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

KARSHI ENGINEERING-ECONOMICS INSTITUTE

DEPARTMENT OF FOREIGN LANGUAGES

Ishonkulov Sh.U.

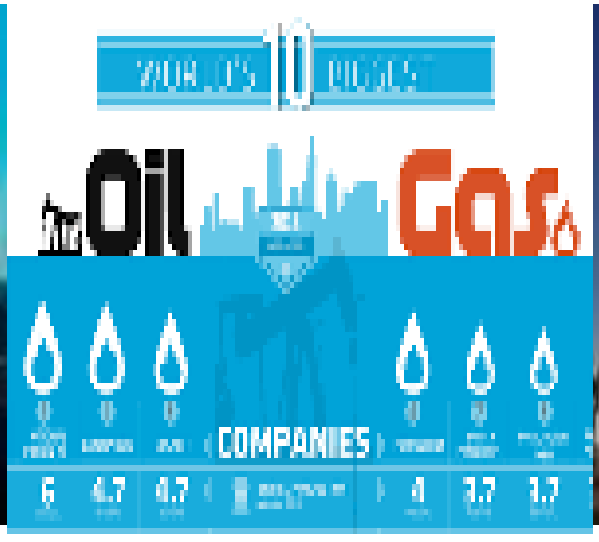
ENGLISH FOR PETROLEUM ENGINEERING-1

Study manual

PRACTICAL USE ENGLISH

FOR 60721800 – "OIL AND GAS BUSINESS" STUDENTS

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



QARSHI-2022

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This study manual on English is developed for the secon-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 talabalari 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.

Qarshi muhandislik-iqtisodiyot instituti
Kengashining 7-sonli qaroridan

KO'CHIRMA

26-fevral 2022 yil Qarshi shahri

Kun tartibi:

4.6. O'quv adabiyotlarini tasdiqlash

Tinglandi: O'quv ishlari bo'yicha prorektor O.N.Bozorov Kengash a'zolarini "Xorijiy tillar" kafedrasining o'qituvchisi Sh.U.Ishonqulov tomonidan 5311900 - "Neft va gaz ishi" (neft va gaz qatlamlarini burg'ulash) ta'lim yo'nalishi uchun tayyorlangan "English for Petroleum Engineering -1" nomli o'quv qo'llanma bilan tanishtirdi.

Ushbu o'quv qo'llanma boshqa adabiyotlardan ko'chirilmagan va xorijiy davlatlar adabiyotlaridagi yangi ma'lumotlar bilan to'ldirilgan hamda namunaviy adabiyotlarni yaratish talablari asosida yozilgan bo'lib, 108 betdan iborat.

O'quv qo'llanma "Xorijiy tillar" kafedrasi (№1,11.02.2022y) va institut Uslubiy kengashi (№7, 25.02.2022 y.) yig'ilishlarida atroflicha muhokama qilingan.

O'quv qo'llanmaga "Xorijiy tillar" kafedrasi mudiri B.H.Xoliyorov va QarDU "Ingliz filologiyasi" fakulteti, "Ingliz tili va adabiyoti" kafedrasi katta o'qituvchisi, *f.f.f.d* (PhD) U.U.Muhammadova tomonidan ijobiy taqrizlar berilgan.

Ushbu masala yuzasidan Kengash

Qaror qiladi:

1. "Xorijiy tillar" kafedrasi o'qituvchisi Sh. U. Ishonqulov tomonidan 5311900 - "Neft va Gaz ishi" (neft va gaz qatlamlarini burg'ulash) ta'lim yo'nalishi uchun tayyorlangan "English for Petroleum Engineering-1" nomli o'quv qo'llanma ma'qullansin va O'zbekiston Respublikasi Oliy va o'rta maxsus ta'lim vazirligi huzuridagi Oliy ta'limni rivojlantirish tadqiqotlari va ilg'or texnologiyalarni tadbiq etish markazi muhokamasiga tavsiya etilsin.

Kengash raisi **O. Sh. Bazarov**

Ilmiy kotib **N. M. Boymurodova**

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 What is engineering?



Warm up!

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

1 How does technology make your life easier?

2 Why are mathematics and physics important?

Vocabulary tasks:

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

Mathematics, engineering, engineer, physics, disciplines, important, machine, design, roadways, inspect, common, science, require, extensive develop, crucial;

Task 3 ***Check (√) the sentence that uses the underlined word correctly.***

1 ___ **A)** A machine is a branch of instruction or learning.
___ **B)** To design something is to plan how it will look and function.

2 ___ **A)** To inspect something is to examine it carefully.
___ **B)** Mathematics is a science that studies matter.

3 ___ **A)** Engineering is the study of quantity, structure, and change.
___ **B)** To develop something is to create it or cause it to grow.

4 ___ A) Technology is a type of machine that makes life easier.
___ **B)** Physics is the art of using the knowledge gained by science.

5 ___ **A)** A machine is device that has multiple parts and does work.
___ **B)** A discipline is a person who applies scientific knowledge.

Task 4 ***Use the words from the list to fill in the blanks.***

mathematics engineering engineer physics disciplines

1 Daniel wants to be a(n) _____.

2 _____ investigates how mass and movement interact.

3 _____ classes are for students who want to build structures.
4 _____ includes studying addition and division.
5 This university offers degrees in many different _____.

Reading tasks:

Task 5 ***Read the text and translate it into Uzbek.***

Today's top careers: Engineering

Engineering is largely a practical activity. It is about putting ideas into action. Civil Engineering is concerned with making bridges, roads, airports, etc. Mechanical engineering deals with the design and produce of tools and machines. Electrical engineering is about the generation and distribution of electricity and its many applications. Electronic engineering is concerned with developing parts and equipment for communications, computing and so on.

Engineering is one of today's fastest growing careers. That's because engineers work in so many areas. Some engineers design roadways. Others inspect very complicated machines. But no matter where they work, they all have two things in common: math and science. Disciplines like mathematics and physics are a must for any engineer. And so becoming an engineer require extensive study.

Engineers develop fascinating new ideas change the world in bid ways. Engineers also create the technologies that make our lives easier. The field of engineering truly is crucial in today's modern world. It is expanding every day, and is a great field to go into.

Task 6 ***Read the text again and choose the correct answer*****s.**

1 What is the text mainly about?
A the importance of mathematics
B the machines that engineers design
C the work and ideas in engineering
D how new technologies change the world

2 According to the article, which of the following do engineers not do?
A design roadways **B** analyze machines
C develop new ideas **D** create new materials

3 What can be inferred about students of engineering?
A They take classes in physics
B They do not take classes in English.
C They attend an extra year of college.
D They design machines in class

Listening tasks:

 ***Track 1:*** **Task 7** ***Listen to a conversation between an engineer and a new employee. Mark the following statements as true (T) or false (F)***

1 ____ The Engineer 1 just left the engineering lab.
2 ____ The Engineer 1 is there to inspect a design.
3 ____ The Engineer 2 designed the vehicle's engine.

Task 8 ***Listen the Track 1 again and complete the conversation.***
Engineer 1: Excuse me. Do you know where the (1) _____ lab is?
Engineer 2: Absolutely. Right this way. Are you new here?
E1: Yes. I'm Oybekjon. I'm here to (2) ____ the company's new engine (3) ____.
E2: Nice to meet you. I'm Anvarjon. I'm designing the vehicle that the (4) ____ is going into
E1: I see. How is it going?
E2: Pretty well. But we're still working on some of the (5) _____.
E1: Well, some projects _____ _____ than others.
E2: Exactly. Here's the engineering lab. Good luck with your first day!

Speaking tasks:

 **Task 9** ***Work with a partner, act out the roles below, based on Task 8. Then change roles.***

Student A: You are a new employee. Talk to **Student B** about:
• location of a room
• your project
• Student B's project
Make up a name for the employee.

Student B: You work with **Student A**. Answer his or her questions.
Make up a name for the employee.

Use language such as:

Do you know where the ..... is? *I am here to analyze the.....*
But we are still working on.....

Task 10 ***Notice the following adjective and verb endings and discuss it in pairs:***

-al * chemical * mechanical * physical * structural
-ial * industrial
-ic * electronic * hydraulic
-en * harden * soften -ize * anodize * galvanize

Writing tasks:

Task 11 ***You are an engineer. Use the conversation from Task 8 to complete a diary entry about your first day at a new job (100-120 words). Write about:***

- someone you met and what they do
- what you are doing in your new job
- a room you were shown to
- Use today's date

Task 12 ***Read this passage and write true (T) or (F) false at the end of the gaps.***

History of Engineering. The Trebuchet.

One of the most significant engineering achievements of the Middle Ages was the trebuchet, a type of catapult. A common siege engine, the trebuchet was used to launch projectiles into an enemy's fortifications during a siege. This method of breaking down an enemy's defense was oftentimes quite successful. The trebuchet was a common weapon of warfare for nearly 2,000 years. In fact, it was used well into the 16th century, long after the invention of gunpowder.

The trebuchet launched projectiles at high speeds by utilizing some important engineering principles. One such principle was the mechanical advantage principle of leverage. Trebuchets were able to multiply the torque that was applied to a simple lever built into their design. This allowed a counterweight to provide enough force to launch the payload that was in the sling on the other side of the pivot. The mass of the object being launched could therefore be very large and cause great destruction.

A. Trebuchets use the advantage principal of mass.

B. Trebuchets increased the torque being applied to a lever.

C. Counterweights and slings are on the same side of a pivot.

Task 13 Write the word that is similar in meaning to the underlined part.

1 Imitations of possible events test for weaknesses. s_ _u_ _ t _ _ n _

2 Engineers take courses in the process of creating drawings. d_a_t_ _g

3 One broken part of larger system causes the machine to fail. m_ _h_ _i_m

4 The initial model of the machine will be finished soon. _r_ _o_y_e

5 The design and construction of machines is a growing field.

_ _c_a_ _c_l e_g_ _e_r_ _g

Puzzle time

doubles 1

Many words in English are made of two words.
Put the word from list A with the correct word from list B.

Lesson 2 Shapes, materials and tools

Warm up!

Task 1 ***At the beginning of the lesson let's talk about these questions.***

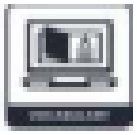
1 How do shapes relate to engineering?

2 What different shapes do engineers use to construct buildings?

3 What kinds of material are in your home?

4 How do engineers decide what materials to use?

Vocabulary tasks:



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

semi-circle, ellipse, rectangle, geometric, prism, vault, cylinder, oval, square, arch, shape, architect, to support, concrete, glass, wire reinforced glass, tile, lumber, steel, ceramic, wood, brick, stone, paint, textured, clay, iron, alloy, rubber;

Task 3 ***Match the words (1–6) with the definition (A–F).***

1 vault	A) a shape that has three dimensions
2 prism	B) a closed arc that resembles a flat circle
3 ellipse	C) relating to the study of shapes
4 rectangle	D) a shape with four sides and right angles
5 semi-circle	E) a shape that is half of a circle
6 geometric	F) an arch that extends through a structure

Task 4 ***Write a word that is similar in meaning to the part in italics.***

1 Azim's table is *a round shape that is longer than it is wide*.

2 Halima wants to be a *person who designs structures*.

3 The building is a *shape with four equal sides*.

4 Tolib's cup is a *shape with two circular ends.*

5 Many old buildings have *curved shapes over the openings*.

Task 5 ***Write a word that is similar in meaning to the part in italics.***

1 The constructor needs *wood that is used in construction.* _ _ m _ _r

2 *Steel that does not rust or stain* stays shiny for a long time.

_ _ _i _l _ _ s s _e _ _

3 Most toilets are made of a *high quality form of ceramic.* _ _ _c _ _ a _ _

4 Sidewalks are a *material made of cement and crushed rocks.* c _ _ c _ _t _

Task 6 ***Match the words (1–7) with the definitions (A–G).***

1 coated	A) a solid, transparent material used in windows
2 tile	B) a material that often covers walls or floors
3 steel	C) made stronger by some type of material
4 ceramic	D) covered by some type of material
5 glass	E) having details added to a surface
6 textured	F) a solid material made for materials such as clay
7 reinforced	G) a strong material made mostly from iron

Reading tasks:

Task 7 Read the text A, B, C and translate it into Uzbek language.

Text A: The Roman Coliseum. The Importance of Shapes in Architecture and Engineering

Most students learn about geometric shapes in school. But architects also need to understand them. In fact, those basic shapes appear in many historical buildings. For example, look at the Roman Coliseum. Although most buildings have a rectangle or square shape, the Coliseum is an ellipse or oval. It features many arches supported by columns, which are cylinders. They provide support. Some parts of the Coliseum have extended arches or vaults, which form prisms. These hallways have high ceilings in the shape of a semi-circle. These shapes are used in modern architecture, too. They add support, structure and style, all at the same time.

Text B: Bid Sheet

There are three types of glass we could use:

- Standard Glass: $5.50/square foot.
- Coated Glass: $ 6.60/square foot.
- Blocks ultraviolet light.
- Wire Reinforced Glass: $8.75/square foot.
- Stronger and more decorative.

The following types of steel are available:

- Standard Steel: $60/square foot.
- Stainless Steel: $85/square foot.
- Does not rust.

We can give you a bid on lumber if you tell us what type you need. We have several options for concrete and tiles:

- ✓ Concrete: $9/square foot.
- ✓ Textured concrete: $16/square foot.
- ✓ Has a polished, decorative appearance.
- ✓ Ceramic tiles: $8/square foot.
- ✓ Porcelain tiles: $16/square foot.
- ✓ More decorative than ceramic tiles.

Text C: Construction Basics: Understanding your materials

Many kinds of building materials are available today, and they all have different properties. Understanding these materials can help you make the best choice for your project.

Natural materials are always popular options. These include wood, glass and metal. Wood is a good insulator. But it only has moderate tensile strength. Glass is a transparent material suitable for windows. But it is also very brittle. Metals are useful for the frameworks of structures. They are great conductors and have lots of luster. Their high ductility and hardness are other benefits. Synthetic materials like foam and plastics are becoming increasingly popular. Foam is light and is a great insulator. Plastics are also very light and malleable. They are durable and easy to maintain, however they are also very expensive. Certain building materials work better for certain situations. Making the right choices will save you time and money in the long run.

Task 8 Read the Text A again and choose the correct answers.

1 What is the text mainly about?

A) why shapes are important to architects.
B) which shapes provide the best support.
C) how an ancient building was constructed.
D) why students learn about geometric shapes.

2 A column is an example of a (n) _____

A) arch B) oval C) cylinder D) square

3. Which shape is NOT used in the Coliseum?

A) an oval B) a circle C) a semi-circle D) a rectangle

Task 9 ***Read the Text B again and mark the following statements as true (T) or false (F).***

1 ____ Coated glass lets ultraviolet light in.
2 ____ Stainless steel costs more than standard steel.
3 ____ Ceramic tiles are less decorative than porcelain tiles.

Task 10 ***Read the Text C again then, complete the table using this information.***

Material	Properties
Glass	
Metal	
Plastic	

Task 11 ***Match the words (1–6) with the definitions (A–F).***

1 plastic	A) a common synthetic material
2 natural	B) a material's ability not to break
3 luster	C) coming from nature, such as wood
4 insulator	D) easily shaped or bent
5 ductility	E) the brightness or shine of a metal
6 malleable	F) a material that contains heat or electricity

Task 12 ***Choose the sentence that uses the word in italics correctly***.

1 A) Cotton is a *synthetic* material.
B) Glass is *brittle* and can shatter.
2 A) Most glass is *transparent.*
B) Metals have low levels of *hardness*.
3 A) You can stretch rubber because it has very low *tensile* strength.
B) Foam retains heat well and is a good *conductor.*

Listening tasks:

Track 2: Task 13 ***Listen to a conversation between an architect and her client. Mark the following statements as true (T) or false (F).***

1 ___ The woman sent the man building designs.
2 ___ The client wants a bigger room.
3 ___ A vaulted ceiling saves energy.

Task 14 ***Listen again and complete the conversation.***

Architect: Keystone Architecture. This is Donna.
Client: Hi, Donna, it's Jim North. I'm calling about the [1]_____ that you sent me.
Architect: Is there a problem?
Client: Well, I'm wondering, why do we need the [2] _____ on the ceilings?
Architect: Oh, vaulted ceilings create more [3] _____.
Client: So they make rooms look [4]_____?
Architect: Yes, exactly. The only downside is that they can [5]_____ energy costs.
Client: In that case. I'd rather go with flat ceilings so we're not [6] _____ energy.

Speaking tasks:

Task 15 ***Before reading the passage about tools discuss these questions.***

1 What jobs do different tools do?
2 Why is it important to have the right tools?

Task 16 ***Read the passage and choose the correct answers***

Instructions for lamp repair

1. Secure the appliance in a vise to hold the lamp in place and free your hands.
2. Remove screws from the covering plate with a screwdriver or an electric drill. Remove the plate to reveal the wiring inside.

3. Locate the wiring causing the bad connection. Using pliers, clip the faulty.
4. Strip the insulation from the faulty wire with a wire stripper.
5. Using the soldering iron, apply solder to the bare wires to make a new connection.
6. Replace the insulation and put it wire back into the lamp.
7. Put the plate back and replace the screws to seal the base.
8. Test the lamp to make sure it works.

1. What are the instructions about?
   A. installing new appliances B. fixing faulty wiring
   C. installing a vise D. safely using a soldering iron

2. According to the manual, what tool is used to clip wiring?
   A) pliers B) a wire stripper C) a soldering iron D) an electric drill

Task 17 ***Choose the word that is closest in meaning to part in italics.***

1 Use the pliers to *cut* the wiring.

A) clip B) drill C) strip

2 Use soft metal to *fuse* the wires.

A) vise B) clip C) solder

3 *Remove the cover from* the wire.

A) clip B) strip C) drill

Writing tasks:

Task 18 ***Match the words (1–7) with the definitions (A–G)***

1 screw	A) holds an object in place
2 drill	B) removes insulation from wiring
3 soldering iron	C) piece of metal used to fasten objects
4 pliers	D) used to grab, pull and cut objects
5 vise	E) twisted by hand to insert or remove screws
6 wire stripper	F) makes holes or inserts and removes screws
7 screwdriver	G) heats and connects metal objects together

Task 19 ***In pairs, discuss the key properties and different types and grades of the following materials. Give examples of the properties that make each material good or bad for watch-making, from a quality perspective.***

Materials:

steel glass aluminum titanium gold plastic copper rubber

Properties

water-resistant abrasion-resistant corrosion-resistant shock-resistant tough brittle elastic durable heavy lightweight thermally stable

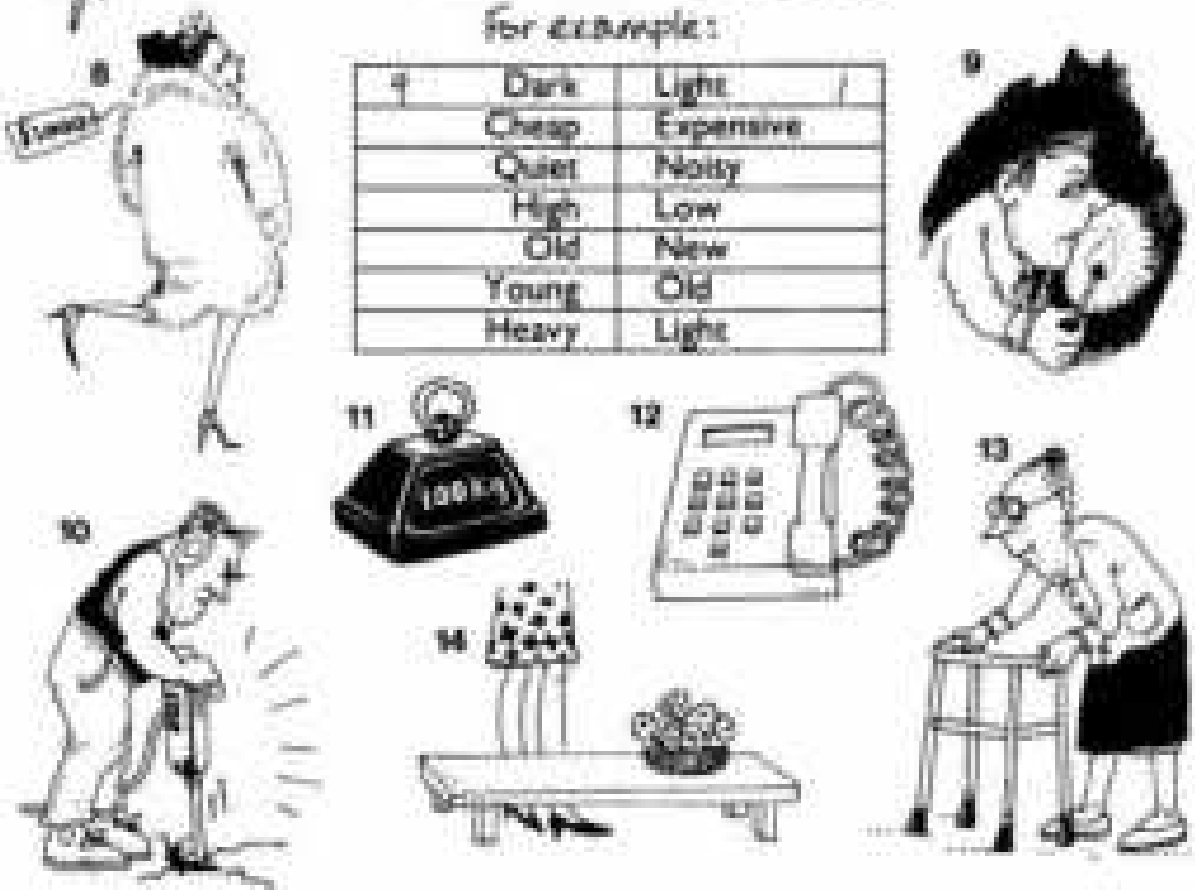
Puzzle time

opposites 1

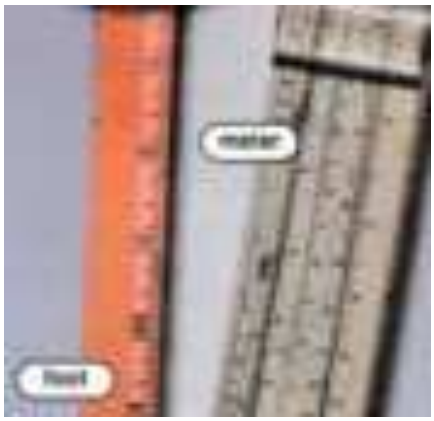
Here are 7 pairs of adjectives.
Can you find the correct pictures?
Write the numbers beside the words.

for example:

Dark	Light
Cheap	Expensive
Quiet	Noisy
High	Low
Old	New
Young	Old
Heavy	Light



Lesson 3 Working with numbers, types of measurement



Vocabulary tasks:

Task 1 ***Translate the active vocabulary of the lesson into Uzbek and learn it by heart.***

Equals, percent, five tenths, five hundredths, error, five thousandths, ten squared, ten cubed, exponents, ten to the fourth power, multiply, times, symbol, amount, calculation, accurate, sample, mistake, correct, incorrect, result, imperial system, measure, measurement;

Task 2 ***Match the words (1-6) with the definitions (A-F)***

1 ___ times	A) multiplied twice by itself
2 ___ percent	B) an amount out of 100
3 ___ equals	C) a number showing powers of multiplication
4 ___ cubed	D) multiplied three times by itself
5 ___ squared	E) multiplied by
6 ___ exponent	F) is the same as

Task 3 ***Write the word that is closest in meaning to the underlined part.***

1 The sample weighs 0,8 of a gram. e_ g_ _ t_ _t_ _

2 The answer is $1{,}12 \times 10^{6}$. t_ _ t_ _ _ _ s_ _ _ _ p_ _er

3 The amount is off by just 0,004. f_ _r t_ _ u _ _ n _ _ _s

4 The design must be accurate to 0,01 of an inch. o_ _ _u_ _r_ _t_ _

Task 4 ***Write a word that is similar in meaning to the underlined part.***

1 The boy is over one hundred centimeters tall! _e_ _r

2 Is that 200 imperial weight measurements or kilograms? p_ _n_ _

3 There is only one thousand millimeters of soda left. _ _t_ r

4 The measurement is just one one-hundredth of a meter off. _e_ _i_ _t _ _

5 The United States' system of measurement uses gallons.

_ _ _ er_ _ l _ y_ t _ _

6 A ruler is a twelve inch length long. _ o _ t

Task 5 Use the words from the list to fill in the blanks.

metric gallons kilograms inch

1 Get seven _____ of water.

2 Daniel's design only weighs seventeen _____.

3 The _____ system is used worldwide.

4 That worm is less than a (n) _____ long!

Reading tasks:

Task 6 ***Read the Text A and B then translate them into Uzbek.***

Text A: How do they say it?

