







Metals Chooser Chart

Different metals or alloys have different properties. Use the chooser chart below to help you choose which is the best metal for your design.

Metal	Aluminium alloy	Copper	Brass	Silver	Mild Steel	Carbon Steel
Colour	silver white	pinkish brown	yellow	bright silver	silver grey	dark grey
Type	non ferrous				ferrous	
Composition	aluminium + traces of copper, magnesium, manganese for hardness	virtually pure copper	alloy of copper and 35% zinc (gilding metal 15% zinc)	silver + 7.5 % copper for hardness (sterling silver)	iron + 0.15 - 0.35% carbon	iron + 0.35 - 1.15% carbon
Source	bauxite mined in Africa, Australia and USA	copper, zinc and ore mined in North and South America, Africa and Russia		mined in North and South America	iron ore mined in Sweden, USA and Russia	
Extraction & processing	electrolysis of aluminium oxide produced from bauxite	smelting of ore and electrolysis		smelting	iron produced in blast furnace is made into steel in a basic oxygen furnace or electric-arc furnace	
Commercial uses	car engine castings & extruded window frames	plumbing and electrical wiring	locks and water taps	jewellery and specialist electrical wiring	car bodies and major structures	tools
Disposal	RC	RC + RU	RC	RC + RU	RC + RU	RC
Durability	tarnishes quickly, corrodes slowly	tarnishes slowly corrodes very slowly	tarnishes slowly corrodes very slowly	tarnishes slowly, corrodes very slowly	tarnishes quickly, corrodes quickly	tarnishes quickly, corrodes slowly

Key: RC = commercially recyclable; RU = likely to be found in a form suitable for re-use in school.

Metals Chooser Chart (cont'd)

Metal	Aluminium alloy	Copper	Brass	Silver	Mild steel	Carbon steel
Melting point •C	700 - 750	1080	950 - 1000	960	1300 - 1500	1200 - 1400
Relative price/£	● x 1.5	● x 10	● x 9 ▲	● x 500 ▲▲	●	● x 2
Ease of sourcing	●●●●	●●●	●●	●	●●●●●	●●●
Hardness (how difficult it is to scratch)	●	●●	●●●	●●	●●●	●●●●●
Strength (how difficult it is to break)	●	●●	●●●	●●	●●●●	●●●●
Density (how heavy it is)	●	●●●●	●●●●	●●●●●	●●●●●	●●●●●
Modulus of elasticity (how difficult it is to stretch)	●	●●●	●●	●●●	●●●●●	●●●●●
Malleability how easy is to shape)	●●	●●●	●●●	●●●●●	●	●
Electrical conductivity	●●●●	●●●●	●●●	●●●●●	●	●
School uses						
Ease of working by hand	○ ○ ○ ○ ○	○ ○ ○ ○	○ ○ ○	○ ○ ○ ○	○ ○	○
Ease of machining	○ ○ ○	○ ○ ○	○ ○ ○	○ ○	○	N/A

Key: ● = the more ●, the greater the property; ▲ = gilding metal (15% zinc and 85% copper) is often used for jewellery (£s x 12); ▲▲ = nickel-silver (18% nickel, 62% copper and 20% zinc) can be used as a cheaper substitute for sterling silver (£s x 16); ○ = the more ○, the easier the material is to use, N/A = not applicable.