# JOURNEY TO THE PAST



# JOURNEY TO THE PAST BACKGROUND INFORMATION FOR TEACHERS

Public Transportation — transportation that charges a set fare, runs on fixed routes, and is available to the public — began in New York City in 1827 with the introduction of the Omnibus, a carriage that could carry about twelve people and was pulled by a horse. Passengers climbed aboard through a back door and paid a fare of about twelve cents. The omnibuses primarily traveled below 14th street in Manhattan. They were slow and bumpy, and the fare was still high for many city residents. As the city grew, vehicles got bigger to accommodate more passengers, became faster by running on rails, and routes got longer as people moved further away from lower Manhattan.

Horses were by far the main source of power for moving people and goods through most of the nineteenth century. In New York City there were well over 150,000 working horses, all needing food, water and housing. In 1872 there was a horse flu that swept across the country and made millions of horses sick and unable to perform their duties. People realized that it did not make sense to rely on one form of power alone for transportation.

As the population in Manhattan spread to communities across the rivers in Brooklyn and The Bronx, and the City of New York consolidated the five boroughs in 1898, the need for reliable transportation grew. Technological advances allowed engineers to leave behind horse power in favor of steam and electricity. Public transportation like trolleys and elevated trains moved millions of people each day in and out of the heart of the city where jobs were concentrated, helping to strengthen the commercial and business life of the city, as well as develop outlying residential neighborhoods where people lived.

Consideration of an underground train system in New York City had started as early as the 1860s, and London opened the world's first subway in 1863. Alfred Ely Beach built and operated a pneumatic (air-powered) subway in lower Manhattan from 1870-1873, comprised of a block-long tunnel underneath Broadway between Warren Street and Murray Street, with one train car that was powered by a giant rotary blower known as the Western Tornado. For three years, Beach's invention moved people up and down the block to demonstrate the ideals of a pneumatic system and how smooth and gentle the ride was compared to the harsh realities of horsecars and omnibuses. Beach's Pneumatic Tube was popular in the three years it ran, with well over 400,000 riders. However, even though he was on the verge of signing a charter to expand his system, there was a financial crisis in 1873 which frightened potential investors and Beach had to abandon his plans.

In the late nineteenth century, New York City had the world's largest urban transport system – 94 miles of elevated railroads, 265 miles of horse-drawn railways (horsecars or streetcars) and 137 miles of horse-drawn omnibuses. As the first East River bridge opened in 1883, a cabledriven railway drew passengers over the Brooklyn Bridge making the connection between Manhattan and Brooklyn much easier and more convenient for the thousands of people who commuted each day.

By the 1890s, after a devastating winter storm known as the Great Blizzard of 1888, New York City formed the Rapid Transit Commission to oversee the creation of the first subway in New York. By 1900, construction had begun and in just 4 and a half years, in 1904, nine miles



of tunnels and tracks with 28 stations along the line were finished and opened. The subway, known as the Interborough Rapid Transit Company or IRT, was immensely popular from day one. Designed to carry about 400,000 riders per day, by 1908 the IRT averaged 800,000 per day, and the trains were at 'crush load'. In 1905 the IRT carried 3.6 million people per mile of track, and by 1914 this had increased to 9.5 million people per mile, more than any other system in the world. As a result, in 1905, the Rapid Transit Commission planned for 19 more subway lines, and about 165 miles of track running through four of the five boroughs (all but Staten Island). Some of the lines would connect to the existing subway and would therefore be operated by the IRT, but some would not connect and would be operated by another company, the BRT or Brooklyn Rapid Transit Company. The IRT, the BRT, and the RTC negotiated the Dual Contracts, signed in 1913, which allowed for shared construction and operation of a greatly expanded system. (After a devastating train accident in 1918, the BRT was reorganized as the BMT in 1923.)

By the 1920s the population in New York City had grown by millions, as immigrants arrived from all over the world to make a better life in America. Transportation struggled to keep up with passenger demand. A new subway system was proposed with two main purposes – faster service in established and populated neighborhoods, and to replace elevated routes with underground routes instead. The new system was called the Independent or IND, was owned and operated by New York City, and was in direct competition for riders with the IRT and the BMT. The first IND line to open in 1932 was the A line, running under 8th Avenue, stretching from 207th Street in Inwood down to Chambers Street in Lower Manhattan.