Symbol	Interpretation	Example
=	equals	5 + 2 = 7 (five plus two equals/is seven)
%	percent	5% (*five percent*)
0,5	five tenth	0,6 (*six tenths / zero point six*)
0,05	five hundredths	0,06 (*six hundredths*)
0,005	five thousandths	0,006 (*six thousandths*)
10^2	ten squared	5^2 + 3 (*five squared plus three*)
10^3	ten cubed	5^3 + 4 (*five cubed plus four*)
10^4	ten to the fourth power (*When using exponents higher than three, say, "ten to the fourth power")*	10^5 / 10^6 / 10^7 (*ten to the fifth power, ten to the sixth power, ten to the seventh power)*
5, 2 x 10^4	scientific notation	5,3 x 10^6 (five point three times ten to the sixth power)

Text B

Karen, We have a problem with the project we're working on. The American engineer we are working with is using imperial measurements. This is incorrect. We all need to use the metric system.

Please inform the American engineer of the following: The pipes we are using are 4,5 meters (450 centimeters) each, not 4 feet, 5 inches. Also, each pipe holds 15 liters, not 15 gallons.

And the weight of the frame is no more than 20 kilograms, instead of 20 pounds. Mistakes like this make a big difference. Someone needs to contact him about this.

Task 7 ***Read the Text A then, complete the chart.***

Symbol	How it is Said
0.09	1 _____
2 _____	ten to the fifth power
32%	3 _____
0.1	4 _____
3^5	5 _____
6 _____	eleven squared

Task 8 ***Read the Text B and mark the following gaps as true (T) or false (F).***

1 ___ The engineers must use the imperial system.
2 ___ The pipes are 4 feet, 5 inches long.
3 ___ The frame must weigh 20 kilograms or less.

Listening tasks:

Track 3: Task 9 ***Listen to a conversation between two engineers. Mark the following statements as true (T) or false (F).***

1 ___ The 1st engineer found an error in the man's work.
2 ___ The 1st engineer reviewed the calculations twice.
3 ___ The error was caused by an incorrect exponent.

Task 10 ***Listen to the Track 3 again and complete the conversation.***

Engineer 1: Kamol, could, you [1]_____ _____ _____ at these numbers?
Engineer 2: Sure. Is there a problem?
Engineer 1: Yes, I've checked the calculations twice but something is [2] _____.
Engineer 2: Ok. Let's see... um, right here you multiplied by ten to the [3] _____ _____.
Engineer 1: Uh, yes. I did. Is that wrong?
Engineer 2: Well, look at the formula. That's the wrong [4] _____. You need to multiply by [5] _____ _____.
Engineer 1: Oh, I see. You're right. Thank you. I don't know how I missed that.
Engineer 2: [6] _____ _____. Hopefully that fixes it.

Track 4: Task 11 ***Listen to a conversation between two engineers. Choose the correct answers.***

1 What is the conversation mainly about?

A) a measurement confusion problem **B**) a measurement conversion problem
C) a language translation problem **D**) a manufacturing problem

2 What can be inferred about the man?

A) He plans to make new pipes.
B) He does not have time to fix his mistake.
C) He always works with European engineers.
D) He has never used metric measurements before.

Task 12 ***Listen to the Track 4 Listen again and complete the conversation.***

Engineer 1: Hello, Timothy. We need to talk about the [1]_____ you're using.
Engineer 2: Okay, What's up?
Engineer 1: Well, you're using [2]_____ measurements instead of [3]_____ measurements.
Engineer 2: Oh, no! I can't believe I made such a simple mistake!
Engineer 1: It's okay. There's plenty of time to fix it.
Engineer 2: All right. So that means we need much [4]_____ pipes, right?
Engineer 1: That's it. We need pipes that are 4.5 [5]_____ not 4 feet, 5 [6] _____.
Engineer 2: I see. Sorry about all this. I almost never work with the metric system!

Speaking task:

Task 13 Work with a partner, act out the roles below, based on task 12. Then switch roles.

Student A: You need to talk a co-worker about measurements. Talk to Student B about:
• incorrect measurements
• correct measurements
• solution

Student B: You are an engineer. Answer **Student A**'s questions.

Use Language such as:

We need to talk about the measurements you are using.
There is plenty of time to fix it.
So that means we need ...., right?

Number talk: 1-199 Do the following tasks:

Task 14 ***Count 1-100 around the class***.

Task 15 ***Study the information and say the numbers.***

How to say numbers: Telephone and reference numbers:

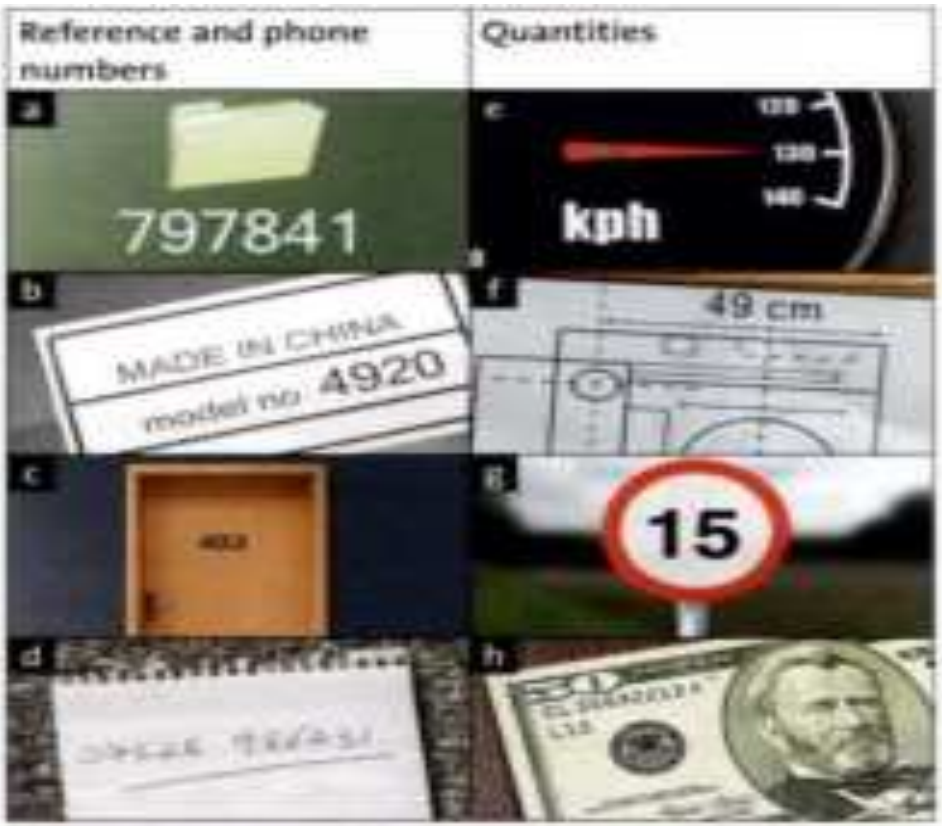
01238 = oh one two three eight (0 = oh or zero)

Quantities

13 = thirteen 30 = thirty 33 = thirty-three

100 = a hundred (or one hundred) 101 = a hundred and one

Task 16 ***Say these numbers.***



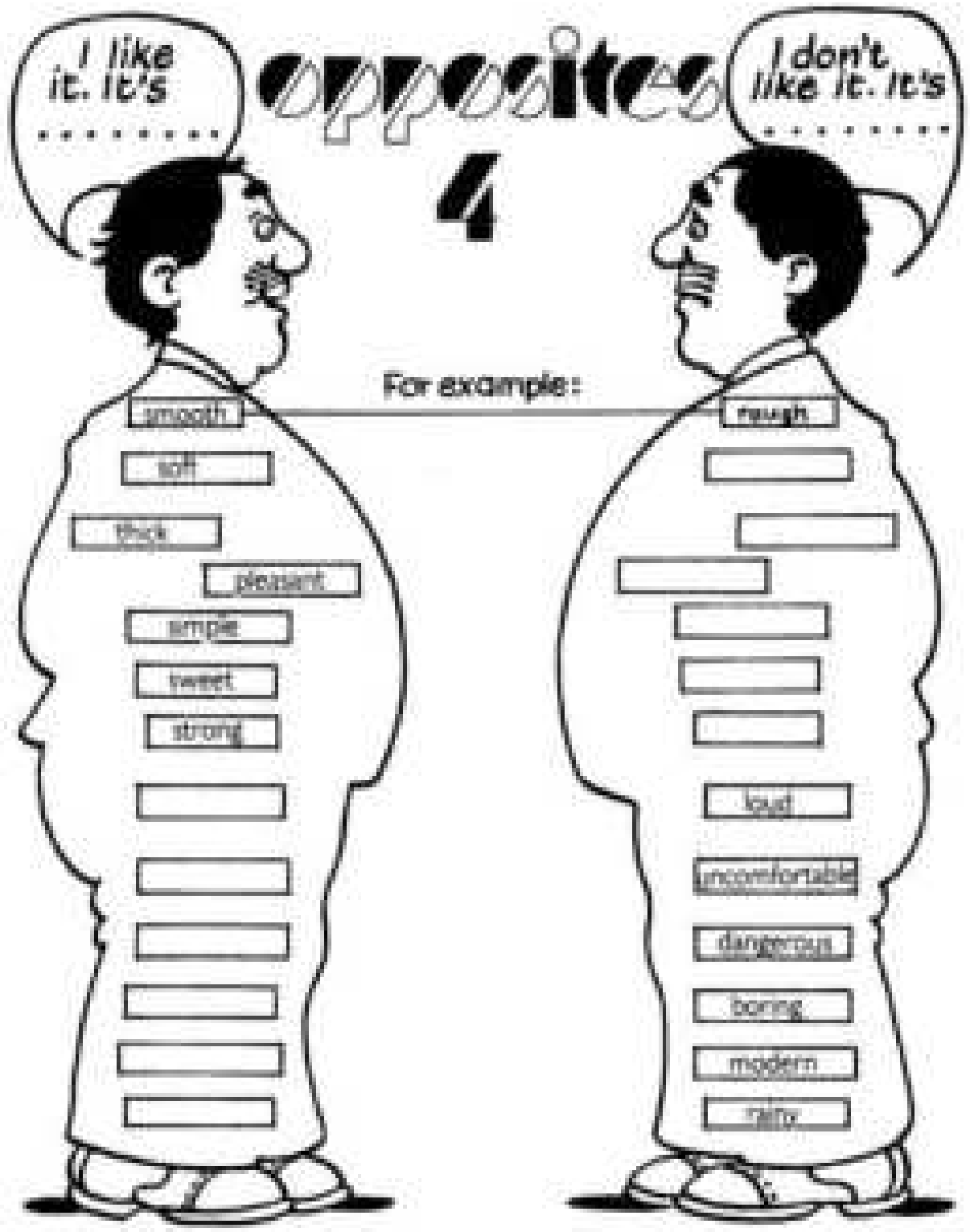
Work in pairs. Student A, write four ***numbers between 100 and 199. Student B, say the numbers.***

Ex. 17 Put the words in the box in order in the correct column. Write the numbers next to them.

eight • ninth • fifth • first • five • four • fourth • nine • eighth • one • second • seven • seventh • third • sixth • ten • tenth • six • three • two

Cardinal numbers	Original numbers
one - 1	**first – 1st**

Puzzle time



rough interesting hard thin weak bitter fine
difficult unpleasant safe comfortable soft antique

LESSON 4 THE OIL INDUSTRY

Warm up

Task 1 ***Study the map and discuss the questions.***

1 Where is your country on the map?

2 Which regions are these countries in?

a Algeria	**e** Malaysia
b Brazil	**f** the UAE
c Canada	**g** the UK
d Kazakhstan	**h** the USA

3 Can you name ten more oil-producing countries?

4 Do you know the words to describe the nationalities for those countries?

EXAMPLES: *an Algerian worker, a Brazilian oil company.....*

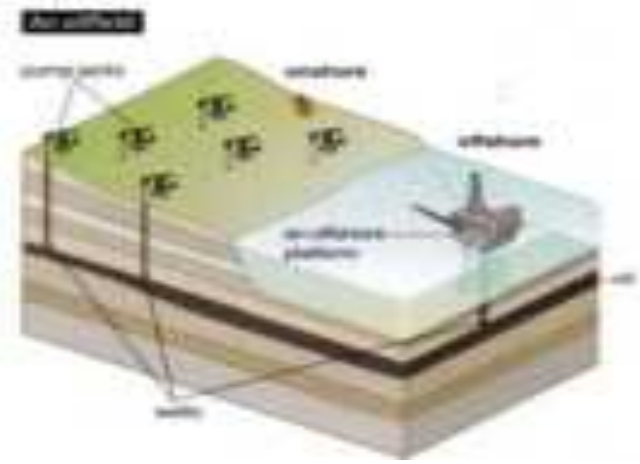
Task 2 ***Ask students to look at the map and name as many of the oil-producing countries as possible. Can they name the top ten oil producing countries? They are (in 2010):***

1 Saudi Arabia -11 million barrels per day (13.9% of estimated world total)
2 Russia - 9.9 million bpd (12.5%)
3 the United States - 8.3million bpd (10.5%)
4 Iran-4.2 million bpd (5.3%)
5 Mexico - 3.8 million bpd (4.8%)
6 China - 3.7 million bpd (4.7%)
7 Canada - 3.1 million bpd (3.9%)
8 Norway- 3 million bpd (3.8%)
9 Venezuela - 2.8 million bpd (3.6%)
10 Kuwait - 2.7 million bpd (3.4%)

But the list has changed by 2021.

- United States – 12108 million barrels per day
- Russia – 10835 million barrels per day
- Saudi Arabia – 9580 million barrels per day
- Iraq – 4620 million barrels per day
- Canada – 4129 million barrels per day
- China – 3823 million barrels per day
- United Arab Emirates – 3058 million barrels per day
- Kuwait – 2652 million barrels per day
- Brazil – 2604 million barrels per day
- Iran - 2213 million barrels per day

Task 3 ***Read the sentences about the UK. Make sentences about your country.***



1 There is a big oil and gas industry in the UK.
2 There are oilfields and gas fields.
3 There are many offshore wells.
4 They are in the north and the east.
5 There are not many onshore fields.
6 There is a big onshore field in the south.

Vocabulary: Tools and hardware

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

foreign, international, offshore, onshore, control room, drilling company, oilfield, oil well, operating company, plant, service company, team, technician, operate, supply, screwdriver, wrench, screws, bolt, spanner, electric drill, nuts, washers;

Task 5 ***Which of these do you have at home?***

Task 6 ***Practise this conversation.***

A: *What's this in English?* **B:** *It's a screwdriver.*

A: *What are these?* **B:** *They're washers*

Grammar: Articles *a / an / the*

We use *a* and *an* to talk about something in general. We use *a* + singular noun that begins with a consonant. *For instance*: ***a*** pipeline, ***a*** team, ***a*** department; We use *an* + singular noun that begins with a vowel. *For instance:* ***an*** *oil rig*, ***an*** *effect*, ***an*** *idea*

However, we use *a* before nouns that begin with a **'y**' sound, e.g. ***a*** *university.* We use ***the*** before singular and plural nouns to talk about:

• a specific example of something: *Malik* is *a manager.* (= one of several) *Malik* is ***the*** *manager of this department.* (= there is only one manager)

• something that is known to everyone present: *He works at* ***the*** *university.* (= everyone understands which university it is)

• something that has been mentioned earlier: *A new plant has just opened.*
We will visit ***the*** *plant next week.*

• some countries, regions, rivers, seas, and oceans: ***the*** *UAE,* ***the*** *US,* ***the*** *UK,* ***the*** *Middle East,* ***the*** *Danube,* ***the*** *North Sea,* ***the*** *Pacific Ocean;*

Task 7 ***Read the staff list and complete the sentences with*** *a, an, the****, or*** *nothing****.***

1 Oxonoil is _____ small oil company.
2 John is _____ manager in the company.
3 John is manager of _____technical department.
He is from _____ UK.
4 Pierre is technician in _____department.
He is from_____ France.
5 Greg is _____ American technician.

Task 8 ***Complete the sentences with*** *a, an, the****, or*** *nothing****.***

1 BP is _____ British company.
2 I like working _____ outside.
3 Ian is from _____ Canada.
4 I work in _____ UAE.

5 There's _____ screwdriver in my toolbox.
6 Exxon is _____ American company.
7 Do you have_____ electric drill at home?
8 Khaled is_____ manager of the workshop.
9 Do you work in_____ Saudi Arabia?
10 There's _____ technician in the control room.
11 I like working in _____ small team.
12 Do you speak_____ English?

Listening: Conversations

Track 5 **Task 9** ***Listen to four conversations. Number the pictures.***

Task 10 Listen again and complete the information.

1 The store is in building _____ in room. **2** The technician needs _____ bolts.
3 The part number is _____. **4** His employee number is _____.
5 The store phone number is_____.

Speaking: Checking

Task 11 Read the conversation then practise it in pairs.

A: What's in the box?
B: There are some bolts.
A: How many?
B: Twenty.
A: Good. What's the part number?
B: PD790.
A: What's that number again?
B: PD790.
A: The list says PD798. They're the wrong bolts.

Task 12 ***Get to know two groupmates. Ask them for the information. Write it down.***

First name: _____
Family: _____
Nationality: _____
Phone number: _____
Email address: _____
Date of birth: _____

Reading: Employers

Task 13 ***Read about the UK. Is your country similar or different? Write S (similar), D (different), or (I don't know) on the right.***

Employers in the UK

Some countries have a national oil company *(NOC),* but there isn't an *NOC* in the UK. There are three other kinds of employer:

1 Operating companies: These are IOCs (international oil companies) with famous names like Shell, Aramco, and ExxonMobil. They operate the wells and plants. There are smaller operating companies too.

2 Drilling companies: The operating companies usually employ drilling companies for drilling wells. Some are foreign companies.

3 Service companies supply equipment and technical services to the other companies. They also do special work, such as underwater work. There are a lot of service companies.

4 You can find a job with all these companies in newspapers, government job centers, and on the internet.

Similar in my country? 1____ 2_____ 3_____ 4_____

Task 14 ***Read about different crews. Match the texts to the pictures of the jobs.***

1 I work on a supertanker. We have a crew of 25. We live on the ship. The captain's in charge. We transport the oil. - *D*

2 Here is my crew. We live and work on an oil rig. The driller is in charge. He's the boss. We extract the oil. I'm a roustabout.

3 Our crew is small. We have a surveyor and three seismic operators. We search for oil. We work in the countryside.

4 The refinery is big. I work in the control room. I supervise the control room operators so I'm the supervisor. We control the refinery. We refine the oil.




Grammar revision

Task 15 Match the halves of the sentences.

1 I'm from	**a)** you from?
2 Where are	**b)** from the US?
3 What is	**c)** aren't Spanish. They're Italian.
4 He's	**d)** Shell an American oil company?
5 Is	**e)** isn't American. It's British.
6 BP	**f)** Braschem and Petrobras Brazilian companies?
7 Are	**g)** Egypt. We're from Libya.
8 Leo and Arno	**h)** German. His name is Otto.
9 Are you	**i)** her name?
10 We aren't from	**j)** Bahrain.

Task 16 Underline the correct words.

1 ***Are there / There are*** a lot of oil and gas jobs in your country?
2 There **is / *are*** two wrenches in my toolbox.
3 ***Is there / There*** **is** a spanner in your toolbox?
4 ***There are / There's*** a big oil and gas industry in Brazil.
5 ***Is there / Is*** a big oil industry in your country?
6 ***There are / There's*** some bolts on the table.
7 ***Are there / There's*** a foreign company drilling in my country.
8 How many technicians ***there / are there*** in your team?

Writing: Completing a form

Task 17 ***Read the information. Then write the dates in number form.***

Writing dates
On forms, we usually write dates like this:
14/ 06/ 2010 or *14/ 06/10* or *14.06.2010* or 14.06.10
In American English, the month comes first: *06/14/2010*

1) 4th February this year_____ **2)** 17th November last year _____

Task 18 ***Read the given information and complete the application form.***
Remember! Names, titles, and nationalities begin with a capital letter.

International Oil Co.

First name	_____	Job title	_____
Family name	_____	Nationality	_____
Employee no.	_____	Date of birth (dd/mm/yyyy)	_____
Manager	_____	Telephone no.	_____
Department	_____	Email	_____
Signature	_____	Date (dd/mm/yyyy)	_____

LESSON 5 LOOKING FOR OIL

Warm up

Task 1 ***Look at the photos. What are the people trying to find? Which ones are the most successful?***




Vocabulary: Active vocabulary of the lesson

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

Explosive, thumper truck, recording truck, heavy plate, receiver, reflected waves, shock waves, layers of rock, search, layer, sea, hydrophones, compressed, air, gun;

Task 3 ***Match the words 1-6 with the words a-f to make partnerships.***

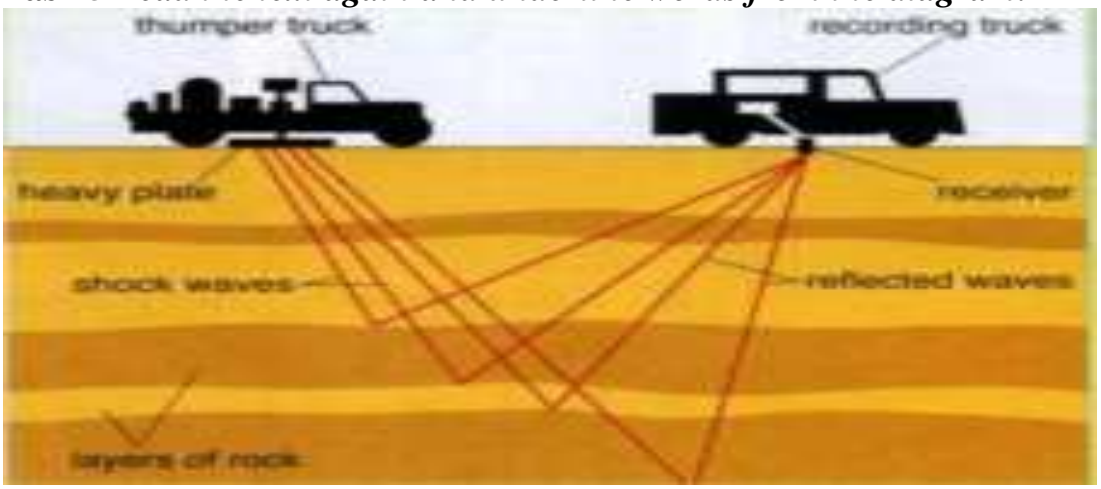
1 thumper	a) operator
2 energy	b) source
3 shock	c) plate
4 recording	d) truck
5 seismic	e) wave
6 heavy	f) truck

Reading: On land; At sea

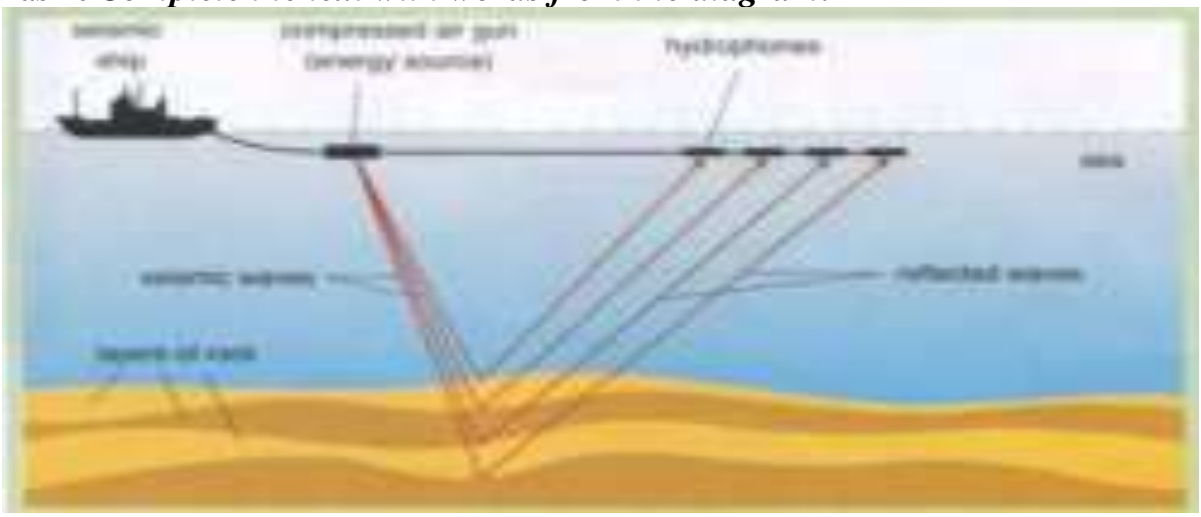
Task 4 Read the text and translate it into Uzbek language.

Seismic operators search for oil. On land thumper truck we use a thumper truck. The thumper truck carries heavy plates. Heavy plates are the energy source. The heavy plates hit the ground and make shock waves. Sometimes we use explosives. The explosion is the energy source. The explosion sends shock waves through the rock. The layers of rock reflect the waves to the receiver. We call these reflected waves. We use computers in the recording truck to record the data and to analyse the data.

