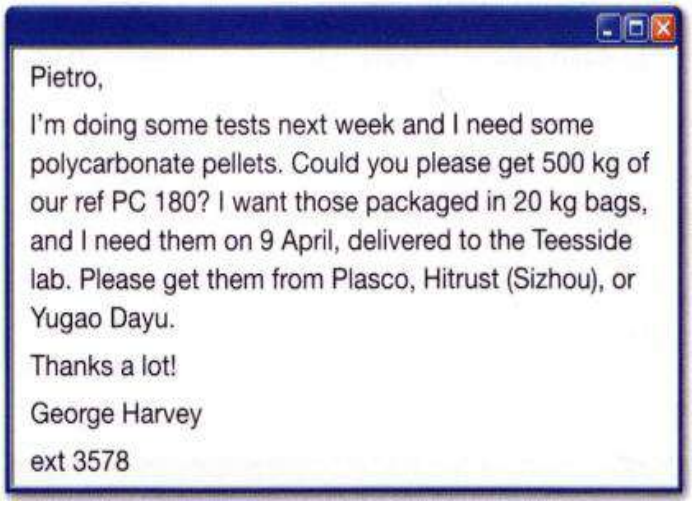
I'm a test technician for Specialist Plastics Limited. My company makes special polymers - plastics - and I work in the test department. I have been here since I left school, and I have been trained to use most of the test equipment. We test all of our materials for strength. We bend them in the bend test, we pull them in the tensile test, and we hit them with a hammer in the impact test.

We need to see how easily they break. This includes testing them at different temperatures. We also test them with different chemicals. We need to understand how chemicals might change our materials. For example, when we put some of our plastics in sea water, they very become weak. We also have to burn them because some materials make toxic chemicals when they burn. We need to know about that.

1 What's the name of Debbie's company?
2 Which part of the company does she work in?
3 What has she learned to use?
4 Who buys her company's products?
5 What subject has her job taught her about?
6 Which industry will use the product that Debbie tested this morning?

Writing: Materials requisition

Task 13 Read the email. Answer the questions below.



Pietro,

I'm doing some tests next week and I need some polycarbonate pellets. Could you please get 500 kg of our ref PC 180? I want those packaged in 20 kg bags, and I need them on 9 April, delivered to the Teesside lab. Please get them from Plasco, Hitrust (Sizhou), or Yugao Dayu.

Thanks a lot!

George Harvey

ext 3578

1 What material does George Harvey want?
2 How much (what quantity) does he need?
3 What type of packaging does he mention?
4 He names three suppliers. What are they?

Task 14 Read the email again. Complete the form.

• A materials requisition form is used to ask your company's buyer to buy something that you need for your work.

MATERIALS REQUISITION

Material:	1
Reference number:	2
Quantity:	3
Packaging:	4
Delivery date:	5
Delivery location:	6
Preferred suppliers:	7
Requested by:	8
Telephone extension:	9

LESSON 10 THE CHEMISTRY OF PETROLEUM

Warm up!

Task 1 Before starting today's lesson, discuss these questions

1 What elements make up petroleum?

2 What other elements may be present in fossil fuels?

Vocabulary tasks:

Task 2 Translate the active vocabulary of the lesson into Uzbek and learn it by heart.

oxygen, sulfur, organic compound, hydrogen, physical properties, saturated, unsaturated, nitrogen, viscosity, density,

Task 3 Read the sentence pairs. Choose where the words best fit the blanks.

1 oxygen / sulfur

A) Animals need _____ in order to breathe.

B) _____ is a yellow substance with an unpleasant smell.

2 atom / organic compound

A) An _____ contains carbon molecules.

B) A special microscope had to be used view the _____.

3 hydrogen / physical properties

A) The scientists inspected the sample's _____.

B) There are two _____ atoms in a water molecule.

Task 4 Read the sentences and choose the correct words.

1 Carbon / Molecule is necessary in order to have an organic compound.

2 The **saturated / unsaturated** hydrocarbon could not take any more hydrogen atoms.

3 Water is a **compound / nitrogen** formed by hydrogen and oxygen molecules.

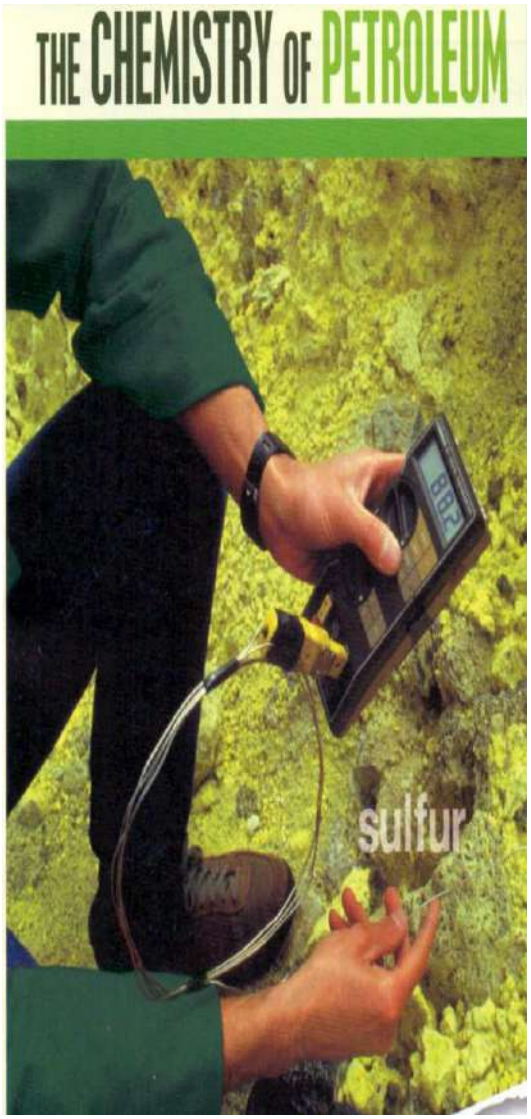
4 It is hard to detect **nitrogen / sulfur** because it is odorless and colorless.

5 The hydrocarbon was **unsaturated / saturated**, so it still attracted hydrogen atoms.

6 The scientist examined the **molecule / physical property** under the microscope.

Reading tasks:

Task 6 Read the text and translate it into Uzbek.



Crude oil consists of several different substances. These substances are mostly compounds of hydrogen and carbon. Any compound that includes carbon is known as an organic compound. The hydrogen atoms join with the carbon atoms to make hydrocarbon molecules. Small quantities of the gases nitrogen and oxygen are also present. Sulfur is present as well.

Crude oil has four main kinds of hydrocarbon molecules. These are paraffins, naphthenes, aromatics, and asphaltics. These molecules help to determine the petroleum's physical properties. Physical properties are things like viscosity or density.

The amount of hydrogen atoms that are linked to carbon atoms is not always the same. When there are as many hydrogen atoms as possible, the hydrocarbon is saturated. If there are fewer hydrogen atoms than possible, the hydrocarbon is unsaturated.

Task 7 Read the text again, then mark the following statements as true (T) or false (F).

1 ___ Crude oil contains organic compounds.
2 ___ Petroleum's physical characteristics are determined by gases.
3 ___ Nitrogen, oxygen, and sulfur are also found in crude oil.
4 ___ When there are as few hydrogen atoms as possible, the hydrocarbon is saturated.
5 ___ Crude oil has four main kinds of hydrocarbon molecules.
6 ___ The nitrogen atoms join with the carbon atoms to make hydrocarbon molecules.

Task 8 Work in small groups. Match the word with the correct definition.

1 *atom*	a) This consists of any number of atoms that are bonded together
2 *molecule*	b) Different compounds that exist together in the same liquid, for example crude oil.
3 *boiling point*	c) The smallest part of a substance that can exist.
4 *mixture*	d) The temperature when a liquid changes into a gas.

Grammar Review: Nouns and articles

Nouns can be countable or uncountable. Both types can be used with ***the***.

Countable nouns: These can be singular or plural. In the singular, they are used with ***a/an*** **or one.** In the plural they can be used with numbers or other expressions:

a *tanker*	*three molecules*
an *oil refinery*	*several platforms*
one *litre*	

The verb agrees with the countable noun: *The* ***tankers carry*** *huge amounts of oil.*

Uncountable nouns: These have no plural form. Nor do we use ***a/an*** or numbers with uncountable nouns, as they cannot be counted. Examples include fuel, mud, oil, time. Not ~~*a mud*~~, ~~*two fuels*~~

Uncountable nouns always have a singular verb form. *Oil is transported in tankers.*

Some nouns, such as fuel, oil, and rock can be both countable and uncountable.

The rig is built on rock. (=rock as a material)

Some rocks contain both oil and gas. (=individual rocks)

When talking about quantities in negatives and questions, we can use much with uncountable nouns and many with countable nouns. We can use a lot of with countable and uncountable nouns.

