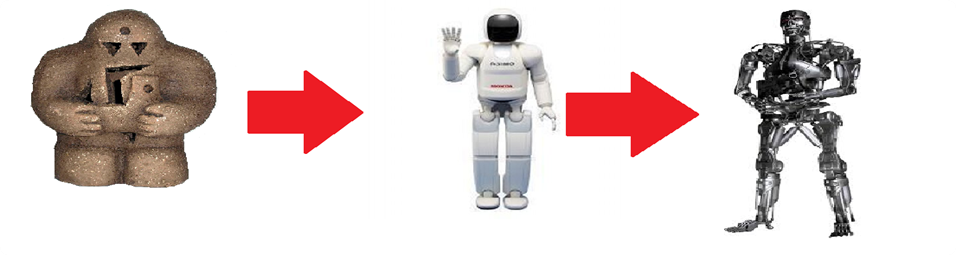
**MODULE 9**

**ROBOTS AND ROBOTICS**

**

“Don't think of robots as replacements for humans - think of them as things that will help make us better at tackling many of the problems we face”. - *Eoin Treacy, an analyst, fund manager, lecturer and author.*

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| --- | --- |
| **Learning points for Module 9:**  **Reading:**  Text 9A.The Invention of the Robot  Text 9B. Robot Teachers  Text 9C. Advances in Underwater Robots  **Vocabulary in context:** Word definitions.Collocations. Synonyms. Word forms.  **Grammar**: Forms of Gerunds. Gerund Phrases  **Speaking**: Robots in our life  **Learning aims:**  - to practise reading and speaking about robots and robotics  - to learn and practise active vocabulary related to the topic of the module  - to learn about the forms of gerunds and gerundial constructions and practise how to understand and use them |  |

 **Lead-in**

**1. *Try to write the definition of a robot. Compare your definition with the definitions of an industrial robot given below. Which of them do you like the most? Explain why.***

A robot is…

* a machine that can move and do some of the work of a person, and is usually controlled by a computer.
* a computer that moves itself or other objects in three-dimensional space under automatic control.
* a device which can be programmed to carry out certain manufacturing or other tasks which are similar to tasks carried out by people.

**READING**

**Part 1**

**2*. In groups complete the list of top ten facts about robots. Then read text 9A and check your answers. (Three facts are not given in the text. Try to find the answers by yourself).***

1. The word robot comes from …
2. The concept of a robot dates back…
3. The first working robots were …
4. Robots are unable …
5. The first accident involving a robot occurred …
6. The great benefit of robotisation is that …
7. The average annual production rate of industrial robots is…
8. The great fear people have of robots is that …
9. The smallest robot is…
10. The number of robots in use is…

**Text 9 A**

**The Invention of the Robot**

(1) The history of robotics initially began in the ancient world. Concepts of artificial servants and companions1 date at least as far back as the ancient legend of Cadmus\*, who is said to have sown2 dragon teeth that **turned into** soldiers. Another example is Pygmalion\*\* whose statue of Galatea came to life. Among the first **verifiable** automata (mechanical devices that function automatically) is a **humanoid** drawn by Leonardo da Vinci (1452–1519) in around 1495. Leonardo's notebooks, rediscovered in the 1950s, contained detailed drawings of a mechanical knight in armour3 which was able to sit up, wave its arms and move its head and jaw.

(2) The **actual** word ‘robot’ was invented in 1922 by Karel Capek, a Check writer and playwright. It was used in a play about an army of industrial robots that became so intelligent that they were able **to take over** the world. Robots developed a **powerful** presence in fiction and film in the twentieth century, long before they were created in reality. It was a case of science fiction propelling4 scientists forward until it became science fact.

(3) The popular idea is that a robot is a machine, **preferably** made of shiny5 metal, that acts and **looks like** a human being. The real robots that were **actually** built to work on the production line in a car factory were far from humanoid. Most industrial robots are the equivalent of a mechanical arm that can pick things up, lift them, **extend**, and so on. The production-line robots are programmed **to carry out** a specific **sequence** of tasks. Robots are unable to think, or decide to do things differently. The robot’s computer may be **set up** by writing all the **separate** movements out as a long computer program. **Alternatively**, it is possible to show the robot what to do.

(4) The great benefit of robotisation, the introduction of robots to carry out industrial tasks, is that it **relieves** factory workers of the most repetitive and tedious6 jobs. Robots are also **suited** to carrying out dangerous tasks that are far too risky for people **to attempt,** such as detonating car bombs. Some robots are **fitted with** **vision equipment** that can **enhance** their **performance**. All the above robots including production-line robots, medical robots, movement imitating robots and self-driving cars are being widely developed and used today. For example, the **average** annual **production rate** of industrial robots is 300,000 **units** per year. Furthermore, advanced humanoid-like robots that can completely imitate human motion also exist. But what about tomorrow?

(5) The great fear people have of robots, and a very natural one, is that robots will **take away** their jobs. So far, it looks as if there is less to fear from robots than once thought. Even robots designed for less technical tasks, such as housework, seem to be very limited. A robot can be programmed to vacuum clean the floor of a room, but it cannot **switch** in an instant, as a human being can, to moving a chair to one side **with a view to cleaning** underneath it, and then swiftly vacuum clean a **complicated** staircase7. The **replacement** of people with robots seems very unlikely. The real future of robotics is in the improvement of **existing** robots and in creating the new ones by humans, as no robot can compare to a human being in terms of8 thinking and inventing.

*\*Cadmus in Greek mythology was a prince, the son of Phoenix and brother of Europa.*

*\*\*Pygmalion in Greek mythology was a sculptor who fell in love with a statue he had created.*

**Vocabulary notes for text 9A**

1 companion партнёр, компаньон

2 is said to have sown как говорится в легенде, посеял

3 knight in armour рыцарь в доспехах

4 propel(ling) толкать вперед, побуждать, стимулировать

5 shiny блестящий, отполированный

6 tedious нудный, скучный, утомительный

7 staircase лестница

8 in terms of с точки зрения, применительно

**3. *Read the text again paying attention to the words in bold. Try to figure out their meaning from context. Explain their meaning or translate them into Russian. Use a dictionary if necessary.***

**4. *Answer the following questions using text 9A.***

1. When did the concept of artificial servants and companions appear? How did we know about that?
2. When were the drawings of a mechanical knight in armour rediscovered and who had drawn them?
3. Who invented the word ‘robot’ and what did it mean?
4. What do robots look like? What allows robots to perform specific sequences of tasks?
5. What are robots used for and what are the main benefits of using robots?
6. What types of robots are widely used today?
7. How does the text answer the question whether robots will replace humans?
8. What is the future of robotics?

**5. *Look at the sample concept-of-definition map of a computer and try to produce a concept-of-definition map of a robot using the information in Text 9A.***

|  |  |
| --- | --- |
|  |  |

**6. *Which of the following sentences best summarises the main points of each paragraph? Explain why.***

The first §

1. is about the ancient legend of Cadmus
2. explains how the concept of artificial servants was born
3. gives an overview of the ancient prototypes of modern robots

The second §

1. describes the origin of the word ‘robot’
2. gives some details on how the word ‘robot’ appeared and how the concept of robots became a reality
3. is about Check playwright Karel Capek

The third §

1. is about how real robots actually look like and operate
2. what robots are made of
3. how the robot’s computer is set up

The fourth §

1. is devoted to the benefits of robotisation
2. describes different type of robots
3. describes the most popular robots used today and the benefits of their application

The fifth §

1. gives the author’s opinion concerning our future jobs
2. explains why the replacement of people with robots is unlikely and what the future of robotics really is
3. describes the most complicated robot

**7. *Summarise text 9A using the sentences from the previous exercise as your key points. Make use of some of the linking expressions from the list below.***

To begin with, as well, on the one hand, on the other hand, although, next, in addition, besides, however, for example, finally, according to the text, etc.

**READING**

**Part 2**

**8. *Match the words with the definitions.***

*to underestimate creativity to adapt to take over to diagnose empathy*

* the ability to think of new ideas
* to think something is less than it is
* to work out what kind of illness someone has
* when someone takes control of something, like a job or a place
* to change something so that it fits better
* the ability to deeply understand someone's situation or feelings

**9. *Read the text and decide which statements are True and which are False.***

1. Most jobs can be done by robots or computers. (T/F)

Начало формы

Конец формы

2. Robots are always better at diagnosing illnesses than doctors. (T/F)

Начало формы

Конец формы

3. Many experts agree robots will replace teachers. (T/F)

Начало формы

Конец формы

4. One advantage of robot teachers is that they don't need to rest. (T/F)

Начало формы

Конец формы

5. Robot assistants could help teachers by marking homework and writing reports. (T/F)

Начало формы

Конец формы

6. Some teachers use robots to reduce their time answering emails and marking homework. (T/F)

Начало формы

**Text 9B**

**Robot Teachers**

(1) If you think of the jobs robots could never do, you would probably put doctors and teachers at the top of the list. It is easy to imagine robot cleaners and factory workers, but some jobs need human connection and creativity. But are we underestimating1 what robots can do? In some cases, they already perform better than doctors at diagnosing illness. Also, some patients might feel more comfortable sharing personal information with a machine than a person. Could there be a place for robots in education after all?

(2) Some educators predict that the robot will do the main job of transferring information and teachers will be like assistants. Intelligent robots will read students' faces, movements and maybe even brain2 signals. Then they will adapt the information to each student. It is not a popular opinion and it is unlikely robots will ever have empathy and the ability to really connect with humans like another human can. One thing is certain, though. A robot teacher is better than no teacher at all. In some parts of the world, there aren't enough teachers and 9–16 percent of children under the age of 14 don't go to school. That problem could be partly solved by robots because they can teach anywhere and won't get stressed, or tired, or move somewhere for an easier, higher-paid job.

(3) Perhaps the question is not 'Will robots replace teachers?' but 'How can robots help teachers?' Office workers can use software to do things like organise and answer emails, arrange meetings and update calendars. Teachers waste a lot of time doing non-teaching work, including more than 11 hours a week marking homework. If robots could cut the time teachers spend marking homework and writing reports3, teachers would have more time and energy for the parts of the job humans do best.

**Vocabulary notes for text 9B**

1 underestimate недооценивать, преуменьшать

2 brain мозг

3 report доклад, отчет

**10. *Match the words from text 9B with their definitions using the context.***

|  |  |
| --- | --- |
| 1. human connection  2. to perform  3. to transfer information  4. an assistant  5. to adapt  6. partly  7. to arrange (meetings)  8. to update (calendars)  9. to mark (homework)  10. to write reports | a. to some degree, but not completely  b. to make something more modern or suitable for use by adding new information  c. a state of being related to someone or something else;  d. to plan, prepare for, or organise something  e. to do an action or a piece of work  f. to correct mistakes;  g. a helper  h. to write a statement to parents about their child performance at school  i. to pass information from one person to another  j. to change something to suit different conditions or uses |

**11. *Read the text again and choose the best answer.***

1. It is easy to think robots …

a. will replace people even if we don't like the idea.

b. are more capable than people and it's true.

c. can do less than people but it is not always true.