Task 5 ***Read the text again and underline words from the diagram.***



Task 6 ***Complete the text with words from the diagram.***



At sea we use a seismic ship. The energy source is a (1) *compressed* air gun or explosives. The (2)_____ waves are reflected to receivers. The receivers are (3)_____. The layers of (4)_____ give different data.

Speaking tasks:

Task 7 ***Practise in pairs. Use the diagram. Ask and answer questions.***

A: What's this?
B: It's a heavy plate.
A: What does it do?
B: It hits the ground and makes shock waves.

B: What are these?
A: They're shock waves.
B: What do they do?
A: They go through the rock.

Task 8 Practise in pairs. Explain how seismic operators search for oil on land and at sea. Draw diagrams to help.

On land seismic operators use thumper trucks. At sea they use seismic ships. .....

Task 9 ***Practise in pairs. Ask and answer questions.***

A: What's your telephone number? **B:** It's 2345 67876. And yours?
A: It's 34556786. How old are you? **B:** I'm 23. And you?
A: I'm 31. How tall are you? What's your height? **B:** I'm five foot eleven inches. And you?
A: I'm five foot seven inches. How heavy are you? **B:** I'm 88 kilos. And you? What's your weight?
A: I'm 99 kilos

Listening tasks: Seismic operators

Task 10 ***Listen*** **Track 6** ***and complete the conversation.***

A: Hi, Sanjar. **B:** Hi Olim.
A: What do you [1]_____? **B:** I'm a seismic operator.
A: What do seismic operators do? **B:** Well, we search for [2]_____.
A: OK. **B:** And we work in crews, or teams. In my crew we have three [3]_____ and five seismic operators.
A: Right. **B:** And [4]_____ shooters.
A: Shooters? **B:** That's right. Shooters.
A: [5]_____do they do? **B:** They handle the explosives.
A: Oh, OK. I understand. **B:** First, we survey the land. We look for the best [6]_____ to go.
A: I see. **B:** Then we clear the land. Were move trees and bushes, for example.
A: OK. **B:** Then we do our tests. We [7]____ thumper trucks. The heavy plates send shock waves into the rock. We use receivers to record the data and we use computers to analyse the data.
A: What about the [8] _____? **B:** The shooters? Well, sometimes we don't use thumper trucks. Sometimes we use explosives. The shooters drill holes in to the ground and prepare the site. Then they detonate the explosives. The explosives send shock waves through the rock. We use receivers to [9]_____ the data from the shock waves. Then we use computers to analyse the data.
A: Do you like your [10]_____? **B:** Yeah, I do.

Task 11 ***Listen to the track 6 again and Find verbs that go with these nouns.***

1 _____*handle*___ explosives **2** _____ land

3 _____ tests
4 _____ thumper trucks
5 _____ shock waves
6 _____ data
7 _____ holes

Task 12 ***Listen to the track 7 and complete the conversation.***

Shooter: OK, your first job. Explosives are [1]_____, so be careful.
Assistant: OK.
Shooter: First of all, [2]_____ off that phone. No phones with explosives.
Assistant: [3]_____.
Shooter: No problem. Now. [4]_____ the box over here.
Assistant: OK.
Shooter: And put the spare cables on the [5]_____. Yellow on the right, red on the left.
Assistant: OK.
Shooter: And keep an [6]_____ on the road. Any cars, call me. OK?
Assistant: OK.
Shooter: And don't touch that flask. It's my coffee. Not [7] _____!
Assistant: OK!

Task 13 Listen to the track 7 again Complete the instructions with the words in the box.

bring	be	~~turn~~	keep	put	touch

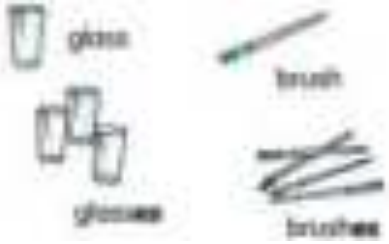
1 __*turn*__ off the phone.
2 _____ the box here.
3 _____ careful.
4 _____ the cables on the truck.
5 _____ an eye on the road.
6 Don't _____ the flask.

Grammar: Plurals of the nouns

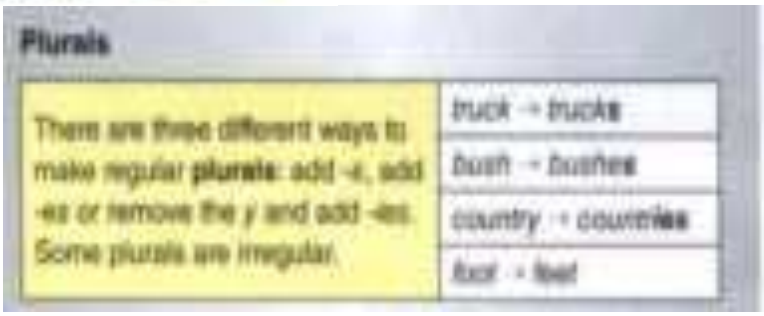
Nouns can be **singular** or **plural**. When you are talking about one person, animal, place, or thing, use a singular noun.

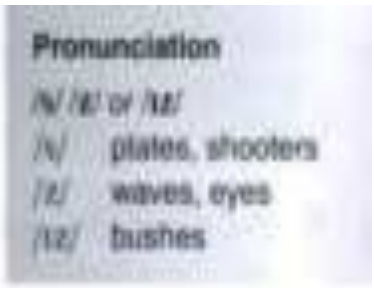
When you are talking about two or more people, animals, places, or things, use plural nouns. Most nouns are made plural by adding **-s** at the end.

Some plural nouns end in -**es**. When the last letters of singular nouns are **ch**, **sh**, **s**, **ss** or **x**, you usually add -**es** to form the plural.



Some plural nouns end in -**ies**. Nouns like these are made plural by changing **y** to **i**, and adding -**es**.
What if there is a vowel before the **y**?
In that case, add -**s** to form the plural.





Task 14 ***Read the conversation again. Underline the questions Then practise in pairs.*** **Ask and answer these questions.**

1 What do seismic operators do? 2 What do surveyors do?
3 What do shooters do?

Writing tasks:

Task 15 ***Look at the picture. Read the sentences about the picture.***

1 The safety manual is on the table.
2 The boots are under the table.
3 The safety glasses are next to the manual.
4 The helmet is on the floor, between the table and the door.
5 My jacket is behind the door, on the hook.
6 The table is in front of the window.
7 The coffee is in the cup.

Task 16 ***Complete the sentences.***

1 Where's the helmet?
It's *on* the floor, _____ the table and the door.
2 Where's the jacket? - It's _____ the door, _____ the hook .
3 Where's the coffee?- It's _____ the cup.
4 Where are the glasses? - They're _____ the table.
5 Where are the boots? - They're_____the manual.
6 Where's the manual? - It's the table.

Lesson 6 Upstream processes

Kick off

Task 1 Read the information. Match the bold words with the explanations 1-6.

1 petrol / gasoline and diesel oil, for example
2 oil under the ground, usually dark brown
3 bring out or make
4 parts of an industry
5 the part that gets oil and gas out of the ground
6 the part that makes and sells useful products

Upstream and downstream

The oil and gas industry has two **sectors**: the **upstream** sector and the **downstream** sector.

Workers in the upstream sector find and **produce crude oil** and gas.

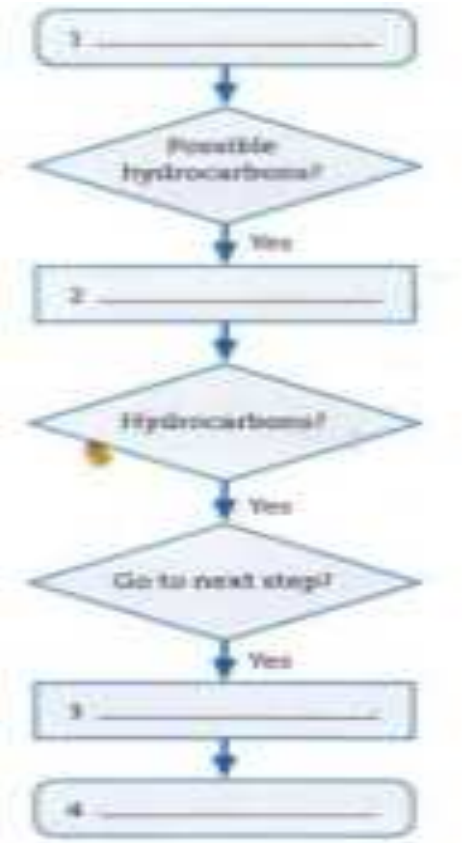
Workers in the downstream sector produce useful things from crude oil, like **fuel** for cars and planes.

Task 2 Look at the pictures in this lesson. Which pictures show.....

1 rocks? **2** a scientist? **3** hydrocarbons? **4** drilling a well? **5** a pipeline? **6** recording data?

Reading: The upstream process

Task 3 Read the text on page 37 and complete the four steps in this flow chart.



Task 4 Answer these questions about the text.

1 What do scientists try to find?
2 Do drillers always find hydrocarbons?
3 What do companies do before development?
4 Why do they build pipelines?
5 Which words mean
a difficulties? pr_____
b carry to another place? tr_____
c move continuously? f_____

How do oil companies find oil and gas?

The first step is exploration. Scientists study rocks and do scientific tests. They look for rocks that can hold hydrocarbons.

What are hydrocarbons?

Oil and gas are made of hydrogen (H) and carbon *(C).* So we call them hydrocarbons.

Do scientists find hydrocarbons?

No, they don't. They choose a good place for the next step: drilling. Drillers drill a well, and they sometimes find hydrocarbons.

Does production start immediately after drilling?

No. First the company does more tests and asks 'How much oil is there?' and 'Are there any problems?' If the results of the tests are good, they go to the next step: development.

What does *development* mean?

It means they prepare for production. For example, they build a pipeline to transport the oil.

How long does development take?

From a few weeks to many years. Then production starts. Crude oil and / or gas flow from the well and along the pipeline.

Vocabulary: Some upstream jobs

Task 5 Match the jobs with the descriptions. Which jobs are in pictures in this unit?

Jobs	Descriptions
1 crane operator	**a** studies rocks
2 driller	**b** operates equipment to help geologists
3 geologist	**c** supervises a drilling crew
4 geotechnician	**d** works in a drilling crew under the driller's supervision
5 maintenance technician	**e** operates a machine for lifting and moving heavy things
6 pipe-fitter	**f** fits pipes to make a pipeline
7 production operator	**g** services and repairs machines and equipment
8 roughneck	**h** checks and operates production equipment

Task 6 Study this information. Then listen and complete it.

a *Company* — *a Canadian oil company*
b *Job* — *a well test operator*
c *Location* — *different places in* _____[1]
d *A typical day* — *prepare*_____[2] *equipment do*_____[3] *and record*_____[4]
e *Hours per day* — _____[5]
f *Start and finish* — _____[6]
g *Good things* — *working* _____[7] *seeing* _____[8]
h *Skills* — _____[9]

Language spot: *do* and *does*, and *Wh-* questions

We use *do* and *does* to form the negative and questions in the Present Simple. **Negative:** I/ You / We / You / They **do not (don't)** work here.

He / She / It **does not (doesn't)** work here.

= subject + ***do / does + not (don't / doesn't)*** + infinitive

Questions	Short answers
Do I / you / we / you / they work here?	Yes, I **do**.
Does he / she / it work here?	No, he **doesn't**.

=auxiliary ***do / does*** + subject + infinitive

We use a question beginning with ***do*** or ***does*** to ask a question that requires a **yes / no** answer.

If we want to find out specific information, we can put a question word before ***do*** or ***does***.

Question words include ***who, what, which, when, where, how***.

Where do you work? What does a well test operator do?

Some more examples

Do *you work outside?* Yes, *I do.*
Does he test rocks? *No, doesn't.*
I don't like working long hours. *He doesn't work in an office.*

Task 7 Choose the correct word to complete the questions.

1 *Do* / *Does* roughnecks work in offices?
2 *Do* / *Does* a driller supervise a drilling crew?
3 *Do* / *Does* a production operator fit pipes?
4 *Do* / *Does* a well test operator test rocks?
5 *Do* / *Does* geologists test wells?
6 *Do* / *Does* maintenance technicians repair things?

Task 8 Ask and answer the questions in Task 7.

Example: A: Do *roughnecks work in offices?* **B***: No, they don't.*

Task 9 Make questions and answers. (You need one or two words for each gap.)

1 A: _____ Steve work? **B:** He_____ in Canada.
2 A: _____he work for? **B:** He _____ for a Canadian oil company.
3 A: _____ many hours per day you work? **B:** I _____ eight hours a day.
4 A: _____ you start in the morning? **B**: I _____at seven o'clock.
5 A:_____ geologists do? **B**: They _____ rocks and do scientific tests.
6 A: _____ country_____ he work in? **B**: He _____ in Russia.
7 A: Why _____ they like the job? **B**: _____ it because the money is good.
8 A: How _____ oil companies find hydrocarbons? **B:** drill wells.

Speaking: Talking about jobs

Task 10 Work in pairs: Student A, Student B, answer Student A's questions about *Igor Kinsky.* Then ask about *Andrea Farrell* and complete the information.

Then Student A, tell the class about Igor. Student B, tell the class about Andrea.

EXAMPLE
Igor Kinsky works for a ..... .
He's a ..... in .....
On a typical day, ...
He works ..... hours.
He likes ..... .

Do you know that?

Saying numbers

In American English, the ***and*** is sometimes left out: two hundred nine (209). In British English, the ***and*** is always used: two hundred and nine (209).

Reading: Measuring oil and gas

Task 11 Read the information and say the examples.

We can measure oil and gas in **cubic metres** (m^3)

Example:

This field produces 100000 cubic metres of gas per day (m3/d)

We use **litres** (l) for small quantities. 1 m^3 = 1000 l

Example:

Oil flows through the pipe at 10 ***litres per second*** *(l/s)*

US **barrels (bbl)** is another common measure. 1bbl = 159 litres

Example: This field produces 600000 barrels of oil per day. (bbl / d or bpd)

Task 12 Say these quantities.

a) 100 l **b)** 50 bbl **c)** 170 m^3 **d)** 12 l/s **e)** 28 m^3/hr

Task 13 How to say large numbers? Read and say the numbers.

209 = two hundred and nine
380 = three hundred and eighty
3000 = three thousand
4444 = four thousand four four hundred and forty-four
500000 = five hundred thousand
560000 = five hundred and sixty thousand
6000000 = six million
7000000000 = seven billion

Listening: Some big numbers

Task 14 Look at the table and guess the approximate numbers.

Oil: the world uses.....	**a)** _____ bbl / d **b)** _____ l / d **c)** _____ l / hr
Number of oil and gas fields in the world	**d)** _____
The biggest field (Ghawar) location size oil production (bbl / d) oil production (m^3 / d) gas production (m^3 / d)	 **e)** _____ **f)** _____ **g)** _____ **h)** _____ **i)** _____

Task 15 Listen and complete the table in Task 14.

Task 16 Find out about oil and / or gas fields in your country. Then write about them, answering the questions.

1 How many fields are there?
2 Which is the biggest field?
3 Where is it?
4 How big is it?
5 How much oil and / or gas does it produce per day?

Writing: Spelling: *e* - the most common letter

Task 17 The letter *e* is the most common letter in English. Which of these words need an *e* at the end?

1) wher__ 2) problem__ 3) writ__ 4) operat__
5) operator__ 6) company__ 7) prepar___ 8) pipelin__

Task 18 Which words need an *e* before the s?

1) produc__s 2) work___s 3) start___s 4) studi___s
5) supervis___s 6) ask__s 7) find__s 8) lik___s

Task 19 Say where the *e* must go.

EXAMPLE*:** gologist: *between the first **g** and the **o

1) oil fild **2)** companis **3)** machin **4)** equipmnt
5) drillr **6)** mony **7)** xploration

Active vocabulary of the lesson:

Adjectives: downstream, upstream

Nouns: barrel, crane operator, cubic metre, development, driller, exploration, fuel, geologist, hydrocarbons, pipeline, production, rock, roughneck;

data (n) information, especially numbers
record (v) write data or enter data on a computer
skills (n) things that you can do well, for example, computer skills, languages, football;

LESSON 7 DOWNSTREAM PROCESSES

Warm up:

Task 1 **What do these people do in the upstream sector of the oil and gas industry?**

driller geologist production operator roughneck

Task 2 **Read and discuss the questions. Learn the *bold* words.**

The downstream sector - what do you think?

Workers in the downstream sector make useful products from crude oil and natural gas. They **transport** these products and sell them.

1 Which of these things are made from oil or natural gas?

2 Can you name ten more things containing oil products?

3 Crude oil goes from the well to a **refinery.** Refineries **separate** crude oil into **light** and **heavy** products, such as petrol (light) and asphalt (heavy).

These men work at an oil refinery. Are they opening a valve or checking data?

4 Gas and oil products get by sea, by road, by rail, and by people. This driver transports petrol by road to **petrol stations** (Am E= filling stations). In this picture is he loading or unloading petrol?

5 Gas **processing plants** separate the different gases in natural gas. Is this man measuring the pipe or looking for **leaks?**

Language spot: Present Continuous

Positive:

I **am talking**. He / She / It **is ('s) talking**. We / You / They **are ('re) talking**.

=subject + **am / is /** ***are*** **+ *-ing*** form

Negative: I **am not ('m not) talking**. He /She / It **is not (isn't) talking.**

We / You / They **are not (aren't) talking**.

=subject + **am / is /** ***are*** **+** ***not*** **('m** ***not / isn't / aren't)*** **+ -ing** form

Questions	**Short answers**
Am I talking?	Yes, I am. / No, I'm not.

Is he / she / it talking? Yes, he / she / it is / No he / she / it isn't.
Are we / you / they talking?

= ***Am* / Is / *Are*** + subject + ***-ing*** form

We use the Present Continuous to talk about what we are doing at the moment. We do not use this tense to talk about routines, jobs, or to give facts about ourselves. For those functions we use the Present Simple.

*We'**re having** trouble with one of the control panels.*
*This machine **isn't working** properly.*
*Why **is** the warning light **flashing**?*

We often use time expressions such as ***(right) now, at the moment, currently***.

George is *giving a talk **right now**.*
The team is *having a meeting **at the moment**.*

-ing form: The rules for forming the *-ing* form are as follows:

- verb + *-ing: talk – talking, work - working*
- verbs ending in *-e: live –living, take – taking;* ***not*** ~~*liveing, takeing*~~
- short verbs ending in consonant + vowel + consonant: *get – getting, stop – stopping*

Some more examples for Present Continuous Tense:

*This man drives a petrol tanker. Right now he **isn't driving**.*
*He's **unloading** petrol.*

Task 3 Answer these questions about the example above.

1 Does he drive a tanker? 2 Is he driving a tanker now?
3 What does he do? 4 What is he doing?

Task 4 Practice this telephone conversation.

A: *Where are you now?* **B:** *I'm* in *the tanker.*
A: *Are you driving?* **B**: *No, I'm having lunch.*

Have similar conversations with these phrases.

1 you now? / at the refinery; working? / having a break
2 he now? / outside; repairing something? / looking for leaks
3 they now? / at the plant; collecting data? / testing pipes
4 she now? / in the manager's office; talking to the manager? / waiting for him

It'smy job

Task 5 Discuss these questions. Then read the text and check your answers.

1 What do petrochemical plants produce?
2 What happens in the control room?
3 How many hours per day do plants work?

I work at a big petrochemical plant. Petrochemical plants produce chemicals from hydrocarbons. This plant gets light hydrocarbons from a refinery and produces ethylene (C_2H_4) and other important chemicals. Many industries use ethylene: for example, they use it to make plastics, detergents, and car tyres.

This plant produces two million tonnes of chemicals per year, and we control the production from this room. We use computers for this. But computers can't do everything. We often need a technician to open or close a valve or check some data, so we use the telephone or radio too. The plant works 24 hours a day, seven days a week, 365 days a year.

So I often work at night. I work seven twelve-hour shifts every two weeks: that's four day shifts and three night shifts. This week I'm working night shifts.

Discuss these questions too.

1 What does the plant produce, and why are the products important?
2 What skills does Jang Li need for her job?
3 How many hours does she work every two weeks?
4 Would you like her job? Why / why not?

Listening: Telephone calls and messages

Task 6 What do you think people do in these departments in a company?

Technical Support Human Resources (HR)

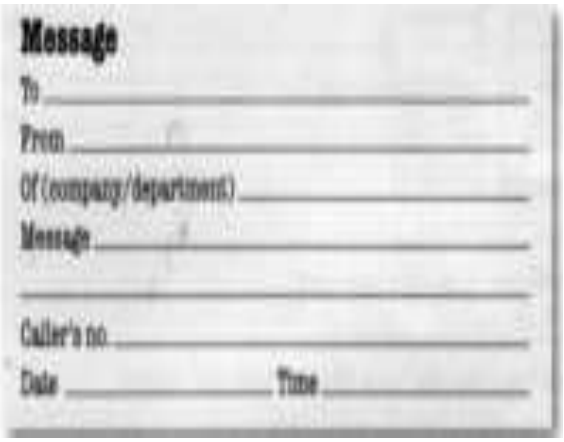
Task 7 Listen to conversation 1.Write *T* (true) or *F* (false).

1 Omar wants to speak to Mike. 2 George is not working today.
3 There is a problem in the control room.

Task 8 Mike is reporting the phone call. Is the information correct?

Listen again. Then report the call, but give more information.

Task 9 Listen to conversation 2 and find the mistake in this written message.



Task 10 You work in the control room with Alberto, but he's in a meeting right now. The phone rings. Answer it and complete this message.

Writing: Messages

Task 11 Write messages for George in Technical Support, like the example. (Notice the changes: *I →he; him → you.)*

Task 12 Write messages for Faisal Hamdi in Human Resources.

Speaking: Making and taking calls

Task 13 Choose the correct words.

A: *Goodbye* / *Hello*[1].Technical Support.
B: Hi. Is it / *that*[2] George?
A: No. *This* / *That*[3] is Ali speaking.
B: Can I *speak* / *say*[4] to George, please?
A: He's *talking* / *talks*[5] to the manager right now. Can I *take* / *get*[6] a message?
B: Yes. *This* / *That*[7] is Andrew Watts *at* / *from*[8] Human Resources.
A: Andrew Watts *at* / *from* [9] HR.
B: Yes, I want to talk to George *about* / *on*[10] the new computers for our office.
B: What's your *phone number* / *number phone*[11]?
A: 3745.
B: OK. *I'll give* / *I give*[12] him the message.
A: *Thank* / *Thanks* [13] you.

Reading: News

Task 14 Work in two groups, A and B. Read your group's news item. Find answers to these questions.

1 What is going up? Where? 2 Why?

A Petrochemicals – a changing world

The top producers of petrochemicals are countries in North America and Europe. But this is changing. Now many countries in Asia and the Middle East are building new petrochemical plants, and petrochemical production is going up fast in these countries.

Saudi Arabia, for example, is hoping to be the number 2 producer in the petrochemical world in 2025.

This is good business because petrochemicals sell at higher prices than crude oil. It is good for employment too. Populations in Asia and the Middle East are going up, so these countries need new jobs for their young people.

B Gas – going up

Oil and gas companies are planning to increase world gas production by 50% before 2030.

Big gas producers like Russia, Saudi Arabia, Qatar, Iran and the UAE are increasing their production fast. Gas production in Africa, Europe, Asia and the Americas is growing too.

Why are they doing this? Gas is becoming more important for many reasons. Petrochemical plants use a lot of gas, and the petrochemicals industry is growing. Oil is very expensive, so many other industries prefer gas too. CO_2 is bad for the environment, and gas produces less CO_2 than oil so many power stations around the world are changing their fuel from coal to gas.

Task 15 Look at these sentences from the news items. Then complete the sentences below about yourself.

Saudi Arabia, for example, is hoping to *be the number 3producer* in *the petrochemical world* in *2025.* Oil *and gas companies are planning* to *increase world gas production by 50% before 2030.*

1 I'm hoping to ..... 2 I'm planning to..... .

Calculating: Task 16 Match the words with the keys on the calculator.

1 plus /add
2 minus / subtract
3 times / multiplied by
4 over / divided by
5 equals
6 per cent
7 point
8 square root

Task 17 Say the calculations for these questions.

1 Li is working three twelve-hour night-shifts this week. How many hours is she working this week?

2 A petrol tanker has 18,500 litres of petrol in it now. It can carry 30,000 litres on the road. How much more petrol can the driver load into the tanker?
3 How many 8,000 - litre tanks do you need for 32,000 litres of oil?
4 A refinery produces 6.2 million litres of petrol per day and 10.75 million litres of other products. What is the total daily production?

Active vocabulary of the lesson:

Adjectives: heavy, light;
Nouns: chemical, department, Human Resources, petrochemical, processing plant, product, refinery, shift, Technical Support, valve;
Verbs: load, separate, unload;

Quiz time

Lesson 8 Safety first

Starter:

Task 1 Point to these parts of your body. Say and learn:
ears, eyes, face, feet, fingers, hands, head;

Task 2 Look at the personal protection equipment (PPE). Complete the sentences below.

