

INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

Science and Technology

1. Picture work. Match the words with the pictures. Which science or industry are they connected with? Say what you know about each.

MICROCHIP

KEYBOARD

SPACESUIT

TELESCOPE

DNA

OIL RIG

MICROSCOPE

LABORATORY



2. What inventions did Jules Verne predict in his books? Try to guess from the pictures given. Do we use these nowadays? Was he very far off the modern technology?



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3.

From the beginning of people's existence they have used **tools**, various types of energy and materials, generally for the purposes of production of nearly everything in our world. Almost every human process for getting food and **shelter** depends on complex technological systems. At present, modern industry largely depends on power, materials, **machinery and production processes**.

In early human history, the only power available was **muscle power** augmented by primitive tools, such as the **wedge** or **lever**. The invention of the **wheel** (about 300 B.C) was followed by the **watermill** and windmill. Not until the 18th century did an alternative source of power appear in the form of the first working **steam engine** developed and improved by James **WATT**. The steam engine and other technical advances made possible the **replacement** of traditional agrarian economy by one dominated by machinery and manufacturing.

The sudden acceleration of technical and economic development that began in Britain in the second half of the 18th century is called the **Industrial Revolution**. This transferred the balance of political power from the landowner to the industrial capitalist and created an urban working class. The steam engine was originally developed for **draining mines** but was rapidly put to use in factories and on the railways. Hand-made products were replaced by machine-made products which increased in number, and together with faster transportation by means of a railway, this meant a significant change in industry.

MICHAEL FARADAY's demonstration of the dynamo in 1831 revealed the potential of the electrical motor and became the basis of electrical engineering. Electricity generated on a commercial scale was available from the early 1880s and was used for electric motors which powered all kinds of machinery and for lighting, first by **carbon arc lamp**, invented by **FRANTIŠEK KŘÍŽÍK**, and by electric bulb invented by **THOMAS ALVA EDISON** in 1879.

Electricity is the most useful and most convenient form of energy, readily convertible into heat and light and used to power machines. Electricity can be generated in one place (**power station/plant**) and distributed anywhere because it flows through wires.

The invention of the **internal-combustion engine** by German scientist Nicholas Otto enabled two Germans, Gottlieb **DAIMLER** and Karl **BENZ** to create the first **petrol-driven** motocar in 1885. This invention made transport faster and more comfortable and shortened travel time.

The 1940s saw the explosion of the first atomic bomb and the development of the nuclear power industry. Nuclear energy as well as natural gas, water power, oil and coal are current sources of energy. Scientists try to increase the contribution of wind, tidal, solar and geothermic power.

The earliest **materials** used by humans were wood, bone, horn, shell and stone. Metals were rare and difficult to get, although forms of bronze and iron were used in 6 000 B.C. The introduction of the **blast furnace** in the 15th century enabled cast iron to be extracted, but this process remained expensive until **charcoal** was substituted by **coke**. This change ensured a plentiful supply of cheap iron at the start of the Industrial Revolution.

Soon new materials were introduced, such as rubber, glass, leather, paper, bricks and porcelain and later new synthetic materials appeared. First **dyes**, then plastic and celluloid and still later drugs were synthesized and synthetic fibres were made. This process still continues as **genetic engineering** grows and enables the production of synthetic **insulin** and **growth hormones**.

Production process and equipment in the factories also changed much. The first attempts at **automation** were demonstrated in the 18th century. The **first assembly line** appeared in meat-packing factories in Chicago in the USA, and then in motor industry in the 20s of the 20th century. At present, electronic computers control fully automated plants (robotics).

Plenty of inventions and discoveries have influenced and changed human life, such as aircraft, radio, television, telephone, X-ray machines, radar, photographs, electric **welding**, birth-control methods, **test-**



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tube babies, penicillin and vitamin C. Undoubtedly the transistor, **integrated circuit** and laser were the three inventions that have had the greatest impact on modern life. Electronic and microelectronic industries, space research and genetic engineering probably represent the branches where progress will continue most rapidly.

Space flights represent a special application of modern technology and science. The first satellites were launched into orbit around Earth in 1957 by the Russians. In 1961 Soviet cosmonaut Yuri **GAGARIN** became the first human in space. In a few years missions to the Moon were achieved, the first being Apollo 11. The first people to step on the Moon on 20th July 1969 were Neil **ARMSTRONG** and Edwin **ALDRIN**. Nowadays, artificial satellites are used for scientific purposes, communications, weather forecasting and **military purposes**.

At present both science and technology are the most important phenomena which can help to solve the problems of people on the earth: to find other alternative sources of energy, to reduce pollution and protect the environment, to find ways how to feed the increasing number of people and to discover medicine against such diseases as cancer, AIDS, Ebola virus or the latest swine or bird flu which threaten contemporary world.

However, not all inventions and discoveries have brought people improvement and innovation. Ballistic **missiles**, extra powerful laser weapons, nuclear and H-bombs and pollution of the environment are only a few examples of how good ideas may be **abused**. Technology depends on how people use it.

