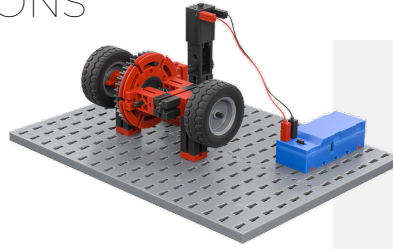


Model 7

Differential gear



Note on the history of technology: The differential drive was patented in 1828 by Onésiphore Pecqueur (1792–1852) as an essential element of his steam-powered automobile. However, it is very similar to the "dynamometer" published by James White as early as 1822. The differential gear may have been known to the Chinese as early as the 3rd century AD: it was probably used by the engineer Ma Jun (200–265) in the construction of a mechanical "compass cart" that always pointed in the same direction.

The students receive the construction instructions for building the differential gear.

Date

Name

Class



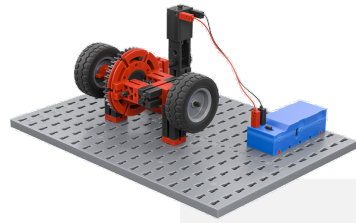
CONSTRUCTION TASK

When cornering, the inner wheel turns more slowly, while the outer wheel turns faster in the same ratio: the drive speed is therefore distributed between the two wheels.

When a vehicle with a differential gear takes a tight corner, the differential ensures that the wheels on the outside of the curve turn faster than those on the inside. Without this gear, the wheels would be forced to turn at the same speed, which would lead to slippage, increased tire wear, and poorer cornering stability. The differential therefore compensates for the differences in speed and enables smooth and stable cornering. Differential gear.

THEMATIC TASK

1. The differential gear transmits the rotation of the drive axle with a crown wheel to an output axle rotated by 90° , thereby slowing it down by a ratio of 1:3.2.
2. If one wheel locks, the other rotates at twice the speed of the drive axle.



Date

Name

Class

EXPERIMENTAL TASK

1. If one wheel spins, the other remains stationary because the differential transmits the drive to the axle with the least resistance.
2. A differential lock can be implemented, for example, by means of a second axle parallel to the output axle, which can be connected to the output axle on each side of the differential via a gear wheel or chain drive, so that the two side axles must rotate at the same speed.



APPENDICES

Building instructions and templates for the gears and models:

Model 7: Construction manual for differential gear.