



MODULE 9

Observing flower colour and pollination - at the Botanic Garden

TIME

3 hours

MATERIALS

60 mixed colour crayons per 10 children
Magnifying glasses
Stopwatch
Sticky back plastic
Flowers (e.g. Lilies)
Watch with second hand
Photocopies of sheet A10

SKILLS

Observation
Group work
Gathering data
Data analysis

KEYWORDS

Colour
Colouration
Pollination
Pollinator
Scent
Petals
Sepals
Stigma
Style
Ovary
Stamens
Pollen
Pistil

CROSS-CURRICULAR

ACTIVITY

Mathematics
Art

Overview

During a field trip to a Botanic Garden children can observe different plant colours and the role of the flowers in attracting insects.

Aims

To discover that plant colour attracts the attention of insects and birds (and other animals), needed for pollination.
To understand that flower structure is important for attracting pollinators.
To understand the process of pollination.

Preparation for the activity

Select an area of grass where you can play a game with the children and place different coloured crayons over a large area of grass, so that they are ready to be used for the game.

Teaching sequence

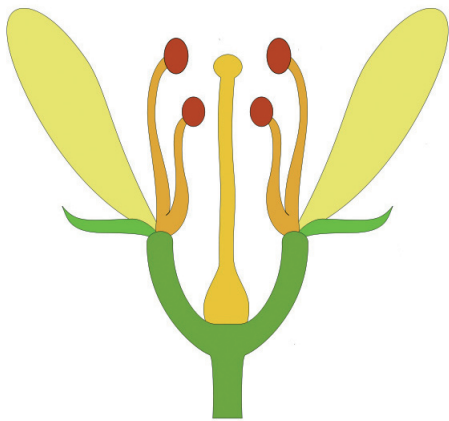
1. Revise the parts of a flower with the children.
2. Give each child a simple flower, e.g. Lilies, Alstroemeria. They dissect the flower slowly from the outside in (i.e. starting with the sepals, then the petals, stamens, stigma, style and ovary).
3. Children can stick the individual parts onto sticky back plastic to 'remake' an enlarged flower (i.e. the sepals at the outside working in towards the ovary). They can use the finished 'flower' as a reference for remembering the parts if they add labels.
4. Divide the children into groups and give out the sheet A10 (2 sheets).
5. In the area you put out the crayons earlier, ask the children to spend 1 minute finding, collecting and marking the coloured crayons they find on the sheet in the sequence in which they found them. They must stop after 1 minute.
6. Collect in the crayons and redistribute them again. Repeat this activity twice. Use sheet A10 to record the findings.
7. The crayons represent flower colours and the children represent pollinators. Children can see from their chart that some flower colours are more visible to us than others.
8. Children then look at different plants. Ask them to observe which colours are attracting most insects. Give the children magnifying glasses so they can observe closely which flowers are visited by pollinators.
9. Children can sit next to a flower and notice which insects visit the flower. They should make a note in their science notebooks of the plant name, what kind of insect visits and how long the insect remains in or on the flower. Ask the children to make a note of anything about the flower structure that is important for attracting insects, e.g. wide, flat petals for insects to land on. Some flowers also release scent, e.g. roses which contain the aromatic secretion rose oil. Children should also observe if insects such as bees visit all flowers, or if they ignore those that look unhealthy or dead.



10. Give the children a short description of the process of pollination (see Media Gallery: Art M9 Flower model) and discuss with them wind and insect pollination and how these different methods may affect flower structure.
11. Plenary. In their groups, encourage the children to analyse their data, and discuss their results which they should have recorded on sheet A10. They can present their conclusions to the class.
12. Play the Pollination Game (see Teachers' Notes).

Teacher / Botanic Garden educator notes

This lesson can be conducted in the spring or summer time at a Botanic Garden. The task enables the children to develop their power of observation and to work like scientists.



Pollination involves the transfer of pollen from the stamen of one flower to the stigma of another flower of the same species. The flowers must be pollinated before they can make seeds. Pollen can be moved by insects (such as bees and butterflies), birds or other animals. These are called pollinators. The flowers attract pollinators with their bright colours, the size and shape of their petals, different smells and with sweet nectar. The pollen and nectar are valuable food for the pollinators, see Food topic.

Some plants, such as grasses, oak and beech are wind-pollinated. The wind shakes the pollen out of their flowers and it is carried in the air. An alternative for dissecting the flower onto sticky backed plastic could be to use laminator pockets, putting the dissected flower parts between the layers and running them through a laminator. Find out if the Botanic Garden has unusual flowers in season, e.g. the impressive stench of *Amorphophallus titanum* will be a pollination story that the children will remember!

This module encourages children to look closely at flowers and discuss their importance. They also discuss which flower colours attract which pollinators.

Birds are attracted to red and orange flowers, while bees are attracted to violet and blue.

Different species of pollinator may spend different amounts of time visiting flowers. For example, honey-bees will visit a flower many more times than butterflies or beetles.



Extension activities

The Pollination Game

Playing games is an enjoyable and memorable way for children to reinforce their learning.

