



## 16.4 Thomas Edison

*Thomas Alva Edison holds the record for the most patents issued to an individual in the United States: 1,093. He is famous for saying that “Genius is one percent inspiration and ninety-nine percent perspiration.” Edison’s hard work and imagination brought us the phonograph, practical incandescent lighting, motion pictures, and the alkaline storage battery.*

### The young entrepreneur



Thomas Alva Edison was born February 11, 1847, in Milan, Ohio, the youngest of seven children. His family moved to Port Huron, Michigan, in 1854 and Thomas attended school there—for a few months. He was

taught reading, writing, and simple arithmetic by his mother, a former teacher, and he read widely and voraciously. The basement was his first laboratory.

When he was 13, Thomas started selling newspapers and candy on the train from Port Huron to Detroit. Waiting for the return train, he often read science and technology books. He set up a chemistry lab in an empty boxcar, until he accidentally set the car on fire.

At 16, Thomas learned to be a telegraph operator and began to travel the country for work. His interest in experiments and gadgets grew and he invented an automatic timer to send telegraph messages while he slept. About this time his hearing was deteriorating; he was left with only about 20 percent hearing in one ear.

### First a patent, then business

In 1868 Edison arrived in Boston. His first patent was issued there for an electronic vote recorder. While the device worked very well, it was a commercial failure. Edison vowed that, in the future, he would only invent things he was certain the public would want.

He moved on to New York, where he invented a “Universal Stock Printer” for which he was paid \$40,000, a huge sum he found hard to comprehend. After developing some devices to improve telegraph communications, Edison had enough money to build a research lab in Menlo Park, New Jersey.

### The invention factory

Edison’s facility had everything he needed for inventing: machine and carpentry shops, a lab, offices, and a library. He hired assistants who specialized where he felt he was lacking, in mathematics, for instance.

The concept of a commercial research facility—an “invention factory” of sorts—was new. Some consider Menlo Park itself to be one of Edison’s most important inventions.

It was there Edison invented the tin foil phonograph, the first machine to record and play back sounds. Next, he developed a practical, safe, and affordable incandescent light. The company he formed to manufacture and market this invention eventually became General Electric.

In 1888, Edison opened an even larger research complex in West Orange, New Jersey. Here he improved the phonograph and created a device that “does for the eye what the phonograph does for the ear.” This was the first motion picture player.

### Not a man to be discouraged

Not all of Edison’s ideas were successful. In the 1890s he sold all his stock in General Electric and invested millions to develop better methods of mining iron ore. He never was able to come up with a workable process and the investment was a loss.

One of the most remarkable aspects of Edison’s character was his refusal to be discouraged by failure. The 3,500 notebooks he kept illustrate his typical approach to inventing: brainstorm as many avenues as possible to create a product, try anything that seems remotely workable, and record everything. Failed experiments, he said, helped direct his thinking toward more useful designs.

Edison also worked to create an efficient storage battery to use in electric cars. By the time his alkaline battery was ready, electric cars were uncommon. But the invention proved useful in other devices, like lighting railway cars and miners’ lamps. Edison’s last patent was granted when he was 83, the year before he died, and his last big undertaking was an attempt, at Henry Ford’s request, to develop an alternative source of rubber. He was still working on the project when he died in 1931.



## Reading reflection

1. Name three different avenues by which Thomas Edison received an education.
2. What did Edison learn from his attempts to sell his first patented invention?
3. Describe Edison's "invention factory."
4. Name two important inventions that came out of Menlo Park.
5. Describe the process Edison used to invent things.
6. How did Edison view his projects that failed?
7. How do you think the tin foil phonograph worked? Discuss and compare your ideas with a fellow member of your class.
8. **Research:** Edison holds the record for the most patents issued to an individual in the United States. Use a library or the Internet to research three of his inventions that are not mentioned in this biography, and briefly describe each one.