2. Some educators think that teachers in the future will …

a. help robots in class. b. a.aНачало формы

teach knowledge to students. c. no longer exist.

3. Robots will probably never …

a. have human understanding of emotions. b. Начало формы

be a popular choice for teachers. c. be intelligent enough to work in education.

4. Some parts of the world ...

a. Начало формы

pay robots to teach. b. already use robots in teaching jobs. c. have a shortage of teachers.

5. Teachers …

a. Начало формы

work harder than office workers. b. have less help than office workers. c. leave their jobs to become office workers.

6. Robots could …

a. Начало формы

empathise with students. b. mark homework. c. prepare lessons.

**12*.* *Work in pairs. Students A strongly believe that robots are better than humans at teaching; Students B strongly believe that robots can never be as good as teachers. Change partners again and talk about your ideas.***

**READING**

**Part 3**

**13. *Before reading answer the following questions. Then read text 9C and check your answers.***

1. What do you see in the pictures below? Do you know how these underwater vehicles are called?
2. In your opinion, how can the topic of robots be related to underwater vehicles?
3. What is the difference between the underwater vehicle (submersible) in the first and in the second picture?
4. What can these vehicles be used for?

|  |  |
| --- | --- |
| 1.  Deep Sea Submarine (c) Kip Evans - Mission Blue | 2. |

**Text 9C**

**Advances in Underwater Robots**

(1) A submersible1 is a small, mobile undersea research vessel capable of functioning in the ocean depths. The development of a great variety of submersibles during the later 1950s and the 1960s came about as a result of improved technology and in response to a demonstrated need for the capability to visit the ocean depths to make direct observations and measurements, to recover lost equipment, and for possible rescue activity. Submersibles are extremely diverse in both shape and size and are designed to perform different and often highly specialised tasks.

(2) In recent years, it has become clear that special purpose, unmanned3 submersible vehicles are replacing manned2 submersibles. Submersible robots that have long been used to explore the underwater environment are expanding rapidly today. Underwater robots are being used in an increasing number of applications, including the military. In addition to rescue missions, submersibles are used for laying underwater pipelines3, for work on offshore oil drilling platforms, for seafloor mapping4, and underwater surveys5. Using robots to conduct underwater inspections is far safer and less expensive than using human divers. They also provide complete, detailed imagery6, real-time data for 3D modelling, better precision7 in detecting structural weaknesses, and improved access to previously unreachable areas, such as inside pipes.

(3) A variety of underwater robots have emerged over the last few decades to meet these challenging underwater tasks: **UUVs:** Unmanned underwater vehicles which travel in a single direction and are highly efficient at mappinglarge areas of seafloor. **ROVs:** Remotely operated vehicles are designed for omni-directional8 maneuvering and are often externally powered and tele-operated using a tether9 cable. They are commonly used to inspect offshore structures. **AUVs**: autonomous underwater vehicles are typically untethered, maneuver themselves, and often have grasping10 and manipulation capabilities. AUVs have a number of depth/size classes, ranging from man-portable vehicles with 100-meter depth ratings to deep-water platforms. Low-cost vehicles: Robotics companies are trying to bring smaller and less expensive vehicles to the general public and hobbyists. These are sometimes used by researchers to test specific aspects of the systems they are developing, such as new sensor arrangements or planning and control strategies.

(4) The dominant trend in underwater robotics is toward autonomy. Instead of remote control by a human or preprogrammed trajectories, we are seeing more built-in autonomy that can react to the specific conditions on-site. Artificial intelligence (AI) will also play a larger role in underwater robotics, where AI might actually take over the role of the ROV pilot, who tele-operates an underwater robot and evaluates its imagery.

**Vocabulary notes for text 9C**

1submersibleподводный аппарат

2manned с человеком на борту

3pipelines трубопроводы

4mapping картографирование

5survey(s) исследование, обзор

6imagery снимки, изображение

7precision точность

8omni-directional во всех направлениях

9tether трос

10grasping схватывание, хватательный

**14*. Read the text and circle any words you do not understand. Try to figure out their meaning from context, use a dictionary to check your guesses.***

***Example:*** *to recover lost equipment – to rescue or get back some articles, e.g. old ships or other vessels, which have sunk (= поднять со дна затонувшее оборудование)*

**15*. Choose the right option according to the information given in text 9C.***

1. A submersible is …

1. a vehicle that can travel under water.
2. an underwater helicopter.
3. a military ship that can stay under water.

2. A submersible was designed to …

1. explore the ocean depths.
2. to grow sea plants and collect pearls.
3. to measure the distances.

3. UUVs are efficient at…

1. collecting seafloor samples.
2. mapping seafloor.
3. rescue missions.

4. ROV …

1. is controlled from the surface.
2. eliminates the cable.
3. is a manned submersible.

5. AUVs …

1. maneuver themselves.
2. use a tether cable.
3. are designed for omni-directional maneuvering.

6. The dominant trend in underwater robotics is toward…

1. remote control by a human.
2. preprogrammed trajectories.
3. autonomy.

**16. *Read the text again and find answers to the following questions.***

1. What is a submersible?

2. When did the development of submersibles come about?

3. What were they designed to do?

4. What types of submersibles are there?

5. What are different types of submersibles designed for?

6. In what applications are submersibles being used nowadays?

7. What is the dominant trend in underwater robotics?

**17. *Mark the following statements as True or False.***

1. A lot of different underwater vehicles appeared 60 years ago.
2. In the 60-s nobody was interested in the exploration of the underwater world.
3. There are not so many types of submersibles.
4. Without using submersibles we wouldn`t have been able to know as much about the ocean depths as we have.
5. Unmanned submersibles are likely to be more widely used in the future.
6. The number of applications of submersibles is growing.
7. Unmanned submersibles are designed to carry out dangerous missions.

**18. Speaking activity. *Search the Internet (e.g. <https://oceanexplorer.noaa.gov/technology/subs/subs.html> ) to find more examples of how submersibles are used. Tell your group about one of them. Decide which examples can be considered important milestones in the development of submersibles. Compare your lists.***

**19. *Study the descriptions of the links below. Choose one video that you find the most interesting, watch it a few times and prepare to tell your groupmates about it. Add your own opinion.***

**Will robots take our jobs?**

It's very clear by now that technology has automated many tasks we once had to labour through - but what about your job? [According to a survey of 1,900 experts by the Pew Research Center,](http://www.pewresearch.org/fact-tank/2014/08/15/as-machines-take-on-more-human-work-whats-left-for-us/) an overwhelming majority believe artificial intelligence will have a very big part in our lives by 2025. Some experts, however, say this might not be totally to our advantage. This video will look at what the future may hold.

<https://www.youtube.com/watch?v=a-7Azih0D98&t=11s>

**Artificial intelligence: Can you build a robot in one day?**

The latest in the BBC's series on intelligent machines takes a look at how easy, or difficult, it is to create robots, while the author is set the challenge of using a Student Robotics kit to create his own robot, in just one day.

<https://www.youtube.com/watch?v=FVMO7fYmTvc>

**Google Engineer Claims Piece of Software Has Feelings.**

A senior Google engineer says one of the company's artificial intelligence systems has become a sapient being. The technology firm has suspended Blake Lemoine for breaching confidentiality rules -- and insists there's no evidence its AI chatbot is now free thinking.  A spokesperson for Google said while chatbots can imitate conversation, they are not sapient. Mr Lemoine has suggested the robot should get its own lawyer.

<https://www.youtube.com/watch?v=XKe1qrQ5NtA>

**VOCABULARY**

**Module 9 Word List**

|  |  |
| --- | --- |
| **Text 9A**  actual (adj)  alternatively (adv)  attempt (n)  average (adj)  be fitted (v) with  carry out (v)  complicated (adj)  enhance (v) performance (n)  existing (adj)  extend (v)  humanoid  look like (v)  powerful (adj)  preferably (adv)  production rate (n)  relieve (v)  separate (adj)  sequence (n)  set up (v)  suit (v)  switch (v) to  take (v) away  take (v) over  turn (v) into  unit (n)  verifiable (adj)  vision (n)  with a view to doing something | **Text 9B**  arrange (v) meetings  assistant (n)  cut (v) the time  diagnose (v)  empathy (n)  human connection (n)  mark (v) homework  partly (adv)  transfer (v) information  underestimate (v)  update (v) calendars  write (v) reports  **Text 9C**  capability (n)  come (n) about  detect (v)  diverse (adj)  emerge (v)  evaluate (v)  in response (n) to  measurement (n)  meet (v) challenging tasks  observation (n)  purpose (n)  recover (v)  rescue (n)  submersible (n) |

**20. *Match the words and word phrases with the correct definitions as they are used in text 9A.***

|  |  |
| --- | --- |
| I.   1. to turn into 2. verifiable 3. humanoid 4. actual 5. to take over 6. powerful 7. vision | 1. able to be proved 2. having a lot of power to control people or events 3. to begin to have control of something 4. to change or develop from one thing to another 5. the ability to see 6. existing in fact 7. a machine or creature with the appearance and qualities of a human |
| II.   1. sequence 2. to set up 3. separate (adj) 4. alternatively 5. to relieve 6. to suit 7. units | 1. to make a machine ready to be used 2. to improve an unpleasant situation 3. a series of related things or events 4. to be convenient 5. items or pieces 6. existing or happening independently 7. used to suggest another possibility (=instead) |
| III.   1. to enhance performance 2. average 3. to switch (to) 4. with a view to doing something 5. existing 6. production rate 7. to take away | 1. typical and usual 2. used to refer to something that exists now 3. the speed at which the process of making goods to be sold happens 4. to change suddenly from one thing to another 5. to remove or subtract 6. with the aim of doing something 7. to improve the quality of something |
| IV.   1. preferably 2. to look like 3. to extend 4. to carry out 5. an attempt 6. to be fitted with 7. complicated | 1. to be similar in appearance to someone 2. to do or complete something 3. if possible 4. an act of trying to do something 5. to be equipped with 6. difficult to understand or deal with 7. to add to something in order to make it bigger or longer |

