

### Back to History Lesson Plan

<b>Team Members:</b>	Amanda Harries Kacy Leiner
<b>Instructional Unit:</b>	Growth of a Nation/Industrialization
<b>Title of Lesson:</b>	Importance of Ohio Inventors
<b>Grade Level</b>	5 <sup>th</sup> Grade lesson reviewing 4 <sup>th</sup> Grade standards
<b>Description</b>	Reintroducing common Ohio inventors to the students as part of a unit on the expansion of the United States.
<b>Standards</b>	4th Grade History Benchmark C: Explain how new developments led to the growth of the United States Growth – 4.6: Explain the importance of inventors such as the Wright Brothers, Charles Kettering, Garrett Morgan, Granville Woods and Thomas Edison. Growth – 5.6: Explain the impact of settlement, industrialization and transportation on the expansion of the United States.
<b>Duration</b>	1 hour of instructional time with additional time for extension activities and review.

#### Materials and Resources

- See attached links under individual activities.

#### Primary Source Materials:

All [invention photographs](http://www.ohiomemory.org) retrieved from The Ohio Historical Society:  
[www.ohiomemory.org](http://www.ohiomemory.org)

- These photos will be used in both an introductory power point and biography stations.

### Warm Up:

- As an introduction to Ohio Inventors, students will guess what a common invention is and what it was used for while viewing them on a power point presentation. Students will use the attached chart to make their guesses. At the end the teacher will share what the actual invention is.
- [Guess the Invention Worksheet](#)

### Instructional Strategies:

- Students will move through 5 different learning stations to review common Ohio inventors.
- Students will read information on the inventor and common inventions. While doing this they will complete graphic organizers to help organize the information they learn.
- All [biographical information](#) retrieved from OPLIN at:

<http://www.oplin.org/famousohioans/inventors/puzzler.html#bios>

### Homework and Practice:

The homework will be the assessment questions.

### Assessment Question:

- [See Assessment Question Worksheet](#)

### Review Activity:

- Students will play memory with a partner matching inventors and inventions.

### Extension Activity:

- Choose one invention discussed and come up with a similar invention or something that was created as a result of the invention.
- Research both inventions chosen
- Complete a Venn-diagram that compares and contrasts the two inventions.

**Name:** \_\_\_\_\_

### **Guess the Invention**

Look at the invention as it pops up on the screen. Using what you've learned and what you know, make a guess of what you think this invention could be.

Invention #1	My Guess is:  The Object is:
Invention #2	My Guess is:  The Object is:
Invention #3	My Guess is:  The Object is:
Invention #4	My Guess is:  The Object is:
Invention #5	My Guess is:  The Object is:

**Name:** \_\_\_\_\_

## **Ohio Inventors**

**Using complete sentences, answer the following question. Remember to answer all parts of the questions and give examples.**

1.) Choose an Ohio inventor that you know. State the invention and explain two reasons it is significant to the growth of the United States.

2.) Out of the inventions we learned about today, pick one and describe how it has affected your life today.

## **Thomas Edison Biography**



**Thomas Alva Edison was born in Milan, Ohio in 1847. He was the son of a lumber dealer. At age seven, he moved with his family to Michigan. The young Edison was not very successful in school, but he showed an early talent for tinkering and a curiosity for how things worked. At age 12, Edison started work as a newsboy on the railroad. He even tried his hand at printing his own newspaper for the railroad passengers. He learned much about science as he read books on his daily train trips between his home and Detroit.**

**When he was 15, Edison learned to operate the telegraph. Over the next three years, he held jobs in telegraph offices in nearly a dozen cities. Edison's new career led to his first invention, an automatic telegraphic repeater. That device saved time re-sending messages. Over the next 50 years, there followed a stream of inventions that dramatically changed life around the world. These included the stock ticker tape, the first practical electric light bulb, the phonograph and record, the movie camera and projector, and the electronic vacuum tube that made radios possible.**

**Edison also built the first electric power station. That station, in New York City, transmitted power by wires to nearby houses and businesses in 1882. In doing this he proved that electricity could be delivered cheaply from a central station over wires. This became the model for the electrical systems we use today.**

**Perhaps Edison's most important contribution was his "invention factory." Edison brought together scientists and engineers to work in a large laboratory he built in Menlo Park, New Jersey. Here, they not only invented, but also quickly turned their discoveries into products that people could use. Edison's "invention factory" turned out more than 1,000 inventions that received patents.**

