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SCIENCE AND TECHNOLOGY

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Метою посібника є навчання читання та розуміння науково-популярних текстів, засвоєння загальнонаукової лексики, формування навичок говоріння з широкого кола тем з галузі науки і техніки. Ефективне практичне оволодіння мовою забезпечується системою лексичних і комунікативних вправ, що стимулюють інтерес і творчу діяльність тих, хто вивчає мову.

Посібник призначений для студентів молодших курсів технічних ВНЗ, а також для широкого кола тих, хто вивчає й удосконалює англійську мову.

SCIENCE AND TECHNOLOGY

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Передмова

Пріоритетною сферою інтересу й уваги у вищому технічному навчальному закладі є галузь науки і техніки.

Наука є однією із визначних особливостей сучасної культури і, можливо, найбільш динамічним її компонентом. Неможливо обговорювати соціальні, культурні, антропологічні проблеми, якщо не брати до уваги розвиток наукової думки. Наука – це сфера людської діяльності, метою і змістом якої є пізнання світу як єдиної системи на основі експериментів і реальних суджень. У якості соціально-мобілізуєчої сили наука використовується для здійснення програм соціально-економічного розвитку, а також для вирішення глобальних проблем сучасності.

Первинним у розумінні природи науки і техніки є їхній вплив на саму людину, на систему її інтересів, потреб і можливостей до дії в організації свого буття і його вдосконалення.

Сучасний фахівець повинен бути підготовлений так, щоб іти в ногу з прогресом науки і техніки, мати повну інформацію про всі, у тому числі новітні, досягнення у своїй галузі і мати досить глибокі знання відповідних фундаментальних наук, уміючи все це використовувати на практиці. Фахівець має застосовувати весь арсенал сучасних наукових методів для досягнення необхідних результатів у конкретній сфері, легко адаптуючись при цьому до умов, які змінюються. Це завдання може бути вирішено тільки на базі міцної фундаментальної освіти.

Наукове спілкування в сучасному світі відбувається здебільшого англійською мовою. Також переважна частина наукової інформації стає доступна англійською мовою, яка останнім часом отримала статус міжнародної.

Для організації ефективного професійно - зорієнтованого спілкування і розуміння інформації зі спеціальності необхідна спеціальна підготовка, що і є головним завданням навчання іноземної мови у ВТНЗ. Одним із основних

компонентів такої підготовки є оволодіння науковою термінологією за відповідною спеціальністю. Але, на наш погляд, на перших порах автентичні матеріали повинні мати науково-популярний характер, бути зрозумілими не тільки для студентів як майбутніх спеціалістів певного фаху, але й для викладача іноземної мови, який, як правило, не має додаткової технічної освіти. Тільки після того, як студенти привчаються легко оперувати загальнонауковою лексикою в рецептивних і продуктивних видах діяльності, доцільно переходити до роботи з вузькопрофільними матеріалами.

Наука замінила звичайні слова універсальною термінологією, при цьому величезна кількість наукових досліджень у світі проводиться на межі декількох галузей знання: фізики, хімії, біології, медицини, інформатики тощо. Звідси виникає кілька причин, через які доцільним є випередити у ВНЗ навчання вузькопрофільної лексики роботою із загальнонауковою або науково-популярною літературою. По-перше, більшість випускників шкіл, які стають студентами технічних ВНЗ, взагалі незнайомі із загальнонауковою лексикою, тому робота зі спеціальними текстами, навіть якщо вони адаптовані, часто викликає значні труднощі. По-друге, науково-популярна література містить велику кількість таких загальнотехнічних термінів, які студент неминуче зустрине в майбутньому як фахівець під час роботи з літературою як за своєю спеціальністю, так і суміжними спеціальностями, які згодом можуть увійти у сферу його професійних інтересів. По-третє, у світлі сучасних тенденцій гуманізації освіти однією із задач іноземної мови як навчальної дисципліни є розширення світогляду, підвищення загальної ерудиції студентів, що стає можливим при знайомстві майбутнього фахівця з досягненнями людства у всіх галузях науки, а не тільки у сфері його спеціалізації.

Таким чином, курс профільно-зорієнтованого навчання іноземної мови в технічному ВНЗ раціонально складати з двох етапів: на першому студенти працюють із матеріалами загальнонаукового характеру, які охоплюють

різноманітні галузі наукового знання, створюючи той самий фундамент, на якому пізніше, на другому етапі, засвоюється конкретний вузькоспеціалізований курс для конкретної групи майбутніх фахівців.

Прикладом матеріалів загальнонаукового характеру є пропонований посібник англійською мовою «Science and Technology», який включає 30 текстів на найрізноманітніші науково-популярні теми. Посібник призначений для студентів молодших курсів технічних ВНЗ, а також для широкого кола тих, хто вивчає й удосконалює англійську мову. Він складається з трьох частин. У першій частині – «Великі винаходи» – студенти знайомляться з основними етапами розвитку техніки і технологій, основними досягненнями наукової думки за всю історію розвитку людства. У другій частині – «Як працює техніка» – викладені основні принципи роботи найпопулярніших технічних пристроїв. У третій частині – «Найвидатніші винахідники всіх часів» – описані долі деяких великих учених і винахідників різних епох.

Кожен текст забезпечений набором до- і післятекстових завдань як лексичного, так і комунікативного характеру. Практика роботи з даним посібником свідчить, що інформація, яка міститься в науково-популярних текстах, викликає інтерес студентів ВНЗ різних профілів і спеціальностей, а робота з ними може розглядатися як початковий етап навчання спеціалізованої англійської мови у технічному ВНЗ будь-якого профілю.

Автор висловлює надію, що придбані студентами знання будуть використані в їхній майбутній професійній діяльності, розширять кругозір, підвищать рівень володіння англійською мовою.

PART I. GREAT INVENTIONS

UNIT 1. BRANCHES OF SCIENCE



Word list:

1.	branch	розділ, галузь
2.	main	основний
3.	to divide	розділяти
4.	major	головний
5.	to behave, behavior	поводити себе, поведінка
6.	society	суспільство
7.	natural sciences	природничі науки
8.	phenomenon	явище
9.	to make up	складати
10.	interdisciplinary	міждисциплінарний
11.	applied science	прикладна наука
12.	to apply	застосовувати
13.	to include	включати
14.	matter	матерія
15.	to conduct	проводити (напр., дослідження)
16.	universe	світ, всесвіт
17.	composition	склад
18.	properties	властивості

19.	as well as	а також
20.	to undergo	випробовувати, зазнавати
21.	relationships	відносини
22.	to comprise	включати, охоплювати
23.	solid	твердий
24.	rock	гірська порода
25.	to be concerned with	стосуватися
26.	origin	походження

Task 1. Match the words with close meaning:

1.	major	a.	use
2.	make up	b.	sphere
3.	apply	c.	also
4.	universe	d.	hard
5.	as well as	e.	main
6.	solid	f.	contain
7.	include	g.	world
8.	branch	h.	compose

Task 2. Answer the following questions (you may do it in your native language):

1. What is the composition of water?
2. What does the matter consist of?
3. What natural phenomena do you find most wonderful?
4. What is twenty divided by five?
5. What natural sciences do you know?
6. What are the properties of metals?
7. What do you think about the origin of the Earth?
8. What do we call applied sciences?

Task 3. Match the words with their definitions:

1.	rock	a.	manner of acting, reacting or functioning
2.	society	b.	involving two or more academic disciplines
3.	behavior	c.	the state of being connected or

			related
4.	comprise	d.	hard, naturally formed mineral
5.	interdisciplinary	e.	consist of, be composed of
6.	undergo	f.	lead, manage
7.	conduct	g.	to pass through, experience
8.	relationships	h.	the totality of people living as an organized community

Task 4. Scan the text and choose the correct answers to questions 1 – 4 below:

1. How many categories do the fundamental sciences include?
 - a. 2
 - b. 3
2. What methods does natural science apply?
 - a. empirical and scientific
 - b. empirical and formal
3. What does not applied science include?
 - a. logic and mathematics
 - b. medicine and computer science
4. What are fields of engineering closely related to?
 - a. applied science
 - b. formal science

Branches of Science

The main branches of science are usually divided into two major groups: social sciences, which study human behavior and societies, and natural sciences, which study natural phenomena. There are also the formal sciences, such as mathematics and logic, which study formal systems. These three categories make up the fundamental sciences, on top of which are interdisciplinary and applied science, such as engineering and medicine.

Natural science is a branch of science that studies the rules that govern the natural world by applying an empirical and scientific method to the study of the universe.

Natural sciences include physics, chemistry, ecology, geology, biology etc.

Physics is a natural science that studies matter and its motion through spacetime. It is the general analysis of nature, conducted in order to understand how the universe behaves.

Chemistry is the science of matter that studies the composition, behavior, structure, and properties of matter, as well as the changes it undergoes during chemical reactions.