**21. *Read the sentences and choose the right option. Explain your choice and translate the sentences into Russian.***

**I.** 1. At the current *amount/rate* of production they expect it will take a few months to carry out the order. 2. These [measures](https://dictionary.cambridge.org/ru/%D1%81%D0%BB%D0%BE%D0%B2%D0%B0%D1%80%D1%8C/%D0%B0%D0%BD%D0%B3%D0%BB%D0%B8%D0%B9%D1%81%D0%BA%D0%B8%D0%B9/measure" \o "measures) have been taken with a(n) *view/aim* to [increasing](https://dictionary.cambridge.org/ru/%D1%81%D0%BB%D0%BE%D0%B2%D0%B0%D1%80%D1%8C/%D0%B0%D0%BD%D0%B3%D0%BB%D0%B8%D0%B9%D1%81%D0%BA%D0%B8%D0%B9/increase" \o "increasing) the company's [results](https://dictionary.cambridge.org/ru/%D1%81%D0%BB%D0%BE%D0%B2%D0%B0%D1%80%D1%8C/%D0%B0%D0%BD%D0%B3%D0%BB%D0%B8%D0%B9%D1%81%D0%BA%D0%B8%D0%B9/profit" \o "profits). 3. Our faculties are in two *separate/secondary* buildings. 4. The results of the new research seem to conflict with the *exciting/existing* theories. 5. The CEO is one of the most *powerless/powerful* figures in a company. 6. She [started](https://dictionary.cambridge.org/ru/%D1%81%D0%BB%D0%BE%D0%B2%D0%B0%D1%80%D1%8C/%D0%B0%D0%BD%D0%B3%D0%BB%D0%B8%D0%B9%D1%81%D0%BA%D0%B8%D0%B9/start" \o "started) [studying](https://dictionary.cambridge.org/ru/%D1%81%D0%BB%D0%BE%D0%B2%D0%B0%D1%80%D1%8C/%D0%B0%D0%BD%D0%B3%D0%BB%D0%B8%D0%B9%D1%81%D0%BA%D0%B8%D0%B9/study" \o "studying) [English](https://dictionary.cambridge.org/ru/%D1%81%D0%BB%D0%BE%D0%B2%D0%B0%D1%80%D1%8C/%D0%B0%D0%BD%D0%B3%D0%BB%D0%B8%D0%B9%D1%81%D0%BA%D0%B8%D0%B9/english" \o "English), but *chose/switched* to History in her second [year](https://dictionary.cambridge.org/ru/%D1%81%D0%BB%D0%BE%D0%B2%D0%B0%D1%80%D1%8C/%D0%B0%D0%BD%D0%B3%D0%BB%D0%B8%D0%B9%D1%81%D0%BA%D0%B8%D0%B9/year" \o "year). 7. He was an [experienced](https://dictionary.cambridge.org/ru/%D1%81%D0%BB%D0%BE%D0%B2%D0%B0%D1%80%D1%8C/%D0%B0%D0%BD%D0%B3%D0%BB%D0%B8%D0%B9%D1%81%D0%BA%D0%B8%D0%B9/experienced" \o "experienced) [player](https://dictionary.cambridge.org/ru/%D1%81%D0%BB%D0%BE%D0%B2%D0%B0%D1%80%D1%8C/%D0%B0%D0%BD%D0%B3%D0%BB%D0%B8%D0%B9%D1%81%D0%BA%D0%B8%D0%B9/player" \o "player) who was working hard to *enhance/enlarge* his performance. 8. If you don’t make any *tries/attempts* to join in their conversation they won’t let you say a word. 9. A series of video are designed to *extend/expect* public awareness of how to protect yourself from the virus.

**II.** 10. The quickest way is through the city centre. *Alongside/alternatively*, there is a ring road, which is less busy. 11. They could choose whatever time *suites/suits* them best because they were among the first to apply. 12. Titanic was *fitted/fixed* with 20 lifeboats which could hold only half the number of passengers onboard. 13. The *average/maximum* age of young people going to universities is about 18-20 years old in our country. 14. According to the forecast, rain in the morning will *turn/move* into snow during the afternoon. 15. The exams are at the end of the term, but the *actual/real* results will appear in June. 16. If you look at the picture of a silicon chip, you might think that it *looks like/looks at* intricate cities. 17. The events in the article are presented in chronological *sequel/sequence*. 18. Water the plants twice a week, *preferentially/preferably* in the morning.

**III.** 19. Throughout the discussion they did not produce a single *verifiable/powerful* fact. 20. Some workers lost their jobs when machines *took over/took away*. 21. Tests should be *carried away/carried out* to find out what the problem is. 22. Cats have good night *view/vision*. 23. The robotics company announced plans to increase production to 10 000 *parts/units* per month. 24. When you apply for a job, you need to fill in a really *hard/complicated* form. 25. He asked for help because he could not *sort/set* the equipment up. 26. There are lots of different medicines that *relieve/retrieve* pain. 27. Before carrying out the experiment the laboratory equipment has to be *set up/suited* properly.

**22. *Look at the words below. Try to recall how they were used in text 9B.***

To underestimate, assistant, empathy, report, to update, connection, partly, to transfer, to arrange, to diagnose, to adapt, to mark, to cut the time, to perform.

**23. *Match the words with the correct definition of the word as it is used in text 9B. Think of your own example sentences with these words.***

|  |  |
| --- | --- |
| 1. to underestimate 2. to adapt 3. empathy 4. report 5. to update 6. connection 7. partly 8. to transfer 9. to arrange 10. to mark | * 1. the state of being related to someone or something   2. to plan, prepare or organise something   3. to some degree, not completely   4. the ability to understand other people’s feelings and problems   5. to think that something or someone is not as good as they really are   6. to correct mistakes and give points for a piece of work   7. a description of an event or situation   8. to change something to suit certain conditions   9. to make something more modern   10. to move something from one place to another |

**24. *Replace the words in bold with their synonyms using the words from Exercise 23. Translate the sentences into Russian.***

***Example:*** *Modern robots can* ***be taught*** *to use information from previous activities for future decisions. → Modern robots can* ***be instructed*** *to use information from previous activities for future decisions.*

1. After the discussion it was decided **to pass on** control of public land to the state. 2. The [meeting](https://dictionary.cambridge.org/ru/%D1%81%D0%BB%D0%BE%D0%B2%D0%B0%D1%80%D1%8C/%D0%B0%D0%BD%D0%B3%D0%BB%D0%B8%D0%B9%D1%81%D0%BA%D0%B8%D0%B9/meeting" \o "meeting) has been **set** for [Wednesday](https://dictionary.cambridge.org/ru/%D1%81%D0%BB%D0%BE%D0%B2%D0%B0%D1%80%D1%8C/%D0%B0%D0%BD%D0%B3%D0%BB%D0%B8%D0%B9%D1%81%D0%BA%D0%B8%D0%B9/wednesday" \o "Wednesday). 3. A **new** [version](https://dictionary.cambridge.org/ru/%D1%81%D0%BB%D0%BE%D0%B2%D0%B0%D1%80%D1%8C/%D0%B0%D0%BD%D0%B3%D0%BB%D0%B8%D0%B9%D1%81%D0%BA%D0%B8%D0%B9/version" \o "version) of that code has just been published. 4. Pearson plans to use technology **to check** examination papers. 5. To write a **statement** to parents about a child’s ability and performance at school is part of a teacher’s job. 6.Many [software](https://dictionary.cambridge.org/ru/%D1%81%D0%BB%D0%BE%D0%B2%D0%B0%D1%80%D1%8C/%D0%B0%D0%BD%D0%B3%D0%BB%D0%B8%D0%B9%D1%81%D0%BA%D0%B8%D0%B9/software" \o "software) [companies](https://dictionary.cambridge.org/ru/%D1%81%D0%BB%D0%BE%D0%B2%D0%B0%D1%80%D1%8C/%D0%B0%D0%BD%D0%B3%D0%BB%D0%B8%D0%B9%D1%81%D0%BA%D0%B8%D0%B9/company" \o "companies) have **changed** [popular](https://dictionary.cambridge.org/ru/%D1%81%D0%BB%D0%BE%D0%B2%D0%B0%D1%80%D1%8C/%D0%B0%D0%BD%D0%B3%D0%BB%D0%B8%D0%B9%D1%81%D0%BA%D0%B8%D0%B9/popular" \o "popular) [programs](https://dictionary.cambridge.org/ru/%D1%81%D0%BB%D0%BE%D0%B2%D0%B0%D1%80%D1%8C/%D0%B0%D0%BD%D0%B3%D0%BB%D0%B8%D0%B9%D1%81%D0%BA%D0%B8%D0%B9/program" \o "programs) to work with the new operating system. 7. He gave in his homework only **half** finished. 8. The city **undervalued** the cost of the new building. 9. Such competences as cooperation, responsibility, self-control and **the capacity to understand other people’s feelings** are really important these days. 10. Family **links** can make getting a job much easier.

**25*. Find the following words or phrases in text 9C.***

1. A noun naming *a small underwater vehicle* used especially for deep sea research. (§1) 2. A phrasal verb which means *to happen or take place* (§ 1)

3. This noun phrase is used to describe *something which happens as an act of responding*. (§ 1) 4. The *quality or state* of *being capable*. (§ 1) 5. *The act of* *recognising or noting a fact* *or object* often using some instruments. (§ 1) 6. *The act or* *process of measuring*. (§ 1) 7. A verb meaning *to bring back to the normal condition*, to find. (§ 1) 8. A noun describing *an act of saving or being saved* from danger or difficulty. (§1) 9. A noun meaning *an aim or end to be reached*. (§ 2) 10. A verb meaning *to discover or determine the fact or presence of something*. (§2) 11. *A number or collection of different things*, especially of a particular class. (§3) 12. A verb meaning *to appear or become known.* (§ 3) 13. A participle form of a verb *range* in combination with the preposition *from* which expresses *the idea of a variety of different things.* (§ 3) 14. A phrase describing *a control of operation from a point at some distance* (§ 4) 15. A verb meaning *to determine the significance, worth, or condition* *of something* (§ 4)

**26*. Match the words with numbers (1-10) with the words with letters (a-j) to make up word collocations. Explain the meaning of these expressions and try to recall how they were used in texts 9A, B, or C.***

|  |  |
| --- | --- |
| **I.**   1. verifiable 2. actual 3. powerful 4. to extend 5. to carry out 6. to set up 7. separate 8. to relieve 9. to be fitted for 10. production   **II.**   1. existing 2. to suit 3. to arrange 4. to update 5. to underestimate 6. complicated 7. remote 8. to enhance 9. to meet 10. rescue | 1. rate 2. a computer 3. the deadline 4. facts 5. issues/meanings 6. results 7. idea 8. the task 9. tension 10. research 11. the purpose 12. system 13. challenges 14. a meeting 15. mission 16. performance 17. approaches 18. control 19. an opponent 20. the software |

**27. *Complete each sentence with the correct word in the necessary form to make up a word collocation from Exercise 26. Translate the sentences into Russian.***

