

# MUZEO EXPRESS

## *Holiday Model Trains*

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## 2017 Education Guide

**Subject:** Social Studies/Science up to 8<sup>th</sup> grade

**Duration of lesson:** About 30 minutes

**Context of lesson:** Fact based; history and basic science/engineering

**Learning objectives:**

- Students will describe events leading to the construction of railroads in California.
- Students will identify major players in the development of California railroads.
- Students will list the California industries/commodities that benefited from the railroads.
- Students will be able to explain how one commodity shipped by railroads affected neighborhoods in Anaheim/Orange County between 1900 and 1935.
- Students will be able to identify the elements that make a steam engine run.
- Students will demonstrate awareness of safety issues around railroad tracks and trains.

**Key points for retention:**

- The Civil War was the driving force behind the Transcontinental Railroad, in order to keep California commodities in Union hands.
- Railroads were one of the factors that allowed California's population to grow exponentially between 1860 and 1900.
- Goods can be shipped quickly and efficiently across the country due to the development of regular and refrigerated freight cars.
- Many California houses from the 1910s to early 1930s were kit houses shipped by railroad.
- A locomotive weighs between 125 and 200 tons, or the combined weight of 19 to 31 African bush elephants.
- Keep your distance from both trains and their tracks.

*\*Consider students proficient if they can answer at least 70% of the questions.*

**Check our website for more information on upcoming exhibits and educational programming; such as the 2018 TrashARTist Challenge and Muck@Muzeo after-school fine art classes.**

**[www.muzeo.org](http://www.muzeo.org)**

**Key Vocabulary:**

Term	Definition
Abraham Lincoln	
Agriculture	
Battery	
Charles Crocker	
Collis P. Huntington	
Commodity	
Diesel	
External combustion engine	
Immigration	
Land grant	
Mark Hopkins	
Pacific Railroad Act of 1862	
Prefabricated	
Telegraph	
Theodore D. Judah	
Transcontinental	

