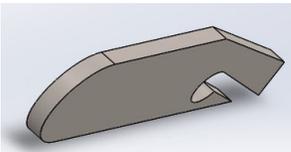
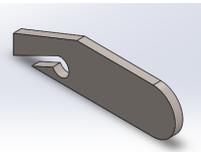


# BOTTLE OPENER - YEAR 9

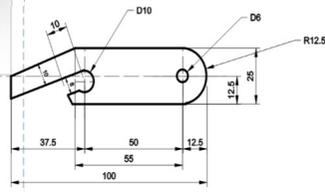


## Design Problem

Some drinks come in a glass bottle. These glass bottles often have a metal cap to seal the drink inside. Many people believe that a drink tastes fresher from a glass bottle.

## Design Brief

Design and make a **Bottle Opener** that can remove the bottle top.



## Marking out

Engineers must be able to make products to the **tolerances** that are given. To help them mark out; Engineers read an Engineering Drawing. This drawing gives you everything you need to know to make the product.

The Bottle Opener needs to be the same size as shown on the Engineering drawing + / o- 0.5mm.

## Metals

There are two groups of metals ;

1. Ferrous
2. Non Ferrous.



Ferrous metals contain **iron**. These metals will rust and attach to magnets. Non-Ferrous metals do **not** contain iron. These metals do not rust or attach to magnets. Metals are often recycled. The problem with this is that they have to be sorted into the same metals group. This is done using magnets.

There is also a separate group of metals called **alloys**. Alloys are a mixture of two or more metals. This is done to enhance the properties of the metal.

**Example** - Chromium, Nickel and Magnesium are added to steel to create Stainless Steel. This alloy is very tough, wear resistant and does not rust. It is therefore used on kitchen sinks and cutlery.

## Hacksaw

After the holes are drilled the straight lines can be cut out using a Hacksaw.



## Pillar Drill

Pillar drills are used to drill **circular** holes into material. When drilling; the work must be clamped down. You must also wear safety goggles.



## Finishing Metals

**Painting** - Paint can be applied with a brush or a spray. Usually a primer is applied first to make the surface smooth then a coloured top coat is applied. **Anodising** - An electric current is passed through the metal which is mixed with a coloured acid. This produces a coloured finish on the metal.

**Plastic Coating** - Metal is heated up and then dipped into a powdered plastic (polymer). The heat melts the plastic which leaves a smooth finish on the metal.

**Anodising** - An electric current is passed through the metal which is mixed with a coloured acid. This produces a coloured finish on the metal.



**Modifications** - All products are developed and modified to suit their customer needs. Most products go through this process so they remain popular and continue to sell well. Think about how the design of the bottle opener could be changed to suit elderly people, or for people with larger or smaller budgets.