There isn't ***much / a lot of*** *time. Are* ***many / a lot of*** *pipelines?*

Articles: *a /an, the or no article* We use ***a/an*** with singular countable nouns to talk about something in general. *They are building* ***a*** *new pipeline*

We use ***the*** before countable and uncountable nouns:

- ✓ When we are referring to a specific thing or to something that is known to the speaker or listener: *He is working on* ***the*** *rig.(=everyone knows which rig)*

✓ When something has already been mentioned:

*An error occurred in system. Unfortunately, **the** error was not spotted.*

✓ With the names of rivers, seas, oceans, canals, and with mountain ranges and many regions: **the Amazon, the Pacific Ocean, the Himalayas, the Far East**

We use no article when we refer to uncountable and plural countable nouns in a general sense. Compare the following two sentences:

*The organic matter is compressed and **air** cannot reach it.*

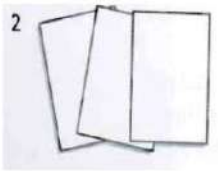
*When the valve is opened, **the** air inside escapes.*

Task 10 Decide if these words are countable or uncountable. Write *C* or *U*.

1 *book - C*	6 *equipment - U*	11 paper	16 road
2 car	7 gas	12 pipeline	17 sand
3 container	8 information	13 plant	18 ship
4 engineer	9 money	14 question	19 water
5 environment	10 noise	15 fuel	20 kerosene

Task 11 Complete the following with an uncountable noun from Task 10

A ton of _____



Three sheets of_____

A lire of _____

three pages of_____

A cubic metre of _____

A box of _____

Task 12 Complete the sentences with one of the following words. Add *a/an* or make the word plural if necessary.

barrel energy equipment experience layer reservoir

1 Oil is found in _____under the ground.
2 People working on a drilling rig have to move _____ that is very heavy.
3 _____ of oil is 159 litres.
4 Oil and gas are very important sources of _____.
5 Tom is a geologist with twenty years' _____.
6 Over thousands of years, dead plants and animals were covered in _____ of mud and sand.

Speaking: It's my job

Task 13 Liza Song works as a petroleum chemist. What training do you think a petroleum chemist needs? Discuss in pairs and put plus (+) in the boxes.

	Yes	No
University degree in chemistry		
Offshore safety training		
Computer technology		
Training in statistics		
Time management courses		
Team working courses		

Read the text and check your answers.

Task 14 Answer the questions.

1 Why did Lisa want to work in the oil industry?
2 Why did she find it easy to get a job?
3 What sort of tasks did she have to do at first?
4 Why does she have to do an offshore safety training course?
5 Why are there more jobs for petroleum chemists at the moment?
6 Would you like to do this job? Why / why not?
7 Would you like to work abroad? Why / why not?

Lisa Song

I have always liked chemistry and after I graduated from university, I decided to find a job in the oil industry because it's more practical. My thesis at university was about catalysts used in the petroleum industry and this gave me an advantage when I went for an interview.

I have been with this company for three years and I've gained a lot of experience using different modern measurement techniques. To begin with I had to do routine laboratory work, but gradually I got more interesting projects. I helped install and calibrate specialist equipment at a refinery and recently I've been part of an offshore project. Next week I have to do a three-day offshore safety training course so I can go to the offshore platform to help with commissioning. I have to make sure I know about new developments and learn more about statistics and computer technology. In the past I just reported results but now I also have to draw conclusions and make recommendations. I've been on company training courses for time management, communication presentation skills, and teamwork, which have been very useful.

The level of exploration in the industry changes from time to time so there is sometimes a higher demand for petroleum chemists. In the last few years the environment has become very important so there are more jobs for chemists. I need to get more experience and then I'm going to apply for a job abroad.

LESSON 11 PROPERTIES OF PETROLEUM

Warm up!

Task 1 Before starting today's lesson, discuss these questions

1 What are some properties of petroleum?

2 A watery liquid could also be said to have what?

Vocabulary tasks:

Task 2 Translate the active vocabulary of the lesson into Uzbek and learn it by heart.

colorless, watery, sour, sweet, low vis, high vis, centipoises, to smell, to contain, thin, odor, to describe, pour point, to identify, property, value, impurity, reside, dissolve, consideration, damage, contaminate;

Task 3 Match the words (1-8) with the definitions (A-H)

1 ____ colorless	**A)** an oil that smells like gasoline
2 ____ watery	B) being thin, containing lots of water
3 ____ sour	C) an oil with a high viscosity
4 ____ sweet	D) being without color
5 ____ low vis	E) an oil that smells like rotten eggs
6 ____ high vis	F) an oil that smells like fruit
7 ____ aromatic	G) an oil with a low viscosity
8 ____ centipoises	H) a measurement used to describe viscosity

Task 4 Read the sentences and choose the correct words.

1. The **viscosity** / **pour point** of the petroleum was very thick.

2. Jane covered her nose because the **viscosity / odor** was so bad.

3. The **color / odor** of that heavy crude oil is almost black.

4. The petroleum's **pour point / color** was low.

Task 5 Match the words (1-8) with the definitions (A-H)

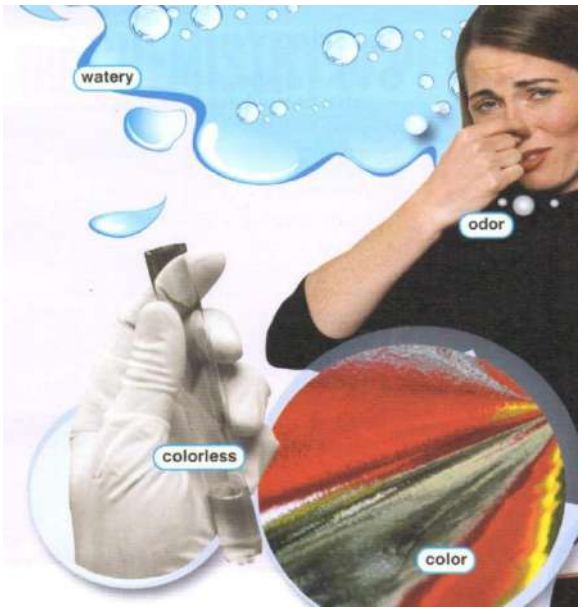
1 value	A) to become absorbed into a liquid
2 impurity	B) the destruction of something
3 reside	C) to make something
4 dissolve	D) an object's monetary or sentimental worth
5 consideration	E) to be present in a certain area

6 damage	F) a hard element that develops naturally in the ground
7 metal	G) a contemplation or deliberation on something
8 contaminate	H) a substance that makes something imperfect or unclean

Reading tasks:

Task 6 Read the text and translate it into Uzbek.

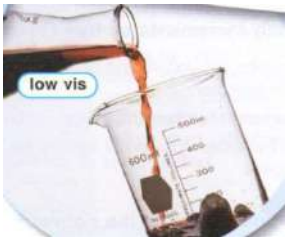
Petroleum Field Guide



There are several different ways to label crude oil. These oil properties can determine the quality and also describe the oil.

One important property of oil is its viscosity. Different types of oil have different viscosity numbers, measured in centipoises (cp). Oil that is watery, with low vis, moves easily. Oil with high vis will move more slowly. Therefore, low vis oils are preferred by engineers.

Another way to characterize oil is by the pour point. The lower the pour point, the better the oil is. This is because oil also needs to flow in cold temperatures.



Color and odor are two more important oil properties. Different oil can vary greatly in color. The lightest crude oil is almost colorless. Heavier crude oil can be green, yellow, red, or black. The odor of oil is generally characterized into sweet, sour, and aromatic crudes.

Task 7 Read the petroleum field guide. Then, choose the correct answers.

1 What is the main idea of the field guide?

A) the different ways to characterize odors of oil
B) the various characteristics of crude oil
C) the preferred oil of engineers
D) the reasons to identify heavier crude oil

2 Which of the following is NOT a property of oil?

A) odor B) color C) centipoises D) pour point

3 According to the guide, which type of oil is preferred by engineers?

A) low wis B) aromatic C) high vis D) high pour point

Task 8 Read the text again, then mark the following statements as true (T) or false (F).

1 ___ The main property of oil is its viscosity.
2 ___ Oil that is watery, with high vis, moves easily.
3 ___ Low vis oils are preferred by engineers.
4 ___ The lightest crude oil is almost without color.

Grammar Review: Talking about the future

There are several ways of talking about the future.

going to – We use ***be+going to+infinitive*** when we can see the probable result of a situation that is happening now.

It's ***going to be*** *difficult to find a job in the present economic climate*
You ***are going to find*** *the exam tough if you don't srart revising now*

We also use this structure to talk about intentions and fixed plans.

*The National Oil Company is recruiting staff, so I****'m going to apply*** *for it.*
We ***are going to visit*** *the new oil rig next week.*

Task 9 There are many different ways of talking about the future. The way we choose depends on how we think about the future event. Match the ideas *1-5* with the language *a-e*.

1 There aren't that many good jobs at the moment so ……
2 I've already agreed to work for them……
3 Courses always end at this time of the year……..
4 A person has arranged to come and see us …….
5 I'm making a decision as I speak ……..

a) I think I'll go along too.
b) Ours finishes next month.
c) I'm going to start working for them next month.
d) It's going to be hard to find a well-paid one.
e) Someone is visiting the college next week.

Speaking: Impurities in Petroleum

Task 10 Read the passage and discuss the given questions then choose the correct answers.

Petroleum sometimes contains impurities. These impurities cause the oil to be unusable in its crude state. Oil may contain dissolved hydrogen sulfide and metals. Oil can also contain carbon dioxide. High concentrations of these pollutants contaminate the oil, making it unusable. For example, excess carbon dioxide causes major damage. Carbon dioxide can cause corrosion in vehicles and other

equipment. Impurities lower the value of petroleum. That is why it is refined before sale.

