

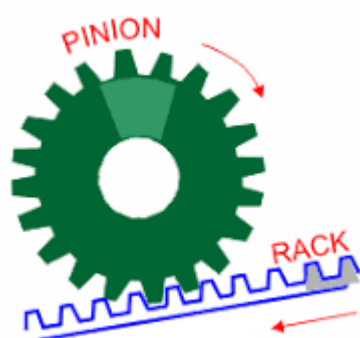
Inclines

Hills and trains

Do you find it hard to go up a hill on your bike?

Trains find it really difficult to go up hills too.

For most railways, the wheels go round to move a train along the track and they are able to climb a gentle slope.

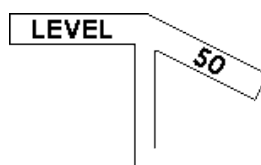


On steep mountains special parts are needed to help the engine get to the top.

A metal track called a **rack** was put between the rails. A cog (called a **pinion**) was put on the engine. This stopped the engine from slipping.

Did you know...?

Snowdon Mountain Railway uses a **rack and pinion** track?



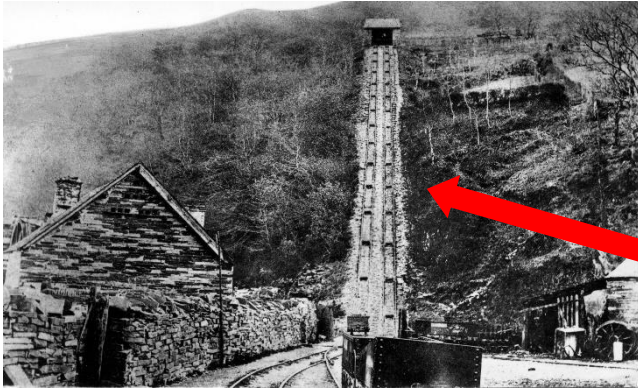
Look out for signs like this when you are on a train. They tell you how steep a track is.



Look out for signs like this when you are in your car. They tell you how steep a road is.

Challenge 1: Can you draw a picture of a train going up a mountain?

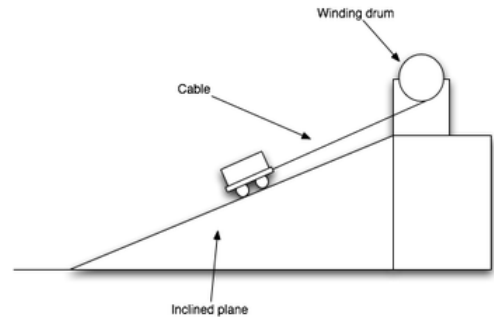




Some railways, like the Talylyn Railway, used a special slope called an **incline** to move wagons up and down steep hills.

This is an incline.

A strong, metal wire called a **cable** pulled an empty wagon up the incline. The cable helped wagons to go down the incline too.



Question - Why was metal a good material to use as a cable?

If the cable snapped or the wagons were not filled very evenly the wagon could fall off the incline. This was not a good thing.

Challenge 2: The end of this story has gone missing. Can you write (or tell someone) the end of the story?

It was a cold, wet day at the quarry. All of the wagons were waiting at the top of the incline. They had been packed neatly with strong, slate roof tiles and were looking forward to going down the slope to meet the steam engine at the bottom. First, wagon Number One went, then Number Two. Next it was the turn of wagon Number Three. The long, metal cable was attached to the end of the wagon and the drum started to turn slowly. Suddenly wagon Number Three spotted that the cable was very rusty and about to break...

Challenge 3: Can you make a ramp and find some things to roll down your ramp?

What happens if you put some material on your ramp? Do the things roll quicker or slower? Try foil, a soft cloth, sandpaper, a towel.

What happens if you make your ramp steeper?

What happens if you make your ramp less steep?