**Edison became an American hero. His genius had improved the lives of millions of people. Yet, he was fond of saying "Genius is two percent inspiration and 98 percent perspiration." Edison died in 1931. He was much beloved as a man who had risen from humble beginnings to give the world electric lights, motion pictures, and recorded music.**

## **Charles Kettering Biography**



**Charles F. Kettering was born near Loudonville, Ohio in 1876. As a young man he studied mechanical and electrical engineering at The Ohio State University.**

**Kettering's first job was with the National Cash Register Company in Dayton. While working there, he invented the first electric cash register and an "accounting machine."**

**In 1909, Kettering left NCR to form his own company, the Dayton Engineering Laboratory Company. His company was a research firm that specialized in inventing devices for use on automobiles. His most famous invention was the self-starter for automobiles. Until that time, automobiles were started with a hand crank. Starting an automobile was a dangerous and difficult chore. With the new starter an electrical motor replaced the crank and starting was as easy as pushing a button.**

**In 1912, General Motors began buying Kettering's starter and other parts for use on the Cadillac automobile. In 1920, General Motors bought his company and shortened its name to Delco. Kettering became the director of research at General Motors. During his years with General Motors, he guided many important research projects. These projects produced many important inventions that improved automobiles. Some of these inventions include, shock absorbers, a new type of transmission, improved headlamps and ethyl gasoline, which makes engines run smoother. Kettering also played a central role in developing the diesel railroad locomotive.**

**By the time he retired, Kettering held 140 patents and was a wealthy man. He used this wealth to support many public causes. He was the co-founder of the Sloan-Kettering Institute for Cancer Research. Kettering was also elected president of the American Association for the Advancement of Science. Even though he was recognized as a leading scientist, he was fond of saying, "I'm a pliers and screwdriver man, not a theory man."**

**Charles Kettering died in 1958, having seen many of his inventions become standard equipment on automobiles.**

## **Granville Woods Biography**



**Granville T. Woods was born in Columbus, Ohio in 1856. He attended school until age 10. After that he worked in a machine shop that repaired locomotives. While working there he became interested in electricity. In 1872, at the age of 16, Woods headed west. He got a job as a fireman on a railroad and later became an engineer. During the long train trips he read all that he could about electricity.**

**In 1876, Woods traveled to the East Coast to attend a technical school. During the days he worked in a machine shop. Each night he attended school, studying electrical and mechanical engineering. Woods graduated in two years and then became an engineer aboard a British steamship. While working on the ship he traveled all around the world. In 1880, Woods returned to Cincinnati, once again working for a railroad company.**

**During the 1880s, Woods patented many inventions. These included a furnace and boiler, automatic railroad brakes, an electrical powered incubator to hatch chicken eggs, a new type of battery and several devices that improved streetcars and electrical rail cars. Perhaps his most important invention was a telegraph that could transmit messages to and from moving trains. That device saved many lives by reducing the number of train wrecks.**

**Even though Woods was well educated and intelligent, he had been denied many opportunities for advancement because he was an African-American. In the late 1880s, he decided to do something about it. He started his own company, the Woods Electric Company.**

**By the time Woods died in 1910, he was often referred to as the "black Edison." He held patents for about 35 devices. Some of those he had sold to large companies such as Westinghouse and Bell Telephone. Many of Wood's inventions were essential to the machines on which the United States built its industrial might during the early 20th century. Unlike Thomas Edison, though, Woods was never famous. Indeed, he is sometimes called "Ohio's forgotten inventor."**

## **The Wright Brothers – Orville Wright Biography**



**Orville Wright was born in Dayton, Ohio in 1871. He was the son of a minister. While he was in high school he began working as a printer's apprentice. Following his apprenticeship, he and his brother, Wilbur, started a printing business, Wright and Wright, Job Printers.**

**Among the Wright's customers was Paul Laurence Dunbar, who had been a high school classmate of Orville's. The Wrights printed The Tattler, a small, weekly newspaper for black readers which Dunbar edited. In 1892, the Wright's helped Dunbar publish his first book of poetry, Oak and Ivy. That book launched Dunbar's career. He went on to become one of the best-known African-American writers of the early 20th century.**

**The printing business was not as kind to the Wrights. Their print shop failed and the brothers opened a bicycle repair shop, the Wright Cycle Company, in 1892. They were so good at working with bicycles that the pair soon began to manufacture their own models. Wilbur grew bored with the daily duties of the shop. After reading of Otto Lilienthal's experiments with gliders in Germany, he became interested in flying. By 1899, Wilbur had begun to experiment with gliders, airplanes that have no engines. Knowing that many people thought powered flight was impossible, Wilbur wrote the Smithsonian Institution for information on flying saying, "I am an enthusiast, but not a crank."**