Many countries have strict oil-refining regulations. These regulations ensure that refining companies eliminate the bad substances. However, even refining the oil may not make it better. This is why engineers test the oil residing in potential drill sites. They must take into consideration whether the oil is worth drilling. The oil may be too contaminated to try to refine. In these cases, the engineers look for a new drilling site.

1 What is the purpose of the article?

A) to discuss oil impurities
B) to argue for stricter refining regulations
C) to explain how engineers choose drill sites
D) to list methods of removing impurities

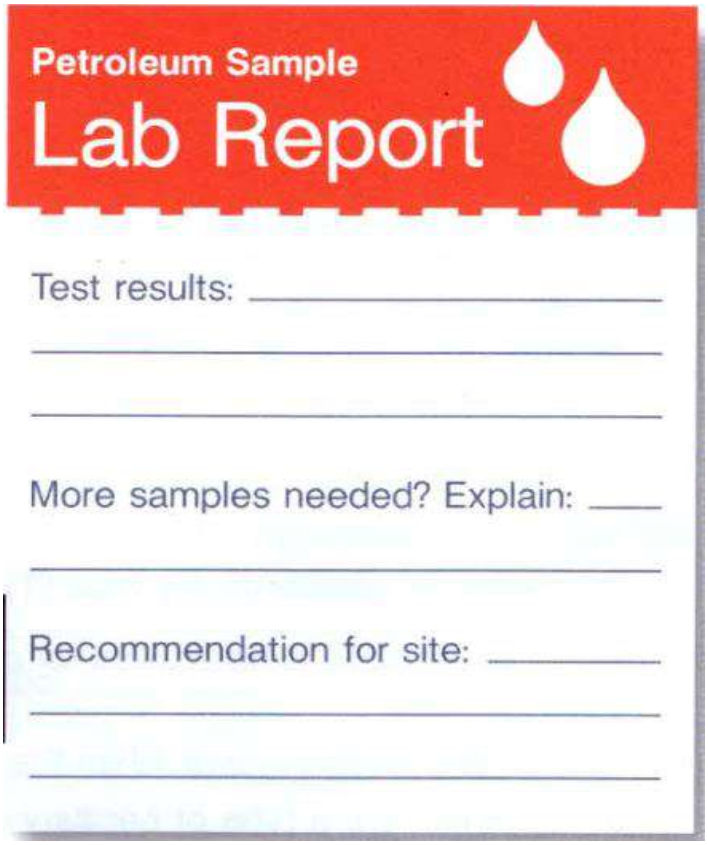
2 Which is NOT listed as a result of impurities in petroleum?

A) The value of petroleum is reduced. B) Equipment may be damaged.
C) Drilling sites become polluted. D) The price of refining it increases.

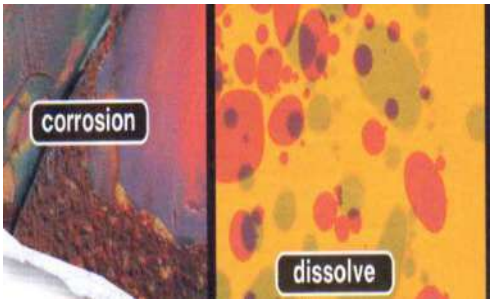
3 Which of the following can cause corrosion?

A) hydrogen sulfide B) dissolved metals
C) dissolved metals D) carbon dioxide

Writhing:



Task 11 Use the paasage and fill out the following lab report for the petroleum sample.



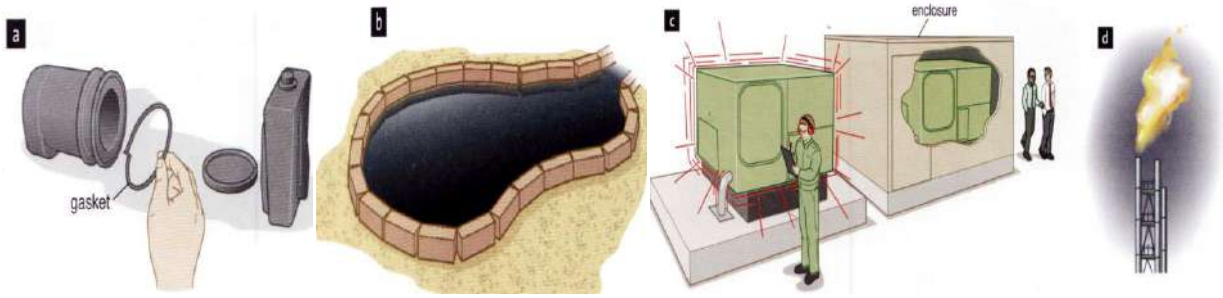
LESSON 12 OIL AND THE ENVIRONMENT



Warm up!

Task 1 Look at these pictures. Which shows_____

1 an oil spill? 2 noisy equipment? 3 broken equipment? 4 a gas flare?



Which of the above can lead to _____

1) noise pollution? *a*, c, *d* 2) water pollution? 3) soil pollution? 4) air pollution?

Task 2 Match each solution below with a picture in Task 1.

1) Reduce the noise. 2) Make it safe. Clean it up.
3) Repair it. 4) Limit or stop it.

Vocabulary tasks: Preventing and dealing with eco-hazards and incidents

Task 3 ***Translate the active vocabulary of the lesson into Uzbek and learn it by heart.***

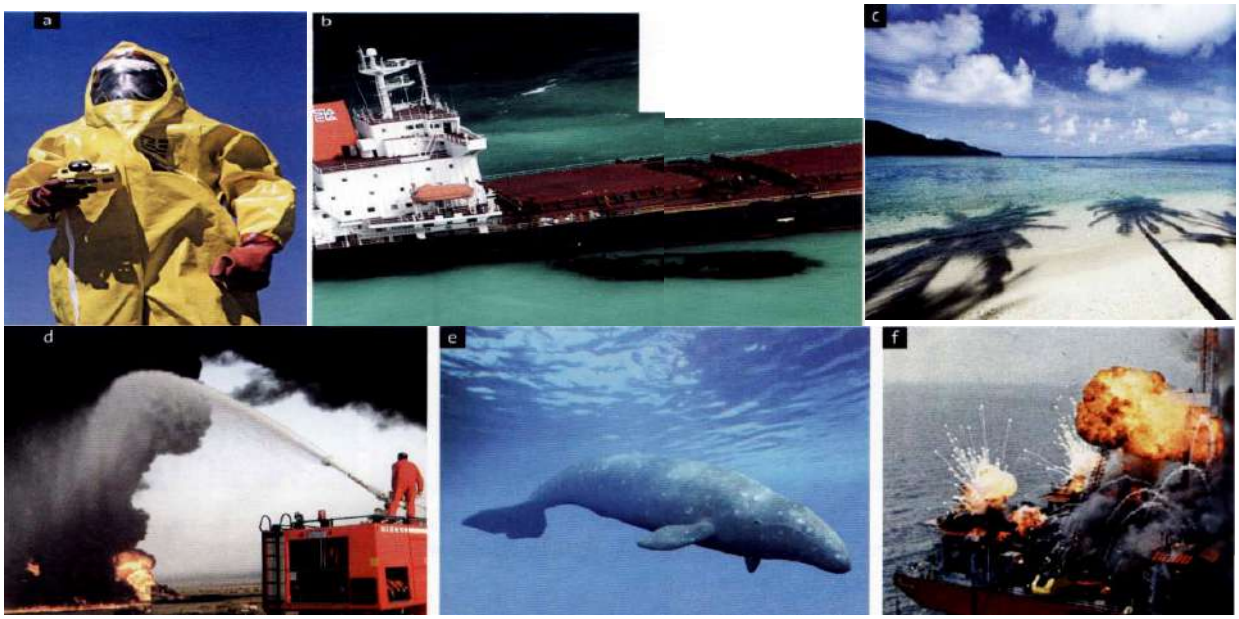
dangerous, environmental, noisy, carefully, safely, contractor, danger, eco-hazard, enclosure, explosion, incident, noise, risk assessment, clean up, repair, reduce;

Task 4 Read information and match sentences *1-6* below with pictures *a-f*

• An eco-hazard is something that can harm the environment: people, plants, animals, water, earth, air.

• An incident is something that happens, an event: a fire, a gas leak, an oil spill, a collision, an accident.

1) The fire started early this morning.
2) After the rig explosion, we improved our equipment and safety procedures.
3) We followed the usual procedure. We reported the spill immediately.
4) There was a gas leak. We wore hazmat suits when we checked the damage.
5) The field is under a beautiful beach, so we used special drilling techniques.
6) Our company has a wildlife protection programme. We studied the grey whales before we started drilling.



Task 5 Complete the sentences with words from Task 4.

Incidents

1) There was a *f*_____ .We put it out quickly.
2) There was an *e*_____. It destroyed the rig.
3) There was an *o*_____ *s*_____. We lost 10,000 litres.
4) There was a *g*_____ l _____. We closed the main valve and made the area safe.

Preventing incidents

5) There are whales in the area, so we have a *w*_____ *p*_____ *p*_____.
6) We follow *s* _____ *p*_____. It's the best way to prevent accidents.
7) We use *s*_____ *d* _____ t _____. We can get oil and protect nature.

Check your answers with a partner.

