Name_____ Date _____

# Steam and You!

## How Steam Engines Helped The United States To Expand Reading

**How Is Steam Used To Help People?** (Please fill in any blank spaces as you read)

Have you ever observed steam, also known as water vapor? For centuries, people have observed steam and how it moves. **Describe steam on the line below. Does it rise or fall?**_____

Steam is _____ and it _____. When lots of steam moves into a pipe, it creates pressure that can be used to move things. Inventors discovered about 300 years ago that they could use steam to power machines. These machines have transformed human life. Steam is used today to help power ships and to spin large **turbines** that generate electricity for millions of people throughout the world. The **steam engine** was one of the most important inventions of the **Industrial Revolution** that occurred about from about **1760 to 1840**. The **Industrial Revolution** was a time when machine **technology** rapidly changed society. Steam engines were used to power **train locomotives**, **steamboats**, machines in factories, equipment in mines, and even automobiles before other kinds of engines were invented.

**Boiling water in a tea kettle produces steam. Steam can power a steam engine.**

**A steamboat uses a steam engine to turn a paddlewheel to move the boat.**

**A steam locomotive was powered when coal or wood was burned inside it to boil water to make steam. The steam powered the engine of the locomotive**

**A steam turbine is a large metal cylinder with large fan blades that can spin when steam flows through its blades. When it spins fast, it can generate electricity. The metal cover of this one is off.**

ARIZONA GEOGRAPHIC ALLIANCE

Before steam-powered engines were invented, factories and **mills** were powered **by people, horses, water, or wind.** Before steam-powered engines, people had to work (or labor) much harder to get things done. For example, many people once used spinning wheels to spin wool and cotton by hand to make thread**.** They used the thread to weave cloth by hand using looms**.** This work was very time consuming and difficult. Horses, mules, camels, and other animals were once used to transport goods in most parts of the world. Animals carrying heavy loads moved slowly and the animals needed frequent breaks and lots of care to stay in good working condition.

**Do you prefer to work hard or to use machines? Write your answer on the lines below.**

_____

_____

For centuries, both water and wind-powered machines helped people get work done. However, both water and wind-powered machines were **unreliable**. Factories powered by river water had to be located near a river, and sometimes the rivers would dry up during summer droughts. During the winter, the river water would freeze and would not turn the water wheel. Similarly, windmills used the wind to help grind wheat into flour, but the wind didn't always blow. Steam power, on the other hand, made it possible for factories to be located anywhere. Steam could provide power all year, day or night. It was more **reliable**.

**The power of the wind moved windmills that were used to grind wheat into flour or to pump water.**

**A water wheel turned by water flowing in a river helps grind wheat into flour inside this mill.**

In **England** in the 1600s, **coal** found underground was mined and burned to heat homes and to make **iron**. Coal became an important fuel because it burned longer than wood, and trees were becoming scarce in England. Back then, horses and mules were used to carry buckets of water out of flooded coal mines. Several inventors in England realized that if they could develop a better way to drain water out of coal mines or to transport goods and people, they would become wealthy. So they began thinking of ways they could use steam to power engines and machines that could be used in mines and to transport people and goods.

Inventors in **England** were the first to build steam engines. Thomas Savery in England invented a steam-powered water pump about 1698, but it wasn't very useful. Later a more useful steam engine was invented in 1712 to pump water out of coal mines. In 1778, **James Watt** designed steam engines that were smaller and used less coal, which meant the engines were more **efficient**. By the early 1800s, Watt's steam engines were used in factories throughout England. The unit of power we use today, the **watt**, was named after him. He also used the term "**horsepower**" to describe how much power his engine could produce. He compared the power of his engine to how much power horses could produce.

**WHERE Was The Steam Engine Used?**

Throughout the 1800s, steam engines were improved and their use slowly spread from England to Europe and America and then around the world. Designers made steam engines smaller and more efficient. Steam engines were used in factories and mills to power machines of all types. Other steam engines were used to power train locomotives, steamboats, and automobiles. Later, steam was used to spin turbines that generated electricity.

**HOW Does The Steam Engine Work?**

To create the steam inside a steam engine, coal or wood was burned under tanks of water to make the water boil. The hot steam created by the **boiling** water went into a pipe or pipes where it built up pressure and moved a **piston** or pistons. The movement of the piston was used to turn a wheel that powered a machine. Then the steam was quickly released from the pipe, and the piston moved back to its original position. This cycle was repeated over and over again to turn the wheels on the machine.