Ecology is the scientific study of the relationships that living organisms have with each other and with their environment.

Geology is the science comprising the study of solid Earth, the rocks of which it is composed, and the processes by which they change.

Biology is the branch of natural science concerned with the study of life and living organisms, including their structure, function, growth, origin, evolution, distribution.

Social science include: anthropology, archaeology, business administration, communication, criminology, economics, education, government, linguistics, international relations, political science, psychology, sociology, history and law.

The formal sciences are concerned with formal systems, such as logic, mathematics, theoretical computer science, information theory, systems theory, decision theory, statistics, and some aspects of linguistics.

Applied science is the application of scientific knowledge in a physical environment. Example fields of applied science include: Applied mathematics, Applied physics, Medicine, Computer science.

Fields of engineering are closely related to applied sciences. Applied science is important for technology development.

Task 5. Read the text again and answer the questions:

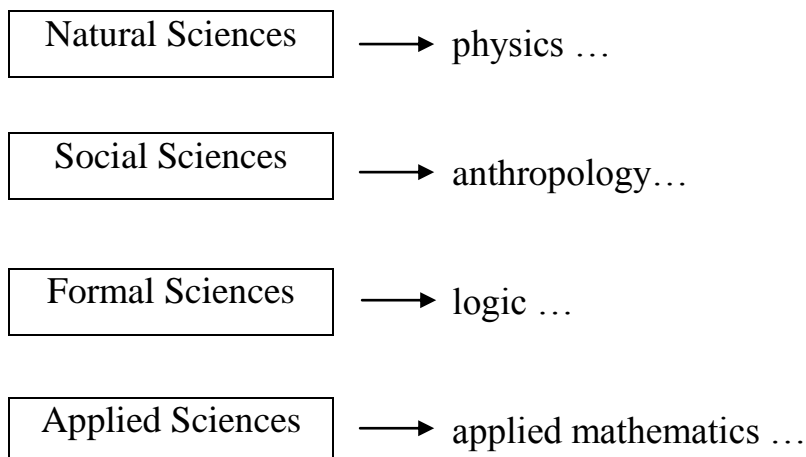
1. What do social sciences study?
2. Which sciences study natural phenomena?
3. To what group do mathematics and logic belong?
4. What categories do fundamental sciences comprise?
5. What are the examples of applied science?

Task 6. Sort out the following by categories:

Physics	Chemistry	Ecology	Geology	Biology

1. is concerned with the study of life and living organisms;
2. studies the solid Earth;
3. studies the properties of matter;
4. analyzes how the universe behaves;
5. studies the relationships of living organisms with their environment;
6. is the study of matter;
7. studies the motion of the matter through spacetime;
8. studies the processes by which rocks change;
9. studies the structure, function, growth, origin of living organisms.

Task 7. Complete the diagram:



Task 8. Based on the diagram above tell what the mentioned groups of sciences include and are concerned with.

UNIT 2. FROM STONE TO IRON AGE



Word list:

1.	stone	камінь
2.	iron	залізо
3.	invention	винахід
4.	tool	знаряддя
5.	similar	подібний, схожий
6.	to involve	передбачати, включати
7.	permanent	постійний
8.	settlement	поселення
9.	to be tied to	бути пов'язаним
10.	survival	виживання
11.	development	розробка, досягнення
12.	shift	зсув
13.	nomadic	кочовий
14.	to prove	доводити
15.	evidence	відомості, факти, дані
16.	ancient	стародавній
17.	to provide	забезпечувати
18.	examination	дослідження
19.	smelting	плавка, плавлення
20.	copper	мідь
21.	alloy	сплав
22.	tin	олово
23.	considerable	значний
24.	owing to	завдяки, внаслідок
25.	abundance	достаток
26.	to compare	порівнювати
27.	common	звичайний
28.	adoption	впровадження, засвоєння

29.	ore	руда
30.	widespread	поширений

Task 1. Match the words with close meaning:

1.	similar	a.	study
2.	permanent	b.	important
3.	evidence	c.	linked
4.	examination	d.	data
5.	considerable	e.	same
6.	owing to	f.	usual
7.	common	g.	thanks to
8.	tied	h.	constant

Task 2. Compose a list of objects which are made of:

stone, iron, copper, tin, alloys of metals

Compare your list with that of your partner's.

Task 3. Match the words to make up possible word-combinations:

1.	ancient	a.	information
2.	iron	b.	results
3.	widespread	c.	settlement
4.	compare	d.	smelting
5.	stone	e.	abundance
6.	technological	f.	life
7.	metal	g.	developments
8.	nomadic	h.	tool
9.	fruit	i.	ore

Task 4. Complete the table:

Verb	Noun
invent	
	involvement
survive	
	proof
	provision
	adoption
develop	

Task 5. Scan the text and**a) find equivalents of the following words and word-combinations:**

1. історія людства (para 1)
2. зброя (para 2)
3. основний, головний (para 2)
4. письмові записи (para 3)
5. печерні малюнки (para 3)
6. людські останки (para 3)
7. мумії (para 3)
8. одомашнення тварин (para 4)
9. витіснив бронзу (para 5)
10. притулок під час війни (para 5);

b) put the main ideas (A – E) in the same order as they are in the text:

- A. Historians get ideas about people's lifestyle from various evidence.
- B. People's activities were connected with survival.
- C. Iron smelting technology was adopted.
- D. The history of technology repeats the history of humanity.
- E. Radical changes in agriculture happened.

From Stone to Iron Age

1. The history of technology is the history of the invention of tools and techniques, and is similar in many ways to the history of humanity.

2. During the Stone Age (or Paleolithic Age), all humans had a lifestyle which involved limited use of tools and few permanent settlements. The first major technologies, then, were tied to survival, hunting, and food preparation in this environment. Fire, stone tools and weapons, and clothing were technological developments of major importance during this period. Stone Age cultures developed music, and engaged in organized warfare.

3. Although the Stone Age cultures left no written records, the shift from nomadic life to settlement and agriculture can be proved by some archaeological evidence. Such evidence includes ancient tools, cave paintings, and other prehistoric art. Human remains also provide direct evidence, both through the examination of bones, and the study of mummies. Though concrete evidence is limited, scientists and historians have been able to get ideas about the lifestyle and culture of various prehistoric peoples, and the role technology played in their lives.

4. The Stone Age developed into the Bronze Age after the Neolithic Revolution. The Neolithic Revolution involved radical changes in agricultural technology which included development of agriculture, animal domestication, and the building of permanent settlements. These combined factors made possible the development of metal smelting, with copper and later bronze, an alloy of tin and copper, being the materials of choice, although polished stone tools continued to be used for a considerable time owing to their abundance compared with the less common metals.

5. The Iron Age involved the adoption of iron smelting technology. It generally replaced bronze, and made it possible to produce tools which were stronger, lighter and cheaper to make than bronze equivalents. Iron ores were much more widespread than either copper or tin. In Europe, large hill forts were built either as a refuge in time of war, or sometimes as permanent settlements.

Task 6. Read the text again. Sort out the following developments by the Ages:

The Stone Age	The Bronze Age	The Iron Age
<i>1</i>	<i>2</i>	<i>3</i>

- animal domestication
- fire
- permanent settlements
- iron smelting technologies

- stone tools
- hill forts
- weapons
- clothing
- bronze

Task 7. Find one meaningful mistake in each sentence and correct it:

1. During the Stone Age humans' lifestyle involved widespread use of tools.
2. Clothing was the technological development of major importance during the Iron Age.
3. The shift from nomadic life to settlement and agriculture can be proved by some written records.
4. The Neolithic Revolution involved development of agriculture, animal domestication and building of large hill forts.
5. Bronze, an alloy of tin and iron, was developed owing to metal smelting.
6. Tools produced during the Iron Age were stronger, lighter though more expensive to make than bronze equivalents.

Task 8. Give short characteristics of the Stone, Bronze and Iron Ages. Say what developments you consider of the major importance and why.