A. 1. My [secretary](https://dictionary.cambridge.org/ru/%D1%81%D0%BB%D0%BE%D0%B2%D0%B0%D1%80%D1%8C/%D0%B0%D0%BD%D0%B3%D0%BB%D0%B8%D0%B9%D1%81%D0%BA%D0%B8%D0%B9/secretary) will [phone](https://dictionary.cambridge.org/ru/%D1%81%D0%BB%D0%BE%D0%B2%D0%B0%D1%80%D1%8C/%D0%B0%D0%BD%D0%B3%D0%BB%D0%B8%D0%B9%D1%81%D0%BA%D0%B8%D0%B9/phone) you to \_\_\_\_\_\_\_ a [meeting](https://dictionary.cambridge.org/ru/%D1%81%D0%BB%D0%BE%D0%B2%D0%B0%D1%80%D1%8C/%D0%B0%D0%BD%D0%B3%D0%BB%D0%B8%D0%B9%D1%81%D0%BA%D0%B8%D0%B9/meeting). 2. The students are encouraged to participate in \_\_\_\_\_\_\_\_ \_\_ research in their field of study. 3. This easily \_\_\_\_\_\_\_\_\_fact proves that our theory is true. 4. \_\_\_\_\_\_\_\_ results may differ from the expected results. 5. Some \_\_\_\_\_\_\_\_\_ideas have emerged at our university. 6. They agreed to \_\_\_\_\_\_\_\_\_the deadline until the end of the month. 7. He helped me to\_\_\_\_\_\_\_\_ my computer. 8. Developing new robots and replacing human workers with intelligent robots are two \_\_\_\_\_\_\_\_ issues. 9. Herbal tea helps \_\_\_\_\_\_\_\_\_ tension and calm the nerves. 10. I’m afraid, [I](file:///C:\i) am not \_\_\_\_\_\_\_\_\_ \_\_ so great a task. 11. The oil \_\_\_\_\_\_\_\_ rate increased due to new technology. 12. In his new book he analyses the \_\_\_\_\_\_\_\_\_ approaches to managing. 13. The old building is now used as a hotel and has been reconstructed to \_\_\_\_\_\_\_\_ that purpose. 14. Since he hadn’t \_\_\_\_\_\_\_\_\_ the antivirus software on his computer for a long time his system was infected. 15. They lost mostly because they had \_\_\_\_\_\_\_\_\_ their opponents. 16. Most of our graduates are well prepared to work with \_\_\_\_\_\_\_\_\_\_ systems. 17. It is difficult to imagine how people watched TV without a \_\_\_\_\_\_\_\_\_\_ control a few decades ago. 18. It has been shown that a bit of stress \_\_\_\_\_\_\_\_\_\_ performance during an exam. 19. If your immune systems fails to \_\_\_\_\_\_\_\_\_\_\_ the challenge of the first contact, you might be infected. 20. The news agencies say that submersibles can also aid search and \_\_\_\_\_\_\_\_\_\_ missions.

**28. *Work in groups. Choose 5-7 words from Module 9 Word list and prepare a short news story to tell your group using these words. Ask your listeners to note down the words while they listen to your story. Compare your lists.***

***Example****:* The P 3 humanoid robot was revealed by Honda in 1998 as a part of the company's continuing humanoid project. President and CEO Hiroyuki Yoshino, at the time, described Honda's humanoid robotics program as consistent with its direction to enhance human mobility. In 1999, Sony introduced the AIBO, a robotic dog with a capacity of interacting with humans; the first models released in Japan sold out in 20 minutes. Honda revealed the most advanced result of their humanoid project in 2000, named ASIMO. ASIMO was fitted to be able to run, walk, maintain connections with humans, recognise faces, and interact with its environment.

**29. *Summarise in English*** ***using some key words from the vocabulary section.***

******Россияне усомнились в способности роботов заменить их на работе. При этом, если посмотреть на похожий опрос от 2019 года, число уверенных в своем преимуществе перед машинами сократилось. Россияне считают, что в обозримом будущем роботы не смогут занять их рабочие места. Социологический опрос на эту тему провел ВЦИОМ. 70% опрошенных заявили, что выполнять их обязанности роботы не будут, хотя 18% считают, что в незначительной степени умные машины заменять их на работе все же смогут. 51% уверены, что сама по себе роботизация — скорее отрицательная тенденция. Больше в успех роботов верит молодое поколение (48%). Среди опрошенных в возрасте от 45 до 59 лет 78% уверены, что заменить их машинами в обозримом будущем не удастся. В опросе, который проводился посредством телефонных интервью, приняли участие 1600 респондентов. В 2019 году проводилось похожее исследование. Как заявили тогда 78% россиян, они не опасаются, что машины смогут заменить их на работе. Среди сфер, где можно использовать роботов, респонденты называли в первую очередь освоение космоса и опасные промышленные производства. Далее шли медицинская диагностика и ликвидация последствий чрезвычайных ситуаций.

**SPEAKING AND DISCUSSION**

**30. *Discuss some of the questions below in mini-groups. Think of what arguments you can give to explain your view, look for more examples to illustrate your points. Share your ideas with other groups.***

1. Robots are already an integral part of manufacturing in factories. Do you believe that one day there will be little need for humans in manufacturing? How are robots better than the human workforce?  
2. If you could have a robot, what tasks would you use it for? Would you ever trust a robot to look after your children or walk your dog?  
3. Police and the military use robots to sweep for landmines and bombs. What are the advantages of these practices? Do you see any other uses for robots in combat and police work?  
4. Do you think that one-day robots will replace teachers?  
5. What threat do machines present to mankind?  
6. Do you believe machines will ever outsmart people and take over the planet?  
7. Robotic surgery is a method to perform surgery using very small tools attached to a robotic arm and a surgeon controls the robotic arm with a computer. How beneficial do you think this is now and for the future of medicine?  
8. Do you believe it’s just a matter of time before fast-food workers are replaced by machines?  
9. What do you think would happen to the world’s economy if robots began replacing people in the workforce?  
10. Did you ever have a favourite sci-fi films hero who was a robot? Speak about this film in more detail.   
**31. *Read how futurologist [Gray Scott](https://www.brainyquote.com/authors/gray-scott-quotes) sees the future of robotics.***

“Robots will harvest, cook, and serve our food. They will work in our factories, drive our cars, and walk our dogs. Like it or not, the age of work is coming to an end”.

***What is your opinion about this prediction? Can you describe a typical day in your life when all work is done by robots? What do you think people will be doing and how our life will change?***

**32. *Work in pairs or groups. Discuss the benefits and disadvantages of machines and automation and create a mini-presentation based on your ideas.***

**GRAMMAR**

**The Forms of the Gerund**

**33. *Underline Gerunds in the sentences from reading and try to explain their meaning or translate the sentences into Russian. Decide how the Gerund is used in each example using the options below.***

* As a subject, complement or object
* After certain verbs
* After prepositions

1. By developing a powerful presence in fiction and film in the twentieth century, robots had become known long before they were created in reality.

2. The production-line robots are capable of carrying out a specific sequence of tasks.

3. The robot’s computer may be set up by writing all the separate movements out as a long computer program.

4. One of the benefits of robotisation is using robots to carry out industrial tasks resulting in relieving factory workers of the most repetitive and tediousjobs.

5. Robots are also suited to carry out dangerous tasks that are far too risky for people to attempt, such as detonating car bombs.

6. A robot can be programmed to vacuum clean the floor of a room, but it cannot switch in an instant to moving a chair to one side with a view to cleaning underneath it, and then swiftly vacuum clean a complicated staircase.

7. Completely imitating human motion is one of the capabilities of advanced humanoid-like robots that makes their development a most promising trend.

8. We still consider replacing people with robots in industry very unlikely.

9. The real future of robotics is in the improvement of existing robots and in creating new ones.

10. No robot is likely to be comparable to a living man in terms of thinking and inventing.

**STUDY NOTE**

Besides **Simple Gerunds,** *e.g. living, doing*, there are also **Perfect** and **Passive** forms.

*Examples: She loves* ***being admired****. (Passive form)*

*My* ***having said*** *that made no difference. (Perfect form)*

*I am surprised at* ***not having been asked*** *about it. (Negative perfect passive form)*

**34. *Fill in the table below with more examples of different gerund forms.***

|  |  |  |
| --- | --- | --- |
| **Gerund** | Active | Passive |
| Simple | *writing,…* | *being written,…* |
| Perfect | *having written, …* | *having been written,…* |

**35. *Find Gerunds in the sentences below and identify what forms they are.***

***Decide whether the Gerund refers to: a time before that of the main verb, the same time or the future?***

1. I was surprised at hearing the news. 2. I was disappointed at not seeing him among the audience. 3. I intend staying with you a few more days. 4. I think of going to Sochi in summer. 5. I don’t remember having seen him before. 6. He mentioned having read about it somewhere. 7. I am proud of having passed all the exams. 8. He didn’t approve of his son having dropped out of the university. 9. He complained of having been badly treated. 10. Your coffee is not ready yet. Would mind waiting a few minutes?

**STUDY NOTE**

The ‘tenses’ of the Gerund do not express absolute time; they express what is known as *relative* time, that is relative to that of the main verb.

***Improving*** *living standards is one of our priorities. (Simple Gerund refers to the same (or future) time as that of the main verb)*

*I don’t remember* ***saying*** *anything like that. (In some contexts Simple Gerund refers to the time before that of the main verb)*

*My* ***having said*** *that made no difference. (Perfect form stresses that the action expressed by the Gerund ‘having said’ precedes the action expressed by the main verb ‘made’)*.

**36. *Read the sentences paying attention to the forms of the Gerunds and explain their meaning. Translate the sentences into Russian.***

***Example:*** *I remember his having objected to this plan. → Perfect form stresses that the action expressed by the gerund ‘having objected’ precedes the action expressed by the main verb ‘remember’.*

1. She is angry about not having been invited. 2. She loves being admired. 3. Visiting people is nicer than being visited. 4. He was afraid of being seen by the police. 5. I don`t like the dog being shut in the house. 6. My having said that made no difference. 7. The criminal’s having shot the policeman reacted against him. 8. I completely forgot having asked him to wait for me there. 9. He apologised for not having written the report on time. 10. I am surprised at not having been asked about it.