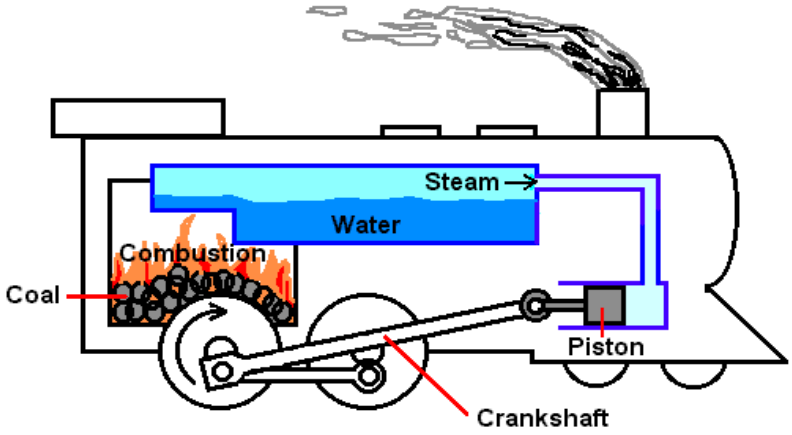



Diagram from myschoolhouse.com

**Diagram Showing How A Steam Train Locomotive Engine Works**

Coal is burned to boil water to make steam. The steam goes into a pipe and builds up enough pressure to move a piston. The piston moves a crankshaft that moves the train wheels on the locomotive. When the steam in the pipe is released, the piston moves back to its original position. This cycle is repeated over again and again to turn the wheels of the locomotive.

**Name** _____ **Date** _____

# Student Worksheet for Steam and You! Reading

**PART 1 Directions:** Read **"Steam and You!"** and circle the best answer for the following questions:

1.) What new source of power was used during the Industrial Revolution?
   a.) Water
   b.) Wind
   c.) Horse
   d.) Steam
   e.) Nuclear

2.) What was the Industrial Revolution?
   a.) A time when people revolted against industry
   b.) A time when machine technology changed rapidly
   c.) A time when industries revolted against technology
   d.) A time when there were no factories or machines
   e.) All of the above

3.) What was a problem for factories that were powered by water or by wind?
   a.) Rivers could dry up during droughts
   b.) The wind didn't always blow
   c.) Rivers could freeze during cold months
   d.) Water-powered factories had to be located near a river
   e.) All of the above

**PART 2 Directions:** Complete the sentence stems below:

4.) Before steam engines were invented, factories and mills were powered by

5.) Four ways steam engines were used in the past were

6.) Two ways steam is used for power today are

7.) Two fuels that were burned to boil the water in steam engines in the past were

8.) Read the caption of the diagram of how a steam train locomotive works. **Fill in the blank spaces** below to describe how steam moves a train locomotive. 

**A steam train locomotive is powered when** _____ is burned to boil _____ to make _____. The _____ goes into a pipe and builds up enough pressure to move a _____ . The _____ moves a crankshaft that moves the _____ on the _____. When the steam in the pipe is released, the _____ moves back to its original position. This _____ is repeated over again and again.

9.) **Draw** a windmill in the space below.

10.) **Vocabulary Matching**. Match the vocabulary words to their definitions. You may use the Key Vocabulary and Definitions sheet to help you.

| | |
|---|---|
| ___ **reliable** | **A.)** a boat powered by a steam engine |
| ___ **steam engine** | **B.)** dependable |
| ___ **Industrial Revolution** | **C.)** a large metal cylinder with fan blades that steam can spin to make electricity |
| ___ **train locomotive** | **D.)** a short cylinder moved back and forth by steam or another expanding gas inside an engine creating power |
| ___ **steamboat** | **E.)** an engine powered by steam |
| ___ **technology** | **F.)** a train car containing an engine that moves the train |
| ___ **turbine** | **G.)** when machine technology rapidly changed society |
| ___ **piston** | **H.)** ways people make things that are useful |

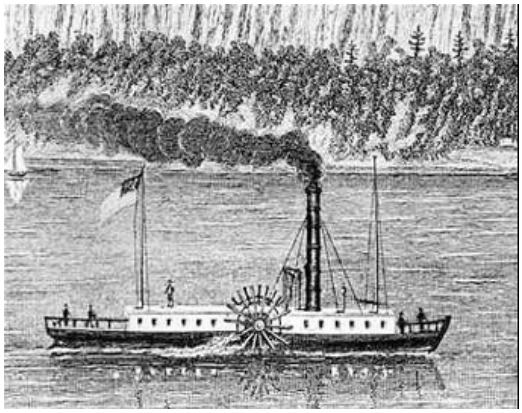
11.) In what country did inventors first build steam engines?

