

one gives electrons away, the other takes them in, and every property on this sheet follows from that

Physical properties of metals and non-metals

Metals

- lustrous, shiny when freshly cut or polished
- malleable, beaten into sheets, and ductile, drawn into wires
- good conductors of heat and electricity
- sonorous, they ring when struck, which is why bells are metal
- hard, strong, high melting and boiling points, solid at room temperature
- high density, and they lose electrons easily to form positive ions

Non-metals

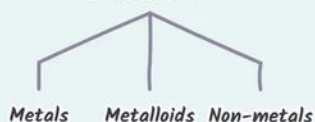
- dull, with no shine of their own
- brittle, a solid one crumbles or shatters when hammered
- poor conductors, they act as insulators
- not sonorous, they give a dead thud
- soft, low melting and boiling points, found as solids, liquids or gases
- low density, and they gain electrons to form negative ions

the whole table comes from one difference: metal atoms hold their outer electrons loosely and the sea of free electrons carries heat, current and the metallic shine

Exceptions worth remembering

- mercury is the only metal that is liquid at 25 C, bromine the only liquid non-metal
- sodium and potassium are so soft they cut with a knife, and so reactive they are stored under kerosene
- gallium and caesium melt in the palm of a hand, well below the boiling point of water
- iodine is a non-metal yet it is lustrous, and graphite is a non-metal that conducts electricity well
- diamond is the hardest natural substance and has a very high melting point, both unusual for a non-metal
- lead and mercury conduct heat poorly for metals, so a rule broken once is still a rule worth quoting

Elements



one heading branching three ways, with metalloids drawn as the middle branch

metalloids such as boron, silicon and germanium show some properties of each side, which is exactly why the middle branch exists