Reading tasks: Preventing environmental damage

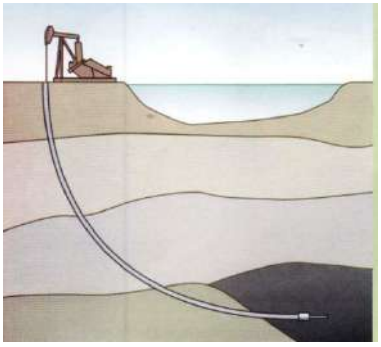
Task 6 ***Read the given text and translate them into Uzbek.***

Wytch Farm

In 1973, the British Gas Corporation discovered a large oilfield in the south of England. There were 65 million tonnes of crude oil in the ground. And on the ground? A nature reserve including forests, trees, animals, birds, and a perfect beach and seaside - and a village. The engineers faced many challenges**:**

- noise from construction and drilling;
- noise from trucks going to and from the site;
- bad smells from the site;
- possible oil spills, fires, and explosions;
- possible damage to the plants and animals in the area.

British Gas planned the work very carefully. They studied the plants and animals in the area and developed a wildlife protection programme. In 1979, they began drilling. They put the drilling rig in a wood. It was behind the trees so people couldn't see it easily. And they used a special drilling technique: horizontal drilling.



The easiest way to drill oil is straight down vertically into the oil. Horizontal drilling (sometimes called extended reach drilling) starts straight down, but then it turns. The drill goes into the oil from the side. Oil companies sometimes drill this way to help the oil flow into the well more easily. But at Wytch Hill, it was a way to protect the environment. When you use horizontal drilling, the oil can be under a beautiful forest, a village, or even the sea, but the drilling rig and the gathering station can be far away. At Wytch Farm, some of the drilling started more than ten kilometres away from the oil. Wytch Farm is the largest onshore oilfield in Western Europe. But environmental damage at the site is very small.

Task 6 ***Read the text again and answer the questions***

1 What can you see in the area around Wytch Farm?
2 How many years passed between discovery and drilling?
3 What special drilling technique did British Gas use?
4 How far did some of the drilling go?

Listening tasks: Problems and solutions

Track 5 Task 7 Listen to the conversations. Match each conversation with a problem.

Conversation	Problem
1 _____	a) a leak
2 _____	b) an oil spill
3 _____	c) a noisy compressor

Task 8 Choose the correct word in each sentence.

1 a) *It's happen* / *It happened* last night. b) We *closed* / *close* the main valve.
2 a) Did it *work* / *worked?* b) It *work* / *worked* very well.
3 a) *It's started* / *It started* two days ago. b) I *wait* / *waited* all day yesterday.

Grammar Review : Past Simple Tense

Past Simple: We use the Past Simple to talk about the past.

Positive: *We started cleaning up last night.*
Negative: *We didn't start cleaning up last night.*
Question: *Did you start cleaning up last night?*

We use the Past Simple to talk about completed actions in the past.

Positive: I / You / He / She / It / We / You / They cleaned the spill right away.
= *subject + Past Simple*

Negative: I / You / He / She/It / We / You / They didn't clean the spill right away.
= *subject + did + not (didn't) + infinitive*

Questions: Did I / you / he / she / it / we / you / they clean the spill right away?
= Did + subject + infinitive

Short answers: Yes, they did. No, they didn't.

To form the Past Simple in the positive, we add ***-d*** or ***-ed*** to the infinitive.

live –lived; want – wanted; I waited all day for the delivery.
He closed the main valve to make it safe.

Some common verbs, such are *do, go,* or *have,* are irregular.

do – did; have – had; go-went; make – made;

Note the use of the infinitive in the negative. *It didn't arrive on time.*
NOT *I It ~~didn't arrived~~ on time.*

We often use time expressions with the Past Simple. These can go at the beginning or end of a sentence.

They completed the refinery in 1995.
The whole team went to the meeting on *Thursday.*
Last week I worked on a risk assessment with the operations team

Task 9 Complete each sentence with a word from the list. Use the Past Simple.

arrive burn go have start

EXAMPLE: *We started cleaning up last night.*

1) The crew _____ at 6.30.
2) The refinery fire _____ for three days.
3) I _____ to college in Abu Dhabi.
4) When we opened the flow, we _____ a lot of problems with the new pipeline.

do make see stop

EXAMPLE: *Did you start cleaning up last night?*

5) Did we _____ a phone call to head office this morning?
6) Did they _____ work at three o'clock yesterday because of the bad weather?
7) Did you _____a training course in the UAE last summer?
8) Did he _____ Khaled and Sami yesterday?

Task 10 Make sentences 1-4 in Task 10 negative.

EXAMPLE:

We started cleaning up last night. ---> *We didn't start cleaning up last night.*

1) _____ 2) _____
3) _____ 4) _____

Task 11 Make questions. Use the Past Simple.

1) you / about / Did / the / learn / oil/at / industry / school/ ?
2) industry / Why / you / did / choose / oil / the / ?
3) tools / school/Did / use / you / power / at / ?
4) you / How / learn / did / oil/about / jobs / ?
5) did / lessons / When / you / English / begin / ?

Speaking: It's my job

Task 12 Match the definitions with the words.

1) companies that do jobs for other companies	a) risk assessment
2) in a way that isn't dangerous	b) safely
3) report about possible dangers	c) construction sites
4) places where buildings, wells, refineries, etc. are built	d) contractors

Task 13 Track 6 Reporting an incident. Listen. Write T (true) or F (false).

1) There's an oil spill. _____
2) It's between tanks 10 and 12. _____
3) There are no injuries. _____
4) About 200 litres of oil spilled. _____
5) The spill is not contained. _____

LESSON 13 WEATHER CONDITIONS

Warm up!

Task 1 Beginning of the lesson, let's discuss these questions.

1 What is the weather like in your country?

2 What kind of extreme weather conditions are present in your country?

Vocabulary tasks: Preventing and dealing with eco-hazards and incidents

Task 2 ***Translate the active vocabulary of the lesson into Uzbek and learn it by heart.***

monsoons, hurricanes, gale-force winds, blowing sand, reduced visibility, lightning strikes, thunderstorm, hail, blizzard, extreme, ice balls, arid, humid, sandstorm, flood;

Task 3 Match the words and phrases (1-8) with the definitions (A-H).

1 ___ hail	**A)** a flash of electricity in the sky during a storm
2___ blizzard	**B)** a very strong wind
3 ___ extreme	**C)** a dangerous spinning wind storm
4___ hurricane	**D)** falling ice balls
5 ___ tornado	**E)** a strong tropical storm
6 ___ lightning	**F)** a storm with rain and lightning
7 ___ thunderstorm	**G)** a storm with a lot of snow
8 ___ gale-force wind	**H)** more serious than normal

Task 4 Read the sentence pairs. Choose which word best fits each blank.

1) rain / snow

A) The trees are white with _____ .

B) The _____ flooded the streets.

2) arid / humid

A) It is quite _____ in the jungle.

B) Deserts are very _____ places.

3) monsoon / sandstorm

A) The _____ left the village flooded.

B) The _____ reduced visibility.

Reading tasks:

Task 5 ***Read the given text and translate them into Uzbek.***

Weathering the Rig

It's important to learn about local climate conditions before working on a rig. That way, you are prepared for any weather situation.

• Rain is common in most places. Sometimes rain is accompanied by thunderstorms. Thunderstorms produce lightning and on occasion, hail.

• Snow can create icy conditions, but blizzards are more dangerous. The blowing snow makes it difficult to see.

• In some humid areas, monsoons bring heavy rainstorms and strong winds. Likewise, in arid desert areas, sandstorms are common.

• Some regions are at risk for hurricanes or tornadoes. These two extreme conditions often bring gale force winds. In the event of a hurricane or tornado warning, seek shelter immediately.

Task 6 Read the text again. Then, choose the correct answers.

1) What is the main idea of the article?

A) how to prepare for different weather conditions

B) what types of weather rig workers encounter

C) where to seek shelter from dangerous storms

D) what conditions cause a storm warning to be issued

2) According to the article, which condition occurs in humid areas?

A) monsoons **C)** snow **B)** tornadoes **D)** hurricanes

3) What is the danger associated with blizzards?

A) gale-force winds **C)** blowing sand

B) lightning strikes **D)** reduced visibility

Listening tasks: Talking about the weather

Track 14 Task 7 Listen and complete the table

-20ºC	0ºC	20ºC	40ºC
It's very _____ today.	It's freezing	It's a nice day	It's very hot today
It's twenty below and...	It's____ degrees.	It's 20 degrees.	It's _____ degrees.
… it's snowing.	There's ice on the roads.	No ____today.	It's very windy.

Speaking:

Task 8 Practise in pairs. Discuss the weather report with your partner.

Place	Today	Tomorrow
Aberdeen	–10° C	3° C
Los Angeles	32° C	33° C
Moscow	–20° C	–23° C
Rio de Janeiro	28° C	25° C
Riyadh	45° C	45° C
Sydney	18° C	21° C

Celsius	Fahrenheit
–30	–22
–25	–13
–20	–4
–15	5
–10	14
–5	23
0	32
5	41
10	50
15	59
20	68
25	77
30	86
35	95
40	104
45	113

A: *What's the weather like in Aberdeen today?*
B: *Freezing. It's minus 10.*
A: *And tomorrow?*
B: *It's going to be 3 degrees and raining.*
A: *What about Riyadh?*
B: *It's hot. 45 degrees.*
A: *What's that in Fahrenheit?*
B: *A hundred and thirteen degrees.*

Task 9 Read the emergency procedures and discuss them in groups.

