



Minerals can be characterised by their:

1. **Crystalline habit:** due to the arrangement of their atoms (prismatic, cubic, tabular etc.). Sodium chloride forms cubic crystals whereas calcite forms hexagonal ones.
2. **Cleavage:** the planes along which they break and the angles these surfaces make with each other. These can be estimated by eye or a compass. This is due to the bonding between molecules. Mica has one cleavage plane which causes it to break into flat sheets. Iron pyrites (fool's gold) has six which causes it to break into cubic prisms.
3. **Colour:** In most metallic ores colour can be a useful clue to mineral composition, especially once they have been oxidised. Green and blue often indicate copper whilst red usually indicates iron. With crystals trace elements can cause a great variety of colour differences.
4. **Streak:** This is the colour of the powdered mineral and is best seen when rubbed against a white tile of unglazed porcelain. This colour can be quite different from that of the parent mineral. Streak is a better diagnostic characteristic than colour.
5. **Scratch or hardness:** By comparing the ability of one mineral to scratch another, a comparative scale has been developed.

Mohs' Scale

1. Talc
2. Gypsum
3. Calcite
4. Fluorite
5. Apatite
6. Orthoclase
7. Quartz
8. Topaz
9. Corundum
10. Diamond

As a rough guide: your fingernail is 2.5, window glass is 5.5 and a steel nail is 6.0.

6. **Lustre:** This depends on the refraction, absorption and reflection of light on the surface of the mineral. Haematite is earthy, quartz is vitreous (glassy) and galena is metallic.
7. **Magnetism:** Some minerals, e.g., magnetite, are magnetic.
8. **Specific Gravity:** This measures the relative weight of the mineral compared with an equal volume of water. (Weigh the mineral in air. Then place the mineral in a measuring cylinder full to the brim with water. Weigh the volume of water displaced by the mineral **OR** since **1mL of water weighs 1gram**, estimate the weight by measuring the volume of water displaced. Divide the weight in air by the weight of water). Precious stones such as diamond, zircon and rubies are easily distinguished by this process.

Resourced by





Name	Crystalline habit	Cleavage angle	Colour	Streak	Hardness	Lustre	Magnetism	Specific Gravity
Diamond	Octahedral	111°	Ranges (colourless, yellow, brown, grey...)	Colourless	10	High (adamantine)	Nil	3.52

### Precious stones - Gems

*How many carats is the gem in your ring?* People think that “carats” represents the size of a precious stone, when carats are really a weight classification. A carat is one fifth of one gram. Specific gravity expresses the density of a material. (i.e., ratio of the gem’s mass to the mass of the same volume of water). Using these two pieces of information, we can tell the difference between a blue sapphire and a blue tourmaline which are the same size and the same colour. Sapphire is more expensive than tourmaline. Diamond has a specific gravity of 3.52 and a cubic zirconia, which looks very similar, has a specific gravity of 5.80. A two-carat diamond is larger than a two-carat cubic zirconia, and much more expensive.

Resourced by

