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ABSTRACT

This lesson explores the group of buildings in West Orange, New Jersey, built in 1887, that formed the core of Thomas Edison's research and development complex. They consisted of chemistry, physics, and metallurgy laboratories; machine shop; pattern shop; research library; and rooms for experiments. The lesson explains that the prototypes (ideas for alkaline batteries, recorded music, motion pictures) Edison developed in his laboratories were transformed into marketable products in an adjacent factory complex he began building in 1888. The lesson is based on the National Register of Historic Places registration file, "Edison National Historic Site," the archives maintained at the site, and other materials about Edison and his laboratory. The material can be used in teaching units on the industrialization of the United States, the development of science and technology, or social change in the United States during the late 19th and early 20th centuries. Students discover how Edison systematized the process of inventing, allowing for the rapid development and production of inventions that improved the lives of millions. The teaching activities include: (1) "West Orange, N.J."; (2) "Edison's Laboratory Complex, 1887"; (3) "Edison's Laboratory Complex, c. 1914"; (4) "The Creation of the Research and Development Laboratory"; (5) "Edison and Popular Culture"; (6) "Edison and Batteries"; (7) "The Laboratory Complex"; (8) "The Chemistry Laboratory"; (9) "Edison's Library"; (10) "Edison and the Phonograph"; and (11) "Phonograph/kinetoscope Parlor, 1895"; (12) "Researching the Impact of Edison's Inventions"; (13) "The Invention Process"; and (14) "Researching the Local Community." Contains a 6-item list of supplementary resources. (BT)

Teaching with Historic Places

The Invention Factory: Thomas Edison's Laboratories

Teaching with Historic Places
National Register of Historic Places
National Park Service
1849 C. Street, N. W. Suite NC400
Washington, D.C. 20240

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The Invention Factory: Thomas Edison's Laboratories

The cluster of red brick buildings still stands. Asphalt driveways cover most of the space separating the buildings. A chain link fence topped with barbed wire surrounds the complex. Today, this group of buildings looks little different from the hundreds of abandoned factory sites that dot the landscape in the industrial towns of New Jersey and other parts of the Northeast. When it was in operation, however, this complex was one of the most important, if little known, creations of Thomas Alva Edison. These buildings--the chemistry, physics, and metallurgy laboratories; machine shop; pattern shop; research library; and rooms for experiments—were built in 1887. They formed the core of Edison's research and development complex, which he claimed contained everything necessary to invent "useful things every man, woman, and child in the world wants...at a price they could afford to pay" (Matthew Josephson, *Edison: A Biography* [New York: John Wiley and Sons, Inc., [1959] 1992, 314.).

It was here in this West Orange, New Jersey, complex that Edison systematically developed his ideas for alkaline storage batteries, recorded music, and motion pictures, and transformed them into marketable products. Once perfected, these prototypes were sent to the vast factory complex Edison began building in 1888 adjacent to the laboratory. Here they were produced in commercial quantities and then sold throughout the world. The products developed at the research laboratory during the late 19th and early 20th centuries dramatically changed the way Americans lived and worked. The fusion of business and technology achieved at the West Orange complex provided a model for modern corporate and governmental research and development laboratories.

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2. The Invention Process

3. Researching the Local Community

Edison National Historic Site - http://www.nps.gov/edis/

Supplementary Resources

About This Lesson

This lesson plan is based on the National Register of Historic Places registration file, "Edison National Historic Site," the archives maintained at the site, and other materials about Thomas Edison and the West Orange laboratory. It was written by Benjamin Bolger, Park Ranger, Edison National Historic Site; and edited by Fay Metcalf, education consultant and series editor for Teaching with Historic Places lesson plans.

Where it fits into the curriculum

The lesson could be used in teaching units on the industrialization of the United States, the development of science and technology, or social change in the United States in the late 19th and early 20th centuries. Students will discover how Edison systematized the process of inventing, allowing for the rapid development and production of inventions that improved the lives of millions of people.

Objectives for students

1) To describe how Edison created the first modern research and development laboratory complex and explain its functions.

2) To explain how Edison used his new complex to develop products and create industries that still affect our lives today.

3) To describe the process of invention from having experienced it through a simulation activity.

4) To investigate how technological and industrial developments have affected their own community.

Materials for students

The readings, script, and maps listed below are designed to be photocopied and distributed to students. The photographs appear twice: in a low-resolution version with associated questions and alone in a high-resolution, full-page version.

1) Three maps of the area and the laboratory and factory complex;

2) Two readings about the work conducted in Edison's laboratory and his inventions;

3) Eight photos featuring Edison, his laboratories, and some of his inventions.

Visiting the Park

Edison National Historic Site is located on Main Street in West Orange, New Jersey. The site is open 9:00 a.m. to 5:00 p.m. daily, except Thanksgiving, Christmas, and New Year's days. For additional information, visit the park web pages at http://www.nps.gov/edis/

Teaching Activities

Setting the Stage

Begin the lesson by explaining to students that Edison lacked formal education, but excelled at putting his practical genius to work. He became a hero to most Americans as an example of what they believed was peculiarly American ingenuity. Born in Milan, Ohio, in 1847, he received only a few months of formal education, but his mother, a retired school teacher, provided him with lessons in the basic subjects.

