

Television, Satellite, Cell Phone

Television began when Russian-American inventor Vladimir Zworykin was performing radio research for RCA. He was certain that radio could send pictures, and in 1923, he patented the first **television camera**, which was named the iconoscope. With the iconoscope, an image is projected onto a screen of photoelectric cells at the bottom of a cathode-ray tube (or liquid crystal). Light strikes the cells and releases a video signal. In 1924, Zworykin patented the kinescope, which was a television picture tube that received the image from the iconoscope. The iconoscope and kinescope formed the first electronic television system.

The **transistor**, invented by Bell Laboratories in 1948, meant smaller televisions. In 1953, the first color television broadcast was aired. Inside the color television, a cathode ray tube changes electricity into pictures. The television screen is made of 525 horizontal lines per frame with thirty frames per second. The color comes from tiny pixels—thousands of red, green, and blue dots. Their lights blend together to make colors.

Flat-screen televisions do not use cathode ray tubes. Instead, they use liquid crystals to show the picture. High-definition televisions have 1,125 horizontal lines. Digital television uses a microchip that turns the signals from an antenna to and from binary code. Earlier TVs

were analog, which needed varying signal strengths, so the picture was not as clear.

A **satellite** allows instant global communication that is relatively inexpensive. Satellites orbit in the same direction as the earth's rotation, but faster. In 1962, NASA put the satellite Telstar into space for AT&T. It was the first working communications satellite. A satellite sends and receives data from anywhere on Earth that the satellite can see. A **global positioning system** (GPS) was developed for the United States Air Force. A GPS device uses signals it receives from satellites. It then cross-references the information from several satellites in order to figure out a precise location. It works anywhere in the world that is visible to the satellites.

Cellular phones work like two-way radios. AT&T introduced them in 1979. The United States is divided into overlapping areas known as "cells." Each has its own transmitter and receiver connected to a central switching office. Cell phones have a small radio transmitter and receiver. As a person moves a cell phone from one place to another, the phone is tracked from one cell to another. The incoming call goes to the central switching office and then to the base station (cell tower) closest to the cell phone. Outgoing calls go to the closest base station, then to the central switching office, and then to the telephone network.

Exercise:

1. How did transistors affect television? _____

2. How do satellites help ordinary people? _____

3. Explain what happens during a cell phone call. _____