12.) Using the World Map that is attached, <u>circle the country</u> where the first steam engines were invented, and write the country's name at the top of the map with an arrow pointing to its location. You may use a map in the classroom to help you if you don't know where it is.

# Steam Engines and the Expansion of the U.S. Reading

**How Did The Invention Of The Steam Engine Influence The Expansion Of The U.S.?**

The United States grew rapidly after James Watt designed his steam engine in 1778. Steam engines were used to power steamboats and train locomotives. This allowed people to travel faster than ever before. In 1807, Robert Fulton built the first steamboat in the U.S. that sailed up the Hudson River from New York City to Albany, N.Y. Steamboats allowed people to travel upstream on rivers as well as downstream, which made transportation much faster and easier. The steam engine moved a paddlewheel that moved the boat in the water.



**A picture of the first steamboat in the U.S. in 1807**

Steam locomotives and railroads began to be built in the U.S. in the 1830s. The first Transcontinental Railroad was completed in 1869. It was the first railroad to cross the entire United States and allowed people to travel by train from New York to San Francisco in only six days. Before railroads were built, it took about 5 months for people to travel halfway across the United States from Missouri to California in wagons pulled by oxen. By 1890, the U.S. had 163,562 miles of railroads. The construction of railroads enabled the rapid movement of people and goods to many parts of the U.S. The U.S. economy expanded rapidly as the numbers of people, farms, factories, cities, and states increased.

**A steam locomotive in the U.S. in the 1860s**

**How Did The Expansion Of Railroads Affect The Economy In The U.S.?**

The expansion of railroads and the use of steamboats expanded the U.S. economy because they both made it easier to transport people and goods over long distances. The expansion of railroads stimulated the growth of the iron and steel industries because iron, and later steel rails, were used to make the tracks. Railroads also required large amounts of wood for railroad ties placed under the rails. Large amounts of coal had to be mined to power steamboats and train locomotives. As railroads brought more immigrant farmers to more parts of the country, the number of farms increased. More food became available that could be transported more quickly over longer distances by steamboats and trains. This enabled cities to grow larger and the population of the U.S. to grow rapidly.

**How Did The Expansion Of Railroads Affect Different People In The U.S.?**

American Civil War veterans, immigrants from Ireland, and thousands of workers from China built the first **Transcontinental Railroad** that crossed the United States. Chinese workers were such good workers that railroad companies sent recruiters to China to find more Chinese workers to work on the railroad. Many of these Chinese workers decided to stay in the U.S. and became U.S. citizens.

**Before railroads expanded, many Native American tribes on the Great Plains hunted buffalo to survive. They used all parts of the buffalo.**

**A man stands on a huge pile of buffalo skulls collected from buffalo that had been killed by hunters who traveled by railroad.**

While the expansion of railroads and the use of steamboats benefited many Americans, it hurt many **Native American tribes** living in the Great Plains; like the Sioux, the Cheyenne, and the Lakota tribes. These tribes hunted **buffalo** to survive. As railroads expanded on the Great Plains, millions of buffalo were killed by hunters who traveled on the railroads. Many of these hunters made money selling buffalo hides. Railroad companies wanted to decrease the numbers of buffalo because sometimes buffalo wandered onto the train tracks and were hit by trains. The U.S. government wanted Native American tribes to sign treaties to stay on reservation lands, but often these lands were far away from buffalo herds. As a result, the lives of many Native Americans were made worse by the expansion of the railroads.

Name _____ Date _____

## Student Worksheet for Steam Engines and the Expansion of the U.S. Reading

**Directions:** Examine the table below to answer the 3 questions below.

| REGION | 1830 | 1840 | 1850 | 1860 | 1870 | 1880 | 1890 |
|---|---|---|---|---|---|---|---|
| **New England** | 30 | 513 | 2,596 | 3,644 | 4,327 | 5,888 | 6,718 |
| **East** | 0 | 1,484 | 3,740 | 11,927 | 18,292 | 28,155 | 40,826 |
| **South** | 10 | 737 | 2,082 | 7,908 | 10,610 | 14,458 | 27,833 |
| **Midwest** | 0 | 0 | 46 | 4,951 | 11,031 | 22,213 | 35,580 |
| **South Central** | 0 | 21 | 107 | 250 | 331 | 1,621 | 5,154 |
| **West** | 0 | 0 | 0 | 239 | 4,578 | 15,466 | 47,451 |
| **TOTAL U.S.** | 40 | 2,755 | 8,571 | 28,920 | 49,168 | 87,801 | 163,562 |

1.) Which region in the U.S. had **the most** miles of railroads in **1850**? _____

2.) Which region in the U.S. had **the most** miles of railroads in **1890**? _____

3.) Based on your answers to questions #1 and #2 above, **which region** of the country do you think **grew the most** between 1850 and 1890?

