

## Plastic Gear Set For Wheel Drive Gear Transmission



This is 3 gear set which is suitable for building a simple version of the small works of science and technology. Gears are machine elements that transmit motion by means of successively engaging teeth. The gear teeth act like small levers. Plastic gears also open new opportunities for more efficient transmissions in many products along with reduced drive drive-cost, weight, noise and wear.

### **FEATURES:**

- Cost effectiveness of the injection-moulding process.
- Elimination of machining operations; capability of fabrication with inserts and integral designs.

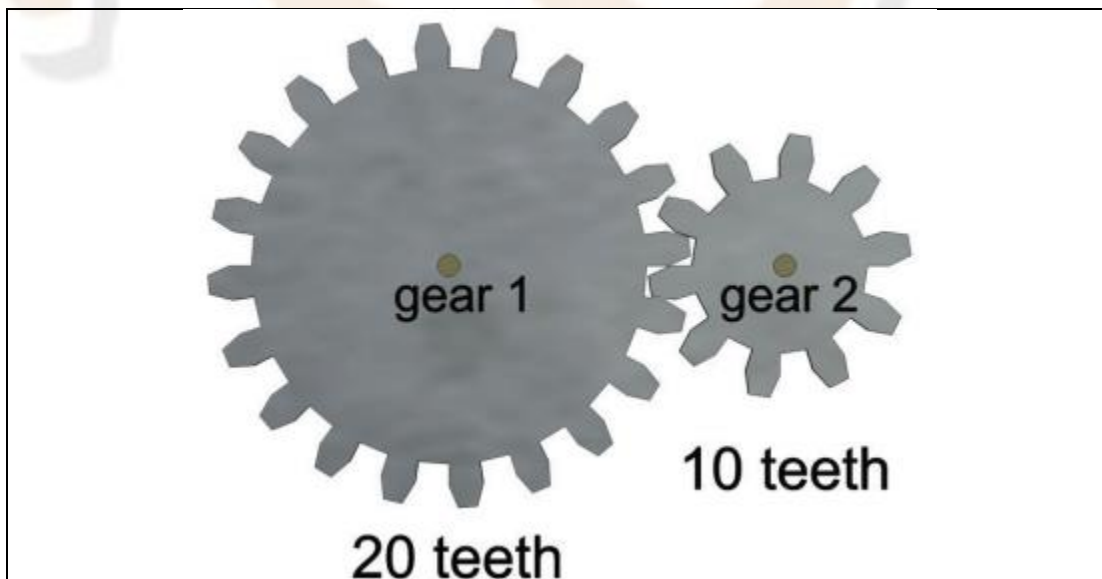
- Low density, lightweight, low inertia. Uniformity of parts.
- Capability to absorb shock and vibration as a result of → elastic compliance.
- Ability to operate with minimum or no lubrication, due to inherent lubrication.
- Relatively low coefficient of friction.
- Corrosion-resistance; elimination of plating, or protective coatings.
- Quietness of operation.
- Tolerances often less critical than for metal gears. due in part to their greater resilience.
- Consistency with trend to greater use of plastic housings and other components. One step production; no preliminary or secondary operations.
- Reduction in the overall lubrication of the gears.

