Mainly composed of ferrite or iron.
Small amounts of other elements added in such as carbon, nickel, tungsten and chromium.
Almost all ferrous metals are magnetic.
Example are mild steel, stainless steel and carbon steel.
Generally a dull grey colour.
Develops a surface oxide over time which is a reddish brown colour.
# MATERIALS FACTSHEET

## Mild steel

### Properties
- Tough
- Malleable
- Magnetic

### Uses
- Structural steel girders
- Car body panels

### Advantages
- Easily worked and joined, even in a school workshop
- Relatively cheap
- Widely available in numerous forms and sections
- Can be recycled

### Disadvantages
- Will oxidise (rust) if left unprotected
- Can only be case hardened
# Stainless steel

## Properties
- Hard
- Tough
- Excellent corrosion resistance

## Uses
- Cutlery
- Kitchen sinks
- Pots and pans
- Surgical instruments

## Advantages
- Easily cleaned
- Does not need any surface finishing
- Can be recycled
- High lustre finish

## Disadvantages
- Difficult to use and join in a school workshop
- Specialist welding equipment required for joining
Carbon steel

**Properties**
- Ductile

**Uses**
- Nails
- Screws
- Nuts and general ironmongery

**Advantages**
- Can be recycled

**Disadvantages**
- Will oxidise (rust) if left unprotected
- Can be easily heat treated
Non-ferrous metals

- Contain no iron
- Consist almost entirely of pure metals
- Not magnetic
- Examples are Aluminium, copper, zinc, and brass
- Good conductors of heat and electricity
## Aluminium

<table>
<thead>
<tr>
<th><strong>Properties</strong></th>
<th><strong>Uses</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Lightweight</td>
<td>• Window frames</td>
</tr>
<tr>
<td>• Soft</td>
<td>• Soft drink cans</td>
</tr>
<tr>
<td>• Ductile</td>
<td>• Kitchen foil</td>
</tr>
<tr>
<td>• Malleable</td>
<td>• Used in alloys</td>
</tr>
<tr>
<td>• Good conductor of heat and electricity</td>
<td></td>
</tr>
<tr>
<td>• Good corrosion resistance</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Advantages</strong></th>
<th><strong>Disadvantages</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Easily drawn into thin wires and sheets</td>
<td>• Expensive</td>
</tr>
<tr>
<td>• Can be recycled</td>
<td>• Difficult to weld as specialist equipment is required</td>
</tr>
<tr>
<td>• Easily cast</td>
<td></td>
</tr>
</tbody>
</table>
# Materials Factsheet: Copper

## Properties
- Malleable
- Ductile
- Good conductor of heat and electricity
- Corrosion resistant

## Uses
- Electric cables
- Plumbing fittings and pipes
- Hot water cylinders

## Advantages
- Easily drawn into thin wires
- Can be recycled
- Easily soldered

## Disadvantages
- Expensive
- Will tarnish (change colour) over time.
Brass (alloy)

**Properties**
- Good resistance to corrosion
- Good fluidity, casts well
- Good conductor of heat and electricity

**Advantages**
- Can be polished to achieve a high-lustre finish
- Tougher than copper
- Can be recycled
- Easily cast and turned

**Uses**
- Plumbing fittings
- Marine fittings

**Disadvantages**
- Relatively expensive
### MATERIALS FACTSHEET
#### zinc

<table>
<thead>
<tr>
<th>Properties</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Excellent resistance to corrosion</td>
<td>• Protective coverings for railings and dustbins</td>
</tr>
<tr>
<td></td>
<td>• Negative battery terminals</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Can be recycled</td>
<td>• Brittle</td>
</tr>
</tbody>
</table>
Alloys

- A metal that is formed by mixing two or more metals.
- An endless list is possible, each with their own properties such as increased hardness.
- Alloys are normally grouped as ferrous or non-ferrous.
- Both Mild steel and brass are alloys;
  - Mild steel is 99.8% iron, 0.2% carbon
  - Brass is 65% copper, 35% zinc