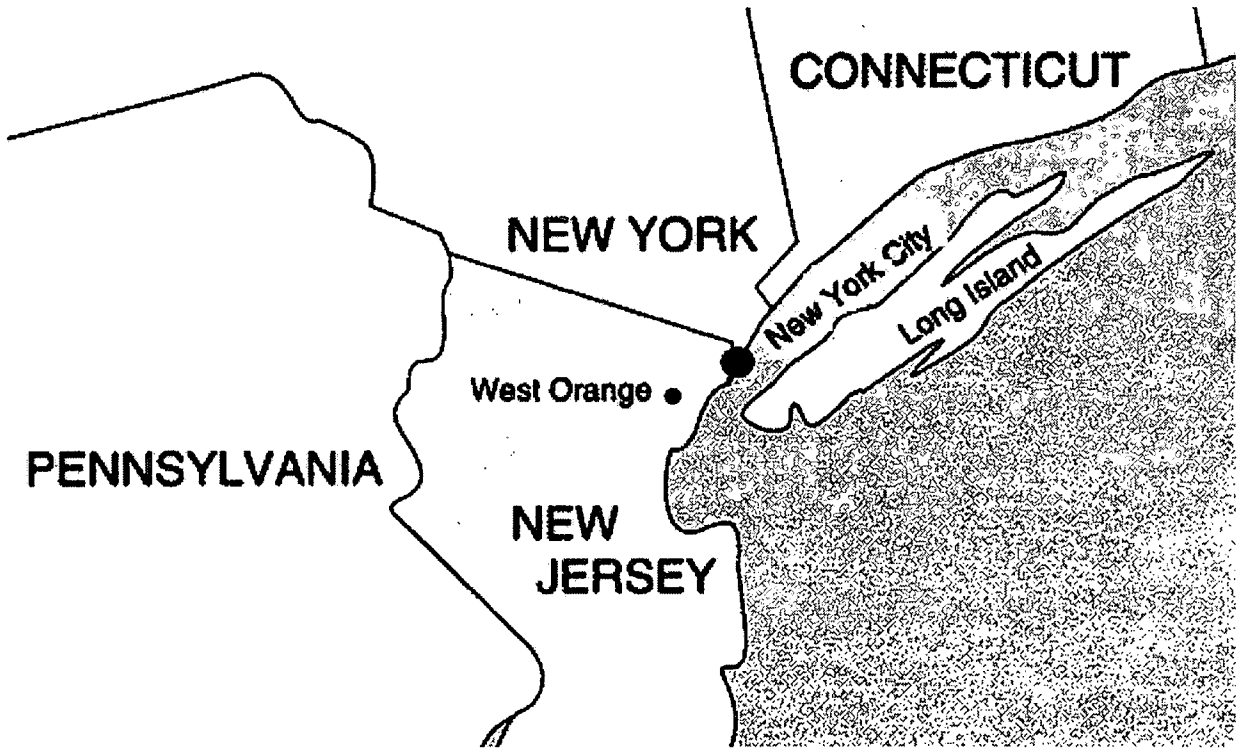
Edison began working for a living when he was 12 years old. As a "candy butcher," he sold newspapers, fruit, candy, and other snacks on a train that ran each day from Port Huron, Michigan (where the family had moved in1854), to Detroit. He built a small laboratory in the baggage car and conducted experiments in telegraphy during his free time. He continued his experiments as he worked as a telegraph operator in the 1860s. He received his first patent when he was 21 and gained a reputation as an inventor, as well as his first financial success, by developing various improvements in telegraph equipment.

In 1877 Edison achieved international fame with his invention of the first phonograph. Two years later, while working in Menlo Park, New Jersey, Edison developed the first practical incandescent light bulb and a complete electrical power system for making electric lighting for homes and businesses. Edison's invention of the electric light established his place in history, and the sale of light bulbs and power systems secured his fortune.

In 1886 Edison set out to build a new laboratory to continue his work on electricity and to develop a systematic process for turning the endless list of other ideas he had into marketable products. By this time, Edison had both the experience and the capital to build the largest and best equipped laboratory in existence with what he called "facilities incomparably superior to any other for the rapid and cheap development of an invention and working it up into Commercial [sic] shape" (Edison Laboratory Notebook N87.11.15, Edison National Historic Site Archives). Edison worked in his West Orange, New Jersey, laboratory for the rest of his life. Of the 1,093 patents he received before his death in 1931, more than half were developed at West Orange.

Teaching Activities-- Locating the Site

Map 1: West Orange, New Jersey and surrounding region.



(Edison National Historic Site)

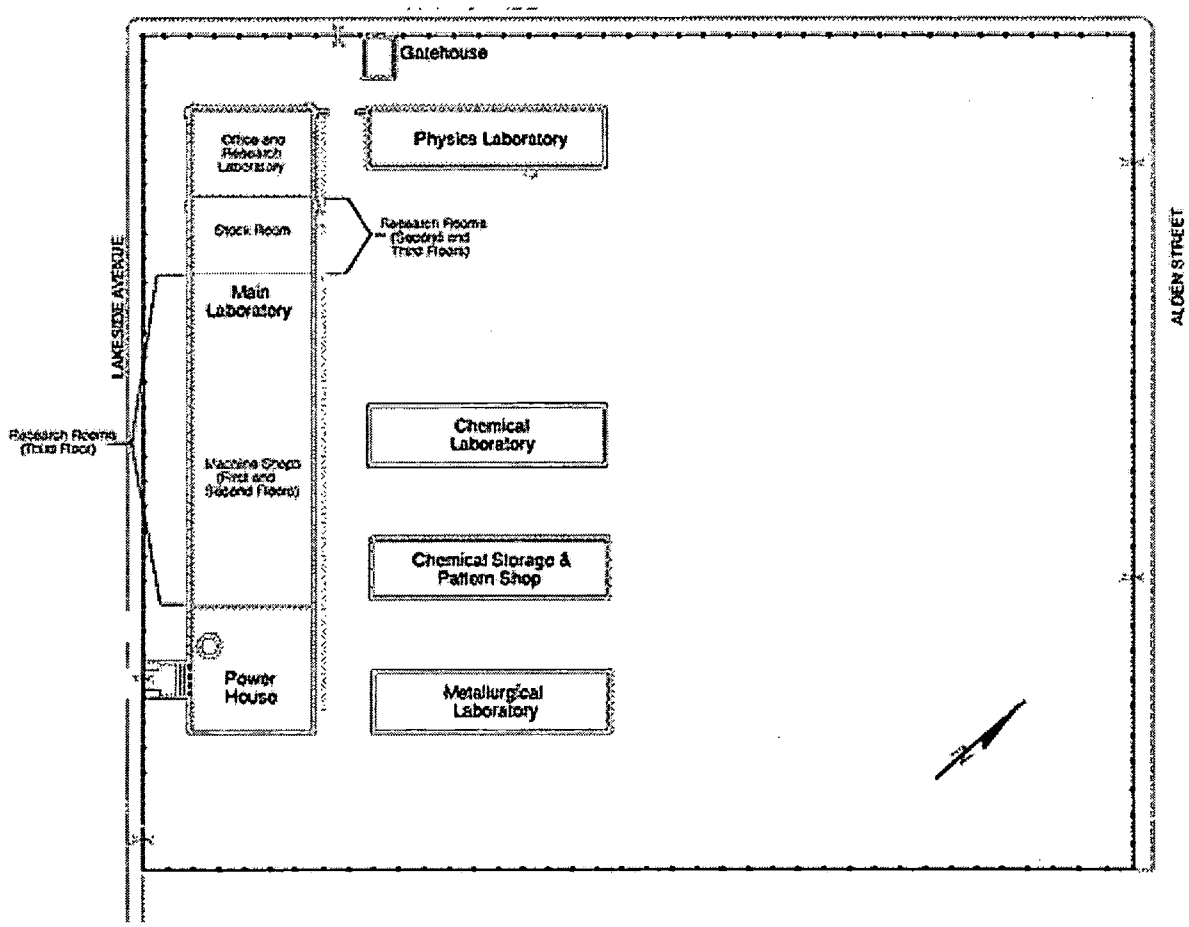
1. Note the location of West Orange, New Jersey, in relation to New York City, where Edison's bankers and investors were located.

