

Meeting of Frontiers

Railroads

Roger Pearson
Alaska Geographic Alliance
Institute of the North
935 W. Third Avenue
Anchorage, AK 99501
USA

Overview:

Russia, Canada, and the United States faced a similar problem in the latter half of the 19th century and the early 20th century: How to provide a transportation system that would link the vast east-west extent of their countries. The answer came in the form of railroad lines. In AK, too, railroads were seen as a means of providing a transport system for resource development. Here, however, the rail line ran in a north-south direction.

This lesson focuses on where the railroad lines were built and the difficulties of constructing lines in the region of the Meeting of Frontiers. It also addresses the impact of railroads on the development of a region.



Construction Work on the Eastern Siberian Railway near Khabarovsk, 1895.
<http://hdl.loc.gov/loc.pnp/wtc.4a03376>

Grade Level:
High School

Goals for the Unit:

- Students will examine the history and geography of railroad development in the Meeting of Frontiers region
- Students will use geography and history research methods to examine the challenges of building a northern railroad
- Students will analyze and evaluate the benefits and limitations of railroad development in the Meeting of Frontiers region
- Students will demonstrate oral and written communications skills

History/Geography National Standards:

Geography 1. Students will use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective.

Geography 11. Students will understand the patterns and networks of economic interdependence on the earth surface.

Geography 17. Students will apply geography to interpret the past.

Geography 18. Students will apply geography to interpret the present and plan for the future.

Historical Thinking Standards: 1. Chronological Thinking

2. Historical Comprehension

3. Historical Analysis and Interpretation

4. Historical Research Capabilities

Geographic Skills:

- Asking geographic questions
- Acquiring geographic information
- Organizing geographic information
- Analyzing geographic information
- Answering geographic questions

Essential Questions:

- How was the development of rail transportation into Siberia different from the westward expansion of railroads in the US?
- How have transportation advances facilitated time-space convergences in Russia and the US?
- What major difficulties were encountered in developing the rail transportation systems in the northern environments?
- What has been the impact of rail transportation in Meeting of Frontiers region?

Vocabulary:

Natural Hazards—Physical environment events and processes that have impacts on human activity. Examples include earthquakes, blizzards, and avalanches.

National Transportation System—The railroad system in Russia is interlinked. The key rail lines of the Meeting of Frontiers region—the Trans-Siberian and the Baikal-Amur Mainline, are linked to rail lines of the rest of Russia. In Alaska, the rail lines are isolated, and not connected to any other national rail system.

Rail Gauge—The standard width of rails in the US is 4 feet 8.5 inches. That is the width of the Alaska Railroad. The Russian and Trans-Siberian rail system is 5 feet 3 inches in width.

Time-Space Convergence—As transportation systems are improved, the time it takes to travel from Point A to Point B is reduced. In effect, Points A and B are “closer” together.

Time Required:

Time will vary depending on the extent of the research. Approximately two to three weeks of regular class periods will be required for the research and presentations.

Materials Required:

- Maps of Alaska, Russia, and the US
- World Atlas with maps of settlements and physical geography
- Poster Paper
- Access to Internet and Meeting of Frontiers web site

DEVELOPING AND PRESENTING THE UNIT

Essential Question: How was the development of the Siberian Railroad system different from that of the US?

To start this investigation it is important to gain an understanding of the differences in the physical geography of the two regions.

Question 1: Which area has the greater problems for building a railroad? Assume that size, cold climate, and permafrost are the key criteria for railroad building “problems”.

Have the students complete the following two “Perspectives” using maps and graph paper.

Perspective 1: How do the areas compare in size:

Siberia is 3,726,058 mi² (9,653,000 km²)

Western US for purposes of this exercise (half of the US minus Alaska and Hawaii):
1,649,038 mi² (4,040,145 Km²)

To illustrate this concept, draw simple sketches of the two regions on graph paper. The representative area of each square will vary with the size of the squares and the graph paper. One example might be to use 100,000 mi² (250,000 km²) for each square.

Perspective 2: How are the areas different in terms of physical geography, especially climate and permafrost?

Using an outline map of Russia, sketch the areas permafrost. (See attached map in the Appendix.) Except for limited mountain areas, there is no permafrost in the Western US.

Make a simple sketch map of the climatic regions in Siberia and the Western US. In addition to a classroom atlas, a simple, but useful map of climate zones can be found at: <http://www.geography.learnonthenet.co.uk/topics/climatezones.html#zones>

Maps of Russia and the US can be found at: <http://www.nationalgeographic.com>

Permafrost and general Arctic based maps are found at: <http://vitalgraphics.grida.no/arcticmap/>

For a more elaborate view of the comparative environments, see: <http://www.worldwildlife.org/wildworld/>

Question 2: In which region, the Western US or Siberia did postal routes develop more extensively?