1 A hard hat protects your _____
2 A face guard protects your _____
3 Boots protect your _____
4_____ protect your ears from noise.
5_____ protect your hands.
6_____ protect your eyes.
7_____ protects you from smoke and dangerous fumes.
8 A _____ protects from a fall.

Reading: Safety signs

Task 3 Talk about the signs. Use these words.
COLOURS: black, blue, green, red, white, yellow;
SHAPES: a circle, ◯ a rectangle, ▭ a square, □ a triangle △

EXAMPLE: *It's a blue and white circle.*

Task 4 Read the text about safety signs. Write these four headings in the correct places.

a Green and white squares or rectangles **b** Black and yellow triangles
c Red and white circles **d** Blue and white circles

Safety signs: colours and shapes

Safety signs are very important because the oil and gas industry has many hazards. (*Hazards* = possible dangers like electricity, chemicals, hot things, gas, machines, noise, falling objects, and slippery surfaces). There are four main kinds of safety sign:

1 _____These signs warn us about hazards. The signs give warnings like *Danger! Overhead crane* or *High voltage.*

2 _____ These signs usually have a red band across them. They tell us we must not do things. For example *Do not smoke here* or *Do not switch off this machine.*

3 _____ These signs tell us 'You must wear or do the thing in the picture'. For example *Wear goggles* or *Read the instructions before you use the machine.*

4 _____ These signs give information about safety. For example, they tell us *This way* to *the emergency exit* or *Life jackets are here.*

Task 5 What does each sign mean in Task 3?

EXAMPLE*: *Sign number* 1 *means 'Wear goggles:

Speaking: What does it mean?

Task 6 Work in pairs. Practice this dialogue.

A: *What does the blue sign mean?*
B: *Which one?*
A: *The one with a man and a book. Can you see* it?
B: *Yes. That means 'Read the instructions before you use the machine*

.

Weights and measures

Task 7 Say these abbreviations next to the correct words.

cm g k km m mm t

1 grams _____ 5 centimetres ____
2 kilos _____ 6 metres_____
3 tonnes _____ 7 kilometres _____
4 millimetres _____

Task 8 Make up you questions using these words correctly.

What's the..... ?	**How ..... is it?**
length, depth	long, deep
width, weight	wide, high
height, speed	heavy, fast

Task 9 Say what these signs mean.

EXAMPLE: 1- Maximum speed twenty kph

Task 10 Study the information. Then say what is happening in the pictures.

Listening: A toolbox talk

Task 11What is happening in the four pictures?

Task 12 **Listen to a supervisor talking to trainees about safety. Which hazards in Task 11 do they talk about? How can you warn the men in pictures 1-4**?

EXAMPLE: ***1*** *Look out! The load is falling!*

Task 13 Can you complete the rules? Listen again and check.

1 _____ under the load.
2 _____ to stop a swinging load.
3_____where you put your hands.
4 The hand signal for *Emergency stop* is.
5_____ always have radio contact with the crane operator.

Vocabulary: Which kind of word?

Task 14 Read the sentences. Which **bold** words are.....

a) nouns? **b)** verbs? **c)** adjectives?

1 He's a **good** crane **operator**.
2 He **operates** a **crane**.
3 He is **Canadian**. He **lives** in **Canada**.

Task 15 Write the words in the correct places in the table.

calculate driller hazard protect safety wide

Nouns	Verbs	Adjectives
width		1
2		safe
3		hazardous
protection	4	
calculator, calculation	5	
drill, 6	drill	

Task 16 Choose the correct word.

1 This old machine isn't *safe / safety*.
2 He's an *Italy / Italian* engineer.
3 Can I use your *calculate / calculator,* please?
4 Refineries *produce / product* useful things from crude oil.
5 There are *hazards / hazardous* in my job.
6 How *depth / deep* is the well?
7 This company is a good *employ / employer*.

Language spot: Modal verb: *can / must*

Modal verbs never change their form and are always followed by the infinitive.
Can: We use *can* to talk about ability.
Positive: I / You / He *I* She / It / We / You / They can lift this.
=subject + *can* + infinitive
Negative: I/You/He /She /It/We /You/They cannot (can't) lift this.
= subject + *cannot (can't)* + infinitive

Questions	**Short answers**
Can I / you / he / she / it / we / you / they lift this?	Yes, I can / No, he can't.

= *Can* + subject + infinitive

Can / *can't* often refer to something that is (not) possible in the circumstances.

One of the hazards is *that the load can fall on you.*

I wear a safety harness, so I can't fall very far.

We also use the question form of *can* to ask for permission and to make a request or ask for help.

Permission: *Can we accompany you on the tour? - Yes, of course. / No, I'm afraid not.*

Help: *Can you explain the process* to *me? Can I ask a question?*

Can you help me prepare this load?

Must: We use *must* to talk about obligation, instructions, and rules.

Positive: I / You / He / She / It / We / You / They must listen carefully.

= subject + *must* + infinitive

Negative: I / You / He / She / It / We / You / They mustn't come into this area without shoes.

=subject + *must* + *not (mustn't)* + infinitive.

We often use *must* and *mustn't* when giving spoken instructions.

One man must always have radio contact with the crane operator.

We *mustn't go beyond this line.*

Task 17 Study this table and complete the conversation.

A: _____[1] *the crane lift* 25 *tonnes?*

B: *No,* it_____ [2]. *It* _____[3] *lift* 20 *tonnes, but* it _____[4] *lift* 25 *tonnes.*

Task 18 Work in pairs. Have similar conversations.

1 Can the tank hold 600 litres?

2 Can the bridge take a six-tonne truck?

3 Can the helicopter lift 7,000 kilos?

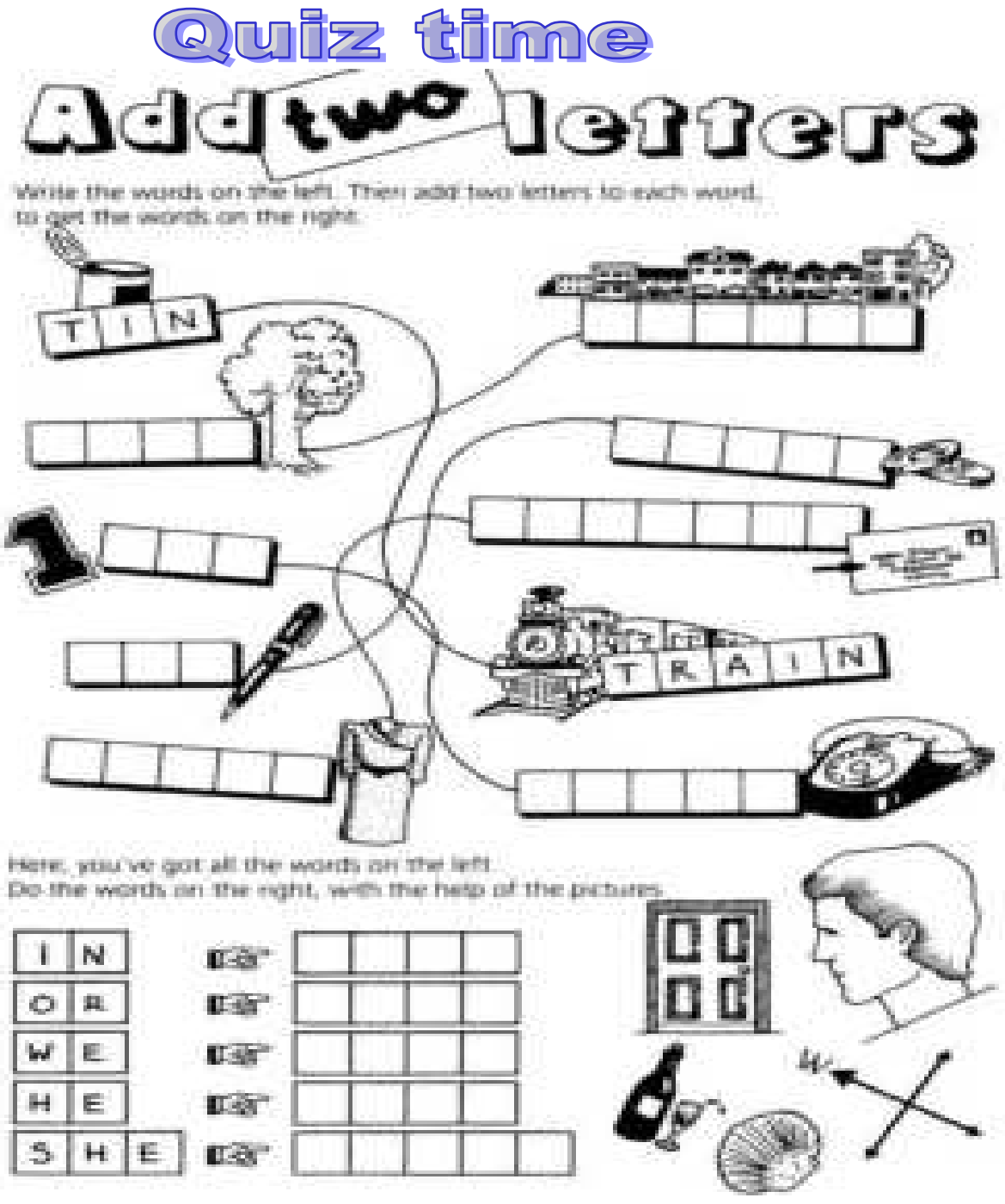
4 Can the crane do 30 kph?

Task 19 Study situations 1and 2.What can you say in situations 3-6?

3) You want to use your friend's phone. Ask him.

4 You are very hot. You want to take off your PPE. Ask the supervisor.
5 You must carry a heavy pipe. Ask someone to helyou with it.
6 You don't know how to use the safety harness. Ask the supervisor to show you.

Task 20 Explain these notices with *must* or *mustn't*
EXAMPLE: *You mustn't touch these switches.*



LESSON 9 OIL FIELDS

Vocabuary: Oil field equipment

Task 1 **Listen and write down the labels for the pictures.**

Task 2 Label these diagrams with the words in the box.

well hole	pumpjack	derrick	drill pipe	drill string
drill collar	drill bit	~~oil field~~		

Speaking tasks:

Task 3 Practise in pairs. Look at the diagrams. Ask and answer questions.

A: *What's this?* ***B:*** *It's a drill pipe. What are those?*
A: *Those are derricks*

Vocabulary: Operating equipment

Task 4 Look at the pictures on the left. Then look at the photo on the right. What can you name?

Listening tasks

Task 24 **5 Listen to and read the conversation**

Supervisor:	**Trainee:**
OK. Listen carefully.	Understood.
First, you turn this handwheel.	Clockwise?
No, anti-clockwise.	OK, anti-clockwise.
Turn it until it's open.	OK Until it's open.
Next, close this valve.	OK. Then close the valve.
And then wait a couple of minutes.	Wait a couple of minutes.
Then read the gauge and write the pressure in the log book.	OK. Got that.
And finally, check the flanges and the valves.	For leaks?
Yes, that's right.	

Task 6 Match the verbs 1-5 with the nouns a-e.

1 Turn	**a)** the gauge
2 Close	**b)** the pressure
3 Read	**c)** the valve
4 Write	**d)** the wheel
5 Check	**e)** the flanges

Reading: Control panels

Task 7 Look at the picture and read the description.

Grammar review:

There is / There are

We use **there is / there are** to say something or somebody exists.	**There is / There's** a lamp on the panel.
	There are three lamps on the panel.
In the plural negative form we use ***any*****,** not a number.	**There isn't (is not)** a switch.
	There aren't (are not) any switches.
In questions we use ***any*** not a number. In short answers we omit the noun.	**A: Is there** a start button?
	B: Yes**, there is /** No**, there isn't (is not)**
	A: Are there any buttons?
	B: Yes**, there are /** No**, there aren't (are not)**

Task 8 Now look at this control panel. Write a description like the one above.

Speaking tasks:

Task 9 Work in pairs. First draw a control panel. Put the controls where you like. Then describe it for your partner to draw.

Telling the time:

Task 10 Practise in pairs. Ask and answer questions about other flights.

A: *What time does the flight to Los Angeles depart/leave?*
B: *At seven thirty-five.*
A: *What's the flight number?*
B: *TH3946.*
A: *What's the gate?*
B: *Al.*
A: *Is it on time?*
B: *Yes, it is. / No, it isn 1 It's delayed / cancelled.*
A: *Thank you. / Thank*

LESSON 10 FINDING OIL AND GAS

Warm up

Task 1 Look at the diagrams in this unit. Which diagrams are.....

1 about geology? 3 about technology? 5 two-dimensional (2D)?
2 about physics? 4 three-dimensional (3D)?

Task 2 Look at this picture. Give your opinions.

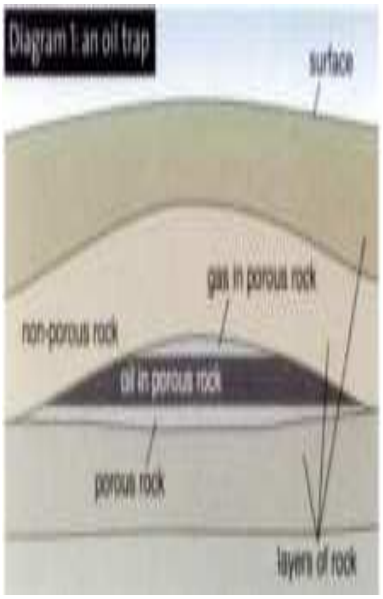
1 What is on the screen?
2 What do the colours mean?
3 What kind of glasses are the people wearing?
4 Who are the people?
5 What are they looking for?

Vocabulary: Some science

Task 3 What do these people study and know about?

a geologist *a physicist* *a geophysicist*

Task 4 Study *diagram 1* and discuss the questions.



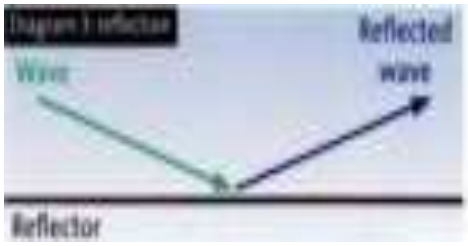
1 Which rock can hold water, oil, and gas?
2 Which rock is hard and very solid?
3 Why is the gas above the oil?
4 Why can't the gas go up to the surface?

Task 5 Study *diagram 2* and complete the sentences.

1 Vibrations produce _____
2 A microphone converts sound waves into _____

Task 6 Look at diagram 3. Then give an example of.....

1) a reflector that reflects light waves.
2) other kinds of wave
3) waves that travel fast
4) waves that travel slowly

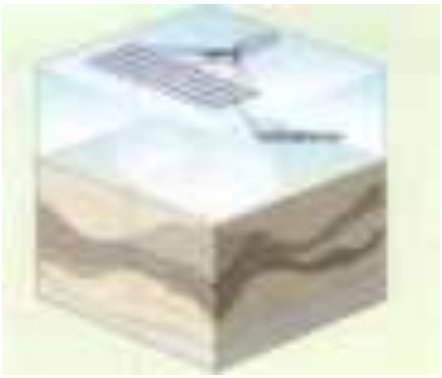


Reading: Seismic exploration

Task 7 Where do you find an oil trap? What is in it and why? Read the text and translate it into Uzbek. Then find answers to the questions.

How to find oil traps

Drilling is expensive. So oil companies plan carefully before they start drilling. First they make 3D maps of the rocks below the surface. Then they study these maps carefully. They look for possible oil traps. How do they make these maps? How do they find out what is below the surface? The answer is 'seismic waves'.

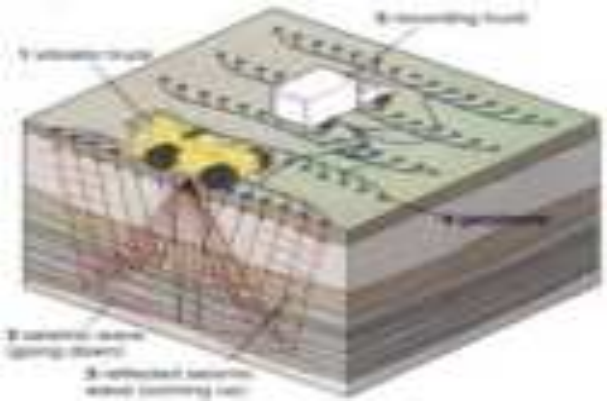


Seismic waves are sound waves, and they can travel through rock layers. Most oil companies use vibrator trucks to make seismic waves. These heavy trucks make vibrations on the surface, and the vibrations send waves down to the rocks below.

Each rock layer reflects some of the waves. The reflected waves travel up to geophones on the surface. Geophones are like microphones: they convert the waves into electrical signals. A machine in the recording truck records the signals. Computers can convert these signals into 3D maps. Seismic reflection works at sea too. But the crews use hydrophones, not geophones, and they use an underwater gun to make seismic waves.

Task 8 Read the text. Write T (true) or F (false).

1 Oil companies make maps of the surface.
2 Seismic waves can't go through rocks.
3 Vibrator trucks make seismic waves.
4 One rock layer reflects all the waves.
5 Geophones send electrical signals to the recording truck.
6 The geophones produce 3D maps.



Task 9 Study this diagram. What do you think the trucks and the geophones do?

Do you know that?

GPS (Global Positioning System) A GPS unit tells you your exact position on Earth. It can also show you the way to other positions.

Satnav (satellite navigation) A satnav unit uses GPS to show the way on a map. Many cars have these units.

Writing: Writing sentences

Task 10 There are eight sentences in the paragraph below. Separate the sentences and write the paragraph correctly.

sentences always begin with a capital letter statements always have a full stop at the end questions have question mark imperatives have a full stop or sometimes an exclamation mark why is this important it is important because it helps us to understand sentences some nouns always have capital letters too the names of people and places are two examples.

My glossary:

seismic, bearing, coordinates, geophone, heading, layer, position, signal, truck, wave, vibration, waypoint, convert, record, reflect;

USEFUL LANGUAGE: DIMENSIONS

1mx2m x4m = *One metre by* two *metres by four metres*

Grammar: Words in sentences

	noun	*verb*	*noun*	*adverb*
	I	I	I	I
1	Faisal	places	the geophones	carefully.
2	He	works	in hot weather and difficult places.	
	I			I
	pronoun		*adjectives*	*noun*

Faisal and *He* = the SUBJECT *geophones* = the OBJECT in sentence **1**

There are three kinds of sentence:

Questions (e.g. *Who* is *he?)* **Statements** (e.g. *He* is *Faisal.)*

Imperatives (e.g. *Stop!)*

In statements, the word order is as follows: *subject + verb*

In questions, the word order is usually: *verb + subject*

In imperatives, there is no subject.

Take this to *the drilling platform.* *Don't do anything yet.*

There are other words that we can use in a sentence, such as nouns, pronouns, adjectives, and adverbs.

Nouns and pronouns

Nouns are the names of things, e.g. *drill, platforms.*

Pronouns are words such as *he, it, they* which can be used instead of nouns. We do not use both together. NOT ~~The *GPS* it *tells you your exact position*~~

Nouns and pronouns can be either the subject or the object of the sentence.

*The **job** is hard work. I haven't got a **job**.* ***It** is on the chair. You're sitting on* **it**.

***We** work with **them**. **He** is in the same team as **me**.* but
***It**'s a CPS receiver. You use **it** to find your exact position on the Earth.*

Adjectives

These are words that describe nouns. They go before nouns or after the verb *be.*

*This a **heavy** piece of equipment. The equipment* is ***heavy***.

Adverbs

These are words that describe a verb. The position of adverbs varies within the sentence. Adverbs of frequency *(usually, never, sometimes,* etc.) go before most verbs but after *be* and modal verbs. Other adverbs, such as *carefully, well,* often go after the object. Adverbs never go between the verb and the object.

*It **usually** takes a few seconds to do this.*

*You read the data from the GPS unit **carefully** to get the position right.*

Sentences often include phrases using prepositions such as in, *on, at,* to say when or where something happened or to talk about conditions.

*It's hard work because you're carrying things **in hot weather**.*

*I prefer working **at night**.*

Task 11 What kind of word is each underlined word? What kind of sentence is it?

EXAMPLE: *Don't forget your GPS.*

Forget is *a verb. The sentence* is *an imperative.*

1 Faisal usually does the work quickly. **2** He likes it, and the money is good.

3 It's very hot in the desert in summer. **4** Is my new radio in the truck?

Task 12 Look at the words in brackets. Where must we put them to make correct sentences?

1 (porous) We find oil and gas in rocks.
2 (reflect) Mirrors light waves very well.
3 (badly) Black things reflect light waves.
4 (every day) He works outside.
5 (exact) What's your position?

Task 13 In the sentences below, change the underlined words to the correct pronoun.

	Subject pronouns	**Object pronouns**
Singular	I, you, he, she, it	me, you, him, her, it
Plural	we, you, they	us, you, them

EXAMPLE: **Subject pronouns:** *I, you, he, she, it we, you, they*

Object pronouns: *me, you, him, her, it, us, you, them*

Mr. Jones wants to talk to you and me. → *He wants* to *talk* to *us.*

1 Faisal is helping Ali and Hamid.
2 The drivers can talk to the man by radio.
3 My friends and I don't like hot weather.
4 The woman in HR has the forms.

5 Mr. Ali has a message for me and all the technicians.

Task 4 Put these words in the correct order to make sentences.

1 the / him / is / talking to / geologist
2 read / carefully / the / data / seismic
3 can / me / help / you?
4 have / I / at the refinery / a job
5 job / a / good / and / it/ it's / I /like

It's my job

Task 5 Faisal Abdel Latif is a geotechnician. He works in a seismic survey crew. Look at the picture and answer the questions.

1 What is Faisal carrying on his back?
2 What electronic gadget is he holding?
3 What is he using it for?
4 What does Faisal do?
5 What must he do carefully?
6 How do the different crews communicate?
7 Why must Faisal be fit?

I work in a seismic crew. I place the geophones. That's my job. We place the geophones before the other crews arrive - the vibrator crews and the recording crew. Then they arrive and they do their work, and then we remove the geophones. We must put the geophones in the right place - that's very important. So we all have a GPS unit. That's a handheld electronic gadget, like the satnav in your car. The GPS tells you your exact position. We read the data carefully to get the position right.

The other crews start work when the geophones are ready. The operator in the recording truck talks to the vibrator crews by radio. He tells them to start the vibrators, and he records the seismic data. After that, we pick up the geophones, and then we move to a new location.

This job can be hard work. You're walking a lot and carrying heavy things - in hot weather sometimes, and in difficult places - like mountains and deserts. So you must be fit. I like the job. I like it for two reasons: I love being outside and seeing different places. And I like working in a team. And the money's good too. That's three reasons, isn't it?!

Speaking: Discussing specs

Task 16 Read the specs (specifications) and make a question about each one.

EXAMPLES: How *many channels does* it *have? What are the dimensions?*

The T60 two-way radio

channels: 6
dimensions: 54 x 140 x 25 mm
weight: 190 9
colour: black
shock resistant: yes
***sand and dust resistant*:** yes
separate clip-on microphone: no
display screen: no

material: plastic
maximum range: 18 km
***battery life*:** 36 hours
water resistant: no

controls: channel selector knob, volume control, on / off switch, press-to-talk button

Quiz time:

A chemical code

Here are some chemical elements and their symbols:

Aluminium	Al	Copper	Cu	Iron	Fe	Oxygen	O
Calcium	Ca	Fluorine	F	Neon	Ne	Phosphorus	P
Carbon	C	Hydrogen	H	Nickel	Ni	Potassium	K
Chlorine	Cl	Iodine	I	Nitrogen	N	Sulphur	S
Cobalt	Co						

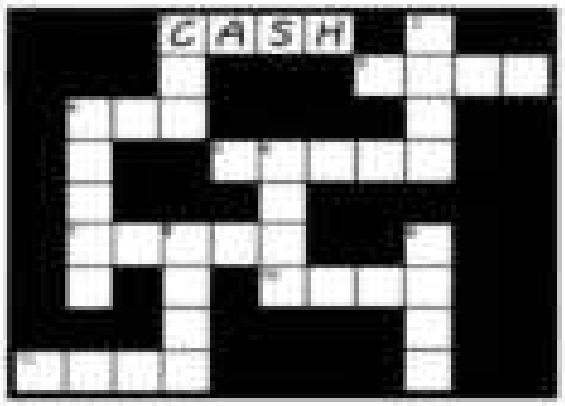
Use the symbols to do this crossword. (All the answers are in the picture.)

