

# Plants Scientific Knowledge

## Introduction

As part of the new framework, Ofsted inspectors will evaluate the extent to which 'Teachers have a good knowledge of the subject(s) and courses they teach'. This guidance has been provided to help you develop a broader knowledge of the concepts in this area of science and not just of the content taught in year 2. This will help you to anticipate and answer questions the children may pose. Alongside this, we have also provided some examples of the possible misconceptions you may find the children have.

Lesson	Scientific Knowledge	Possible Child Misconceptions
<b>Lesson 1</b> What Do Plants Need to Grow?	<p>Plants are capable of growing in almost all habitats on Earth. To grow successfully, plants need the correct temperature, sunlight and water. Some plants need much more sunlight and water than others.</p> <p>Plants create their own food through a chemical reaction called photosynthesis. The function of the leaves is to carry out photosynthesis.</p> <p>Photosynthesis requires sunlight, water and carbon dioxide. This chemical reaction produces glucose (which the plants use as food) and oxygen (which they expel through the leaves).</p> <p>Plant leaves contain chlorophyll, which absorbs sunlight. It is chlorophyll that gives leaves their green colour.</p> <p>Most seeds do not need sunlight to germinate, only water and the right temperature. However, there are some seeds that require sunlight to grow, such as poppy seeds.</p>	<p>Children may think that plants can only grow in soil. Part of the investigation in this lesson will help to address this. Children may also think that it has to be warm for a seed to grow. It is important that 'the right/ correct temperature' is used rather than 'warmth'.</p>
<b>Lesson 2</b> What's Inside a Seed?	<p>A typical seed consists of an embryo (the developing plant) and a protective seed coat. The seed will also have a form of food store to use until the plant can photosynthesise.</p>	<p>Children may not realise that seeds have a food store. They may also not realise that seeds contain the undeveloped plant.</p>

## Lesson 3

## Life Cycle of a Plant

Plants can grow from a seed, a bulb, a runner or a tuber. Seeds are an embryo plant, created by pollination.

During pollination, the pollen from the anther is transferred (by wind, water, insects, birds or other animals) to the stigma. It may be transferred to a different plant or to the same plant (self-pollination).

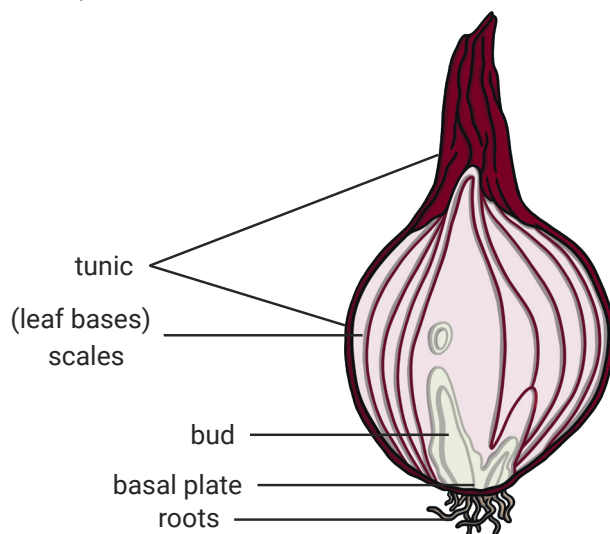
After fertilisation, the female parts of the plant develop into the fruit and seeds.

Seeds are dispersed from the parent plant to ensure that there is little competition for resources such as light, water and nutrients. Dispersal can happen in a number of ways.

- **Wind dispersal:** Seeds such as maple seeds and dandelion seeds are dispersed by the wind.
- **Animal dispersal:** Animals often eat seeds and fruit. The seed coat protects the seed from digestion, allowing it to pass through unharmed. Other seeds have a sticky, spiky coat that allows them to 'hitch a ride' on the fur of larger animals.
- **Water dispersal:** Plants that grow by water can use the water to disperse their seeds. These plants, such as the coconut palm, produce seeds that are light and float easily on water, allowing their seeds to travel longer distances.

