

## Intermodal Rail Transportation in Michigan

By Robertha Brown [robertha.brown@detroitk12.org](mailto:robertha.brown@detroitk12.org) Neinas Elementary School

**Target Grade/Subject:** 3

### Lesson Overview:

Students will become familiar with the current uses and changes in train operations over the past years, and create a train engine to display

### Sources Consulted:

[www.cprailphotos.com](http://www.cprailphotos.com), [www.cnrphotos.com](http://www.cnrphotos.com)

[www.bnsf.com/media/video](http://www.bnsf.com/media/video)

Google the history of trains in Michigan images [www.loadmatch.com](http://www.loadmatch.com),

[www.greatamericantrains.com](http://www.greatamericantrains.com), [www.yardgoatimages.com](http://www.yardgoatimages.com),

[www.pbs/wgbh/americanexperience/features/timeline/steamliners](http://www.pbs/wgbh/americanexperience/features/timeline/steamliners).

### Learning Objectives:

Students will be able to create a timeline of trains in Michigan, use the interactive notebook, and graphic organizer to minimize misconceptions, and create a train engine to display.

### Benchmarks Addressed:

3 – H3.0.8 Use case studies or stories to describe how the ideas or actions of individuals affected the history of Michigan.

3 – H3.0.9 Describe how Michigan attained statehood.

3 – H3.0.10 Create a timeline to sequence early Michigan history (American Indians, exploration, settlement, statehood).

3 – G1.0.1 Use cardinal directions (north, south, east, west) to describe the relative location of significant places in the immediate environment.

3 – G1.0.2 Use thematic maps to identify and describe the physical and human characteristics of Michigan.

3 –G4.0.3 Describe some of the current movements of goods, people, jobs or information to, from, or within Michigan and explain reasons for the movements.

3 –E1.0.3 Analyze how Michigan’s location and natural resources influenced its economic development (e.g., how waterways and other natural resources have influenced economic activities such as mining, lumbering, automobile manufacturing, and furniture making).

CCSS.ELA-Literacy.RI.3.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).

## Materials

### *Per teacher*

Single hole punch ¼" (6mm)

One fan

### *Per student*

5 sheets 12 x 18 Tag board construction paper

12 inch ruler (may change measurements for cm or mm)

8 straws (4 – 1.5cm and 4 – 1.3cm)

1 notebook (note: copies of information may be stapled/glued to the left side/page)

Students create back and front enclosures.

## New Vocabulary:

Caboose	Train Car	Conductor	Engineer	Freight	Passenger
Intermodal	Coal	Locomotive	Locomotion	Steam train	Authentic
Optional	Custom	Collection	Dimensions	Venue	Pollution
Integrate	History	Vintage	Efficiency	Goods	Services
Volunteer	Maintain	Throttle	Diesel fuel	Configuration	Indicator
Rechargeable	Automatic	Restoration	Environment	Preservation	Contribute

## Focus Question:

Why is it necessary to change the style and operation of trains?

Are trains today better than the older models?

Describe the trains you have seen or had the opportunity to ride in. How was the ride?

## Classroom Activity:

1. Students will view select videos from the web sites above as they engage in creating a train car (instructions below).
2. The class will create a graphic organizer in their notebooks after creating one together (Large group) using the answers to the focus questions.
3. Copies of the Intermodal map (<http://www.bnsf.com/customers/pdf/maps/intermodal-map-large.pdf>) per student will allow the ability to locate Michigan and determine if the train could travel to Detroit. Teacher will preview and discuss websites prior to introducing the lesson.

4. When explaining goods and services use interests of the child (video games, hand held devices), allow students to determine how these items might arrive at the store (Truck)? Where did the truck pick up the items (from the train yard).
5. Students will create a timeline of train styles that traveled to or are in Michigan (trolley, People Mover, ex.)

**Note:** Freight is the commodity being shipped, not the mode of shipment. A rail freight car could be one of many types ... tank cars for liquids, box cars for general merchandise, flat bed cars for large items, or construction materials, etc. Trucks operate on roads and highways.

### **Train Engine Assembly**

**Note:** Be careful with this lesson. If you use it with the “streamliner” material you will get different results. This prototype will likely move better if you make the back as large as possible, increasing the “sail” area. That is very different from the streamlining process, which would create smooth rounded corners. Teachers will find that the car shape is almost irrelevant, the engines that will move the best will be the ones with the best wheel/axle construction.

Measure 2 inches from the edge of the construction paper (cp), mark your distance from the top of the cp to the bottom of the cp – draw a line down through each mark.

Measure 3.25 inches from the edge of the construction paper (cp), mark your distance from the top of the cp to the bottom of the cp – draw a line down through each mark.

Measure 1 inch from the edge of the construction paper (cp), mark your distance from the top of the cp to the bottom of the cp – draw a line down through each mark.

Measure 3.5 inches from the edge of the construction paper (cp), mark your distance from the top of the cp to the bottom of the cp – draw a line down through each mark.

Measure 1 inch from the edge of the construction paper (cp), mark your distance from the top of the cp to the bottom of the cp – draw a line down through each mark.

Measure 3.25 inches from the edge of the construction paper (cp), mark your distance from the top of the cp to the bottom of the cp – draw a line down through each mark.

Measure 2 inches from the edge of the construction paper (cp), mark your distance from the top of the cp to the bottom of the cp – draw a line down through each mark.

Now we will begin the folding process:

Fold inward at the first and second line. Fold outward at the third and fourth line. Fold inward at the fifth and sixth line. Glue or tape the facing sides together and the overlapping top of the car.

Students can cut out the 4 x 4 squares to cover the ends of the car.

Measure for holes at 3 inches from end of the car and 0.5 inches from bottom then use the hole punch to create 4 holes. Wheels are created with a 3 inch diameter.

Students should experiment with the size of the wheel to create a faster train. Begin with a single piece of construction paper then look around for other wheel ideas (Thicker, smaller, etc...)

Use straws as an axle, attach wheels (students may create a track), place a small fan on the floor or table, position the train car in front of the fan, and let go. Students may adjust their train cars for speed or shorten them by cutting them in half to create 2 cars. What can be gained or lost from making one train into two trains?

Note: Streamlining is about the trainset (engine and 2-4 cars usually) Cars are the things the engine pulls, or pushes, along the track).

### **Assessment:**

Wrap up the lesson with a teacher led discussion of what worked, and what didn't. This should include discussion of the shape, and how that compares with the streamliners. It should also cover design and execution of the axle/wheel sets, and how friction there causes most of the movement problems. The "best" engines will have wheels that are carefully aligned, that don't rub on the sides, and that are smooth and round.

Students will be assessed through observation, using their graphic organizer as a reference to answer questions generated by the teacher, grade the timeline and grade prototype train car and the final creation.

\*\*This lesson can be implemented in 1 period lesson by only using the timeline for example or as many days as 5 for the entire lesson. Samples of the interactive notebook and uses are attached. Prototype of train car pictured below.