UNIT 3. THE ANCIENT WORLD'S TECHNOLOGIES



Word list:

1.	growth	зростання
2.	to produce	виробляти, створювати
3.	advance	успіх, просування вперед
4.	to be notable for	відомий, примітний
5.	to credit	приписувати
6.	wheel	колесо
7.	c (cerca)	приблизно, близько
8.	BC (Before Christ)	до нашої ери
9.	sophisticated	складний, високого рівня
10.	mud-brick	глинобитна цегла
11.	arch	арка
12.	to span	охоплювати
13.	to predict	передбачувати
14.	eclipse	затемнення
15.	to be responsible for	бути відповідальним за
16.	numerous	численний
17.	discovery	відкриття
18.	contribution	вклад
19.	cast iron	чавун
20.	suspension bridge	підвісний міст
21.	steam engine	паровий двигун
22.	possibility	можливість
23.	to harness	підкорювати, використовувати
24.	to create	створювати

25.	ownership	володіння
26.	masonry	кам'яна кладка
27.	spinning and weaving	прядіння і ткацтво
28.	harbor	гавань
29.	dam	дамба
30.	vault	звід
31.	dome	купол
32.	scale	масштаб
33.	concrete	бетон
34.	suitable	підходящий
35.	durable	довговічний
36.	skills	навички, майстерність
37.	blade	лезо
38.	crack	тріщина

Task 1. Match the words with close meaning:

1.	advance	a.	increase
2.	produce	b.	nearly
3.	growth	c.	manufacture
4.	notable	d.	forecast
5.	cerca	e.	success
6.	span	f.	long-lived
7.	predict	g.	cover
8.	durable	h.	famous

Task 2. Make up word-combinations from the following words:

1.	suspension	a.	iron
2.	predict	b.	engine
3.	cast	c.	brick
4.	before	d.	bridge
5.	steam	e.	harbor
6.	mud	f.	Christ
7.	quiet	g.	eclipse

Task 3. Make up as many word-combinations as possible with the following words:

1. to create ... (e.g. to create new ideas)
2. to be responsible for ...
3. numerous ...

4. suitable ...
5. contribution into ...
6. ... discovery
7. ... possibility
8. ownership of ...

Task 4. Match the following definitions with one of the inventions from the Word list:

1. – a roof having a circular or elliptical shape
2. – a barrier constructed across a waterway to control the level of water
3. – a structure shaped like an inverted U.
4. – a solid round disk that allows transport to move
5. – a hard, strong construction material
6. – stonework or brickwork
7. – the processes of making fibrous material into e.g., thread
8. – an arched structure serving to cover a space

Task 5. Fill in the gaps with the suitable words from the box:

credited	harness	scale
skills	blade	cracks

1. Greek inventors were the first to ... natural forces.
2. The Chinese were ... with the invention of gunpowder.
3. Because of extremely hot weather the ground was covered with numerous
....
4. She hurt her finger with the knife ... cutting vegetables.
5. After tornado the ... of destruction was great.
6. You may perfect any ... by regular exercises.

Task 6. Before reading the text say what ancient civilizations you know and what inventions they can be contributed with.

Scan the text and point out which civilizations you have not mentioned.

The Ancient World's Technologies

It was the growth of the ancient civilizations which produced the greatest advances in technology and engineering which stimulated other societies to adopt new ways of living and governance.

The Egyptians invented and used many simple machines to aid construction processes. The Indus Valley Civilization is notable for its early application of city planning and sanitation technologies.

The peoples of Mesopotamia have been credited with the invention of the wheel. They lived in cities from c4000BC, and developed a sophisticated architecture in mud-brick and stone, including the use of the true arch. The walls of Babylon were so massive they were called a Wonder of the World. They developed extensive water systems; canals for transport and irrigation. Their palaces had sophisticated drainage systems. The Babylonians were good astronomers, keeping a series of records spanning 800 years. They were also able to predict eclipses.

The Chinese were responsible for numerous technology discoveries and developments. Major technological contributions from China include early seismological detectors, matches, paper, cast iron, the iron plough, the suspension bridge, the parachute, natural gas as fuel, the magnetic compass, the propeller and gunpowder.

Ancient Greek made a lot of innovations in mechanical technology, including the watermill which was the first human-devised motive force not to rely on muscle labour. Apart from their pioneering use of waterpower, Greek inventors were also the first to experiment with wind power and even created the earliest steam engine, opening up entirely new possibilities in harnessing natural forces.

The Romans developed an intensive and sophisticated agriculture, created laws providing for individual ownership, advanced stone masonry technology,

advanced road-building, military engineering, civil engineering, spinning and weaving. Roman engineers were the first to build monumental arches, amphitheatres, aqueducts, public baths, true arch bridges, harbours, reservoirs and dams, vaults and domes on a very large scale across their Empire. Notable Roman inventions include the book (Codex), glass blowing and concrete. Because Rome was located on a volcanic peninsula, with sand which contained suitable crystalline grains, the concrete which the Romans formulated was especially durable. Some of their buildings have lasted 2000 years, to the present day.

The engineering skills of the Inca and the Mayans were great, even by today's standards. An example is the lifting of pieces with the weight of one ton in their stonework placed together so that not even a blade can fit in-between the cracks. Like the Inca, the Maya also had knowledge of fairly advanced agricultural and construction technology. Throughout this time period much of this construction, was made only by women, as men of the Maya civilization believed that women were responsible for the creation of new things.

Task 7. Read the text again and say which of the societies

- were good astronomers;
- is notable for application of city planning and sanitation technologies;
- believed that women were responsible for the creation of new things;
- were the first to experiment with wind power;
- built structures which have survived to the present day;
- developed legal regulations of ownership.

Task 8. Sort out the following inventions by societies:

The Egyptians	The Indus	The Babylonians	The Chinese	The Greeks	The Romans	The Mayans
1	2	3	4	5	6	7

– cast iron

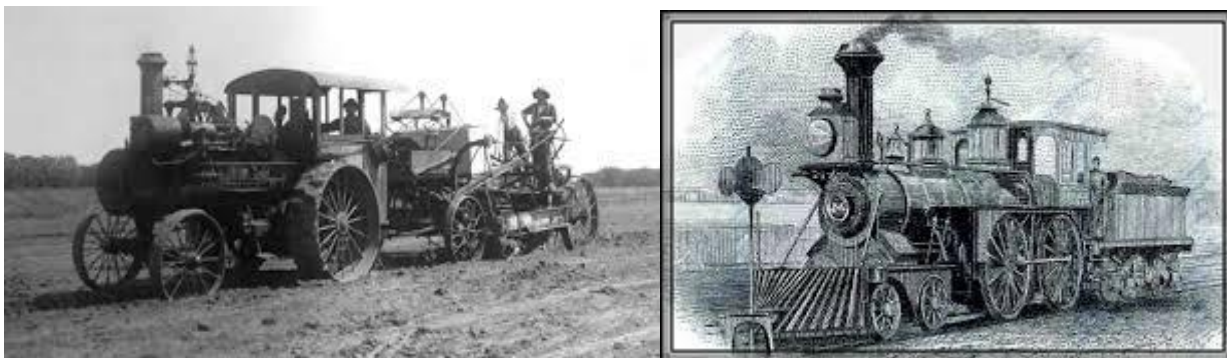
– paper

– propeller

- watermill
- spinning and weaving
- city planning
- arch
- e.g. 4* – matches
- steam engine
- military engineering
- simple machines to aid construction process
- masonry
- suspension bridge
- dam
- canals
- lifting of heavy pieces
- magnetic compass
- harbor
- concrete
- drainage system
- sanitation
- public baths

**Task 9. Choose the civilization you would like to learn more about.
Prepare a report (up to 3 min) about its achievements.**

UNIT 4. INDUSTRIAL REVOLUTION



Word list:

1.	to characterize	характеризувати
2.	mining	вуглевидобуток, вугільна промисловість
3.	to increase	збільшувати
4.	amount	кількість
5.	abundant	багатий, рясний
6.	to convert	перетворювати, обертати
7.	blast furnace	домenna піч
8.	to constrain	обмежувати
9.	mill	млин
10.	valuable	цінний
11.	source	джерело
12.	to drain	осушувати
13.	to access	мати доступ
14.	output	вироблення, продукція
15.	pressure	тиск
16.	to follow	слідувати
17.	astonishing	приголомшливий
18.	to originate	відбуватися, брати початок
19.	especially	особливо
20.	safely	безпечно
21.	to explore	досліджувати
22.	incandescent light bulb	лампа розжарювання
23.	profound	глибокий
24.	effect	вплив, ефект
25.	shift	зміна
26.	sewing machine	швейна машина
27.	reaper	жатка, збиральна машина

28.	to occur	відбуватися, траплятися
29.	iron-clad	оббитий залізом
30.	research	дослідження

Task 1. Match the words with close meaning:

1.	amount	a.	transform
2.	explore	b.	limit
3.	abundant	c.	study
4.	occur	d.	quantity
5.	profound	e.	deep
6.	convert	f.	happen
7.	effect	g.	rich
8.	constrain	h.	influence

Task 2. Make up appropriate word-combinations with the words from A and B and translate them:

A: blast, coal, sewing, incandescent, iron, wind, astonishing, eight-hour.

B: mining, machine, mill, furnace, clad, light bulb, shift, discovery.

Task 3. Make up as many word-combinations as you can with the following words:

1. to increase ... (e.g. to increase speed)
2. to characterize ...
3. valuable ...
4. source of ...
5. to drain ...
6. output of ...
7. research into ...
8. under pressure of ...

