

## Museum Challenge

### Grade Levels:

Grades 3-4

### Concepts:

Communities Change over Time

Transportation Changes over Time

The Way People Work Changes over Time

### Objectives:

Students will explore how developments in transportation affected the city of Newark's growth and the state of Ohio. Students will explore how labor changed from a cottage system to a factory system during the Industrial Revolution.

### Ohio's New Learning Standards:

Grade Three

Theme: Communities: Past and Present, Near and Far

The local community serves as the focal point for third grade as students begin to understand how their communities have changed over time and to make comparisons with communities in other places. The study of local history comes alive through the use of artifacts and documents. They also learn how communities are governed and how the local economy is organized.

History Strand:

2. Primary sources such as artifacts, maps, and photographs can be used to show change over time.
3. Local communities change over time.

Grade Four

Theme: Ohio in the United States

The fourth-grade year focuses on the early development of Ohio and the United States. Students must learn about the history, geography, government, and economy of their state and nation. Foundations of U.S. history are laid as students study prehistoric Ohio cultures, early America life, the U.S. Constitution, and the development and growth of Ohio and the United States. Students begin to understand how ideas and events from the past have shaped Ohio and the United States today.

### Building Prior Knowledge:

Educational programs at The Works are designed to support classroom instruction. The following information is the factual basis of the Museum Challenge tour. Your visit at The Works will be brief; we cannot teach all we wish. This information is provided for your convenience and for your students' benefit.

## Transportation

1. **Canal Lock #9.** Licking County's first settlers in the late 1700's discovered three valuable resources in abundance: trees, rivers, and soil. They used the trees for shelters and other buildings. They used the rivers and streams to power, first, saw and later, grist mills. The soil was excellent for growing crops such as corn and wheat. More settlers were attracted to the area and Newark was platted in 1802. Newark and Licking County was an agriculturally dependent economy, people either farmed or sold items to farmers. Despite the ability of the area to grow plentiful crops, the economy was depressed. The existing roads in and out of Newark were few and poor. This was the case throughout Ohio. Newark, Licking County, and the state of Ohio could simply grow more crops than they could ever get to market. The solution to the problem was a canal system that would connect Lake Erie to the Ohio River. On July 4, 1825 ground for the Ohio & Erie Canal was broken just south of Newark at Licking Summit. Upon its completion the Ohio & Erie Canal ran 308 miles between Cleveland and Portsmouth, 23 miles of it through Licking County. In 1830, the first canal boat from Cleveland arrived in Newark- and it changed everything. By 1831, Newark wheat was being sold in Massillon- one hundred miles away! People and goods could now move within and without the state. With the ability to sell crops at bigger and more distant markets, Licking County's farmers flourished. Manufacturers such as Scheidler Machine Works and Simpson's Soap Factory built factories on the edge of the canal; raw material could come in and finished products be shipped out. A service industry; restaurants, hotels, dance halls, and saloons, sprung up along the canal as well. Newark's population in 1825 was 1,000 people. By 1840, it had nearly tripled to 2,700. The canal was the technological feat of its day. In addition to digging 308 miles of ditch, workers also built 153 stone culverts, 146 sandstone locks, 14 aqueducts, 14 dams, 2 reservoirs, and numerous feeder canals. Before you is a lock made from sandstone quarried at Blackhand Gorge. Locks worked similar to an elevator to move horse or mule pulled boats from one elevation to another. A key piece of technology within this lock is the mitre gate. This is Lock #9, it was a toll lock. The red house beside it is the Lockmaster's House, it was built around 1830. It was the lockmaster's responsibility to collect the toll and manually operate the gates for boats to "lock through".

Canals had their problems too. They were slow travel. There was a speed limit of 4 miles per hour and each lock took 10-15 minutes to pass through. They froze in the winter and flooded during thaws or heavy rains. They were costly to maintain and repair.

The advent of the railroad led to the canal's demise; by 1900 the canal was not relevant to Newark's transportation any longer.

