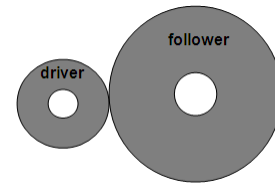
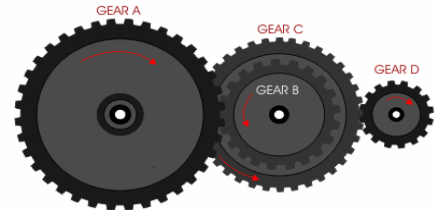


Speed & Gearing Equations

$$\text{Gear Ratio} = \frac{\# \text{ Follower Teeth}}{\# \text{ Driver Teeth}}$$



$$\text{Compound Gear Ratio} = \frac{\# \text{ Follower Teeth (B)}}{\# \text{ Driver Teeth (A)}} \times \frac{\# \text{ Follower Teeth (D)}}{\# \text{ Driver Teeth (C)}}$$



$$\text{Circumference} = \pi d$$

Distance travelled per minute

$$\text{Distance} = \text{Motor RPM} * \text{Circumference}$$

Distance travelled per second

$$\text{Distance} = \frac{\text{Motor RPM} * \text{Circumference}}{60}$$

Distance travelled per minute
(when using a gear ratio)

$$\text{Distance} = \frac{\text{Motor RPM}}{\text{Gear ratio}} \times \text{Circumference}$$

Distance travelled per second
(when using a gear ratio)

$$\text{Distance} = \frac{\frac{\text{Motor RPM}}{\text{Gear ratio}} \times \text{Circumference}}{60}$$

Set distance to travel per second
(eg. I want to go 5cm/sec)

$$\text{Gear Ratio} = \text{Motor RPM} / \frac{\text{Distance to travel (seconds)}}{\text{Circumference}} \times 60$$

Degrees of travel in seconds
(eg. Want arm to go 90° in 5 seconds)

$$\text{Gear Ratio} = \text{Motor RPM} / \frac{\text{degrees to travel}}{360} \div \frac{\text{time (s)}}{60}$$