Emergency procedures

1 Raise the alarm.
2 Contact the emergency services.
3 Switch off all machinery.
4 Proceed upwind to an assembly area.
5 Check that all your crew or departments are present or accounted for.
6 Report to the senior person present.

Task 10 Complete the emergency procedures for a refinery. Don't look at Task 9 above.

Raise _____

Contact _____

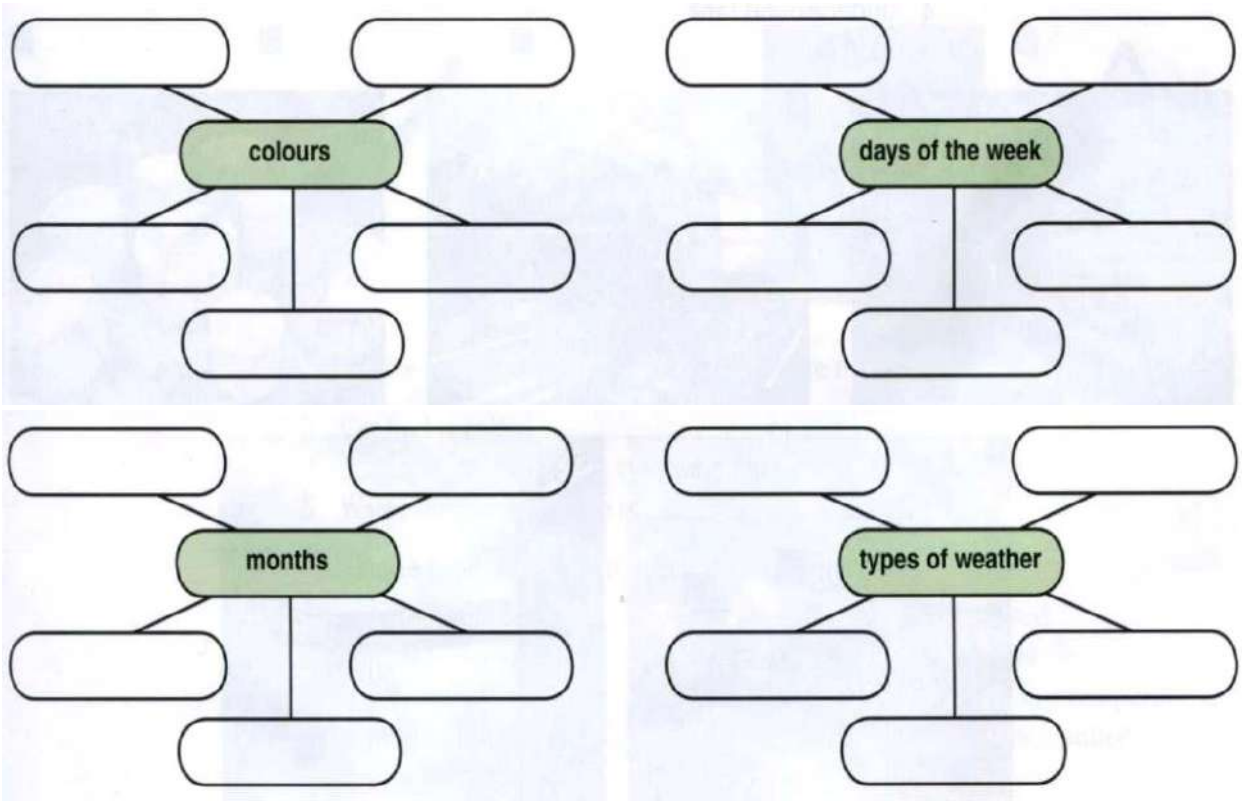
Switch _____

Proceed _____

Check _____

Report _____

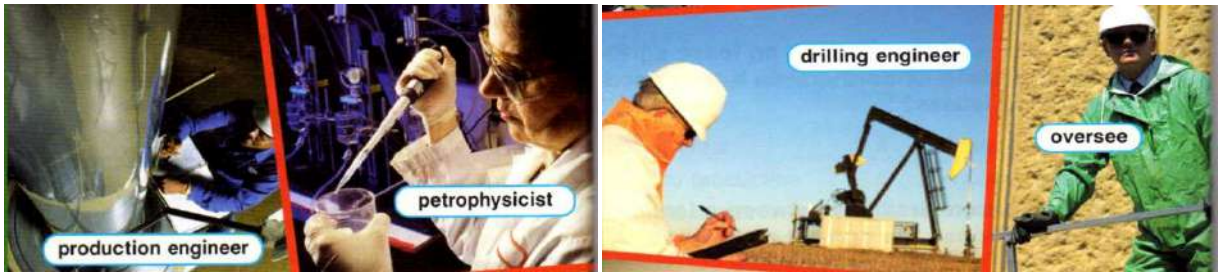
Task 11 Complete each of these word spiders.



Grammar review: Giving instructions;

We use the infinitive without *to* to give **instructions**.	***Turn on*** *the lights.*
	Turn off *that phone.*
	Stand *up.*
	Sit *down.*
We add ***please*** to make the instructions more polite.	*Please* ***don't touch****.*
	Please ***turn on*** *the lights.*
	Sit *down, please.*

LESSON 14 PETROLEUM ENGINEERS



Warm up!

Task 1 Beginning of the lesson, let's discuss these questions.

1 What are some types of engineers that work in the petroleum industry?

2 Who works in the lab as well as in the field?

Vocabulary tasks:

Task 2 ***Translate the active vocabulary of the lesson into Uzbek and learn it by heart.***

reservoir engineer, petrophysicist, production engineer, facilities engineer, academic, to oversee, to advise, to supervise, to be completed, drilling engineer, structural engineer, reservoir engineer, assignments, electrician, plumber, mechanic, carpenters, pipes fitter, proficient

Task 3 Match the words (1-6) with the definitions (A-F).

1 ___ reservoir engineer
2 ___ petrophysicist
3 ___ production engineer
4 ___ facilities engineer
5 ___ academic
6 ___ oversee

A) a person who studies rock properties and advises other engineers
B) a person who ensures that a building is safe for use
C) to supervise people or a project
D) a person who helps maintain oil reservoir sites
E) relating to learning or instruction
F) a person who ensures that the different phases of a project are completed

Task 4 Read the sentence pairs. Choose which word best fits each blank.

1) drilling / structural
A) The _____ engineer deemed the building an unsafe work place.
B) The _____ engineer designed the new oil well.

2) title / assignment

A) His job _____ is chemical engineer.

B) Jane's new job _____ is to inspect all the new structures.

Task 5 Match the words and (1-6) with the definitions (A-F).

1 ___ talented	**A)** being able to do something correctly and efficiently
2 ___ electrician	**B)** a person who installs and repairs wiring
3 ___ plumber	**C)** having the ability to do something
4 ___ proficient	**D)** a person who puts together and repairs mechanical piping systems
5 ___ pipe fitter	**E)** a person who installs and maintains pipes
6 ___ driver	**F)** a person who operates a vehicle

Task 6 Choose the sentence that uses the underlined parts correctly.

1 A) The instrument technician had to come and fix the pipe after it burst.

B) The metalworker welded the steel pipes together.

2 A) The mechanic repaired the company truck after it broke down.

B) The carpenter repaired the building's wiring.

3 A) The pipe fitter transported the oil to the refinery.

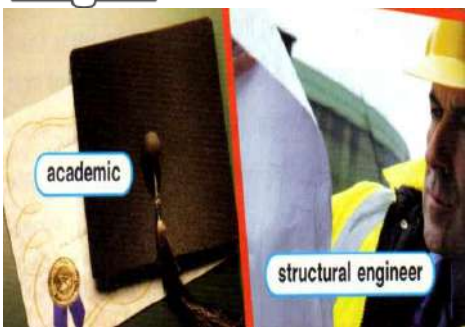
B) The instrument technician repaired the broken gauge.

4 A) The carpenter replaced the broken boards on the drill floor.

B) The plumber fixed the frayed wires in the panel.

Reading tasks:

Task 7 ***Read the job posting and translate them into Uzbek.***



Global Energy: **Careers**

We are looking for people to fill the following positions:

Job titles:

Drilling Engineer: The drilling engineer helps design and construct wells. Position requires both team and independent work.

Production Engineer: The production engineer oversees oil production. Applicants need at least three years of management experience.

Structural Engineer: The structural engineer ensures all buildings and work areas are safe. Job description includes inspecting and maintaining structures. This person frequently works with the facilities engineer.
Petrophysicist: The petrophysicist must have a thorough understanding of wire line log analysis. This person works closely with the reservoir engineer.
Reservoir engineer: Job description includes inspecting oil and petroleum reservoirs. This person also assists with different reservoir-planning assignments.
All applicants must have relevant academic credentials and degrees.

Global Energy: Come be part of our dynamic team!

Global Energy needs talented employees to join our staff. We have career opportunities in many different fields. Currently, we have openings for the following positions

Electricians	Carpenters
Mechanics	Metalworkers
Plumbers	Drivers
Pipe fitters	Instrument technicians

Advantages to joining our team:

- ✓ Work with the most proficient engineers in the petroleum industry.
- ✓ Earn a competitive salary with great benefits.
- ✓ Have the opportunity for career advancement.
- ✓ Get the chance to travel. Licensure is required for all positions.