2. Since the automobile was not yet in use in 1886, how do you think Edison would have made the trip back and forth to New York City?

3. How might being close to the city and port of New York have been useful?

Teaching Activities-- Locating the Site

Map 2: Edison's Laboratory Complex, 1887.



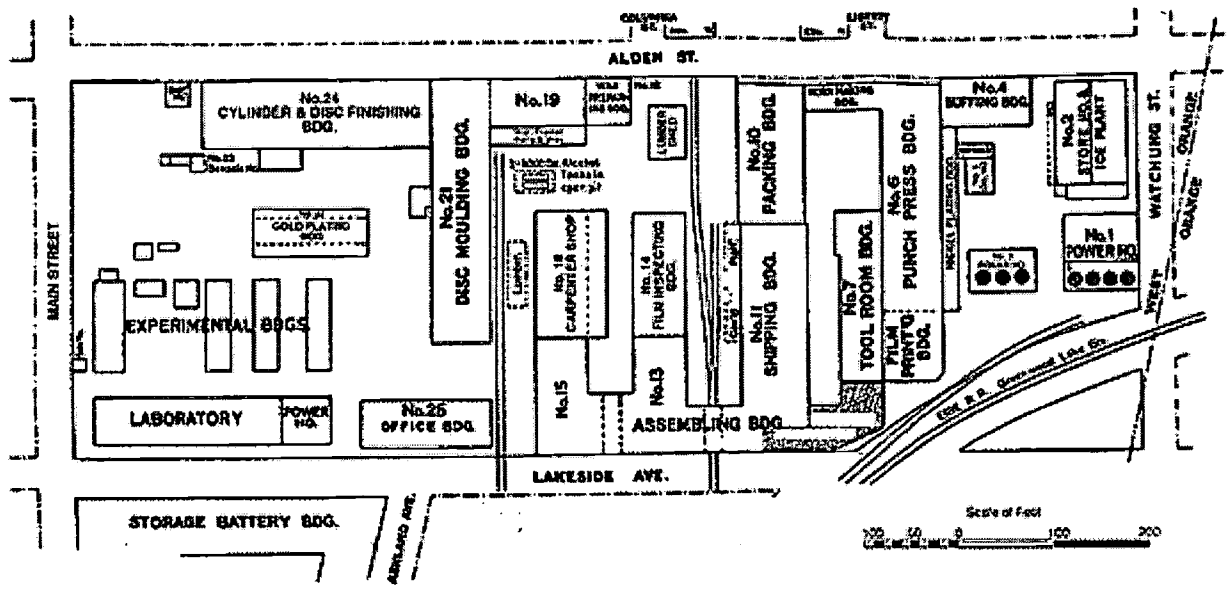
(Edison National Historic Site)

1. What were the different buildings used for? Why do you think there are so many different facilities?

2. What do you think is the purpose for the arrangement of the buildings? What is gained by having the buildings clustered rather than in one long row?

Teaching Activities-- Locating the Site

Map 3: Edison's Laboratory and Factory Complex, c. 1914.



Edison National Historic Site

1. Using Map 2 as a guide, locate the 1887 buildings.

2. How do you think Edison brought in large quantities of supplies and shipped out his finished products?

3. What buildings suggest that Edison produced phonograph records (also known as discs) as well as the machines to play them?

4. What might have been the advantage of having the laboratory and factories so close together? (Additional information is provided in Reading1.)

Teaching Activities--Determining the Facts

Reading 1: The Creation of the Research and Development Laboratory

Thomas Edison was a man of broad and wide-ranging interests. During his lifetime, he developed inventions for consumers, businesses, and industries in fields ranging from sound reproduction to iron ore mining. Edison never limited his curiosity or his work. Anything was grist for his mill. The one restriction he put upon his work was that a project had to have a practical commercial application. Edison said, "I always invented to obtain money to go on inventing" (Josephson, 314). That meant his inventions had to have a market, so that the profits could fund new inventions.

Edison had previously built laboratories in Newark and in Menlo Park, New Jersey--indeed, he had already won the nickname of the "wizard of Menlo Park"--when he moved to West Orange, in 1886. The following year Edison built a new laboratory complex on what he believed would be a perfect site. The area was largely undeveloped, the land was cheap, and it was less than a mile away from the mansion he had purchased for his second wife. The site was also close to New York City where the bankers and investors who helped finance his work were located. Well established rail and ferry services existed near the Hudson River that could put Edison in their offices within an hour.