<http://hdl.loc.gov/loc.pnp/wtc.4a03398>

To answer this question, compare the following maps from the Library of Congress:

For Siberia, the following map was created in the 1960's: <http://hdl.loc.gov/loc.gmd/g7001p.mf000016>

To trace the main places on the routes note the following places on a blank map of Russia and using a map of Russia.

From West to East:

(Northern Route) Tobolsk, Tomsk, Yeniseysk, Yakutsk, Okhotsk

(Southern Route) Tobolsk, Tomsk, Krasnoyarsk, Irkutsk, Nerchinsk

For the Western US, see: <http://hdl.loc.gov/loc.gmd/g4051p.mf000055>

For simplicity sake, one may wish to only sketch the routes on the left-half of the map.

Question 3: By 1901, how extensively developed were the rail systems in Siberia and the Western US?

To answer this question, use blank maps of the US and Russia and sketch the 1901 rail routes using the following maps:

Siberia: <http://hdl.loc.gov/loc.gmd/g7201p.mf000014>

As of 1901, the Trans-Siberian Railroad was incomplete. The Amur section was not completed until 1916. Thus, the railroad consisted of the following sections in 1901:

From West to East: Chelybinsk, Omsk, Novosibirsk, Krasnoyarsk, Kansk, Irkutsk, Chita

From East to West: Vladivostok, Khabarovsk

Western US: <http://international.loc.gov/intldl/mtfhtml/mfdev/devamerpacrail.html>

(Click on the “Map of Railroads and Transportation Routes” on the Meeting of Frontiers web site.

Question 4: Today, the US has an extensive railroad system. This can be seen on a map from the US National Atlas: <http://www.nationalatlas.gov/>

Click on “Roads” on the “Basic Map” to see the Interstate Highway System. Click on “Transportation” and go to “Railroads” to see the rail system.

By way of contrast, how extensive is the Siberian railroad system today?

See: http://en.wikipedia.org/wiki/Trans-Siberian_railway

The route for the Amur extension of the Trans-Siberian Railroad was completed in 1916.

The route for the Baikal-Amur Mainline was “officially” completed in 1991, but a major tunnel was only completed in 2003.

(<http://newsfromrussia.com/main/2003/10/29/50885.html>).

The Baikal-Amer Mainline route can be traced through these places: Tayshet, Bratsk, Ust-Kut, Nizhneangarsk, Tynda, Komsomol’sk na Amure, Sovetskaya Gavan

Extension Question: How extensive are year-round highway systems in Siberia and the Western US?

For the Western US, go to the US National Atlas (<http://www.nationalatlas.gov/>) and click on “Roads”.

For Siberia, the Trans-Siberian Highway is not quite complete as of 2005. The Amur section is scheduled to be completed and paved by 2008. The completed sections as of the late 1990’s were as follows:

From West: Chelybinsk, Omsk, Novosibirsk, Krasnoyarsk, Kansk, Tayshet, Irkutsk, Chita

From East: Vladivostok, Khabarovsk, Blagoveshchensk

Essential Question: How have transportation advances facilitated time-space convergences in Russia and the US?

With improved transportation systems, people can get from one place to another more quickly. To gain a perspective on these changes over time, the following exercise draws upon changes from the early explorers to today.

Exercise: Develop a PowerPoint or similar presentation showing how distance “shrank” in time as transportation systems improved. Use the examples noted below. The chart should be supplemented with images (maps, pictures) and discussion of each of the examples.

Examples:

- Vitus Bering’s First Kamchatka Expedition (1725)
- Lewis and Clark Expedition (1804)
- Boston to San Francisco (early to mid 1800’s) by boat
- Railroad from Moscow to Vladivostok (today)
- Railroad from New York to San Francisco (today)
- Highway from New York to San Francisco (today)
- Highway from St. Petersburg to Vladivostok (today, assume the Trans-Siberian Highway is completed)
- Optional: Cross-continental flights

First Kamchatka Expedition

The First Kamchatka Expedition (1725-1730), led by Vitus Bering, began in St. Petersburg in late January 1725. Bering reached the Pacific coast at Okhotsk in late October, 1726. In all, the expedition covered approximately 4,500 miles and took 21 months or 640 days. (This is a rate of 7 miles per day.)

