

## 1. Introduction



Eli Whitney, a young man from Massachusetts, listened politely to the Georgia planters' complaints. Tobacco prices were low, and rice and indigo prices weren't much better. Cotton grew well, but cleaning the seeds out of cotton fibers was a big problem. A slave picking out seeds by hand could clean only a few pounds a day. At that rate, even using cheap slave labor, there was little profit in raising cotton.

As the planters talked, a solution to their problem began to take shape in Whitney's mind. While growing up in Massachusetts, Whitney had revealed a gift for invention. As a boy, he had invented a machine to manufacture nails more quickly than making them by hand. From nails, he had gone on to hat pins and men's canes. After graduating from college in 1792, Whitney went to Georgia to work as a tutor. Instead of tutoring, however, he became intrigued by the problem of cotton cleaning and, he wrote, "struck out a plan of a Machine in my mind."

The result, as you will read, was an invention that changed life in both the North and the South—but in very different ways. This probably did not surprise Whitney. As a Northerner living in the South, he had already noticed many differences between the two areas of the country.

As American citizens, Northerners and Southerners shared a fierce pride in their country and a faith in democracy. Yet their outlooks and attitudes about many things were quite different. The two areas also differed in their economies, transportation systems, and societies. Between 1800 and 1850, these differences led to sharply conflicting views on many national issues—so much so that, at times, Northerners and Southerners seemed to be living in two separate worlds.



## 2. Geography of the North

From the rocky shores of Maine to the gently rolling plains of Iowa, the North had a variety of climates and natural features. Northerners adapted to these geographical differences by creating different industries and ways of making a living.

**Climate** All the Northern states experienced four distinct seasons, from freezing winters to hot, humid summers. But the most northerly states, such as Maine and Minnesota, had colder winters and shorter summer growing seasons than states farther south, such as Pennsylvania and Ohio.

**Natural Features** Different areas of the North had distinctive natural features. The jagged New England coast, for example, had hundreds of bays and inlets that were perfect for use as harbors. Shipbuilding, fishing, and commerce flourished in this area, while towns such as Boston became busy seaports.



Inland from the sea lay a narrow, flat plain with a thin covering of rocky soil. Farming was not easy here. Instead, many people turned to trade and crafts. Others moved west in search of better farmland.

New England's hills rose sharply above V-shaped valleys carved by steep streams. The hillsides offered barely enough land for small farms, but they were covered with thick forests of spruce and fir. New Englanders found that they could make money by harvesting timber. The wood was used for shipbuilding and in trade with other countries.

Farther south in New York, Pennsylvania, and New Jersey, broad rivers like the Hudson and the Delaware had deposited rich soil over the plains. People living in these areas supported themselves by farming.

Across the Appalachian Mountains lay the Central Plains, a large, forested region drained by the Ohio and Mississippi rivers. The Central Plains boast some of the best agricultural soil in the world. From Ohio to Illinois, settlers cleared the forests to make way for farms.

Industrious Northerners were thus changing the landscape. One result was **deforestation [deforestation: the clearing away of forests]**, or the clearing of forests. By 1850, Americans had cleared about 177,000 square miles of dense forest. And with the growth of industry, the demand for coal and other minerals led to a big increase in mining after about 1820, especially in Pennsylvania.

### 3. Geography of the South



The South extended from Maryland south to Florida and from the Atlantic Coast west to Louisiana and Texas. Climate and natural features encouraged Southerners to base their way of life on agriculture.

**Climate** Compared to the North, the Southern states enjoyed mild winters and long, hot, humid summers. Plentiful rainfall and long growing seasons made this a perfect place for raising warm-weather crops that would have withered and died farther north.

**Natural Features** Wide coastal plains edged the southern shoreline from Chesapeake Bay to the Gulf of Mexico. These fertile lowlands stretched inland for as much as 300 miles in parts of the South.

Along the coast, the plains were dotted with swamps and marshes. These damp lowlands were ideal for growing rice and sugarcane, which thrived in warm, soggy soil. Indigo was grown on the dry land above the swamps, and tobacco and corn were farmed farther inland. A visitor to this area noted that “the Planters by the richness of the Soil, live [in] the most easie and pleasant Manner of any People I have ever met with.”

Above the plains rose the Appalachians. Settlers who ventured into this rugged backcountry carved farms and orchards out of rolling hills and mountain hollows. Some backcountry farmers worked on land so steep that it was joked that they kept falling out of their cornfields.

Although most people in the South were farmers, Southerners used natural resources in other ways as well. In North Carolina, they harvested thick pine forests for lumber. From Chesapeake Bay in Virginia and Maryland, they gathered fish, oysters, and crabs.

An especially important feature of the South was its broad, flat rivers. Many of the South’s earliest towns were built at the mouths of rivers. As people moved away from the coast, they followed the rivers inland, building their homes and farms alongside these water highways. Oceangoing ships could even sail up Southern rivers to conduct business right at a planter’s private dock. Here, the ships were loaded with tobacco or other cash crops for sale in the Caribbean or Europe.

### 4. Economy of the South

The South’s economy was based on agriculture. Most white Southerners were **agrarians [agrarians: person who favors an agricultural way of life and government policies that support agricultural interests]** who favored a way of life based on farming. This was especially true of rich **plantation [plantation: a large area of privately owned land where crops were grown through the labor of workers who lived on the land]** owners, who did not have to do the hard work of growing crops themselves.

Although most white Southerners worked their own small farms, plantation owners used slaves to grow such cash crops as tobacco, rice, sugarcane, and indigo. By the early 1790s, however, the use of slaves had begun to decline. Europeans were unwilling to pay high prices for tobacco and rice, which they could purchase more cheaply from other British colonies. Cotton was a promising crop, but growers who experimented with it had a hard time making a profit. Until some way was found to clean the seeds out of its fiber easily, cotton was of little value. Discouraged planters were buying fewer slaves, and even letting some go free.

In 1793, a young Yale graduate named Eli Whitney took a job tutoring children on a Georgia plantation. There, he saw his first cotton boll. Observing the way cotton was cleaned by hand, Whitney had an idea. “If a machine could be invented which would clean the Cotton with expedition [speed],” he wrote his father, “it would be a great thing . . . to the Country.”

Whitney set to work. Six months later, he had a working machine that would change agriculture in the South.



**The Impact of the Cotton Gin** Whitney's "cotton engine," called the **cotton gin [cotton gin: a hand-operated machine that cleans seeds and other unwanted material from cotton]** for short, was a simple machine that used rotating combs to separate cotton fiber from its seeds. Using a cotton gin, a single worker could clean as much cotton as 50 laborers working **manually [manually: using human effort, not electricity or other power]** , or by hand.

