12. Science and technology

**Living condition in the past and now – development of science and technology, living standards, household appliances**.

The word **science** (veda) comes from the Latin "scientia," meaning knowledge (vedomosti, znalosti). It’s hard to define exactly what makes something a science but we can define it both as a process of gaining knowledge (proces získavania vedomostí, and as the organized (usporiadaný) body of knowledge (súbor vedomostí) gained by this process – e. g. by experimentation (pomocou experimentovania), observation (pozorovania) and study (skúmania). There are many fields of science, for example, natural sciences (prírodné vedy) such as biology, chemistry, physics (fyzika) environmental sciences (vedy o životnom prostredí), social sciences (spoločenské vedy) – psychology, sociology, economics. Technology is a product of science. Society depends on technology and on the other hand technology exists thanks to the needs of society.

First important discovery (objav) in the past was the discovery of **fire**. Fire was used for cooking, protection against predators; heat in cold climates; and light, which allowed the working day to be extended and may have led to the "leisure-time" creation of art such as cave paintings. Another important invention was the invention of the **wheel**. People used it for transportation, for making pottery (pottery wheel – hrnčiarsky hruh). Other early inventions include paper, silk (hodváb) and gunpowder (pušný prach) (in China), compass, glasses, scissors, followed by printing machine by Guttenberg, parachute by Da Vinci, light bulb (žiarovka) by Edison, etc.

**The industrial revolution started in the 18th century in the England. It** brought mass production and workers were replaced by machines. It brought (priniesla) many changes and inventions such as invention of steam power (parná elektrina) and powered machinery (elektrinou poháňané stroje). Electricity has become a part of our lives since it was discovered (bola objavená) and first powered machinery was made. We use electric appliances (elektrické spotrebiče), electricity is needed to light houses and offices, in factories to run machinery (stroje), in transport, business etc.

Technology has become (sa stala) part of our life (súčasťou nášho života) and new technological inventions make our life easier and increase (zvyšujú) our living standards (životnú úroveň). They help people at work (computers, fax machines, phones, mobiles, cars) and also at home (food processor (kuchynský robot), mixer, iron (žehlička), microwave oven (mikrovlnná rúra), fridge, freezer (mrazák), dishwasher (umývačka), washing mashine (práčka), oven (rúra), cooker (sporák), whisk (šľahač) hoover (vysávač)).

**Unique inventions of science and technology**

People make big scientific and technological progress in **transport, medicine, biology and information technology**. When we compare how people travelled in the past and how they travel today, the progress transportation industry is amazing. In the past people travelled on foot (pešo) or in carriages (kočoch) pulled (ťahaných) by horses. It took a long time to get from one place to another. Today, we use cars, lorries/trucks (nákladné autá), vans (dodávky) and planes for transportation of people or things. Nowadays there is public transport (verejná doprava) in most towns (bus, trolley bus, tram), high-speed trains and supersonic planes (nadzvukové lietadlá) to travel long distances and cars to get to work, to shops or to go for a weekend break.

**ELECTRICITY** – we cannot imagine our life without electricity; we use it for lighting, heating, radio, TV, etc. Electricity which is used as a form of energy is in fact electric current (elektrický prúd). It is produced in power stations (elektrárne) and is brought to our houses via cables.

**THE TELEPHONE** – it enables us to communicate with others both in everyday life and in business. It dates back to 1876 when Alexander Graham Bell, physicist and inventor, developed his “speaking box “. Nowadays people use wireless (bezdrôtové) phones called **MOBILE**s or cell phones. Alexander Calder, an American sculptor, invented the **mobile** in the early 20th century. His invention became famous worldwide. **PROS**: You can text (sms-kovať) your friends, take pictures, make phone calls, browse the Internet, listen to music and radio, watch video clips, store (uchovávať) and send pictures, videos, SMS messages with your mobile. You can reach people when they are not at home, be in touch with your friends who live in other part of Slovakia. When you are in danger (v nebezpečenstve), you can call an emergency number (číslo pre tiesňové volania) 112 even if there is no signal. **CONS**: Mobiles emit (vydávajú) radio waves which can be harmful (škodlivé) for our brain. They might cause headaches and diseases such as cancer (rakovina). It is annoying when somebody has his/her mobile on e. g. in the theatre or cinema and it starts ringing during performance or film. We are not allowed to have mobiles on during the lessons. We can make phone calls during our breaks but during lessons mobiles have to be switched off.

**CAR** - this invention made transport faster and more comfortable and significantly shortened travel time. It was invented by two Germans, Gottlieb Daimler and Karl Benz (1885).

**TELEVISION** – is a relatively recent achievement, at least for the public, because it did not appear in people’s houses until the 1950s.The first television transmission was made in England in 1926 by the Scotsman John Logie Baird.

**COMPUTER** – first computers were developed during the Second World War but they were too big and noisy and slow. Today, computers are small and almost (takmer) every family has at least one. There are two kinds of PC: laptop and desktop (stolný PC).

Main parts: (hardware and software) monitor with screen, system unit (systémová jednotka) – the case with CD/DVD driver, speakers, microphone, web camera, keyboard, mouse and mouse mat. Every computer has to have an operating system e.g. WINDOWS. ADVANTAGES: you work and write more effectively, you can create documents, edit (upravovať), store (uchovávať), process (spracovávať), print (tlačiť) and open them later. Computers have also replaced people in some professions.