4.) **Use the information in the table below** and the **grid** on the back side of this sheet to create a bar graph that will illustrate the growth in the **Total Miles of Railroads in the U.S. from 1830 to 1890.** Each small rectangle on the grid will equal 10,000 miles of railroad.

### Number of Miles of Railroads in the U.S. per decade from 1830 to 1890

| Year | 1830 | 1840 | 1850 | 1860 | 1870 | 1880 | 1890 |
|---|---|---|---|---|---|---|---|
| **Total Miles of Railroad** | 40 | 2,755 | 8,571 | 28,920 | 49,168 | 87,801 | 163,562 |

ARIZONA GEOGRAPHIC ALLIANCE

**USE THE GRID BELOW to CREATE YOUR GRAPH for question #4**



**Directions:**

Each small rectangle represents 10,000 miles of railroad.

Use the information **in the table on the back side** of this sheet and scrap paper to **round** the total number of miles of railroad for each year to the nearest 10,000. **Hint:** You round the one thousands place down to 0 if the number is 4 or less. You round the thousands place up to the next ten thousands place if the number in the thousands place is more than 5. Examples: **2**,755 rounds down to 0. **8**,571 rounds up to 10,000.

Then **divide** each rounded number by 10,000 to find the total number of rectangles to color. **Color in the correct number of small rectangles for each year**. Use the left column for a guide.

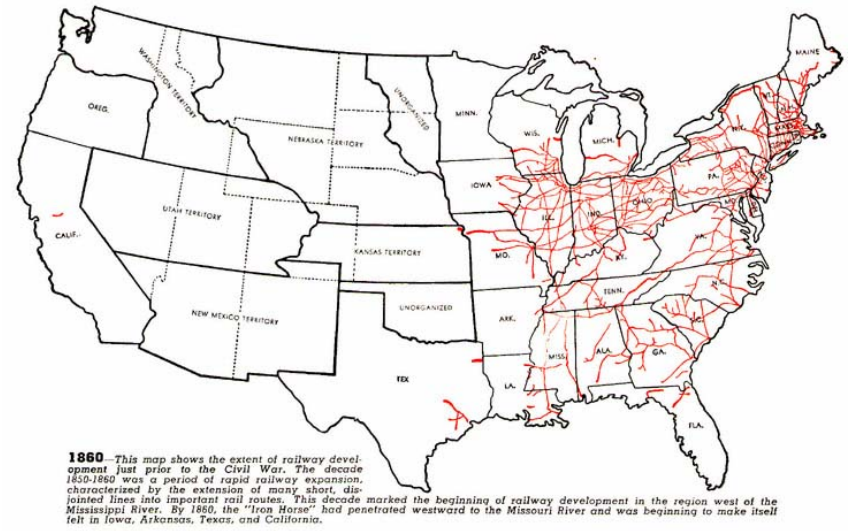
| Rounded Miles of Railroad | Number of Miles of Railroads in the U.S. Per Decade from 1830 to 1890 | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1830 | 1840 | 1850 | 1860 | 1870 | 1880 | 1890 |
| 170,000 | | | | | | | |
| 160,000 | | | | | | | |
| 150,000 | | | | | | | |
| 140,000 | | | | | | | |
| 130,000 | | | | | | | |
| 120,000 | | | | | | | |
| 110,000 | | | | | | | |
| 100,000 | | | | | | | |
| 90,000 | | | | | | | |
| 80,000 | | | | | | | |
| 70,000 | | | | | | | |
| 60,000 | | | | | | | |
| 50,000 | | | | | | | |
| 40,000 | | | | | | | |
| 30,000 | | | | | | | |
| 20,000 | | | | | | | |
| 10,000 | | | | | | | |

5.) Look at the two maps below showing **railroads** in the U.S. **in 1860 and in 1890.** **(p. 3)** Describe the most important differences you see.

6.) **Why** do you think there are **fewer miles** of railroads **in 1890** in states like **Nevada, Wyoming, and Arizona** and **more railroads** in states like **Illinois, Iowa, Indiana, and Ohio**? Write reasons for your answer.

