



U.S. Department of the Interior Bureau of Land Management

Standards Addressed:
SS4.4

Transcontinental Railroad

The completion of the transcontinental railroad in 1869 marked a new era in U.S. history. In this lesson students will comprehend the history of this engineering feat which brought the nation together. Students will understand the types of labor which built the railroad, utilize math skills to learn interesting railroad facts, and investigate historic photos.

Objectives

- Students will learn about the Transcontinental Railroad and will recognize related vocabulary.
- Students will recognize the labor utilized to build the railroad and select a favored labor.
- Students will solve math problems to discover railroad facts.
- Students will investigate primary sources to research historical figures.

Preparation

Print the following handouts for each student.

- [Transcontinental Railroad Overview](#)
- [Railroad Vocabulary](#)
- [Railroad Vocabulary Find](#)
- [Railroad Workers Crossword](#)
- [Railroad Workers Questions](#)
- [Math Skills Transcontinental Railroad Facts](#)

Download the [Railroad Personalities PowerPoint](#).

Materials

Railroad Personalities PowerPoint

Directions

Lesson One: Introduction to the Transcontinental Railroad

Read the [Transcontinental Railroad Overview](#) as a class. Check for understanding with the students. Utilize the [Railroad Vocabulary Find](#) to review the [Vocabulary](#).

Lesson Two: Railroad Workers

Read the introductory paragraph on the [Railroad Workers Crossword](#) with the class. Discuss how construction takes many different workers performing many different jobs. Review the names of the two companies building the transcontinental railroad and what you have learned about their workers from the [Transcontinental Railroad Overview](#). Instruct the students to complete the [Railroad Workers Crossword](#) with a partner.

When pairs are finished with the [Crossword](#) hand out the [Railroad Workers Questions](#) for the pairs to answer. Students may work together to brainstorm dangers of the jobs. Have students report their choices and findings to the class.

Lesson Three: Math Skills

Assign students to complete the math problems on the [Math Skills Transcontinental Railroad Facts](#) worksheet. Their answers will reveal fun facts about the railroad.



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Lesson Four: Picture Observations of Railroad Personalities

Display the *Railroad Personalities PowerPoint* to the students on a whiteboard or screen or print copies of each photo. Have students journal their observations of each photo. Allow time between each photo to document. Utilize the Abraham Lincoln photo as an example. Teachers may want to list some possible roles such as financier, planning, choosing routes, day to day building, hiring, etc.

Photo Reflections: Imagine the role of the individual in the photo.

- List some observations of the person. (What do you see?)

Use your observations to try to answer the questions.

- When did this person live?
- What did this person do?
- Was this person a boss? A financier? An overseer of construction? A general worker?

Show the slide show again with the roles of each person. Discuss as a class the difference between observation and inference.

Assign students a partner. The group will pick two personalities to **compare**, one from the Union Pacific and one from the Central Pacific. The personalities should have similar jobs. The student groups will answer the following questions.

Comparisons Compare two photos of the railroad men.

- What is similar and what is different?
- Did your original predictions about the men hold true?
- What in the photo led you to make your original prediction?
- Is there something in the photo/or about the photo that may lead you to discover the man's real job?

Then research the men online and answer the following statement:

I believe __ (person) __ working for the __ (UP/CP) __ was more successful at his job because _____ . . .

(Use three pieces of evidence to support your statement.)



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Transcontinental Railroad Overview

Although some had dreamed of connecting the continent by rail and several had already started the planning, it wasn't until Abraham Lincoln signed the bill, "Pacific Railroad Act of 1892" that the transcontinental railroad became a possibility. Two railroad companies were hired to do the job. The Central Pacific Railroad would work east from Sacramento and the Union Pacific Railroad would work west. The race was on to lay railroad track as quickly (not as best) as possible. A meeting point for the two rails was not established and whoever could lay the most track would receive more money in the form of United States bonds and land grants.

The Central Pacific Railroad faced the monumental task of building through the Sierra Nevada Mountains. Progress was slowed by tall mountains, tall trees, and terrible weather. The company laid track through California, Nevada and into Utah. Many workers on this railroad were Chinamen. Chinamen did not receive the same pay as other workers because of prejudice. However, they worked harder and with great skill. Without the efforts of the Chinamen and the terrifying work they performed, the railroad may have never made it through the mountains of California.

