

Iron

Iron (/ˈaɪərn/) is a [chemical element](#) with [symbol](#) **Fe** (from [Latin](#): *ferrum*) and [atomic number](#) 26. It is a [metal](#) that belongs to the [first transition series](#) and [group 8](#) of the [periodic table](#). It is by mass the most common element on [Earth](#), forming much of Earth's [outer](#) and [inner core](#). It is the fourth most common [element in the Earth's crust](#).

In its metallic state, iron is rare in the [Earth's crust](#), limited mainly to deposition by [meteorites](#). [Iron ores](#), by contrast, are among the most abundant in the Earth's crust, although extracting usable metal from them requires [kilns](#) or [furnaces](#) capable of reaching 1,500 °C (2,730 °F) or higher, about 500 °C (900 °F) higher than what is enough to [smelt copper](#). Humans started to master that process in [Eurasia](#) only about 2000 BCE, and the use of iron [tools](#) and [weapons](#) began to displace [copper alloys](#), in some regions, only around 1200 BCE. That event is considered the transition from the [Bronze Age](#) to the [Iron Age](#). In the [modern world](#), iron alloys, such as [steel](#), [inox](#), [cast iron](#) and [special steels](#) are by far the most common industrial metals, because of their mechanical properties and low cost.

Pristine and smooth pure iron surfaces are mirror-like silvery-gray. However, iron reacts readily with [oxygen](#) and [water](#) to give brown to black [hydrated iron oxides](#), commonly known as [rust](#). Unlike the oxides of some other metals, that form [passivating](#) layers, rust occupies more volume than the metal and thus flakes off, exposing fresh surfaces for corrosion.

The body of an adult human contains about 4 grams (0.005% body weight) of iron, mostly in [hemoglobin](#) and [myoglobin](#). These two [proteins](#) play essential roles in [vertebrate metabolism](#), respectively [oxygen transport](#) by [blood](#) and oxygen storage in [muscles](#). To maintain the necessary levels, [human iron metabolism](#) requires a minimum of iron in the diet. Iron is also the metal at the active site of many important [redox enzymes](#) dealing with [cellular respiration](#) and [oxidation and reduction](#) in plants and animals.^[5]

Chemically, the most common oxidation states of iron are [iron\(II\)](#) and [iron\(III\)](#). Iron shares many properties of other [transition metals](#), including the other [group 8 elements](#), [ruthenium](#) and [osmium](#). Iron forms compounds in a wide range of [oxidation states](#), −2 to +7. Iron also forms many [coordination compounds](#); some of them, such as [ferrocene](#), [ferrioxalate](#), and [Prussian blue](#), have substantial industrial, medical, or research applications.