**THE INTERNET** - Perhaps one of the greatest inventions of our times is **the Internet**. No doubt, the NET has had a big effect on almost every part of our lives. It has changed the way we do **business**, **how we communicate** and entertain and how we **search for information**. Many people send documents, buy things, plan their holiday, book hotels and tickets, read current news, check weather conditions, find out about diseases and treatment methods, learn about countries and their cultures, look for jobs or transfer their money via the Internet. **Chatting, joining discussion groups, reading articles, downloading music** is very popular among the young people. People watch films online, upload and download videos, music, chat (rozprávajú sa) with friends on social networks such as Facebook, ICQ, Pokec etc. You can also send e-mails, data, files and pictures from wherever you are. Computers are used for education and training. DISADVANTAGES: The easy access to information via Internet has made students lazy in terms of their education since they are able to download information without exploring their topic of research. They also use computers for mathematical tables and calculations without actually solving the problems. Also, it is important for parents to keep a check on the browsing habits of their children as some websites are not meant for their viewing. Other disadvantages include [identity theft](http://www.buzzle.com/articles/identity-theft/) and [virus threat](http://www.buzzle.com/articles/computer-viruses/). Computers viruses are harmful to the systems and can be transferred from one computer system to another. Children spend too much time in front of their computer and do not go out with friends. They chat on the Internet instead (namiesto) of meeting their friends. It also causes poor eyesight (spôsobuje poškodenie zraku).

**NUCLEAR PHYSICS** (jadrová fyzika). Another very useful branch of science is nuclear physics (branch of physics concerned with the nucleus (jadro) of the atom). The main use of nuclear physics is in nuclear power. Nuclear power stations (jadrové elektrárne) produce a huge amount of electricity. The problem is that they are very dangerous when some accidents occur (as in Chernobyl (the Ukraine) where a massive nuclear explosion put the rest of Europe in danger) and there are also problems with nuclear waste which is radioactive. Many organizations such as Greenpeace protest against the use of nuclear power and promote (propagujú) alternative ways of producing electricity. Another usage is in X-ray (form of electromagnetic radiation) which is widely used for diagnosing in medicine. Many people suffering from cancer are treated by irradiation (žiarenie). Nuclear physics was misused (zneužitá) many times in the history of mankind, e.g. atomic/nuclear bombs were used in the Second World War to destroy Japanese towns of Hiroshima and Nagasaki, and nuclear weapons are (jadrové zbrane) still the greatest threat (hrozba) to mankind (pre ľudstvo).

**BIOLOGY** – in the biology, especially MICROBIOLOGY the scientists create the life. Today “in vitro” fertilization (oplodnenie v skúmavke) and cloning (klonovanie) are the most debated issues in this field.

**MEDICINE** – great progress has been made in the field of medicine. New medicines help to cure various diseases that were incurable in the past. New discoveries (objavy) help to prolong life and make the lives of the disabled/handicapped (postihnutých) easier. Vaccines help to prevent serious diseases such as rabbies (besnota), measles (osýpky), mumps, scarlet fever (šarlach) and many kinds of cancer (cervical cancer)

**Science and technology to help people (electronics, information technology, nuclear physics)**

Electronics : includes electronic equipment for everyday use, such as mobiles, television sets, camcorders, MP3 players, radios, HI-FI sets, DVD players and recorders, digital cameras, Personal Computers, GPS and household appliances (domáce spotrebiče).

Information technology: Computers, the Internet – pozri vyššie

Nuclear physics: The inventions of nuclear physics are used in medicine, both in diagnosis and therapy. Pozri vyššie

**Misuse/abuse of science and technology (weapons of mass destruction, substance abuse, violence, consumer society, new diseases)**

Nuclear physics – used for military purposes (na vojenské účely), weapons of mass destruction (zbrane hromadného ničenia) were developed.

Also cars have started to be used for military purposes. They produce exhaust fumes (výfukové plyny) which cause the air pollution (znečistenie ovzdušia). Cars need petrol and there have been conflicts between nations because of oil fields and oil pipelines.

Technology leads to a **consumer lifestyle** (konzumný spôsob života). Consumer society is harmful to the environment, we produce too much waste, smog, fumes, the use of Freon has caused the **hole in the ozone layer** (dieru v ozónovej vrstve), chemical and other factories produce fumes, hazardous and radioactive waste that pollute the air, soil (pôdu) and water. Other problem is global warming caused by the **greenhouse effect**. One of the causes of the greenhouse effect is too much carbon dioxide (CO2) in the atmosphere. It causes rising temperatures, the melting of mountain glaciers and polar icebergs and an expansion of ocean waters. Today, people get allergic and many civilization diseases have occurred in the past few decades such as hay fever, hypersensitivity to certain agents, materials, food.

We spend too much time at home, do not go out, we are getting lazier because we have too many household appliances that do the work instead of us, we do not have enough exercise, do not do any sports, do not relax. On the other hand we have no time, we are more stressed, depressed, we suffer from social, psychological and spiritual hungers (duševným hladom). Consumer life style causes many diseases such as heart attack, cancer, diabetes, people get fatter and lose their muscle mass.

**Mankind and science in the future (replacement of the teacher by the computer, children and computers, brain drain)**

Scientists will continue to conduct research in medicine, microbiology and all other fields of science. Slovakia has a lot of good researchers, but in recent years a lot of good scientists, programmers, technicians, doctors and teachers have left the country to find a better-paid job elsewhere in the Western Europe, the USA or Canada. This phenomenon, called the **brain drain** (odliv mozgov) is becoming a problem in many post-communist countries. It is caused by low salaries (nízkymi platmi) and the lack of job opportunities (nedostatkom pracovných príležitostí).

Computers have already replaced people in some professions. Some people think that they will replace teachers too. Others argue that computers can only be used in education for acquiring/gaining (na získavanie) passive knowledge and for testing the knowledge. However, many types of interactive programmes have been developed and many European universities have started to offer online study programmes.