

# Lesson Plan:

Teacher: SCHS

Class: Second Grade Mathematics

Date: 11/11//2016

Topic: Railroads

Lesson: Railroads and How they Work

State Standard: 2.1.2.5, 2.1.2.2

## Goals and Objectives:

1. Understand the factors involved in running a railroad
2. Compute related mathematical tasks, such as: cost of tickets, number of passengers on a train, time for journey between two stops, read a timetable, how many miles the passenger will travel.
3. Understand some of the jobs required to run a railroad.

## Behavioral Objectives:

1. The student will be able to (TSWBAT) compute the cost of a number of tickets for the same trip using a railroad schedule.
2. TSWBAT use a timetable and a map (marked with number of miles to each destination) to record on a form the cost of one ticket, the cost of two tickets, the destination, and the number of miles to the destination.
3. TSWBAT report their findings to the group, record them on a table, and compare the figures with the other groups.
4. TSWBAT use mathematics in a situation that could be encountered in daily life.
5. TSWBAT compare distances and time for different destinations and discuss the concepts of “longer,” “shorter,” “farther,” “more or less time,” “more or less expensive.”

## Rationale:

People often ask, “Why do I need to study a subject when I will never use it?” These exercises demonstrate how mathematical skills are and were used in everyday life. Students will gain experience in comparing distance traveled to the time it takes to travel that distance.

## Anticipatory Set: (5 minutes)

One 50-piece puzzle for each group depicting different trains, such as a steam train, a modern train, train stations, the logos of different railroad companies. All of these will be related to Steele County.

## Activities:

1. Ask students who has ridden on a railroad train? Did it look the same or different than this steam locomotive? Trains have changed over the years with lots of improvements.
2. Show PowerPoint (6 minutes). Using script; discuss the puzzle picture, the difference between a passenger train and a freight train.
  - a. Railroads run using mathematics.  
Johnny Cash sings "Rock Island Line."  
The Rock Island Line was one of many that ran through Steele County for many years.
    - Or sing "I've been Working on the Railroad" with the students.
  - b. (Puzzle picture). The puzzle you've put together is a photo of the very first train to pass through Owatonna on the Winona and St. Peter Railroad in 1873 – that's 143 years ago. That would be the time when your great-great-grandfather might have seen it.
  - c. Trains brought many things to Steele County. Trains brought many people and things to Steele County and took many people and things to other far away places, such as livestock (cattle, pigs, horses), food – wheat, corn for people and livestock feed; trains brought people to live in Steele County and people to visit.
    - Cranes are loading and unloaded cargo to a railroad car.
    - These men have brought many bags of cargo in carts to be loaded on a train and carried to other destinations. Could this be mail?
  - d. William H. Taft made a stop in Owatonna when he was campaigning for President in 1908.  
This was how candidates for president campaigned in the early part of the twentieth century. There was no television, radio, or Internet.
    - What can you conclude from this photograph?
    - The people have umbrellas. It is raining.
  - e. Trains brought equipment farmers needed. This is a lading bill that shows the cost of the Wild Oat Separator with a lading bill for the separator.
  - f. Trains brought the circus to town. What kind of animals are in these photographs?
    - a. Camels above, Lion below.  
Would people in Steele County get to see these animals in any other way? In 1900, zoos are in big cities at this time. Travel to other countries was expensive for most people.
  - g. There were many jobs for people working on the railroad.  
Here 13 men unload a circus wagon from the Milwaukee Road railroad flatbed car as part of the Hegenbeck-Wallace Circus June 18, 1919. Gawkers from town surround the activity. The rear of a draft horse at the right edge of the photo, demonstrates that horses were still used for many tasks, especially hauling heavy items.
    - What is a gawker? A bystander who is there to look at the activity.
  - g. Even Acrobats came to Steele County by train.

- h. Railroads brought soldiers to training and then off to the boats that would take them to Europe in World War I - that was in 1917, almost 100 years ago.
- i. Many people worked hard to build the railroads. Building a railroad required laying down tracks, building bridges, water towers (for producing steam), gravel for the side of the tracks.

Construction of Railroad Underpass on Mineral Springs Road showing workers on the large stone blocks and the train tracks. One man is sitting on a suspended stone. Smokestack is visible in right rear.

- j. The Rock Island Railroad Bridge on the Straight River in Owatonna, Minnesota.
- k. The railroad depot was an important part of every town. This is the Milwaukee Road Depot in Medford with depot agent, Harry Conklin, standing along the tracks.
- l. The Bixby Railroad Depot was moved to the Village of Yesteryear at the Steele County Historical Society. You can visit the depot and the train by it. (Duluth, Missabe & Iron Range Railway caboose)

You can visit this Railroad Depot at the Village of Yesteryear from May until the end of September and for special events (name an upcoming event, such as the SC Fair.) Next to the station is a caboose, which is the car at the end of the train.