2. **Baltimore & Ohio Railroad Yard.** The canal system in Ohio was most beneficial to those communities that were located on or near the canals. That left many communities without an effective means of transportation for goods and people. Early advocates promoted rail as a means to connect those communities to the canal system. Those advocates also recognized that the canals were primarily north and south routes and envisioned railroads as east and west routes. Support of railroads appeared in Ohio as early as the 1820's but little construction occurred until the 1840's. The construction of the canal system nearly bankrupted the state of Ohio; citizens were reluctant to support, and invest in, what some considered an unsafe form of transportation. Opinions quickly changed though. In 1840 a mere forty miles of railroad track existed within the state. During the 1850's, 2,571 miles of track were laid in Ohio. By the early 1850's, the Sandusky, Mansfield, & Newark Railroad and the

Central Ohio Railroad were both operating in the county. The Steubenville and Indiana Railroad Company completed a rail line from Newark through Coshocton to Steubenville in 1855. After the Civil War (1865), that line became part of the Panhandle Line which connected Pittsburgh, Cincinnati, Chicago, and St. Louis. In 1880, the Pennsylvania Railroad leased the Panhandle Line and built a new passenger depot and freight house in Newark (which still stands today).

In 1866, the Baltimore & Ohio leased the Central Ohio RR. In 1873, B&O constructed the “most extensive car shops to be found in the west” in Newark. The rail yard employed 800 men and attracted other manufacturers to Newark. By 1875, the B&O had taken control of the Sandusky, Mansfield, & Newark RR and the Newark, Somerset, & Straightsville RR. These acquisitions made the B&O one of the largest railroads in the nation connecting the cities of Baltimore, Maryland and Chicago, Illinois for the first time.

During the first half of the 1900’s an average of 90 freight and 25 passenger trains passed through Newark daily. The B&O RR was fast reliable transportation that allowed people to travel between cities and goods to be sold in distant markets. As with the earlier canals, Newark economy and population grew because of the railroads. Railroad dominated American transportation until the end of World War II. On June 30, 1961 the last B&O passenger train left Newark. On March 3, 1985 the last B&O train to originate from Newark left the yard.

- 3. The National Road.** By the early 1800’s Ohio had become a settled area but travel from eastern cities (New York, Boston, Baltimore) was difficult. The Appalachian Mountains were a formidable obstruction between Ohio and the eastern seaboard. Travel by river was unreliable and sometimes dangerous. In 1806, President Thomas Jefferson signed a Congressional act authorizing the construction of a national road that would connect Cumberland, Maryland to the Ohio River. Construction on the road began in 1811 and reached Wheeling, Virginia (now West Virginia) in 1818. The National Road was the first paved (macadam) road to cross the Appalachian Mountains. The National Road was later extended across Ohio and Indiana and ended at Vandalia, Illinois in 1840. The new 700 mile road opened the west for settlement and the movement of goods. Many villages and towns were established along the Road and many local roads were built to connect even more communities to the Road.

The National Road passed through the towns of Brownsville, Hebron, and Kirkersville in southern Licking County. By 1833, thousands of wagons, carriages, and herds of livestock all shared the road as they travelled. In the early 1900’s traffic on the Road was changing from horses to automobiles. By 1932, asphalt was applied to most of the National Road which had been designated as US 40 by then. The construction of Interstate 70 (1956) across Ohio approximately follows the same route as US 40. Interstate 70 removed much of the traffic off of US 40.

The automobile and trucking led to the decline of the American railroad system. During the 1940’s the nation’s best roads were two lanes. The 1944 Federal Highway Act called for a national system of interstate highways. The highway administration mapped out 40,000 miles of interstate.

During the four years of World War II (1941-45), the US government froze American car manufacturing for civilians; those factories were used to produce cars for the military, tanks, and even aircraft engines. It was 1946 before any American cars were back in production. By that time, Americans were ready to replace their aging cars.

During the war, the Army needed to move large numbers of troops and supplies. Larger and better trucks with larger, more capable diesel engines were designed and built in American factories that had been producing trucks for civilian use. When the war ended, what these manufacturers had learned propelled the trucking industry forward.

The refrigerated trailer also played a large role in expanding the trucking industry. By 1941, designs were patented for a shock resistant refrigeration unit that would be mounted on the trailer. After World War II,

refrigerated trucks meant that a local farmer's market expanded beyond the 50 miles around his farm.

Refrigerated trucks not only changed that but also spawned the frozen food industry.

An improved system of highways, new trucking technology, and an appetite for the automobile once again changed how people and goods moved in America.

