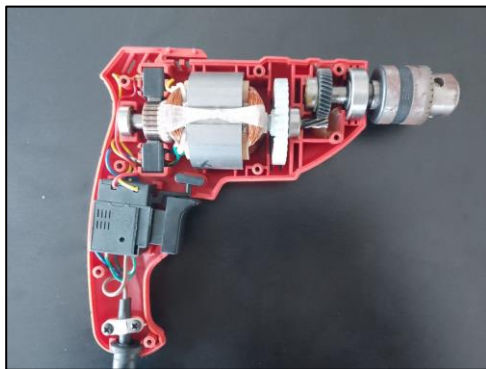


## Gears: Electric Drills

### Background

Gears are found everywhere, in all kinds of machines and tools. There are different types and shapes of gears that give them a wide range of uses. Gears can be found in cars, clocks, pumps, blenders, bicycles, elevators, and so many other places.



One of the most used tools with gears is an electric drill. The gears in an electric drill provide versatility by allowing different settings. A low speed/high torque setting is best for driving screws whereas a high speed/low torque setting is best for drilling. Drills are one of the most common tools used in the trades. They are used by construction workers, carpenters, plumbers, auto mechanics, electricians and any other profession that requires drilling circular holes, inserting screws or threading fasteners into materials.



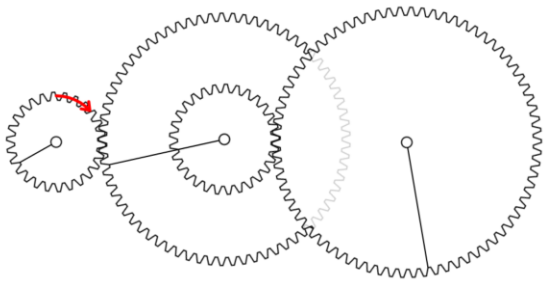
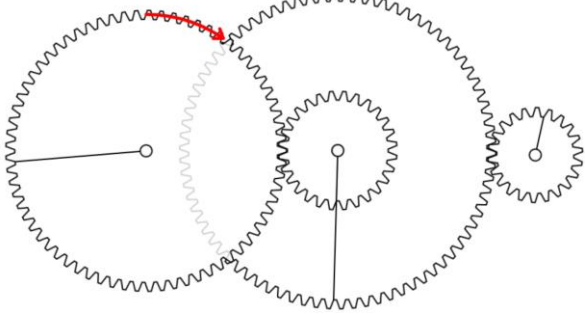
### Materials

- Two small Lego gears
- Two large Lego gears
- Lego Technic axle rods
- Lego Technic bricks with holes

### Procedure

1. Drills use compound gears to get the desired torque or speed for drilling.
2. Challenge students to create a gear train for the highest possible torque (force) using the four gears. This gear train will have a low speed.
3. Challenge students to create a gear train for the highest possible speed using the four gears. This gear train will have low torque.
4. Here is how to create high torque or high-speed gear trains:

5.

High Torque/Low Speed	High Speed/Low Torque
	
	
<p>A small input gear connected to a large output gear generates torque. Compounding it generates more torque.</p>	<p>A large input gear connected to a small output gear creates more speed. Compounding it generates more speed.</p>

**Sources**

Drill picture: <https://www.tatoltool.com/electric-drill-and-its-components/>

Gears: <http://www.gearsket.ch/>