A fun game that can be used to teach pollination can be found at: http://www.kew.org/education/wildlifezone/4_env_games.pdf

Investigating Pollen

Children will find it interesting to look at pollen grains, as they often have very beautiful, sculptural surfaces which children can link to understanding of how flowers are pollinated (e.g. wind pollinated flowers tend to have smooth, small pollen which is carried in the air; insect pollinated flowers may have spiky pollen grains which stick to pollinators).

It is possible to extract pollen from flowers and examine it under a microscope.

You may have a wide selection of flowering plants at school, or you could use florists' flowers.

Plants that produce large amounts of pollen include horse chestnut, courgette, hibiscus, hollyhock, sunflower, pine, lily and tulip. You could try dusting pollen straight onto a microscope slide and displaying it on a whiteboard. Otherwise, follow the procedure for preparing pollen slides from: <http://www-saps.plantsci.cam.ac.uk/osmos/os26.htm#3>

A wide range of images of pollen grains can be downloaded from: <http://www-saps.plantsci.cam.ac.uk/pollen/index.htm> Once children have prepared and examined their pollen grains they can use them as the basis for creating their own artworks; paintings or sculptures inspired by what they have seen.

Investigating flower colour in ultraviolet

An unusual fact about flowers is that they often appear different colours when seen under UV light.

Pollinators such as insects are able to see different wavelengths of light than humans. A flower colour which we see may appear a totally different colour to bee and butterfly pollinators. A range of flowers photographed under UV light can be found at: http://www.naturfotograf.com/UV_flowers_list.html

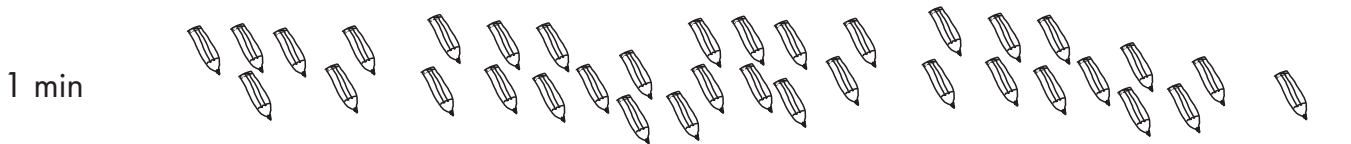
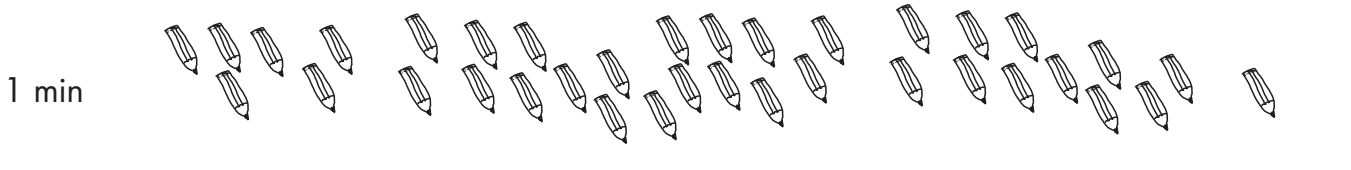
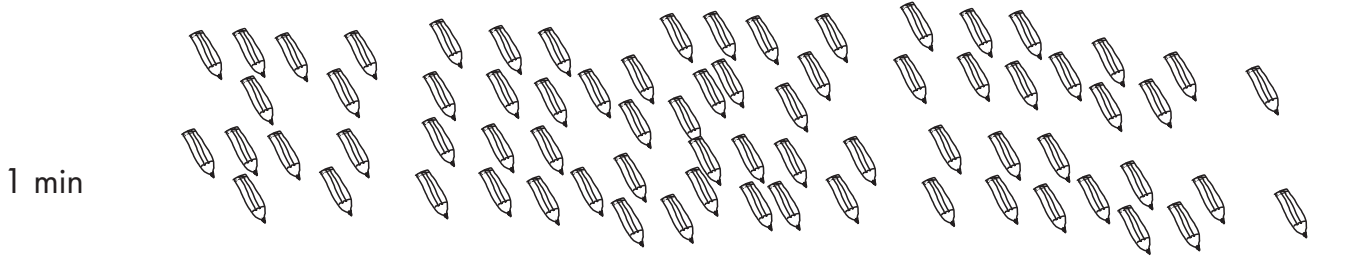
Some flowers have nectar guides (colouring on the surface of the petals which guides pollinators to the nectar). Nectar guides are prominent and visible on some flowers such as foxgloves, which have a series of spots on the petals.

If you carry out this module after the children have studied Module 8 'Making and using natural dyes' they will have studied some plant colours already.

You can also connect this module with Module 4 'A gift for a Friend' which focuses on seeds – the product of pollination.

Field Trip to a Botanic Garden to observe flower colours and pollination

Record the order of colour crayons you found on the grass by colouring the crayons below.



After you have observed flowers in the garden, discuss why they have different colours.

I think the flowers have different colours because

Discuss and write down some other ways in which flowers attract insects or birds.

What was the most interesting insect activity you saw in the garden today?

Take a walk in the garden. Find a bright flower you like and fill the whole space below with a drawing of it. Label the parts of the flower (e.g. sepals, petals etc.).

 **Today I learned**