When he began to build his new laboratory complex, Edison's goal was to have on hand everything needed to quickly and cheaply perfect inventions and ready them for mass production. All the necessary tools, machines, materials, and skilled personnel would be housed within the complex. Edison originally planned to have the entire facility in one 250-foot long, three-story building. Even before this huge facility was completed, however, Edison realized it would not be big enough. He then built four one-story buildings set at right angles to the main building. The original five buildings of the laboratory complex opened for operation in late 1887. More buildings, including factory buildings for manufacturing his inventions, were added later as they were needed.

To assist him in his invention work, Edison employed a large and diverse staff of more than 200 machinists, scientists, craftsmen, and laborers at peak production. This staff was divided by Edison into as many as 10 to 20 small teams, each working simultaneously for as long as necessary to turn an idea into a perfected finished prototype or model. Martin V. Melosi in Thomas A. Edison and the Modernization of America noted that "It was not unusual for Edison to give his staff the general outline of what he wanted, and then turn them loose to find the best method of achieving the goal" (103). Edison himself would move from team to team advising and cajoling efforts as necessary. When a particular invention was perfected, Edison quickly patented the device. With such extensive facilities and his large staff, Edison was able to turn out

new products on an unprecedented scale and with unprecedented speed. From the West Orange complex came improved phonographs, a perfected alkaline storage battery, the movie camera, and the fluoroscope (a diagnostic tool widely used before X-rays were perfected).

Long experience as an inventor had taught Edison that money was made not from selling patent rights or from royalties, but from the direct sale of the products to the public. In 1888 Edison began building factories next to his laboratory complex to manufacture the finished products based on his inventions. These factories produced all the necessary parts for Edison inventions. In turn, most of the machinery used in the factory to manufacture the inventions was designed and machined in the laboratory complex. The finished products were distributed and sold around the country and abroad. Profits from the sale of these Edison products were used to fund further research, to improve existing Edison inventions, and to allow Edison and his research staff to develop new ideas for inventions. The proximity of the factories to the laboratory complex helped speed up the invention process by making it possible to quickly put new inventions or improvements on the market. Technological innovation could move forward at an unprecedented rate.

This process is most clearly shown by Edison's work on the phonograph. He was the original inventor of the product, which first used foil cylinders to record sound. Shortly after he opened his new laboratory, Edison heard that the rival inventors had been awarded patents for improvements to the machine. Rather than suing these rivals for infringement of his original patent, Edison set out to develop his own "perfected" phonograph. For nearly two years, he and his team dedicated themselves to that goal. Edison's original patent used a tinfoil sheet for recording sound, but in his patent application he had listed a number of materials that could be used for records--all kinds of waxed substances among them. He tried out many such substances and finally settled on a hollow cylinder with walls about a quarter of an inch thick made from a wax compound which allowed for closer grooving. He replaced the old recording needle with a sapphire stylus and created a "floating weight" to hold the stylus in place. His first factories in West Orange were built to mass produce that product. The phonographs were then sold throughout the country and the world. The profits were used by Edison to fund further work on improving the phonograph--developing plastic cylinders rather than wax cylinders, for example, and also to create new inventions. For over 40 years, such innovations developed in the laboratory were quickly utilized in the factories. Edison always felt that an invention could be improved, and he was never satisfied until he had done that. The diversity of Edison's inventive interests and industries helped the financial stability of his complex. By working on many projects simultaneously, the laboratory's future was not dependent on the success of one idea. Further, the profits from older, successful inventions and companies provided the needed financial support for Edison's new ideas and companies. For example, during the long, difficult, and very expensive struggle to develop the alkaline storage battery, Edison's already successful phonograph business provided the necessary financial support.

By uniting the resources of the laboratories and factories, Edison was able to accomplish far more than would have otherwise been possible. Edison and other inventors had previously been constrained by the small size of both their laboratories and their financial resources. By creating a large, diverse laboratory and factory complex, Edison could undertake more inventive

projects with greater resources, both technological and financial, than had ever been possible before. Edison worked at this laboratory complex for 44 years. With his modern research and development laboratory, Edison had the space, tools, and flexibility to work on any promising new idea that came to mind. With Edison's genius, the impossible became possible.

Questions for Reading 1

1. What was Edison's one requirement of an invention? Why was this important?

2. What was Edison's objective in building a new laboratory? Was he successful? Support your answer.

3. Why was the laboratory staff important?

4. Why did Edison manufacture his inventions himself when it would have been easier to sell the rights to the inventions?

5. How did the laboratory and factory facilities support each other?

6. How did the sale of phonographs help Edison?

7. Why was it helpful for Edison to develop diverse products?

Reading 1 was compiled from Anne Booth, "Edison National Historic Site" (Essex County, New Jersey) National Register of Historic Places Registration Form, Washington, D.C.: U.S. Department of the Interior, National Park Service, 1978; materials from the Edison National Historic Site Archives; Kim Keister, "Genius at Work," Historic Preservation (January 1994); and Matthew Josephson, Edison: A Biography (New York: John Wiley & Sons, Inc., [1959] 1992).

Teaching Activities--Determining the Facts

Reading 2: Edison and Popular Culture

Every time we play recorded music, go to the movies, or watch a videotape on our VCR, we enjoy the benefits of Thomas Edison's genius and hard work. Edison lived to see great industries arise from his inventions: electric light and power, sound recording, and motion pictures.

Beginning with the first tinfoil phonograph in 1877 and continuing almost to his death in 1931, Edison and his researchers made countless improvements to the phonograph, constantly striving to achieve the finest sound reproduction possible. At first Edison thought the phonograph primarily suitable only for business purposes like the dictation of letters. What the public really wanted, however, was a machine to play music. Recognizing the biggest market for the phonograph, Edison began producing musical records in the early 1890s. No matter how scratchy and crude those early cylinder records seem today, they were wondrous indeed to buyers who were hearing recorded sound for the very first time. Modern records, cassette tapes, and compact discs all trace back directly to Edison's early experiments with sound recording.

Not satisfied with merely recording sound, Edison turned his attention to another of the senses: sight. In October 1888 Edison wrote that he intended to do "for the Eye what the phonograph does for the Ear, which is the recording and reproduction of things in motion...."1 Thus began Edison's development of the kinetograph (motion picture camera) and kinetoscope (viewer).