Across

1 Calcium + Sulphur + Hydrogen
3 Cobalt + Neon
4 Copper + Phosphorus
5 Carbon + Hydrogen + Aluminium + Potassium
7 Calcium + Nitrogen + Aluminium
10 Fluorine + Iodine + Sulphur + Hydrogen
11 Calcium + Iron

Down

1 Calcium + Phosphorus
2 Cobalt + Oxygen + Potassium
4 Chlorine + Oxygen + Carbon + Potassium
6 Hydrogen + Aluminium + Fluorine
8 Nickel + Neon
9 Sulphur + Hydrogen + Iodine + Phosphorus

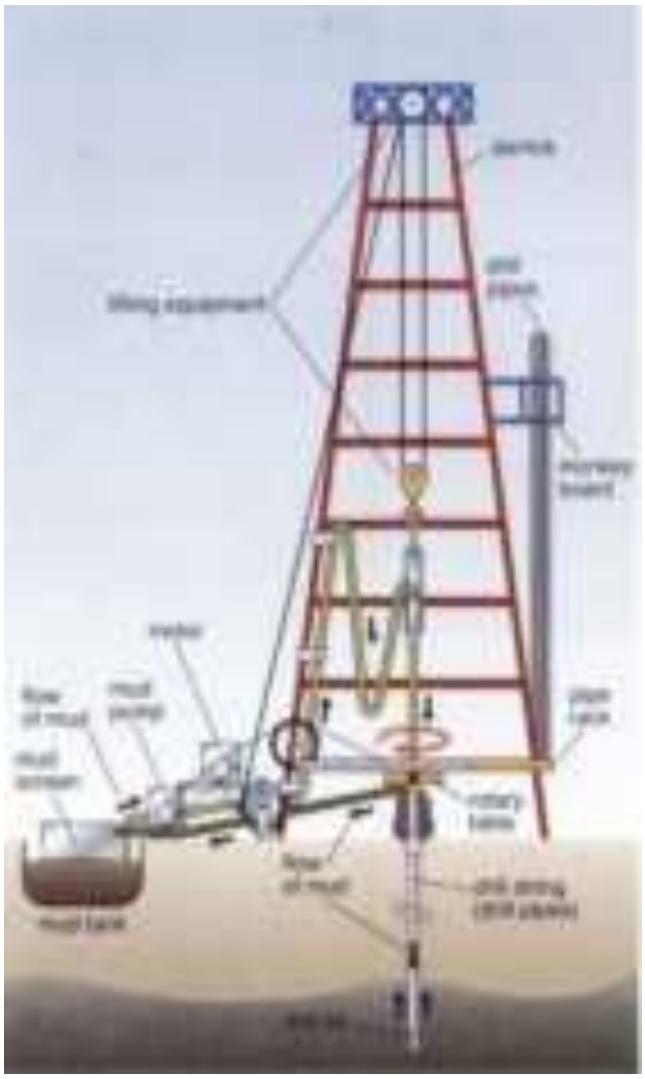


LESSON 11 DRILLING

Warm up:

Task 1 Study these simplified diagrams and the words. Then discuss the questions below.

1 Which part rotates and drills through rock?
2 What is between the bit and the surface?
3 Where do the pipes stand before they go into the hole?
4 What tall thing supports the lifting equipment and the drill string?
5 What does the rotary table do to the drill string?
6 What is mud?
7 Which machine sends mud down to the bit?
8 What comes up to the surface with the mud?
9 For deep wells, the derrick must be very strong. Why?



Task 2 Complete the description of the mud process. Use words from the diagrams.

Drilling mud is a mixture of water, clay, and other materials. The _____[1] pumps mud from the _____[2] into the top of the drill string. The mud flows down inside the _____[3] to the bit. It cleans and cools the _____[4]. Then it flows up the hole and carries _____ [5] up with it. The mud and cuttings go to the_____ [6]. The mud screen separates the cuttings from the mud. The mud flows through to the _____[7] below.

Reading: A drilling crew

Task 3 Read the text. Then answer the questions. *Which person / people* .....

1) are usually the youngest and most junior?
2) is usually the oldest and most senior?
3) need to be strong? Why?
4) is not afraid of high places?

5) must watch gauges or screens carefully? Why?
6) needs a desk and a telephone? Why?

Who are the people in a typical drilling crew?

Roustabouts are often the youngest people in a drilling crew. They clean, maintain, and move equipment and help the other workers. Roustabouts want better jobs, so they work hard, listen carefully, and learn fast.

Roughnecks are like roustabouts, but they are more skilled. They work on the drilling floor. They connect the heavy drill pipes and put them into the hole, or they disconnect the pipes as they come up out of the hole. The **derrickman** works high up on the monkey board about 25 metres above the floor. He guides the top part of the drill pipe. At other times, he helps the mud engineer (or 'mud man'): he checks the mud and maintains the pump. The mud must not be too thick or too thin, and the pump must keep working.

The **driller** supervises and trains the drilling crew, and he controls the drilling equipment. For example, he operates the motor that lifts the drill pipes. He controls the speed of the drill, which must not be too fast or too slow. On very modern rigs, the driller sits in a special driller's chair. The chair has joystick controls and display screens - like a computer game.

The **rig manager or tool pusher** is the most senior person in the drilling crew. He is usually the oldest and most experienced person too. He makes sure the crew has all the right equipment. He is responsible for their safety and for paperwork.

Grammar review: Adjective forms

We can change adjective forms to modify the meaning of the adjective.

too, not ... enough

We use *too* + adjective and *not* + adjective + *enough* to talk about qualities in a different way.

The liquid is *too thick.* (= it needs to be less thick)

The liquid is *not thick enough.* (= it needs to be thicker)

We can use these expressions with adjectives that have opposite meanings to make them mean the same thing.

too thin = not thick enough *too dark = not light enough*

-er, -est and *more, most*

We can add ***-er*** *to* the end of an adjective or put ***more*** in front of the adjective to make a comparison between two things or people. We add ***-est*** or put ***the most*** in front of the adjective to make a comparison between more than two things or people. The rules are as follows:

		Adjective	**Comparative**	**Superlative**
Short adjective	+ ***-er /-est***	*tall*	*taller*	*the tallest*
Adjective ending in ***-e***	+ ***-r*** / ***-st***	*large*	*larger*	*the largest*
Short adjective ending in ***consanat +vowel + consonant***	Double the consonant + ***-er / -st***	*big*	*bigger*	*the biggest*
Adjective of two or more syllables	**more / the most**+ adjective	*modern* *important*	*more modern* *more important*	*the most modern* *the most important*
Adjective ending in ***consonant + -y***	change ***-y*** to ***-i*** + ***-er /-est***	*heavy*	*heav**ier***	*the heav**iest***

Let's make the mud thicker. *The problem with the pump* is *getting more serious.*

Task 4 Choose the correct word to complete each sentence.

1) Drilling mud is usually *thicker / thinner* than water.
2) There's a problem with that pump. It's *too noisy / the noisiest.*
3) This water isn't hot enough. It should be *colder / hotter.*
4) Roughnecks must be strong because the drilling equipment is very *light / heavy.*
5) These chemicals can be *dangerous / difficult,* so we use PPE.
6) Roustabouts are the *least / most* junior people on the crew.
7) The rig manager is probably the *oldest / heaviest* worker on a rig.
8) This rope is *too short / shorter.* We need a longer one.
9) Safety is more *exact / important* than speed.
10) A mile is *longer / weaker than* a kilometer.

Task 5 Match the opposites.

1) thick	**a)** narrow	8) high	**h)** weak
2) long	**b)** light	9) strong	**i)** shallow
3) heavy	**c)** thin	10) hot	**j)** quiet
4) wide	**d)** low	11) difficult	**k)** approximate
5) noisy	**e)** short	12) important	**l)** safe
6) big	**f)** cold	13) dangerous	**m)** easy
7) deep	**g)** small	14) exact	**n)** unimportant

Task 6 Complete the conversations about problems.

1) Problem: a small wrench.
A: The wrench isn't _____. **B:** We need a _____ one.
2) Problem: a short bolt.
A: The bolt is _____. **B:** I'll get a _____ one.
3) Problem: a dangerous job.
A: This job is_____. **B:** Yes. I want a ____ job.
4) Problem: cold water.
A: The water isn't _____. **B:** It should be _____.
5) Problem: a narrow walkway.
A: The walkway is _____. **B:** We must make it _____.

Task 7 Complete the questions, changing the word in brackets to *more* + adjective or adjective + *-er.*

1) Which is (difficult): maths or English?
2) Which is (long): a kilometre or a mile?
3) Which is (important): speed or safety?
4) Which is (cold): Canada or the USA?
5) Which is (dangerous): fire or H2S gas?
6) Which is (big): Russia or China?

Task 8 Read the examples and answer the questions below.

The comparative form *(-er / more):*

Who is ***older:*** *Jack or Hamid?* *And who* is ***more experienced?***

The superlative form *(-est / most)*

Who is ***the oldest*** person here? Who is ***the most senior*** person in the crew?

1) Which form compares only two things?
2) Which form means "Number l" of many things?

Task 9 Complete the sentences. Use the superlative form of the adjectives in the list.

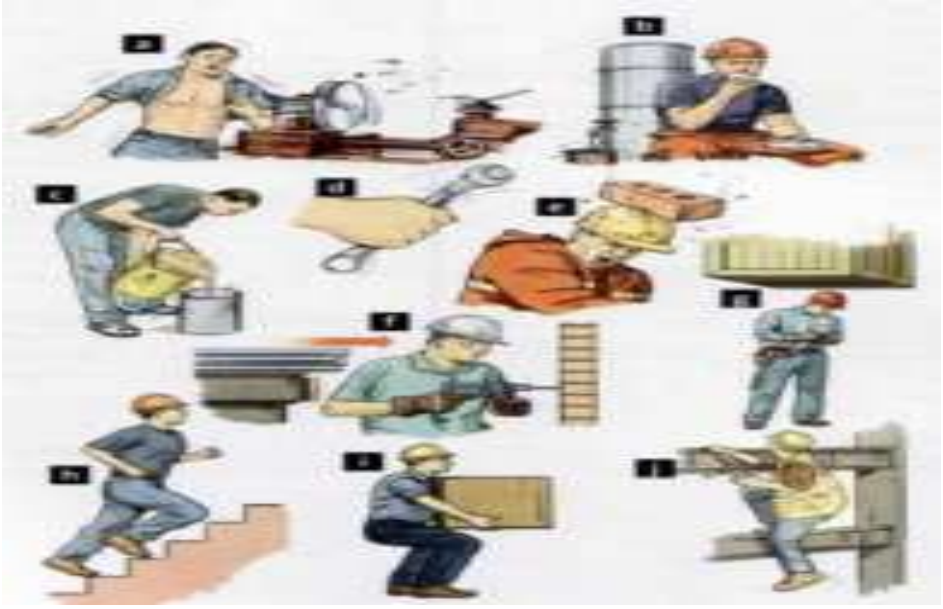
big deep dirty experienced junior old

1 Roustabouts are the _____ people on an oil rig and they do the jobs.
2 The tool pusher is usually the _____ and the _____ person on a rig.
3 The _____well in the world is 10,685 metres. The well is in the Gulf of Mexico and belongs to BP, one of the _____ International Oil Companies.

Speaking: Giving safety advice

Task 10 The pictures are from a safety manual for drilling crews. Which person is .....

1) wearing loose clothes?
2) standing under a load?
3) running up or down steps?
4) eating near chemicals?
5) handling chemicals without PPE?
6) walking below people working?
7) standing between a wall and a moving load?
8) using a broken tool?
9) climbing without a safety harness?
10) doing the right thing: lifting correctly and keeping his back straight?

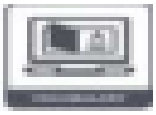


Task 11 Say what might happen in each situation.

Example: *Machines might catch his loose clothes and injure him.*

Task 12 Work in pairs. You work in a drilling crew. You are looking after a new person in the crew. Take turns advising him.

Example: *You shouldn't wear loose clothes because machines might catch them.*



Vocabulary: Understanding instructions

Task 13 Underline the verbs that tell you what to do.

Example: *I want you to load the truck.*

1 Clean the floor.
2 Climb up to the monkey board.
3 You need to tighten that loose bolt.
4 I want you to dig a hole.
5 Those boxes shouldn't be on the floor. Move them now.
6 Unload those pipes from the truck.
7 See those pipes? Stack them on the rack.
8 Guide the pipe into position.
9 Today, you're painting the tank.
10 Connect the new hose to the pump.
11 Pour this chemical into the pipe.
12 The bit might be damaged. Inspect it carefully.

Task 14 Match the sentence halves.

1 Connect	a) the bit for damage.
2 Paint	b) the mud off the rotary table.
3 Inspect	c) up to the top ofthe derrick.
4 Clean	d) the tank red.
5 Dig	e) those pipes away from the door. They're blocking it.
6 Unload	f) the pipes neatly on the pipe rack.
7 Stack	g) the boxes from the truck and put them in the warehouse.
8 Tighten	h) the hose to the pump.
9 Move	i) that bolt. It's loose.
10 Climb	j) a hole here.

Glossary of the lesson:

Adjectives: thick (= viscous), thin;
Nouns: derrick, derrickman, drill bit, drill string, motor, mud, pump, tool pusher, roustabout;
Verbs: connect, disconnect, guide, tighten;

Lesson 12 Working offshore

Warm up

Task 1 This production platform off the coast of Canada is one of the biggest platforms in the world. Answer the questions.

1 Where can helicopters land on the platform?
2 Where do the workers eat and sleep?
3 How can they escape in an emergency?
4 Which part of the platform processes crude oil?
5 Where do they burn gas if there is too much gas?

Task 2 Which are the three biggest hazards on a platform, and why? Give your opinion.

• flammable gas • bad weather • electrical equipment • sparks
• big waves • million-tonne icebergs • other things

Reading: A production platform

Task 3 Read the text and translate it into Uzbek language.

Going offshore

You arrive by helicopter. But first, you receive safety training. Even day visitors must have safety training. Offshore work is more hazardous than onshore work, so workers must also have a medical test and do a fire-fighting and escape course before they go.

You get out of the helicopter and hold on to your hat. You are now standing on a production platform high above the water. It is as big as a football field. The top of the derrick is higher than a twenty-storey building. Drilling platforms are not as big as this because they only do drilling. Production platforms are bigger because they do more things and must accommodate more people.

A typical production platform has four main areas above the water. One is the accommodation area, where the workers eat and sleep. Another is the well head or drilling area. That contains the derrick, well heads, and drilling equipment. Crude oil comes up to the well heads with gas and water in it. So it goes to the process area, which separates the oil from the other things. All the areas need electricity and other utilities. The utilities area provides these: a generator makes electricity, and there is equipment for heating, ventilation, air conditioning, and water distribution.

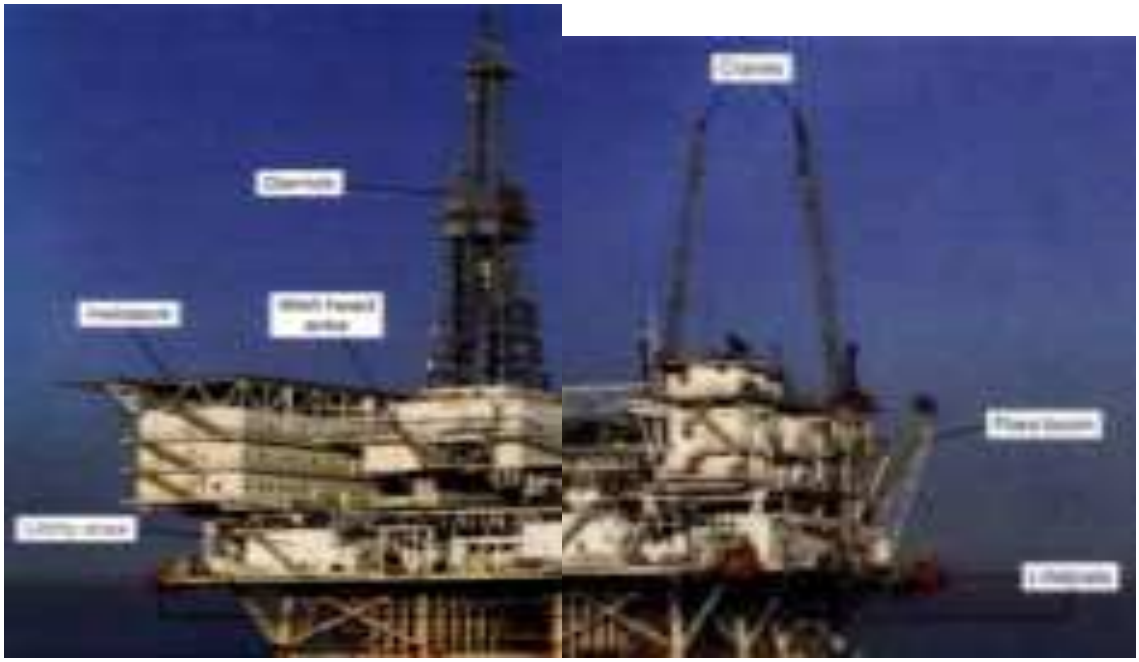
Task 4 Match this information with sentences in the text.

1 Nobody can visit an offshore platform without some safety training.
2 Offshore workers must be physically fit.
3 The platform is the same size as a football field.

4 Drilling platforms are smaller than production platforms.
5 The process area separates oil from gas and water.
6 The utilities area provides electricity.

Task 5 Match words from the text with these definitions. The first letter is given.

1 teaching or learning a skill – *t* _____
2 a number of lessons – *c* _____
3 part of a place or building – *a* _____
4 a place to sleep and eat – *a* _____
5 the area and equipment at the top of a well- w_____
6 services that most buildings have, like electricity and water for example -*u*___
7 a machine for making electricity – g _____
8 sending fresh air into and around a building – *v*_____
9 sending something to many places – *d*____



Task 6 Circle these prepositions in the text.

Paragraph 1: by, than;
Paragraph 2: out of, on to, above, as, of;
Paragraph 4: with, in, to, from, for;

Task 7 Complete these sentences with a preposition from Task 6.

1) Heavy equipment arrives _____ boat.
2) The accommodation area is as big _____ a hotel.
3) Don't get out _____ the helicopter.
4) Hold _____ the rope.
5) The lifeboats are on two sides _____ the platform.
6) What are the cranes _____?

7) They are _____ lifting things from boats.
8) The derrick is _____ the well head area.

Grammar review: Comparative sentences

There are several ways of making comparisons.
• comparative form of the adjective + *than*
Helicopters are faster than boats.
Offshore work is *more hazardous than onshore work.*
Note that some adjectives have irregular comparative and superlative forms.
good – better – the best *bad – worse – the worst* *far – further – the furthest*
I think offshore work is *better than onshore work.*
The platform was further from land than I realized.
Note that the comparative form of the adjective is followed by *than,* not *that.*
not ~~*bigger that*~~
• *as* + adjective + *as* We use *as .. .as* to talk about two things or people that are equal in some way.
The platform is *as big as a football field.*
The rooms are great. They're as comfortable as they are at home.
• *not as* + adjective + *as* We use *not as ... as* to say that one thing or person has less of a particular quality than another.
The food isn't as good as it is *at home.*
Onshore work is *not as hazardous as offshore work.*

Task 8 Match the phrases with the mathematical symbols.

1) A is bigger than B.
2) A is as big as B.
3) A is not as big as B.

A < B
A > B
A = B

Task 9 Compare these things. Use your knowledge and opinions and the adjectives in brackets.

Example: boats - helicopters (fast) -> *Boats are not as fast as helicopters.*
1 helicopters - boats (fast) 2 crude oil- petrol (heavy)
3 drilling rigs - production platforms (large)
4 safety - speed (important) 5 gas - oil (useful)

Task 10 Compare these things. Give your own opinions.

Example: physical work - office-based work -> *Office-based work* is *better than physical work.*
1 very cold weather - very hot weather 2 nice work - good pay
3 an offshore job - an onshore job

Number talk: Measuring and adjusting variables

Task 11 Match these variables with the four gauges.

Variable	Some common measurement units.
Pressure	1bar = 100 kilopascals (kPa), 10 bar = 1megapascal (mPa)
temperature	degrees Celsius (0C)
level	per cent (%) or metres (m)
flow	cubic metres per minute (m3/min)

Task 12 Complete these short conversations with the correct variables and units. Then practise saying them.

1 **A:** What's the _____of fluid in this tank? **B:** It's 2.1 m. That's 70% full.
2 **A:** What's the reading on the _____ gauge?
B: 12 m3/min. Is that lower than usual?
3 **A:** The water's hotter than normal. What's the exact _____?
B: The gauge says it's 98 _____.
4 **A:** The pump _____ is 24 bar now.
B: It shouldn't be as high as that. It should be 2mPa. That's 20 _____.

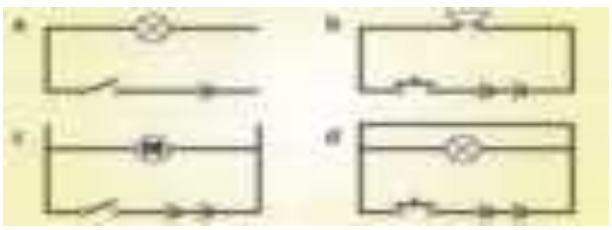
Vocabulary: Electricity and circuits

This is a multimeter. Dave uses it to test electrical circuits and measure these variables.

Variables	Units
current (l)	amps (A)
resistance (R)	ohms (Ω)
voltage (V)	volts (V)

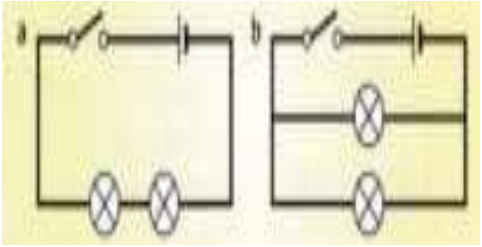
Task 13 Look at the *circuits a, b, c* and *d*. Match these components with the symbols.

battery buzzer
cell lamp
motor on-off switch
wire push switch



Task 14 Match the descriptions with the correct circuits.

1) a cell, a switch, and two lamps in parallel
2) a cell, a switch, and two lamps in series



If one lamp fails in the series circuit and in the parallel circuit, what happens to the other lamps? Why?

Writing: A leave request form

Task 15 Read the information and the form. Then answer the questions.

Leave request form

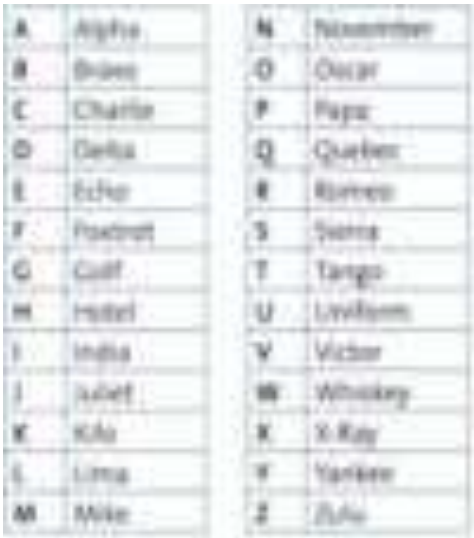
Employee name
Department
Supervisor
Type of absence requested (please tick one)
Sick
Personal Leave
Maternity / Paternity
Other
Dates of absence
From _____ to _____
Reasons for absence
Employee's signature _____
Date _____

Dave (see *It's my job)* has a cousin, Dan. Dan is getting married next Saturday. Dave should work that day, but he wants to go to the wedding. So he must request leave. He must complete this form and give it to the supervisor of the Maintenance crew (name: Martin Olsen).

1 What should Dave write in the *department* box?
a) Production b) Maintenance
c) Transport
2 Which word means 'not being at work'?
3 Which type of absence should he request?
4 What are the dates for next Saturday and Sunday?
5 What can he write in the *reasons* box?

Vocabulary: The international radio alphabet

We often need to spell out words, names, and codes on the radio and the phone. Some letters are difficult to hear correctly, for example *P, B, V,* and *E.* The international spelling alphabet solves this problem.



A	Alpha	N	November
B	Bravo	O	Oscar
C	Charlie	P	Papa
D	Delta	Q	Quebec
E	Echo	R	Romeo
F	Foxtrot	S	Sierra
G	Golf	T	Tango
H	Hotel	U	Uniform
I	India	V	Victor
J	Juliet	W	Whiskey
K	Kilo	X	X-Ray
L	Lima	Y	Yankee
M	Mike	Z	Zulu

Task 16 You don't need to understand the words, but it may help you to remember them. Find

1 people (9)
2 countries and cities (3)
3 letters from the Greek alphabet (2)

4 dances (2) **5** a sport **6** a building **7** a month **8** a weight **9** reflected sound **10** light waves **11** clothes **12** a drink **13** a Spanish word for mountains **14** an exclamation: 'Well done!'

Listening: Radio conversation

Task 17 Read about using two-way radios. Then discuss the questions.

• Most two-way radios have a PTT (Press-to-talk) button. Press it and talk. Then say 'Over' and release the button.

• Words can be difficult to hear. So speak clearly in short sentences. People often use easy-to-hear words like *Negative* (No) and *Affirmative* (Yes).

1 How is using a radio different from using a phone?

2 Why are words sometimes difficult to hear?

Task 18 Listen to a radio conversation between two offshore workers: Martin in the control room and Dave, a technician. Underline the correct words

1 Dave is in the *process* / *well head* / utilities area.
2 Dave must find gauge *P324* / *BD24* / *PD24.*
3 The reading on the gauge is 3 / 5 / 9 bar.
4 The reading in the control room is *higher* / *lower* / *the same.*
5 *Dave* / *Marlin* / *They* will diagnose the problem.