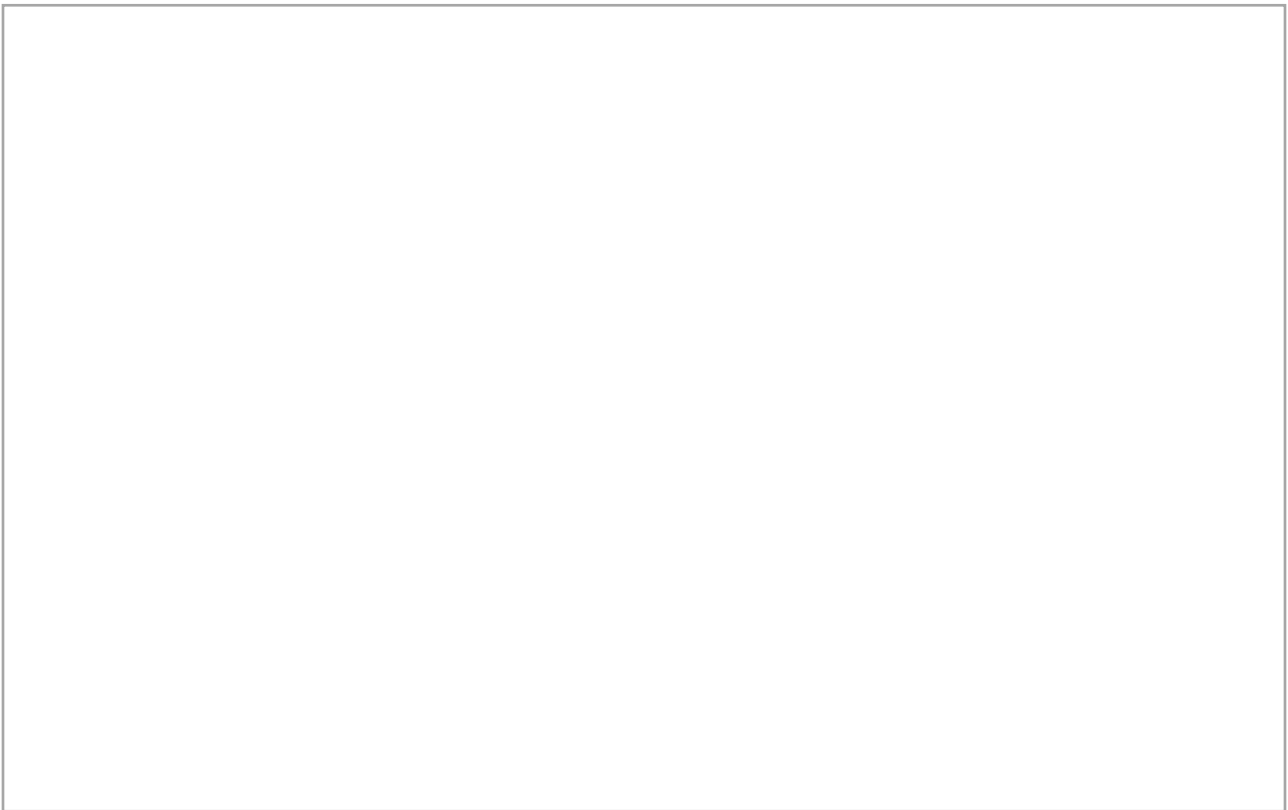
**Questions:**

- 1) Theodore Judah is the man who originally identified potential rail routes through the Sierra Nevada. When did he originally start mapping routes?
  
- 2) What effect did the Civil War have on the development of railroads in Union states? Why was it important to the North to develop a transcontinental railroad?
  
- 3) Without using Google, what are things that were found/made in California in the 1860s that the rest of the country might want? What later developments in technology allowed these items to be shipped to a larger part of the U.S.?
  
- 4) In addition to heading up an important railroad in California, what were the “Big Four” – Charles Crocker, Collis P. Huntington, Leland Stanford, and Mark Hopkins – known for?
  
  
  
  
  
  
  
  
  
  
- 5) Name the parts of an external combustion engine.
  
  
  
  
  
  
  
  
  
  
- 6) What are some of the potential problems associated with a steam engine?
  
  
  
  
  
  
  
  
  
  
- 7) What are the most important parts of a diesel engine? How does it differ from a steam engine?
  
  
  
  
  
  
  
  
  
  
- 8) Why do you think a diesel engine is the power source of choice for railroads today?

9) Is it safe to play near train stations or train tracks? Why or why not?

10) How many towns in O.C. had train depots in the 1920s? Have you seen “kit houses” in the towns that had depots? Can you tell them apart from newer construction? What is different? What is the same?

11) Imagine you are buying a house from the Sears Catalog. How many rooms should it have? What are the rooms? Do you want it to look just like the picture in the catalog, or do you want to customize it? Draw a picture of your “kit house” here:



12) Which entrepreneur created the first restaurant chain? What classic Hollywood movie was made about the business?

## ANSWER KEY

### Key Vocabulary:

Term	Definition
<b>Abraham Lincoln</b>	16 <sup>TH</sup> President of the U.S. Signed legislation authorizing the Transcontinental Railroad.
<b>Agriculture</b>	The science or practice of farming, including cultivation of the soil for the growing of crops and the rearing of animals to provide food, wool, and other products.
<b>Battery</b>	A container consisting of one or more cells, in which chemical energy is converted into electricity and used as a source of power.
<b>Charles Crocker</b>	American railroad executive who founded the Central Pacific RR (later the Southern Pacific), which constructed the western-most portion of the Transcontinental RR. Acquired controlling interest for his son in Woolworth National Bank, renaming it Crocker Bank.
<b>Collis P. Huntington</b>	Another founder of the Central Pacific RR. Was previously a merchant in Sacramento at the start of the Gold Rush. Considered the most ruthless of the “Big Four.”
<b>Commodity</b>	A raw material or primary agricultural product that can be bought or sold such as copper or coffee. A useful or valuable thing such as water or time.
<b>Diesel</b>	An internal combustion engine in which heat produced by the compression of air in the cylinder is used to ignite fuel.
<b>External combustion engine</b>	A heat engine where a working fluid, contained internally, is heated by combustion in an external source, through the engine wall or a heat exchanger. The fluid then expands and acts on the mechanism of the engine, producing motion and usable work.
<b>Immigration</b>	The action of coming to live permanently in a foreign country.
<b>Land grant</b>	A grant of public land, especially to an institution, organization, or to a particular group of people.
<b>Mark Hopkins</b>	Ran a wholesale grocery store in Sacramento during the Gold Rush. One of the four founders of the Central Pacific RR. The Mark Hopkins Hotel in San Francisco stands on the site of his former mansion, which burned down in the aftermath of the 1906 SF earthquake.
<b>Pacific Railroad Act of 1862</b>	Legislation signed by Pres. Lincoln on July 1, 1862, designed to bring both railroads and the telegraph to the Pacific. Granted rights of way to Union Pacific RR and Central Pacific RR companies, creating land grants that the companies were able to turn around and sell to create capital to build the lines. Also meant to keep commodities from California and the PNW in Union hands.
<b>Prefabricated</b>	To manufacture sections of a building or furniture to enable quick and easy assembly on site.
<b>Telegraph</b>	A system for transmitting messages from a distance along a wire, especially one creating signals by making and breaking an electrical connection.
<b>Theodore D. Judah</b>	Chief engineer for the Sacramento Valley RR, who was a central figure in the original promotion, establishment, and design of the first Transcontinental RR. Performed the original surveys to determine the best routes over the Sierra Nevada mountains.
<b>Transcontinental</b>	Extending across or relating to two or more continents.