Over the next five years Edison experimented with the making of motion pictures, erecting the Black Maria, the world's first structure especially constructed to be a motion picture studio. These first motion pictures were not projected on a theater screen. Instead viewers looked through a peephole mounted on top of a box with the projector inside. For a nickel, viewers could look through the peephole to see films of men at work, like Blacksmith Scene, or a dancer, Carmencita, or perhaps a scene of everyday life, like The Barbershop. Although lasting less than a minute, these first short films excited audiences as much as any film seen today.

The first films were also silent, but in 1895 Edison attempted to combine sound recording and motion pictures in a device he called the kinetophone. Unfortunately, this early effort at talking motion pictures proved unsuccessful. More than 30 years would pass before sound films were here to stay.

The peephole kinetoscope was a success, but Edison and other researchers realized that projected films were the next step in motion picture development. Although practical film projection was first achieved in Europe, the first commercially successful American motion picture projector was "Edison's Vitascope." The vitascope combined Edison's name recognition with the work of Francis Jenkins and Thomas Armat to launch the era of projected film in the United States. When the vitascope premiered in New York City in 1896, the sensation of the evening was a film titled

Rough Sea at Dover made by Englishman Robert Paul. So realistic was the view of waves crashing on Dover beach that people in the front rows actually shrank back in their seats, fearful of getting wet.

Edison wanted to invent things to improve the life of all people, whether it was light for their homes, phonographs for their homes and businesses, or motion pictures for their education and entertainment. Just as he often built on the work of those who preceded him, so, too, have others built on Edison's work. Every time we watch a movie or listen to our favorite compact disc, we enjoy the legacy of Edison's genius. But true genius, said Edison, is "hard work, stick-to-itiveness, and common sense."[2] His own example of dedication and determination may be the true legacy of Thomas Edison.

[1] Thomas A. Edison, Patent Caveat 110, October 8, 1888, Edison National Historical Site Archives.
[2] Frank L. Dyer and Thomas C. Martin, Edison: His Life and Inventions (New York: Harper & Brothers, 1910), 607.

Questions for Reading 2

1. Why do you think Edison's phonograph became such a popular household possession?

2. What was the Black Maria?

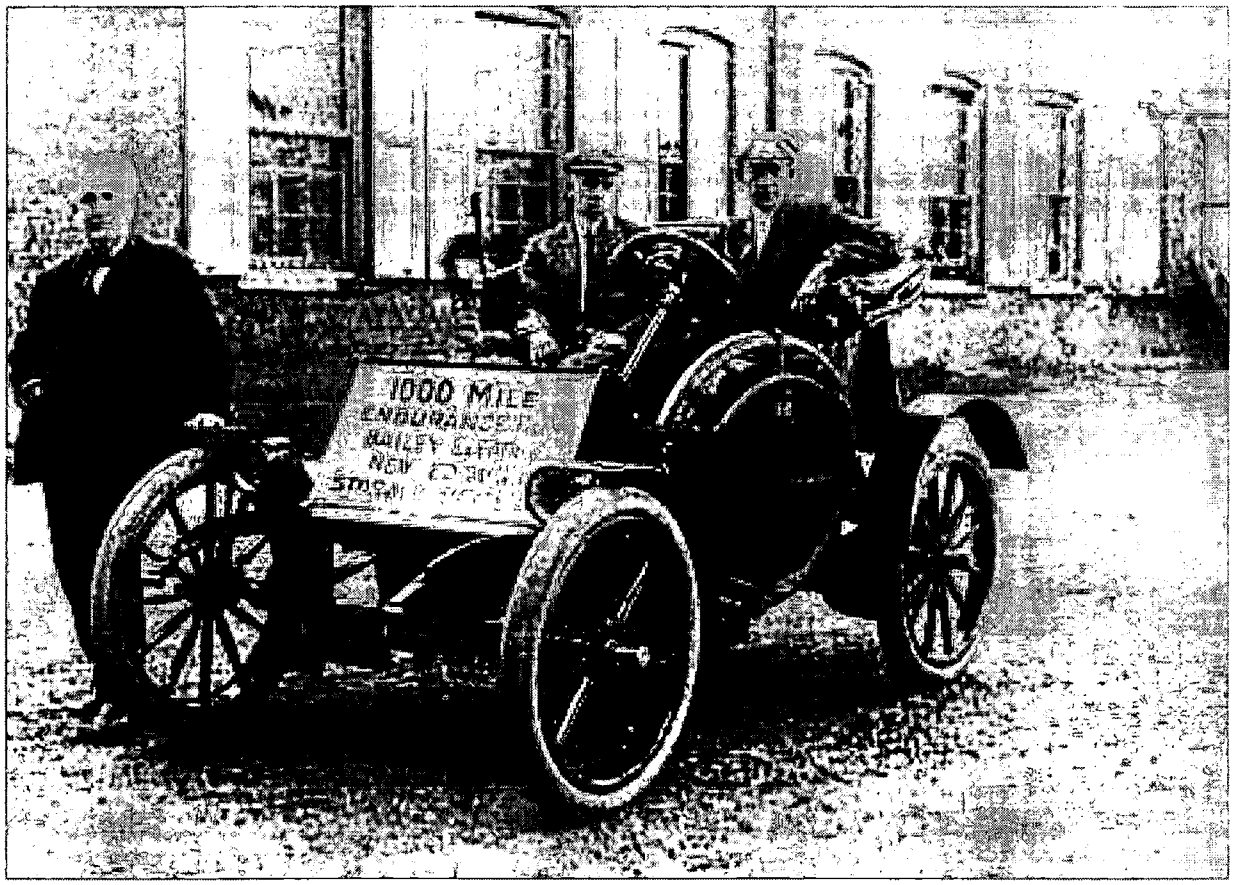
3. How did people watch the first motion pictures?

4. How do you think you would have felt if you had been present when the vitascope premiered in New York City?

Reading 2 was compiled from records of the Curatorial Collection at Edison National Historic Site.

Teaching Activities--Visual Evidence

Photo 1a: Edison at his West Orange lab with an electric car powered by Edison batteries, 1910.



