Materials

Listen to the recording and complete the text.

Materials used in engineering are **metals** and _____. A metal is a chemical element that is a good conductor of both _____ and heat and that oxidizes in reaction with oxygen in the air. Common engineering metals include **aluminium**, chromium, _____, iron, magnesium, nickel, titanium and zinc. These are most often used as alloys.

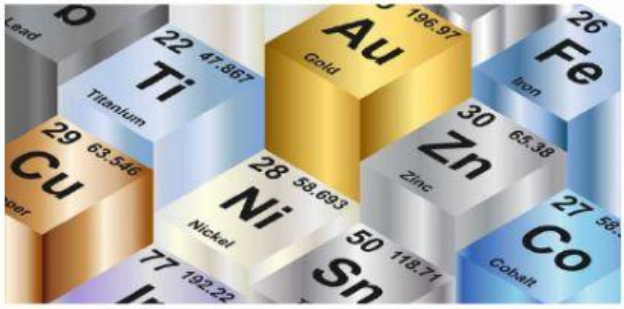
An alloy is a mixture of two or more elements in a solid solution in which the major - _____ is a metal. Most pure metals are either too soft, _____ or chemically reactive for practical use. Alloying a metal with one or more other metals or non-metal elements often enhances its _____.

Of all the metallic alloys in use today, the alloys of iron, i.e. steel, stainless steel, _____, tool steel, structural **steel**, make up the largest proportion both by quantity and commercial use. Iron alloyed with various proportions of _____ gives low, mid and high carbon steels. Graphitization will produce _____where the proportion of carbon will be higher than 2.14%.

Other significant metallic alloys are those of aluminium, alloyed mostly with magnesium, copper and manganese, and copper used to create solid solutions of _____ (copper and tin) and **brass** (copper and _____). Metal alloys are _____ to have high resistance to shear, torque and deformation.

Ferrous is an adjective used to indicate the presence of _____. It is derived from the Latin word meaning "containing iron". **Ferrous metals** include steel and iron with a carbon content of a few percent and alloys of iron with other metals such as _____ steel.

The term **non-ferrous** is used to indicate metals other than iron and alloys that do not _____ an appreciable amount of iron. Non-ferrous metals are utilized in structural applications requiring reduced _____, higher strength, non-magnetic properties, higher melting points, or resistance to chemical and atmospheric _____. They are also specified for electrical and electronic applications.



LIVEWORKSHEETS

1 Listen and complete the definitions with the words in the box.

cooking	coins	alloy	air	copper	wires	steel
carbon	gold	ferrum	expensive	ductile		

Iron: Its Latin name is (1) *ferrum*. It is magnetic and has a silvery colour. In prehistoric times it was used to make ornaments and weapons. If exposed to the (2) _____, it **oxidises**.

(3) _____: It is one of the most widely used metals by humans. In prehistoric times it was used to make cooking utensils, (4) _____ and ornamental objects. It is used in (5) _____ and cables.

(6) _____: It is the most (7) _____ metal and is used to create precious jewellery. It is the most (8) _____ metal.

(9) _____: It is an (10) _____ formed from iron and (11) _____. It can contain between 2.1% and 4% carbon. It is also used for (12) _____ utensils and pans.

Match the words with the definitions

1 alloy	a ☐ a type of plastic used for insulation
2 steel	b ☐ a combination of different metals
3 PVC	c ☐ an alloy formed by mixing iron and carbon
4 concrete	d ☐ an alloy formed by mixing copper and zinc
5 brass	e ☐ metals containing iron
6 ferrous materials	f ☐ a composite material used to build houses
7 ceramic	g ☐ a metal not suitable as structural material
8 iron	h ☐ a good insulator but brittle

LIVEWORKSHEETS