Listen again for these phrases. Then say what they mean.

Managing the conversation	Understanding and responding
1 Thisis (Name) **2** (Name) Do you read? **3** Go ahead (Name) **4** Stand by **5** Out.	**1** Affirmative **2** Negative **3** Say again **4** That's correct **5** Check

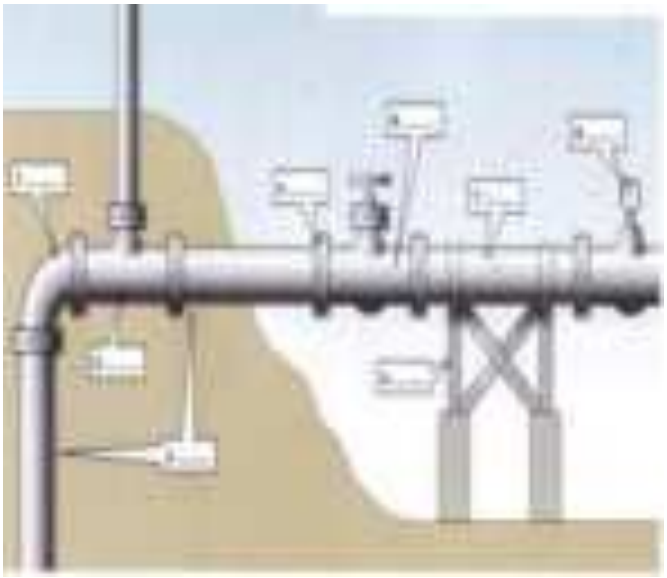
Glossary of the lesson:

Nouns: area, circuit, gauge, instrument, level, platform, pressure, training, wire, variable, well head;

Verbs: adjust, go ahead, increase, stand by;

Lesson 13 Pipes and Pipelines

Warm up:



Task 1 Match the names with 1-8 in the picture.

a flanged joint
b tee
c valve
d elbow
e pipe support
f flowmeter
g underground pipeline
h section of pipe

Task 2 Discuss the given questions.

1 Are there any pipes near where you are right now?
2 What do the pipes carry? What size are they?
3 Are there any major pipelines in your country? Can you name some world famous pipelines?

Reading: Inspection and cleaning

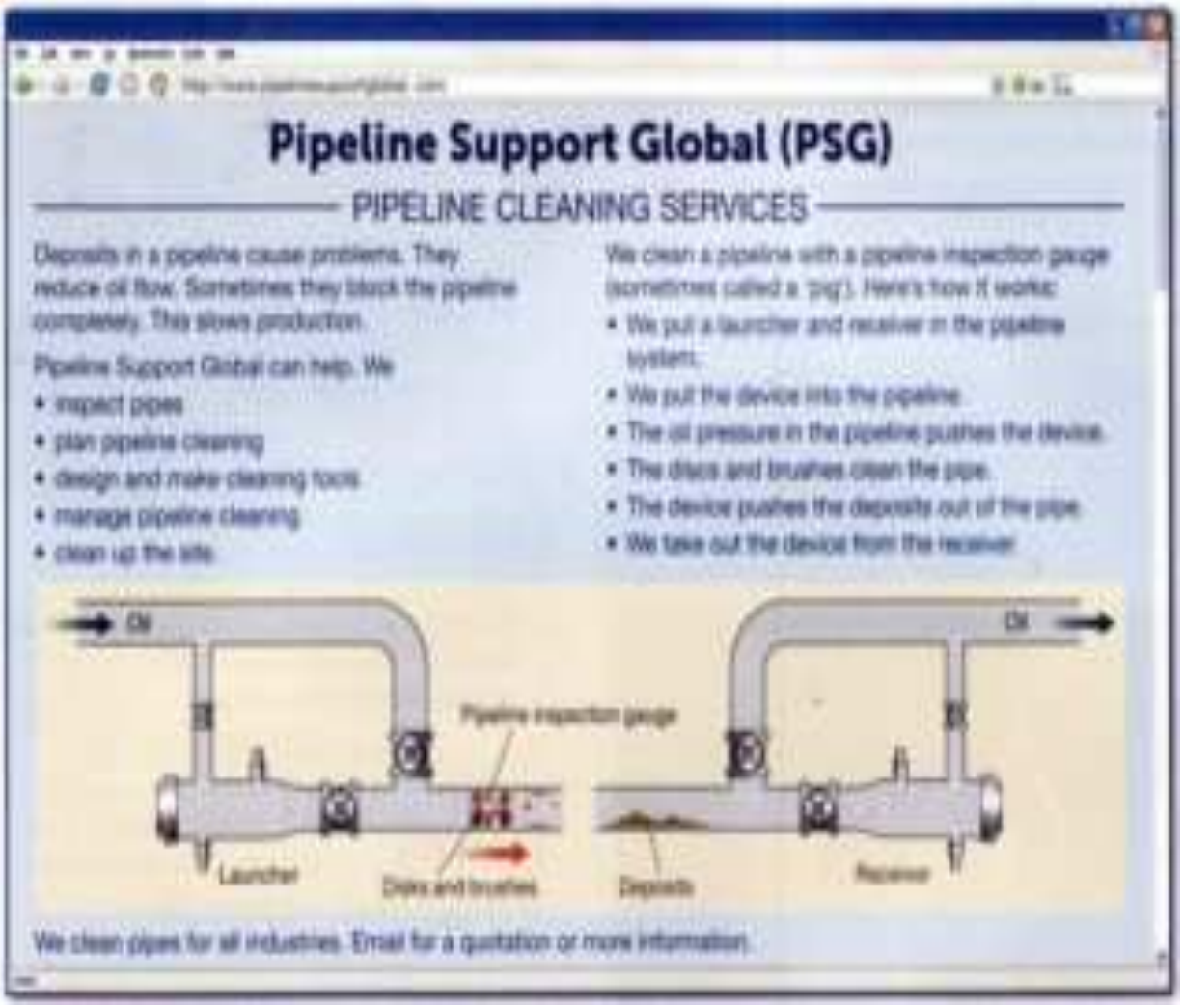
Task 3 Match the bold words with their meaning.

1 cause problems	**a)** stop the flow in
2 reduce oil flow	**b)** look carefully at
3 block the pipeline	**c)** make plans for
4 inspect pipes	**d)** make less
5 design tools	**e)** make

Task 4 Read the text. Complete the sentences.

1 D_____ reduce the flow of oil.
2 PSG makes t_____ that clean pipes.
3 Workers use a 1_____ to put the device in the pipe.
4 The device has d _____ and b_____. They clean the pipe.
5 Workers take the device out at the r_____.
6 A q _____ is a price for a job.

What cleaning jobs do you do in your everyday life?
What cleaning tools do you use?



Speaking: Describing a pipeline

Task 5 Match the descriptions with the numbers on the map.

a At the motorway, the pipe goes underground.

b There's a flow meter just before the pipeline goes into the forest.

c There's an elbow, then the pipeline goes east.

d There's a valve near the tee.

e There's one section of pipe over the river.

f There are two straight sections joined by a flanged joint.

g There are two pipe supports under this section.

h The pipeline goes south for about 100 metres. Then there's a tee

Vocabulary: Welding

Task 6 Read the text and look at the picture. Answer the questions.

1 What problems can arc rays cause?
2 What problems can smoke cause?
3 What problems can sparks cause?
4 Why is leather good for protection?
5 What do welders wear to protect their faces?

Welding is joining two pieces of metal together by making them very hot. One type of welding machine uses electricity to make a very hot spark called an arc. The arc melts the pieces of metal and they join together. Welding makes smoke, sparks, and a type of light called arc rays.

Welding hazards

• Sparks can cause fires.
• The electricity that makes the arc can also shock or burn you.
• Arc rays can burn skin (like sunburn) and eyes.
• Smoke can hurt your eyes, nose, and mouth. It can also cause problems with breathing.

Welding protection

Welders wear a helmet that protects their eyes and head. They also wear leather shoes and leather gloves to protect their hands and feet from sparks, arc rays, and hot metal. Leather is made from the skin of animas is very strong and it doesn't melt.

It's my job

Task 7 Read the passage and answer the questions.

There's a big oil and gas industry in Brazil. We also produce a lot of ethanol. So I'm always busy! Most metal pipes and fittings are welded. This means that pipe-fitters and welders work closely together. The pipe-fitters read plans for pipe systems, cut and prepare pipes, lay them out, and put all the parts together. They also drill holes for instruments (flow meters, for example) and they assemble flanges, elbows, and tees. Then I do my work. I weld together sections of pipe. After I weld the pipes, the pipe-fitters assemble them. They use bolts to join the flanged joints. Then inspectors inspect and test the pipes. Finally, workers paint and sometimes insulate the pipes.

Welders always have to be careful of electric shock, burns to the skin and eyes, and smoke. Where possible we work in the workshop but a lot of work is out on site.

Sometimes I have to work high up or in confined places, for example inside a pipe, so safety is really important.

1) Who does Joao work closely with?
2) What happens to the pipes before Joao welds them?
3) Who assembles the pipes after the welding?
4) What do the inspectors do after they inspect the pipes?
5) What three welding hazards does Joao mention?

Task 8 Number the steps in order.

a) Inspectors inspect the pipes.
b) Pipe-fitters read the plans.
c) Workers paint the pipes.
d) Pipe-fitters prepare the pipes and put parts together.
e) Pipe-fitters assemble the pipes.
f)Welders join the sections of pipe.

Listening: Welding hazards and precautions

Task 9 Look at the picture. Match the names with the parts.

Task 10 Match each sign with a warning.

1) Don't drop the cylinder!
2) Be careful. Don't trip and fall.
3) Secure the gas cylinder.
4) This could explode.
5) Use the ventilation fan.

Task 11 Listen to the health and safety officer talking to a team of welders and pipe-fitters. Number the welding hazards in the order you hear them.

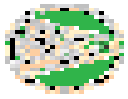
a gas cylinders **b** arc sparks **c** arc rays
d smoke **e** electric shock **f** trips and falls

Task 12 Match each hazard (a-f) in Task 11 above with a precaution.

1 Weld dry. 2 Always move it safely. 3 Cover up skin and eyes.
4 No pockets! 5 Know the material we're welding.
6 Keep the work area clean and tidy

Task 13 Listen again. Tick the pieces of safety equipment you hear.

1 safety glasses	☐	**7** respirator	☐
2 welder's helmet	☐	**8** boots	☐
3 face guard	☐	**9** ventilation system	☐
4 gloves	☐	**10** ear protectors	☐
5 cotton trousers	☐	**11** safety harness	☐
6 welding jacket	☐	**12** leather shoes	☐



Grammar review: Countable and uncountable nouns

Nouns can be countable or uncountable. Both types can be used with *the.*
Most nouns have singular and plural forms.

cylinder - cylinders, spark - sparks, material- materials

We call these countable nouns. We can use *a, some, the,* and *many* with countable nouns.

I have a cylinder. I see some sparks. We need the material.
How many cylinders are there?

In the singular, they are used with *a / an* or *one.* In the plural, they can be used with numbers or other expressions such as *some* or *many.*

a pipe three instruments an inspector several fittings one litre

The verb agrees with the countable noun.

The pipe carries the oil. Some sparks are coming out of the machinery.

Some nouns have only one form.

smoke, skin, water

We call these uncountable nouns. These have no plural form. They are used with expressions such as *some* or *much,* but not *a/ an* or numbers. Examples include *safety, smoke,* and *petrol.*

There's some water on the floor. *How much oxygen have we got?*
NOT a *smoke,* ~~*two petrols*~~
Uncountable nouns always have a singular verb form.
There is *smoke inside.* Is *there much smoke?*

Task 14 Choose the correct words to complete each sentence.

1 We switch off *equipment* / *an equipment.*
2 There are six main *hazard* / *hazards* for welders.
3 Gas *cylinder* / *cylinders* can explode.
4 Never look at *spark* / *the spark.*
5 Hot sparks can burn *clothes* / *a clothes* and start fires.
6 *Smoke* / *A smoke* from welding can be dangerous.
7 Use *cart* / *a cart.*
8 We always know *material / the material* we're welding.
9 Cover *skin* / *a skin* and eyes.
10 Don't stand in *water* / *a water.*

Task 15 Use the words in the list to complete the sentences. Then tick *U* (uncountable) or C (countable).

brush deposits ethanol eyes information oil shock smoke steam welder

U	C
☐	☐
☐	☐
☐	☐
☐	☐
☐	☐
☐	☐
☐	☐
☐	☐
☐	☐
☐	☐

1 Boiling water makes _____.
2 I have some _____.
3 I had wet feet and got a _____.
4 The _____ cleans the pipe.
5 My car holds five litres of _____.
6 The arc ray burned my _____.
7 I work as a _____ in Brazil.
8 Don't breathe the _____ !
9 There are some _____ in the pipe.
10_____is a biofuel.

Task 16 Complete the sentences with *much* or *many*.

1 How_____ oxygen cylinders are there?
2 How _____ petrol is there?
3 We can't weld here. There's too_____ water on the floor.
4 We have 100 nuts and 200 bolts. There are too _____ bolts!
5 How_____time have we got?
6 There are eight of us. That's too _____ people for one truck.

Number talk: Measuring pipes

Task 17 Use the words to complete the text.

diameter inside length radius thickness

C = circumference
D = outside _____[1]
B = _____[2] diameter (bore)
S = pipe wall _____[3]
L= _____[4]

r = inside _____[5] (B /2)

Task 18 Read the formula and the notes. Write and do the calculations. Remember to convert all measurements to metres.
Example: *L*= 12 m, *r=0.5* m. *V*= _____ *m3*
We write - 3.14 x 0.5 x 0.5 x 12 = 9.42 m3
We say - *Three point one four times point five times point five times twelve equals nine point four two cubic metres.*

1) L= 12.4 m, r = 22 mm. V = _____ m^3
2) L = 565 m, r = 550 mm. V = _____ m^3
3) L = 22.3 km, r = 1.2 m. V = _____ m^3
4) L= 640km, r=1.8m. V= _____ m^3

Task 19 Look at the picture in Task 17. Answer the questions about the pipe.

1 How long is it? **2** How thick is the wall?
3 What's the bore? **4** What's the outside diameter?
5 What's the pipe's circumference? **6** What is its volume?

Reading: Isometrics and MTOs

Task 20 Read the text. Then look at the drawing and write T (true) or F(false) for each sentence.

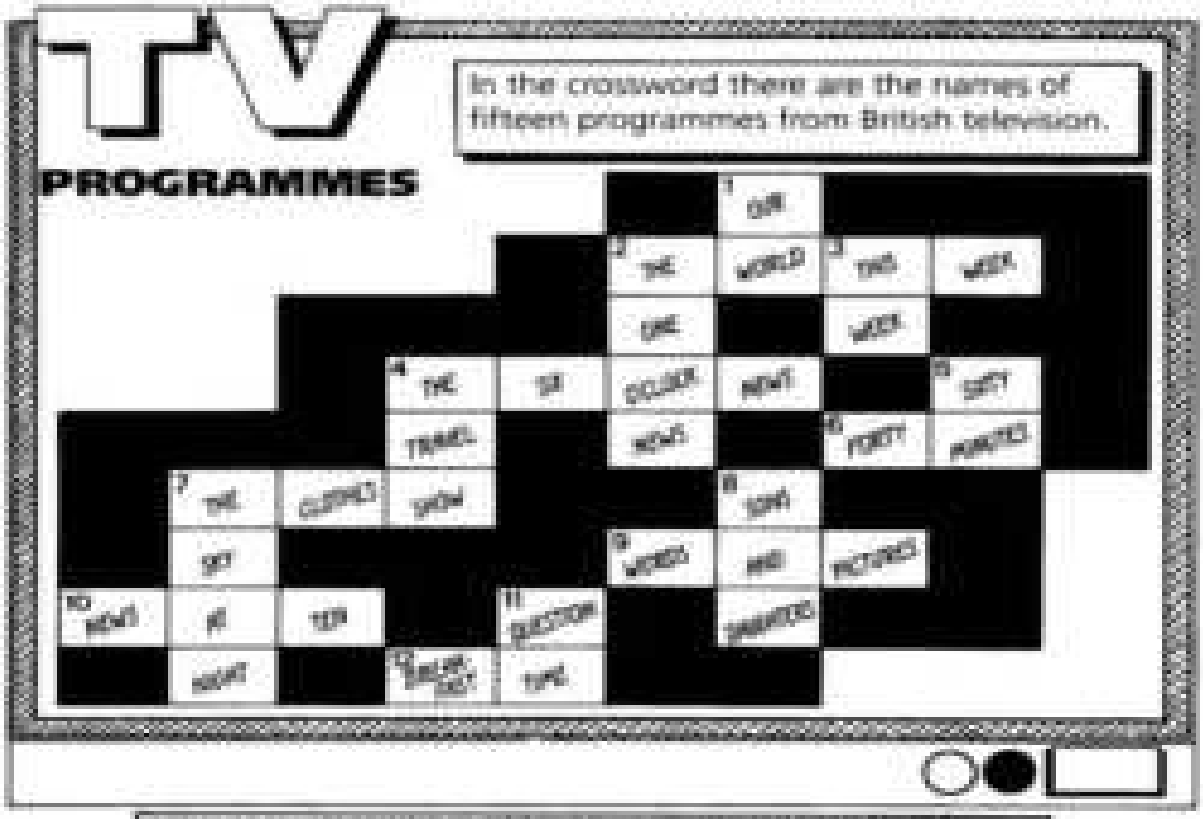
Special piping drawings called isometrics show the pipe in three dimensions (height, width, depth) on a flat drawing.
The isometric drawing also includes a Material Take Off or MTO which is a list of the material and the parts for a pipeline.

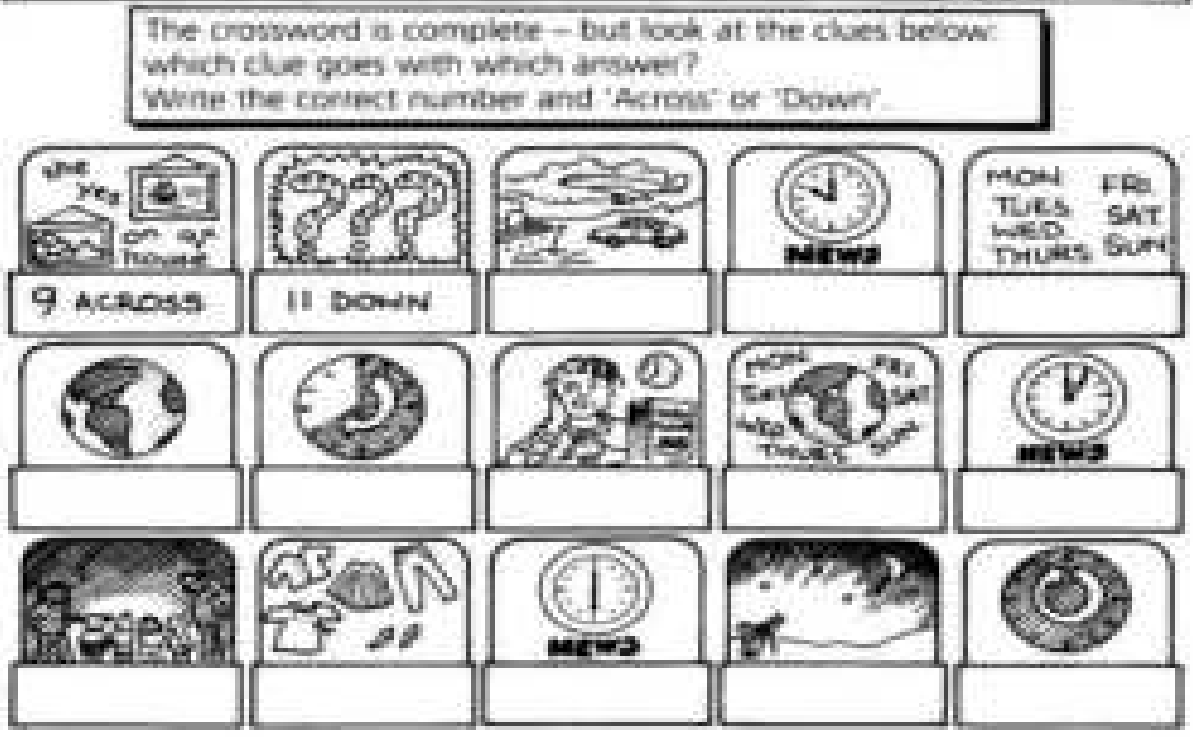
1 This drawing is a list of materials.
2 The drawing shows one tee.
3 2840 mm is probably the pipe's radius.
4 1900 mm is the measurement between the two elbows.
5 The drawing shows calculations for the volume of each pipe section.

Glossary of the lesson.

Nouns: circumference, deposit, diameter, flow, inspection, length, radius, volume, regulator, thickness;
Verbs: block, cause, design, inspect, reduce;

Puzzle time:





LESSON 14 REFINERY AND REFINING OIL AND GAS

Stater:

Task 1 Match the petroleum product with a picture.

asphalt / bitumen | liquid petroleum gas | petrol/gasoline
kerosene / jet fuel | diesel / petrodiesel | fuel oil

Can you name other ways each product is used?

Task 2 Answer the questions.

1 Which product is the heaviest?
2 Which is the lightest?
3 Which is a solid?
4 Which ones are liquids?
5 Which burns as a gas?

Listening: A refinery tour

Task 3 Listen to the presentation about Oakton refinery. Match each description (1-9) with a place (a-i) in the picture below.

Task 4 Listen again and complete the sentences. Use the words in the list.

bring *is connected* *is hidden* *is refined* *is returned*
manage *take* *travels* *is stored*

1 This is the jetty. Tankers _____crude oil to the refinery. They unload the crude oil here.
2 The crude oil _____ along these pipes into the tanks at the tank farm.
3 The crude oil _____ in these tanks until it is refined. Some of them are 80 metres high. There are over 200 steps to the top.
4 This is the main refinery. This is where the oil_____ in the distillation towers.
5 These pipes take the products out of the refinery. Some of the pipes _____ kerosene to the airport.
6 The refinery uses river water for cooling the machinery. The used water _____ here, to the salt marsh. It is often cleaner when it is returned than it was when it was taken from the river.
7 The refinery _____ to the main road here. All of the workers come and go this way. Some of our products leave this way in tankers.
8 The admin block is where the offices are. The people who work here _____the people and all of the machinery at the refinery.
9 Oakton is the neighbouring village. The refinery_____ from the village by trees.

Task 5 Answer the questions.

1 Where is the crude oil stored?
2 Where is the crude oil refined?
3 Where is water returned to the river?
4 Where are products taken out of the refinery?

Grammar review: The Passive

We use the Passive to explain actions or processes. It generally isn't important who does the action. It is the action that is the most important element.

Passive: *The crude oil is stored in these tanks*.(= this is the process; it doesn't matter who stores them)

The refinery and pipes are hidden from the village by trees.

=subject + present simple of *be* + past participle

Active

We use the Active when we know who or what does an action, and we feel that it is relevant or important to give this information.

The crude oil travels along these pipes into the tanks.

The refinery uses river water for cooling the machinery.

= subject + verb;

When describing a process, we can sometimes choose to use either the Active or the Passive. In this case, w e often use *by* with the Passive to say who does the action.

Active: *A bridge **connects** the refinery* to *the main road.*
*Tankers **bring** crude oil* to *the refinery.*
Passive: *The refinery **is connected** to the main road by a bridge.*
*Crude oil **is brought** to the refinery by tankers.*

Task 6 Choose the correct word.

1 The trees *hide* / *are hidden* the refinery.
2 The refinery is *managed* / *manages* from the admin block.
3 Some products *leave* / *are left* the refinery in tankers.
4 Kerosene is *taken* / *takes* to the airport by a pipeline.
5 The crude oil is *refined* / *refines* in the distillation towers.
6 Tankers *unload* / *are unloaded* their oil at the jetty.
7 The crude oil *stores* / is *stored* in the tanks.
8 The distillation towers *are distilled* / *distil* the crude oil.

Task 7 Match the actions with the pictures.

a) Check the transport emergency card.
b) Connect the pipes.
c) Drain the hoses.
d) Load the tanker.
e) Earth the tanker.
f) Switch off the master switch.
g) Drive the tanker into the loading area.
h) Drive the tanker out of the loading area.

Task 8 Complete the sentences. Explain how a bulk tanker is loaded safely. Use the Passive.

1 First, the tanker _____.
2 Then the tanker _____.
3 Next, the _____.
4 After that, the _____.
5 Then _____.
6 Next, _____.
7 After that, _____
8 Finally, _____ .

Number talk: Temperature

Task 9 Match the numbers with the words.