**37*. Fill in the gaps using the appropriate Gerund form. Explain their meaning or translate the sentences into Russian.***

*having seen - being spoken - having allowed me - Combining - visiting - having had - having to* - *being corrected - being told*

1. The place is worth \_\_\_\_\_\_\_ . 2. Can you remember \_\_\_\_\_\_\_ the man before? 3. She was terrified of \_\_\_\_\_\_\_\_ speak to any­body, and even more, of \_\_\_\_\_\_\_\_ to. 4. After \_\_\_\_\_\_\_\_ by the teacher, the stu­dents' papers were returned to them. 5. I was surprised at my mother's \_\_\_\_\_\_\_\_\_ to go on a trip. 6. On \_\_\_\_\_\_\_\_ the news, she turned pale. 7. \_\_\_\_\_\_\_\_\_ robots with the Internet of things is expected to open up thrilling possibilities along the way. 8. In his closing speech the chairman said that he appreciated \_\_\_\_\_\_\_\_\_ the opportunity to take part in the conference.

**Gerund Phrases**

**Lead-in**

**38. *Make up sentences by matching two parts. Translate the sentences into Russian paying attention to the gerunds.***

|  |  |
| --- | --- |
| 1. We read about robots 2. We learned about K. Capek’s 3. The text describes robots and gives a few examples of | 1. their doing useful jobs. 2. being suited to carry out dangerous tasks. 3. having invented the word ‘robot’. |

**STUDY NOTE**

A combination of a gerund with a noun or pronoun: a possessive noun (-'s) or possessive pronoun (my, your, his) or a noun in the general case, and a personal pronoun in the objective case (me, you, him) is called a **Gerund Phrase or Gerundial Construction**.The Gerund phrase is equivalent to the subordinate clause in meaning.

*Do you mind* ***Peter’s (his) opening*** *the window?* (if Peter opens the window)

*Do you mind* ***my helping you out****?* (if I help you)

*Her thoughts were interrupted by* ***the door opening*** *gently.*  (when the door opened)

**39*. Rewrite the following sentences using Gerund Phrases.***

***Example.*** *Employees must do their tasks carefully. → The boss insists on* ***the employees’ doing*** *their job better.*

1. The teacher allows his students to put off the work. The teacher doesn’t mind the students’\_\_\_\_\_\_\_ . 2. My cousin got my e-mail although I had addressed it wrongly. He got my e-mail in spite of my \_\_\_\_\_\_\_ . 3. He cannot take part in the tender. He is a foreigner. His \_\_\_\_\_\_\_ doesn’t allow him to take part in the tender. 4. Did you give me back the book I had lent you. I can’t remember \_\_\_­­\_\_\_ . 5. The woman said that I could open the window. She didn’t mind \_\_\_\_\_\_\_\_ . 6. My father doesn’t like me to stay out late at night. My father doesn’t like \_\_\_\_\_\_\_ . 7. I’m sure she asked you not to phone after 11.p.m. Have you forgotten \_\_\_\_\_\_\_ ? 8. He was interrupted when the door opened and more people came in. He was interrupted by \_\_\_\_\_\_\_ . 9. Mike is never late. I could hardly imagine \_\_\_\_\_\_\_. 10. Richard came in. I had to stop talking. I was interrupted by \_\_\_\_\_\_\_ .

**40\*. *Identify Gerund Phrases and translate the sentences into Russian****.*

1. Mendeleev's having established a periodic law of nature has entered his name

into the history book of the world science. 2. Success in science often results from

the scientist's confining his attention to one problem for many years. 3. The results of the experiment depended upon his having applied the proper technique. 4. The idea of scientists' being responsible for most ills of the present day situation is unfortunately quite popular. 5. A brain-storming session consists in everybody's proposing as many and as wild ideas as possible, without being concerned as to whether they are workable or not. 6. Science is sometimes humorously defined as a practice of the scientist's satisfying his curiosity at the expense of the Government. 7. We know about Newton’s having written “the Principia” in a very short time. 8. There is a theory of the Earth behaving as a large magnet.

**Gerunds and Gerund Phrases after Prepositions**

**41*. Read the sentences paying attention to the use of Gerunds and Gerund Phrases after prepositions. Translate the sentences into Russian.***

1. As AI continues to improve, we will be getting more and more used to the technology making independent decisions in our homes, streets, and workplaces. 2. Programming robots to carry out a specific sequence of tasks made it possible to use them for working on the production line. 3. Every student knows of robots steadily moving outside the confines of factory lines. 4. If robots are suited for improvising in order to complete a task, it will be a great skill for a robot to have. 5. A robot could help make video calls to family members, including allowing them to make virtual visits by acting as a telepresence platform. 6. The infection of your computer may lead to deleting crucial files and installing hidden programs on your computer. 7.Unemployed people who will lose their jobs because of intelligent machines are unlikely to be thankful to scientists and engineers for having developed these smart robots. 8. It is hard not to be excited about being able to make a robot cope in real human environment. 9.  Many people with electric cars today suffer from "range anxiety", the stress caused by worrying about the battery running out of electricity. 10. Electric car manufacturers say that we are at the point of achieving a revolution in the electric vehicle charging experience.

**42. *Read the sentences paying attention to the prepositions used with the verbs followed by Gerunds. Translate the sentences into Russian.***

1. If you want to *enquire about* enrolling on the course you should write an email to this address. 2. They seem *excited about* being here. 3. Today we still cannot *rely on* autonomous cars eliminating all the accidents on our roads. 4. The delegation *insisted on* holding an immediate meeting. 5. He was *depressed about* being lonely and forgotten. 6. Though he *apologised for* not inviting me to his party I think he did it on purpose. 7. Most employees *approve of* our boss dealing with the crisis. 8. Nobody can be *blamed for* doing what he thinks is best. 9. My driving instructor *warned me against* driving without seatbelts. 10. They *informed us about* opening dozens of new underground stations in the near future.

**43. *Read the text and choose the correct preposition. Tell your partner if you would like to visit Mount Hood and explain why?***

*Before/without* learning the details about Mount Hood, in Oregon, we had seen this beautiful picture. We thought*for/ by/ of* visiting this picturesque place but decided that there was no point *in/at* going there *without* */ after/before* receiving information about this volcano. *After/ in/for* searching the Internet, we learned that volcano Hood was potentially active. But unofficially, Hood was considered calm and active tourism was developed there. We learned that there were three ski resorts. *For/at/by* going there, you need to take skis. *After/to*/*for* having visited this interesting place, we plan to invite friends, talk with them about our trip and show photographs.

**44. *Complete the sentences with the correct preposition and the Gerund of the verbs in brackets. Use a dictionary if necessary.***

1. The possibility \_\_\_\_\_ \_\_\_\_\_ chemical energy into mechanical is evident. (to transform) 2. People worldwide should insist \_\_\_\_\_ \_\_\_\_\_ ‘killer robots’. (to ban) 3. The engineer succeeded \_\_\_\_\_ \_\_\_\_\_ a very complicated problem. (to solve) 4. This engineer is involved \_\_\_\_\_ \_\_\_\_\_ the technologies that will give us a new generation of robots. (to develop) 5. The researcher objected \_\_\_\_\_ their \_\_\_\_\_ new methods before the test was completed. (to introduce) 6. During the videoconference they discussed some methods \_\_\_\_\_ \_\_\_\_\_ new projects. (to finance). 7. The speaker improved his report \_\_\_\_\_ \_\_\_\_\_ the end. (to change) 8. The final decision depends \_\_\_\_\_\_ their \_\_\_\_\_\_ the details of the project. (to submit) 9. Everybody was surprised \_\_\_\_\_\_ his \_\_\_\_\_\_ in that experiment. (not/to take part) 10. He was disappointed \_\_\_\_\_\_\_ \_\_\_\_\_\_ the reason of the incident. (not/to find out). 11. Most of the population approved \_\_\_\_\_\_\_ the government’s \_\_\_\_\_\_\_ taxes. (to cut) 12. Heat may be produced \_\_\_\_\_\_ \_\_\_\_\_\_ coal, gas or any other fuel. (to burn)

**INDEPENDENT FURTHER STUDY**

**45. *Listen about top 5 real-life robots. Match the names of robots with their descriptions.***

Less than 30 years ago, advanced robots were nothing but a hopeful dream and futuristic vision. Fast forward to today, and thanks to the ever-increasing advancements in science and technology, these visions are genuine realities. ***<https://www.youtube.com/watch?v=9DaTZQxg21U&t=43s>***

**Sofia, Robocop, Kuri, Toyota T-HR 3, ASIMO.**

* This robot holds the title of the most socially advanced and one of the oldest cyborgs in the world.
* An adorable home robot and a super high-tech companion that could easily become your best friend.
* A life-sized police robot that patrols Dubai’s city malls.
* A third generation humanoid robot which works by mimicking the maneuvers of its human operator.
* A realistic humanoid robot designed for research, education, and entertainment.

**46. *Listen again and answer the questions.***

***Which robot …***

1. *…* has 29 body parts and his movements are natural and smooth?
2. … displays how she is feeling using a bright LED?
3. … is capable of carrying out actions and lifelike movements that most humanoids cannot?
4. … can hold a conversation, has a sense of humour and can express her genuine feelings?
5. … can identify wanted criminals and collect evidence?
6. … can help humans in different situations, including at home, in healthcare facilities, construction work, areas affected by natural disasters, and even the outer space?
7. … is designed to specifically interact with humans at home?
8. … has gone through many stages of development?
9. … is the world's first robot citizen and the first robot Innovation Ambassador for the United Nations Development Programme?
10. … keeps the streets safe and sound for people to enjoy?

**47. *Listen again and note down what the following dates and figures refer to.***

***Example:*** February the 14th, 2016 → On the 14th of February, 2016, Sofia was activated

1. 60
2. 2018
3. 0,6
4. October the 25th, 2017
5. 25%
6. and 14
7. 29, 10 and 16
8. 75
9. 20

**Phrasal Verbs**

**STUDY NOTE**

A **Phrasal** verb is a main verb plus one or two particles (an adverb or a preposition): *go away, put up with*. Sometimes the **meaning** of the phrasal verb is clear because it is very similar to the main verb: *open up doors.* But often it is almost impossible to guess the meaning of a phrasal verb because it is very different from the meaning of the main verb: *make up (=make piece), pull up (=stop).*

*The* *[internet](https://dictionary.cambridge.org/dictionary/english/internet" \o "internet) has****[opened](https://dictionary.cambridge.org/dictionary/english/open" \o "opened) up*** *new [opportunities](https://dictionary.cambridge.org/dictionary/english/opportunity" \o "opportunities) for [cost-effective](https://dictionary.cambridge.org/dictionary/english/cost-effective" \o "cost-effective) [brand](https://dictionary.cambridge.org/dictionary/english/brand" \o "brand) [building](https://dictionary.cambridge.org/dictionary/english/building" \o "building). Technology changes so fast, it is hard* ***to keep up with*** *it.*

**Phrasal** verbs are an important part of the English language and particularly of the everyday spoken English.

**48. *Find a suitable ending for each Phrasal verb. Use them in a sentence of your own.***

|  |  |
| --- | --- |
| 1. back up 2. bring out 3. switch off 4. drop out 5. carry on 6. talk over 7. cut down on 8. get by with 9. run out of 10. watch out for | 1. the light 2. important files 3. the old laptop 4. some problems 5. snakes 6. of college 7. fast food 8. a new magazine 9. electricity 10. with the project |

**49. *Fill in the missing Phrasal verbs using the words in brackets as prompts.***

*Took off / wake up / set up / make out / went on / cut in /*

*/ set off / came out / carry on / broke down.*

1. The driver … sharply after overtaking the lorry. (put oneself into a position between others) 2. Do you know who … the company? (started) 3. The taxi … on the way to the airport and I nearly missed my flight. (something went wrong with the taxi) 4. We’d better … before the rush-hour traffic starts. (begin our journey) 5. What time did … you this morning? (stop sleeping) 6. The book first … in 1997. (was published) 7. The plane … an hour late. (flew into the air) 8. The lecture … till 6.30. (lasted) 9. My tutor wants me to … with the project while he is away on business. (to continue). 10. It’s difficult to … what she’s saying. (hear/understand)

**Separable or Inseparable?**

**STUDY NOTE**

Sometimes, the preposition/adverb is placed either after the verb or after the object.