Across the South, planters began growing cotton. Within ten years, cotton was the South's most important crop. By 1860, sales of cotton overseas earned more than all other U.S. exports combined.

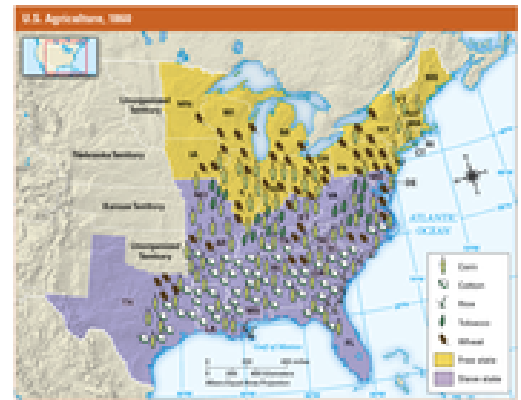
**Expanding Demand for Land and Slaves** Raising cotton in the same fields year after year soon wore out the soil. In search of fresh, fertile soil, cotton planters pushed west. By 1850, cotton plantations stretched from the Atlantic Coast to Texas.

Whitney had hoped his invention would lighten the work of slaves. Instead, it

made slavery more important to the South than ever. As cotton spread westward, slavery followed. Between 1790 and 1850, the number of slaves in the South rose from 500,000 to more than 3 million.

With many white Southerners putting money into land and slaves, the South had little interest in building factories. As a result, wrote an Alabama newspaper, "We purchase all our luxuries and necessities from the North . . . the slaveholder dresses in Northern goods, rides in a Northern saddle, sports his Northern carriage, reads Northern books. In Northern vessels his products are carried to market."

One successful Southern factory was the Tredegar Iron Works in Richmond, Virginia. Using mostly slave labor, the factory made ammunition and weapons for the U.S. army, as well as steam engines, rails, and locomotives. But the vast majority of white Southerners made their living off the land.



## 5. Economy of the North

While the cotton gin made cotton the South's dominant crop, other types of machines were causing changes in the North. The people and the ideas behind these machines were part of the **Industrial Revolution [Industrial Revolution: the dramatic change in economies and cultures brought about by the use of machines to do work formerly done by hand]** , which began in England in the late 1700s and spread to the United States and the rest of the world by

the early 1800s. During the Industrial Revolution, people shifted from making things and doing work by hand to making things and doing work with machines. It created a new class of workers as well as a new class of **industrialists [industrialists: person whose wealth comes from the ownership of industrial businesses and who favors government policies that support industry]** , owners of large factories and other businesses based on manufacturing.



**The Growth of Industry in the North** One of the people who helped bring the Industrial Revolution to the United States was Francis Cabot Lowell, a Boston business owner. In 1810, Lowell visited England. There he saw how textile mill owners were using

machines to spin cotton into thread and weave the thread into cloth. To power these devices, they used fast-moving streams to turn a wheel, which in turn supplied energy to the machinery.

Lowell memorized the design of the British machines. When he returned to Massachusetts, he built even better ones. By 1815, he and his partners had built one of the first American textile factories, along the Merrimack River outside Boston. This factory combined spinning and weaving machinery in the same building. One observer marveled that Lowell's mill



“took your bale of cotton in at one end and gave out yards of cloth at the other, after goodness knows what digestive process.”

To run his machinery, Lowell hired young women, who jumped at the chance to earn cash wages. The “Lowell girls” toiled 12 to 15 hours each day, with only Sundays off. Soon textile mills were springing up all along other Northern rivers.

By the 1830s, inventors in both the United States and Europe had learned to use steam engines to power machinery. With steam engines, businesspeople could build factories anywhere, not just along rivers. Meanwhile, the inventive Eli Whitney showed manufacturers how they could assemble products even more cheaply by making them from identical, interchangeable parts.



New inventions and manufacturing methods made goods cheaper and more plentiful. But these **innovations [innovations: new idea, method, or invention]** also shifted work from skilled craftspeople to less-skilled laborers. When Elias Howe developed the sewing machine in 1846, for example, skilled seamstresses could not compete. Some took jobs in garment factories, but they earned much less money working the sewing machines than they had sewing by hand.

For Northern industrialists, the new machines and production methods were a source of great wealth. Factory owners tended to favor a strong national government that could promote improvements in manufacturing, trade, and transportation. Southern agrarians, however, looked down on the newly rich industrialists and the laborers who worked for them. Proud Southerners called factory workers “wage slaves.” But they also worried that Northern interests might grow too powerful and threaten the South’s way of life.



**Machines Make Agriculture More Efficient** The Industrial Revolution had effects on farming as well. New machines increased the rate at which agricultural goods could be produced. In 1831, Virginia farmer Cyrus McCormick built a working model of “a right smart” machine called a reaper. A reaper could cut 28 times more grain than a single man using a scythe, which is a hand tool with a long, curved blade.

In 1847, McCormick built a reaper factory in Chicago, Illinois. Using interchangeable parts, his factory was soon producing several thousand reapers a year.

Around the same time, John Deere invented the steel-tipped plow. This innovation **drastically [drastically: extreme or sudden]** reduced the amount of labor needed to plow a field. By making it easier to plant

and harvest large quantities of wheat, inventions like the steel-tipped plow and the reaper helped transform the Central Plains into America’s “bread basket.” Thanks to the Industrial Revolution, the Northern economy grew rapidly after 1800. By 1860, the value of manufacturing in the North was ten times greater than in the South.

## 6. Transportation in the North

Factory owners needed fast, inexpensive ways to deliver their goods to distant customers. South Carolina congressman John C. Calhoun had a solution. “Let us bind the republic together,” he said, “with a perfect system of roads and canals.” Calhoun called such projects **internal [internal: inside or within]** improvements.

**Building Better Roads** In the early 1800s, most American roads were rutted boneshakers. In 1806, Congress funded the construction of a National Road across the Appalachian Mountains. The purpose of this highway was to connect the new western states with the East. With its smooth gravel surface, the National Road was a joy to travel.

As popular as the National Road was, in 1816 President James Monroe vetoed a bill that would have given states money to build more roads. Monroe argued that spending federal money for a state’s internal improvements was unconstitutional.

**Fast Ships and Canals** Even with better roads, river travel was still faster and cheaper than travel by land. But moving upstream against a river’s current was hard work. To solve this problem, inventors in both the United States and Europe experimented with boats powered by steam engines.

In 1807, Robert Fulton showed that steamboats were practical by racing the steamboat *Clermont* upstream on New York's Hudson River. Said Fulton, "I overtook many boats and passed them as if they had been at anchor." A Dutchman watching the strange craft from the shore shouted, "The devil is on his way up-river with a sawmill on a boat!" By the 1820s, smoke-belching steamboats were chugging up and down major rivers and across the Great Lakes.