1)	- 40°C	**a)** minus forty degrees Celsius
2)	- 20°C	**b)** thirty-seven degrees Celsius
3)	- 45°C	**c)** zero degrees Celsius
4)	- 37°C	**d)** one hundred degrees Celsius
5)	- 100°C	**e)** forty-five degrees Celsius

Task 10 Complete the sentences with the temperatures in Task 9.

1) _____ °C is an average summer temperature in Saudi Arabia.
2) Ice melts at _____ 0c.
3) Water boils at _____ 0c.
4) Normal body temperature is _____ 0c.
5) _____ °C is a cold winter day in Alaska.

Task 11 Take the temperature quiz. Complete the sentences with the numbers in the list.

-42 200 250 400 600

1) In a refinery, crude oil is heated to about _____^{0}c.
2) Asphalt usually boils at more than _____^{0}c.
3) The boiling point of LP gas is usually about _____^{0}c.
4) Petrol often boils at _____^{0}c.
5) The boiling point of kerosene is usually about _____^{0}c.

It's my job

Task 12 Can you guess what a process technician does?

1) monitors the refinery equipment.
2) organizes the schedule of crude oil delivery.
3) deals with environmental complaints.
4) takes care of troubleshooting and repairs.
5) tests the refinery's products.

Read and check your answers.

Task 13 Read the passage and answer the questions.

Suparman Perkasa

I work at an oil refinery in Sumatra, Indonesia. It's a big refinery. There are more than 300 tanks and nearly 1,000 workers. My team takes care of all of the refinery equipment. When the refinery is running normally, we monitor all of the equipment. This means we check and maintain everything. When there is a problem, we troubleshoot it. That means trying to understand what's wrong. Then we try to repair it. We work closely with the maintenance team.

Sometimes, we need to shut down part of the refinery for a big repair job and for some maintenance jobs, for example furnace cleaning. Shutting down means safely stopping some of the machines. But you can't just switch it off! We usually schedule a maintenance shut down a year in advance. We work closely with an experienced, specialist contractor. Another important job is checking the products that are made in the refinery. This means we test the petrol, the kerosene, and so on to make sure it is good. My team also writes in the production log. The production log is the information about how much crude oil we have processed and how much of each product we have made.

1 How many people work at Suparman's refinery?
2 What two reasons does he give for shutting down?
3 What maintenance job does he mention?
4 How much time do they take to plan a shut down?
5 What two refinery products does he mention?

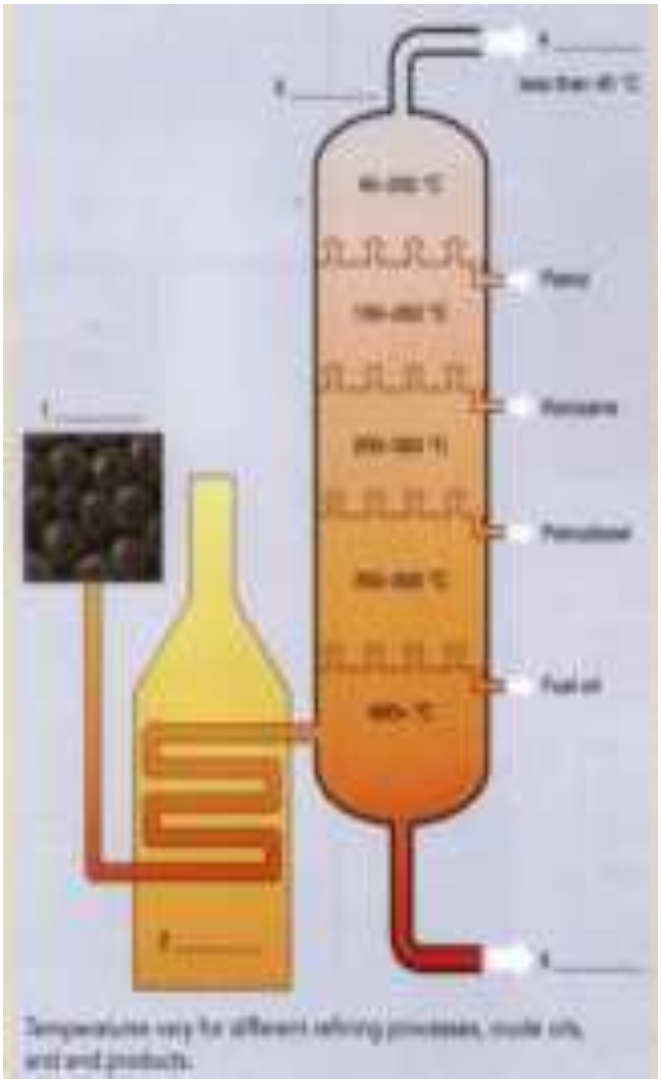
Reading: Fractional distillation

Task 14 Read the text. Use the words in *bold* to label the picture (1-5)

How a refinery works

An oil refinery turns **crude oil** into **petroleum gas,** petrol/gasoline, kerosene, diesel oil, fuel oil, **asphalt / bitumen,** and many other products. Here's how it works. First, the crude oil is pumped into the **furnace,** where it is boiled. Next, the boiling oil enters the bottom of the **distillation tower.** Boiling separates the crude oil into fractions. *Fraction* means *part.* The fractions of crude oil are products with different boiling points: petroleum gas, petrol, and so on.

The lightest product, petroleum gas, rises to the top. The heaviest products, like asphalt, sink to the bottom. After the products are separated, they are piped out of the tower. The different products are stored in tanks in the refinery. Finally, they are taken out of the refinery by tanker lorry, rail tanker, boat, or pipeline.



Refineries and the environment

In addition to making useful petroleum products, fractional distillation and other refinery processes also can create noise, odour, air pollution, and water pollution. Most countries have environmental rules that refineries must follow. All refineries must monitor and control possible problems. Every refinery has a safety and environment officer. His or her job is to make sure the refinery follows the rules.

Answer the questions.

1) Which product has a boiling point of about 350^0C
2) Which is lighter, petrol or kerosene?
3) Which is the heaviest product on the picture?
4) What three vehicles does the text mention?
5) What environmental problems are mentioned?
6) Who has the job of monitoring possible environmental problems?

Keywords of the lesson

Nouns: asphalt, boil, bulk tanker, degrees Celsius (OC), fractional distillation, fuel oil, furnace, gas, kerosene, liquid petroleum gas (LPG), petrodiesel;

Adjective: solid

Verbs: earth, melt, refine;

monitor (v) to watch and check something over a period of time in order to see how it develops, so that you can make any necessary changes;

production (n) amount of a product that is made, for example 14.5 million litres of petrol per day

troubleshoot (v) find and correct problems in a mechanical, electrical, or electronic system

earth (v) (Br E) connect an electrical device with the ground. Am E= *ground*

Do you know that?

World's top three refineries in production

Name of refinery	**Location**	**Litres per day**
Paraguana Refining Complex	Venezuela	149.5 million
SK Energy Ulsan Refinery	South Korea	133.5 million
Yeosu Refinery	South Korea	111.3 million

Task 15 Match the words 1-13 with their descriptions a-m.

1) substation	a) water supply for chemical processes
2) conversion area	b) the centre of the refinery
3) tank farm	c) control of access
4) canteen	d) space for cars
5) main gate	e) electricity supply

6) administration building	f) store of dangerous materials
7) separation area	g) where chemicals are added to make products ready for market
8) river	h) a place to get food
9) treatment area	i) offices for different petroleum products
10) labs	j) storage tanks
11) parking area	k) the location of the distillation columns
12) hazardous materials area	l) the location of the labs
13) control room	m) where heat and pressure are used to change the components;

Writing: Refinery jobs

Task 16 Read the texts. Match the jobs in the box to the descriptions.

safety instructor ~~control room operator~~ maintenance supervisor pump system operator lab technician

1 My job is to work in the refinery control room. I monitor equipment and troubleshoot problems, *control room operator*

2 I'm responsible for all the pump systems in the refinery. I use different instruments in my work, including pressure gauges and flowmeters.

3 I work in a lab. My job is to add chemicals to the products and carry out tests. I write a lot of reports.

4 My job is to co-ordinate and supervise a team of engineers and technicians. Together we inspect and maintain refinery equipment and piping systems. Sometimes we repair equipment.

5 I train all the employees in everything to do with fire safety. This includes hazmat training as well as emergency procedures.

Task 17 Find the odd one out. Explain why.

1 employee, engineer, equipment, technician, supervisor

2 pressure gauge, piping systems, pump systems, flowmeters, training

3 fire safety, write reports, carry out tests, monitor equipment, train employees

Task 18 Underline the following word partnerships in the descriptions above.

a) refinery equipment	b) fire safety
c) emergency procedures	d) piping systems
e) hazmat training	f) pressure gauges

LESSON 15 PETROLEUM RESERVES

Get ready!

Task 1 Before you read the passage, talk about these questions.

1 When might governments need to use petroleum reserves?

2 What is made between governments and oil companies to ensure oil supplies do not run out?

Reading tasks:

Task 2 Read the passage and translate it into Uzbek language.

Strategic Petroleum Reserves

People are dependent on oil for transportation, electricity and the manufacture of goods. A shortage of available oil leads to an energy crisis. Currently, most oil shortages are the result of an embargo. During an embargo, exporting oil countries limit operations. They no longer allow another country to import their oil. When oil reservoirs run low someday, a global energy crisis could occur.

To prepare for oil shortages, many countries create domestic strategic stockpiles. They store barrels of oil in safe locations. These oil supplies can be used in emergencies. Often governments make agreements with oil companies. They create a price for large amounts of oil. Goverments sometimes purchase oil from other governments' stockpiles.

Task 3 Read the passage again and mark the following statements as true (T) or false (F).

1 _____ An energy crisis can result from an oil embargo.

2 _____ Countries that import oil send it to other countries.

3 _____ Governments cannot release oil from strategic stockpiles.

Vocabulary tasks:

Task 4 Translate the active vocabulary of the lesson into Uzbek language.

energy crisis, embargo, exporting oil countries, to import, global, to occur, to store, domestic, stockpiles, oil supplies, emergencies, agreement, to purchase, price, government, to allow, oil shortage, to create, available, safe locations;

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

1 ___ import	A) a very serious situation
2 ___ store	B) a period when a valuable resource is scarce
3 ___ global	C) to spend products to a different country
4 ___ energy crisis	D) a large accumulation of something
5 ___ emergency	E) to bring in products from another country
6 ___ exporting	F) having to do with the entire world
7 ___ domestic	G) having to do with one country
8 ___ stockpile	H) to put something away for future use

Task 6 Read the sentence pairs. Choose where the words best fit the blanks.

1 agreement / oil supply

A) The oil company and the government made an _____ for the purchase of oil.

B) Some people are worried the world's _____ is going to run out.

2 embargo / strategic

A) The country has created a large _____ petroleum reserve.

B) An oil _____ can cause an energy crisis for some countries.

Speaking tasks:

Task 7 Work in groups and discuss these questions.

1 What do you know about the theory of 'peak oil'? How true do you think it is?

2 What new resources of oil and gas that we know about have not been exploited yet?

Task 8 Read the given text and discuss it in groups. Do some exercises.

Arctic Circle may hold key to world oil supply

The United States Geological Survey (USGS) believes that the area north of the Arctic Circle holds an estimated 90 billion barrels of oil. This is enough to supply the world for almost three years at 86.4 million barrels a day. Russia, Canada, Denmark, Norway, and the USA have all claimed some of these resources. Global warming is melting the ice so it is easier to reach the oil. The USGS thinks the area north of the Arctic Circle could also contain 1,770 trillion cubic feet of natural gas. The Arctic holds about thirteen per cent of the world's undiscovered oil, 30 per cent of the undiscovered natural gas and twenty per cent of the undiscovered liquefied natural gas.

Mark Myers of the USGS thinks it is important to have the facts. Then we can decide how to protect endangered species, native communities, and the health of our planet.

Frank O'Donnell of Clean Air Watch said polar bears and other wildlife within the Arctic Circle are losing their habitat due to global warming which is caused by burning fossil fuels, and would also be put in danger by companies searching for oil. An oil split could cause enormous damage to the environment and habitats.

Task 9 Read the text again and answer the questions.

1 How many barrels of oil does the world consume each day?
2 Which countries are interested in exploiting the Arctic?
3 Why has this area become easier to exploit?
4 What do these percentages describe? 13% 30% 20 %
5 Who is Mark Myers?
6 Why does Mr. Myers think we need to have the survey information?
7 What dangers does the Arctic face because of global warming?
8 What other dangers could be caused by companies exploring for oil?

Task 10 How many zeros are there in these numbers?

1 ten	3 a thousand	5 a billion
2 a hundred	4 a million	6 a trillion

Task 11 Write the large numbers in the text in full.

a) 86.4 million _____
b) 90 billion _____
c) 1, 770 trillion _____

Task 12 Translate the given sentences into Uzbek language.

1) Petroleum has been known to man long before our era.
2) We learn that petroleum has been used for illumination in the countries to the Caspian and Mediterranean Seas as far as several centuries B.C.
3) Russian geologists have established nearly 30 areas where solid gas could exist.
4) The early rotary procedure has hardly changed over the years.
5) Over time, the Earth's crust has grown thicker and more stable.
6) Ice or glaciers have not been important for most of the sediments in which oil and gas are found.
7) For several thousands of years hydrocarbons have been used for illumination.
8) Petroleum and natural gas belong to the mineral that have been used for illumination.
9) Accumulations of petroleum have also been found only in certain individual sections of a limestone block.
10) Sedimentary rocks are often classified according to the way they had been formed and to the size of the particles in them.

Task 13 Put the words in the correct order to make notes.

1 office / send / letter / this / please / the / to / Bahrain
2 don't / computer / this / use / please
3 this / to / safety / the / officer / please / take / key
4 don't / please / these / drawings / from / workshop / the / remove
5 copies / please / 10 / this / of / make / letter
6 don't / this / destroy / please / drawing

Task 14 Match each note with a picture.

Task 15 Read the service report. Write T (true) or F (false).

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.

APPENDIX

Irregular verbs

Infinitive	Past Simple	Past Participle	Infinitive	Past Simple	Past Participle
be	was / were	been	know	knew	known
become	became	become	leave	left	left
begin	began	begun	lose	lost	lost
break	broke	broken	make	made	made
bring	brought	brought	meet	met	met
build	built	built	put	put	put
burn	burnt / burned	burnt / burned	quit	quit	quit
buy	bought	bought	read	read	read
choose	chose	chosen	ride	rode	ridden
come	came	come	run	ran	run
cost	cost	cost	say	said	said
cut	cut	cut	see	saw	seen
deal	dealt	dealt	sell	sold	sold
dig	dug	dug	send	sent	sent
do	did	done	shake	shook	shaken
drink	drank	drunk	show	showed	shown
drive	drove	driven	shut	shut	shut
fall	fell	fallen	sleep	slept	slept
feel	felt	felt	smell	smelt	smelt
find	found	found	speak	spoke	spoken
fly	flew	flown	spend	spent	spent
freeze	froze	frozen	stand	stood	stood
get	got	got / gotten	swim	swam	swum
give	gave	given	take	took	taken
go	went	gone / been	teach	taught	taught
grow	grew	grown	tell	told	told
have	had	had	think	thought	thought
hear	heard	heard	throw	threw	thrown
hide	hid	hidden	understand	understood	understood
hit	hit	hit	wear	wore	worn
hurt	hurt	hurt	write	wrote	written
keep	kept	kept			

Abbreviations

°	degree
%	per cent
π	pi
±	plus or minus
2D	two-dimensional
3D	three-dimensional
A	amps
a.m.	ante meridian (in the morning)
bbl	barrel
bpd	barrels per day
C	Carbon
C	Celsius
co.	company
CO_2	carbon dioxide
dd/mm/yyyy	day/month/year
E	east
g	gram
GPS	global positioning system
H	hydrogen
HR	Human Resources
IOC	international oil company
k	kilogram
kPa	kilopascal
kph	kilometres per hour
I	current
l	litre
LAT	latitude
LNG	liquefied natural gas
LON	longitude
LPG	liquefied petroleum gas
m	metre
m^3	cubic metre
mm	millimetre
µm	micron
mPa	megapascal
N	north
N	nitrogen
no.	number
NOC	national oil company
Ω	ohms
p.m.	post meridian (in the afternoon / evening / at night)
PPE	personal protection equipment
PTT	press to talk
PVC	polyvinyl chloride
r	radius
R	resistance
S	south
t	tonne
UAE	United Arab Emirates
UK	United Kingdom
USA	United States of America
V	voltage / volts
W	west

GLOSSARY

above-ground - *on the surface of the earth rather than under it*
activate (*v) - to make a device start working*
adjust (*v)- to change something slightly to make it better or more suitable*
ambulance (*n) - a vehicle with special equipment, used for taking sick people to hospital*
ammonia (*n) (symbol:* NH_3) *a gas with a strong smell, used to make fertilizers and cleaning substances*
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.*
barrel (*n) - 1. a large round container with flat ends and curved sides, used for storing liquids such as oil 2. (abbr. bbl) a unit for measuring oil that equals 42 US gallons (= about 159 litres)*
bearing (*n) - the direction in which you must travel in order to reach a particular place.* ***Bearings*** *are measured in degrees in a clockwise direction from north.*
belt (*n) - a band in a machine that turns round in order to turn something else*
bent (*adj) - not straight*
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*
bolt (*n) - a strong metal pin like a screw that attaches to a circle of metal (= a nut) to fasten things together*
broken (*adj) - damaged or no longer working correctly*
budget (*n) - the money that is available to someone and a plan of how it will be spent*
bulk tanker (*n) - a ship or truck that carries oil, gas, or petrol in very large quantities*
carbon black (*n) - a fine carbon powder, used to make black paint or ink and some kinds of rubber*
carefully (*adv) - with care and attention*
cause (*v) - to make something happen, especially something bad*
chemical (*n) - a particular compound or substance, especially one which has been artificially prepared*
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*
containment (*n) - 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.*
contractor (*n) - a person or company that does work or provides goods for another company*
control room (*n) - a room that contains equipment for operating the machines in a factory, refinery, etc.*
convert (*v) - to change something from one form, system, etc. to another, for example to change sound waves into an electrical signal*
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)*
cubic metre (*n) - (abbr.* m^3) - a unit of volume that equals 1,000 litres
cuboid (*adj)* - shaped like a cube *(= a shape with six square sides like a box)*

cylindrical (*adj) - shaped like a cylinder (= an object like a pipe with long straight sides and two round ends)*
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*
deal with (v) - *to take action to solve a problem*
defibrillator (*n) - medical equipment that is used to give the heart an electric shock so that it beats normally*
degrees Celsius (*n)(abbr.* ^{0}C) - *a scale of temperature in which water freezes at O^o and boils at 100^o*
department (*n) - a section of a company or other large organization*
deposit (*n) - a substance that is left somewhere by the flow of water, oil, etc., such as dirt left at the bottom of a pipe*
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*
diameter (*n) - the width of a circle or any other round object such as a pipe*
disconnect (*v) - to separate two or more things*
downstream (*adj) - connected with the processing and selling of oil and gas*
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
earth (*v) - to connect equipment to the ground so that it is protected from the possible flow of electric current (Am E= ground)*
eco-hazard (*n) - something that can harm the environment*
emergency (*n) - a sudden dangerous situation which needs immediate action to deal with it*
emergency shower (*n) - a shower in a factory or laboratory that is used if there is an accident;*
enclosure (*n) - an area that is surrounded by a wall and is used for a particular purpose*
ensure *(v) - to make certain that something happens*
environmental (*adj)* - connected with the environment (= the natural world in which people, animals, and plants live)
evacuate (*v) - to make people leave a dangerous building or area*
exploration (*n) - the process of finding a source of oil or gas that a company can possibly develop*
explosion (*n)* - the sudden violent bursting of something like a bomb
fire engine (*n) - a special vehicle that carries firefighters (= people who put out fires) and their equipment*
fire extinguisher (*n) - a device with water or chemicals inside that you use to stop a fire burning*
first aid kit (*n) - a box containing medicine and equipment that you use for emergency medical treatment*
flow (*n) - the steady movement of a liquid in one direction*
foreign (*adj) - in or from a country that is not your own*
fractional distillation (*n) - the process of separating the different substances within crude oil by heating it until it becomes a gas and then collecting the gas and liquids that form at different temperatures*

frozen - (*adj) - 1. (of a screw, etc.) stuck or rusted so that it no longer moves 2. (of a computer) not working or responding so that you cannot move anything on screen*
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.*
gas (*n) - any substance that is neither a solid nor a liquid, for example hydrogen and oxygen*
gauge (*n) - a device for measuring the amount or level of something*
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*
guide (*v) - to move something in a particular direction*
hazard (*n) - something that may be dangerous*
heading (*n) - the direction in which you are currently moving*
heavy (*adj) - weighing a lot*
horizontal (*adj) **- going across and parallel to the ground rather than going up and down***
Human Resources (*n) - the department in a company that deals with employing and training people.*
hydrocarbons (*n) - chemicals that are made of hydrogen and carbon, especially the main substances in oil, gas, and coa*l
incident (*n) - a bad or unfortunate event such as an accident*
increase (*v) - to make something larger in amount*
inexpensive (*adj) - not costing a lot of money; cheap*
injure (*v)* *- to harm someone physically, especially in an accident*
inspect (*v) - to examine something closely to check that there are no problems or errors*
inspection (*n) - a close examination to check that there are no problems or errors*
install (v) - *to fix equipment into position so that it can be used*
instrument (*n) - a tool or device used for a particular task, especially for technical or scientific work*
international (*adj) - connected with or involving two or more countries*
jammed *(adj) - not able to move*
kerosene (*n) - a type of oil made from crude oil and used as fuel for planes and for heating in houses*
layer (*n) - a sheet or level of rock, soil, etc. that is above or below other sheets or surfaces*
length (*n) - the size of something from one end to the other*
level (*n) - the amount or height of something, for example the amount of liquid in a tank*
light (*adj) - not weighing very much*
liquefied natural gas (LNG) (*n)* *- natural gas such as methane that is changed into liquid so that it can be stored or transported more easily*
liquefy (v) - *to become liquid; to make something become liquid*
liquid *(adj)* *- in the form of a liquid; not a solid or a gas*
liquid petroleum gas (LPG) (*n*) *- gas that is obtained from crude oil and made into a liquid under pressure. LPG is usually a mixture of propane and butane and is used as fuel for some vehicles or for heating in houses.*
load (v) - *to put things on or in a vehicle, a container, etc.*
maintain (v) - *to keep a machine, a tool, etc. in good condition by checking or repairing it regularly*

maintenance (*n)* - *the act of keeping something in good condition by checking or repairing it regularly;*
manage (v) - *1. to be responsible for organizing a business, a team, etc. 2. to decide how to use money in a sensible way*
man-made *(adj) - made by people; not natural*
medical oxygen (*n) - pure oxygen that is given to someone to breathe as part of medical treatment*
melt *(*v) - *(of a solid substance) to become liquid as a result of heating*
messy *(adj) - untidy*
methane (*n) (symb* CH4) - *a gas without colour or smell, that burns easily and is used as fuel. Natural gas mainly contains methane.*
micron (*n)* – one millionth of a metre;
molecule (*n)* - the smallest unit of a chemical substance, consisting of a group of atoms
monomer (*n)* - a molecule that can join with other molecules to form a polymer
motor (*n) - a machine that uses petrol / gasoline, electricity, etc. to produce movement and supply power to a vehicle or device*
mud (*n) - a mixture of water, earth, and other materials which cools and cleans the drill bit*
noise (*n) - sound, especially when it is loud or unpleasant*
noisy (*ad) - making a lot of noise*
offshore (*adj) at sea, not far from the land*
oilfield (*n) - an area of land that has large amounts of oil under its surface*
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*
operate (v) - *1. to use or control a machine; 2.to manage an organization or process*
operating company (*n) - a company that controls production of an oil well*
organize (v) - *to plan work in an efficient way*
package (v) - *to put something into a box, bag, etc. so that you can transport or sell it*
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*
plant (*n) - a large factory that processes oil and gas, produces power, etc.*
plastics (*n) - artificial materials that are made from polymers. Plastics can be shaped when heated and are used for making many things.*
platform (*n) - a large structure standing above water in the sea which provides a base for drilling for oil or gas*
plentiful (*adj) - available in large amounts*
polyethylene (*n) - a common type of plastic that is used for making bags or packaging*
polymer (*n) - a substance that is made from a number of the same molecules (= monomers) that are joined together. Polymers are used to make plastics*.
position (*n) - the place where a person or thing is located*
precision (*n) - very accurate: a precision instrument*
prehistoric (*adj) - relating to the ancient past before people kept written records*
pressure *(n) - the amount of force that a gas or liquid produces in a pipe or container*
processing plant (*n)- a factory that separates the different substances within oil and natural gas*
product (*n) - a thing that is made, usually for sale*
production (*n) the process of removing oil or gas from the ground and transporting it*
protect (v) *to make sure that a person or thing is not harmed or damaged*
pump *(n) - a machine that is used to force liquid, gas, or air into or out of something*
radius (*n) - the distance between the centre of a circle and its outer edge*
react *(*v) - *to respond to something by behaving in a particular way*