## Answers to questions

- 1) Theodore Judah is the man who originally identified potential rail routes through the Sierra Nevada. When did he originally start mapping routes?
  - a. 1850s
- 2) What effect did the Civil War have on the development of railroads in Union states? Why was it important to the North to develop a transcontinental railroad?
  - a. It was important to the North to keep commodities like California crops, lumber, and minerals in Union hands. By building a rail line that bypassed Southern states, California commodities would not fall into Confederate hands.
- 3) Without using Google, what are things that were found/made in California in the 1860s that the rest of the country might want? What developments in technology later allowed these items to be shipped to a larger part of the U.S.?
  - a. Crops – multiple answers acceptable. Minerals like gold and silver. Lumber like oak and redwood. Later, railroads developed refrigerator cars which allowed crops to be shipped coast to coast
- 4) In addition to heading up an important railroad in California, what were the “Big Four” – Charles Crocker, Collis P. Huntington, Leland Stanford, and Mark Hopkins – known for?
  - a. Charles Crocker – banking (Crocker Bank)
  - b. Collis P. Huntington – with nephew Henry Huntington, the Pacific Electric Railway
  - c. Leland Stanford – Governor of California, bequest starting Stanford University
  - d. Mark Hopkins – land where his mansion (built from railroad profits) once stood is the site of the Mark Hopkins Hotel in San Francisco
- 5) Name the parts of an external combustion engine.
  - a. Firebox, boiler, dome, smokebox, chimney, piston, crankshaft, wheel
- 6) What are some of the potential problems associated with a steam engine?
  - a. Constant need for fuel to keep boiler going
  - b. If the engine isn't properly tended, the boiler can explode
- 7) What are the most important parts of a diesel engine? How does it differ from a steam engine?
  - a. Piston, intake valve, fuel injector nozzle, combustion chamber
  - b. In a diesel engine, the fuel is heated directly in the combustion chamber, while the fuel and the heat source are in separate chambers in steam engines
- 8) Why do you think a diesel engine is the power source of choice for railroads today?
  - a. Diesels are capable of carrying heavy loads uphill
- 9) Is it safe to play near train stations or train tracks? Why or why not?
  - a. Never safe to play near trains, stations, or tracks
  - b. Answers will vary

- 10) How many towns in O.C. had train depots in the 1920s? Have you seen “kit houses” in the towns that had depots? Can you tell them apart from newer construction? What is different? What is the same?
- a. Anaheim, Orange, Tustin, Santa Ana, San Juan Capistrano, Fullerton. Most kit houses were wooden bungalow structures, but there are some stucco houses, as well as apartment buildings that came from kits. Further answers will vary.
- 11) Imagine you are buying a house from the Sears Catalog. How many rooms should it have? What are the rooms? Do you want it to look like the picture in the catalog, or do you want to customize it? Draw a picture of your “kit house” here:
- a. Individual effort by student.
- 12) Which entrepreneur created the first restaurant chain? What classic Hollywood movie was made about the business?
- a. Fred Harvey started his chain of Fred Harvey restaurants at Atchison Topeka & Santa Fe depots in the 19<sup>th</sup> century, later expanding to service on Atchison Topeka & Santa Fe dining cars. Classic film was *The Harvey Girls*, 1946, MGM Studios.