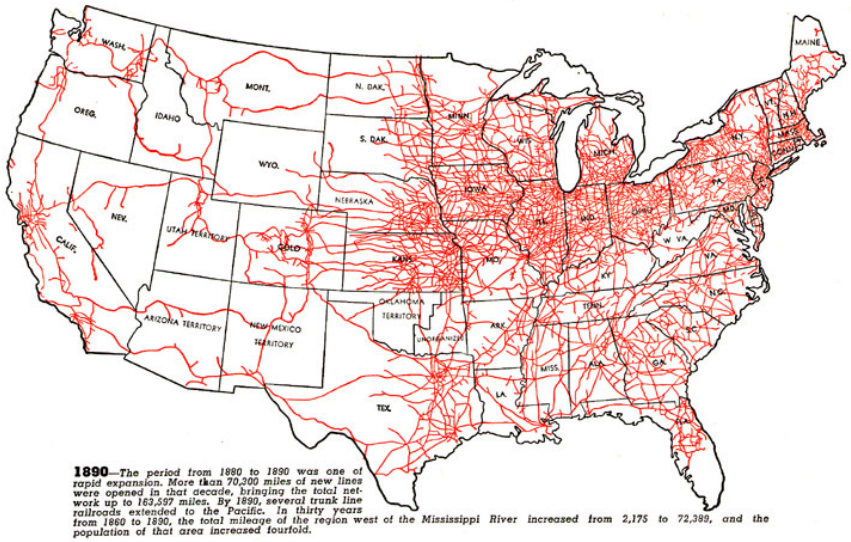
## Map showing U.S. Railroads in 1860

**(Maps from the pamphlet "AMERICAN RAILROADS: Their Growth and Development", The Association of American Railroads, January, 1951)**




**1860**—*This map shows the extent of railway development just prior to the Civil War. The decade 1850-1860 was a period of rapid railway expansion, characterized by the extension of many short, disjointed lines into important rail routes. This decade marked the beginning of railway development in the region west of the Mississippi River. By 1860, the "Iron Horse" had penetrated westward to the Missouri River and was beginning to make itself felt in Iowa, Arkansas, Texas, and California.*

## Map showing U.S. Railroads in 1890




**1890**—*The period from 1880 to 1890 was one of rapid expansion. More than 70,300 miles of new lines were opened in that decade, bringing the total network up to 163,597 miles. By 1890, several trunk line railroads extended to the Pacific. In thirty years from 1860 to 1890, the total mileage of the region west of the Mississippi River increased from 2,175 to 72,389, and the population of that area increased fourfold.*

ARIZONA GEOGRAPHIC ALLIANCE

7.) **Using the four sentence stems below**, write at least **4 sentences** that describe **(p.4)** **some of the benefits** and **some of the problems** that resulted from the use of steam engines. Mention how Native Americans viewed the expansion of railroads in the U.S. You may re-read the information in the handout to help you write about this topic.

a.) One of the benefits that resulted from the use of steam engines was

b.) Another benefit was that

c.) Steam engines also helped people because

d.) Native Americans were hurt by the expansion of the railroads because

8.) Next to each vocabulary word below, **write a sentence** using the word.
**reliable –**

**steam engine –**

**Industrial Revolution –**

**train locomotive –**

**steamboat –**

**technology –**

**turbine -**

**piston –**

## Steam and You Quiz

NAME_____

**PART 1 Directions: Circle the best answer** for the following questions:

1.) What new source of power was used during the Industrial Revolution?
   a.) Water
   b.) Steam
   c.) Horse
   d.) Wind
   e.) Nuclear

2.) What was the Industrial Revolution?
   a.) A time when people revolted against industry
   b.) A time when industries revolted against technology
   c.) A time when there were no factories or machines
   d.) A time when machine technology changed rapidly
   e.) All of the above

3.) What was a problem for factories that were powered by water or by wind?
   a.) Rivers could dry up during droughts.
   b.) The wind didn't always blow.
   c.) Rivers could freeze during cold months.
   d.) Water-powered factories had to be located near a river.
   e.) All of the above

**PART 2 Directions:** Complete the sentence stems below:

4.) Before steam engines were invented, factories and mills were powered by

5.) Two ways steam engines were used in the past were

6.) One way steam is used for power today is

7.) Two fuels that were burned to boil the water in steam engines in the past were

8.) **Use the words below to fill in the blank spaces** below to describe how steam moves a train locomotive. (Hint: the word **"piston" is used 3 times**).

**piston wheels cycle water locomotive steam coal**

A steam train locomotive is powered when _____ is burned to boil _____ to make _____. The _____ goes into a pipe and builds up enough pressure to move a _____ . The _____ moves a crankshaft that moves the _____ on the _____. When the steam in the pipe is released, the _____ moves back to its original position. This _____ is repeated over again and again.

9.) **Draw** a windmill in the space below.