By 1940, both private transit companies were bankrupt. Having been constrained by the five-cent fare for their lifetimes, the IRT and BRT were bought out by New York City and all the subway lines then came under municipal control. Overseen by the Board of Transportation, after eight years the fare was raised to ten cents and ridership on all transit increased to record numbers. By 1953, the New York City Transit Authority assumed control of all city-owned bus lines, trolley lines, and subway routes. The fare went up again to fifteen cents, and vital repair and maintenance work began on the fifty-year old infrastructure.

In 1968 The New York State Legislature created the Metropolitan Transportation Authority (MTA) to oversee transportation operations in twelve counties. The MTA became New York City Transit's parent agency. Today, the MTA controls the subways and buses, some of the bridges and tunnels, Long Island Railroad, Metro North Railroad, Staten Island Railroad and it is responsible for construction projects called Capital Programs, such as the Second Avenue Subway, that improve transportation across the region.



# JOURNEY TO THE PAST PRE-VISIT



# **JOURNEY TO THE PAST** PRE-VISIT

## GRADE LEVELS: 1st – 3rd Grade

# **LEARNING STANDARDS** SOCIAL STUDIES: 1.2, 1.6, 1.7, 1.8, 1.9, 1.10, 2.1, 2.2, 2.5, 2.6, 2.7, 3.3 ELEMENTARY SCIENCE: STANDARD 7

# ESTIMATED TIME: One 45-60-minute period

### **PRE-VISIT OBJECTIVES**

- Students will look closely at archival images of New York City and will compare an image of the past with one from the present
- Students will understand the difference between private transportation and public transportation
- Students will use critical thinking skills to explore how transportation changed over time
- Students will use their imaginations to write a short story about riding in a horsecar.

#### MATERIALS

- Image 1. The Bowery, 1896
- Image 2. Survey photograph of E. 149th Street, 1903
- Image 3. Last Day of Bleecker Street Horsecar Line, July 26, 1917
- Image 4. All-Electric local bus outside MTA Headquarters, 2018
- Story-writing sheet
- Pencils

**ESSENTIAL QUESTION** How has public transportation changed over time to meet the changing needs of the city?



### **INTRODUCTORY DISCUSSION** (10 minutes)

- A long time ago New York City was very different from today. As we Journey to the Past we will learn about transportation long ago and how it helped the city grow.
- Ask the students about how they traveled to school today. Likely lots of students walk to school, so they can also share other modes of transportation they saw on their walk.
- As the students respond, make a list of the vehicles they noticed on chart paper or the board, and start a discussion about the difference between private transportation, such as a family car, and public transportation, which can be defined as transportation that usually runs on a fixed route, with a fixed schedule, carrying many people at once. Public transportation in New York City began long before the subway opened in 1904.
- Ask the students what kinds of transportation might have carried people long ago, before subways and buses? Have students share their ideas.
- In the past, horses were the main source of power for transportation in New York City, moving people and goods in coaches and wagons. In the late 1800s there were nearly 200,000 working horses in the city. Can you imagine how the city sounded and smelled?.

#### TRANSITION TO ACTIVITY (1 minute)

- As the city grew, people moved to New York and there was a need to move more people greater distances around the city. Streets were crowded, so tracks for trains were built high up above the streets. These were called elevated trains, and they used small steam engines to pull passenger cars.
- We are going to look at two photographs of New York City long ago and talk about what we notice.

#### ACTIVITY 1: Historic Photograph Discussion (10 minutes)

This activity can be done with a projected image, or at tables with printed images. Students will look at archival images of:

- 1. The Bowery, 1896
- 2. Survey photograph of E.149th St, 1903

Encourage students to look closely and respond to what they notice, then ask the following questions. Each response can be paraphrased and connected to other students' responses to build group learning. Share background information as it is relevant to the students' comments or questions.

- What is happening in this photograph?
- What kinds of activities are people engaged in?
- · Describe the buildings in the image
- Describe the different modes of transportation that you see
- Imagine you are in the photograph, standing in the street what do you imagine you would smell and hear?
- Think about New York City today How is this street different from the streets you see and travel every day?
- The image of E.149th St. was taken as the city began to build the subway. This was a big and important project, so the city decided to photograph what the streets looked like before, during construction, and after the subway opened, so they could see how it affected the buildings, streets, and traffic. These photographs recorded what life was like, showing people, buildings, and transportation.



#### **TRANSITION TO ACTIVITY** (1 minute)

- It helps to see change over time when you see images of the same place or object from different time periods, side by side.
- We are now going to look closely at two more images, one from one hundred years ago and one from today.