The Union Pacific Railroad faced other problems in the east. Severe weather and flooding slowed down progress. Bridges were washed out and had to be rebuilt. Also, good trees for building railroad ties and structures were not available in the plain's region. The railroad chose to use trees like cottonwoods which were poor in quality. Sometimes these trees had to be hauled from miles away. Many workers on this railroad were Civil War Veterans or Irish immigrants. Construction workers were paid about \$2.50 a day with room-and-board. This was a good wage for men looking for work to start a new life. The Union Pacific started in Omaha, Nebraska and worked its way west into Utah. This is the railroad that was built through Wyoming.

Both railroads were joined on May 10, 1869, at Promontory Summit in the Utah territory. The railroad was complete and transcontinental train services began. It was now cheaper to ride the trains across the country than weather the seas or trod along the trails. An average cost was a mere \$65 per person.

The railroads changed the west. End-of-track towns came to life all along the route as people moved in to support the railroad or to make new lives in the west. Some of these towns survived and are still doing well today. The others became ghost towns.

What are some towns in Wyoming that began as end-of-track towns on the railroad?

Answer: Cheyenne, Laramie, Rawlins, Rock Springs, Green River, Evanston



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Railroad Vocabulary

- end-of-track** • a town that grew because of construction at the end of railroad tracks
- fishplate** • metal plates which hold railroad tracks together
- frostbite** • destruction of body parts caused by exposure to freezing temperatures
- ghost town** • a town that is no longer inhabited by people
- immigrant** • someone who enters or settles in a foreign country
- land grant** • free land given by the government
- prejudice** • negative judgment or opinion without the knowledge of facts
- snow sheds** • covers that protect tracks and trains from too much snow
- spike** • a large heavy nail
- tie** • timber laid crosswise to support railway tracks
- transcontinental** • crossing the continent
- tunnels** • an underground passage



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Railroad Vocabulary Find

Find the message sent by telegraph at the completion of the railroad within the grid of letters.

D	O	N	E	W	L	S	H	W	W	K	I	J	R	N	Q	Q	E	M	K
F	L	R	I	J	R	Z	H	Z	P	N	I	C	S	Y	U	T	T	T	Y
Z	E	B	V	B	U	U	S	E	I	G	F	N	Y	V	C	G	I	K	Z
T	T	M	S	U	N	W	Q	Y	K	M	I	P	P	F	H	Y	B	Q	V
P	R	V	E	V	D	Z	W	V	B	L	M	W	R	O	B	C	T	T	L
E	I	A	I	H	E	A	U	U	K	H	G	I	S	Z	H	H	S	N	E
T	C	E	N	D	O	F	T	R	A	C	K	T	G	M	Q	N	O	A	N
I	N	I	N	S	S	U	H	N	Y	X	Y	Z	U	R	F	V	R	R	N
E	A	K	D	O	C	M	J	R	B	O	S	H	H	C	A	I	F	G	U
G	J	L	A	U	F	O	L	G	W	Q	N	M	K	J	S	N	L	D	T
P	X	X	P	I	J	X	N	N	X	H	O	X	A	H	J	I	T	N	H
I	Z	M	W	J	U	E	W	T	R	P	W	M	R	Y	X	P	R	A	H
M	Y	R	D	V	S	H	R	G	I	D	S	Y	B	O	G	M	C	L	X
L	U	B	U	L	U	A	Z	P	T	N	H	N	E	U	Y	N	V	X	J
W	Y	M	I	G	M	I	Z	E	I	J	E	I	Z	N	Q	L	C	S	N
E	T	A	L	P	H	S	I	F	K	P	D	N	H	M	I	X	S	P	Z
E	J	L	I	V	R	B	I	T	L	I	F	Q	T	R	E	V	P	P	J
Q	C	O	J	B	Z	V	E	G	R	W	P	T	S	A	A	B	M	Q	H
N	T	B	L	X	C	W	Z	W	E	F	K	S	K	K	L	E	P	T	R
Q	A	L	B	J	G	K	H	O	Z	O	E	I	W	P	C	Q	B	A	D