10.) **Vocabulary Matching**. Match the vocabulary words with their definitions.

| | |
|---|---|
| ___ **reliable** | **A.)** a boat powered by a steam engine |
| ___ **piston** | **B.)** dependable |
| ___ **train locomotive** | **C.)** a large metal cylinder with fan blades that steam can spin to make electricity |
| ___ **steamboat** | **D.)** a short cylinder moved back and forth by steam or another expanding gas inside an engine creating power |
| ___ **Industrial Revolution** | **E.)** an engine powered by steam |
| ___ **turbine** | **F.)** a train car containing an engine that moves the train |
| ___ **technology** | **G.)** when machine technology rapidly changed society |
| ___ **steam engine** | **H.)** ways people make things that are useful |

11.) In what country did inventors first build steam engines?

## Quiz for Steam Engines and the Expansion of the U.S. Name_____

**DIRECTIONS: Using the four sentence stems below**, write at least **4 sentences** that describe **some of the benefits** and **some of the problems** that resulted from the use of steam engines. Mention how Native Americans viewed the expansion of railroads in the U.S.

1.) One of the benefits that resulted from the use of steam engines was

2.) Another benefit of steam engines was that

3.) Steam engines helped the United States to expand because

4.) Native Americans were hurt by the expansion of the railroads because

5.) Does **new technology** benefit people, harm people, or both? Give reasons for your answer.

DIRECTIONS: Next to each vocabulary word below, **write a sentence using the word**.

**6.) reliable –**

**7.) steam engine –**

**8.) Industrial Revolution –**

**9.) train locomotive –**

**10.) steamboat –**

**11.) technology –**

**12.) turbine -**

**13.) piston –**

ARIZONA GEOGRAPHIC ALLIANCE

**Answer Key: Steam and You! How Steam Engines Helped The United States To Expand**

**P1 HOW Is Steam Used To Help People?** (Please fill in any blank spaces as you read)

Have you ever observed steam, also known as water vapor? For centuries, people have observed steam and how it moves. **Describe steam on the line below. Does it rise or fall?**

___Students may have variety of answers**, inclurding that steam is hot and it rises**.___

Steam is __hot__ and it _rises__.

**P2 WHY Were People Searching For An Easier Way To Do Work?**

**Do you prefer to work hard or to use machines? Write your answer on the lines below.**

_____**Student answers will vary, but most will say they prefer to use machines**._____

# Answer Key: Student Worksheet for Steam and You!

1. What new source of power was used during the Industrial Revolution?
   a.) Water
   b.) Wind
   c.) Horse
   d.) Steam
   e.) Nuclear

2. What was the Industrial Revolution?
   a.) A time when people revolted against industry
   b.) A time when machine technology changed rapidly
   c.) A time when industries revolted against technology
   d.) A time when there were no factories or machines
   e.) All of the above

3. What was a problem for factories that were powered by water or by wind?
   a.) Rivers could dry up during droughts
   b.) The wind didn't always blow
   c.) Rivers could freeze during cold months
   d.) Water-powered factories had to be located near a river
   e.) All of the above

**PART 2 Directions:** Complete the sentence stems below:

4. Before steam engines were invented, factories and mills were powered by **people, horses, water, or wind.**
5. Four ways steam engines were used in the past were

ARIZONA GEOGRAPHIC ALLIANCE

**to power machines, steamboats, train locomotives, and automobiles (and equipment in mines).**

6. Two ways steam is used for power today are
   **to power ships and to generate electricity.**
7. Two fuels that were burned to boil the water in steam engines in the past were
   **wood and coal.**

8. **Fill in the blank spaces** below to describe how steam moves a train locomotive.

**A steam train locomotive is powered when** __coal or wood___ is burned to boil__water__ to make _____steam_____. The _____steam_____ goes into a pipe and builds up enough pressure to move a _____piston___ . The _____piston_____ moves a crankshaft that moves the _____wheels_____ on the __train locomotive_____. When the steam in the pipe is released, the _____piston___ moves back to its original position. This ___cycle__ is repeated over again and again.

9. **Draw** a water wheel and a windmill in the space below. Drawings will vary
10. **Vocabulary Matching**. Match the vocabulary words with their definitions by writing the letter of the correct definition on the space next to each word. You may use Vocabulary Sheet.