(Photo: Edison National Historic Site)

Photo 1b:Edison holding one of his miner safety lamps, 1923.

(Photo: Edison National Historic Site)

Edison did not invent the first storage battery, but combined new materials to create a storage battery suitable for practical use. By the time he perfected the alkaline storage battery, electric-powered cars had lost out in the competition with gas-powered cars that could be driven far greater distances. A failure as the motive force for automobiles, the alkaline storage battery was ultimately a great commercial success as the power source for train lights, marine appliances, and miners' lamps. Prior to this invention, miners used candles or small oil lamps attached to their hard hats as their light source.

1. Why do you think miners' lamps would have been an important application of the alkaline storage battery invention?

2. How does Edison's invention of the alkaline storage battery continue to affect our lives today?

3. List all the things you use that are operated by batteries. How would life be different if practical storage batteries had not been invented?

4. How do you think the "invention factory" might have affected Edison's ability to turn a commercial failure into a success?

Photo 2a: The laboratory complex, 1890s.

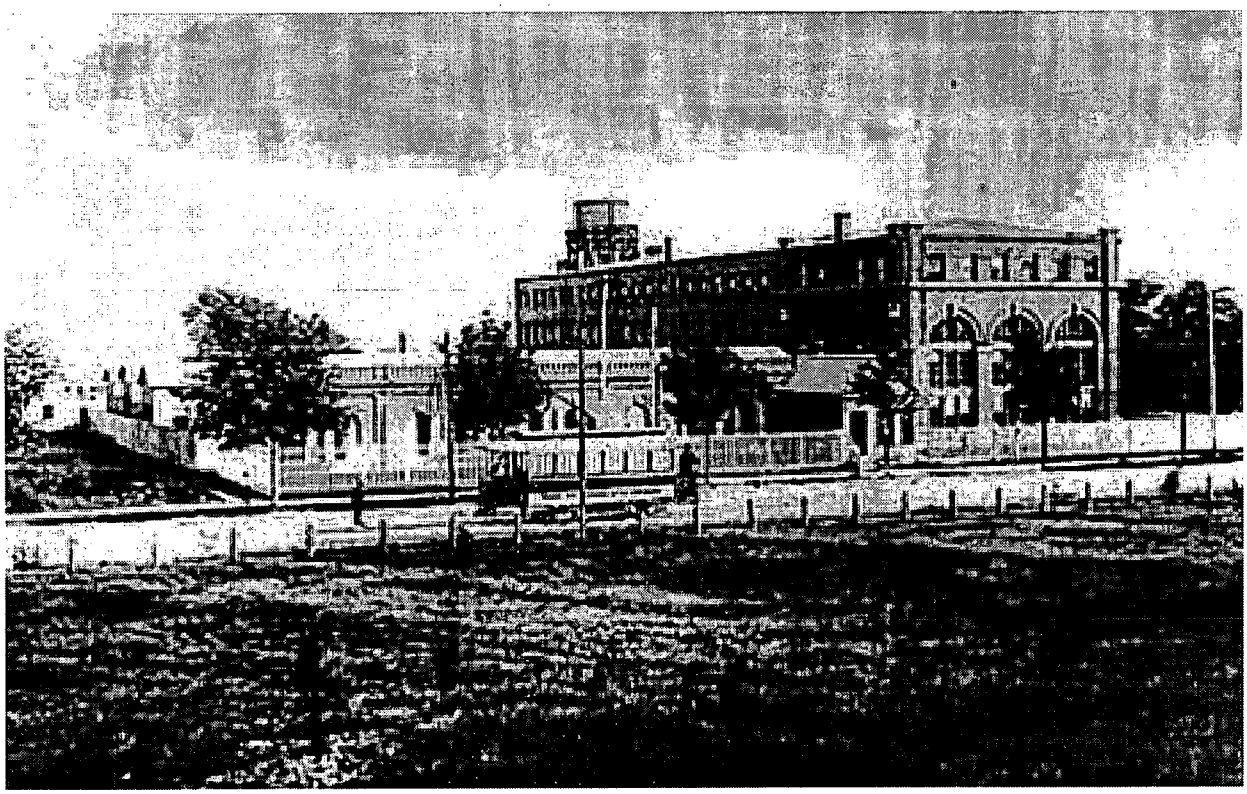
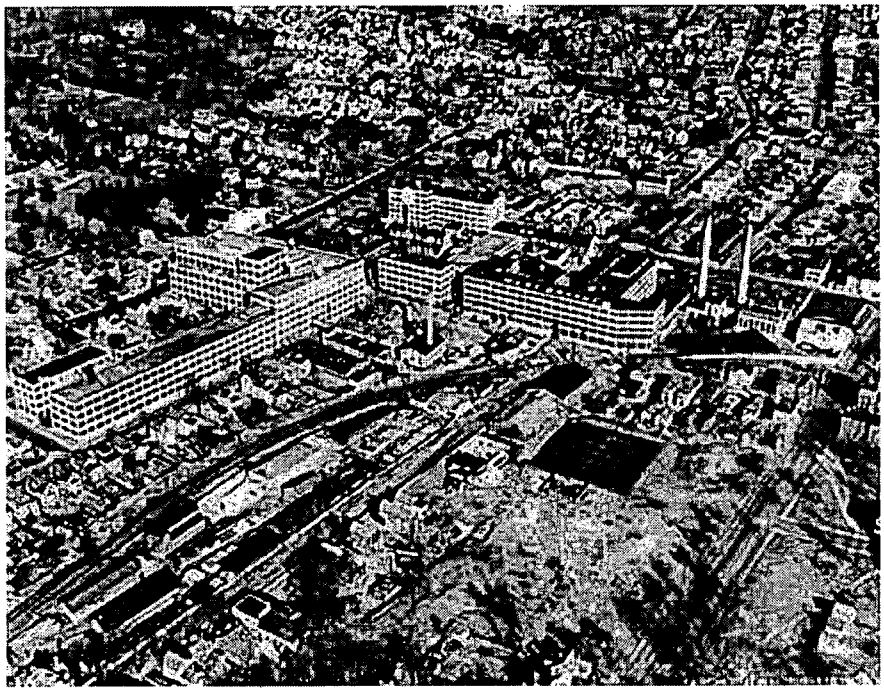


Photo 2b:Aerial view of Thomas A. Edison Incorporated, 1929.