In time, transportation routes improved, as the Meeting of Frontiers web site notes: “The Siberian postal service was created in 1689 and traveled three times a summer from Moscow to Tobol'sk, and from there on to Nerchinsk and Iakutsk. By the eighteenth century, it stretched across nearly all of Siberia.” See the quote and a map of the postal route in the right-hand panel at:

<http://international.loc.gov/intldl/mtfhtml/mfdev/mfdevmnt.html>

US: Lewis and Clark

Lewis and Clark left St. Lewis on May 21, 1804. They arrived at the Pacific Ocean, at the mouth of the Columbia River, on November 19, 1805. Their return trip was shorter in duration. They left Ft. Clatsop (near present-day Astoria, Oregon) on March 23, 1806, and arrived back in St. Louis on September 23, 1806. Using just the return trip, it took them 184 days to travel from the Pacific coast to St. Louis, a distance of approximately 2,400 miles following Clark's return route. Students can use a string and a map to measure the distance of each route. The National Geographic Society map “Western Migration” shows the Lewis and Clark and other trails. You can also view the routes on the Web with a historic map at: <http://www.nationalgeographic.com/maps/> Go to the “Search for Maps” and then click on “Historic Maps” and go to “Lewis and Clark.” The map can be saved or printed.

Using the formula:

Distance = Rate x Time, one can calculate how far the explorers traveled each day:

$R = \text{Distance}/\text{Time}$ or $2400 \text{ miles}/184 \text{ days} = 12.7 \text{ miles per day}$.

For comparison, the Oregon Trail (approximately 1,700 miles from Independence, Missouri to what is now Portland, Oregon) took 139 days at a rate of 12 miles per day. The California Trail, of comparable distance, took about 121 days to traverse.

Ship Travel Boston to San Francisco/St. Petersburg to Kamchatka

Travel by boat from Boston to San Francisco in the mid-1800's took approximately 9 months and involved traveling around Cape Horn at the southern tip of Argentina and Chile. Similarly, to reach Kamchatka and Russian America, Russia ships would take approximately 9 months to go around the Cape of Africa and Asia to reach their destination.

Railroad from Moscow to Vladivostok (today)

To travel from Moscow to Vladivostok on the Trans-Siberian Railroad today takes 7 days and 6 nights. Note, however, that when the Trans-Siberian Railroad was first completed, travel was hazardous and slow. In an 1899 article of *Scientific American*, Henry Michelsen notes that there were many problems with the railroad. He concludes: “The time, therefore, between Vladivostock and Hamburg, under present conditions, will be about the same either by rail or steamer, with the advantage of uninterrupted passage and fragmentary rates in favor of the latter.” (See:

<http://www.travelhistory.org/siberia/construction/sciam1899-08-26/sciamtext1899-08-26.html>)

Distance: 5,785 mi (9,310 km)

Railroad from New York to Seattle (today)

Sample Schedule: Leave 20 January at 2:50 pm and travel via Chicago to arrive in Seattle 23 January 10:20 am.

Distance (approximate): 2,900 mi (4,640 km)

Highway Travel (today)

Assume the Trans-Siberian Highway has been completed. Travel in both the US and Russia should be no more than 400 miles per day. Use the same starting points and destinations as for the railroads.

Assessment:

The last major railroad line built in the North was the Baikal-Amur Mainline, which was fully completed only recently. There have been suggestions that rail lines should be extended from Alaska to British Columbia and from Alaska to Russia (via the Bering Strait). Students may wish to speculate on the benefits and costs of such rail extensions. However, before speculating on the future, a review of the overall impact of railroads of the past is in order. This assessment effort will allow students to evaluate the major difficulties were encountered in developing the rail transportation systems in the northern environments and the impact of the railroads on their regions.

Divide students into groups, with each group focusing on one of the following railroads: the Amur Line, Alaska Railroad, and the White Pass and Yukon.

Each group should develop a presentation on when and why the railroad was built, the environment through which the railroad traversed, and the difficulties encountered in building the line. The table below offers some comparative features. Students may wish to utilize either a PowerPoint or poster type of presentation. An evaluation rubric should be given to the groups and discussed before they start the project. Considerations should include the quality and quantity of the information collected, the clarity of the statements, the quality of the presentation, and the interest/enthusiasm of the presentation.