Task 4. Complete the sentences with the suitable words from the box:

followed safely	Especially Accessed	reaper originated
--------------------	------------------------	----------------------

1. Football _____ in Great Britain.
2. On his way home he was _____ by a strange man.
3. Reading good literature is very important, _____ in young years.
4. Modern cars are equipped with some devices to run _____ .
5. A lot of information on this subject can be _____ in the Internet.
6. A _____ was invented as a farm machine for harvesting grain.

Task 5. Before reading the text say what developments you associate with the Industrial Revolution. Scan the text and choose the correct answers to questions 1 – 5 below:

Industrial Revolution

The British Industrial Revolution is characterized by developments in the areas of textile manufacturing, mining, metallurgy and transport driven by the development of the steam engine. Above all else, the revolution was driven by cheap energy in the form of coal, produced in ever-increasing amounts from the abundant resources of Britain. Coal converted to coke gave the blast furnace and cast iron in much larger amounts than before, and a range of structures could be created, such as The Iron Bridge. Cheap coal meant that industry was no longer constrained by water resources driving the mills, although it continued as a valuable source of power. The steam engine helped drain the mines, so more coal reserves could be accessed, and the output of coal increased. The development of the high-pressure steam engine made locomotives possible, and a transport revolution followed.

The Industrial Revolution was followed by astonishing developments in transportation, construction, and communication technologies originating in Europe, especially in Britain. The steam engine which had existed since the early 18th century, was practically applied to both steamboat and railway transportation. The first purpose built railway line opened between Manchester and Liverpool in 1825, the Rocket locomotive of Robert Stephenson being one of the first working

locomotives used on the line. Telegraphy also developed into a practical technology in the 19th century to help run the railways safely.

Other technologies were explored for the first time, including the incandescent light bulb. The invention of the incandescent light bulb had a profound effect on the workplace because factories could now have second and third shift workers.

Shoe production was mechanized and sewing machines introduced around the middle of the 19th century. Mass production of sewing machines and agricultural machinery such as reapers occurred in the mid to late 19th century. Bicycles were mass-produced beginning in the 1880s.

Steamships were eventually completely iron-clad, and played a role in the opening of Japan and China to trade with the West. The Second Industrial Revolution at the end of the 19th century saw rapid development of chemical, electrical, petroleum, and steel technologies connected with highly structured technology research.

The period from last third of the 19th century until WW1 is sometimes referred to as the Second Industrial Revolution.

1. How many stages did the Industrial Revolution include?
 - a. 3.
 - b. 2.
2. By what source of energy was the revolution driven by?
 - a. In the form of oil.
 - b. In the form of coal.
3. What made locomotives possible?
 - a. Steam engine.
 - b. Gasoline engine.
4. Why was the invention of the incandescent light bulb so important?
 - a. It allowed to work in shifts.
 - b. It allowed to save energy of coal.

5. When did the Second Industrial Revolution start?
- In the last third of the 19th century.
 - In the mid of the 19th century.

Task 6. Read the text again and say what the following dates are associated with:

- ✓ the middle of the 19th century
- ✓ the end of the 19th century
- ✓ 1830
- ✓ the 1880s
- ✓ the last third of the 19th century

Task 7. You are to choose the one best answer – A, B, C or D to each question:

1. What area was not influenced by the development of the steam engine?
 - mining
 - textile manufacturing
 - metallurgy
 - medicine
2. What was not mass-produced in the second half of the 19th century?
 - Reapers
 - Bicycles
 - Automobiles
 - Sewing machines
3. What technology was not developed during the Second Industrial Revolution?
 - Electrical
 - Petroleum
 - Steel
 - IT

4. Which development is not referred to the Industrial Revolution?
- A. Locomotive
 - B. Incandescent light bulb
 - C. Printing press
 - D. Sewing Machine

Task 8. Summarize the text according to the plan:

1. How the steam engine influenced the development of coal industry.
2. The use of the steam engine in transport.
3. The invention of the incandescent light bulb.
4. Introduction of mass production.

UNIT 5. THE 20TH CENTURY TECHNOLOGY



Word list:

1.	rapidly	швидко
2.	implementation	впровадження, реалізація
3.	scientific	науковий
4.	to contribute	робити вклад
5.	due to	завдяки
6.	gains	завоювання
7.	in part	частково
8.	sound recording	звукозапис
9.	to pave the way	прокласти дорогу
10.	storage	зберігання
11.	data	дані
12.	improvement	поліпшення, удосконалення
13.	vast	обширний, значний
14.	nuclear power	ядерна енергетика
15.	significant	значний
16.	vote	голосування
17.	to establish	встановлювати, засновувати
18.	supply	постачання
19.	distribution	розподіл
20.	refrigeration	охолодження (штучне)
21.	highway	автомагістраль

22.	spacecraft	космічний корабель
23.	household appliances	побутові прилади
24.	petroleum	нафтопродукти
25.	fiber	волокно
26.	material science	матеріалознавство

Task 1. Match the words with close meaning:

1.	implementation	a.	thanks to
2.	storage	b.	information
3.	rapidly	c.	perfection
4.	spacecraft	d.	introduction
5.	due to	e.	keeping
6.	improvement	f.	quickly
7.	data	g.	rocket

Task 2. Make up the possible word-combinations from A and B:

A.	1.	sound	B.	a.	power
	2.	in		b.	science
	3.	pave		c.	recording
	4.	material		d.	the way
	5.	nuclear		e.	part
	6.	household		f.	appliances

Task 3. Match the following definitions with one of the words from the Word list:

1. to give to a common fund or for a common purpose
2. very great in size, number, amount or quantity
3. to express a choice or an opinion
4. to found, generate, set up
5. a main public road, especially one connecting towns and cities
6. the process of cooling or freezing
7. oily, thick, usually dark-colored liquids often used as fuel

Task 4. Choose the word that best completes each sentence:

1. Working hard he made a (an) _____ progress in studies.

- a. important
 - b. significant
 - c. special
2. The _____ of the town with food products was stopped because of military actions.
- a. support
 - b. keeping
 - c. supply
3. Optic _____ is actively used in modern technologies.
- a. material
 - b. fiber
 - c. device
4. Every morning he starts with _____ of duties among the members of his team.
- a. distribution
 - b. selection
 - c. definition
5. His _____ works have been translated into many languages.
- a. researched
 - b. academic
 - c. scientific
6. Antibiotics are one of the major _____ of the medical science of the 20th century.
- a. improvements
 - b. gains
 - c. implementations

Task 5. Before reading the text say what you consider the most significant scientific gains of the 20th century and why.

Task 6. Read the text and agree or disagree with the statements below:***The 20th Century Technology***

The 20th century technology developed rapidly. Communication technology, transportation technology, broad teaching and implementation of the scientific method, and increased research spending all contributed to the advancement of modern science and technology. Due to the scientific gains directly tied to military research and development, technologies including electronic computing might not have developed as rapidly as they did in part due to war. Radio, radar, and early sound recording were key technologies which paved the way for the telephone, fax machine, and magnetic storage of data. Energy and engine technology improvements were also vast, including nuclear power. Transport by rocketry was another significant 20th century development. Most of this work occurred in Germany (Oberth), Russia (Tsiolkovsky), and the United States (Goddard).

The US National Academy of Engineering, by expert vote, established the following ranking of the most important technological developments of the 20th century:

1. Electrification	11. Highways
2. Automobile	12. Spacecraft
3. Airplane	13. Internet
4. Water supply and distribution	14. Imaging
5. Electronics	15. Household appliances
6. Radio and television	16. Health technologies
7. Mechanized agriculture	17. Petroleum and petrochemical technologies
8. Computers	18. Laser and fiber optics
9. Telephone	19. Nuclear technologies
10. Air conditioning and refrigeration	20. Materials science

Absent from the above list is the systematic method of mass production which contributed to almost all of the above technologies.

1.	Spending on research was limited in the 20 th century.	T/F
2.	Electronic computing developed so rapidly due to military research.	T/F
3.	The telephone was followed by radio, radar and early sound recording.	T/F
4.	Most of the research into transport by rocketry occurred not only in Russia.	T/F
5.	Developments in construction were not included in the list of the most important technological achievements of the 20 th century.	T/F

Task 7. Match the sentences halves 1 – 5 with a – e:

1.	Broad teaching is one of the factors	a.	were ranked by experts from the US National Academy of Engineering.
2.	Some advanced technologies including electronic computing	b.	contributed to almost all advanced technologies of the 20 th century.
3.	Nuclear power is one of the main	c.	that contributed to the advancement of modern science and technology.
4.	The most important technological developments of the 20 th century	d.	improvements in energy technology.
5.	The systematic method of mass production	e.	developed rapidly in part due to war.

Task 8. Choose three most important, in your opinion, developments of the 20th century and prove your choice.

