# Invention of the Light Bulb | How We Got to Now: Light

## Background Essay

We tend to think of great inventions as the result of one pioneering inventor. But most inventions come from many people, whose ideas build on each other over time. The light bulb is good example: Thomas Alva Edison often gets credit for inventing the light bulb, but his invention was really an improvement on nearly 80 years of previous inventions.

It all began in 1802, when Englishman Humphry Davy invented the first electric light. He connected a charcoal rod to batteries, and found the electricity made the carbon in the charcoal glow. This type of light, known as the “arc lamp,” was used to light city streets.

Over the next several decades, other inventors experimented with different ways to produce light by passing an electric current through material (called the filament) inside a tube. In 1840, Warren de la Rue created a glass bulb with a platinum filament, an efficient but expensive solution. La Rue’s design also used a vacuum tube, but pumping and keeping out the air proved to be very complicated.

In the following years, many other inventors came up with new designs for this type of light, called incandescent bulbs. They experimented with different filament materials and tried different vacuums or gases inside the bulbs. In 1879, two inventors, Englishman Joseph Swan and American Thomas Edison, each independently designed a bulb that would burn for a few hours. Both inventors used a carbon filament made by burning cotton thread or paper.

Within a year, Edison had improved his bulb using a burned bamboo filament and a new method to vacuum more air from the bulb. Edison also invented new ways to make and use light bulbs, as well as new methods to generate and distribute electricity. His pioneering work made light bulbs practical for the general public.

Other inventors continued to improve the light bulb. By the early 1900s, the carbon filament was replaced by a longer-lasting and brighter tungsten filament, which is still used in light bulbs today. Inventors also discovered that a bulb burned longer filled with nitrogen gas than no gas at all.

Despite these improvements, incandescent bulbs were still not energy efficient: they lost most of their energy as heat, instead of light. During the 20th century, many inventors turned their attention to new ways of producing light. The first fluorescent lights appeared in the early 1900s. Based on experiments of the late 19th century, these lamps produced light by sending an electrical charge through tubes filled with mercury gas. The first fluorescent lamps were long tubes, used to light large areas in businesses. By the end of the 20th century, fluorescent light in the form of compact fluorescent bulbs had become an efficient, cost-effective alternative for households.

Today, there’s a new type of light called LED (or light-emitting diode). LEDs, which produce light by sending an electrical current through a semiconductor, are the most efficient bulbs ever developed. The first LED bulb was created in 1962. Over the next few decades, these bulbs would appear in digital clocks, electronics, Christmas tree lights, traffic lights, and cars. The 21st century has brought LED light bulbs that can be used for household lighting.

Beginning with the first arc lamp in 1902, inventors have come up with new and better ways to produce light with electricity. What will light fixtures of tomorrow look like? It’s likely that inventors are working on that technology today.

Discussion Questions

* Explain what Edison meant when he said he was “more of a sponge than an inventor.”
* Why did Edison show the first light bulb he designed to reporters one at a time? Why do you think he bothered to present this light bulb at all?
* Who were Edison’s “Muckers”? How did they represent a new way of inventing? [AND/OR: How were Edison’s Muckers rewarded? How did this represent a new business model?]
* How long did it take Edison and his team to invent the first long-lasting light bulb? What do you think it was like to work in Edison’s lab during this time?
* Edison once said about the light bulb, “I have not failed. I've just found 10,000 ways that won’t work.” What does this quote reflect about Edison? What traits do you think most successful people share with Edison?
* Tell the class about something you can do well, but that took many mistakes before you succeeded. What happens if you’re afraid to make a mistake?