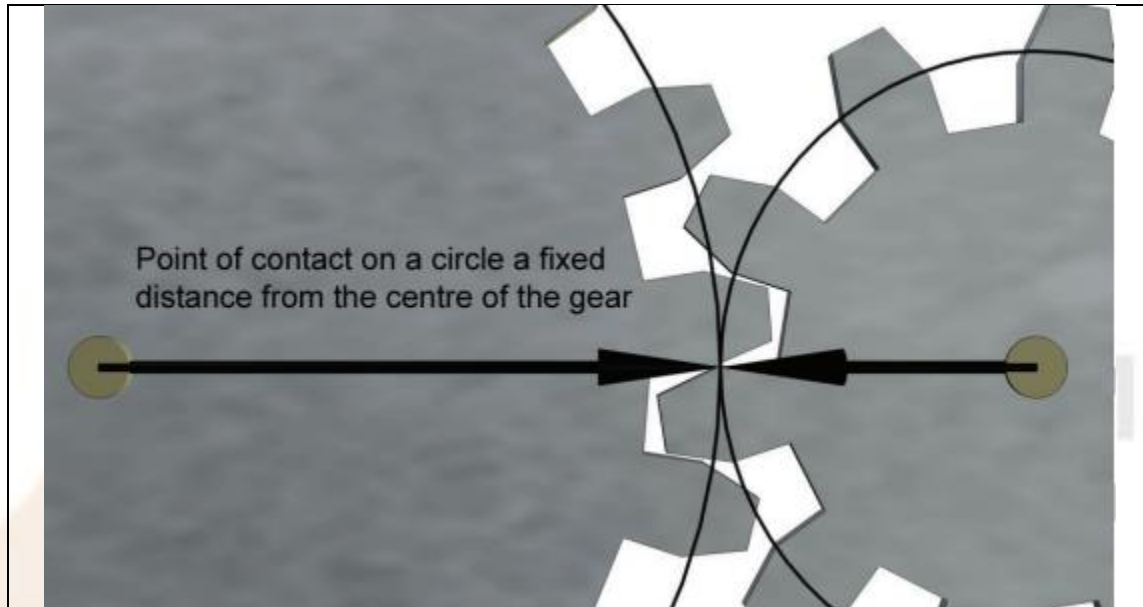
#### **SPECIFICATIONS:**

- Gear modulus: 0.5M
- Gear Aperture: Suitable motor with shaft diameter of 1.0mm and 2.0mm

#### **FUNCTIONAL DESCRIPTION:**

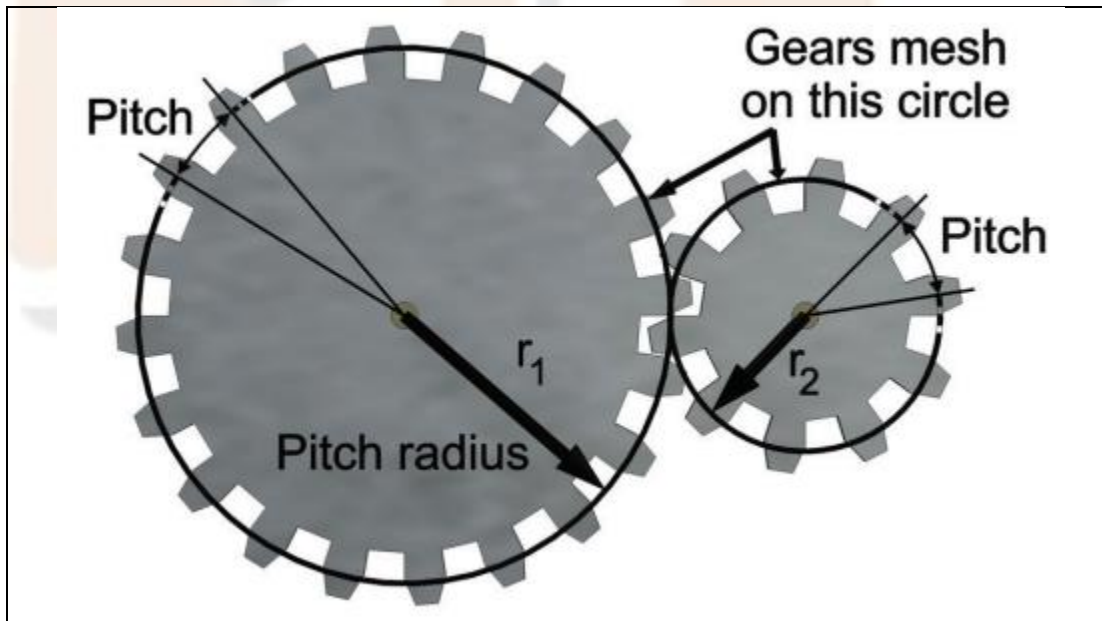
A common gear design is the spur gear. Two inter-meshed spur gears are shown in below diagram. From the point forward in this activity the word gear will be used to mean spur gear.





**CHARACTERISING GEARS:**

The following diagram shows the same two gears.



There are three important numbers that characterize a gear.

**Pitch radius, r:**

The pitch radius is the radius of the circle that passes through the points where two gears mesh. This circle is called the pitch circle and the pitch circles of two connected gears meet at a single point.

**Pitch,p:**

The pitch is the distance around the pitch circle between the same two points on two adjacent teeth.