_B_ **reliable**
_E_ **steam engine**
_G_ **Industrial Revolution**
_F_ **train locomotive**
_A_ **steamboat**
_H_ **technology**
_C_ **turbine**
_D_ **piston**

**A.)** a boat powered by a steam engine
**B.)** dependable
**C.)** a large metal cylinder **with fan blades** that steam can spin to make electricity
**D.)** a short cylinder **moved back and forth** by steam or another expanding gas inside an engine creating power
**E.)** an engine powered by steam
**F.)** a train car containing an engine that moves the train
**G.)** when machine technology rapidly changed society
**H.)** ways people make things that are useful

11. In what country did inventors first build steam engines? **England**
12. Using the World Map that is attached, circle the country where the first steam engines were invented and write its name at the top of the map with an arrow pointing to its location. You may use a map in the classroom to help you if you don't know where it is.
    **Students should circle England on the world map.**

**ANSWER KEY** **Student Worksheet for Steam Engines and the Expansion of the U.S.**

1.) Which region in the U.S. had **the most** miles of railroads in **1850**?
**The East.**

2.) Which region in the U.S. had **the most** miles of railroads in **1890**?
**The West.**

3.) Based on your answers to questions #1 and #2 above, **which region** of the country do you think **grew the most** between 1850 and 1890?
**Based on the increase of the miles of railroads, the West grew the most.**

4.)

| Rounded Miles of Railroad | Total Number of Miles of Railroads in the U.S. per decade from 1830 to 1890 | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1830 | 1840 | 1850 | 1860 | 1870 | 1880 | 1890 |
| 170,000 | | | | | | | |
| 160,000 | | | | | | | |
| 150,000 | | | | | | | |
| 140,000 | | | | | | | |
| 130,000 | | | | | | | |
| 120,000 | | | | | | | |
| 110,000 | | | | | | | |
| 100,000 | | | | | | | |
| 90,000 | | | | | | | |
| 80,000 | | | | | | | |
| 70,000 | | | | | | | |
| 60,000 | | | | | | | |
| 50,000 | | | | | | | |
| 40,000 | | | | | | | |
| 30,000 | | | | | | | |
| 20,000 | | | | | | | |
| 10,000 | | | | | | | |

ARIZONA GEOGRAPHIC ALLIANCE

5.) Look at the two maps below showing **railroads** in the U.S. **in 1860 and in 1890.** **(p. 3)**
Describe the most important differences you see.
**There are many more miles of railroads in 1890 than in 1860. The railroads extend across the entire U.S. from coast to coast in 1890, but not in 1860.**
6.) **Why** do you think there are **fewer miles** of railroads **in 1890** in states like **Nevada, Wyoming, and Arizona** and **more railroads** in states like **Illinois, Iowa, Indiana, and Ohio**?
Write reasons for your answer.
**Answers will vary. Nevada, Wyoming, and Arizona have drier climates and fewer farms than Illinois, Iowa, Indiana, and Ohio. There were more people living in Illinois, Iowa, Indiana and Ohio. There are more mountains in Nevada, Wyoming, and Arizona than in Illinois, Iowa, Indiana, and Ohio.**
7.) **Using the four sentence stems below**, write at least **5 sentences** that describe **(p.4)**
**some of the benefits** and **some of the problems** that resulted from the use of steam engines.
Mention how Native Americans viewed the expansion of railroads in the U.S.
a.) One of the benefits that resulted from the use of steam engines was **transportation became easier and faster. (or steam machines could do more work for people and more goods could be produced for less money)**

b.) Another benefit of steam engines was that **steam machines could do more work for people and more goods could be produced for less money (or transportation became easier)**
c.) Steam engines helped the United States to expand because **transportation improved, the number of farms increased, the food supply increased, population increased, and cities grew. The steel industry also grew to make rails for the railroad.**

d.) Native Americans were hurt by the expansion of the railroads because **the railroads traveled through Native American lands and they were forced to move to Indian reservations. Buffalo were vitally important to Native Americans but railroads encouraged the hunting of buffalo almost to extinction.**

e.) **Answers will vary but might include: Better transportation increased the number of farms which made more food available and this made the population grow.**

8.) Next to each vocabulary word below, **write a sentence** using the word.
**reliable – Possible answer: Steam power was more reliable than wind or water power**
**steam engine – Possible answer: Many machines and vehicles were powered by steam engines.**
**Industrial Revolution – Possible answer: Many machines were invented during the Industrial Revolution.**
**train locomotive – Possible answer: The train locomotive was pulling a long train.**
**steamboat – Possible answer: I have always wanted to ride on a steamboat.**
**technology – Possible answer: The technology we have today is better than the technology people had 100 years ago.**
**turbine - Possible answer: Steam can turn a turbine that can generate electricity.**
**piston – Possible answer: A piston is shaped like a cylinder.**

## Answer Key for Steam and You! Quiz

**All Questions are 4 points each, EXCEPT for #8 (3 points for each word) and #11 (4 points For each vocabulary word). TOTAL is 102 points.**