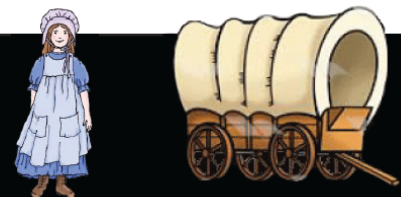
END OF TRACK
FISHPLATE
FROSTBITE

GHOST TOWN
IMMIGRANT
LAND GRANT

PREJUDICE
SNOW SHED
TRANSCONTINENTAL
TIE
TUNNEL
SPIKE



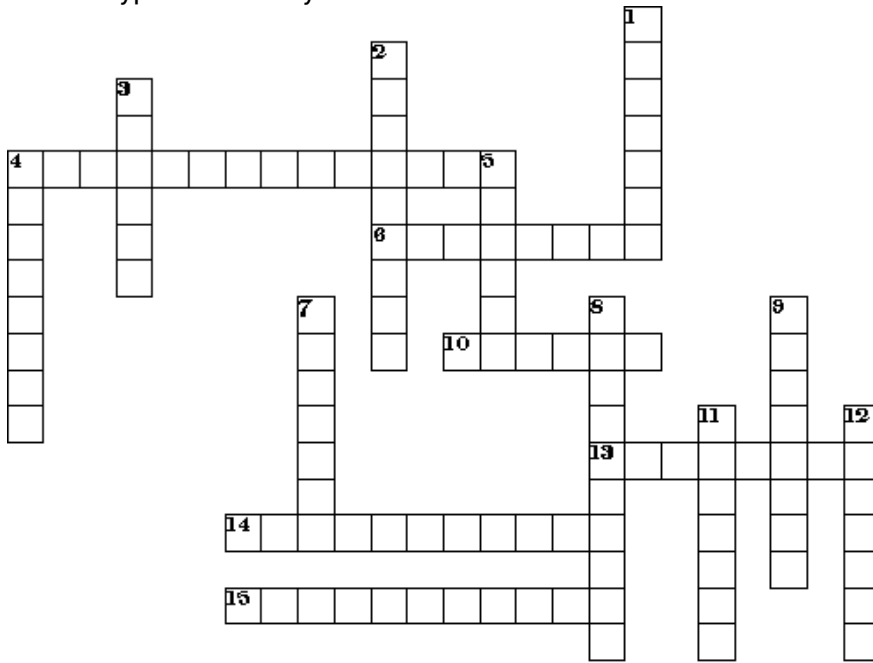
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Railroad Workers Crossword

Building a railroad required a lot of work and many different skills. Workers worked long hours on tedious jobs which were often dangerous. They also had to remain healthy despite the long-hard days. If workers became sick, they could lose their jobs without pay for the month. Use the clues to match the workers with the type of work they did.



Word List

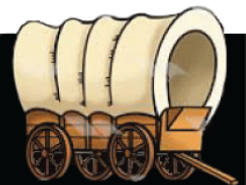
Surveyor
Rodman
Flagman
Chainman
Grader
Bridge builders
Tie-hack
Mule-whacker
Iron-man
Spiker
Gandy-dancer
Tea-bearers
Conductor
Brakeman
Fireman
Engineer

Across

4. builds bridges over rivers and canyons
6. measures the distance between the surveyor and the rodman
10. uses picks, dynamite, and shovels to smooth the roadbed
13. drives the train
14. bounces on shovel handles to pry up ties to make the rails level
15. hauls supplies to the construction site

Down

1. sends messages between the surveyor and the rodman by waving a flag
2. takes tickets, solves problems, and relays information to the engineer
3. holds a pole so the surveyor can measure the slope of the land
4. connects and disconnects the cars and sets the brakes
5. drives the spikes into the ties to hold the tracks in place
7. feeds the firebox with wood or coal
8. carries gallons of tea to the Chinese workers in empty powder kegs
9. charts the flattest, safest route for the tracks
11. cuts trees in the mountains for railroad ties
12. carries and lowers 560-pound rails





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Railroad Workers Questions

Answer the following questions about working on the railroad.

- Which work would you have liked?
- Why did you choose that work?
- After a twelve-hour day earning only a dollar, would you still choose that work?

Every job on the railroad had some dangers associated with it. Choose three different types of work and list three dangers the job may have involved. Use your thinking caps. (Hint. Think about where the workers were working: in large or small groups? Are they isolated from the others? What were they doing? What tools or materials did they use?)



