# Solution sheet

# Gears Task 5 – Transmission gearing (III)

There are different solutions for some of the experimental tasks, each of which have advantages and disadvantages. Students should compare and evaluate these solutions. Calculating the gearing ratios between input and output drive is a good and practical application for fractions.

## Experimental task

1. The axle of the Z30 can be used, for instance, to add a gearing ratio, gearing down of 10:40 (Z10 to Z40), and from there further gearing down of 10:20 (Z10 to Z20).

2. Overall, this results in a gearing down of 1:30 x 1:4 x 1:2 = 1:240.

Solution in group work:

A much greater gearing down can be achieved if a Z40 is mounted on the output axle of the worm gear instead of the Z30. If you attach another worm gear to the output axle, which in turn drives a Z40, and attach another worm gear to its output axle that drives a Z40 (and so forth), then you will achieve a gearing down of (1:40)n with n = number of worm gears.

The large building panel can be used to build such an “infinity machine”.

References:

Wolfgang Bürger: *Nur zwölf Stunden bis zur Ewigkeit.* Spektrum der Wissenschaft, 2/2004, p. 102-103. (<https://www.spektrum.de/pdf/sdw-04-02-s102-pdf/835752>)

Arthur Ganson: *Maschine mit Granit (machine with concrete)*, Youtube, <https://youtu.be/8jeQ1gK1J-E>

Remadus: *Die Ewigkeitsmaschine*. Youtube, <https://youtu.be/AZ3EDa-qM34>

Dirk Fox: *Die Ewigkeitsmaschine*. ft:pedia 1/20215, S. 41-43. (https://ftcommunity.de/ftpedia/2015/2015-1/ftpedia-2015-1.pdf#page=41)