*Mary****made up****a really entertaining story. Mary****made****the story****up****.*

If the object is a pronoun, however, the preposition/adverb has to be placed after the pronoun (object).

*She****made****it****up****.* ***Put****it****down. Take****it****off.***

Some Phrasal verbs are always inseparable.

*I****came across****some old photos in a drawer. ~~I~~****~~came~~****~~some old photos~~****~~across~~****~~in a drawer.~~*

<https://www.youtube.com/watch?app=desktop&v=GW8i5s2KauY>

**50. *Read the sentences below paying attention to the position of objects. Translate the sentences into Russian or explain their meaning.***

1. Ann **reminds** me **of** a girlfriend of mine.
2. How can we **protect** children **from** dangerous material on the Internet?
3. I’d like to **thank** everyone **for** their kindness.
4. Somebody **broke into** his car and stole his radio.
5. I don’t like this song. I don’t want to **listen to** it any more.
6. Getting to the final **depends on** winning the semi-final!
7. She **took** her coat **off**, hung it up and sat down.
8. We **keep up with** each other by phone and email.

**51. *Read the passage and try to fill in the gaps with Phrasal verbs. Do you agree with Mary?***

*To keep up with/ putting off/ to let somebody down/ to meet up/ to ring somebody up/ point out* */get together/* *stand by.*

Mary: How often do you and your friends 1.\_\_\_\_\_\_ ? In our busy lives today, it’s easy 2.\_\_\_\_\_\_\_ our friends \_\_\_\_\_\_\_ by 3.\_\_\_\_\_\_\_ social arrangements or even forgetting 4.\_\_\_\_\_\_\_ them \_\_\_\_\_\_ . Yet our friends are the people who 5. \_\_\_\_\_\_\_ us when we need support. So while it’s great 6. \_\_\_\_\_\_\_\_ people on social media, psychologists 7. \_\_\_\_\_\_\_\_ that’s really important to make time 8.\_\_\_\_\_\_\_\_ together too.

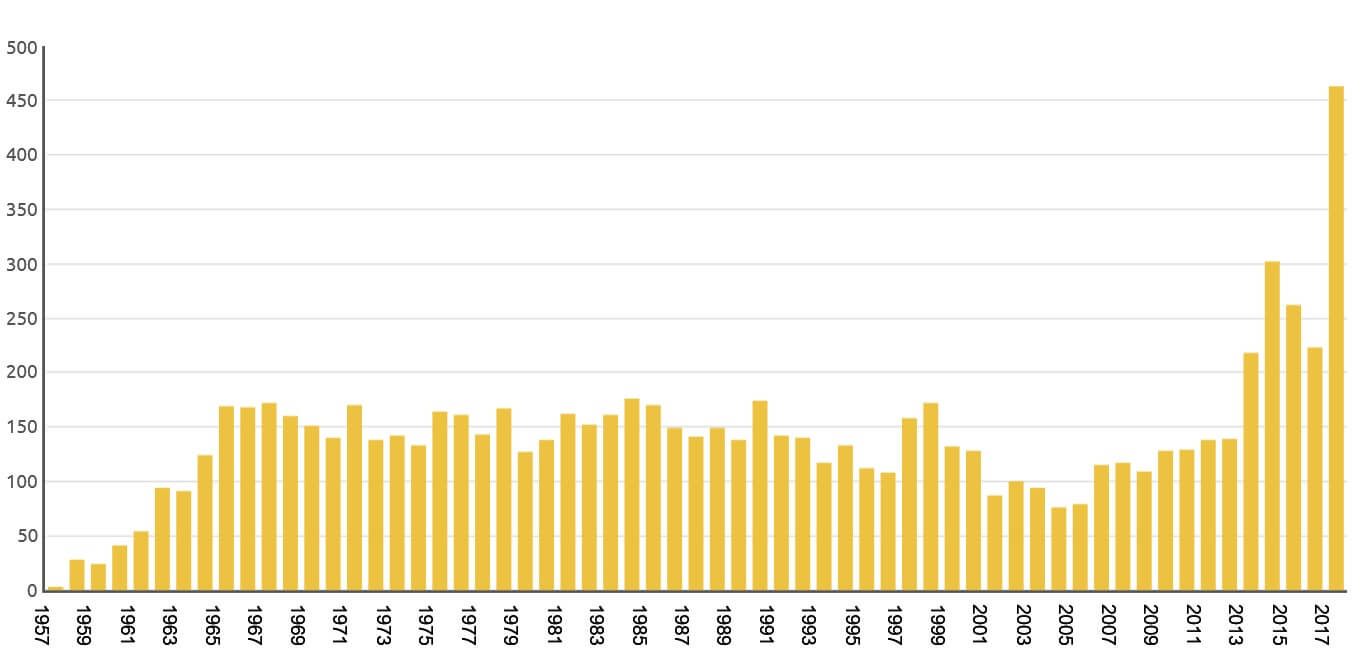
**52*. To find out more about Phrasal verbs and check your answers watch the video following the link:***

<https://www.youtube.com/watch?v=Gqu-bgwML00&t=35s>

**53. *Choose the right option a, b, or c to test your knowledge of Phrasal verbs. Translate the sentences into Russian.***

1. A new wearable device allows better understanding of how we feel, creates more meaningful conversations with those we \_\_\_\_\_\_\_ and helps us lead happier lives.
   1. are for b. care about c. care
2. Some batteries in today's electric cars can \_\_\_\_\_\_\_\_ to 12 hours to charge fully.
   1. take up b. take in c. take out
3. There is a special feature on Google maps which allows to \_\_\_\_\_\_\_ the information about the air quality where you are \_\_\_\_\_\_\_\_ for a bike ride, picnic, or camping trip.
4. find out/heading out b. find up/heading along c. find about/heading to
5. Google \_\_\_\_\_\_\_\_ its first translation service in 2006 and has continually added to its repository.
6. rolled up b. rolled out c. rolled away
7. The electric-powered two-wheelers are helping people nimbly \_\_\_\_\_\_\_\_\_ traffic and effortlessly \_\_\_\_\_\_\_\_ town.
8. zip between/get around b. zip among/ get through c. zip through/get about
9. Alternatively, the user can \_\_\_\_\_\_\_ their music device and the speaker will \_\_\_\_\_\_\_\_\_ the rider's favourite tunes.
10. plug into/boom up b. plug at/boom away c. plug in/boom out
11. Special technology has been developed to cause plants it to give off light.
12. Many of us \_\_\_\_\_\_\_\_\_watching sci-fi movies with airborne taxis. The companies which aim to start operating air taxis also need to \_\_\_\_\_\_\_what traffic rules the taxis will need to follow, and what kind of training flying taxi pilots will need.
13. grew up/ work out b. grew on/work up c. grew at/work through
14. Over generations, automobiles have influenced every aspect of society in many ways and have changed to \_\_\_\_\_\_\_the times.
15. keep with b. keep up c. keep up with
16. Computers have minds of their own and always seem to \_\_\_\_\_\_\_\_ or crash at the worst possible moment.
17. play away b. play up c. play out
18. Most users find it impossible to work out what has gone wrong, so it is very important that you regularly \_\_\_\_\_\_\_ all your important files.
19. back in b. back on c. back up
20. It is equally important that you \_\_\_\_\_\_\_ the computer correctly before you \_\_\_\_\_\_\_\_\_ .
21. shut away/ switch off it b. shut down/switch it off c. shut off/switch off
22. Whatever you do, don’t forget to log off after using the Internet.
23. log off b. log away c. log out
24. Steve Jobs \_\_\_\_\_\_\_ university to set up a company. He and his friend \_\_\_\_\_\_\_ with an operating system which was a huge success.
25. dropped from/came out b. dropped off/came in c. dropped out of/came up

**Describing Diagrams and Graphs**



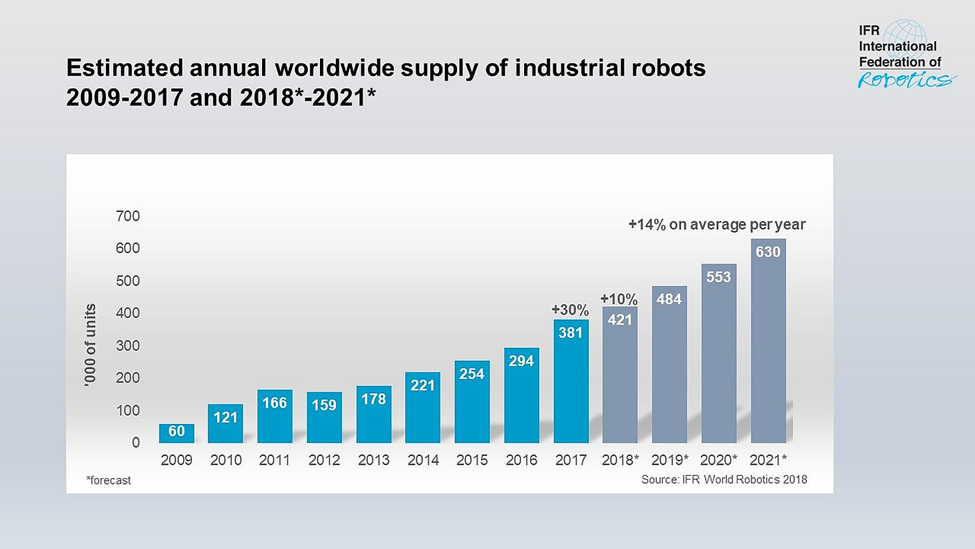
**54. *Use the verbs below to complete the description of the chart.***

*Over, remained, shows, constant, increase, overcoming, decrease, increasing.*

The bar chart *\_\_\_\_\_\_* the number of satellites launched into space per year. It can be seen from the chart that after the first satellite was launched in 1957, an *\_\_\_\_\_\_\_* trend continued up to 1965 with the number of launches *\_\_\_\_\_\_\_* 100. Since 1965 until early 2000s the number of satellites launched per year *\_\_\_\_\_\_\_* relatively *\_\_\_\_\_\_\_* . Between 2001 – 2005 there came a minor *\_\_\_\_\_\_\_* with the minimum number of less than 100 in 2004. It was replaced by a major *\_\_\_\_\_\_\_\_* in 2007 that continued up to 2017 when *\_\_\_\_\_\_\_* 450 satellites were launched.