VOCABULARY

tools	nástroje	horn	rohovina
shelter	přístřeší	rare	vzácný
muscle power	lidský pohon	iron	železo
machinery process	strojový proces	petrol-driven	benzínový
invention	vynález	blast furnace	vysoká pec
lever	páka	cast iron	litina
wheel	kolo	charcoal	dřevěné uhlí
wedge	klín	coke	koks
watermill	vodní mlýn	plentiful	hojný
steam engine	parní stroj	rubber	guma
replacement	nahrazení	leather	kůže
agrarian	zemědělský	bricks	cihly
acceleration	zrychlení	synthetic fibre	umělé vlákno
draining mines	odvodňování dolů	dye	barvivo
machine-made	strojově vyrobený	growth hormone	růstový hormon
generate	vyrábět (energii)	automation	automatizace
to power	pohánět	assembly line	výrobní linka
carbon arc lamp	uhlíková oblouková lampa	aircraft	letadla
convenient	výhodný	X-ray	rentgen
convertible	přeměnitelný	welding	svařování
current	současný	test-tube babies	děti ze zkumavky
tidal power	energie přílivu	integrated circuit	integr. obvod
solar	sluneční	impact	dopad
geothermic	geotermální	military purpose	válečný účel
feed	nakrmit	H-bomb	vodíková bomba
abuse	zneužít	improvement	zlepšení
lightning conductor	bleskosvod	contact lens	kontaktní čočka
circumnavigation	obeplutí	internal combustion	spalovací motor
founder	zakladatel	ships's screw propeller	lodní šroub



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4. Associate each invention or idea with a name.

Inventions	Inventors	Association
1. Pasteurization	a) Galileo Galilei (1564-1642)	1
2. Ships' screw propeller	b) František Křižík (1847-1941)	2
3. Dynamite	c) Georg Johann Mendel (1822-1884)	3
4. Radioactivity	d) Louis Pasteur (1822-1895)	4
5. Arc lamp	e) Alfred Nobel (1833-1896)	5
6. Space travel	f) Orville Wright and Wilbur Wright	6
7. Lightning conductor	g) Gottlieb Daimler and Karl Benz	7
8. Soft contact lens	h) Julius Robert Oppenheimer (1904-1967)	8
9. Petrol-driven car	i) Otto Wichterle (1913-1998)	9
10. The sun is the centre of the solar system	j) Ferdinand Magellan (1480-1521)	10
11. First circumnavigation of the world	k) Sigmund Freud (1865-1939)	11
12. Polagraphy	l) Jan Janský (1873-1921)	12
13. Free association method and interpretation of dreams	m) Nicolaus August Otto (1832-1891)	13
14. Internal-combustion engine	n) Josef Ressel (1793-1857)	14
15. Development of the atomic bomb	o) Jaroslav Heyrovský (1890-1967)	15
16. The first successful powered flight	p) Yuri Gagarin (1934-1968)	16
17. Founder of genetics	q) Prokop Diviš, Benjamin Franklin	17
18. blood groups	r) Marie and Pierre Curie	18

5. Crossword puzzle. Read the clues and fill in the crossword puzzle.

Alexander Flemming – 1.

Otto Wichterle – contact 2.

Thomas 3. Edison

Alexander Graham Bell – 4.

The Montgolfier brothers – hot-air 5.

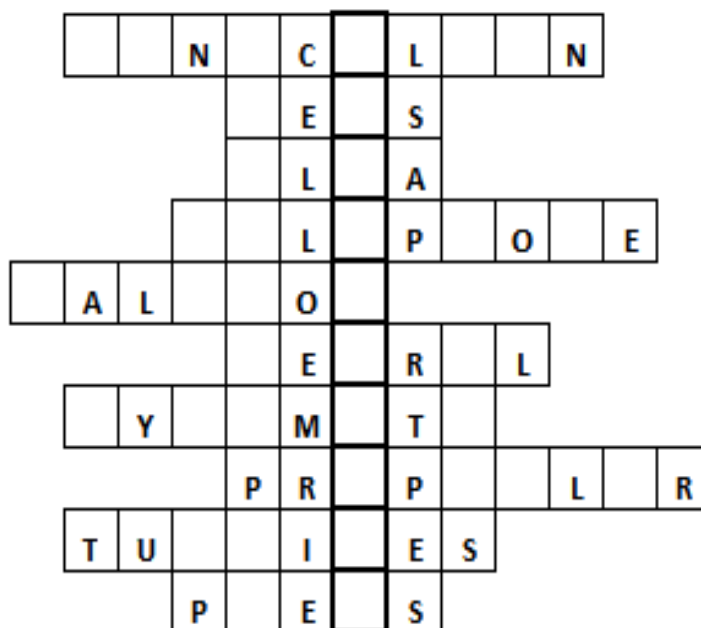
Karl Benz – 6.-powered automobile

Alfred Nobel – 7.

Josef Ressel – ship 8.








Aurel Stodola – gas 9.

Johann Gutenberg – printing 10.



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6. Name the inventions, give the approximate date when they were discovered and put them in the correct chronological order.

	LIGHT BULB	1862
	H-BOMB	1848
	INTERNAL-COMBUSTION ENGINE	1887
	ASSEMBLY LINE	1940
	SATELLITE	1913
	STEAM ENGINE	1957
	CONTACT LENS	1879



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SOLUTIONS:

2) Verne's visions of the future: aeroplane, space craft, submarine, airship

4) 1d, 2n, 3e, 4r, 5b, 6p, 7q, 8i, 9g, 10a, 11j, 12o, 13k, 14m, 15h, 16f, 17c, 18l

5) penicillin, lens, Alva, telephone, balloon, petrol, dynamite, propeller, turbines, press

6) internal combustion engine – 1862

steam engine - 1848

contact lens – 1887

H-bomb – 1940

assembly line – 1913

satellite – 1987

bulb - 1879