Science and technology

Science is a systematic enterprise that builds and organizes knowledge in the form of testable explanations and predictions about the universe. In a closely related meaning, "science" refers to the body of reliable knowledge itself, of the type that can be logically and rationally explained.

The word technology refers to the making, modification, usage, and knowledge of tools, machines, techniques, crafts, systems, and methods of organization, in order to solve a problem, improve a pre-existing solution to a problem, achieve a goal, handle an applied input/output relation or perform a specific function.

**Stone Age (2,6mya – 3500BC)**

* materials: stone, bones, wood and antler
* men: crafting, hunting, fishing
* women: gathering, weaving
* fire: used for cooking, protection against wild animals
* weapons: rocks, spears, trapping pits
* tools: grinder, scraping tool, lithic flake
* later on – farms (wheat, barley…)
* ceramic / clay pots and vessels
* wool and linen cloth

**Bronze Age (3500BC – 1200BC)**

* weapons: swords, axes; shields
* wheel – easier transportation, carts, chariots
* Abacus – basic mathematical calculations, forerunner of the computer

**Iron Age (1300-200BC), Ancient and medieval technology**

* improvements of all basic tools – lighter, stronger; armour
* siege weapons: catapult, ballista
* Chinese inventions: paper, matches, compass, crossbow, gunpowder

**Industrial revolution (1760-1840)**

* improvements in all areas of industry (mining, textile, transport, communication, …)
* steam engine (James Watt)
* telegraph, Morse code (Samuel Morse)

**Second industrial revolution (19th century – 1945)**

* electricity
* electric bulb (patent of Thomas Edison)
* film (Auguste and Louis Lumière)
* TV (Farnsworth, patented by Zworykin)
* radio
* car
* electric motor
* plane
* telephone

**Computers**

The first generation of computers appeared during the World War II. This computer weighted about 30tons and took up to 170m2. Other computers like UNIVAC or BINAC weighted also tens of tons and were installed in special buildings. Nowadays these buildings are called “data centres”.

The second generation fixed a big issue with reliability. Computers weren’t reliable because of vacuum tubes. This was sorted out when vacuum tubes were replaced transistors. A transistor is a semiconductor device which may or may not conduct electricity. This state (on and off) can be expressed by 0 and 1 in binary system.

The third generation introduced integrated circuits. Thanks to this, engineers were able to integrate more parts on each circuit. At this time first calculators appeared as well as the oldest operating system – Unix. This system and its basics are still used in current operating systems and the system itself is running on critical servers.

Since the beginning of the current fourth generation computers hasn’t changed much. The term PC was created by IBM in 1981.

**Mobile phones**

The boom started around 1980. Around this time first GSM transmitters were built in the USA. People started adapting very quickly and thanks to its comfort mobile phones has become one of the fastest selling products. Until 2000 mobile phones was used for calling or sending an SMS. Then the speed of development increased rapidly. Simple games, WAP (very limited “internet” for mobile phones), colour display, polyphonic ringtones, cameras, Bluetooth, Wi-Fi etc.

**Internet**

The first network that is considered to be as a first Internet was called ARPANET. It was network funded by U.S. Department of Defense. After a few years universities started to join this network and in 1981 ARPANET expanded among universities. This network was called CSNET. In the Czech Republic similar network for universities still works (CESNET). In early 1990s first households could buy internet. The speed was only 56kbit/s which is extremely slow nowadays but back then it was useable. But even nowadays we can “experience” this speed. Mobile internet providers use FUP (Fair user policy) in order to regulate traffic in their networks. However, in the last few years it only works as a trick, so you spend more money on better tariff. Current internet speed is about 100-2000times faster.

**Common activities**

* office / school work
* entertainment
  + playing games
  + chatting with friends
  + watching videos
  + listening to music / radio
  + reading news / articles
  + browsing the Internet

**Future of technology**

* new ways of controlling a PC/mobile phone
  + nowadays: touch screen/ keyboard and mouse/ gamepad / touchpad
  + future: voice, gestures using camera, brain-computer interface
* two visions about modern household
  + displays on all kinds of surfaces
  + glasses

**Vocabulary (technology)**

|  |  |  |  |
| --- | --- | --- | --- |
| mya (million years ago) | před milionem let | hoe | motyka |
| antlers | parohy | food preservation | konverzace jídla |
| hand axe / biface | pěstní klín | cloth dyeing | barvení látek |
| lithic flake | pazourek | alloy of copper and tin | slitina mědi a cínu |
| grinder | nástroj s funkcí podobnou moždíři (drtič) | wagon | povoz |
| scraping tool | nástroj na škrábání | cart | vozík |
| trapping pit | padací jáma (past) | abacus | počítadlo |
| spear | oštěp, kopí | chariot | dvoukolý (válečný) vůz |
| linen | len (látka) | siege weapons | obléhací zbraně |
| wheat | pšenice | gunpowder | střelný prach |
| barley | ječmen | windmill | větrný mlýn |
| vessel | nádoba | transistor | tranzistor |
| augmented reality | rozšířená realita | integrated circuit | integrovaný obvod |

**Vocabulary (science)**

|  |  |  |  |
| --- | --- | --- | --- |
| pace | tempo, rychlost | splice | spojit |
| circumference | obvod | overthrow | vyvrátit |
| chart | zmapovat | breakthrough | průlom |
| conduct | provádět (v kontextu) | recede | vzdalovat se |
| frontiers | hranice | atom smasher | urychlovač částic |
| celestial | nebeský | diameter | průměr |
| fermentation | kvašení | discard | vyřadit |