Of course, rivers weren't always located where people needed them. In 1817, the state of New York hired engineers and workers to build a 363-mile canal from the Hudson River to Lake Erie. The Erie Canal provided the first all-water link between farms on the Central Plains and East Coast cities. It was so successful that other states built canals as well.

Overseas traders also needed faster ways to travel. Sailing ships sometimes took so long to cross the Pacific Ocean that the goods they carried spoiled. In the 1840s, sleek clipper ships were introduced that cut ocean travel time in half. The clipper ships led to increased Northern trade with foreign ports around the world.

**Traveling by Rail** The future of transportation, however, lay not on water, but on rails. Inspired by the success of steamboats, inventors developed steam-powered locomotives. These trains traveled faster than steamboats and could go wherever tracks could be laid—even across mountains.

So many railroad companies were laying tracks that, by the 1840s, railroads were the North's biggest business. By 1860, more than 20,000 miles of rail linked Northern factories to cities hundreds of miles away.

## 7. Transportation in the South

Most of the rail lines in the United States were in the North. In the South, people and goods continued to move on rivers. The slow current broad channels of Southern rivers made water travel easy and relatively cheap.

Cotton was the most important Southern product shipped by water. On plantation docks, slaves loaded cotton bales directly onto steam-powered riverboats. The riverboats then traveled hundreds of miles downstream to such port cities as Savannah, Georgia, or Mobile, Alabama. West of the Appalachians, most cotton moved down the Mississippi River, the largest of all the Southern waterways. The cotton boom made New Orleans, the port at the mouth of the Mississippi, one of the South's few big cities. Once the cotton reached the sea, it was loaded onto sailing ships headed for ports in England or the North.



and

Because river travel was the South's main form of transportation, most Southern towns and cities sprang up along waterways. With little need for roads or canals to connect these settlements, Southerners opposed bills in Congress that would use federal funds for internal improvements. Such projects, they believed, would benefit the North far more than the South.

Some railroads were built in the South, including lines that helped Southern farmers ship their products to the North. Southerners were proud of the fact that the iron rails for many of the area's railroads came from Virginia's Tredegar Iron Works. Still, in 1860 the South had just 10,000 miles of rail, compared with over 20,000 miles in the North.

## 8. Society in the South

For the most part, the South was not greatly affected by the Jacksonian spirit of equality and opportunity or the reform movements of the mid-1800s. Many Southerners in 1860 still measured wealth in terms of land and slaves. The result was a rigid social structure with a few rich plantation owners at the top, white farmers and workers in the middle, and African Americans—mostly enslaved—at the bottom.





Slavery deeply affected the lives of all Southerners, black and white. As long as the slave economy could be preserved, the South had little incentive to make progress economically or culturally. Even religion was affected. Southern church leaders defended the practice—taking a position that divided them from many churches in the North, whose leaders taught that slavery was un-Christian. In the words of one historian, “The South grew, but it did not develop.”

**White Southerners** A small group of wealthy plantation owners dominated the economy and politics of the South. They enjoyed a leisurely way of life, filled with parties and social visits. While their sons often went to colleges and universities, their daughters received little education. Instead, girls were brought up to be wives and hostesses.

Most white families owned some land, but only about one in four owned even one slave. The majority of white families worked their own fields and made most of what they needed themselves. About 10 percent of whites were too poor to own any land. They rented rugged mountain or forest land and paid the rent with the crops they raised. Since public schools were few and often inferior to those in the North, many white children were illiterate.

**African Americans in the South** A small minority of the African Americans in the South were free blacks. Free blacks were often forced to wear special badges, pay extra taxes, and live separately from whites. Most lived in towns and cities, where they found jobs as skilled craftspeople, servants, or laborers.

The great majority of African Americans in the South were slaves. Some worked as cooks, carpenters, blacksmiths, house servants, or nursemaids. But most were field hands who labored from dawn until past dusk.

## 9. Society in the North

As in the South, most people in the North were neither wealthy nor powerful. By 1860, about seven in ten Northerners still lived on farms. But more and more Northerners were moving to towns and cities. Between 1800 and 1850, the number of cities with populations of at least 2,500 had increased from 33 to 237. Except for a few cities around the Great Lakes, such as Chicago and Detroit, nearly all of the 50 largest urban areas were in the Northeast. Only 12 were in the slave states of the South. And Northern cities were growing rapidly. Between 1840 and 1860, the populations of New York, Philadelphia, and Boston nearly tripled. By 1860, more than a million people lived in New York.



New or old, Northern cities often lacked sewers and paved streets. In dirty and crowded neighborhoods, diseases spread rapidly. “The streets are filthy,” wrote one observer about New York City, “and the stranger is not a little surprised to meet the hogs walking about in them, for the purpose of devouring the vegetables and offal [trash] thrown into the gutter.”

**African Americans in the North** After the American Revolution, all of the Northern states had taken steps to end slavery. Although blacks in the North were free, they were not treated as equal to whites. In most states, they could not vote, hold office, serve on juries, or attend white churches and schools.

African Americans responded by forming their own churches and starting their own businesses. Because few employers would give them skilled jobs, African Americans often worked as laborers or servants.

**Immigrants Arrive in the North** Between 1845 and 1860, four million immigrants [immigrants: person who moves from one country to another. Such a movement is called immigration.]—most of them from Ireland and Germany—swelled the North’s growing population. In Ireland, a potato famine from 1845 to 1849 drove hundreds of thousands of families to the United States. In the German states, failed



revolutions sent people fleeing overseas. Some immigrants had enough money to buy land and farm. But most settled in cities, where they found jobs in mills and factories.

Some Americans resented the newcomers, especially the Irish. Irish immigrants faced **hostility [hostility: unfriendly or angry feelings or behavior]** because they were Roman Catholic. The United States at the time was mostly Protestant. In addition, many Irish immigrants were poor. Because they would accept very low wages, they were thought to take jobs away from native-born workers. German immigrants did not experience the same hostility that Irish immigrants endured. Most German immigrants were Protestant and middle class.

Between 1820 and 1860, more than one-third of all U.S. immigrants came from Ireland. More than 1 million Irish immigrants came to the United States between 1846 and 1855. Too poor to travel, most of them settled in northeastern cities, including New York, Boston, and Philadelphia.

## Summary

**In this chapter, you learned how the North and the South developed differently from each other in the first half of the 1800s.**

**Geography** Geography was one reason why Northerners and Southerners developed different ways of life. In the North, physical features such as harbors encouraged the growth of shipbuilding, fishing, and commerce. The land and climate supported the harvesting of timber and such crops as corn and wheat. In the South, the climate and land was ideal for warm-weather crops like cotton, rice, and sugarcane.