**The Wrights studied books, observed birds and conducted experiments on the problem of flight. They suffered many failures in their early attempts to fly. Finally, they decided that the main reason no one had been able to build a successful airplane was because most of the information written about flight was inaccurate. The brothers decided to start again. This time they relied on their own studies. Their real breakthrough came when they built a wind tunnel. The wind tunnel allowed them to conduct experiments on wing design. After more than 200 designs, they were successful.**

**Leaving nothing to chance, the Wrights also studied weather charts to find the best place to conduct their test flights. Because of the strong winds along the North Carolina coast, Wilbur decided to test the gliders there. Orville stayed behind in Dayton to operate the bicycle shop while Wilbur set up a camp at Kitty Hawk, in**



**1900. There, he and Orville conducted experiments to improve their glider during 1901 and 1902.**

**After the Wrights perfected their glider, they were ready to build a powered airplane. They discovered, however, that no one made a gasoline engine light enough for their design. Determined not to give up, the brothers built their own engine.**

**In 1903, the Wrights returned to Kitty Hawk to test their airplane. They flipped a coin to decide who would pilot the first flight. Wilbur won and made the first attempt at powered flight on December 14, 1903. Before the craft became airborne, it crashed. After spending two days repairing the machine, it was Orville's turn. This time, on December 17, 1903 at 10:53 a.m., the Wright Flyer lifted off the ground. It remained airborne for 12 seconds to become the first powered flight in history. The brothers took turns flying the machine three more times. Eventually, they kept it in the air for almost a minute. On the final flight, the Flyer was so badly damaged that they had to abandon the experiments and return to Dayton.**

**The brothers continued their research and perfected the airplane during 1904 and 1905 at what is now the site of the Wright Patterson Air Force Base. By 1905, they had produced the first practical airplane, the Wright Flyer III. That craft could make repeated takeoffs and landings, fly in circles and stay in the air more than 30 minutes. Despite their successes, the Wrights were unable to sell their design. Finally, they decided to manufacture and sell their own airplanes. In 1909, they founded the Wright Aeronautical Company.**

**The company lasted only a short time because Wilbur contracted typhoid fever and died in 1912. Without his brother, Orville lost interest and sold the business. Orville Wright lived until 1948 and saw the world shrink as a result of his invention. He saw the airplane become a major weapon of war and an important means of transportation. Today, the Wright Brothers Bicycle Shop is preserved at the Henry Ford Museum in Dearborn, Michigan and their original airplane is housed at the Smithsonian Institution in Washington, D.C.**

## **The Wright Brothers – Wilbur Wright Biography**



**Wilbur Wright was born near Millville, Indiana in 1867. He was the son of a minister. Early in his youth Wright moved with his family to Dayton, Ohio. Following his final year of high school, Wright stayed home for several years tending his sick mother. After she died in 1889, Wilbur and his brother, Orville, started a printing business, Wright and Wright, Job Printers.**

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**Wilbur never lived to see his invention reach its true potential. In 1912, he became ill with typhoid fever and quickly died. Today, the Wright Brothers Bicycle Shop is preserved at the Henry Ford Museum in Dearborn, Michigan and their original airplane is housed at the Smithsonian Institution in Washington, D.C.**

## **Garrett Morgan Biography**



**Garrett Augustus Morgan, Sr. was an American inventor whose curiosity and innovation led him to develop several commercial products, the successors of which are still in use today. A practical man of humble beginnings, Morgan devoted his life to creating items that made the lives of common people safer and more convenient.**

**Among his creations was the three-position traffic signal, a traffic management device that greatly improved safety along America's streets and roadways. Morgan's technology was the basis for the modern-day traffic signal and was a significant contribution to development of what we now know as Intelligent Transportation Systems.**

**In 1895, Morgan moved to Cleveland, Ohio, where he worked as a sewing machine repairman for a clothing manufacturer. Experimenting with gadgets and materials to discover better ways of performing his trade became Morgan's passion. News of his proficiency for fixing things traveled fast and led to numerous job opportunities with various manufacturing firms throughout the Cleveland area.**

**Morgan opened his own sewing equipment and repair shop in 1907. It was the first of several businesses he would start. In 1909, he expanded the enterprise to include a tailoring shop which retained 32 employees. The new company made coats, suits, and dresses, all sewn with equipment the budding inventor had made himself.**