- Lake Shore Electric Railway Interurban Railcar No. 174.** An interurban was a single motorized railcar that carried passengers between cities (word study: inter=between, urban=city). Ohio had an extensive network of interurban lines that connected many cities within the state. A line ran from Columbus through small towns such as Hebron to Newark with a side spur to Buckeye Lake where an amusement park used to stand. Interurban systems were popular throughout the region (New York, Pennsylvania, Ohio, Indiana, Illinois, and Wisconsin). In fact, the first interurban line in the United States connected Newark to Granville. Interurban cars were popular from about 1890 until 1939, enjoying the height of their success in the 1920's. Interurban railcars filled an important gap in transportation history. By the late 1800's, the canal system was in decline and we were still some years away from the automobile. Trains were popular but they often bypassed smaller communities to connect larger cities such as Columbus and Chicago. Interurban railcars provided a fast, convenient, and inexpensive method of transportation from city to city. The automobile ultimately led to the interurban railcar's demise. Between the years 1908 and 1927 the Ford Motor Company built 15 million Model T cars. As more people drove there was less demand for the interurban. Additionally, intercity bus lines such as Greyhound were established in the 1920's and also contributed to the interurban railcar's end. The Lake Shore Electric Railway Company was an interurban electric trolley that ran between Cleveland, Lorain, Sandusky, Norwalk, Fremont, Toledo, and Detroit. The Lake Shore Electric began through service from Cleveland to Toledo in December 1901. By 1907, the line operated 114 cars and carried over one million passengers. The last car from Lake Shore electric ran from Cleveland to Lorain in 1938. Railcar No. 174 was built here in Newark. In 1897, the Jewett Car Company relocated from Jewett, Ohio to Newark to build a larger facility. By 1900, the new facility was in full production and by the end of the year 118 interurban cars were produced in Newark. The company continued to grow, employing 600 workers at its peak, and produced an average of one car a day. Several factors, including the decline of the US economy as World War I began in Europe, caused Jewett to file bankruptcy in 1918.

## Industry

Most products people in industrialized nations use today are turned out quickly through the process of mass production, by people (and, sometimes, robots) working on assembly lines. It has not always been this way however. There was a time people had to spend long, tedious hours of hand labor to produce even the simplest objects.

"Cottage Industry" is a term used to describe a home-based system of manufacturing. Rural families were some of the first involved in cottage industries. They added to their agricultural income by making products at home. Merchants provided raw materials to the families, collected and marketed the finished product, and then paid the family a percentage of the price paid to the end customer.

The Industrial Revolution was a period from approximately 1750 to the late 1800's in which machines changed people's way of life as well as their method of manufacture. It began in the textile industry of Great Britain and spread to Europe and North America, not only changing manufacturing but agriculture, transportation, and mining as well.

The changes that brought about the Industrial Revolution were:

1. The invention of machines to do the work of hand tools
2. The use of steam in place of human or animal muscle
3. The adoption of the factory system

In the Land of Legend Shops we have several good examples of cottage industries:

1. **Spinning, Weaving & Quilt Shop:** Sheep to quilt was a labor intensive process. The sheep was sheared, the wool carded, dyed, spun, and loomed. This took hours of labor. Remember that the Industrial Revolution began in textiles? The invention of the flying shuttle enabled a weaver to produce more textiles in less time. The increased production due to the flying shuttle demanded more yarn. The invention of the spinning jenny allowed a single worker to produce 8 or more spools of yarn at once. The power loom (powered by a line shaft) utilized steam instead of human muscle to weave. Production of textiles was faster and easier than ever before.
2. **Cabinet Making & Woodworking:** Here is another example of a cottage industry. Look at all the hand tools. It took a lot of human muscle and patience to make something of wood. Take notice of the treadle lathe and the hand powered drill press.

Now let's take a look at our line shaft system:

1. A line shaft system such as this existed within this building when it was a factory. You are standing in what was once the Scheidler Machine Works. Reinhard Scheidler opened this factory in 1882 and manufactured portable and stationary steam engines and saw mills. The steam engines he made were used primarily for agricultural purposes; downstairs you can see a restored Scheidler steam engine that was manufactured here in 1901. I can think of no better example of the Industrial Revolution than a factory that used a steam engine and line shaft system to make more steam engines!
2. Before small electric motors existed to power individual machines, factories relied on line shaft systems to power machines. A large central power source, such as a steam engine, powered the central line shaft you see above us. The central shaft turned each pulley and leather belt which in turn powered each machine. The line shaft system was an important part of the Industrial Revolution.
3. Remember that treadle lathe and hand powered drill press? Take a look at this lathe and drill press. You can certainly turn more wood and drill more holes with these machines than what you saw in the Cabinet Making and Woodworking Shop.
4. This is also an example of the factory system (that replaced cottage industries). The factory system is characterized by a large workforce of unskilled labor, a central work location, and machinery. A factory is able to produce more and in less time. The finished products are generally more uniform and consistent.