#### ACTIVITY 2: Image Discussion and Writing Activity (20 minutes)

- Pass out sets of two photographs, one from the past (*Last Day of Bleecker Street Horsecar Line, July 26, 1917*) and one from today (*All-Electric local bus outside MTA Headquarters, 2018*) to each table.
- Encourage the students to share with the person next to them what they notice in the images, especially things that are the same or different.
- Ask the students to think about why some things may have changed and others did not.
- Give the students five minutes to discuss the images at tables, pairs, or in small groups. Ask one or two students to share some of their observations.
- Instruct students to look again at the *Last Day of Bleecker Street Horsecar Line, July 26, 1917* image and imagine the full story of what might happen before or after the image was taken.
- After they have had a few moments to think, they can start to write a 'And then what happened?' short story about riding on this horsecar. Hand out the story sheets to each student. Before they begin writing, read aloud the prompt at the top of the worksheet.

#### WRAP-UP/CONCLUSION (3 minutes)

• Students can share their 'And then what happened?' stories with the class.



# JOURNEY TO THE PAST PRE-VISIT IMAGES







#### The Bowery, 1896

The Third Avenue Elevated line opened in 1878 and ran from Chatham Square in Lower Manhattan to Gun Hill Road in the Bronx. Elevated trains spurred the growth and development of the city in the 19th-century, providing the first rapid transit that moved nearly twice as fast as any vehicle on the street. Developers followed these elevated tracks as they snaked their way up Manhattan, creating retail, entertainment, and residential districts. Though the 'Els' were the quickest ways to traverse the island until the subway opened, their infrastructure got in the way as more and more motor vehicles arrived on the streets. And elevated trains couldn't operate well during inclement winter weather. Eventually, all elevated lines in Manhattan were removed, with the Third Avenue El being the last one to go in 1955, though it lasted until 1973 in the Bronx.







#### Survey photograph of E. 149th Street, 1903

The first subway line was known as the IRT or Interborough Rapid Transit. The first part of the line opened in October of 1904 and ran from City Hall in Lower Manhattan to 145th St in Harlem. Because the population of New York City continued to increase, almost as soon as the IRT opened the decision was made to expand public transportation of all kinds throughout the five boroughs. This would help distribute the population and provide a way for residents to move quickly throughout the city. The IRT planned to expand under the Harlem River and into the Bronx, providing rapid transit to the growing population as this area developed. The East 149th street station opened in 1919, spurring the growth and modernization of the surrounding neighborhood.







#### Last Day of Bleecker Street Horsecar Line, July 26, 1917

Horse-drawn vehicles were the mainstay of transportation for most of the 19th century. Omnibuses were the first public transportation in New York City and were comprised of wooden wagons pulled by one horse. They could carry about twelve people and did not meet the demand of the growing population as they city expanded beyond Lower Manhattan. Transportation experts decided to make the vehicles larger, and embedded rails in the street for the wheels which provided a smoother and quicker ride than before. Eventually a cleaner, faster and more modern mode of power, an electric motor, was invented and trolleys took over the streets, replacing horse-drawn lines across the city.







#### All-Electric local bus outside MTA Headquarters, 2018

Motor buses have been traversing the streets on New York since 1907. Double decker buses traveled up and down the major avenues in Manhattan, offering their passengers a much quieter and more comfortable ride than they were used to. Because they were not confined to tracks in the middle of the street like the trolleys, they were safer for passengers to board and alight at the curb, and they could go on any street the route called for. Today, New York City has the largest and greenest bus fleet in the country. In 2018, the MTA introduced a limited number of all-electric buses that produce zero emissions and plan to provide more in the coming years.



### AND THEN WHAT HAPPENED....

It was a windy morning in New York City. I was on my way to school, but I was late! I decided I needed to go faster than I could go on my own two feet, so I stopped to see if a horsecar was coming and searched in my pocket for 5 cents to pay the fare. Before too long, I heard the familar sound of horse's hooves clip-clopping on the cobblestone street and I stretched out my hand to let the driver know I wanted him to stop. And then...

#### What happened next?

(Think about what you could hear, smell and see from the horsecar. Think about who else was riding and what the conductor and driver were doing. Did you get to school in time?)