For more information, contact us at 779-555-9812.
We look forward to hearing from you!

Task 8 Read the text again. Then choose the correct answers.

1 What is the flyer's main purpose?
A) to advertise benefits of working for Global Energy
B) to describe Global Energy's current employees
C) to recruit new Global Energy employees
D) to promote Global Energy's advancement

2 Which is not an open position?
A) electrician B) plumber C) engineer D) driver

3 What can you infer about a person who is hired as an electrician?
A) He or she has worked with engineers before
B) He or she has a license.
C) He or she has worked in the petroleum industry.
D) He or she has management experience.

Listening task:

Track 15 Task 9 Listen and write down the words you hear.

1 We __*transport*___ the oil.
2 We _____ the oil.
3 We _____ for oil.
4 We _____ the oil.
5 I work on a _____.
6 We work on an _____.
7 We work in the _____.
8 We work in the _____.
9 I'm the _____.
10 I'm the _____.
11 I'm a _____.
12 I'm a _____ operator
13 I'm a _____.
14 I'm a _____ operator

Grammar Review : Asking questions

We use questions to get information. The word order in questions is different from positive and negative sentences and we can use special questions words.

Is he the supervisor? *Are you John?*
What's your name? *What do you do?*
Where do you work? *How do you spell that?*

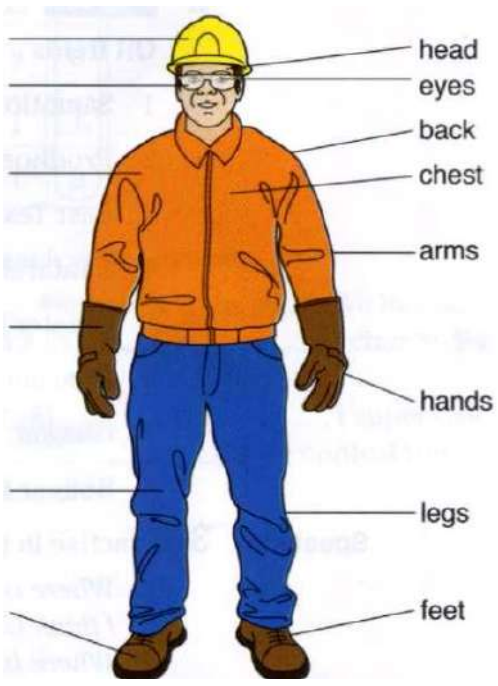
Task 10 Use *what* o r *where* to complete the questions.

1 _*Where*_ do you work?
2 _____ do you do?
3 _____'s my helmet?
4 _____'s a roughneck?
5 _____'s your name?
6 _____ are you from?
7 _____ does he do?

Speaking task:

Task 13 Look at the picture and label the PPE items. Then practise in pairs. Ask and answer questions about PPE items.

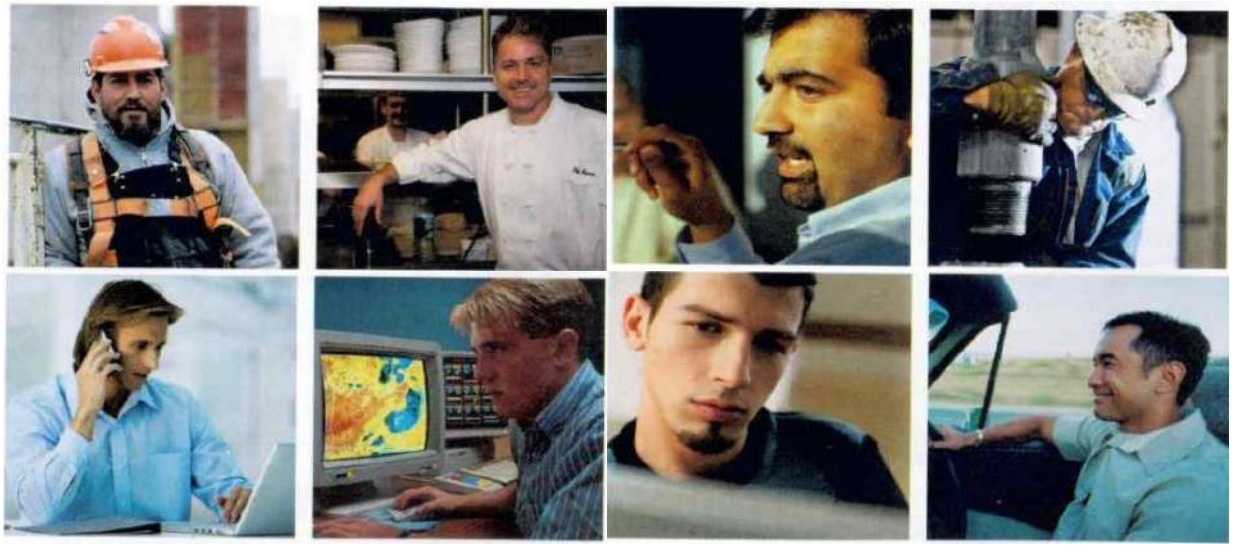
A: What does a helmet protect?
B: It protects the head.
A: What do gloves protect?
B: They protect the hands



LESSON 15 JOBS IN THE OIL INDUSTRY

Warm up!

Task 1 Look at the pictures. What sort of jobs do you think these people have?



Task 2 Read about these people. How much work mainly outdoors and how much work indoors?

1 *Lars - Production Engineer*: I work with everything to do with the well - design, with the well – design, construction, operation, maintenance, quality. I mainly manage projects from the office and sometimes visit drilling sites.

2 *Paul - Derrickhand:* I check mud that is used in drilling every four hours and send the data to the engineers. I am also responsible for the mud pumps.

3 *Aleksey - Driller:* I work on a drilling rig. It is hard work moving and maintaining heavy equipment.

4 *Hausa - Chef:* I work on a large oil rig in the North Sea. It's my job to prepare food for the 140 workers who work on the rig.

5 *Karl - Production Field Administrator:* It's my job to enter data into computer programs and do other office jobs when necessary.

6 *Miguel –Plant Manager:* I'm the manager of factory that makes storage tanks and piping for oil and gas companies. I spend most of my days discussing projects, design, safety, etc. with people in the company.

7 *Bo - Field Engineer:* In my job we use wireline to collect data from a well while it is being drilled. I work with two other people and drive long distances each week.

8 *Ulf - Remote Operated Vihicle Pilot:* We use an ROV to check structures and conditions under the water. It's my job to operate this vehicle from the platform using electronic equipment.

Choose a job that you would like to do and choose a job you would not like to do. Work in small groups and explain your choices to the others.

Vocabulary tasks: Finding jobs; People and jobs

Task 3 ***Translate the active vocabulary of the lesson into Uzbek and learn it by heart.***

ambition, apprentice, contract, experience, internship / placement, opportunity, qualification, reference, reputation, responsibility, skill, to apply, to draw up, to negotiate, to promote;

Task 4 Read the sentences and match the words in bold with definitions 1-15.

- She went for three ***interviews*** before they gave her the job.
- I'm trying to find a ***placement*** or ***internship*** for the summer to get some experience.
- You don't need lots of ***qualifications*** but you have to be tough and ready to work hard.
- I think I'm going to ***apply for*** a postgraduate course if there are still vacancies.
- Just send me a ***CV***, don't worry about a ***covering letter***.
- There's an ***application form*** on our website you can ***fill in***.
- The company ***recruits*** and ***trains*** over a hundred school-leavers each year.
- I'd like the names of two ***referees*** as well.
- More than ninety ***candidates*** replied to the advertisement.

1 the letter you send with a CV that says why you want the job
2 to add information to the gaps on a form
3 the practical knowledge and know-how you get from doing something
4 an official document that shows you have reached a required level
5 a person who wants to be considered for a job
6 a meeting where you are asked questions to see if you are suitable for a job
7 a list of printed questions that you answer by filling the gaps
8 (Br E) a job that is often a part of studies where you get experience of a particular kind of work. Usually unpaid
9 (Am E) a job that is often a part of studies where you get experience of a particular kind of work. Usually unpaid
10 (Am E) someone who knows you well who gives their opinion of you
11 An available job
12 to teach someone how to do a specific task
13 to get someone to join a business or organization
14 a document that gives details about your education and qualifications and the jobs you have done
15 to formally request a job

Task 5 The job titles of people who do certain jobs often end in –ist, -er, -or, -ian.

Examples: a person who works in technology = technologist

a person who manages = manager

Write the job titles of the people who do the following.

1) a person who welds metal pieces together
2) a person who works with electrical equipment
3) a person who supervises work
4) a person who drills
5) a person who works with technical things
6) a person who operates machinery
7) a person who plans how to do something
8) a person who has studied geology
9) a person who surveys the land
10) a person who has studied science

Reading tasks: Jobs in oil and gas

Task 6 Read the job posting and translate them into Uzbek.

A world of opportunities

There are many different jobs within the oil and gas industry, each requiring different skills and qualifications and sometimes travel.

Working as a laborer is physically hard. You have to be strong and willing to work very hard. You work outdoors on site, perhaps for a drilling or pipeline company. You only need qualifications from school and, of course, health and safety qualifications. You get the chance to travel and often get paid overtime so you can earn good wages.

An apprentice begins work after leaving school, working together with a qualified person such as a technician, electrician, or welder to learn the job. At the same time, an apprentice spends time at college to get a recognized certificate or diploma. It can take three or four years but there is the chance to travel and get paid for overtime too.

