Topic: Metal Insects

3D Design

The manipulation of materials to create creatures

READ.

Metals

Many products are made from metal, and understanding the way each metal will function is vital. For example, if a metal is needed for strength and lightweight **properties**, then **aluminum** could be a possibility. Many sports cars are made of aluminum, as are areophane shells and wings.

Ferrous Metals

Ferrous metals are metals that consist mostly of iron and small amounts of other elements.

Ferrous metals are prone to rusting if exposed to moisture. Ferrous metals can also be picked up by a magnet. The rusting and magnetic properties in ferrous metals are both down due to the iron. Typical ferrous metals include mild steel, cast iron and steel.

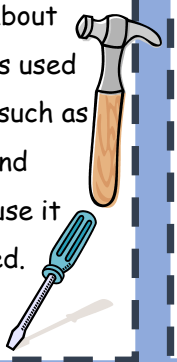
Non-Ferrous Metals

Non-ferrous metals are metals that do not have any iron in them at all.

This means that Non-ferrous metals are not attracted to a magnet and they also do not rust in the same way when exposed to moisture. Typical Non-ferrous metals include copper, aluminum (coke cans), tin and zinc.

Tool Steel

This contains about 1% carbon. It is used to make tools, such as screwdrivers and hammers because it can be hardened.

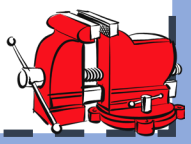


Mild Steel

This is the most common ferrous metals and the softest one. It is grey in colour. It contains about 0.3% carbon. It is used for nuts and bolts, stool legs and car bodies.

Cast Iron

This is heavy, hard and brittle. It is used for vices, drill stands and car engines. These shapes can only be made by casting.



Brass

This is an alloy of copper and zinc. It is heavy, quite hard and gold in colour.

Stainless Steel

Many new metal alloys have been created, which have extra hardness, extra strength or extra resistance to corrosion. Stainless steel does not go rusty in water like other steel.

Copper

This is quite tough but easily shaped and pinkish brown in colour. It conducts heat and electricity well and can be shaped and soldered easily, but it is quite expensive.

Aluminum

This is light, soft, easily shaped and silvery grey in colour. It conducts heat and electricity well. It is used to make window saucepans, cooking foil and aircraft.

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RECALL.

Metals

Many products are made from _____, and understanding the way each metal will _____ is vital. For example, if a metal is needed for _____ and _____ **properties**, then **aluminum** could be a possibility. Many sports cars are made of aluminum, as are areophane shells and wings.

Ferrous Metals

Ferrous metals are metals that _____ mostly of _____ and small amounts of other _____.

Ferrous metals are prone to _____ if exposed to _____. Ferrous metals can also be picked up by a _____. The rusting and magnetic _____ in ferrous metals are both down due to the _____. Typical ferrous metals include mild steel, cast iron and steel.

Non-Ferrous Metals

Non-ferrous metals are metals that ___ _____ have any iron in them at all.

This means that Non-ferrous metals are not _____ to a magnet and they also do not _____ in the same way when _____ to _____. Typical Non-ferrous metals include _____, aluminum (coke cans), tin and _____.

Tool Steel

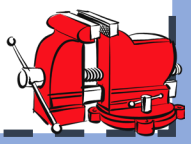
This contains about ___ carbon. It is used to make _____, such as screwdrivers and hammers because it can be _____.

Mild Steel

This is the most common _____ metals and the _____ one. It is grey in colour. It contains about _____% carbon. It is used for ___ and _____, stool legs and car bodies.

Cast Iron

This is _____, hard and _____. It is used for _____, drill stands and car engines. These shapes can only be made by _____.



Brass

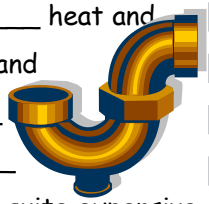
This is an _____ of _____ and zinc. It is heavy, quite _____ and gold in colour.

Stainless Steel

Many new metal _____ have been created, which have extra _____, extra _____ or extra _____ to _____. Stainless steel does not go rusty in water like other steel.

Copper

This is quite _____ but easily _____ and pinkish brown in colour. It _____ heat and _____ well and can be _____ and _____ easily, but it is quite expensive.



Aluminum

This is _____, _____, easily shaped and silvery grey in colour. It conducts _____ and electricity well. It is used to make windo frames, _____, coo and aircraft.

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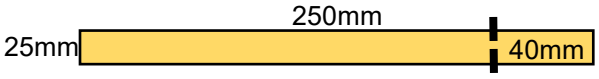
RETRIEVE.

Mathematics

If you were given a piece of copper which was 250mm x 25mm and you cut off 40mm. What is the area of the piece of copper you would be left with?



Total area left _____

Health & Safety

List 2 potential hazards that need to be considered when carrying out sheet metalworking tasks.

1 _____

2 _____

Metalworking processes

Choose two of the processes you used to make your insect. Explain, using full sentences with adjectives and connectives, the technique for carrying out the process.

Process 1: _____

Technique _____

_____

Process 2: _____

Technique _____

_____

Common types of metals

Name the type of metal each of these products is made from:

Drinks Cans	Plumbing Connections	Cutlery	Trombone
			
.....	.....	.....	.....

Topic: Metal structures

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RETRIEVE & APPLY.

Properties

Read the boxes at the bottom of the table carefully. Re-write them into the correct box on the table below to describe the properties and uses of the four metals.

Metal	Properties	Uses
Aluminium		
Copper		
Gold		
Steel		

Jewellery

Good conductor of electricity, resistant to corrosion, easily shaped, flexible

Shiny, very resistant to corrosion, very unreactive, soft, easily shaped,

Very strong, very dense

Electrical wiring, water pipes

Lightweight structures, aircraft, drinks cans, high voltage cables

Low density, strong, resistant to corrosion, good conductor of electricity

Large structures, and heavy-duty engineering such as bridges, trains, cars etc