# JOURNEY TO THE PAST POST VISIT



# **JOURNEY TO THE PAST** POST VISIT

## **GRADE LEVELS:** 1st – 3rd Grade

LEARNING STANDARDS: Please see Pre-Visit materials

## ESTIMATED TIME: One 45-60-minute period

## **POST-VISIT OBJECTIVES**

- Students will examine images of real inventions and use observation and critical thinking skills to consider why they were invented and how they worked
- Students will share ideas and build knowledge by listening and participating in group discussions
- Students will use their imaginations to design a train of the future

### MATERIALS

- Image 1. Alfred E Beach Pneumatic Railway Patent
- Image 2. Beach Pneumatic Railway car interior
- Image 3. The Blowing Bowler Subway Car Card and Video, Red Nose Studios
- Image 4. Ralph Briney Station Indicator Invention, 1938
- Image 5. Henry Swift Patent, 1927
- Image 6. R211 Subway Car Prototype
- Construction paper
- Markers, crayons or other coloring materials

#### **ESSENTIAL QUESTION**

How has public transportation changed over time to meet the changing needs of the city?



#### **INTRODUCTORY DISCUSSION** (5 minutes)

- What do students remember about their visit to the Museum?
- Can you remember a story that you heard?
- Did you have a favorite vehicle that you saw? Why?
- Transportation and the city have changed over time. Many changes have been a response to a problem to make things better.
- The city built tunnels for trains because the streets were too crowded and to protect people and vehicles from bad weather
- Tunnels were built under the river because there weren't enough bridges to carry all the trains.

#### TRANSITION TO ACTIVITY (1 minute)

Some people who fix problems are called inventors and they invent all kinds of things to make life better. When people invent something, like a lightbulb or a television, they draw a picture of their invention and write a description of what it does and how it works.

### ACTIVITY 1: Image Discussion – Early Underground Railway (10 minutes)

- Show the image of the Beach Pneumatic Railway patent to the students, either projected or copies.
- This is a drawing of an invention from the 1860s.
  - What do you notice in this image?
  - Does it look like something you've seen before? Why or why not?
- Let the discussion build, paraphrase and connect answers to encourage group learning
- Share background information as it is relevant to students' observations and questions:
  - Alfred Ely Beach invented The Beach Pneumatic Railway. It was a train car moved through a tunnel by air created by a giant fan. It was built in the 1870s underneath one block of Broadway in Manhattan, and was the first underground train in the country. At the time, people thought it was amazing that a tunnel could be built under the street without the street collapsing, and that a fan could move a train car.
- Show Image 2, the illustration of the of the Beach pneumatic subway car, and let the students know that this is what it looked like after it was made.
- Share the video, *The Blowing Bowler* by Red Nose Studios. It shows subway trains through time, starting with Beach's train car.

- What did you notice? How did the trains change over time?



#### **TRANSITION TO ACTIVITY** (1 minute)

- Share with students that they will examine images of two other ideas that people had to help make transportation in better in New York City.
- Ask students to turn and talk to their neighbor and tell them one thing they notice.

#### ACTIVITY 2: Transportation Inventions (7 minutes)

- One invention was an above-ground train, on elevated tracks, hanging from an overhead rail. The other invention was a sign inside a train car to help people see what the next stop would be. Think about these questions as you are looking:
  - Have you seen anything like these inventions anywhere?
  - In what ways could these inventions help people get around the city?
- Hand out the images of the Briney invention and the Swift invention and ask students to look quietly.
- Ask students to share something they noticed about the inventions and share background information as it is relevant.
- Collect the images.

#### TRANSITION TO ACTIVITY (1 minute)

- It is now the students' turn to be a problem solver or an inventor
- Have you ever invented anything before? Were you trying to solve a problem?
- What are some steps that inventors might have to take before they make their inventions?

#### ACTIVITY 3: Invent Your Own Subway Cars of the Future (20 minutes)

- Hand out copies of the image of the R211 subway car for students to look at individually, in pairs, or in groups.
- Often, inventors must test their invention many times before it is just right. When the MTA gets new subway cars they are tested, and changes are made to the design before they are built. Show students the image of the new subway car design, the R211.
- Think about the future and what subway trains might look like in 20 years. How could they be better? What would you want them to look like or do?
- Hand out drawing supplies. Ask students to turn their ideas into a drawing and make a colorful poster with the name of their invented subway car and a detailed drawing.
- Invite one or two students to share their inventions with the class.

#### WRAP-UP/CONCLUSION (5 minutes)

- Early transportation like horsecars and omnibuses worked well 150 years ago but do not meet the city's needs today. Perhaps the trains and buses we have today won't work well in the future.
- Encourage the students to go on a gallery walk through the classroom to see everyone's inventions.



