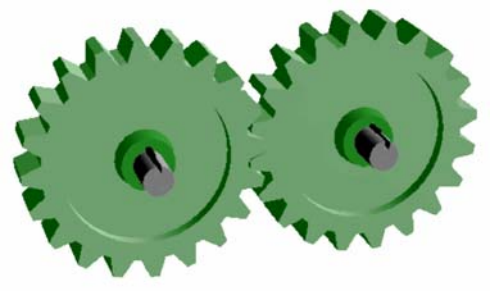
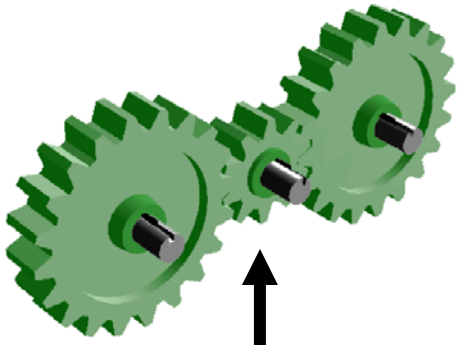
Simple Gears – A Gear Train



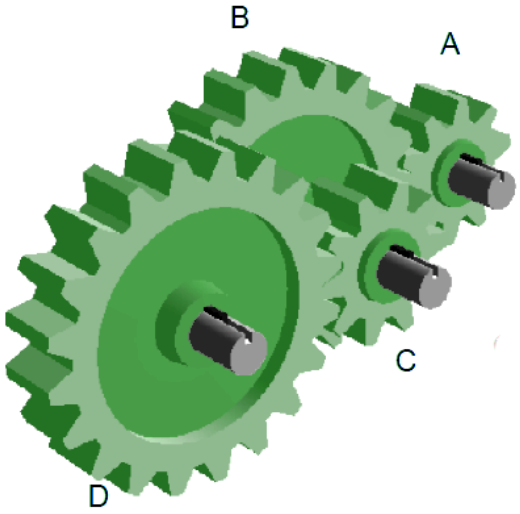
GEAR TRAIN

- A simple gear train uses two gears, which can be of different sizes.
- If one of these gears is attached to a motor or a crank then it is called the ***driver gear***.
- The gear that is turned by the driver gear is called the ***driven gear***.



IDLER GEAR

- When a simple gear train has three meshed gears, the middle gear - between the driver gear and the driven gear - is called an ***idler gear***.
- An idler gear does not affect the gear ratio (velocity ratio) between the driver gear and the driven gear.



- Compound gear trains involve several pairs of meshing gears. They are used where large speed changes are required - or to get different outputs moving at different speeds.
- Gear ratios often called 'velocity ratios' (VR) and are calculated using the same principle as for simple gear trains – which is:
- VR = number of teeth on the ***DRIVEN*** gear divided by the number of teeth on the ***DRIVER*** gear.

However in a compound gear train, the velocity ratio for each pair of gears must then be multiplied together to calculate the total velocity ratio of the whole gear train:

Total VR = VR1 x VR2 x VR3 x VR4 ….. etc.

$$\text{Gear Ratio} = \frac{\text{no of teeth on B}}{\text{no of teeth on A}} \times \frac{\text{no of teeth on D}}{\text{no of teeth on C}}$$