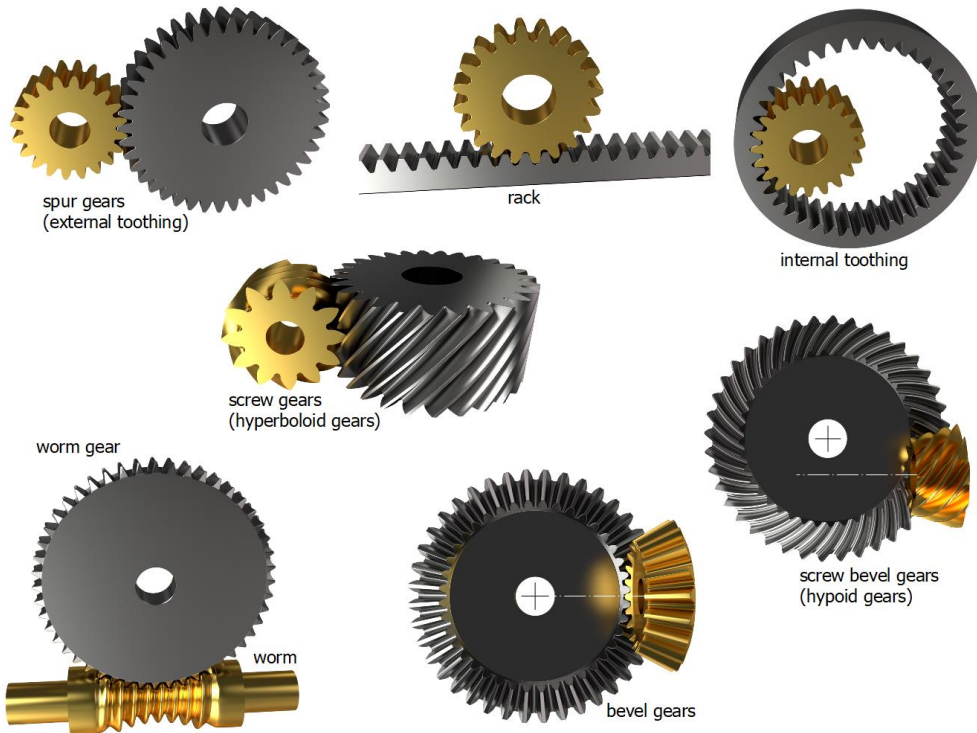


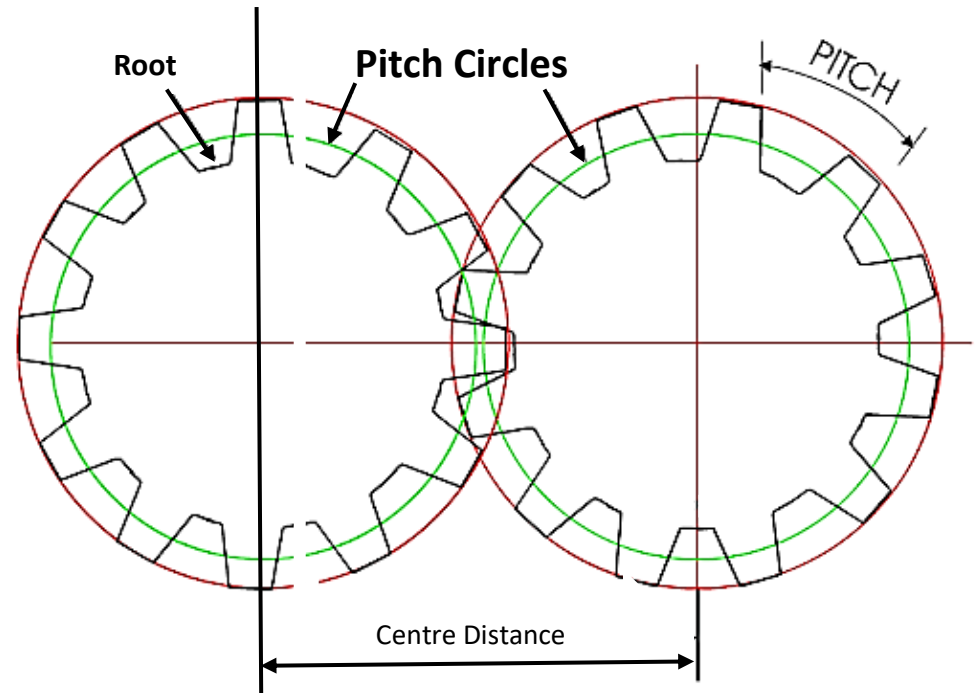
Task 3 Understand Gears, Produce Labelled drawings.

Gears are used by Mechanical Engineers to transfer rotational energy or motion. When gears are joined together they are known as a gear train. In a car, gears help the driver to increase or decrease speed by changing gears through the gear box.

The picture below shows Spur Gears, Rack and Pinion, Internal toothed gears, Screw gears, Screw Bevel gears, Worm Gear and worm and bevel Gears. All sorts of gears!!