(Photo: Edison National Historic Site)

1. Compare Photo 2a of the laboratory complex in the 1890s with Photo 2b of the complex as it appeared in 1929. How had the area surrounding the complex changed?

2. Try to match the buildings in Photos 2a and 2b with those shown in Maps 2 and 3.

Photo 3: Edison staff members at work in the chemistry laboratory, 1910.

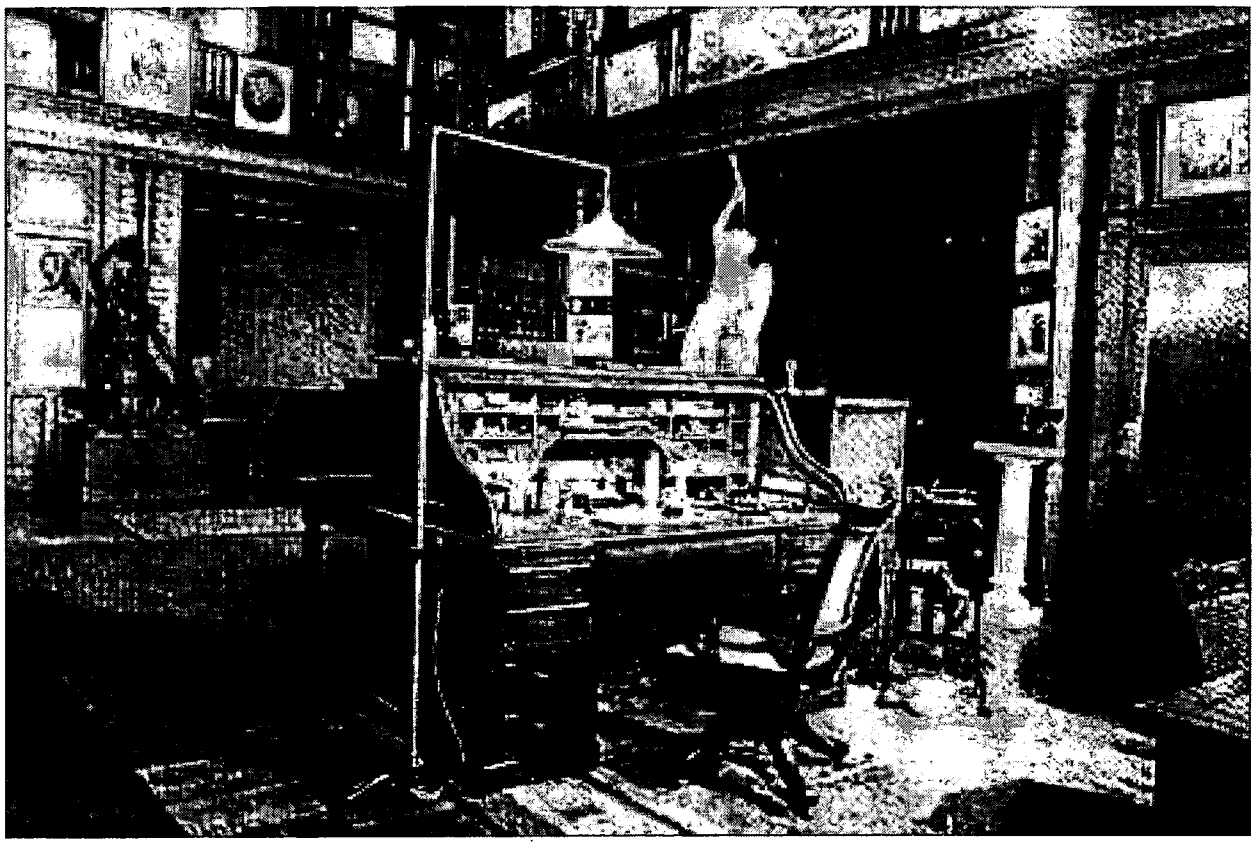
(Photo: Edison National Historic Site)

It was in this lab that Edison's team of workers tested hundreds of chemicals for use in such inventions as the storage battery and the improved phonograph record.

1. What does the photo suggest about the laboratory complex?

2. What does the photo suggest about the people who worked there?

Photo 4: Edison's library in the main laboratory.



(Photo: Edison National Historic Site)

This section of the building is a large hall with a 30-foot high ceiling and two tiers of galleries that surround the room. In this large space are stored his more than 10,000 books, displays of many of his initial inventions, and several of the numerous awards presented to Edison for his achievements. Not shown in the photo, but included in the furnishings of the library, is the cot used by Edison for his famous catnaps. Edison sometimes worked for 24 or more hours straight. When he was close to a solution for a problem involved in one of his inventions, he might stay at the laboratory for several days at a time, catching only short naps when he could. Even when things were going smoothly, he slept only a few hours at night, depending on his catnaps to restore his energy.

1. Note the white statue in the right center of the photo. What is the "Genius of Electricity" holding in his raised right arm?

2. Would you have expected to find such an elegantly furnished and decorated room in a research and development library?

3. Why would Edison have considered the library an important part of his invention factory?

Photo 5: Edison and his associates inspect the improved phonograph, June 16, 1888.

(Photo: Edison National Historic Site)

Edison was very aware of the need for publicity to popularize his inventions and his "genius." At that time the only way to hear music or talks was at a live performance

1. Would you have been anxious to buy the latest device for playing records if you had been alive at the time of Edison and seen this photograph?

Photo 6: A phonograph/kinetoscope parlor in San Francisco, 1895.

The nickelodeon machines on the left were coin operated phonographs. Patrons could deposit a nickel and then listen to an Edison phonograph record through the listening tubes that can be seen hanging from the machines. The kinetoscopes were also coin operated and were used to watch early Edison motion pictures. After depositing a nickel, the patron viewed a 20-second- to one-minute-long movie through a viewing slit in the top of the box. A visit to a phonograph and kinetoscope parlor was probably the first opportunity that many people had to hear recorded music or see moving images of people.