**Economy** In contrast to the variety of trades and businesses in the North, the South depended primarily on agriculture. Although only a minority of white Southerners owned slaves, much of the South's economy depended on slave labor. In the North, the new inventions of the Industrial Revolution led to the development of mills and factories. Increasing numbers of people went to work as wage earners.

**Transportation** Steamboats and railroads improved transportation for Northerners, making it easier for them to travel and to ship goods over long distances. In the South, however, people continued to travel by river, and rail lines were fewer.

**Society** In the South, the wealthy few enjoyed great influence and power. But even the poorest whites ranked above African Americans, whether free or slave. The North, too, had its wealthy class. But farmers and laborers alike believed they could create comfortable lives for their families through hard work.



## Reading Further - The Mill Girls of Lowell



**In the first half of the 1800s, factory work gave girls and young women a taste of city life. Many of these young women came from farms to work in New England's textile mills. They wanted to earn money. They also wanted to find adventure in the cities that were growing up around the factories.**

Row after row of looms line the huge wooden floor of a red-brick factory building. Long pulleys connect the looms to the ceiling and their power source. During a workday, hundreds of machines are running at one time. The racket is deafening. Clouds of cotton dust foul the air. The factory has huge glass windows, but they are kept closed so the air stays humid. That keeps the threads from breaking as machines turn them into cloth.

It is 1850. Over a mile of five- and six-story red-brick buildings line the banks of the Merrimack River in Lowell, Massachusetts. Six miles of canals run waterwheels for the 40 mill buildings. In the buildings, the

waterwheels power 10,000 looms and 320,000 spindles. More than 10,000 people work in the factories of the young city. Every week, Lowell's mills produce nearly a million yards—or 568 miles—of cloth.

The cloth is made of cotton. The cotton has traveled hundreds of miles by ship or rail from the South. Northern textile manufacturers, including those who own the factories in Lowell, get virtually all their cotton from the South, where African American slaves have planted, tended, harvested, and cleaned it.

On the factory floor, workers dart quickly back and forth between machines, so they can tend more than one at a time. Most of the workers are girls and women. Many have left family farms across New England to make a new life in Lowell and other cities that had sprouted up along New England's rivers.

Factory work was difficult, but great rewards waited for the women who worked in the mills. Money, culture, and independence changed the lives of countless farm girls who, for a while at least, became factory workers.

### **The Mill-Girl Workforce**

In big, bold letters, the recruiting notice announced jobs for 75 young women in the cotton mills in Lowell and Chicopee, Massachusetts. The women would commit to work for a year. In exchange, they would earn a dollar a week, paid in cash every month.

Today, the promise of a factory job might not seem so inviting, but it was quite appealing in the 1830s. The factories had an almost magnetic pull for many young women, especially those who had been raised on New England farms. If they stayed on the farms, most of them could count on marrying, having children, and working on the farm their whole lives. And farming in New England challenged even the hardest workers. The population was growing, making land scarce. The soil was rocky, and the growing season was short. More and more people were looking elsewhere for work—to crafts, to the West, or to the cities.

Answering the call of the factory recruiter promised something new, different, and profitable. One young woman, Sally Rice, left her family in Vermont, eventually to work in a factory in Connecticut. In a letter written in 1839, she explained her reasons for leaving home.

*I can never be happy there in among so many mountains . . . I am [al]most 19 years old. I must of course have something of my own before many years have passed over my head. And where is that something coming from if I go home and earn nothing . . . You may think me unkind but how can you blame me for wanting to stay here. I have but one life to live and I want to enjoy myself as well as I can while I live.*

Many other women shared Sally Rice's feelings, and like her, they went to work in the factories.

While most of the women who first staffed the factories came from farms, some girls came for other reasons. Harriet Hanson's mother moved to Lowell from Boston with her four small children after her husband died. Harriet started working at the mills when she was ten years old. After Lucy Larcom's mother was widowed, she moved the family to Lowell from a nearby town. Lucy started working in a factory when she was 11.

At the very least, life in the mills offered girls and women survival. At the most, it promised a chance to have something of their own, including adventure, before they settled down and married.

### **A Mill Girl's Life**

In the 1830s, it would not have been considered proper for a young woman to move to a city alone, without an adult chaperone. The mill owners had to find a way to make the move to factory life feel safe for their workers and to reassure the workers' parents. They also wanted to make sure the workers were well disciplined so that they would be efficient.

For those reasons, the manufacturing companies built boarding houses. The young women lived there under the protective watch of an older woman. They ate their meals at the boarding house, slept there, and often became friends with other boarders. One Lowell mill worker wrote to her father in New Hampshire that "I have a very good boarding place . . . The girls are all kind and obliging. The girls that I room with are all from Vermont and good girls too."



The mill girls had opportunities in Lowell that they would never have had on the farm. They could attend lectures and plays, and join literary discussion groups and libraries. And their wages allowed them to shop. One woman whose sister worked in Lowell described how the women who went to the factories came home changed: “They went in their plain, country-made clothes, and after working several months, would come home for a visit, or perhaps to be married, in their tasteful city dresses and with more money in their pockets than they had ever owned before.”

Young women in Lowell even started their own magazine, *The Lowell Offering*. From 1840 to 1845, the girls wrote essays, stories, and poems. Some of their writing told about how much they liked their lives in Lowell. Other pieces told stories about women coming to work in the mills so they could help their families out of financial problems. But when historians looked at other sources—like bank accounts they discovered that most of the mill girls were not helping their families at all. Instead, they were saving money to use later for school, clothes, or a dowry (money they would bring to a marriage).

### **Hard Work at the Mills**

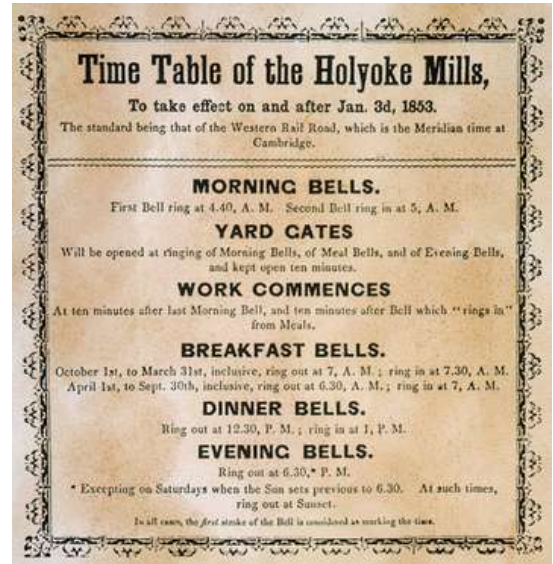
The mill girls enjoyed the opportunities they had in Lowell and other mill towns. But they had to work very hard in the factories to support themselves.