UNIT 6. BIRTH OF COMPUTER SCIENCE



Word list:

1.	computer	людина, яка виконує розрахунки; комп'ютер
2.	to perform	виконувати
3.	computation	обчислення
4.	to employ	наймати на роботу, задіяти
5.	degree	ступінь
6.	calculus	обчислення
7.	to refer to	відноситися
8.	value	величина
9.	numeric quantity	чисельна величина
10.	angle	кут
11.	shaft	вал
12.	digital	цифровий
13.	to render	передавати, відтворювати
14.	to store	зберігати
15.	device	прилад
16.	gradually	поступово
17.	to give away	поступатися
18.	onset	наступ, натиск
19.	common	загальноприйнятий, загальний
20.	previous	колишній, попередній
21.	network	мережа
22.	equipment	обладнання

Task 4. Match the following definitions with one of the words from the Word list:

1. One of the series of steps in a process; a stage.
2. The figure formed by two lines starting from a common point.
3. A long, generally cylindrical bar that rotates and transmits power.
4. A complex, interconnected system.
5. To turn, to direct the attention, to make mention.
6. A specified or indefinite number or amount.

Task 5. Scan the text. Put the main ideas (A – E) in the same order as they are in the text:

- A. Later the name computer was given to any machine that performed the work of a human computer.
- B. The Internet won the global communication space.
- C. Previously people who performed calculations were called computers.
- D. Two kinds of computing machines – analog and digital – appeared.
- E. The concept of a world-wide network, called Internet, was introduced.

Birth of Computer Science

Before the 1920s, computers were human clerks that performed computations. They were usually under the lead of a physicist. Many thousands of computers were employed in commerce, government, and research establishments. Most of these computers were women, and they were known to have a degree in calculus. Some performed astronomical calculations for calendars.

After the 1920s, the expression computing machine referred to any machine that performed the work of a human computer.

Machines that computed with continuous values became known as the analog kind. They used machinery that represented continuous numeric quantities, like the angle of a shaft rotation or difference in electrical potential.

Digital machinery, in contrast to analog, were able to render a state of a numeric value and store each individual digit. Digital machinery used relays before the invention of faster memory devices.

The phrase computing machine gradually gave away, after the late 1940s, to just computer as the onset of electronic digital machinery became common. These computers were able to perform the calculations that were performed by the previous human clerks.

The history of the Internet began with the development of electronic computers in the 1950s. The public was first introduced to the concepts that would lead to the Internet when a message was sent from the laboratory at University of California, Los Angeles, after the second piece of network equipment was installed at Stanford Research Institute. This led to the development of protocols for internetworking, in which multiple separate networks could be joined together into a network of networks.

In 1982, the Internet protocol suite was standardized, and consequently, the concept of a world-wide network of interconnected networks, called the Internet, was introduced.

Since the mid-1990s, the Internet has had a revolutionary impact on culture and commerce, including the rise of instant communication by electronic mail, instant messaging, the World Wide Web with its discussion forums, blogs, social networking, and online shopping sites. The Internet won the global communication space almost instantly: it only communicated 1% of the information flowing through two-way telecommunications networks in the year 1993, already 51% by 2000, and more than 97% of the telecommunicated information by 2007. Today the Internet continues to grow, driven by ever greater amounts of online information, commerce, entertainment, and social networking.

Task 6. Restore the questions to the following answers:

1. Human clerks that performed computations.
2. Machines that computed with continuous values.

3. Machines that were able to render a state of a numeric value and store each individual digit.
4. With the development of electronic computers in the 1950s.
5. Discussion forums, blogs, social networking, online shopping sites.

Task 7. Read the text again and match the dates with the events:

1.	Before the 1920s	a.	the history of the Internet began.
2.	After late 1940s	b.	the Internet protocol suite was standardized.
3.	In the 1950s	c.	the Internet has had a revolutionary impact on various fields of life.
4.	In 1982	d.	the Internet communicated only 1% of the information through telecommunications networks.
5.	Since the mid-1990s	e.	computers were human clerks that performed computations.
6.	In 1993	f.	the Internet communicated more than 97% of information.
7.	By 2007	g.	the phrase computing machine gave away to just computer.

Task 8. Close the right-hand part of the previous exercise and, according to the dates, restore the history of computer development.

UNIT 7. HISTORY OF MEDICINE



Word list:

1.	both	обидва, обидві
2.	to introduce	вводити, впроваджувати
3.	prognosis	прогноз
4.	examination	обстеження
5.	germ	мікроб
6.	disease	хвороба
7.	cure	виліковування, зцілення
8.	treatment	лікування
9.	surgery	хірургія
10.	measures	заходи
11.	along with	поряд з
12.	nurse	медсестра
13.	physician	лікар-терапевт
14.	cardiac surgery	хірургія серця
15.	to accomplish	здійснити, виконати
16.	kidney	нирка
17.	tiny	крихітний
18.	to assist	допомагати, сприяти
19.	tissues	тканини
20.	invasive	інвазивний, пов'язаний з

		проникненням всередину
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Task 1. Match the words with close meaning:

1.	along with	a.	perform
2.	prognosis	b.	study
3.	assist	c.	small
4.	examination	d.	illness
5.	accomplish	e.	forecast
6.	tiny	f.	help
7.	disease	g.	together with

Task 2. Make up possible word-combinations:

1.	cardiac	a.	measures
2.	introduce	b.	physician
3.	invasive	c.	operation
4.	family	d.	cure
5.	urgent	e.	surgery
6.	complete	f.	new rules

Task 3. Complete the sentences with the suitable words from the box:

both	nurse	treatment
kidneys	germs	tissues

1. He is afraid of _____ and washes his hands many times a day.
2. She recovered quickly after the operation thanks to the care of a very professional _____ .
3. I have twin sisters. They _____ go to the university.
4. After the long but efficient _____ he felt much better.
5. She has serious problems with _____ and has to diet.
6. Fortunately, the attacker’s knife did not injure his internal organs, only his _____ .

Task 4. Before reading the text say what medical discoveries you consider most important for the humanity. Scan the text to see whether they are mentioned.

History of Medicine

The ancient Egyptians had a system of medicine that was very advanced for its time and influenced later medical traditions. The Egyptians and Babylonians both introduced the concepts of diagnosis, prognosis, and medical examination. The Greeks went even further, and advanced as well medical ethics. The Hippocratic Oath, still taken by doctors today, was written in Greece in the 5th century BC. During the Renaissance, understanding of anatomy improved, and the microscope was invented. The germ theory of disease in the 19th century led to cures for many infectious diseases. Military doctors advanced the methods of trauma treatment and surgery. Public health measures were developed especially in the 19th century as the rapid growth of cities required systematic sanitary measures. The mid-20th century was characterized by new biological treatments, such as antibiotics. These advancements, along with developments in chemistry, genetics, and lab technology (such as the x-ray) led to modern medicine. Medicine was heavily professionalized in the 20th century, and new careers opened to women as nurses (from the 1870s) and as physicians (especially after 1970). The 21st century is characterized by very advanced research involving numerous fields of science.

Cardiac surgery was revolutionized in the late 1940s, as open-heart surgery was introduced.

In 1954 Joseph Murray, J. Hartwell Harrison and others accomplished the first kidney transplantation. Transplantations of other organs, such as heart, liver and pancreas, were also introduced during the latter 20th century. The first partial face transplant was performed in 2005, and the first full one in 2010. By the end of the 20th century, microtechnology had been used to create tiny robotic devices to assist microsurgery using micro-video and fiber-optic cameras to view internal tissues during surgery with minimally invasive practices.

Task 5. Read the text again and match the sentences halves 1–5 with a–e:

1.	Military doctors	a.	was accomplished by a group of scientists.
2.	The Greeks developed	b.	is still taken by doctors today.
3.	The microscope was invented	c.	medical ethics.
4.	Hippocratic Oath	d.	advanced the methods of trauma treatment and surgery.
5.	The first kidney transplantation	e.	during the Renaissance.

Task 6. You are to choose the one best answer A, B, C or D to each question:

1. Which concept was not introduced by the Egyptians and Babylonians?

The concept of

A. medical examination

B. prognosis

C. diagnosis

D. cardiac surgery

2. The developments in which field do not form the basis of modern medicine?

A. genetics

B. geophysics

C. lab technology

D. chemistry

3. Which organ cannot be transplanted?

A. liver

B. heart

C. brain

D. pancreas

4. Which of the following cannot assist microsurgery?

A. fiber-optic cameras

B. micro-video cameras

C. tiny robotic devices

D. vacuum cleaner

Task 7. Say what the following dates from the text are associated with:

- ✓ the 5th century BC;
- ✓ the 19th century;
- ✓ the mid-20th century;
- ✓ the 1870s;
- ✓ 1970;
- ✓ the late 1940s;
- ✓ 1954;
- ✓ the latter 20th century;
- ✓ 2005;
- ✓ 2010;
- ✓ the end of the 20th century.