1. Why do you suppose these machines were all together in one place rather than in private homes?

2. How do you think people responded to these novelties?

3. What later inventions can you think of that might have affected people in the same way?

Putting It All Together

Only a small part of the original West Orange invention complex remains today. Those buildings are now preserved as the Edison National Historic Site in West Orange, New Jersey. Although Edison had begun the idea of an extensive research and development complex when he set up shop in Menlo Park, New Jersey, it was here in West Orange in 1887 that his dreams came to fruition. In this all-encompassing facility began a new stage in the history of invention. The following activities will help students understand the process of invention as well as its impact on society.

Activity 1: Researching the Impact of Edison's Inventions

Edison received over 1,000 patents during his lifetime. Many of these inventions still affect our lives today, both directly and indirectly. Have students research the development and history of any one of Edison's inventions and trace it to the present day. Books on Edison and on the history of technology found in schools and public libraries provide a good starting point. Especially useful are the following: Charles Musser, *Before the Nickelodeon: Edwin S. Porter and the Edison Manufacturing Company* (Berkeley, California: University of California Press, 1990); Charles Musser, *The Emergence of Cinema: The American Screen to 1907 [History of the American Cinema, Volume I]* (New York: Charles Scribner's Sons, 1990); Robert Friedel and Paul Israel, *Edison's Electric Light: Biography of an Invention* (New Brunswick, New Jersey: Rutgers University Press, 1986); Andre Millard, *Edison and the Business of Innovation* (Baltimore: The John Hopkins University Press, 1990); and Matthew Josephson, *Edison: A Biography* (New York: John Wiley & Sons, Inc., [1959] 1992).

Activity 2: The Invention Process

Teachers must prepare for this activity ahead of time. It asks students to simulate a research and development team by working in much the same way Edison's employees did. Students work together in teams to design and produce a new vehicle meeting the criteria outlined in the Research Information section. It is through teamwork and problem solving that a new invention is made. Divide students into groups of five and have each group member take a specific role. Every team member has a role, and no team member may take on the role of another team member. Give each team 30-45 minutes to complete their invention, and then have each spokesperson present it to the rest of the class.

Student Roles:

Draftsperson will draw the plans for the team's invention. The plans should show two views of the invention.

Stockroom person will choose the proper materials from those available. Materials can be items in the classroom or things brought from home.

Model builder will construct a working model of the invention from the design agreed upon.

Advertiser will write a compelling descriptive paragraph on why people should

buy their team's invention.
Spokesperson will try to convince the class that their invention is the best by explaining the plans, demonstrating the invention using a ramp (a board about six feet long that can be propped against a desk in the front of the classroom), and reading aloud the materials prepared by the advertiser.

Research Information:

All of Edison's inventions started out with research. Since your time is short, we will provide some research results for you. Our hypothetical research has found that our society needs a new vehicle, because by the year 2010, students from the fourth grade on will be driving to school. Therefore, this vehicle must be operated easily by people too young to have a license to drive automobiles. It must be safe for you and your friends to use. Through our research we also found it must have the following:

1. An odd number of working wheels.
2. Between 10 and 20 parts.
3. Be able to travel down a ramp without breaking or falling apart.

Wrap Up:

After all vehicles have been built, described, and tested, hold a full class discussion on why students think some vehicles worked and some did not. Ask students what changes, if any, they would make in their inventions. What would their team do next to improve their invention? What do they think Edison would do next?

Activity 3: Researching the Local Community

Have students research their own communities to see how changes in technology and industry have altered the landscape. In what ways has the appearance of the community changed since it was first founded? Consider changes in buildings, businesses, transportation, and the surrounding countryside. How have inventions of Edison and others of his time (electric lights, cars, power and telephone lines, etc.) affected the community?

Students might also look at economic problems their community may be facing. Are the problems caused by the advance of technology and industry? Could these problems be solved by further scientific or technological advances? Libraries, local historical societies, and chambers of commerce are good sources for photographs, sketches, drawings, or paintings of the community as it changed over time. Have students complete the activity by producing a classroom or hallway display that shows these changes.

The Invention Factory--Supplementary Resources

The Invention Factory: Thomas Edison's Laboratories covers only part of the life of America's greatest inventors. Below are materials for further exploration of the subjects this lesson considers.

Edison Resources

Edison National Historic Site http://www.nps.gov/edis/

This unit of the National Park Service consists of Edison's research and development laboratory and his home, Glenmont. The park's web pages detail his history; its offerings include photographs, his 1,093 patents, and materials for teachers.

Library of Congress http://memory.loc.gov/ammem/mdbquery.html

The American Memory collection offers a wide variety of resources about Edison, including some of the earliest films his company produced. Start with the search engine, being sure to choose "Match this exact phrase" before you enter the topic you want to search.

National Archives

The Archives has placed on its web site Edison's patent application for the electric bulb and a petition he signed asking that the Chicago's World Fair be allowed to remain open on Sundays. To find them, visit the NAIL Digital Copies search engine, then enter "Edison."
http://www.nara.gov/cgi-bin/starfinder/0?path=images.txt&id=demo&pass=&OK=OK

The Thomas A. Edison Papers http://edison.rutgers.edu/taep.htm

The Edison Papers are a documentary editing project from Rutgers, the National Park Service, the Smithsonian, and the New Jersey Historical Commission. Its web site contains photographs, maps, a list of Edison's companies, and reference materials about his records.

AITLC Guide to Thomas Alva Edison http://tlc.ai.org/edison.htm

The ACCESS INDIANA Teaching & Learning Center has collected links for learning more about Edison's life through readings, through historic sites, and through other educational materials.

Adventures in CyberSound

Russell Naughton's on-line Ph.D. dissertation on the history of radio provides many resources about Edison. Among the most striking are excellent photographs of his inventions and audio clips of Edison reading "Mary Had a Little Lamb" and explaining the importance of the "Machine Era."

U.S. DEPARTMENT OF EDUCATION
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