In addition to background information and ideas from the above exercises, the Meeting of Frontiers web site and the Alaska Railroad web site offer excellent historical information. See:

Amur Line: <http://international.loc.gov/intldl/mtfhtml/mfdev/igdamur.html>

White Pass and Yukon Railroad:

<http://international.loc.gov/intldl/mtfhtml/mfak/igyukon.html>

Alaska Railroad: <http://www.alaskarails.org/ARR-history-main.html>

Comparisons of the Amur, Alaska, & Yukon & White Pass Railroads

Feature	AMUR Line	ALASKA Railroad	White Pass & Yukon
Distance			
Direction			
Linkages to Other RR Lines			
Dates built			
Climate(s)			
Mountains			
Permafrost			
Builder (Gov't or Private)			
Labor Force			
Special Engineering Issues			
Economic/Political Reasons for railroad			
Functions of the railroad today			
Map of Railroad			

References

Antonson, Joan M. and William S. Hanable. 1984. *Alaska's Heritage*. Anchorage: The Alaska Historical Commission.

Bourne, Russell. 1995. *Americans on the Move: A History of Waterways, Railways, and Highways*. Golden, CO: Fulcrum.

Clifford, Howard. 1999. *Alaska/Yukon Railroads: An Illustrated History*. Arlington, WA: Oso Publishing Company.

Library of Congress. "Development" in *Meeting of Frontiers*.
<http://international.loc.gov/intldl/mtfhtml/mfdev/mfdevmnt.html>

Lincoln, W. Bruce. *The Conquest of a Continent: Siberia and the Russians*. 1994. New York: Random House.

National Geographic Society. <http://plasma.nationalgeographic.com/mapmachine/>

Naske, Claus-M. and H.E. Slotnick. 1994. *Alaska: A History of the 49th State*. Norman: University of Oklahoma Press.

Pearson, Roger and Marjorie Hermans (eds.) 1998. *Alaska in Maps: A thematic atlas*. Fairbanks: University of Alaska Fairbanks.

Rennick, Penny (ed.). 1992. "Alaska's Railroads." *Alaska Geographic*, 19:4.

The Trans-Siberian Railway Web Encyclopedia. <http://www.transsib.ru/Eng/index.htm>

For a more complete bibliography, refer to the Meeting of Frontiers website.

APPENDIX

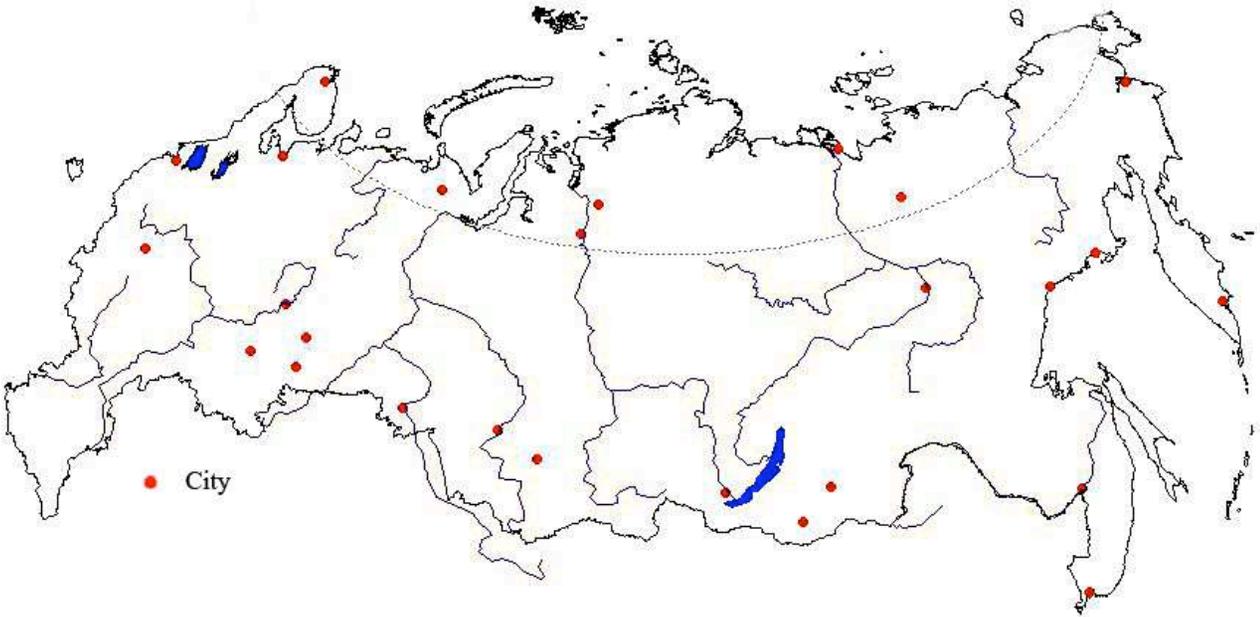
Map 1: Russia: Cities and Permafrost

Map 2: Russia: Lakes and Rivers

Map 3: US West

Map 4: Alaska

RUSSIA



• City

0 1000 Miles

Western U.S.