There are so many types of gears doing the same job; one gear rotates and drives the gear that is connected to it. The gear that is connected to the Driver Gear is known as the Driven gear.

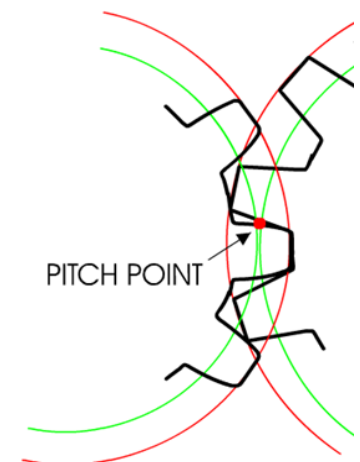


The gears above are known as *spur gears*. The circle marked in red shows the outer limit of the teeth whilst the green circles are known as the pitch circles. The pitch circle of a gear is very important as it is used by engineers to determine the shape of the teeth and the ratio between gears

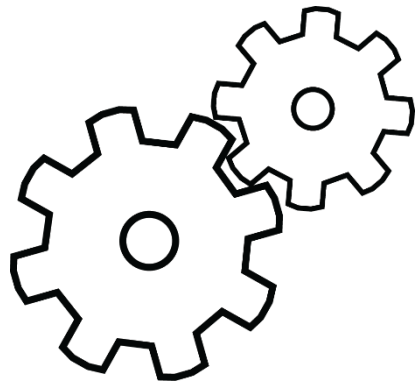
The pitch of a gear is the distance between any point on one tooth and the same point on the next tooth.

The *root* is the bottom part of a gear wheel.

The pitch point is the point where gear teeth contact each other as they rotate.



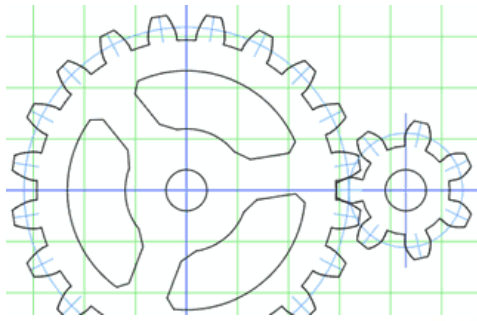
Drawing gears or making 2D card models of gears will help you to understand how they work.



Here are two gears with different pitch circles.

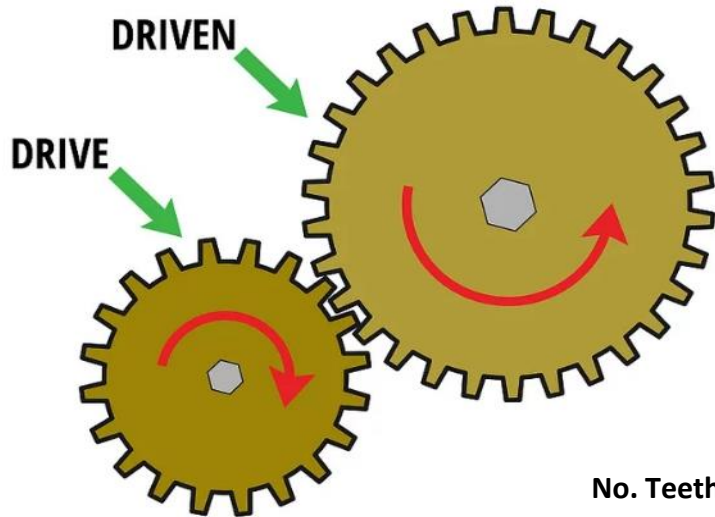
One Gear is driving the other gear.

One gear is known as the Driver, and the other is known as the Driven gear.



Gears have different numbers of teeth.

This relationship is known as the gear tooth ratio or Gear Ratio.



The Gear Ratio = $\frac{\text{No. Teeth on Driver gear}}{\text{No. Teeth on Driven gear}}$

GEAR RATIO EXAMPLE

If the Driven Gear has 20 teeth and the Drive Gear has 30 teeth, then the gear ratio can be calculated

$$\text{The Gear Ratio} = \frac{\text{No. Teeth on Driver gear}}{\text{No. Teeth on Driven gear}} = \frac{30}{20} = \underline{1.5}$$

This means that for every revolution of the Driver Gear there will be 1.5 revolutions of the Driven Gear.

What you need to do

For this task you are being asked to produce at least two A4 pages of labelled drawings and sketches of gears.

You are being challenged to carry out independent research. What can you find out for yourself about Gears, how to draw them, how they work and the different types of gears that engineers use in mechanical systems.

Can you produce examples of how an Engineer would calculate the gear ratio between connected gears?

Watch the videos below to find out more about gears and tips on how to draw them.

Look at the link that will take you to a brilliant website called Technologystudent.com

<http://technologystudent.com/gears1/geardex1.htm>