Technologists usually study at college for two or three years and have a qualification before they begin work in specialized fields. Their job is to decide which equipment to use on site, know how to install it, and use it. Some technologists have an office job, but some work in the field and have to travel.

Engineers have a university degree and are often expected to do more study while working. They earn a good salary but have a lot of responsibility and have to know and follow regulations. There are usually good chances of promotion and many engineers work their way up to jobs as managers. Engineers work in the office and also travel to work sites.

Of course not all the jobs in oil and gas are technical jobs. There are many people who work in transportation, health and safety, or customer relations. There

are also people who have to negotiate with land owners and draw up contracts. It's an amazing industry! There are millions of people working in almost every country in the world, so there are lots of opportunities.

Task 7 Read the text in more detail and put a tick (V) for yes or across (X) for no in the boxes in the table.

A	Office job	College education	University education	Opportunity to travel	Overtime

Task 8 Complete the following sentences with suitable words from the text.

1 I've been working as a technologist, but now I've finished my course at university and I hope to get _____ soon.
2 We have to work 38 hours a week, but if we work longer we get paid _____.
3 Workers usually get paid _____ but professional people get a _____.
4 He doesn't work outside. He's got an _____.
5 You must do a health and safety course and get a _____ before you can work in this area.
6 It takes three or four years of university to get a _____.

Listening task: Into the future

Track 16 Task 9 Harper, Walid, Patrick and Scott are at technical college together. They are discussing their plans for when they finish their course. Listen to the conversation and answer the questions.

1 How many have already found a job?
2 How many are still looking?

Task 10 Listen again and write T (true) or F (false).

1 The course lasts for another three months.
2 Walid has got a job with the National Oil Company.
3 Harper wants to travel.
4 An oil company representative is coming to the college.
5 Harper has arranged to speak to someone.
6 Scott doesn't want to do any more studies.
7 Patrick has found a job offshore.
8 Patrick replied to an advertisement in a newspaper.

Speaking: It's my job

Task 11What is Exploration? What is explorationist? Read what Andy says about his job? Answer the questions.

1 Has Andy always had the same job?

2 What did Andy do in his gap year?
3 What do you think a gap year is?
4 What does Andy like about his job?
5 What languages does Andy speak?
6 Why do you think it is useful to speak two languages?
7 Does Andy think that it's good to work in the oil and gas industry?
8 What are the disadvantages with his job?

I started work for a Scottish oil and gas company as technical assistant. That was two years ago. Then I was promoted to junior explorationist. My company spends a lot of time searching for oil and gas. My job is to analyse data that we collect from seismic studies and I now have to manage my own projects.

At university, I studied geology and physical geography. After I graduated I had a gap year. I have always enjoyed travelling so I spent the year travelling around the world. It was a great experience. I learned a lot about different cultures and about myself too.

I love my job because there is a wide variety of different tasks. I travel to the places where we are carrying out seismic surveys. I have to organize tests and collect and analyse data. I speak English and French equally well and that can be very helpful. I've already been to some of the hottest and coldest parts of the world. Working in extreme conditions at onshore sites can be tough. We spend long days in our truck in the heat or cold in places where very few people live. In the office I analyse the data we have collected so we can build a subsurface map. I have a lot of responsibility. It's really exciting when my manager makes the decision to drill.

Jobs in the oil and gas industry are well-paid. I get a good salary. I also have the opportunity to do further study as well as travel. I'd definitely recommend the job to others but it's not the easiest job for people with a family. I'm often away from home for long periods of time and I may have to live abroad in the future.

Writing: A CV and a letter of application

Task 12 Jerry has sent his CV and a covering email to Mr. Rashid. Complete the letter of application with words and expressions from the list.

As I told	I would now like
Dear	Please
if you need them	Thank you very much
I look forward	Yours sincerely

Object: Work experience placement summer 20___

_____ [1] Mr Rashid

_____ [2] for talking to me earlier. _____ [3] I am looking for a placement in an exploration company as part of my degree course.

As OES has an excellent reputation in this field I thought I would apply to you.
I have some experience of fieldwork and have studied the theory of different research methods.
_____[4] to gain valuable first-hand practical experience of exploration techniques.
I am an open and friendly person who is willing to learn. I work well in a team. I recognize the importance of confidentiality in your line of business and am trustworthy. _____ [5] an up-to-date CV for your consideration. I am happy to supply references _____[6]. _____[7] to hearing from you, _____[8]

Jerry Henderson

Task 13 Now look at Jerry's CV and match the missing headings with the text.

1 Objective	4 Work experience	5 Interests
2 Date of birth	3 References	6 Education and qualifications

CV Jerry Henderson

Name: Gerald Paul Henderson

a _____ 21 December 19—

Home address: 92 Green Road, Rickwood, Herts, WD3 6RF
Telephone: 01924 786512 mobile: 07819 876386
e-mail: j_phenderson24@superserve

b _____

To find a placement in a petroleum exploration company that will help me gain and develop my practical skills.

c _____

19— – 19— Netherwood Sixth Form College
A levels: Maths A; Physics A; Chemistry B; Geology A
20— – 20—University of Nottingham. Currently in the second year of a three-year degree programme.

Skills:
Clean driving licence.
Good computer skills. 3D computer modelling packages.

d _____

July – August 20—: Warehouseman

e _____

Rock climbing. Kayaking. Chess.

f _____

I can supply the names of two people on request.

GLOSSARY

Lesson 1

accurate – *correct in all details; exact*
benefit – *an advantage or profit gained from something*
buyer – *a person or company who buys a product from seller*
circumference – *is the measurement of the distance around the outside of a circle*
dispute – *a disagreement or argument*
divert – *to divert a substance is to redirect or reroute it in a different direction*
gauged – *if something has been gauged, its volume or amount has been measured*
meter prover – *is a machine which tests whether a gas meter is working correctly*
offloading line – *is a pipe that is used to transfer petroleum from one place to another*
perfect – *if something is perfect, it has no faults or flaws*
sealed – *if an opening is sealed, it is closed off so that nothing can get through*
seller – *is a person or company that sells a product to a buyer*
storage tank – *is a large container in which something is stored.*
strapping crew – *is a team of workers that measures oil volume*
truck driver - *a person whose business is transporting goods by truck.*

Lesson 2

above-ground – *on the surface of the earth rather than under it*
cuboid – *shaped like a cube (= a shape with six square sides like a box)*
cylindrical – *shaped like a cylinder*
horizontal - *going across and parallel to the ground rather than going up and down*
vertical – *going straight up or down*
ammonia – *a gas with a strong smell, used to make fertilizers and cleaning substances*
vapour – *a gas such as steam that is created by the heating of a liquid or solid substance*
vaporize – *to become gas; to make something become gas*
liquid – *in the form of a liquid; not a solid or a gas*
spherical – *shaped like a sphere (= a figure that is completely round like a ball)*
underground – *under the surface of the ground*
liquefied natural gas (LNG) – *gas that is obtained from crude oil and made into a liquid under pressure.*
methane – *a gas without colour or smell, that burns easily and is used as fuel.*
consume – *to use something, especially fuel or energy*
liquefy – *to become liquid; to make something become liquid*
to transport – *take or carry (people or goods) from one place to another by means of a vehicle, aircraft, or ship.*

Lesson 3

chemical additives - *introduced into a waste stream that is used for cleaning, disinfecting, or maintenance and which may be detected in effluent discharged to water*

channel – *an opening that runs through something*

cost-effective – *something that is inexpensive in regards to the money spent on it to obtain a result*

disposed – *inclined or willing*

hydrochloric acid – *a corrosive liquid used to create wider channels in rock beds*

inexpensive - *not costing a great deal; cheap*

hydraulic fracturing – *a drilling process that uses chemicals and water to break up rock*

marginal – *minor and not important; not central*

shale formations – *a collection of the grained sedimentary rock that traps natural gas*

shale gas – *natural gas that is trapped in shale formations*

substantial – *being very important*

to create – *bring (something) into existence*

to extract – *remove or take out, especially by effort or force*

Lesson 4

asphyxiation – *the inability to breathe due to lack of oxygen*

death – *the permanent ending of vital processes in a cell or tissue*

dizziness – *a condition that makes people think they are falling*

exposure – *a state of being in contact with something*

flammable – *easily set on fire*

headache – *a pain in a person's head*

hydrogen sulfide – *a colorless gas known for its pungent "rotten egg" odor at low concentrations*

inhaling – *breathing something in*

irritation – *inflammation or other discomfort in a body part caused by reaction to an irritant substance*

odorless – *having no odour*

precaution – *a measure taken in advance to prevent something dangerous, unpleasant, or inconvenient from happening*

self-contained breathing apparatuses (SCBA) - *special breathing equipment consisting of a container of air which you carry on your back and a tube and mask through which you breathe the air*

sour gas – *natural gas with high H2S amounts*

to depend on – *to be determined or decided by (something)*

to install – *to fix equipment into position so that it ca n be used*

to prevent – *keep (something) from happening*

to render – *provide or give (a service, help, etc.)*

toxic – *very harmful or unpleasant in a pervasive or insidious way*

unconscious – *unaware and unable to sense anything*

Lesson 5

adapted – *become adjusted to new conditions*

advantage – *a condition or circumstance that puts one in a favourable or superior position*