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Math Skills Transcontinental Railroad Facts

PROBLEMS	ANSWERS
<ul style="list-style-type: none"> Approximately one in ten Chinese workers died from accidents or the cold. If you have frostbite and are losing fingers and toes at the same ratio, how many would you lose? 	
<ul style="list-style-type: none"> One mile of track contained: <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>202</p> <p>+150</p> <hr style="width: 50%; margin: 0 auto;"/> <p>rails</p> </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>1,750</p> <p>x 2</p> <hr style="width: 50%; margin: 0 auto;"/> <p>ties</p> </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>7,000</p> <p>5,250</p> <p>+1,750</p> <hr style="width: 50%; margin: 0 auto;"/> <p>nuts</p> <p>& bolts</p> </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>14,000</p> <p>x 2</p> <hr style="width: 50%; margin: 0 auto;"/> <p>+100</p> <hr style="width: 50%; margin: 0 auto;"/> <p>+ 60</p> <hr style="width: 50%; margin: 0 auto;"/> <p>spikes</p> </div> </div>	
<ul style="list-style-type: none"> The Pacific Railway Act of _____ (one thousand eight hundred and sixty four) allowed the railroad companies to issue their own bonds and doubled the land grants. 	
<ul style="list-style-type: none"> $3 \times 5 =$ _____ tunnels were built between Sacramento and Promontory Summit. 	
<ul style="list-style-type: none"> Only $99 - 4$ _____ $+ 5$ _____ $- 96 =$ _____ tunnels were built between Omaha and Promontory Summit. 	
<ul style="list-style-type: none"> East Tunnel, built by the Union Pacific, was 772 feet long and used 1,064 kegs of black powder to create. On average how many kegs per foot were used? 	
<ul style="list-style-type: none"> 3×10 _____ $+ 3 + 4 =$ _____ snow sheds were built to keep snow off the tracks. 	
<ul style="list-style-type: none"> Summit Tunnel took two years to complete. It was 1,659 feet long. How many feet were completed on average each day? _____ 	
<ul style="list-style-type: none"> The railroads overlapped for 80 miles before a spot was chosen by Congress to meet. At the rate of pay of \$32,000/mile how much would a company lose if their overlapping track was not used? 	





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<ul style="list-style-type: none"> The Union Pacific laid 992 miles of track from Omaha, Nebraska to Promontory Summit, Utah. If the lowest rate (\$16,000/mile) for level land east of the Rockies is used, what is the minimum amount the Union Pacific should have been paid? 	
<ul style="list-style-type: none"> The golden spikes and special laurel tie were immediately removed and replaced by normal ones after the press show. The last spike was made of $88 \div 5 =$ _____ carat gold and weighed $109 \times 4 =$ _____ grams. 	
<ul style="list-style-type: none"> A gold nugget on the end of the spike made rings for President Ulysses S. Grant, Secretary of State William Seward, Governor Stanford and others. If each ring contains at least 4 grams of gold, what was the minimum weight of the gold nugget? 	
<ul style="list-style-type: none"> The Central Pacific Railroad paid the voyage from China to California for imported workers; but the workers had to pay the company back out of their wages. A voyage was \$40 by steamship and \$35 by sailboat. Approximately how long would it take a Chinese worker to pay back each voyage with a wage of \$35 per month? (Assume a payment of \$5 per month) 	
<ul style="list-style-type: none"> The rails had to lay exactly 56 inches apart. This is _____ feet ____ inches. 	
<ul style="list-style-type: none"> Fishplates are metal plates that bolt together to hold the ends of rails together. How many fishplates would be needed for one mile of track? (Note one fishplate is needed to bind two rails together. Assume the first and the last rail will be bound to other track.) 	
<ul style="list-style-type: none"> The message "done" was sent out by telegraph nationwide to announce the completion of the railroad. The Morris Code is: D - . . . O - - - N - . E . .. How many times did the messenger have to tap the telegraph transmitter? 	



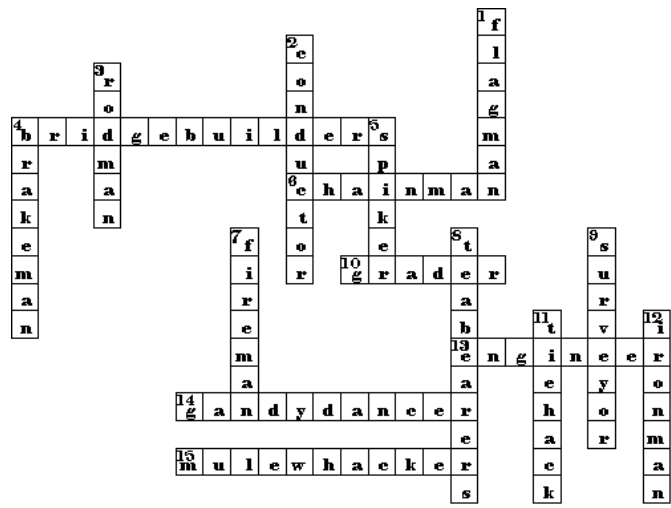
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Teacher Solutions



D O N E



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