

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.



 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
- 2 steel
- 3 PVC
- 4 concrete
- 5 brass
- 6 ferrous materials
- 7 ceramic
- 8 iron

- a ☐ a type of plastic used for insulation
- b ☐ a combination of different metals
- c ☐ an alloy formed by mixing iron and carbon
- d ☐ an alloy formed by mixing copper and zinc
- e ☐ metals containing iron
- f ☐ a composite material used to build houses
- g ☐ a metal not suitable as structural material
- h ☐ a good insulator but brittle