## **Classroom Connections:**

Investigate these words and phrases in your classroom before visiting The Works:

community	labor	Factory System
infrastructure	economy	mass production
agriculture	Industrial Revolution	workforce
industry	Cottage Industry	interchangeable parts

### **Literacy Links:**

Millard, A. (1998). *A street through time*. NY: DK Publishing.

Mitchell, D. (2010). *Driven: a photobiography of Henry Ford*. Washington DC: National Geographic Society.

Nelson, R. (2003). *Transportation then and now*. MN: Lerner Publications.

Paulsen, G. (1998). *The tortilla factory*. NY: Voyager Books.

Spengler, K. (2011). *An illustrated timeline of transportation*. MN: Picture Window Books.

### **Extensions at The Works:**

Learn more about steam engines and the Scheidler Machine Works.

Explore exhibits dedicated to Newark's manufacturing heritage.

Ohio & Erie Canal Lock #9

Lakeshore Electric Railway Interurban Car No. 174

### **Additional Resources:**

Ohio History Central: Transportation

(<http://www.ohiohistorycentral.org/topic.php?nm=transportation&rec=21>)

The Henry Ford Museum (<http://www.hfmgv.org>)

American Historical Association: Careers for Students of History

(<http://www.historians.org/pubs/careers/Introduction.htm>)

Licking County Library: Genealogy & Local History (<http://www.lickingcountylibrary.info/history.aspx>)

The Library of Congress presents America's Story (<http://www.americaslibrary.gov/index.html>)

### **Museum Challenge: Pre-visit**

**The Importance of Transportation Systems**

Have students work in groups of five or six and use their textbooks to create a time line or illustrated map of the nation's transportation history. Then to help students understand the impact of transportation on their own community, have each group research one local transportation route or transportation system. This could be a major interstate highway, local airport, subway system, ferry port, or train station. They might compare the community's economy before and after the transportation system was built, describe new businesses brought to the area, and list the types of goods exported via this transportation route. To gather information on how their regional transportation systems evolved, students might contact a local transportation office, use newspaper archives, research collections at local historical societies, or conduct interviews with area residents.

The group should use their findings to create a local time line or map for the transportation history of their community and compare it with the time line or map they prepared for the national system. Have them note the relationships between the two time lines or maps and determine if their community's transportation system differed in any way from national developments. If there are significant differences, have students research why that was the case. Have the groups make presentations describing their projects, and use those presentations as the basis for class discussion.

-National Park Service (<http://www.cr.nps.gov/nr/twhp/wwwlps/lessons/41ohio/41ohio.htm>)

### **Cottage Industry and Factory Systems**

As a class, watch these short videos of two very different ways in which to make glass bottles.

The first is from the University of Louisville, the artist produces one bottle in about ten minutes.

<http://www.youtube.com/watch?v=9un4WXrnljo>

The second is a sixteen second clip of an automated machine making bottles.

<http://www.youtube.com/watch?v=RgTIMf4O620&feature=fvwp&NR=1>

As a class, discuss the pros and cons of each method.

EX: The artist produces a bottle of much better quality but at a much slower rate.

### **As a City Goes**

As a City Goes is a Gear Box available for rental from The Works. The Gear Box is a collection of historical documents, artifacts, and objects designed to supplement and enhance student learning



within the classroom. The collection allows students to not only learn of history but to also interact with history. The focus of As a City Goes is transportation and industry in Licking County. It begins with a look at the natural resources the county offered its first residents and what industries grew out of those resources. It examines the history and impact of the Ohio and Erie Canal, railroads, and National Road within Ohio and Licking County. Individually the stories of transportation and industry are fascinating; together they tell the story of growth, innovation, and prosperity. As a City Goes is a perfect choice for use within the classroom in the weeks prior to participating in Museum Challenge. Contact Craig Montgomery, History Educator, for rental information at 740-349-9277 ext: 228 or [craigmontgomery@attheworks.org](mailto:craigmontgomery@attheworks.org).

### **Museum Challenge: Post-Visit**

The Industrial Revolution brought about many changes to the way people work. There were many unforeseen consequences as well. These issues are worthy of group or individual research projects.

Written, oral, or even artistic presentations may be developed based on the research. A few of the negative consequences were:

- Exploitation of labor
- Children's labor
- Unsafe working conditions
- Pollution
- Exploitation of the earth for coal
- Rapid unplanned city growth
- Overcrowding in cities
- Poor living conditions