

Make Your Own Three Rail Track

Get your parent's permission before doing this project!

Indoors:

1. What is the distance between two standard gauge rails? _____
2. What is the distance between two narrow gauge rails? _____
3. Using masking tape or painter's tape, create a straight line on the floor about 7 feet long. This is the first rail of your track.
4. Using a ruler or measuring tape, measure the distance of standard gauge rail and place a small piece of tape on the ground parallel to each end of your first rail.
5. Use tape to create a straight line of rail connecting the two small pieces of tape. This is the second rail of your standard gauge track.
6. Repeat steps 4 and 5 for narrow gauge, placing your new rail between the standard gauge rails.
7. You should now have three lines of tape representing your three-rail track.

Outdoors:

To do this activity outdoors, use sidewalk chalk on a driveway or other flat surface.

Rail Gauge

Rails are the steel bars that train wheels travel along. The measurement between the rails is rail gauge, which is a very important aspect of railroad development. If that measurement is incorrect by even a few centimeters, trains could derail. However, not all railroads use the same gauge.



Standard Gauge and Narrow Gauge are the two main types of railroad gauges in the United States. Narrow gauge railroad tracks can have many different widths. We will be focusing on the narrow gauge railroad of the Denver & Rio Grande in the Southwestern United States, which is 3-foot narrow gauge.

Standard Gauge

Standard Gauge is the gauge most widely used on railroads in the United States. The measurement between the rails is 4 feet 8 1/2 inches.

This number may sound a little weird, but there is a reason for it, and it started a long time ago, in a land across the Atlantic Ocean.

When the Ancient Romans crossed the channel from Europe to Britain in the first century, their goal was to take over. They brought an army complete with chariots. As the chariots crossed Britain, they left ruts across the countryside, creating roads. After the Romans left, the English made wagon wheels the same distance apart as on the Roman chariot. This allowed them to continue using the roads (and ruts) without breaking wheels and axles on their wagons.



Del Vaga, P. Apollo Driving the Chariot of the Sun [Photograph]. Art Institute of Chicago. <https://www.artic.edu/artworks/82070/apollo-driving-the-chariot-of-the-sun>

What's the difference?

There are 12 inches in a foot.

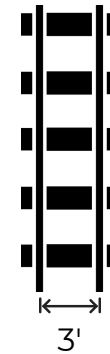
Standard gauge = 4 feet 8 1/2 inches wide.

Narrow gauge = 3 feet

Standard Gauge



Narrow Gauge



How many inches wider is standard gauge than narrow gauge?

Converting the Narrow Gauge

By 1909, much of the Denver & Rio Grande's narrow gauge had been converted to standard gauge. Due to the steep hills and tight turns required to get from Antonito, Colorado, to Chama, New Mexico, the San Juan Extension from Alamosa to Durango remained narrow gauge. The Cumbres & Toltec Scenic Railroad still runs on a 64-mile stretch of this narrow gauge line.

Three-Rail Track

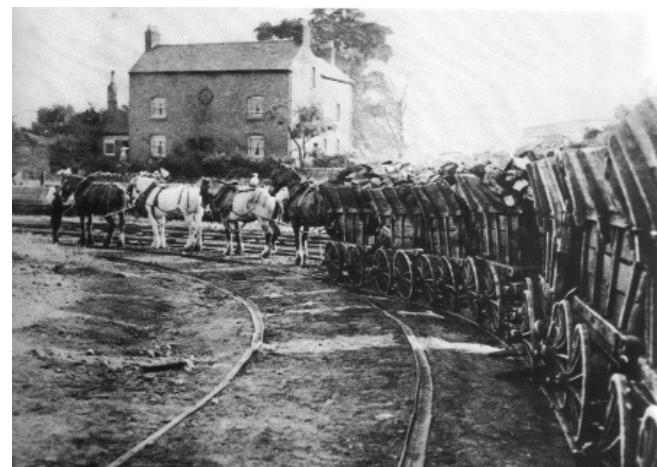
The track from Alamosa to Antonito became both standard gauge and narrow gauge by adding a third rail. The three-rail track could be used by both standard gauge and narrow gauge trains. Sometimes trains would combine standard and narrow gauge cars in one train by using a flat car with two couplers so they could connect to standard gauge or narrow gauge cars.



You are probably wondering what Roman chariots and English wagons have to do with American trains, and we are getting there, I promise.

The English wagon builders began building wagon tramways or wagonways. Rails were laid down at the same width as wagon wheels. Then, wagons were strung together in a line and pulled down the tracks by horses. These were called wagonways. The rails under the wheels allowed a few horses to pull multiple wagons along the tramway easily.

The same people who built the early wagonways were England's early railroad builders. Many of the parts used in early American railroads came from England. These included locomotives, tools, and even laborers. Because much of our equipment came from England, many of our railroads are built in the same standard gauge as England's.



"Illustrated History of the Railroads", Public domain, via Wikimedia Commons

Narrow Gauge

Narrow gauge is a gauge that is narrower or has less space between the rails than standard gauge. The Cumbres & Toltec Scenic Railroad, originally part of the Denver & Rio Grande, is a 3-foot narrow gauge railroad.

The Denver & Rio Grande Railroad was built in the late 1800s. Much of the railroad runs through mountain ranges. The railroad was built to carry goods like lumber, silver, coal, and passengers.

Why do you think they built a narrow gauge railroad instead of standard gauge?

The railroad's builders thought they could save money by creating a narrow gauge line. They were also able to save time and manpower because the roadbeds were narrower and required less blasting of rock and cutting of trees.

The standard gauge locomotive is the larger one on the left and the narrow gauge locomotive is the smaller one on the right.



What made Narrow Gauge cheaper?

1. Narrow gauge rail was lighter than standard gauge rail because narrow gauge equipment that traveled on the rail was lighter, which made it cheaper.
2. Equipment was cheaper. Locomotives, cars, and maintenance of way equipment would be smaller and lighter.
3. Narrow gauge road beds were narrower. The road bed is the rocks and other materials that can be found under the rails. The roadbed supports the rail and helps hold it in place.
4. Lighter rail and narrower road beds meant the line could make tighter curves along canyon walls and climb steep mountains.
5. Smaller roadbeds also meant the railroad could be built more quickly, saving money on labor and wages.



The standard passenger car is the larger passenger car, while the smaller car is a narrow gauge passenger car.