

Wagon Design

Overview

Students review the purpose and route of the Santa Fe Trail, use a primary source to discuss alternative methods of transporting goods along the trail, and design a vehicle they believe would be an alternate way to move trade goods along the trail.

Standards

Science (2013)

Title 3-5 Engineering Design

Performance Expectation 3-5-ETS1-1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

Performance Expectation 3-5-ETS1-2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

KGSS (2020)

Standard 4 Societies experience continuity and change over time.

Benchmark 4.1 The student will recognize and evaluate continuity and change over time.

Objectives

Content

1. The student will explore a transportation option for traveling on the Santa Fe Trail taking into consideration terrain, function, and available materials.

Skill

1. The student will evaluate a primary source for information about nineteenth century transportation.

2. The student will design a vehicle for use on the Santa Fe Trail taking into consideration terrain, function, and available materials.

Essential Questions

1. How could people move goods along the Santa Fe Trail?

Assessments

1. Class discussion about alternative transportation ideas using a primary source.
2. Design and comparison of vehicles for use on Santa Fe Trail.

Activities

Previous Knowledge: Students need to be familiar with the function of the Santa Fe Trail as a commercial trail reaching from the Kansas-Missouri border to Santa Fe and the general terrain of the trail.

Advance Preparation: Access an image of a nineteenth century wind wagon to share with students. Images of two different wind wagons are located at the end of this lesson or at <https://www.kansasmemory.org/item/318949> and <https://www.kansasmemory.org/item/318950>

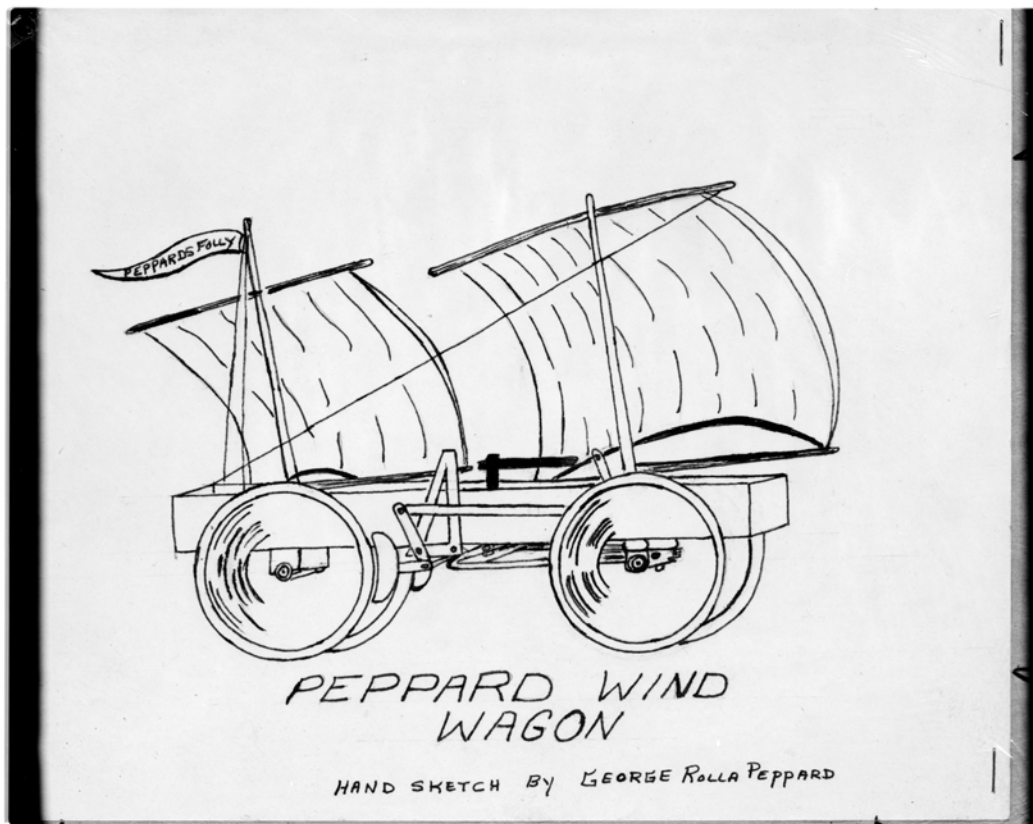
1. Introduce the Santa Fe Trail topic. Access students' previous knowledge of the trail
 - a. It was a commercial trail that entrepreneurs used to move goods both east and west to make a profit on their investment.
 - b. The trail is approximately 800 miles one-way across the prairie, mountains, desert, and rivers.
 - c. The trail functioned before self-propelled vehicles or paved roads, so traders used pack mules or wagons pulled by mules or oxen to haul their merchandise.
2. Open a discussion about what made moving goods along the Santa Fe Trail easy or difficult. Make a list of the pros and cons for the class to see. (Cons: needed to carry grain for mules which took away space for more goods, had to find water for livestock, travel was slow—only 10 to 20 miles a day, crossing flooded rivers was dangerous, wagons needed to be repaired if they broke down. Pros: oxen and mules could pull heavy loads, vehicles with wheels were practical for the trail, oxen grazed off the prairie grasses so there was no need to haul grain.)
3. Share this quote from Charles C. Post about another option considered for moving along a trail. His 1859 diary entry stated, "We overtook a curiosity in the shape of a wind wagon. It is a four wheeled vehicle, about nine feet across schooner rigged a very large sail. The whole weighs three thousand pounds. It plowed right through the mud, but cast anchor in a deep ravine when the wind failed to fill the sail and she stopped, the old captain has got out or applied for a patent, he says when he gets it perfected he will bet ten thousand dollars he can get to the Rocky mountains in six days . . ." (Hafen, Overland, p. 29)
 - a. Share images of nineteenth century wind wagons with the class. <https://www.kansasmemory.org/item/318949> <https://www.kansasmemory.org/item/318950>
 - b. Discuss the pros and cons of the wind wagon Charles Post observed.
4. Have students design a vehicle to use on the Santa Fe Trail. Designs must consider the need to carry trade goods, the environment across which the wagons travel, and the materials available in the mid-1800s. They may improve on the wind wagon concept or develop a new design.
5. Students present their designs. Presentations must include what they believe to be the pros and cons of their design as well as any insights or concerns they had while working on it.
6. Conclude by having class decide what they believe the most efficient and reliable way to move merchandise along the trail in the 1800s and why.

Extension: Compare 19th century methods of moving merchandise with contemporary methods. Compare the pros and cons of each. How do the benefits of each compare for the entrepreneur, the environment, and the consumer?

Source for quote:

Haffen, LeRoy R. Overland Routes to the Gold Fields, 1859 from contemporary diaries. (Glendale, CA: The Arthur Clark Company, 1942).

Hand Sketch of Peppard Wind Wagon
Kansas Memory #318949



Wind Wagon Sketch from "Frank Leslie's Illustrated Newspaper," July 7, 1860
Kansas Memory #318950