Task 8. Based on the dates from Task 7 restore the history of medicine.

UNIT 8. HISTORY OF THE SOCIAL SCIENCES



Word list:

1.	term	термін
2.	medieval	середньовічний
3.	to reflect	відображати
4.	various	різний
5.	enlightenment	просвітництво
6.	to challenge	кидати виклик
7.	to substitute	замінювати, витіснити
8.	equation	рівняння
9.	quantitative	кількісний
10.	qualitative	якісний
11.	implication	сенс, значення
12.	consequences	наслідки
13.	to endeavour	намагатися, прагнути
14.	to unify	об'єднати
15.	realm	область, сфера
16.	to regard	розглядати
17.	to cite	посилатися
18.	principal	основний, головний
19.	mind	розум
20.	to border on	межувати
21.	humanities	гуманітарні науки

Task 1. Match the words with close meaning:

1.	unify	a.	field
2.	term	b.	different
3.	realm	c.	consider

4.	regard	d.	definition
5.	various	e.	combine
6.	implication	f.	replace
7.	substitute	g.	meaning

Task 2. Find the word close in the meaning to the first word of the line:

- | | | | |
|-----------------|-----------------|-----------------|--------------|
| 1. quantitative | a) numerous | b) numeric | c) number |
| 2. consequences | a) sequence | b) following | c) results |
| 3. endeavour | a) try | b) initiate | c) originate |
| 4. cite | a) say | b) refer | c) declare |
| 5. principal | a) princess | b) master | c) major |
| 6. mind | a) intelligence | b) intellectual | c) sense |

Task 3. Complete the table:

Verb	Noun
	reflection
enlighten	
	challenger
equate	
	unification

Task 4. Match the following definitions with one of the words from the Word list:

1. Related or belonging to the Middle Ages.
2. Relating to or concerning quality.
3. To lie close, near to another.
4. Studies intended to provide general knowledge and intellectual skills involving human beings.

Task 5. Scan the text and choose the correct answers to questions 1 – 4 below:

1. Where can the evidence of early Sociology be found?
 - a. In medieval Christianity.

- b. In medieval Islam.
 - 2. Where are the first social studies reflected?
 - a. In specialized encyclopedias.
 - b. In historical novels.
 - 3. Who is generally regarded as the “Father of Sociology”?
 - a. Durkheim.
 - b. Comte.
 - 4. What science did psychology belong to before it developed as an independent discipline?
 - a. To physiology.
 - b. To philosophy.

History of the Social Sciences

Since the mid-20th century, the term "social science" has referred more generally, not just to sociology, but to all those disciplines which analyse society and culture; from anthropology to linguistics to media studies.

There is evidence of early sociology in medieval Islam, and such philosophers as Confucius theorised on topics such as social roles.

The beginnings of the social sciences in the 18th century are reflected in various grand encyclopedias of Diderot, with articles from Rousseau and other pioneers. The growth of the social sciences is also reflected in other specialized encyclopedias.

Around the start of the 20th century, Enlightenment philosophy was challenged in many ways. After the use of classical theories since the end of the scientific revolution, various fields substituted mathematics studies for experimental studies and examining equations to build a theoretical structure. The development of social science subfields became very quantitative in methodology. Increasingly, quantitative and qualitative methods are being integrated in the study of human action and its implications and consequences.

Sociology was established by Comte in 1838. He endeavoured to unify history, psychology and economics through the scientific understanding of the social realm.

Though Comte is generally regarded as the "Father of Sociology", the discipline was formally established by another French thinker, Émile Durkheim (1858–1917). Durkheim set up the first European department of sociology at the University of Bordeaux in 1895.

Today, Durkheim, Marx and Max Weber are typically cited as the three principal architects of social science. "Social science", however, has since become an umbrella term to describe all those disciplines, outside of physical science and art, which analyze human societies.

The history of psychology as a scholarly study of the mind and behavior dates back to the Ancient Greeks. There is also evidence of psychological thought in ancient Egypt. Psychology was a branch of philosophy until the 1870s, when it developed as an independent scientific discipline in Germany and the United States. Psychology borders on various other fields including physiology, neuroscience, artificial intelligence, sociology, anthropology, as well as philosophy and other components of the humanities.

Task 6. Read the text again and choose the one best answer A, B, C or D to each question:

1. Which discipline does not the term "social science" refer to?
A. Linguistics B. Anthropology C. Culture D. Medical studies
2. What did not Comte unify into Sociology?
A. Psychology B. Physiology C. History D. Economics
3. Who is not typically cited as principal architects of social science?
A. Confucius B. Marx C. Weber D. Durkheim
4. Which field does not psychology border on?
A. Physiology B. Philosophy C. Physics D. Sociology

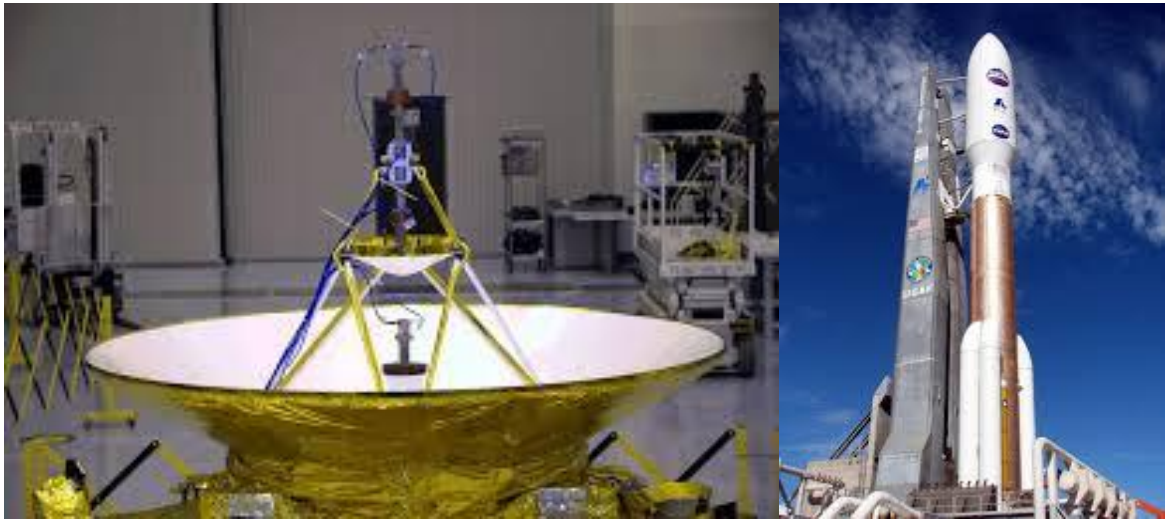
Task 7. Find one meaningful mistake in each sentence and correct it:

1. Social sciences analyze the universe and culture.
2. Social sciences were firstly reflected in various grand journals.
3. Quantitative and qualitative methods are seldom used in the study of societies.
4. The first European department of Sociology was set up in Germany.
5. "Social science" is an umbrella term for all disciplines within physical science and art.

Task 8. Render the text completing the following sentences:

1. The term "social science" refers to
2. The evidence of early sociology is found in
3. The first social studies are reflected in
4. In the 20th century Sociology started to use ... methods.
5. Sociology as a discipline was formally established by ... in
6. The three principle architects of social science are
7. Psychology studies
8. It borders on

UNIT 9. NEW HORIZONS FOR SCIENCE DEVELOPMENT IN THE 21ST CENTURY



Word list:

1.	horizon	горизонт
2.	broadband access	широкосмуговий доступ в інтернет
3.	commonplace	звичайне явище
4.	wireless	бездротовий
5.	to be capable of	бути здатним
6.	playback	відтворення
7.	steadily	стійко
8.	to decrease	знижувати
9.	ongoing	триваючий
10.	whole	цілий, увесь
11.	genome	геном, сукупність генів
12.	sequencing	послідовність
13.	stem cell	стовбурова клітина
14.	bionic	біонічний, котрий поєднує біологію і техніку
15.	nuclear fusion	ядерний синтез
16.	scramjet	надзвуковий літак
17.	drone	безпілотний літак
18.	railgun	рейкотрон, електромагнітна гармата
19.	beam	промінь
20.	superconductivity	надпровідність

21.	fuel cell	паливний елемент
22.	plug-in	той, який можна підключити, з штепсельним контактом
23.	artificial	штучний
24.	intelligence	інтелект
25.	solar cell	сонячна батарея
26.	integrated circuit	інтегральна схема, мікросхема
27.	particle	частинка
28.	to expand	розширювати (ся)
29.	to be underway	бути в процесі розробки або реалізації
30.	dwarf	карлик

Task 1. Match two parts to form a word or a word-combination:

1.	rail	a.	circuit
2.	common	b.	back
3.	fuel	c.	conductivity
4.	nuclear	d.	less
5.	scram	e.	place
6.	wire	f.	cell
7.	plug	g.	access
8.	play	h.	going
9.	integrated	i.	gun
10.	super	j.	fusion
11.	on	k.	cell
12.	stem	l.	in
13.	broadband	m.	jet

Task 2. Make up as many word-combinations as you can with the following words:

1. to be capable of ... (e.g. be capable of doing this difficult task)
2. to decrease ...
3. the whole ...
4. sequencing of ...
5. artificial ...
6. to expand ...
7. particle of ...

