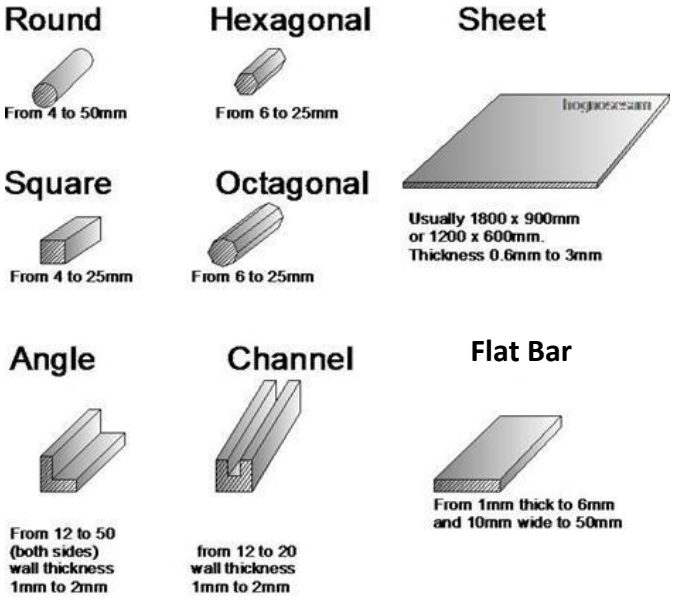
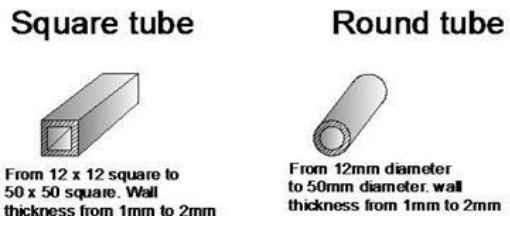
NAME: _____

Common Metal Shapes & Sizes

Most manufacturers use common shapes and sizes for making their products. It is cheaper and easier to obtain. Unusual sized materials commonly have to be specially made and cost more to produce. The most common shapes are round, square, hexagonal, octagonal, strip, sheet, angle, channel, round tubes and square tubes. Some of the most common sizes are shown below. The shaded areas of the shapes are the 'cross-section' of the material which is what the metal looks like when it is cut across its length. Round material is called BAR when it is thick, ROD when it is medium diameter and WIRE when it is thin. When sheet material is thick, it is called Plate material.

Round and round tubes are measured across their diameter.
Hexagonal and octagonal shapes are measured across their flats (A/F)
Wall thickness (W) is the thickness of the tube, pipe etc.





Metals fall into three main groups

1. **Ferrous Metals** - **Those metals which contain iron. They are almost always magnetic and almost always rust. Examples could be MILD STEEL, CAST IRON and CARBON STEEL. Basically, the Metals manganese, iron, nickel, cobalt and there are all magnetic.**

2. **Non-Ferrous Metals** - **Those metals that do not contain iron. Examples could be COPPER, ALUMINIUM, TIN, SILVER, PLATINIUM, GOLD and LEAD. These are not magnetic.** An alphabetical list of metals include: Aluminium, Antimony, Barium, Beryllium, Bismuth, Brass, Bronze, Cadmium, Calcium, Copper, Gold, Lead, Lithium, Magnesium, Mercury, Molybdenum, Pewter, Platinum, Plutonium, Potassium, Radium, Rhodium, Silver, Sodium, Solder, Strontium, Tin, Titanium, Tungsten, Uranium, Vanadium and Zinc

3. **Alloys** - **A mixture of metals or a metal and small quantities of other substances. These materials can be further grouped into FERROUS ALLOYS, examples of which might be STAINLESS STEEL (Steel and Chromium), HIGH SPEED STEEL (Steel and Tungsten) and NON-FERROUS ALLOYS, examples of which might be BRASS (Copper and Zinc), BRONZE (Copper and Tin) and DURALAMIN (Aluminium and Copper). Mixtures are made to alter the properties of a metal. For example adding tin to copper makes the resulting metal (BRONZE) harder than just copper and it also makes it more resistant to weather (that is why they make statues out of it).**

QUESTIONS

1. Which type of Ferrous metal would be suitable to make tough kitchen sink units from? The surface would have to withstand shocks and wear and water flooding.

2. Name the Ferrous metal that most work-shop tools are made from?

3. Give an example of a suitable ferrous metal that may be used to make garden tools?

4. Why are the majority of wire electrical cables made from copper?

5. Name a Non-ferrous metal that is used to protect dental nurses, doctors and dentists from the harmful radiation that is given off when using X-rays?

6. How are steel corrugated roofs made water resistant?

7. Why are the panels of certain cars made from Aluminium?

8. Name a Non-Ferrous metal that is suitable to make ornaments ?

9. Give the name of the metal that is suitable to make jewellery from? Why is it a good choice?

10. Why is High tensile steel an ideal metal to make car gears from?

NAME AND MELTING POINT	FERROUS/ NON-FERROUS	COMPOSITION EASE of USE	PROPERTIES AND WORKING CHARACTERISTICS * Difficult to work ** Easier to work *** Easy to work	USES
Cast Iron 1200 C	Ferrous	Iron with over 3.3% Carbon	Hard brittle good under compression, cannot be bent. *	Machine parts, disc brakes, vices.
Mild Steel 1600 C	Ferrous	Iron with 0.15% to 0.35% Carbon	Tough, ductile, maleable, rusts easily, easy to weld and braze. ***	Nut,bolts,screws nails, conduit. Often painted to stop rusting.
Medium Carbon Steel 1500 C	Ferrous	Iron with 0.4% to 0.7% Carbon	Hard, strong not as ductile or malleable as mild steel. Can weld and braze. **	Springs, some tools.
High Carbon Steel 1800 C	Ferrous	Iron with 0.8% to 1.5% Carbon	Very hard, brittle not ductile or malleable, can weld and braze. **	Most workshop tools and machine tools.
Stainless Steel 1400 C	Ferrous	Iron, Chromium, Nickel and Magnesium	Hard,tough resists wear and corrosion. *	Kitchen utensils cutlery sinks.
Aluminium 660 C	Non-Ferrous	Pure metal	Excellent weight to strength ratio. Soft, light, easily polished. Not easy to join. ***	Pots, pans, cans, kitchen foil.
Duralamin 650 C	Non-Ferrous	Aluminium, Copper, Manganese and Magnesium	Strength like that of mild steel but much lighter. Machines easily. **	Aeroplanes and parts, bridge structures.
Copper 1080 C	Non-Ferrous	Pure Metal	Tough, malleable, ductile, easily joined with silver solder soft solder and braze. Polishes well. Good conductor of heat and electricity ***	Electrical wire, water pipes, water cylinders
Brass 900-1000 C	Non-Ferrous	Copper and Zinc	Harder than copper resists corrosion soft and silver solders easily. Good conductor of heat electricity. Polishes easily.	Castings, ornaments, fixtures and fittings.

			Good for casting.*	