Workdays were long and ruled by the bell. In the summer, the wake-up bell rang at 4:30 A.M. Twenty minutes later, the girls reported to work. They had a half-hour break for breakfast and another for dinner. (Dinner was the afternoon meal). They did not finish their workday until 7 P.M.

Not only were the workdays long, but the work was hard. Harriet Hanson described her work as a doffer. Doffers were the youngest girls. Their job was to take bobbins that had filled with yarn off the machines and replace them with empty ones. She remembered her job many years later:

*I can see myself now, racing down the alley, between the spinning-frames, carrying in front of me a bobbin-box bigger than I was. [Doffers] had to be very swift in their movements, so as not to keep the spinning-frames stopped long.*

—Harriet H. Robinson, *Loom & Spindle or Life Among the Early Mill Girls*, 1898



Lucy Larcom described being overwhelmed by a machine she was supposed to tend: “It had to be watched in a dozen directions every minute,” she wrote. “I felt as if the half-live creature with its great, groaning joints, and whizzing fan, was aware of my incapacity to manage it.”

The mill work got more demanding for women over time. Company owners wanted to make more money, so they increased the amount of work the women had to do and lowered their wages.

The mill girls did not simply accept such changes. Several times, they went out on strike to protest pay cuts and increases in the fees they paid to live in the boarding houses. The women described themselves as “daughters of freemen.” Their ancestors had fought to be free from English rule, they said. They believed that the factory owners’ actions interfered with their freedom, and so they rebelled.

Over time, mill girls began to leave the factories, finding better opportunities elsewhere. By the 1850s, as immigrants began filling the mill jobs, the era of the mill girls was coming to a close.

### **Preparing to Write: Recording Details**

Primary source materials tell us a great deal about life during the Industrial Revolution. In Lowell, Massachusetts, for example, both mill workers and visitors described their experiences. They wrote letters, diaries, books, and newspaper articles. The details they recorded help us better understand that time and place.

- 1) Describe life in Lowell in the mid-1800s.
- 2) What would you have seen in the factories in Lowell?

- 3) Describe the people you would have seen in the factories.
- 4) Outside of the mills, what were workers' lives like?

### Writing Diary Entries

Suppose you were a mill worker in Lowell in the mid-1800s. You are keeping a diary of your experiences. Write one entry to describe your feelings and experiences soon after you arrived in Lowell. Write a second entry to describe your feelings and experiences a year later. Include factual details in your entries.

Use this rubric to evaluate your diary entries. Make changes in your entries if you need to.

Score	Description
3	The diary entries clearly describe feelings and experiences. They include factual details. There are no spelling or grammar errors.
2	The diary entries describe feelings and experiences. They include details. There are few spelling or grammar errors.
1	The diary entries do not describe feelings and experiences. They do not include details. There are many spelling or grammar errors.

### Enrichment Essay - Comparing Slavery in West Africa and America

Imagine being a slave in America in the 1800s. You are put up for sale at an auction along with your father, mother, brothers, and sisters. You do not know whether you will be sold with any member of your family. You do not know whether you will be sold to someone who will whip or kill you if you disobey. The only certainty is that you have no legal right to do anything except what your owner orders you to do.

That is a small part of what the experience of slavery was like in America. Sadly, slavery was not new. Many societies throughout history have had slavery. But the practice of slavery has meant different things in different times and places.

Most of the slaves brought to America came from West Africa. Europeans had begun trading in West African slaves in the late 1400s. Even before this, however, slavery existed on the African continent. In what ways was African slavery like slavery in America? In what ways was it different? Let's take a look.

#### Slavery in West Africa

West Africa in the 1400s had towns and cities, kingdoms and empires. Trade, especially trade across the Sahara Desert, had brought great wealth to West African kingdoms and, eventually, empires, such as Ghana, Mali, and Songhai. But life for most West Africans revolved around their village. And village life included slaves and slavery.

There were several ways that people became slaves in West Africa. In some cases, circumstances made people choose slavery. If a man owned money and was unable to pay, he could become a slave until the debt was paid off. Sometimes entire families worked as slaves until a father's or husband's debts were paid. In times of famine, some people sold themselves or their children into slavery in exchange for food.

Other people were forced into slavery. Sometimes criminals were made slaves as punishment for their crimes. Sometimes people, especially children, were captured from their villages and sold into slavery by traders. The largest numbers of slaves in West Africa, however, were prisoners of war. Some wars were started just to take prisoners, who could then be sold to other villages for a profit.

No one would freely choose to be a slave. Still, in West Africa the lives of slaves were not very different from those of their owners. Slaves were part of village life. They worked, ate, and slept with the family that owned them.

#### Slavery in America

The type of slavery practiced in the American South is called "chattel slavery." This means that slaves were treated as property rather than as human beings. (The word *chattel* can refer to any kind of movable property.)

The practice of slave auctions illustrates the meaning of chattel slavery. In an auction, slaves were put on display and sold to the highest bidders. In many ways, they were treated like animals being sold at a market. Buyers might measure the

strength of a slave by feeling his or her arms and legs. To see if slaves were healthy, buyers might examine their teeth. As you have learned, slaves from the same family could be sold to different owners, never to see their loved ones again.

Slave owners kept tight control over their slaves, backed up by laws. In many states, it was illegal to teach a slave to read and write. The laws made it clear that slaves were not to be regarded as human beings with the same rights as other people. For example, here is a Louisiana law that was similar to laws in many southern states:

*The condition of a slave being merely a passive one... he owes to his master, and to all his family, a respect without bounds, and an absolute obedience, and he is consequently to execute all orders which he receives from him, his said master, or from them.*

Other state laws and codes strengthened owners' control over their slaves and limited the slaves' freedom. Except for work, slaves were forbidden to gather in groups of more than five people. They were not allowed to leave their owner's plantation without a written pass. Slaves could not even preach to their people if a white owner was not present. Law and custom alike constantly reinforced the enormous gulf between black slaves and even the poorest whites.

Complete the Venn diagram below. In the outside rings record two unique characteristics of slavery in West Africa and two unique characteristics of slavery in America. In the center section, record at least two ways that slavery was similar in both places.

### **Enrichment Essay - From Immigrant to Citizen**

Beginning in the 1840s, great waves of immigrants began to arrive in the United States. Most of these immigrants came from Europe, but immigrants also came from Asia, Mexico, and Canada. Millions of people left the homes they knew and made a long, difficult journey to an unknown life in the United States. Why did these immigrants decide to come? What kind of life did they find in their new home?