- m. This is a picture of the interior of the Union Depot in Owatonna. The three men in the office area are J. B. Carpenter, Jack Johnson, and James Klecker.
  - What do you see in the Picture? There are two windows, radiator, curved desk, clock, calendar, KEEP SMILING sign, four row small cabinet, and other office supplies in this picture. How is this different than your Mom or Dad's office?

Many people worked on the railroad. The person who managed the railroad building was the depot agent. The people who worked on for the railroad loved railroads and loved their jobs. Many of them kept their jobs for a long time.

- Pete Schneider worked for the railroad for 41 years. He worked for 17 years as depot agent for the Rock Island Line.
  - Phil "Zip" Jensen worked for the Rock Island depot in Albert Lea for 45 years. He began as a yard clerk and a car checker, then he was the freight house manager for 38 years.
  - Charlie Todd worked for the Rock Island Line as depot agent in Ellendale. His wife helped him by delivering telegrams and collecting express bills. During summer jobs, he learned telegraphy by hanging around the night operators.
- n. A Ticket Agent had to be certified. For that, he needed to have math skills. What would he need to add and subtract?

- o. The Union Depot was built in 1877. In front of the depot is the actual train that Casey Jones drove. Buzz Kaplan from Owatonna purchased the train and brought it to Owatonna. The Depot is used today as a meeting center. Many old train depots are used in other ways today.
- p. Several railroad companies shared the depot as a spot for passengers to board and depart and for freight to be loaded and unloaded. When the new depot was built in Owatonna, each rail company had separate ticket and telegraph offices.
- q. Waiting for their trains to board, people could sit on comfortable benches and warm themselves by an iron stove.
- r. Casey Jones and Old Engine No. 201.  
Casey Jones was an engineer for Illinois Central for 10 years. In 1893, he drove passengers to the World's Columbian Exposition in Chicago on Engine 201. This was his only assignment driving a passenger train until 1899 when he drove the fast Chicago-New Orleans train called "Cannonball." On a late evening in April, 1900, Casey saved his passengers and staff people by staying on the train to control a collision with a disabled freight car stuck on the tracks. He became an American folk hero when his dramatic death was immortalized in song.
- s. This is a photo of the temporary Depot in Havana around 1895.  
A railroad track required constant maintenance. Notice the handcar on the tracks. A handcar was propelled by humans pushing and pulling the pump lever. A "section crew" used the handcar to inspect and repair the railroad tracks. A handcar was also known as a pump trolley, pump car, Kalamazoo, velocipede, or draisine.
- t. Here is a diagram of an early handcar so from a sales brochure. You can see how it is made. Point out pump lever, mechanism for turning wheels, railroad tracks.
- r. A snowstorm could cause big delays and problems on a railroad line.  
This is the Rock Island Depot in the snow.
  - Trains with snowplows near the depot. Both have snow plows and flat cars to catch the snow. The train on the left has the plow in front of the engine. The train on the right has a plow and car attached to the caboose. The train on the left was delayed two days at the stone quarry cut north of Owatonna because of the snow.
  - The people are digging out the railroad tracks after a big snowstorm near Owatonna in 1917 so that the train can get through. The snow banks are over their heads - eight to ten feet high.
- u. As automobiles and airplanes came into common use, passenger trains were needed less and less. Many of the lines stopped operating. This is a newspaper article with a picture of the Rock Island *Plainsman* leaving Owatonna bound for the Twin Cities for the last time in 1969.
- v. Replace with train schedule, explain activity.

- Role Play (3 minutes). In groups of three or four, students will role play an exchange of money for tickets for passengers on the train. One student will be the ticket agent. One student will be the ticket purchaser, buying two tickets, one for him/herself and one for the companion. One student will be the companion. One student will be the ticket taker. Each group will be given a different destination to which to work.
- Recording (5 minutes). Using a time table, a map (marked with number of miles to each destination), and a form to record the cost of one ticket, the cost of two tickets, the destination, and the number of miles to the destination.
- Sharing (5 minutes). Each group will share their findings with the class. One student from each group or the teacher will record the findings on a large chart that all the students can see.
- Discussion (5 minutes). Ask the students:
  - n. Which journey is the longest? Which journey takes the most time?
  - o. Which journey is shortest? Which journey would take the least time?
  - p. Which journey cost the most money? Which journey cost the least?

2.1.2.5 Solve real-world and mathematical addition and subtraction problems involving whole numbers with up to 2 digits.

2.1.2.2 Demonstrate mastery of addition and subtraction facts; add and subtract one- and two-digit numbers in real world and mathematical problems. Demonstrate fluency with basic addition facts and related subtraction facts.

**Materials:**

1. Puzzles of the first railroad train to come through Owatonna.
2. PowerPoint and appropriate projector.
3. Forms for students to fill out in the role playing exercise.
4. Large chart on which to record findings.
5. Railroad timetables.
6. Maps of Steele County with railroads marked, mileage between destinations marked.