



# KNOWLEDGE ORGANISER

SCIENCE: OUR CHANGING WORLD

YEAR THREE

## KEY KNOWLEDGE:

QUESTION 1: How do leaves change through the year?

### ANSWER

A deciduous tree is a tree that loses its leaves every autumn and grows new leaves each spring. Each year deciduous trees go through a process in which their green leaves become bright yellow, gold, orange and red for a few weeks before turning brown and falling to the ground.

#### **The purpose of a leaf**

During the months of September, October, and November, the changing colours of a tree's leaves is something we all enjoy. But believe it or not, the trees don't change their colours just so we will have something pretty to look at. There is actually a reason for the many colours of autumn. Photosynthesis is the process trees (and plants) use to make their food. Taking energy from the sun, water from the ground, and carbon dioxide from the air, they make glucose (sugar) to 'eat' so they can grow into strong, healthy trees. The leaves of a tree (or plant) are where photosynthesis happens because the chlorophyll in the leaves is what makes photosynthesis possible. Chlorophyll also has another job...it is what makes leaves green. So, as long as the leaves are able to soak up enough heat and energy from the sun to make food, the leaves on the tree stay green. But when the seasons begin to change and the weather turns colder...



#### **Why leaves change colours...or do they**

When the seasons change in places where deciduous trees grow, the days get shorter (there is less sunshine) and the weather gets colder. When this happens it is harder for the chlorophyll in the leaves to make the food needed to stay green. So instead of making more food, the leaves start using food they have stored away for this time of year. As the leaves use the food (glucose) that has been stored away, a layer of cells forms at the bottom of each leaf. These cells are spongy like a cork. Their job is to act like a door between the leaf and the rest of the tree—a door that closes very slowly and doesn't 'shut' until all the leaf's food is gone. While this is happening the colours in the leaves of the trees are able to show through. That's right...the red, yellow, gold and orange colours are hiding in the leaves all summer long. The colours just can't be seen in the summer because of all the chlorophyll in the leaves that makes plants and leaves green. Once all the food is used up, the leaves turn brown, die and fall to the ground.



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QUESTION 2: How do flowers change through the year?

ANSWER

Flowering plants all go through the same stages of a life cycle, but the length of time they take varies a lot between species. Some plants go through their complete cycle in a few weeks – others take many years.

**Annuals** are plants that grow from a seed, then flower and make new seeds, then die, all in less than a year. Some go through this cycle more than once in a year.

**Biennials** are plants that take 2 years to go through their life cycle. They grow from a seed, then rest over winter. In spring, they produce flowers, set seeds and die. New plants grow from the seeds.

**Perennials** are plants that live for 3 or more years. Some, such as trees, flower and set seeds every year for many years. Some others have stems and leaves that die away over winter but the plant continues to live underground. In the spring, new stems grow, which later bear flowers.

QUESTION 3: What is pollination?

ANSWER

## Pollination: how insects help plants to make seeds

Insects take pollen between flowering plants of the same type. The pollen fertilises egg cells to make seeds.

1. The bright colours and smell of that flower tell me that it's got the sugary nectar I love to eat and the pollen I feed to my kids. Yum!



2. Om nom nom. While eating at this flower some of the pollen has rubbed off on me by accident.

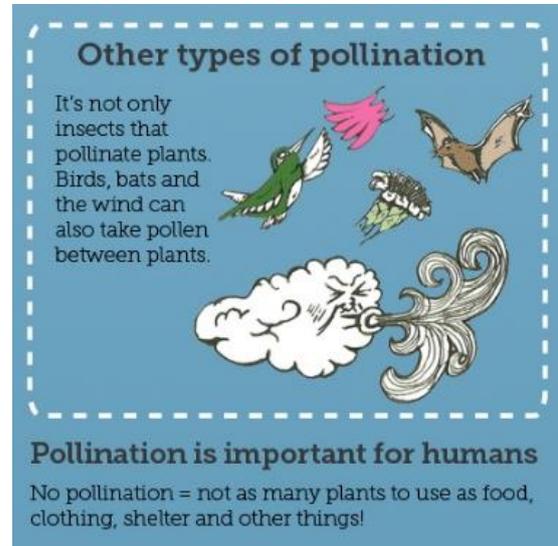
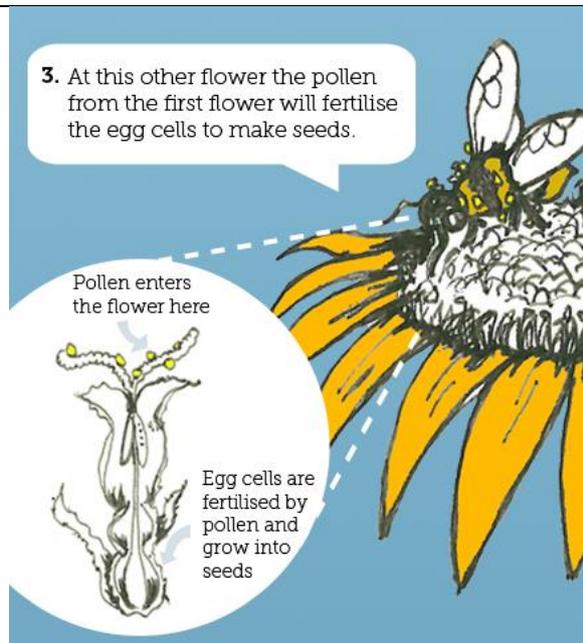




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QUESTION 4: What is seed dispersal?

ANSWER

Seeds are dispersed away from each other and from the parent plant so that there is less competition. The commonest methods of seed dispersal are:

**wind** e.g. dandelion, sycamore fruits are light and have extensions which act as parachutes or wings to catch the wind

**animal internal** e.g. tomato, plum, raspberry, grape have brightly coloured and succulent fruits which contain seeds with indigestible coats which allow the seeds to pass through the animal undamaged

**animal external** e.g. goose grass, burdock, the fruits have hooks which attach them to the fur of passing animals.

**explosive/ self propelled** e.g. pea pod. The pod burst open when ripe projecting the seeds away from the plant.

### How Seeds Travel