Many immigrants were drawn to the United States by the opportunities it offered. One important opportunity was the possibility of becoming an American citizen and acquiring all the rights and responsibilities native-born citizens enjoy.

### **Immigrants are pushed from their homes and pulled to the United States**

The reasons immigrants came to the United States can be divided into *push factors* and *pull factors*. Push factors are problems that cause people to move, pushing them out of their traditional homes. Pull factors are attractions that draw, or pull, people to another place.

Two major push factors that caused people to leave Europe were population growth and hunger. Much of Europe experienced rapid population growth in the 1800s. As a result, cities became crowded, people had difficulty finding jobs, and food became scarce. Crop failures made conditions even worse.

This was especially true in Ireland, which experienced a devastating famine in the 1840s. A potato rot destroyed Ireland's potato crop year after year. Potatoes were the most important part of the Irish food supply. As a result, many were left starving. Countless people died of starvation in rural areas and in the streets of Irish cities. Desperate people ate weeds to try to keep themselves alive. Sometimes the number of dead was so overwhelming that cities ran out of coffins. One newspaper wrote,

*"Death by starvation" has ceased to be an article of news, and day by day multitudes of our population are swept down into the pit -- literally the pit -- in which the victims of the famine are interred [buried].*

Many people left Ireland in search of a better life. Nearly two million Irish are estimated to have immigrated to the United States in the famine years.

Other immigrants were pushed out of their homes by religious persecution. Many Russian and Polish Jews fled their villages to escape deadly organized anti-Jewish attacks known as pogroms. In the largely Muslim Ottoman Empire, Armenian Christians fled persecution by the Turks.



While immigrants fled problems in their homelands, they were also attracted to the United States by the opportunities it offered. Immigrants saw the United States as a place where they could achieve their dreams. Many were attracted by the opportunity to live in a free and democratic society. Economic opportunities also drew immigrants. Booming factories in U.S. cities offered job opportunities for unskilled immigrant workers.

Others came to take advantage of plentiful farmland or to work on the ever-expanding railroads. When the Chinese Exclusion Act of 1882 banned Chinese immigration, there was a shortage of farm laborers on the West Coast. Immigrants from Japan, Korea, and the Philippines took advantage of the opportunity, and moved to the West Coast to work in agriculture and on the railroads.

Immigrants were also drawn by the stories they heard. Friends and relatives who had already immigrated to the United States wrote home about their experiences. These letters often described the United States in glowing, although sometimes inaccurate, terms. Immigrants came to think of the United States as the “land of milk and honey” and a place where the “streets are paved with gold.”

### **Immigrants Adjust to Life in the United States**

Immigrants typically came to the United States with little money and few possessions. They were usually uneducated. As a result, many native-born Americans saw immigrants as inferior, and most immigrants were not welcomed into American society. The customs of immigrants from Southern and Eastern Europe, who were mostly Catholic and Jewish, seemed strange to Americans who were mostly of Northern European, Protestant ancestry. Native-born Americans feared that increased immigration threatened American values and traditions. Most believed that immigrants should become “Americanized,” and should try to look and act like native-born Americans.

As they gradually adapted to American life, immigrants often clustered in their own ethnic neighborhoods in big cities. There, many immigrants held on to their old customs and language. But others were eager to adopt the ways of life of their new country. Over time, most immigrants did become acculturated into U.S. society. Acculturation occurs when the culture of one group of people adapts to the culture of another group. Immigrants began to adopt many aspects of American culture. At the same time, they also continued to practice the religion, celebrate the holidays, and cook the foods of their home countries.

The children of immigrants usually embraced American culture more eagerly than their parents. Education was the main tool of assimilation. Immigrant children in public schools learned to speak English. They also studied American history and civics. The children of immigrants were natural-born citizens. All people born in the United States, no matter who their parents are, are citizens of the United States.

### **Naturalization and Citizenship**

Immigrants did not automatically become citizens. However, they could choose to become U.S. citizens through naturalization. Naturalization is a legal process through which a person can become a citizen of the United States. The Naturalization Act of 1802 established the basic requirements for naturalization. An immigrant had to reside in the United States for at least 5 years before applying for citizenship. The Naturalization Act stated that candidates for citizenship had to be of “good moral character.” They also had to declare their allegiance to the constitution. One important right male immigrants gained when they became citizens was the right to vote. Immigrants who could vote became a powerful political force in many U.S. cities by the late 19th century. Women, however, did not win the right to vote until 1920.

Today, immigrants applying for citizenship must study English and learn about the history of the United States. They must also pass a test and take an oath of allegiance before they can become citizens. In 2011, over 690,000 immigrants went through this process to become naturalized American citizens.

Once immigrants become citizens, they gain important rights and responsibilities, both as citizens of the state they live in and as citizens of the United States as a whole. The U.S. Constitution guarantees basic rights for all Americans. For example, the First Amendment states that we have the right to free speech. We are free to share our ideas in public – including criticism of our government. The First Amendment also protects religious freedom – we are all free to worship as we like. The U.S. government cannot support one religion or force people to take part in it.

As citizens we also have economic rights. For example, the Fifth Amendment of the Constitution limits the government's power to take away our property. We have important political rights such as the right to vote and to run for and hold political office. We also have many rights beyond those listed in the Constitution.

With our rights come responsibilities. The responsibilities of citizenship ensure the well-being of our country. For example, all citizens must obey the law. Laws ensure that everyone's rights are protected. Citizens also support the government by paying taxes. Taxes pay for important things like roads, police and fire departments, schools, libraries and parks. Citizens must also serve on juries. Juries make sure that everyone can get a fair trial.

Citizens also hold the power of government. One way they use that power is by electing people to serve in government on the national, state, and local levels. Today, all citizens over the age of 18 have the right to vote in elections. Those who are elected serve as representatives of the voters. If citizens do not vote, they give up their power. Therefore, voting is both a right and a responsibility. Many groups, such as women and African Americans, were historically denied the right to vote in the United States. Women and African Americans struggled for many years to be able to exercise this right. These hard fought struggles have made the right to vote even more precious, and have made the responsibility to vote even more important.

Citizens are responsible for making informed voting decisions. They need to find out about the candidates and issues on which they will vote. In the past, citizens could get information by listening to candidates speak, talking with friends, and reading the newspaper. Today, citizens can become informed voters by watching television and doing research on the internet. Citizens can also shape the actions of government by contacting public officials, signing petitions, and taking part in peaceful demonstrations.

Immigrants in the past came to the United States with a dream for a better life. Immigrants today come to the United States with the same "American dream." For many immigrants, an important part of this dream is a desire to become a citizen and a full participant in American civic life. Just as they did in the past, with hard work and perseverance, immigrants today can earn all the rights and responsibilities native-born Americans are privileged to have.