**In 1920 Morgan started the Cleveland Call newspaper. As the years progressed, he became a prosperous and widely respected businessman. His prosperity enabled him to purchase a home and an automobile. Morgan's experiences driving through the streets of Cleveland are what led him to invent the nation's first patented three-position traffic signal.**

**Garrett Morgan was constantly experimenting with new ideas. Though the traffic signal came at the height of his career and became one of his most renowned inventions, it was just one of several items he developed, manufactured, and sold over the years.**

**One day, while tinkering in his workshop, Morgan accidentally discovered that some of the chemicals used in his sewing machine repair business also relaxed the tight curl pattern of kinky hair. To market his new discovery, he started the G.A.**

**Morgan Hair Refining Company in 1913. Later, he created both a hair dying ointment and a curved-tooth pressing comb. The new company manufactured and sold these items as well as the hair processing cream. Morgan also invented a zig-zag stitching attachment for manually operated sewing machines and a self-extinguishing cigarette filter.**

## **Primary Source Pictures**

Thomas Edison Light Bulb

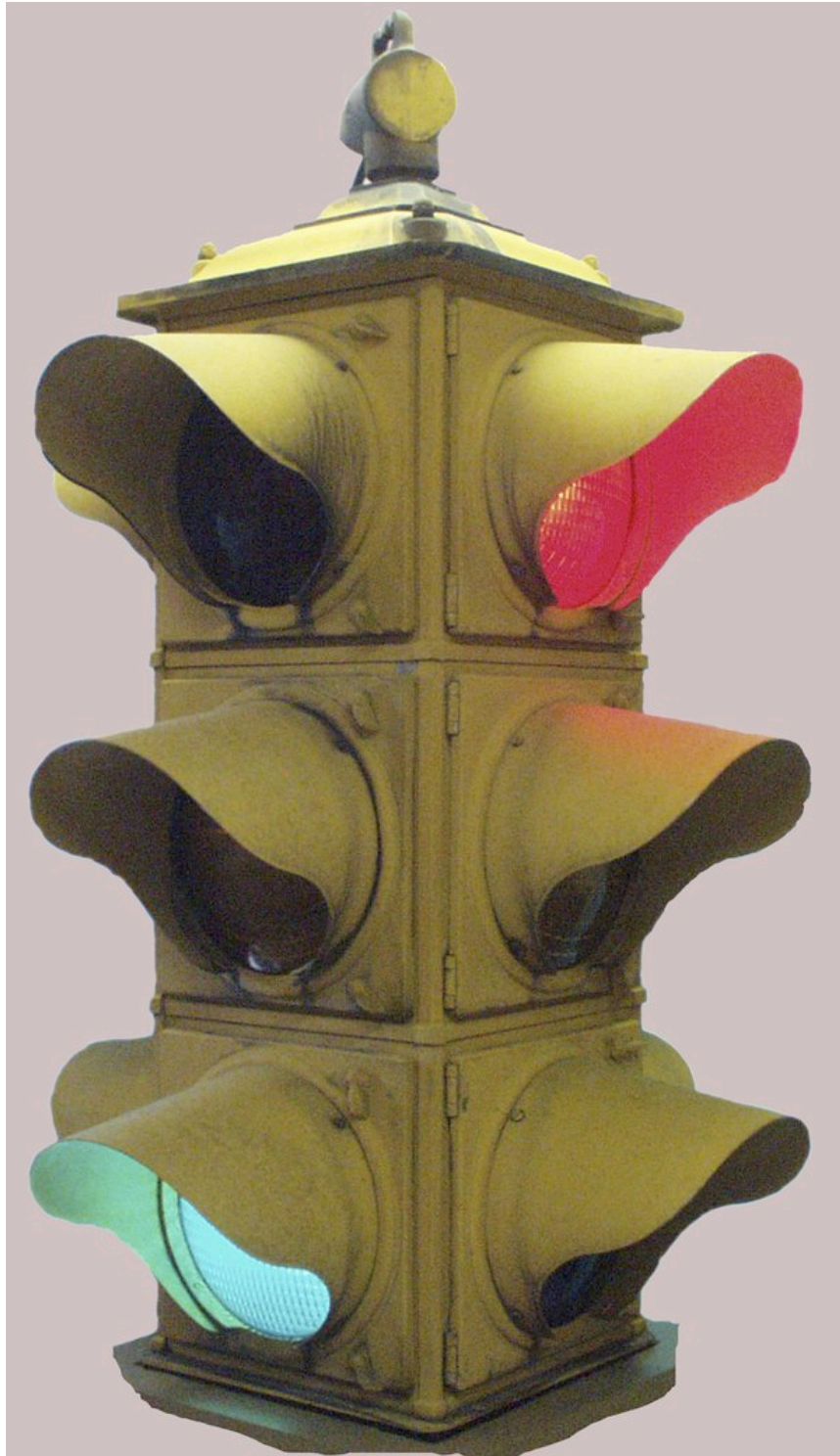


## Thomas Edison Phonograph





Garrett Morgan Four-Way Traffic Light

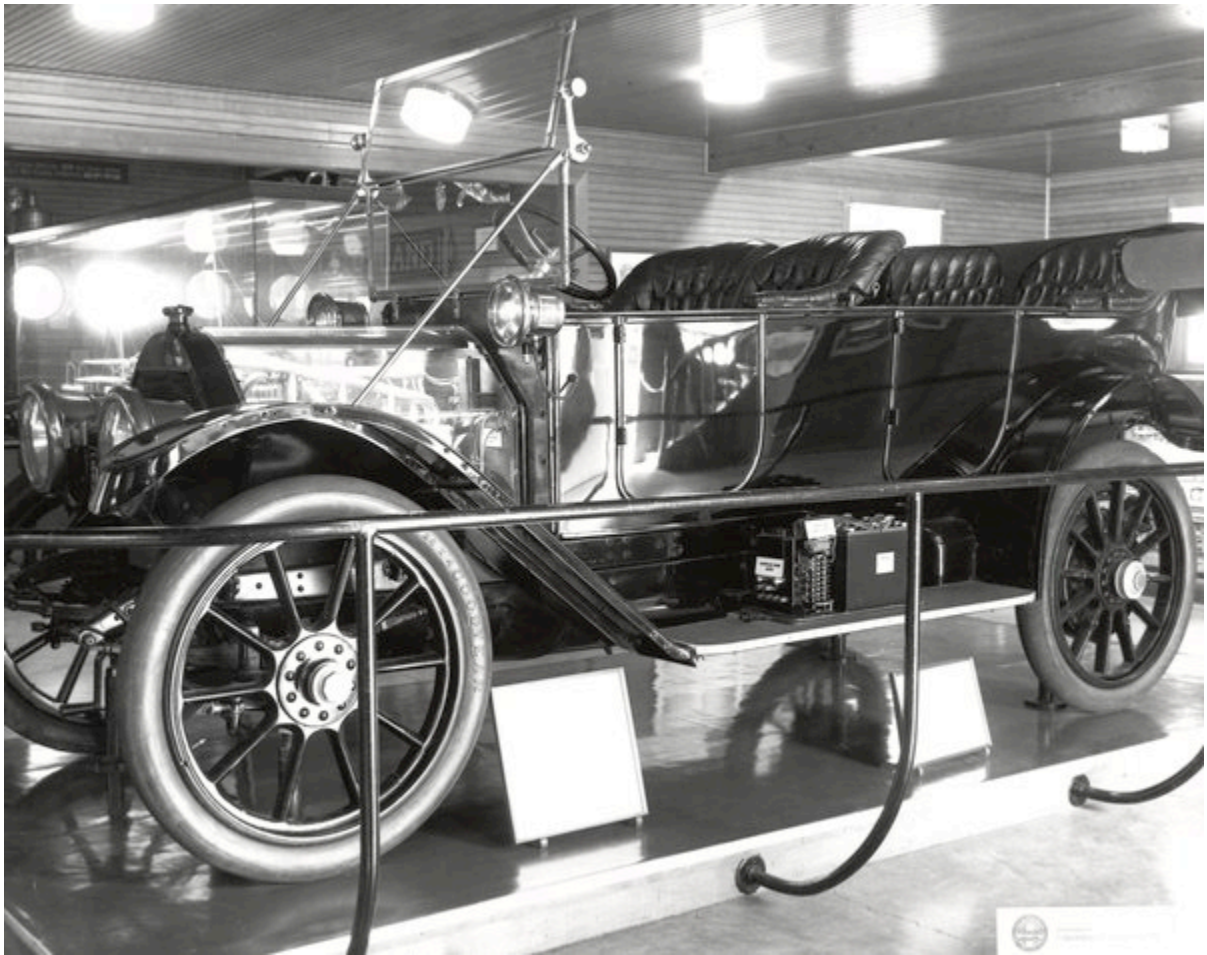




## Wright Brothers Flyer



## Charles Kettering Self-Starting Ignition



Granville Woods Railway Telegraph