# JOURNEY TO THE PAST POST VISIT IMAGES



A.E.Beach, Prezimatic Railway, Patented Nov.5, 1867. No.70, 504,

Jig. 1.

Fig. 4. Fig. 3. Jig. 2. 7 Inventor. Mitnesses, Ely Beach.

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#### Alfred E. Beach Pneumatic Railway Patent

Alfred Ely Beach was an inventor who developed an idea for an underground passenger railway for New York City in the 1860s and 70s. He was inspired by railways in Europe that used pneumatic power to move trains, instead of steam engines. He believed that he could design a pneumatically powered subway system for his city that was becoming more crowded with people. Though he was unable to garner the support of the politicians of Tammany Hall, he hired his own laborers and, using a special building tool called a shield, was able to construct a 312-foot tunnel underneath Broadway along City Hall Park. The station, in the basement level of Devlin's Department Store, was made more inviting with a pianist, fish pond, and decorations on the walls. Those who were curious and brave enough to try out Beach's train were thrilled not only by the very short but smooth glide under Broadway in a well-appointed, wooden car, but also with the giant rotary fan that generated enough air power to move the train along the tracks. The Beach Pneumatic Railway was in operation from 1870-1873. Unfortunately, there was a financial crash in 1873 before Beach could secure permits and funding to extend his tunnels.







#### Beach Pneumatic Railway Car Interior

An illustration of the inside of the Beach Pneumatic Railway car, with wood-paneled walls, windows, leather seats, and oil lamps.







#### The Blowing Bowler, Red Nose Studios

In 2016, Red Nose Studios was commissioned by MTA Arts & Design to create an Art Card for subway cars and a short, animated film inspired by the history of the subway, from the Beach Pneumatic Railway to modern cars through 2016. They eventually turned this idea into a children's book called *The Secret Subway*.

The art card pays tribute to both the past and the future of the subway as our hero chases his elusive blowing bowler across the platform and into the future as Alfred Beach encourages him forward. The animation follows a man as he chases after his wind-tossed bowler hat in a subway. While pursuing the hat, "a progression of subway cars rolls by representing designs from the Beach Pneumatic Transit Company (1870s), Interborough Rapid Transit Company (1910s), a second-generation R-10 car (1940s), an R-15 car (1950s), a car from the 1970s State of the Art Car Program (SOAC), and a more recent R-188 subway car (2013)."

Video: http://www.rednosestudio.com/the-blowing-bowler







#### Ralph Briney Station Indicator Invention, 1938

An invention called a Station Indicator was presented to the Board of Transportation in 1938 by a man named Ralph Briney. He thought that his sign, which automatically showed the name of the next station stop, would help prevent passengers from missing their stops or rushing to the doors at the last minute, which often caused delays as passengers held doors open. He envisioned that his sign would hang in the middle of the train or trolley car, with the name on both sides for ease of viewing.





This invention provides a single rail on each side o the street supported by crossbeams at suitable intervals. These extend across and above the sidewalks and rest on columns at the curb and are secured in the street line at the other end. To short pillars dropped from the ends of these crossbeams are attached the rails having parallel tracks upon each side upon which the wheels of the trucks from which the cars are suspended may run and are electri cally driven. This construction is less expensive than a subway, is more simple, and will not interfere with syste already in use. Passengers travel in the open, and light and air are freely admitted to the buildings on each side The loading platforms are above the sidewalks and may be continued as second-story sidewalks, doubling the capacit of the street and permitting access to stores and dwellin on the second floor. There is no cumbersome overhead structure across the street, such as is associated with t elevated railways of the present time, and there is less noise and dirt.



#### Henry Swift Patent, 1927

In 1927 Henry Swift submitted his idea for a monorail to the Board of Transportation. His monorail would have a sidewalk on the second-story level where passengers could board the train, which he envisioned would help alleviate crowding on the streets while at the same time providing second-story access to apartments and stores. He proposed fitting overhead wheels with rubber tires to provide transportation that was quieter than the existing elevated trains, and at the same time creating trains that would eliminate steel dust (small particles of steel in the air caused by the metal train wheels running over metal rails).