8. ... is underway.

Task 3. Match the words with their definitions:

1.	steadily	a.	application of biological principles to the study and design of engineering systems
2.	horizon	b.	radiated light, shine
3.	dwarf	c.	a pilotless aircraft operated by remote control
4.	genome	d.	without change or variations
5.	drone	e.	good mental abilities
6.	bionics	f.	the apparent intersection of the earth and sky as seen by an observer
7.	intelligence	g.	an atypically small person or object
8.	beam	h.	the total content of genetic material within an organism

Task 4. One word is wrong in the following word combinations. Replace it by the appropriate one:

1. integrated circus
2. solar call
3. superconduction
4. railgun
5. plug-on
6. nuclear fiction
7. Broadway access
8. artificial intelligent

Task 5. Before reading the text say what, in your opinion, the most prospective scientific developments are. Scan the text to see whether your ideas are correct or not.

New Horizons for Science Development in the 21st Century

In the early 21st century, the main technology being developed is electronics. Broadband Internet access became commonplace in developed countries, as did wireless Internet on smartphones that are capable of multimedia playback (video, audio, eBooks) and running other applications (e.g., navigation, productivity tools, and games). The price of 3D printers is steadily decreasing and finding uses in many areas.

Research is ongoing into quantum computers, nanotechnology, bioengineering/biotechnology (cheap and accessible whole genome sequencing and personalized medicine, stem cell treatments, developments on new vaccines, bionic body parts, cloning), nuclear fusion, advanced materials (e.g., graphene), the scramjet and drones (along with railguns and high-energy laser beams for military uses), superconductivity, the memristor, and green technologies such as alternative fuels (e.g., fuel cells, self-driving electric & plug-in hybrid cars), artificial intelligence, solar cells, integrated circuits, wireless power devices and batteries.

The understanding of particle physics is also expected to expand through particle accelerator projects, such as the Large Hadron Collider – the largest science project in the world.

Spacecraft designs are also being developed, like the Orion. Despite challenges and criticism, NASA plans a manned mission to Mars in the 2030s. New Horizons is currently underway and will study the dwarf planet Pluto and its moons in the near future.

Task 6. Read the text and sort out the following developments by categories:

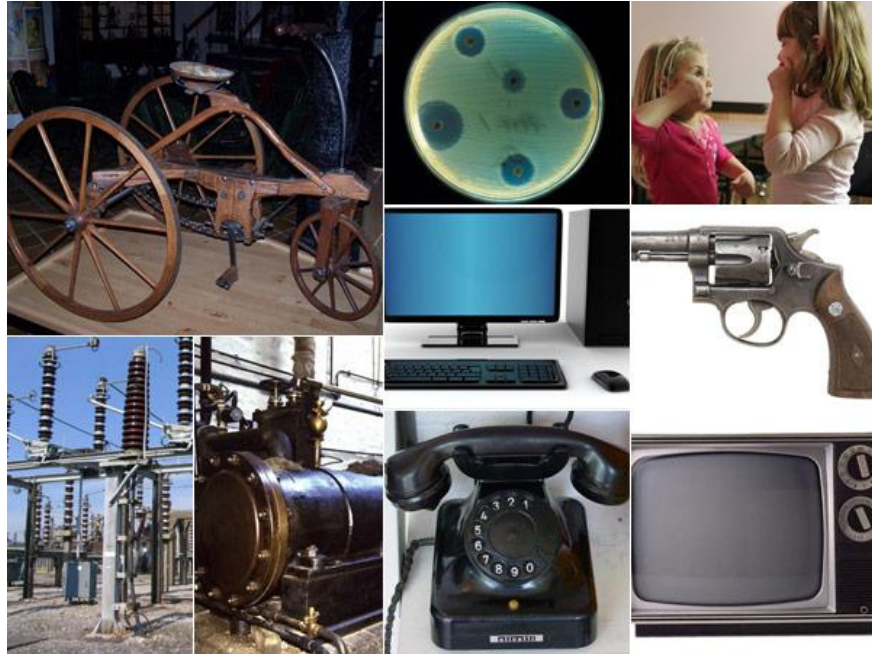
Electronics	Engineering	Medicine	Aerospace technologies	Power engineering
1	2	3	4	5

– stem cell treatment	– bionic body parts
-----------------------	---------------------

– nuclear fusion	– railgun
– high-energy laser beams	– eBooks
<i>e.g. 1</i> – wireless Internet	– drone
– fuel cells	– new vaccines
– cloning	– 3D printers
– scramjet	– integrated circuits
– superconductivity	– games
– solar cells	– self-driving electric and plug-in hybrid cars
– particle accelerator	– quantum computers

Task 7. Choose one of the fields from Task 6 and tell about developments in this field.

UNIT 10. TOP 10 INVENTIONS



Word list:

1.	transmission	передача, пересилання
2.	image	картинка, зображення
3.	to rotate	обертати
4.	resolution	роздільна здатність (зображення)
5.	to evolve	розвиватися, еволюціонувати
6.	path	шлях
7.	vehicle	транспортний засіб
8.	to design	конструювати
9.	internal combustion engine	двигун внутрішнього згорання
10.	to recognize	визнавати
11.	to require	вимагати
12.	exposure	виставляння (напр., на світло)
13.	to fade	блякнути
14.	to consider	вважати, розглядати
15.	contrary to	всупереч, на відміну від
16.	to improve	вдосконалити, покращувати
17.	stuff	речі
18.	to facilitate	полегшувати
19.	to enable	полегшувати, забезпечувати можливість
20.	burden	ноша, вантаж

21.	nail	цвях
22.	to crumble	зруйнуватися, рухнути
23.	to cast	відливати
24.	meanwhile	тим часом
25.	to insert	вставляти
26.	fastener	кріпильна деталь
27.	printing press	друкарський верстат
28.	mold	1) пресформа; 2) цвіль
29.	dissemination	поширення
30.	sample	зразок
31.	to contaminate	заражати
32.	fungus	гриб
33.	to purify	очищувати
34.	prior	попередній, що передує
35.	predecessor	попередник

Task 1. Match the words with close meaning:

1.	improve	a.	regard
2.	facilitate	b.	infect
3.	evolve	c.	make easier
4.	contrary to	d.	way
5.	consider	e.	previous
6.	path	f.	develop
7.	contaminate	g.	at the same time
8.	prior	h.	perfect
9.	meanwhile	i.	unlike

Task 2. Make up as many word-combinations as you can with the following words:

1. to design ... (e.g. to design a new car model)
2. to recognize ...
3. to require ...
4. to enable ...
5. dissemination of ...
6. a sample of ...
7. to purify ...
8. predecessor of ...

Task 3. Make up possible word-combinations with the words from A and B:

A.	1.	heavy	B.	a.	wheel
	2.	printing		b.	photo
	3.	rotate		c.	nail
	4.	steel		d.	vehicle
	5.	passenger		e.	burden
	6.	faded		f.	mold
	7.	cast		g.	press

Task 4. Match the words with their definitions:

1.	stuff	a.	the process of burning
2.	image	b.	the act or process of sending a message, picture, or other information from one location to another
3.	exposure	c.	any organism without chlorophyll, leaves, roots, parasites
4.	transmission	d.	a reproduction of the form of a person or object
5.	combustion	e.	household or personal things considered as a group
6.	fungus	f.	an act of presenting something to an action or an influence

Task 5. Complete the table:

Verb	Noun
resolve	
	crumb
	insertion
fasten	
	facilitation

Task 6. Before reading the text say what inventions you would refer to the top 10 inventions in the history of the mankind. Scan the text to see whether the information in it coincides with your ideas.

Top 10 Inventions

1. The telephone

The telephone is an instrument that converts voice and sound signals into electrical impulses for transmission by wire to a different location, where another telephone receives the electrical impulses and turns them back into recognizable sounds. In 1875, Alexander Graham Bell built the first telephone that transmitted electrically the human voice.

2. Television

In 1884, Paul Nipkow sent images over wires using a rotating metal disk technology with 18 lines of resolution. Television then evolved along two paths, mechanical based on Nipkow's rotating disks, and electronic based on the cathode ray tube. American Charles Jenkins and Scotsman John Baird followed the mechanical model while Philo Farnsworth, working independently in San Francisco, and Russian émigré Vladimir Zworin, working for Westinghouse and later RCA, advanced the electronic model.