**Number of teeth,n:**

How many teeth a gear has, an integer. In the case of worms, it is the number of thread starts that the worm has.

**CONNECTNG GEARS:**

The circumference of the pitch circle of a gear of radius r is given by:

$$C = 2\pi r$$

If the pitch of the gears used is p then the number of teeth is given by

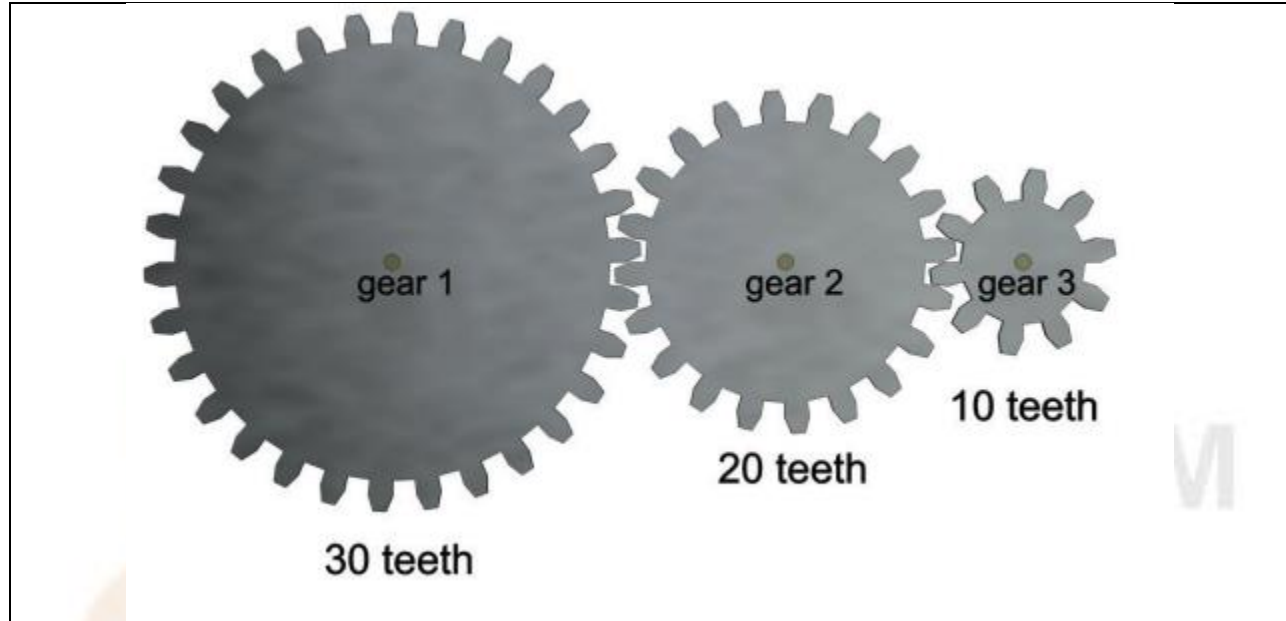
$$n = \frac{2\pi r}{p}$$

**CONNECTING THREE GEARS:**

Recall, the ratio of the turns gear 1 will make, N1, relative to the number gear 2 will make, N2, is related to the ratio of the number of teeth through

$$\frac{N1}{N2} = \frac{n2}{n1}$$

If the number of turns is measured per unit time (i.e. you are measuring the rpm, then this expression gives you the ratio of the speeds of the two gears.



### **TORQUE TRANSMISSION:**

In this section connecting two gears with a different number of teeth leads to an increase or decrease in the speed with which one rotates relative to the other. The ratio of the turns gear 1 will make  $N_1$ , relative to the number gear 2 will make,  $N_2$ , is related to the ratio of the number of teeth through

$$\frac{N_1}{N_2} = \frac{n_2}{n_1}$$

### **TRANSMISSION EFFICIENCY:**

Whenever torque is transferred from one shaft to another using gears there is a loss of available torque due to friction between the gears and in the bearings that hold the axes. For the spur gears used in this example each gear pair will transmit 90% of the torque applied on the driven side.

This is gear efficiency.

**APPLICATIONS:**

Small works of science and technology.

**PACKAGE INCLUDES:**

1x Plastic Gear Set of Small Motor for Wheel Drive Gear Transmission