Asexual plants produce young plants that are identical to the parent plant. Bulbs and runners are examples of asexual reproduction.

Bulbs consist of five basic parts: the basal plate that grows the roots, scales that store nutrients, the paper-like tunic that protects the scales, the embryo plant and the lateral buds that go on to produce more bulbs.



Children may think that all plants die off after seed production and dispersal. It can be helpful to draw attention to examples of plants that continue to produce more seeds in future years rather than dying off (for example, the oak tree life cycle example given in the eBook).

Although this unit focuses on plants grown from seeds, it is important that children are aware of plants that can grow from bulbs too.

Some children may not recognise that nuts are fruits that contain seeds. It may be useful to show children photos of a number of different types of seeds.

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Bulbs are asexual and do not need pollination to produce new plants. At the end of the growing season, the plant sends all the nutrients back into the bulb where they are stored ready for the next growing season. A new plant will then grow from that bulb and the lateral bulbs will begin to grow into bulbs themselves.

Tuber plants are also asexual. Some 'root vegetables' are tubers. Tubers are a nutrient storage stem for plants, that typically grow beneath the soil near to the roots.

Some plants produce side stems that grow plantlets to enable them to reproduce, called runners. Spider plants and strawberry plants are both examples of plants that grow runners.

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#### Lesson 4

##### What Do Plants Need to Stay Healthy? Part 1

Plants are capable of growing in almost all habitats on Earth. To grow successfully, plants need the correct temperature, sunlight and water. Some plants need much more sunlight and water than others.

Plants create their own food through a chemical reaction called photosynthesis. The function of the leaves is to carry out photosynthesis.

Photosynthesis requires sunlight, water and carbon dioxide. This chemical reaction produces glucose (which the plants use as food) and oxygen (which they expel through the leaves).

Plant leaves contain chlorophyll, which absorbs sunlight. It is chlorophyll that gives leaves their green colour.

Most seeds do not need sunlight to germinate, only water and the right temperature. However, there are some seeds that require sunlight to grow, such as poppy seeds.

Children may think that plants can only grow in soil. Part of the investigation in this lesson will help to address this. Children may also think that it has to be warm for a seed to grow. It is important that 'the right/correct temperature' is used rather than 'warmth'.

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## Lesson 5

### What Do Plants Need to Stay Healthy? Part 2

Plants are capable of growing in almost all habitats on Earth. To grow successfully, plants need the correct temperature, sunlight and water. Some plants need much more sunlight and water than others.

Plants create their own food through a chemical reaction called photosynthesis. The function of the leaves is to carry out photosynthesis.

Photosynthesis requires sunlight, water and carbon dioxide. This chemical reaction produces glucose (which the plants use as food) and oxygen (which they expel through the leaves).

Plant leaves contain chlorophyll, which absorbs sunlight. It is chlorophyll that gives leaves their green colour.

Most seeds do not need sunlight to germinate, only water and the right temperature. However, there are some seeds that require sunlight to grow, such as poppy seeds.

Children may think that plants can only grow in soil. Part of the investigation in this lesson will help to address this. Children may also think that it has to be warm for a seed to grow. It is important that 'the right/correct temperature' is used rather than 'warmth'.

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## Lesson 6

### How Do Plants Grow in Hot, Dry or Cold Places?

Plants have numerous adaptations to allow them to survive in harsh environments. In dry places, many plants will have a shallow root system that allows them to collect rainwater as soon as it falls. They may also have small leaves or spines. These help the plant to conserve water and help to prevent animals from eating the plant and its water store. Any leaves tend to be waxy, which also helps the plant to retain water.

Plants that grow in cold, windy environments tend to grow closer to the ground to help to protect them from the harsh wind. They sometimes have a hairy stem that helps them to conserve heat.

Children may think that plants cannot grow in cold or dry places, if they believe that plants need water and warmth. It is important that children are taught that plants each need the correct temperature and amount of water for them.