3. The automobile

In 1769, the very first self-propelled road vehicle was invented by French mechanic, Nicolas Joseph Cugnot. However, it was a steam-powered model. In 1885, Karl Benz designed and built the world's first practical automobile to be powered by an internal-combustion engine. In 1885, Gottlieb Daimler took the internal combustion engine a step further and patented what is generally recognized as the prototype of the modern gas engine and later built the world's first four-wheeled motor vehicle.

4. The camera

In 1814, Joseph Nicéphore Niépce created the first photographic image with a camera obscura, however, the image required eight hours of light exposure and later faded. Louis-Jacques-Mandé Daguerre is considered the inventor of the first practical process of photography in 1837.

5. The light bulb

Contrary to popular belief, Thomas Alva Edison didn't "invent" the light bulb, but rather he improved upon a 50-year-old idea. In 1809, Humphry Davy, an English chemist, invented the first electric light. In 1878, Sir Joseph Wilson Swan, an English physicist, was the first person to invent a practical and longer-lasting electric lightbulb (13.5 hours) with a carbon fiber filament. In 1879, Thomas Alva Edison invented a carbon filament that burned for forty hours.

6. The wheel

Before the invention of the wheel in 3500 B.C., humans were severely limited in how much stuff we could transport over land, and how far. Wheeled carts facilitated agriculture and commerce by enabling the transportation of goods to and from markets, as well as easing the burdens of people traveling great distances. Now, wheels are vital to our way of life, found in everything from clocks to vehicles to turbines.

7. The nail

Without nails, civilization would surely crumble. This key invention dates back more than 2,000 years to the Ancient Roman period, and became possible only after humans developed the ability to cast and shape metal. Previously, wood structures had to be built by interlocking adjacent boards geometrically.

Meanwhile, the screw a stronger but harder-to-insert fastener is thought to have been invented by the Greek scholar Archimedes in the third century B.C.

8. The printing press

The German Johannes Gutenberg invented the printing press around 1440. Key to its development was the hand mold, a new molding technique that enabled the rapid creation of large quantities of metal movable type. Printing presses exponentially increased the speed with which book copies could be made, and thus they led to the rapid and widespread dissemination of knowledge for the first time in history. Twenty million volumes had been printed in Western Europe by 1500.

9. Penicillin

It's one of the most famous discovery stories in history. In 1928, the Scottish scientist Alexander Fleming noticed a bacteria-filled Petri dish in his

laboratory with its lid accidentally ajar. The sample had become contaminated with a mold, and everywhere the mold was, the bacteria was dead. That antibiotic mold turned out to be the fungus *Penicillium*, and over the next two decades, chemists purified it and developed the drug Penicillin, which fights a huge number of bacterial infections in humans without harming the humans themselves.

Penicillin was being mass produced and advertised by 1944 to treat servicemen in World War II of venereal diseases.

10. The Internet

It really needs no introduction: the global system of interconnected computer networks known as the Internet is used by billions of people worldwide. Countless people helped develop it, but the person most often credited with its invention is the computer scientist Lawrence Roberts. In the 1960s, a team of computer scientists working for the U.S. Defense Department's ARPA (Advanced Research Projects Agency) built a communications network to connect the computers in the agency, called ARPANET. It used a method of data transmission called "packet switching" which Roberts, a member of the team, developed based on prior work of other computer scientists. ARPANET was the predecessor of the Internet.

Task 7. Read the text again and say what inventions these names are associated with:

- ✓ Nicolas Joseph Cugnot
- ✓ Thomas Edison
- ✓ Louis-Jacques-Mandé Daguerre
- ✓ Alexander Fleming
- ✓ Lawrence Roberts
- ✓ Johannes Gutenberg
- ✓ Archimedes
- ✓ Gottlieb Daimler
- ✓ Alexander Graham Bell

✓ Vladimir Zworkin

Task 8. Someone is talking about the inventions from the text. Which are they referring to each time?

1. It increased the speed with which book copies could be made.
2. It facilitated the goods transportation and traveling great distances.
3. It contained a carbon fiber filament that burned for forty hours.
4. It transmits electrically the human voice.
5. Without them the civilization would crumble.
6. Its electronic model is based on the cathode ray tube.
7. It is a system of data transmission through interconnected computer networks.
8. It is powered by the internal combustion engine.
9. The first images required eight hours of light exposure.
10. It fights a huge number of bacterial infections in humans without harming the humans themselves.

Task 9. Give a brief characteristic of each invention and its history.

TEST 1 (Units 1-10)**Choose the best word to fill each gap:**

1. ... is the branch of natural science concerned with the study of living organisms.
 - a) Ecology
 - b) Natural science
 - c) Biology
 - d) Geology

2. Stone tools, weapons and clothing were technological developments of major importance during the
 - a) Bronze Age
 - b) Stone Age
 - c) Iron Age
 - d) Neolithic Revolution

3. Major technological contributions from ... include matches, cast iron, the suspension bridge, the parachute etc.
 - a) the Greeks
 - b) the Romans
 - c) the Mayans
 - d) the Chinese

4. ... engineers were the first to build monumental arches, amphitheatres, public baths, harbours.
 - a) Mayan
 - b) Roman
 - c) Greek
 - d) Egyptian

5. The Industrial Revolution was driven by cheap energy in the form of ...
 - a) oil
 - b) gas

- c) coal
 - d) Iron
6. Electronic computing developed rapidly due to ... research.
- a) military
 - b) industrial
 - c) communication
 - d) agricultural
7. Previously computers were human clerks that ... computations.
- a) operated
 - b) performed
 - c) calculated
 - d) increased
8. The Internet won the global communication space almost
- a) quickly
 - b) rapidly
 - c) fast
 - d) instantly
9. The Hippocratic ... was written in Greece in the 5th century BC.
- a) slogan
 - b) hymn
 - c) oath
 - d) ethics
10. ... surgery was revolutionized as open-heart surgery was introduced.
- a) transplant
 - b) kidney
 - c) invasive
 - d) cardiac
11. Social sciences analyze ... and culture.
- a) physiology
 - b) geology

- c) society
d) matter
12. The beginnings of the social sciences were reflected in various specialized
... .
- a) journals
b) encyclopedias
c) magazines
d) books
13. The price of 3D printers is steadily ... and finding uses in many areas.
- a) increasing
b) cutting
c) decreasing
d) going up
14. The world's first automobile with internal ... engine was built in 1885.
- a) steam
b) combustion
c) oil
d) expansion
15. ... are vital to our way of life, found in everything from clocks to turbines.
- a) engines
b) wheels
c) bulbs
d) nails

Match the sentences halves:

16.	Physics is a natural science	a.	the concrete which the Romans formulated was especially durable.
17.	Some archaeological evidence of the Stone Age	b.	key technologies which paved the way for the telephone and fax

			machine.
18.	Because Rome was located on a volcanic peninsula	c.	led to cures for many infectious diseases.
19.	The steam engine	d.	dates back to Ancient Greeks.
20.	Radio, radar and early sound recording were	e.	that studies matter and its motion through spacetime.
21.	Machines that computed with continuous values	f.	is electronics.
22.	The germ theory of disease	g.	with which book copies could be made.
23.	The history of psychology as a study of the mind and behavior	h.	includes ancient tools, cave painting and other prehistoric art.
24.	In the early 21 st century the main technology being developed	i.	became known as the analog kind.
25.	Printing presses exponentially increased the speed	j.	was practically applied to both steamboat and railway transportation.

Choose the correct answers to the following questions:

26. What does Ecology study?

- a) properties of matter
- b) the rules that govern the universe
- c) the relationships between living organisms and their environment
- d) the structure of living organisms

27. What were the major technological developments of the Stone Age?

- a) cave painting and other prehistoric art
- b) animal domestication and permanent settlements
- c) iron smelting technology

d) fire, weapons, clothing

28. What were not invented by the Chinese?

a) paper

b) canals for transport and irrigation

c) matches

d) gunpowder

29. Which of the following made it possible for factories to work in shifts?

a) telegraphy

b) steam engine

c) incandescent bulb

d) mass production

30. Which of the following did not contribute to the advancement of modern science and technology?

a) military actions

b) communication technology

c) transportation technology

d) increased research spending

31. When was the Internet introduced?

a) in the 1920s

b) in the 1950s

c) in the 1980s

d) in the 1990s

32. What caused taking public health measures?

a) rapid growth of cities

b) professionalization of medicine

c) transplantation of organs

d) development of the germ theory

33. Which name is not associated with the social sciences?

a) Weber

b) Marx

c) Durkheim

d) Fleming

34. What cannot be considered the car of the future?

a) self-driving electric cars

b) plug-in hybrid cars

c) cars with steam engines

d) cars with fuel cells

35. Who invented photography?

a) Edison

b) Daguerre

c) Bell

d) Gutenberg

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