**55. *Describe the chart given below. Use the information in the Skill Section to help you with the task.* *Before you begin, read the following advice.***

* Begin with an introductory statement: *e.g. The graph/table/chart shows/describes…*
* Don’t try to describe every detail. Look for significant features
* End with a comment on general trends

****

**CHECK YOURSELF**

**1. Robots Quiz. *Choose the right answer.***

1. What is a robot?

a. a machine designed to complete a task

b. mechanical parts put together

c. a program written for specific applications

2. What are the components of a typical robot?

****a. robotic arms, legs and a body

b. sensors, control systems, effectors

c. the power source, the motor, the frame

3. Where were robots first used?

a. in automotive industry

b. in a lab

c. in the space

4. How do robots make decisions?

a. They consult with the motherboard.

b. They think and think until they come up with a decision.

c. They follow directions written in a computer program.

5. When was the first robot launched?

a. 270 BC

b. 1977

c. 1830

6. First robots could only perform one task at a time.

a. True

b. False

7. The idea of a robot apocalypse is something imagined by sci-fi writers and is not a real concern for researchers.

a. True

b. False

8. These are robots that will not function unless controlled by humans.

a. manual

b. smart

c. sequential

9. These are robots that are designed to perform series of tasks in the same sequence.

a. manual

b. smart

c. sequential

10. These are robots that are considered to possess artificial intelligence.

a. manual

b. smart

c. sequential

**2. *Look at the words below. Try to recall how they were used in text 9A. Give their definitions or translate them into Russian.***

Turn into/ verifiable/ humanoid/ actual(ly)/ take over/ powerful/ sequence/ set up/ separate/ alternatively/ relieve/ suit/ vision/ enhance performance/ average/ production rate/ unit/ switch to/ with a view to doing something/ complicated/ existing/ preferably/ look like/ extend/ carry out/ attempt/ be fitted with.

**3. *Fill in the gaps with the words from Exercise 2 above in the right form.***

1. The study will be **c**\_\_\_\_\_\_\_\_\_ **o**\_\_\_\_ over a six-month period. 2. There were lots of rumours but nobody knew what had **a**\_\_\_\_\_\_\_\_\_ happened. 3. More and more people confess that they fear that robots will **t**\_\_\_\_\_\_\_\_ **o**\_\_\_\_\_ their jobs. 4. When you go out, having some form of identification is recommended, **p**\_\_\_\_\_\_\_\_ a passport. 5. Inside the robot there’s a built-in computer, which **l**\_\_\_\_\_\_\_\_ **l**\_\_\_\_\_\_ a card. 6. We do our best to **e**\_\_\_\_\_\_\_\_\_ our students’ participation in the English Language Olympiad**.** 7.There is a particular **s**\_\_\_\_\_\_\_\_\_\_\_ in which you have to perform these tasks. 8. New toll roads could help **r**\_\_\_\_\_\_\_\_\_\_ congestion on other routes. 9. If you fail, you can have a second **a**\_\_\_\_\_\_\_\_\_\_ at the exam. 10. There are few scientists whose **v**\_\_\_\_\_\_\_\_\_ of the future seem to be likely to happen. 11. The **a**\_\_\_\_\_\_\_\_\_ of the three numbers *7, 12* and *20* is *13*, because the total of *7, 12* and *20* is *39*, and *39* divided by *3* is *13*. 12. More workers were employed to enhance the **p**\_\_\_\_\_\_\_ **r**\_\_\_\_\_\_ of the vehicles. 13. Each **u**\_\_\_\_\_\_\_ of the [text](https://dictionary.cambridge.org/ru/%D1%81%D0%BB%D0%BE%D0%B2%D0%B0%D1%80%D1%8C/%D0%B0%D0%BD%D0%B3%D0%BB%D0%B8%D0%B9%D1%81%D0%BA%D0%B8%D0%B9/text) [book](https://dictionary.cambridge.org/ru/%D1%81%D0%BB%D0%BE%D0%B2%D0%B0%D1%80%D1%8C/%D0%B0%D0%BD%D0%B3%D0%BB%D0%B8%D0%B9%D1%81%D0%BA%D0%B8%D0%B9/book) [focuses](https://dictionary.cambridge.org/ru/%D1%81%D0%BB%D0%BE%D0%B2%D0%B0%D1%80%D1%8C/%D0%B0%D0%BD%D0%B3%D0%BB%D0%B8%D0%B9%D1%81%D0%BA%D0%B8%D0%B9/focuses) on a different [grammar](https://dictionary.cambridge.org/ru/%D1%81%D0%BB%D0%BE%D0%B2%D0%B0%D1%80%D1%8C/%D0%B0%D0%BD%D0%B3%D0%BB%D0%B8%D0%B9%D1%81%D0%BA%D0%B8%D0%B9/grammar) [point](https://dictionary.cambridge.org/ru/%D1%81%D0%BB%D0%BE%D0%B2%D0%B0%D1%80%D1%8C/%D0%B0%D0%BD%D0%B3%D0%BB%D0%B8%D0%B9%D1%81%D0%BA%D0%B8%D0%B9/point). 14. When you register you need to fill in a really **c**\_\_\_\_\_\_\_\_\_ form. 15. New medicines are developed which are successfully used in the **e**\_\_\_\_\_\_\_\_\_ courses of treatment. 16. Freezing temperatures **t**\_\_\_\_\_\_ water **i**\_\_\_\_\_ ice. 17. Tests allow teachers to measure their students’ **p**\_\_\_\_\_\_\_\_\_ . 18. A robot resembling humans is called a **h**\_\_\_\_\_\_\_ robot. 19. You can take an online course, or **a**\_\_\_\_\_\_\_\_\_, you can have a face-to-face classes. 20. When you deliver a presentation, you should mention only **v**\_\_\_\_\_\_\_\_ facts. 21. The Internet has a **p**\_\_\_\_\_\_\_\_ influence on public opinion. 22. Such a database will be extremely costly to **s**\_\_\_\_\_\_\_\_ **u**\_\_ . 23. After the quarrel they went their **s**\_\_\_\_\_\_\_ ways. 24. We hope that new technologies will make a **s**\_\_\_\_\_\_\_\_ to clean sources of energy possible. 25. His new car is **f**\_\_\_\_\_\_\_\_ with an alarm, so it is well protected. 26. He has a degree in Engineering and is best **s**\_\_\_\_\_\_\_ for technical work.

**4. *Guess the words from their definitions and fill in the gaps in the text below using these words.***

*1. a helper; 2. to some degree, but not completely; 3. to correct mistakes while checking homework; 4. to pass information from one person to another; 5. a state of being related to someone or something else; 6. to make something more modern or suitable for use by adding new information; 7. to change something to suit different conditions or uses; 8. to write a statement to parents about their child performance at school; 9. to plan, prepare for, or organise something.*

If you think of the jobs robots could never do, you would probably put doctors and teachers at the top of the list. It is easy to imagine robot cleaners and factory workers, but some jobs need 1.\_\_\_\_\_\_\_\_\_ and creativity. …. Some educators predict that the robot will do the main job of 2.\_\_\_\_\_\_\_ \_\_\_\_\_\_\_ and teachers will be like 3.\_\_\_\_\_\_\_\_ . Intelligent robots will read students' faces, movements and maybe even brain2 signals. Then they will 4.\_\_\_\_\_\_\_\_\_ the information to each student. …. A robot teacher is better than no teacher at all. In some parts of the world, there aren't enough teachers and 9–16 per cent of children under the age of 14 don't go to school. That problem could be 5.\_\_\_\_\_\_\_\_ solved by robots because they can teach anywhere and won't get stressed, or tired, or move somewhere for an easier, higher-paid job. Perhaps the question is not 'Will robots replace teachers?' but 'How can robots help teachers?' Office workers can use software to do things like organise and answer emails, 6.\_\_\_\_\_\_\_\_\_ meetings and 7.\_\_\_\_\_\_\_\_ calendars. Teachers waste a lot of time doing non-teaching work, including more than 11 hours a week 8.\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ . If robots could cut the time teachers spend marking homework and 9.\_\_\_\_\_\_\_\_\_\_ , teachers would have more time and energy for the parts of the job humans do best.

**5\*. *Use the words in the box to fill in the gaps in the sentences below. There are two extra words which you don’t need to use in each box.***

*Crew, submersible, vehicle, to collect, life –support, capability, to recover, remotely, rescue, samples.*

\_\_\_1\_\_\_ is a small, mobile undersea research\_\_2\_\_ capable of functioning in the ocean depths. Some of the tasks submersibles performed were to make direct observations and measurements, \_\_\_3\_\_\_ lost equipment, and for possible \_\_\_4\_\_\_ activity. Manned submersibles also have a \_\_\_5\_\_\_ compartment within a pressure hull and \_\_\_\_ 6\_\_\_systems. Some submersibles have mechanical arms (manipulators) to collect \_\_\_7\_\_\_and perform other modest tasks outside the vessel. To take the right decision they needed ­­­\_\_\_8\_\_\_ data from various sources.