#### R211 Subway Car Prototype

The New Technology R211 cars feature 58-inch door spans, which are eight inches wider than standard doors on existing cars. The expanded doors are designed to decrease customer boarding times to expedite train movement by reducing the amount of time trains dwell in stations. This will help reduce delays, especially during congested rush hours. The cars will also include digital displays and signage that provide real-time information about service and stations, new grab rails including double-poles, brighter lighting, and safety graphics. But the most notable change to the R211 design is the "open gangway" pilot program. This open design features soft accordionlike walls, and allows riders to move freely between cars to reduce crowding and distribute passenger loads more evenly throughout the train.



# JOURNEY TO THE PAST LEARNING STANDARDS



# **JOURNEY TO THE PAST** LEARNING STANDARDS

# **GRADE LEVELS:** 1st – 3rd Grade

### Social Studies

#### 1st

- 1.2 There are significant individuals, historical events, and symbols that are important to American cultural identity
- 1.6 People and communities depend on and modify their physical environment
- 1.7 Families have a past and change over time. There are different types of documents that relate family histories.
- 1.8 Historical sources reveal information about how life in the past differs from the present
- 1.9 Communities meet people's needs; People use tolls, science and technology to meet their needs
- 1.10 b, C People in the community have different jobs; Community workers use tools and resources to provide services in a community; Community workers are diverse and work with one another

## 2nd

- 2.1 a, b, C, d Population density and use of the land distinguish types of communities; Types of transportation in rural and urban communities may be different; New York City as an Urban Community
- 2.2 Communities are diverse
- 2.5 a, b, C Geography and natural resources shape where and how urban, suburban and rural communities develop and how they sustain themselves. Influence of physical features on the development of different communities.
- 2.6 a, b Identifying continuities and changes over time can help understand historical developments
- 2.7 a New York City changed and grew during the 1700s, 1800s and 1900s
- 3rd
- 3.3 Geographic factors influence where people settle and form communities. People adapt to and modify their environment in different ways to meet their needs

# Elementary Science Core Curriculum

# Standard 7 / Connections

The knowledge and skills of mathematics, science and technology are used together to make informed decisions and solve problems, especially those relating to issues of science/technology/ society, consumer decision making, design and inquiry into phenomena



# JOURNEY TO THE PAST

RESOURCES + GLOSSARY OF TERMS



# JOURNEY TO THE PAST RECOMMENDED RESOURCES

### **CHILDREN'S BOOKS**

A Subway for New York by David Weitzman Lost in NYC: A Subway Adventure by Nadja Spiegelman If You Lived 100 Years Ago by Ann McGovern The Secret Subway by Shana Corey & Red Nose Studio

### **RESOURCE BOOKS**

*The City Beneath Us: Building the New York Subways* by New York Transit Museum with Vivian Heller

## VIDEOS

https://archive.org/details/What\_Happened\_1901 https://archive.org/details/NewYorkCityInABlizzard https://archive.org/details/Arteries1941 (particularly 3:01-4:53)



# **JOURNEY TO THE PAST** GLOSSARY OF TERMS

Bus Operator - the person who drives the bus

**Compressed Air** - air that has been compressed to a pressure higher than atmospheric pressure

**Construction** – the building of something, typically a large structure

Elevated Train – trains that run on elevated tracks above the streets

**Horsecar** – a surface vehicle that rides on rails embedded in the street, pulled by one or two horses

**Immigrant**– a person who moves from one country to another country to live permanently

Innovation – a new method, idea or product

**Invention** - something newly designed or created, or the activity of designing or creating a new thing

**Monorail** – a railroad in which the track consists of a single rail, usually elevated, with the trains suspended from it or balancing on it

**Prototype** – a first model of something, especially a machine, from which other forms are developed or copied

**Public Transportation** – Transportation that runs on a fixed schedule, has a fixed route and is for many people

Omnibus - a wooden wagon pulled by a horse

**Rapid Transit** – a form of high-speed urban passenger transportation such as a subway or elevated railroad system

Streetcar - a surface vehicle that rides on rails embedded in the street

Sandhog – a person who works underground constructing tunnels

**Subway** – an underground electric railway (in New York City we refer to the whole system as the subway even though about 40% of the system is above the ground)

**Train Conductor** – the person who opens and closes the doors and makes announcements on the train

Train Operator - the person who drives or operates the train

**Trolley** – a surface vehicle that runs on rails embedded in the street, powered by electricity, either from overhead wires or an underground conduit

**Tunnel Boring Machine** - also known as a "mole", is a machine used to excavate tunnels. They can bore through anything from hard rock to sand, and can build tunnels big and small

