Mesh two different sized gears.

Have a twisting contest with a partner! Which gear amplifies force?

Try spinning your gears, switching the input and output gears. Which way amplifies speed?

Try different sets of gears!
MECHANICAL ADVANTAGE RUBBER BAND RACER

HOW’S IT WORK?

Amplifying Force

- Small input gear
- BIG OUTPUT GEAR

\[
\frac{1}{2} \text{ distance} \quad 2\times \text{TORQUE}
\]

Mechanical Advantage = 2

Find mechanical advantage using the gears’ teeth.

Amplifying Speed

- BIG INPUT GEAR
- Small output gear

\[
2\times \text{DISTANCE} \quad \frac{1}{2} \text{torque}
\]

Mechanical Advantage = \(\frac{1}{2}\)

When mechanical advantage is bigger than 1, force goes up (and speed goes down).

When mechanical advantage is less than 1, force goes down (and speed goes up).

Optional

GEAR TRAINS

Make a gear train! Can you get more speed? Force?

What if you use compound gears in your gear train?

Compound gears are two gears on the same axle.

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