1.) What new source of power was used during the Industrial Revolution?
   a.) Water
   b.) Steam
   c.) Horse
   d.) Wind
   e.) Nuclear

2.) What was the Industrial Revolution?
   a.) A time when people revolted against industry
   b.) A time when industries revolted against technology
   c.) A time when there were no factories or machines
   d.) A time when machine technology changed rapidly
   e.) All of the above

3.) What was a problem for factories that were powered by water or by wind?
   f.) Rivers could dry up during droughts
   g.) The wind didn't always blow
   h.) Rivers could freeze during cold months
   i.) Water-powered factories had to be located near a river
   j.) All of the above

**PART 2 Directions:** Complete the sentence stems below:

4.) Before steam engines were invented, factories and mills were powered by
   **people, horses, water, or wind.**

5.) Two ways steam engines were used in the past were
   **to power machines, steamboats, train locomotives, automobiles, or equipment in mines.**

6.) One way steam is used for power today is
   **to power ships or to generate electricity.**

7.) Two fuels that were burned to boil the water in steam engines in the past were
   **wood and coal.**

8.) **Use the words below to fill in the blank spaces** below to describe how steam moves a train locomotive. (Hint: the word **"piston" is used 3 times**).

**piston wheels cycle water locomotive steam coal**

**A steam train locomotive is powered when** __coal___ is burned to boil__water__ to make _____steam_____. The _____steam_____ goes into a pipe and builds up enough pressure to move a ____piston___ . The ____piston____ moves a crankshaft that moves the _____wheels____ on the __train locomotive____. When the steam in the pipe is released, the ____piston___ moves back to its original position. This ___cycle__ is repeated over again and again.

ARIZONA GEOGRAPHIC ALLIANCE

9.) **Draw** a windmill in the space below.

10.) **Vocabulary Matching**.

| | |
|---|---|
| _B_ **reliable** | **A.)** a boat powered by a steam engine |
| _D_ **piston** | **B.)** dependable |
| _F_ **train locomotive** | **C.)** a large metal cylinder with fan blades that steam can spin to make electricity |
| _A_ **steamboat** | **D.)** a short cylinder moved back and forth by steam or another expanding gas inside an engine creating power |
| _G_ **Industrial Revolution** | **E.)** an engine powered by steam |
| _C_ **turbine** | **F.)** a train car containing an engine that moves the train |
| _H_ **technology** | **G.)** when machine technology rapidly changed society |
| _E_ **steam engine** | **H.)** ways people make things that are useful |

11.) In what country did inventors first build steam engines?
**England**

**ANSWER KEY for Quiz for Steam Engines and the Expansion of the U.S.**
**Questions 1-5 are 5 points each, sentences for 6-13 are 3 points each. Total = 49 points**

**1.)** One of the benefits that resulted from the use of steam engines was **transportation became easier and faster. (or steam machines could do more work for people and more goods could be produced for less money)**

**2.)** Another benefit of steam engines was that **steam machines could do more work for people and more goods could be produced for less money (or transportation became easier)**

**3.)** Steam engines helped the United States to expand because **they made transportation easier, the number of farms increased, the food supply increased, the population increased, and cities grew. The steel industry also grew.**

**4.)** Native Americans were hurt by the expansion of the railroads because **the railroads traveled through Native American lands and they were forced to move to Indian reservations. Buffalo were vitally important to Native Americans but railroads encouraged the hunting of the buffalo almost to extinction.**

**5.)** Does **new technology** benefit people, harm people, or both? **Give examples**.
**Possible answer: New technology usually benefits people, but new technology can also be used to harm people. An example is how the expansion of railroads in the U.S. made life more difficult for Native Americans. Another example is the internet. The internet usually benefits people, but the internet can also be used to harm people.**

**DIRECTIONS:** Next to each vocabulary word below, **write a sentence using the word**.
**6.) reliable – Possible answer: Steam power was more reliable than wind or water pow**
**7.) steam engine – Possible answer: Many machines and vehicles were powered by steam engines.**
**8.) Industrial Revolution – Possible answer: Many machines were invented during the Industrial Revolution.**
**9.) train locomotive – Possible answer: The train locomotive was pulling a long train.**
**10.) steamboat – Possible answer: I have always wanted to ride on a steamboat.**
**11.) technology – Possible answer: The technology we have today is better than the technology people had 100 years ago.**
**12.) turbine - Possible answer: Steam can turn a turbine that can generate electricity.**
**13.) piston – Possible answer: A piston is shaped like a cylinder.**

ARIZONA GEOGRAPHIC ALLIANCE