record *(v) - 1. to keep an account of facts, measurements, etc. by writing them down or storing them in a computer 2. (of a measuring device) to show a particular measurement or amount*
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.*
reflect (v) - *to throw back light, sound, etc. from a surface*
regulator (*n) - a device on a machine that automatically controls something such as speed, pressure, etc.*
reinstall (v) - *to install something again*
remove *(v) - to take something away from a place*
repair *(v) - to fix something that is broken or damaged*
replace (*v) - to change something that is old or broken for a similar thing that is newer or better*
requisite (*n) - a formal written request for something*
responsibility (*n) - something that it is your duty to deal with because it is part of your job*
rigger (*n) - a person who prepares or uses equipment for lifting heavy objects*
risk assessment (*n) - an examination of the possible dangers in a particular situation before it happens*
rock *(n) - the hard solid material on the surface of the earth; a piece of this material*
roughneck (*n) - a skilled person who works on a drill, for example by connecting or separating the pipes in a drill string*
roustabout (*n) - a man with no special skills who does basic work on an oil or gas rig*
rule (*n) - a regulation or principle that tells you what to do in particular situations*
rusted (*adj) - covered with rust (= a reddish-brown substance that forms on iron when it is in contact with water and air)*
safely (*adv) - in a way that is not dangerous*
safety (*n) -* 1. the state of being safe 2. something that prevents injury or harm: *a safety helmet*
schedule (*n) - a plan or list of all the work that you must do and when you must do each task*
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*
shift (*n) - a period of time worked by workers in a factory, refinery, etc where some people work at night and other people work during the day*
shock (*n) - you get an electric shock if electricity suddenly passes through your body*
sign *(n) - a notice with a picture or writing on it that gives instructions, a warning, etc.*
signal (*n) -* 1. a movement or sound that you make to give instructions, a warning, etc 2. a series of electrical waves that carry sounds, pictures, or messages
slippery (*adj) - (of an object or a surface) difficult to hold or stand on because it is smooth and wet*
solid (*adj) - hard or firm; not in the form of a liquid or gas*
specialize (in) (*v) - to concentrate on a particular area of business; to become an expert in something*
spherical (*adj) - shaped like a sphere (= a figure that is completely round like a ball)*
split (*adj) - with a tear or crack in the surface*
stand by (*v) - used to ask someone to prepare or get ready to do something*
stretcher (*n) - a long piece of cloth with a pole on each side, used for carrying a sick or injured person*
supplier (n) - *a person or company that supplies goods*
supply (*v) to provide somebody with something that they need*

synthetic (*adj) - artificial; made by combining chemical substances rather than made naturally by plants or animals*
team (*n) a group of people who work together*
Technical Support (*n) - a department in a company that deals* with problems relating to computers or technical equipment
technician (n) - *a person whose job involves looking after technical equipment*
thick (*adj) - (of a liquid) not flowing very easily*
thickness (*n) - the distance between opposite surfaces or sides of a solid object*
thin (*adj) - (of a liquid) containing more water than usual so that it flows very easily*
tidy (*ad) - arranged neatly and with everything in order*
tighten (*v) - to make something become tight or tighter*
toolpusher (*n) - the most senior person in a drilling crew who is responsible for managing the staff and the supply of equipment; also known as a rig manager*
training (*n) - the process of learning the skills that you need to do a job*
troubleshooting (*n) - helping to solve problems in a company or an organization*
truck (*n) - a large vehicle for carrying heavy loads by road*
underground (*adj) - under the surface of the ground*
unload (*v) - to remove things from a vehicle or ship*
upstream (*adj) - connected with finding and drilling for oil and gas*
valve (*n) - a device that opens and closes and which is used for controlling the flow of a liquid or gas through a pipe*
vaporize (v) - *to become gas; to make something become gas*
vapour (*n) - a gas such as steam that is created by the heating of a liquid or solid substance*
variable (*n) - a number or quantity that can change*
vertical (*adj) - going straight up or down*
vibration (*n) - a continuous shaking movement*
volume (*n) - the amount of space in a container, for example the amount of liquid that a pipe can hold*
warn (*v) - to tell someone about a possible danger so that they can avoid it*
wave (*n) - the form that energy such as sound and light takes as it moves*
waypoint (*n) - a place where you may stop during a flight or journey*
well head (*n) - a structure over the top of a well with equipment for controlling the flow of oil or gas*
wire *(n) - a thin piece of metal that can carry an electric current*
workbench (*n) - a long table used when working with tools*
worn (*adj) - made thinner, smoother, or weaker because of being used or rubbed a lot*

Communication tasks

Student A

1 Ask questions to find out about Student B's lorry.

length: _____

height: _____

weight: _____

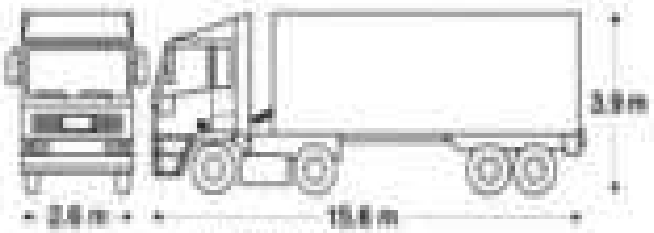
speed: _____

Useful language

How _____ is it?

(long, high, heavy, fast)

2 Answer Student B's questions about this lorry.



Model D-158
32 tonnes, 80 kph

3 Can the lorries go on a road with each sign? Tick (✓) the correct box.

					
D-156	yes ☐ no ☐	yes ☐ no ☐	yes ☐ no ☐	yes ☐ no ☐	yes ☐ no ☐
D-134	yes ☐ no ☐	yes ☐ no ☐	yes ☐ no ☐	yes ☐ no ☐	yes ☐ no ☐

Student B

1 Answer Student A's questions about this lorry.

Model D-114
27 tonnes, 70 kph

2 Ask questions to find out about Student A's lorry.

length: _____

height: _____

weight: _____

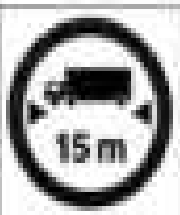
speed: _____

Useful language

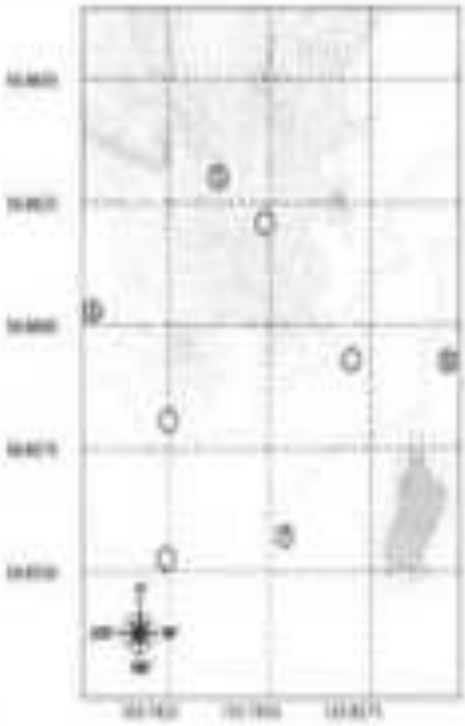
How _____ is it?

(long, high, heavy, fast)

3 Can the lorries go on a road with each sign? Tick (✓) the correct box.

					
D-156	yes ☐ no ☐	yes ☐ no ☐	yes ☐ no ☐	yes ☐ no ☐	yes ☐ no ☐
D-134	yes ☐ no ☐	yes ☐ no ☐	yes ☐ no ☐	yes ☐ no ☐	yes ☐ no ☐

Student A



1 Write the numbers from the map.

a. _____ Your position: 16. 8562, 101.7912

b. _____ Your next waypoint: 16.8605, 101.7104

c. _____ The position of the survey crew: 16.8632, 101.7635

d. _____ Base camp: 16.8191, 101.8516

2 Answer Student B's questions.

3 Ask Student B questions. Mark three places on the map.

2 = Student B's position

4 = Student B's next waypoint

8 = The position of the seismic team

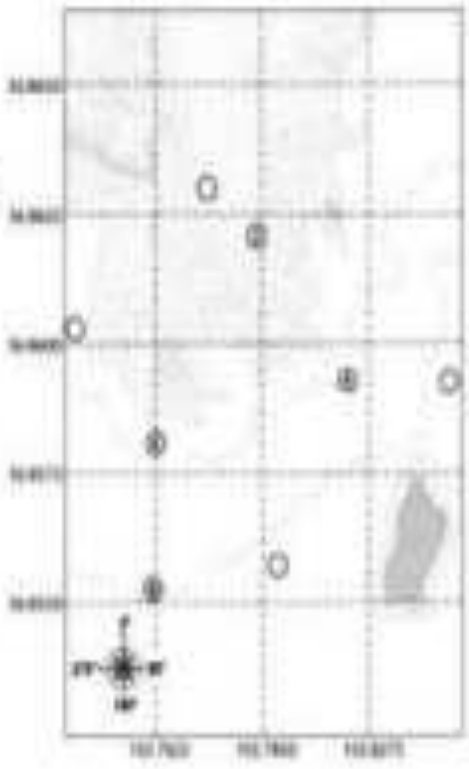
6 = Your meeting place with Student B

What is Student B's heading?

Useful language

What's your position right now?
My coordinates are _____ degrees by _____ degrees.
What's your heading?
_____ degrees.

Student B



1 Write the numbers from the map.

a. _____ Your position: 16. 8622, 101.7840

b. _____ Your next waypoint: 16.8595, 101.8190

c. _____ Your meeting place with Student A: 16.8183, 101.7425

d. _____ The seismic team: 16.8151, 101.7420

2 Ask Student A questions. Mark three places on the map.

9 = Student A's position

1 = Student A's next waypoint

1 = The position of the survey crew

1 = Student A's base camp

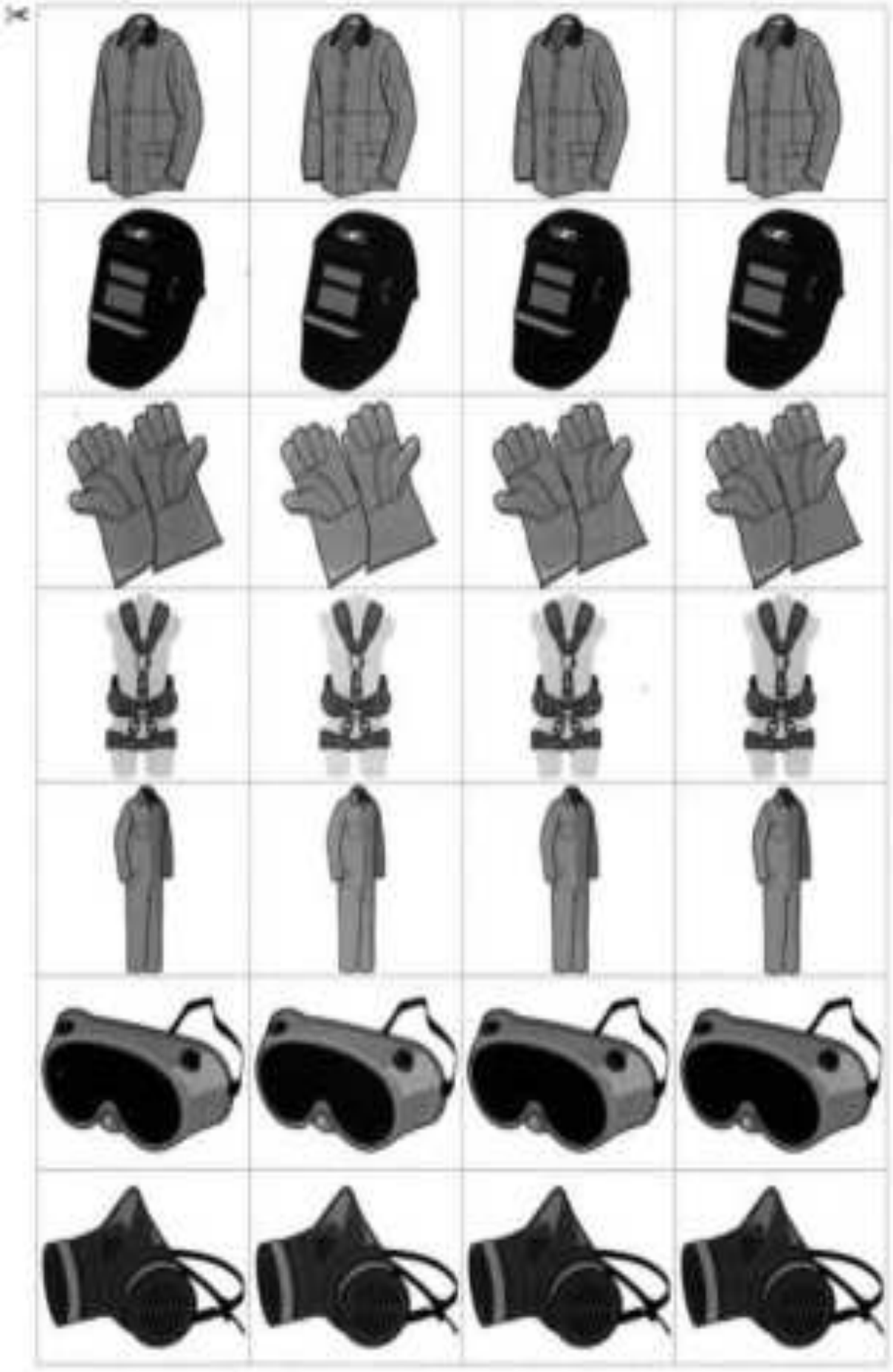
What is Student A's heading?

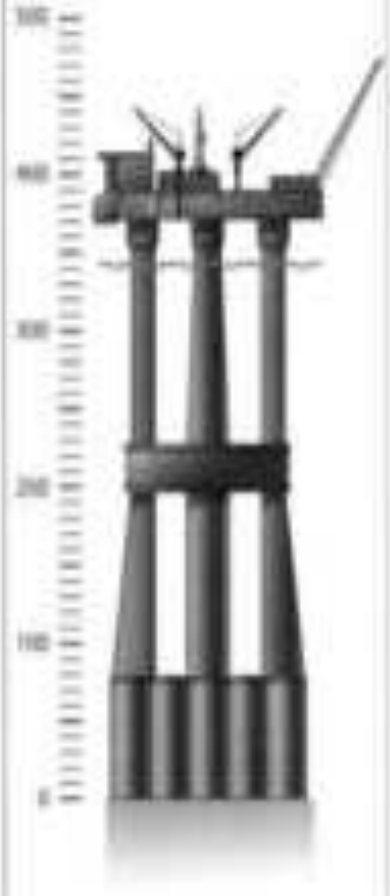
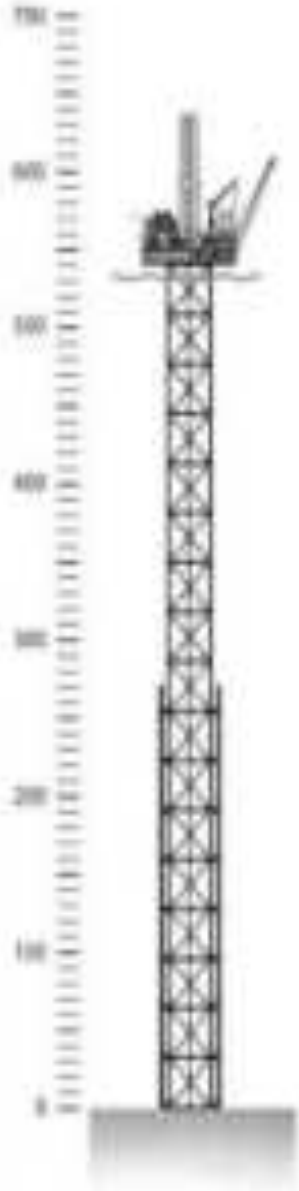
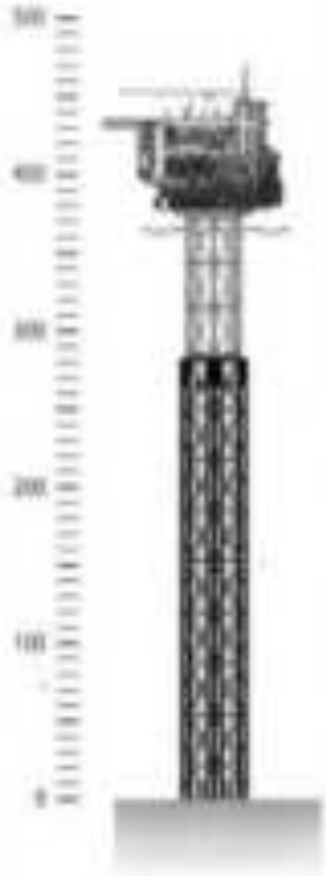
3 Answer Student A's questions.

Useful language

What's your position right now?
My coordinates are _____ degrees by _____ degrees.
What's your heading?
_____ degrees.

Roustabout	Roughneck	Derrickman	Driller	Rig manager
				
• is like a roustabout, but more skilled • works on the drilling floor • connects and disconnects drill pipes	• works high up on the monkey board • guides the top part of the drill pipe • checks the mud and maintains the pump	• is the youngest in a drilling crew • cleans, maintains, and moves equipment • helps the other workers	• is the most senior person in the drilling crew • is usually the oldest and most experienced • makes sure the crew has the right equipment • is responsible for safety and paperwork	• supervises and trains the drilling crew • controls the drilling equipment • on very modern rigs, sits in a special chair
Mud pump	**Pipe rack**	**Derrick**	**Mud screen**	**Monkey board**
				
• supports the lifting equipment and the drill string	• sends mud down to the bit	• holds the pipes before they go into the hole	• is where the derrickman works	• separates the cuttings from the mud

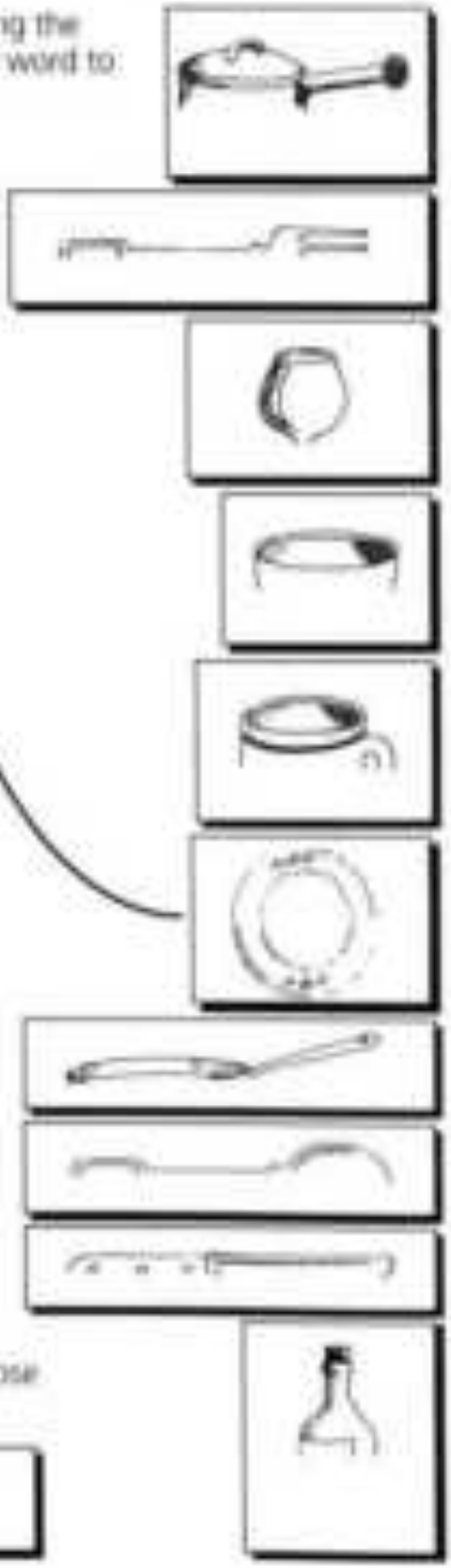


Student A	Student B	Student C
		
The Troll A Offshore Gas Platform Location: North Sea Year construction finished: 1996 Weight: 656,000 tonnes Height: 472 m Production: 300,000,000 m³ of natural gas per day	The Petronius Oil Platform Location: Gulf of Mexico Year construction finished: 2000 Weight: 43,200 tonnes Height: 640 m Production: 8,000 m³ of oil and 2,000,000 m³ of natural gas per day	The Tombua-Landana Oil Platform Location: Atlantic Ocean, near West Africa Year construction finished: 2009 Weight: 52,000 tonnes Height: 474 m Production: 30,000 m³ of oil per day

TOP HALF ONLY

Complete the other words and pictures by adding the bottom half of each one. Draw a line from each word to the correct picture.

PLATE



Question: In which room could you find those things? Complete the word:

KITCHEN

People and things

Read the eleven film titles. (They are the titles of films from the United Kingdom and the United States.) By reading each title, decide if the film could be about ...

...a person

...a thing

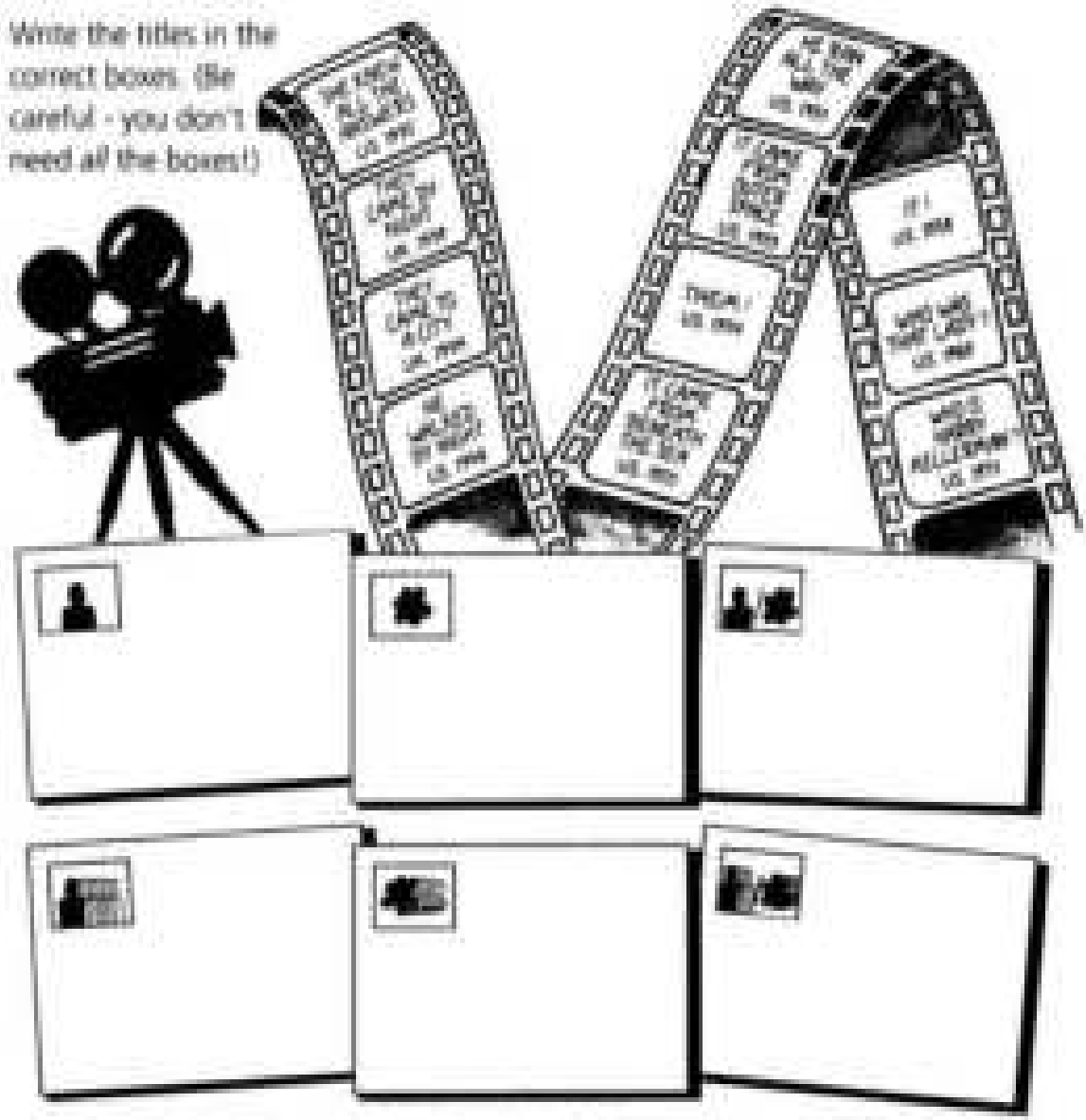
...a person or a thing

...people

...things

...people or things

Write the titles in the correct boxes. (Be careful - you don't need all the boxes!)



Question: In the first box, which films are about a man? And which films are about a woman?

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