

Colours in Leaves Experiment

Key Stage 2

Scheme of work unit:	4D	Solids, liquids and how they can be separated
	6A	Interdependence and adaptation (could be linked with unit 1B and 5E if appropriate)
Intended learning:	4D	Investigate separating the pigments in leaves from the liquid inside the leaf.
	6A	Investigate and understand why chlorophyll is important to a plant/tree. Understand why leaves change colour in the autumn/winter.

Introduction notes:

- Discuss with children what they think a plant requires in order to grow.
- Focus on the fact that plants require light to grow. Light is most available during the summer months.

Information:

- The leaves of trees/plants are factories producing sugar from carbon dioxide and water by the action of light on chlorophyll.
- Chlorophyll is a very large molecule that is attached to chloroplasts in leaves, and is what helps plants/trees turn sunlight into food. It is also chlorophyll that causes the leaves to appear green.
- The shortening days and cool nights of autumn trigger a change in the plant/tree.
- The plant requires less food in winter, so the amount of chlorophyll required decreases, the green colour fades and the leaves change colour.
- The colours in the leaves are pigments. These are coloured molecules that are insoluble in the liquid inside the leaf (although they may be soluble in other liquids).
- When the amount of chlorophyll in the leaves is reduced, we see the colours of other pigments in the leaf. For example carotene (birch and hickory) appears bright yellow or anthocyanin (red maple) appears red.
- Remember that chlorophyll appears green because it absorbs red/blue light, but reflects green light.

Resources required:

- Leaves from 2 different deciduous (colour changing) trees
- 2 large leaves or 4 small leaves per container
- Sample containers
- Parafilm or clingfilm
- Warm ethanol
- Filter paper
- Pencils

Practical notes:

Care needs to be taken to ensure the water is not too warm as to scald the pupils. Containers should ideally be long and thin – we have successfully used sample vials. Ethanol should not be ingested.

Further work:

Unit 4D Link to other separation techniques, such as chromatography using food dyes or felt pens.

Unit 6A From what pupils understand about absorption and reflection of light, ask questions about the copper beech tree, which has purple/black leaves. Leaves are different colour to normal green leaves, because they contain “green chlorophyll”, so the light reflected is different from the normal chlorophyll found in most trees and plants (purple/black). See if pupils are able to identify the reason for seeing the different colour is because the chlorophyll is absorbing and reflecting different colours of light.

Answers:

1. The shortening days and cool nights of autumn trigger a change in the plant/tree. The plant requires less food in winter, so the amount of chlorophyll required decreases, the green colour fades and the leaves change colour.
2. Chlorophyll is a pigment found in leaves that enables plants and trees to convert the light from the sun into food for the tree/plant.
4. They come from other pigments contained within the leaf. Chlorophyll gives the green colour. Carotene gives the yellow and anthocyanin the red colour.
5. Carotene – yellow. Anthocyanin – red