- 1) Describe two push and two pull factors that might encourage someone to come to the United States.
- 2) What are the criteria for becoming a naturalized citizen?
- 3) Explain the process for becoming a naturalized citizen. (For the most up-to-date process, look at Homeland Security's website: <http://www.dhs.gov/how-do-i/become-citizen>).

### **Enrichment Essay - American Scientists and Inventors**

In history, we often read about the lives of public leaders. We learn about kings and presidents, generals and leaders of social change. Leaders like these help to change the world. But other people also have a big hand in shaping our lives. Among them are scientists and inventors.

Think how different your life would be without the work of scientists and inventors. How would your life change without electricity, telephones, cars, or refrigerators? What if most Americans died before age 40? Suppose that no one had ever seen a picture of Earth from space, or a photograph of Mars.

These things were all true of life 200 years ago. Since then, people working in science and technology have given us a very different world. Let's meet a few of the Americans who have made important contributions in science and technology. Would you like to follow in their footsteps one day?

#### **The Many-Talented Benjamin Banneker**

Benjamin Banneker was born in the colony of Maryland in 1731. He was the son of free African Americans. He lived all his life on the tobacco farm that his father left him. But his mind roamed far and wide—even to the stars.

Banneker was always curious, and he was always learning. As a young man, he received a pocket watch as a gift. The watch inspired him to build his own clock out of wood. It was the first clock built in the American colonies, and it kept perfect time for 40 years.

Later in life, Banneker taught himself mathematics and astronomy (the study of the sun, planets, and stars). He used this information to publish his own almanac. An almanac is a book with useful information for farmers, like the time of sunrises and sunsets. Banneker used his knowledge of mathematics to do all the calculations himself.

His almanac made Banneker famous. Known as the "African astronomer," he used his fame to fight against prejudice and slavery.

Banneker sent one of his almanacs to President Thomas Jefferson. He wanted to prove that blacks were just as intelligent and talented as whites. Banneker reminded Jefferson of his words in the Declaration of Independence: "All men are created equal." But like many people of his time, Jefferson wasn't ready to admit that blacks and whites were equal in every way.

Today, our nation's capital is a testament to Banneker's talents. Banneker helped to plan the city of Washington, D.C. One day, the Frenchman in charge of the project quit, taking all the plans with him. Banneker was able to draw a complete layout of all the streets, parks, and major buildings from memory. His powerful mind gave us the capital city we know today.

Banneker's many talents are amazing to think about. He was a farmer, mathematician, scientist, inventor, and city planner. But even he couldn't bring about what he wanted most of all—an end to both slavery and war. "Ah, why will men forget that they are brothers?" he asked. We still struggle with his question today.

### **George Washington Carver, Agricultural Scientist and Teacher**

George Washington Carver was born into a slave family in Missouri in 1864. When he was only a baby, his mother disappeared. She may have been kidnapped by slave raiders. The Carvers, the white couple who had owned George's mother, took George and his brother into their family.

George was a sickly child. But like Benjamin Banneker, he was very intelligent and very curious. When he was ten years old, he left the farm. He was determined to get an education.

After working his way through high school, George attended Iowa State College. In 1896, he earned a master's degree in agriculture. By this time, he had shown that he was a talented teacher as well as a gifted student.

George left Iowa to teach at Booker T. Washington's Tuskegee Institute in Alabama. Tuskegee was a school where African American students learned about agriculture and industry.

At Tuskegee, Carver became known for both his teaching and his scientific studies. He was eager to find ways to improve the lives of poor African American farmers. Taking a truck into the countryside, he taught farmers to plant a variety of crops instead of relying only on cotton.

Through his research, Carver found new uses for crops like cow peas, sweet potatoes, and peanuts. He was very interested in finding new ways to use peanuts. He knew they were a cheap source of protein that did not exhaust the soil the way cotton did. His work in this area brought him fame as the "Peanut Man."

Like Benjamin Banneker, Carver used his fame to work for racial equality. He often spoke at white colleges, winning students to his side with his intelligence and warmth. For countless black Americans, he became a symbol of African American achievement.

### **Thomas Edison, Master of Invention**

Thomas Edison was born in a small town in Ohio in 1847. Like Benjamin Banneker, he had little formal schooling. When he did go to school, he was a poor student. One teacher even said there was something wrong with his brain.

Edison's mother was angry. She told the teacher that he didn't know what he was talking about. "She was the most enthusiastic champion a boy ever had," Edison said later. "I determined right then that I would be worthy of her."

Young Edison set to work teaching himself. He loved to read books by scientists and try to repeat their experiments. More than once, he nearly blew up his homemade lab!

Edison was still a boy when he lost most of his hearing, perhaps because of a fever. Later in life he became completely deaf.

Edison didn't let his problem with hearing hold him back. In fact, Edison said that his deafness helped him improve his favorite invention, the "talking machine," or phonograph. The phonograph played back recorded sounds. It is the ancestor of today's stereos and CD players. Edison kept improving his machine until even he could hear all the tones in a piece of music.



Edison's "talking machine" amazed people, but it was only one of hundreds of marvels that came from his busy brain. Edison improved the telegraph and the telephone. He developed the world's first big central power station in New York City. Most important, he invented a practical light bulb. That invention alone changed people's lives forever.

In 1876, Edison started an "invention factory" in Menlo Park, New Jersey. There, he and his team continued creating new inventions. Among them was a motion picture (movie) projector.

In all, Edison was responsible for more than 1,000 inventions. One book about him calls Edison "the man who made the future."

Strangely, "the man who made the future" wasn't in favor of all new inventions. Edison liked the early movies that had no sound. By the late 1920s, "talking pictures" were starting to replace silent movies. Edison, who was in his 80s, didn't like the new "talkies" much.

"They have spoiled everything for me," he said. "The actors concentrate on the voice now. They have forgotten how to act. I can sense it more than you because I am deaf. It's astounding how much more a deaf person can see!"

### **The Natural World: John J. Audubon and Rachel Carson**

Some people become scientists out of a love for the natural world. John James Audubon and Rachel Carson were this kind of scientist.

Audubon was born on a Caribbean island in 1785. His father was a French sailor who had served in the American Revolution. When John was 14, his father took him to France. There he attended a military school and also studied drawing.

Audubon was 18 when he came to the United States. After first trying farming, he set up a store on the Kentucky frontier. But his true love was birds. Audubon was fascinated by American birds, and he loved to draw them.

When he was in his 30s, Audubon decided to make painting birds his life's work. He camped out in the woods, observing birds carefully. He studied their habits, appearance, and flight. As a result, his paintings were more lifelike than others of his time.