*Depths, submersible, carry out, operate, capability, remotely, perform, crew, samples, applications.*

|  |  |
| --- | --- |
| Automated vehicles\_\_\_9\_\_\_ without continuous control from people and \_\_\_10\_\_\_ routine tasks under the sea for months at a time. \_\_\_11\_\_\_-operated vehicles are controlled by people from a safe distance and are often equipped with a manipulator, cameras and sensors. It is difficult for human beings to reach the \_\_\_12\_\_\_ of seas and oceans. Submersibles are being used in an increasing number of \_\_\_13\_\_\_\_. Submersibles are constructed in a variety of sizes and shapes and are designed to \_\_\_\_14\_\_\_ different and often highly specialized tasks. The development of submersibles came about in response to a need for the \_\_\_15\_\_\_ to visit the ocean depths. One of the most impressive submersibles is the *Aluminaut,* constructed of high-strength aluminum alloys and able to operate at 4,570 m carrying a \_\_\_16\_\_\_ of six. |  |

**6. *Complete each sentence by writing in the correct preposition and form of the verb given in the right column.***

|  |  |
| --- | --- |
| 1. Scientists succeeded … … the way for the exploration of Mars.  2. She doesn’t approve … … in scandals.  3. He didn’t object … … to a new flat.  4. They couldn’t prevent her … … the house.  5. At the time I was thinking … … a job at a big firm in Moscow.  6. Why are you accusing her … … the documents?  7. I thanked him again … … me the car.  8. Unfortunately he persisted … … his crazy ideas.  9. They congratulated me … ... from university.  10.Are you accusing me … ...?  11.The police suspect him … … the money. | 1. PAVE  2. BE INVOLVED  3. MOVE  4. SELL  5. TAKE  6. LOSE  7. LEND  8. EXPRESS  9. GRADUATE  10. LIE  11. STEAL |

**7\*. *Read the sentences and explain the use of Complex Infinitives and Gerunds. Translate the sentences.***

1. I’d like to be chosen for this role. 2. She regretted not having told us about the accident. 3. The computer should have been repaired last week. 4. You’d better be sleeping now. 5. He denied having been asked to prepare a presentation. 6. Being invited to take part in the conference made them feel good. 7. He can’t have done it on his own, he is not strong enough. 8. Everything's changed, but they forgot to send me the memo. 9. I can’t stand being asked my age. 10. She must have been sleeping all night.

**8\*. *Complete the sentences with the appropriate form of the Gerund or the Infinitive of the verb in brackets.***

1. Every athlete’s dream is (to choose) to take part in the Olympic games. 2. (go) to university changed many people’s lives. 3. He thinks that hackers might (steal) money from his bank accounts for months. 4. His countrymen congratulated him on (win) the race. 5. Nobody knew of his (send) to work in Africa. 6. Do you know someone who is not looking forward to (go) on holiday? 7. The citizens were warned about a new coronavirus strain (appear) in the country. 8. I can’t see our tutor. He seems (to leave) a few minutes ago. 9. The engineer denied (use) his colleagues’ ideas in his work. 10. I can’t find my key. I must (lose) it. 11. After (fail) the exam in January he was allowed to take it again in February. 12. Due to (be able/speak) French he found lots of job offers in France. 13. He doesn’t respond well to (ask) to do things. 14. Don’t disturb her. She seems (to study) for her exams. 15. At the end of his presentation the speaker said that he was glad (to cover) all the points of his talk. 16. Black paintings by Goya are completely different from his earlier works because of his (to paint) them when he was old and ill. 17. He was sacked because they suspected him of (lie) in order to get the job. 18. The flat looks so tidy. You must just (to clean) it. 19. I don’t like (to interrupt) when I’m working. 20. In addition to (lose) my phone, I realised that I had left my credit card at home.

**9. *Choose two or three statements below and decide whether you agree or disagree with it. Explain why. Give your own examples.***

**Statements about Robots**

1. Robots seem like a modern day invention, but in reality they were created in ancient Greece and Rome.
2. With the appearance of AI, some computers and robots have been given the opportunity to act with human-like behavior.
3. Most jobs are better done by robots.
4. Robots will never replace humans.
5. Nanobots, robots scaled down to microscopic size, have a very promising future.
6. Some of the applications of robots we only imagine in science fiction could one day be a reality.
7. Autonomous intelligent robots will replace people in all the activities and functions in the near future.
8. One day the development of AI and robotics might escape the human control.

**MODULE 9 PROGRESS TEST**

**Vocabulary. *Decide which answer a, b or c best fits into each gap.***

The 1\_\_\_\_\_\_\_\_ word “robot,” derived from the Czechoslovakian word *robota*

(worker), was first used in the play where robots appeared as artificial humans who functioned only as workers. Devices called “robots” today are extremely 2\_\_\_\_\_\_\_\_\_ in both shape and function. For example, the 3\_\_\_\_\_\_\_\_\_ robots that work in manufacturing plants mainly 4\_\_\_\_\_\_\_\_ a certain task programmed into them by human operators and usually 5\_\_\_\_\_\_\_\_ a human arm. Robots that help with 6\_\_\_\_\_\_\_\_ operations at disaster sites include those that move away debris and other obstacles through manipulation via 7\_\_\_\_\_\_\_ control. 8\_\_\_\_\_\_\_\_\_ , robots that can perform more complicated tasks, e.g. get around obstacles in their path and search for victims, are self-controlled. With the appearance of AI robots and computers have been able to learn and to use information from previous activities to make future decisions. Smart robots have been 9\_\_\_\_\_\_\_\_ the capability to act with human-like behavior. Face recognition software, computer10 \_\_\_\_\_\_\_\_\_ , or computer games that give players a response based on the players actions are all forms of artificial intelligence.

1. a. real b. actual c. true

2. a. diverse b. various c. multiple

3. a. exciting b. exiting c. existing

4. a. carry on b. carry off c. carry out

5. a. look as if b. look like c. look similar

6. a. rescue b. relieve c. reliable

7. a. distant b. long-range c. remote

8. a. alternately b. alternatively c. actually

9. a. fitted with b. fixed with c. fitted to

10. a. sight b. inspiration c. vision

**Grammar. *Choose the right answer.***

1. Check writer Karel Capek, who is claimed \_\_\_\_\_\_\_ the word robot, described robots’ \_\_\_\_\_\_\_\_ the world in one of his plays.

a. to have invented/conquering b. to invent/conquer c. to be invented/to have conquered

2. Though robots are famous for \_\_\_\_\_\_\_ lots of complicated or dangerous jobs, they are unable \_\_\_\_\_\_\_\_ like humans and be creative.

a. have done/thinking b. doing/think c. having done /to think

3. Some people think that we are quite a long way off \_\_\_\_\_\_\_\_ the computing power of the algorithms for fully autonomous AI.

a. having developed b. being developed c. developing

4. Others admit that the potential consequences of \_\_\_\_\_\_\_ something that can match or surpass human intelligence frightens them.

a. creating b. having created c. being created

5. If robots become more intelligent than humans, the predictions of science fiction writers about robots’ \_\_\_\_\_\_\_ over millions of human jobs will come true.

a. take b. taking c. having taken

6. In his essay on robots he described robots’ \_\_\_\_\_\_\_\_ for exploring ocean depths and in space projects.

a. employed b. employing c. having been employed

7. In addition to \_\_\_\_\_\_\_\_ into the depths of the ocean and \_\_\_\_\_\_\_ tasks on the moon, modern robots were taught to do housework such as \_\_\_\_\_\_ floors.

a. diving/performing/vacuuming b. dive/perform/to vacuum c. having dived/performed/vacuuming

8. Scientists believe that robots of the future will be capable of \_\_\_\_\_\_ after us in our old age, \_\_\_\_\_\_\_ our emotions and \_\_\_\_\_\_\_ when we are happy or sad.

a. looking/understand/know b. looking/understanding/know c. looking/understanding/knowing

9. \_\_\_\_\_\_\_\_ certain manufacturing tasks similar to tasks carried out by people is the main function of robots.

a. Carry out b. Carrying out c. Carried out

10. By \_\_\_\_\_\_\_ the location via sensors, the robot was able to find the person in the home and then tell us who was at the door and why.

a. access b. being accessed c. having accessed

**APPENDIX**

**DESCRIBING DIAGRAMS**

Diagrams (graphs and charts) are often used to summarise data. They make it easy to see trends1 and the amount of variation in the information being studied. That’s why it is important to understand and be able to describe the ways charts and graphs display information.

**Types of diagrams and graphs**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| C:\Users\matin\AppData\Local\Microsoft\Windows\INetCache\IE\6AMBE5RM\mcol-pie-chart[1].png  Pie chart | C:\Users\matin\AppData\Local\Microsoft\Windows\INetCache\IE\AJPGIHPB\0xlWi[1].jpg  Histogram | |  |  | | --- | --- | | Number | Year | | 23 | 2019 | | 31 | 2022 |   Table |
| C:\Users\matin\AppData\Local\Microsoft\Windows\INetCache\IE\EQ5SMFTQ\Hfi06[1].png  Bar chart | C:\Users\matin\AppData\Local\Microsoft\Windows\INetCache\IE\EQ5SMFTQ\LampFlowchart[1].png  Flowchart | C:\Users\matin\AppData\Local\Microsoft\Windows\INetCache\IE\AJPGIHPB\simple_line-1[1].png  Graph |

**Diagrams** are visual ways of presenting data concisely. You could think of diagrams as a super-category.

A **pie chart** is a circle divided into segments from the middle (like slices of a cake) to show how the total is divided up.

A **bar chart** is a diagram in which different amounts are represented by thin vertical or horizontal bars which have the same width but vary in height or length.

A **histogram** is a kind of bar chart but the bar width also varies to indicate different values.

A **flowchart** is a diagram which indicates the stages of a process. A **table** is a grid with columns and rows of numbers.

A **graph** is a picture with measurements marked on it as lines or curves, used to compare different things or show the development of something.

**Graphs** show how numbers increase or decrease.

**Useful Graph Vocabulary**

**UP**: increase2, rise3, grow (growth), went up, soar, double, multiply, climb, exceed, double, jump …

**DOWN**: decrease, drop, fall, decline, plummet, halve, plunge …

**UP and DOWN**: fluctuate, undulated, dip …

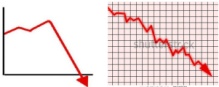
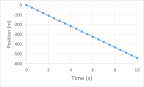
**SAME**: stable, stabilized, levelled off, remained constant or steady, consistent …

**CHANGES**: suddenly, sharply, dramatically, steeply …

**TOP**: reached a peak, peaked, reached its highest level …

**BOTTOM**: bottomed out, sank, reached the lowest level …

***Match the verbs with their opposites. Explain the meaning of the verbs below.***

double plummet

soar fall below

multiply depreciate

appreciate decrease significantly

exceed halve

1a *trend* is the direction of change in the data: *People’s average lifespan has generally increased over the last century, even though in a few war years it declined. So we could say the* ***trend*** *has been for people to live longer than previous generations.*

2 the nouns *increase* and *decrease* have the stress on the first syllable, but the verbs have the stress on the second syllable.

3 the nouns *rise, growth, fall, drop* or *decline*, like *increase* and *decrease* are followed by in (to explain what is rising) or of (to explain the size of the change): *a* ***rise of 10% in the number of cars.***

**Note that *graph* is a noun and *graphic* is usually an adjective:**

***The economics textbook contains a lot of fascinating graphs.***

***My nephew studied graphic design.***

***The book contains some graphic descriptions of the main trends.***

Graphics can be used as a plural noun to refer to pictorial material: *The* ***graphics*** *in that computer game are brilliant.*