



Why do leaves change colour in autumn?

KS2 Ages 7-11 ⌚ 3 min read

All summer, leaves are working factories. They use sunlight, water, and carbon dioxide to make food for the tree in a process called photosynthesis. The green colour comes from **chlorophyll** — the pigment that captures sunlight. It's so abundant that it drowns out all the other colours in the leaf.

In autumn, days get shorter and temperatures drop. The tree senses this and starts preparing for winter. It's going into a kind of controlled shutdown — growing conditions will soon be too poor to justify keeping thousands of leaves running. So it starts to pull the valuable nutrients (especially nitrogen) out of its leaves and store them in the branches and trunk for spring.

It's like a shop closing for winter. Before the shutters come down, the owners bring all the valuable stock back inside — no point leaving it out where it might be damaged. The tree "brings back" the chlorophyll and other nutrients from the leaves into the trunk. When the chlorophyll goes, the green disappears — and the other colours that were always there, hidden underneath, suddenly become visible.

So the colours were there all along?

Yes — the yellows and oranges were already in the leaf, all summer, hidden under the intensity of the green chlorophyll. When the green breaks down and is withdrawn, the yellows (xanthophylls) and oranges (carotenoids) finally show through. They're the same pigments that make bananas yellow and carrots orange.

What about the reds?

Red is actually different — it's not hidden under the green. Red pigments (anthocyanins) are actively *produced* during autumn, particularly in sunny, cool conditions. Scientists think they may protect the leaf during the nutrient withdrawal process, acting like a sunscreen that prevents damage and slows the breakdown long enough for the tree to recover more chlorophyll. Some trees produce lots of red; others mostly yellow; it depends on the species and the weather.

Why do some autumns look more spectacular than others?

The best autumn colour comes from warm sunny days and cool (but not freezing) nights. The sun promotes red pigment production; the cool nights slow the withdrawal process, giving the colours longer to develop. A wet, grey autumn tends to be more muted. Climate affects the chemistry, which affects the colours.