In 1827, Audubon began publishing his great work, *Birds of America*. It took him 12 years to complete it. When it was done, *Birds of America* included engravings of more than 1,000 birds. Each engraving was colored by hand. Later, Audubon published his field notes that described bird behavior. He also did lifelike paintings of other animals.

Audubon's work inspired others to care for nature and for American birds and animals. In 1886, one of his followers started the first Audubon Society. More than 100 years later, the Audubon Society still works to preserve American wildlife and its habitats.

Unlike John Audubon, Rachel Carson was a trained scientist. Her specialty was marine biology, the study of life in the sea. But like Audubon, she had another talent as well. His was painting, and hers was writing.

Carson was born in Pennsylvania in 1907. Even as a child, she loved books and the beauty of nature. As an adult, she put these two loves together by writing popular science books like *Under the Sea Wind* and *The Sea Around Us*.

Carson's last book, *Silent Spring*, was one of the most influential books of the 20th century. Carson had become alarmed by the effects of a chemical pesticide called DDT. In *Silent Spring*, she wrote about how poisons like DDT threaten wildlife, people, and the environment.

*Silent Spring* was published in 1962. The book became a huge sensation. In time, the use of DDT was outlawed. Just as important, *Silent Spring* made people around the world think about the environment in a new way.

Today, Rachel Carson is given much of the credit for helping to start the modern environmental movement. She had a great influence because she was both a careful scientist and a talented writer. One newspaper editor wrote, "A few thousand words from her, and the world took a new direction."

## **Fighting Disease: Dr. Jonas Salk**

In the first half of the 20th century, summer was a time of fear for American parents. Every summer, thousands of children in the United States were infected with polio. This crippling disease is caused by a virus that destroys nerve cells in the body. Victims of polio can become paralyzed, unable to use their arms or legs. When polio infects the lungs, victims can't breathe without the help of machines.

Polio was terrifying, but it had a powerful enemy in Dr. Jonas Salk. Salk was born in New York City in 1914. His parents were Jewish immigrants from Russia. They did not have formal schooling themselves, but they were determined to see their children succeed. They encouraged young Jonas to study hard, and he did. He became the first member of his family to go to college.

In college, Salk became fascinated by the study of medicine. He decided to go to medical school.

Salk was still a medical student when he began thinking about vaccines. Vaccines are a special type of drug. They contain variations of the tiny organisms that cause diseases like polio. When people take a vaccine, their bodies learn to fight these organisms. As a result, people don't get the disease.

In medical school, Salk was taught that it was impossible to make a safe vaccine against diseases caused by viruses. The trouble was that the vaccine itself could give people the disease.

Like all great scientists, Salk was curious. Instead of accepting what others said, he decided to test the truth for himself. Salk's curiosity led to one of the biggest breakthroughs in the history of medicine.

First, he helped to develop a vaccine that worked against the flu virus. After years of research, he was able to create a vaccine against polio.

In 1955, scientists announced that Salk's vaccine worked—and it was safe. For the first time, doctors had a way to keep people from getting polio. Overnight, Salk became an international hero.

Salk's vaccine could have made him rich. But he didn't try to make money from it. Instead, he gave his formula away so that it could help people everywhere.

Later, scientists developed other polio vaccines. The results were dramatic. By 1980, polio had disappeared from the United States. By 1994, the entire Western Hemisphere was free of the terrifying disease.

Salk continued to work on other medical problems, including AIDS. He also wrote books to educate the public about science. He was truly a scientist who changed people's lives.

## **Exploring the Universe: Carl Sagan and Neil Armstrong**

Some scientists, like Jonas Salk, study things you can only see in a microscope. Others study the biggest thing there is—the universe.

Carl Sagan spent most of his life exploring the mysteries of the universe. The son of a Russian immigrant, he was born in New York City in 1934. After studying physics in college, he went on to become an astronomer.

As a scientist, Sagan was eager to see humans explore the universe beyond Earth. He helped plan U.S. missions that sent unmanned spacecraft to other planets in our solar system. These missions sent back valuable information about Earth's neighbors in space, as well as many dramatic photographs.

Sagan was especially fascinated by the idea of life in other parts of the universe. He did experiments to try to show how life could have started on our planet. His experiments helped to show how chemicals in the Earth's atmosphere could have combined to form the building blocks of life.

Those same chemicals can be found in space. Sagan believed that life was probably common in the universe. He thought there might even be many intelligent civilizations in our own Milky Way galaxy.

When Sagan wasn't doing research, he was excitedly sharing his ideas with anyone who would listen. His knowledge and enthusiasm made him a great science educator. He wrote several popular books, and he starred in a television series about the universe.

Sagan even wrote a novel about humans' first contact with beings from another world. The novel, *Contact*, was made into a movie in 1997.

Sagan died shortly before the movie was released. If you watch the movie, at the end you will see the words "In memory of Carl."

Carl Sagan traveled the universe in his mind. Neil Armstrong was the first human to actually set foot on another world.

Armstrong was born in Ohio in 1930. When he was 16, he began flying planes as a student pilot. Later, he became a fighter pilot and a test pilot. In 1962, when America's space program was still young, he was selected for astronaut training.

Armstrong flew several space missions, but it was his trip to the moon that captured the imaginations of people everywhere. Along with two other astronauts, Armstrong was lifted into space aboard a mighty Apollo rocket in July 1969. Four days later, Apollo 11 began circling the moon.

After hours of careful preparation, Armstrong and Buzz Aldrin rode a small craft called a *lunar module* to the surface of the moon. The module was named the Eagle. When it touched down, Armstrong radioed a message that thrilled the world. "The Eagle has landed," he said.

All over the world, people were gathered around television sets. A short time later, they saw Armstrong make his way down a ladder to the moon's surface. When his foot touched the ground, Armstrong said, "That's one small step for a man, one giant leap for mankind."

Truly, it was a giant leap. There have been other missions to the moon, and there will probably be more in the future. Some day, humans may even travel to other planets, such as Mars. But no one who was watching will ever forget the moment when Neil Armstrong took humanity's first step onto another world.

- 1) Create a simple and informative poster about one of the people you learned about in this reading. Include the person's name, an interest-grabbing title that relates to the person's achievements, some additional words that describe the person's character traits, and illustrations.
- 2) Compare the effects of scientific discoveries you read about in at least two different time periods. For each, explain how it affected people's lives in history and explain whether you still benefit from the discovery today.

### **Scientist & Discovery**

### **Impact at the Time**

### **Impact on You Today**

- 3) Research and write a brief biography of a scientist or inventor that you think has changed the world. (Consider asking your teacher or another adult for some potential people to research.) Include information about the person's early life, achievements, and then explain how these inventions or discoveries have changed our daily lives. Make sure to properly cite your sources.