cost-efficient – *being effective without wasting time or effort or expense*

efficiency – *skillfulness in avoiding wasted time and effort*

human intelligence - *tactical intelligence on the natural and man-made characteristics of an area*

operator – *a person who operates the vehicle or machinery*

productivity – *the quality of being productive or having the power to produce*

remote control – *a device that can be used to control a machine or apparatus from a distance*

repetitive – *occurring without interruption*

to harvest – *the process or period of gathering in crops.*

unmanned – *not having or needing a crew or staff*

withstand - *remain undamaged or unaffected by; resist*

Lesson 6

broken – *damaged or no longer working correctly*

budget – *the money that is available to someone and a plan of how it will be spent*

cluttered – *covered with or full of many things, in an untidy way*

containment – *a structure that an oil tank stands in. The containment holds any oil that leaks from the tank and prevents it from spreading to other areas.*

maintain – *to keep a machine, a tool, etc. in good condition by checking or repairing it regularly*

manage - *to be responsible for organizing a business, a team, etc*

messy – *untidy*

micron – *one millionth of a metre (= 0.000001m)*

organize – *to plan work in an efficient way*

precision – *very accurate: a precision instrument*

replace – *to change something that is old or broken for a similar thing that is newer or better*

responsibility – *something that it is your duty to deal with because it is part of your job*

schedule – *a plan or list of all the work that you must do and when you must do each task*

tidy – *arranged neatly and with everything in order*

workbench – *a long table used when working with tools*

Lesson 7

belt – *a band in a machine that turns round in order to turn something else*

bent – *not straight*

bolt – *a strong metal pin like a screw that attaches to a circle of metal (= a nut) to fasten things together*

corroded – *(of a metal or hard substance) destroyed slowly by chemical action*

damaged – *harmed or spoiled*

frozen –*(of a computer) not working or responding so that you cannot move anything on screen*

gear - *a wheel with teeth (= pointed parts) around its edge that works with other gears to control the speed at which an engine turns something*

jammed – *not able to move*

maintenance – *the act of keeping something in good condition by checking or repairing it regularly*

reinstall – *to install something again*

remove - *to take something away from a place*

rusted – *covered with rust (= a reddish-brown substance that forms on iron when it is in contact with water and air)*

split – *with a tear or crack in the surface*

troubleshooting – *helping to solve problems in a company or an organization*

worn – *made thinner, smoother, or weaker because of being used or rubbed a lot*

Lesson 8

activate - *to make a device start working*

ambulance – *a vehicle with special equipment, used for taking sick people to hospital*

assess – *to examine and judge a situation, person, etc*

deal with – *to take action to solve a problem*

defibrillator – *medical equipment that is used to give the heart an electric shock so that it beats normally*

emergency shower – *a shower in a factory or laboratory that is used if there is an accident; also called a safety shower*

ensure – *to make certain that something happens*

evacuate – *to make people leave a dangerous building or area*

fire engine – *a special vehicle that carries firefighters (= people who put out fires) and their equipment*

fire extinguisher – *a device with water or chemicals inside that you use to stop a fire burning*

first aid kit – *a box containing medicine and equipment that you use for emergency medical treatment*

medical oxygen - *pure oxygen that is given to someone to breathe as part of medical treatment*

react – *to respond to something by behaving in a particular way*

stretcher – *a long piece of cloth with a pole on each side, used for carrying a sick or injured person*

Lesson 9

carbon black – *a fine carbon powder, used to make black paint or ink and some kinds of rubber*

inexpensive – *not costing a lot of money; cheap*

man-made – *made by people; not natural*

molecule – *the smallest unit of a chemical substance, consisting of a group of atoms*

monomer – *a molecule that can join with other molecules to form a polymer*

plastics - *artificial materials that are made from polymers*

plentiful – *available in large amounts*
polyethylene – *a common type of plastic that is used for making bags or packaging*
prehistoric – *relating to the ancient past before people kept written records*
requisition – *a formal written request for something*
supplier – *to provide somebody with something that they need*
synthetic – *artificial; made by combining chemical substances rather than made naturally by plants or animals*
to package – *to put something into a box, bag, etc. so that you can transport or sell it*
to specialize (in) – *to concentrate on a particular area of business; to become an expert in something*

Lesson 10

oxygen – *a colourless, odourless reactive gas, the chemical element of atomic number 8 and the life-supporting component of the air*
sulfur – *the chemical element of atomic number 16, a yellow combustible non-metal*
organic compound – *any of a large class of chemical compounds in which one or more atoms of carbon are covalently linked to atoms of other elements*
hydrogen - *a colourless, odourless, highly flammable gas, the chemical element of atomic number 1*
physical properties – *is a property (as color, hardness, boiling point) of matter not involving in its manifestation a chemical change*
saturated – *holding as much water or moisture as can be absorbed; thoroughly soaked*
unsaturated – *(of organic molecules) having carbon–carbon double or triple bonds and therefore not containing the greatest possible number of hydrogen atoms.*
nitrogen – *the chemical element of atomic number 7, a colourless, odourless unreactive gas that forms about 78 per cent of the earth's atmosphere*.
viscosity – *the state of being thick, sticky, and semi-fluid in consistency, due to internal friction*
density – *the degree of compactness of a substance*

Lesson 11

oil well (*n) - a hole in the ground that an oil company makes in order to get oil*
onshore (*adj) on the land rather than at sea*
petrochemical (*n) - any chemical substance that you obtain from crude oil or natural gas*
petrodiesel (*n) - a type of fuel made from crude oil (= petroleum) and used in diesel engines*
pipeline (*n) - a series of pipes that carries oil and gas over long distances*

reduce (v) - *to make something less or smaller in size*
refine (v) - *to make crude oil into petrol, plastic, etc. by separating it into different substances*
refinery (*n) - a place where crude oil is separated into different substances and processed in order to produce petrol /gasoline, plastic, etc.*
seismic (*adj) - relating to earthquakes or other movements of the earth*
separate (*v) - to divide things into different parts or groups*
service company (*n) - a company that supplies equipment and technical services to other companies*

Lesson 12

circuit (*n) - the complete path that an electric current flows along*
circumference (*n) - the distance around a circle or round shape such as a pipe*
clean up (*v) - to remove rubbish, dirt, etc. from somewhere, such as oil that has spilt because of an accident*
cluttered (*adj) - (of a place) covered with or full of many things, in an untidy way*
connect (*v) - to join together two or more things*
consume (*v) - to use something, especially fuel or energy*
derrick (*n) - a tall structure over an oil well for holding the drill*
derrickman (*n) - the person who moves the top part of a drill string*
design (*v) - to create and make plans for a new device, machine, etc.*
development (*n) - the process of preparing an oil well for production, for example by building a pipeline*
fuel (*n) - a material that you burn to produce heat or power*
fuel oil (*n) - a type of oil produced from crude oil and used as fuel for ships, trains, etc. as well as for heating buildings*
fumes (*n) - smoke or gas which is dangerous to breathe*
furnace (*n) - a container like an oven that is heated to very high temperatures so that you can melt iron, etc.*

Lesson 13

area (*n) - part of a place, used for a particular purpose*
asphalt (*n) - a thick black substance, used for making the surface of roads*
assess (*v) - to examine and judge a situation, person, etc.*
damage *(v) - to harm or spoil something*
damaged (adj) - *harmed or spoiled*
danger (*n) - the possibility of harm to someone or something*
dangerous (*adj) - likely to cause harm*
eco-hazard (*n) - something that can harm the environment*
emergency (*n) - a sudden dangerous situation which needs immediate action to deal with it*
geologist (*n) - a scientist who studies the earth, especially by examining the rocks of a particular area to find out if oil or gas is under the ground;*
geophone (n) - *on n a device t hat is used on land for recording seismic waves so that you can make a map of the land and rocks in t hat area*
go ahead (*v) - used to tell someone that they can begin to do something*

Lesson 14

block (*v) - to prevent oil or gas from flowing through a pipe*
boil (*v) - (of liquid) to reach the temperature at which it forms bubbles and becomes gas*
coordinates (*n) - two numbers that are used to describe the position of something on a map*
corroded (*adj) - (of a metal or hard substance) destroyed slowly by chemical action*
crane *(n)* - a tall machine with a long arm, used to lift and *move* heavy objects
crane operator (*n) - a person who controls a crane (a machine for lifting and moving heavy things)*
drill bit *(n) - the cutting part of a drill*
drill string (*n) - a series of pipes that form the main part of a drill, connecting the wellhead to the drill bit*
driller (*n) - a person who controls a drill and manages the work of the drilling crew (= the people who work on a drill)*
drilling company (*n)* - a company that drills holes for an oil or gas company

Lesson 15

crane operator (*n) - a person who controls a crane (a machine for lifting and moving heavy things)*
derrickman (*n) - the person who moves the top part of a drill string*
driller (*n) - a person who controls a drill and manages the work of the drilling crew (= the people who work on a drill)*
geologist (*n) - a scientist who studies the earth, especially by examining the rocks of a particular area to find out if oil or gas is under the ground;*
Human Resources (*n) - the department in a company that deals with employing and training people.*
inspect (*v) - to examine something closely to check that there are no problems or errors*
refinery (*n) - a place where crude oil is separated into different substances and processed in order to produce petrol /gasoline, plastic, etc.*
responsibility (*n) - something that it is your duty to deal with because it is part of your job*

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