

Unit 5B Life cycles

ABOUT THE UNIT

Through this unit children learn that plants and animals reproduce as part of their life cycle and that in every life cycle there are distinct processes and stages. They should begin to understand how reproduction is important to the survival of the species.

Experimental and investigative work focuses on:

- making observations and comparisons
- drawing conclusions.

Work in this unit also offers children opportunities to relate their knowledge and understanding of science to their personal health and to consider ways in which living things need protection.

Some of the work in this unit is likely to be undertaken in relation to the school's programme for personal, social and health education and must be consistent with the school's sex education policy.

This unit takes approximately 12 hours.

WHERE THE UNIT FITS IN

Builds on Units 2A 'Health and growth' and Unit 3B 'Helping plants grow well'

Children need:

- to understand the role of light and water in plant growth
- to be familiar with the structure of plants (excluding flower parts)
- to be able to use standard measurements of volume and length.

Links with Units 4A, 5B and personal, social and health education.

VOCABULARY

In this unit children will have opportunities to use:

- words and phrases associated with life processes eg *reproduction, life cycle*
- names for parts of a flower eg *stamen, style, stigma, sepal, petal, ovary, pollen*
- names for processes related to life cycles and associated verbs eg *reproduction/reproduce, germination/germinate, pollination/pollinate, fertilisation/fertilise, dispersal/disperse*
- descriptions and explanations using a sequence of ideas.

RESOURCES

- collection of pictures of plants with fruit eg *apple trees, vines, dandelions, beans, horse chestnut, tomatoes*
- hand lenses/microscopes
- examples of flowers eg *mallow, buttercup* and pictures of flowers
- collection of fruits and seeds including those dispersed by different mechanisms
- pictures illustrating the plants from which seeds come
- rapidly germinating seeds eg *radish, spring onion*
- thermometers
- containers in which to germinate seeds
- soils etc in which to germinate seeds
- secondary sources eg *video, CD-ROM, reference books* showing newly born animals and giving information about gestation periods

EXPECTATIONS

at the end of this unit

most children will:

name and explain the functions of some parts of a flower; describe the processes of pollination, fertilisation, seed dispersal and germination; explain how to carry out a fair test to find the conditions necessary for germination; explain that living things need to reproduce if the species is to survive and recognise stages in the growth and development of humans

some children will not have made so much progress and will:

name the parts of a flower and explain how pollen and seeds are dispersed; describe some of the conditions tested in investigating germination and recognise some stages in the development of humans

some children will have progressed further and will also:

explain why it is important to use a number of seeds or plants in an investigation into growth or germination

LEARNING OBJECTIVES

CHILDREN SHOULD LEARN

- that flowering plants reproduce

- that seeds can be dispersed in a variety of ways
- to make careful observations of fruits and seeds, to compare them and use results to draw conclusions
- that many fruits and seeds provide food for animals including humans

- that plants reproduce
- to consider conditions that might affect germination and plan how to test them
- how to alter one factor at a time in order to carry out a fair test
- that several seeds should be used in each set of conditions in order to get reliable evidence
- to make careful observations and comparisons and use these to draw conclusions
- that seeds need water and warmth (but not light) for germination

- that insects pollinate some flowers

- that plants produce flowers which have male and female organs, seeds are formed when pollen from the male organ fertilises the ovum (female)

POSSIBLE TEACHING ACTIVITIES

- ◆ Remind children of earlier work on seeds and plant growth and show them a series of pictures of flowering plants (or plants if these are available) with ripe fruits and ask children a series of questions to elicit their ideas about fruits eg
 - *Where did the fruits grow from?*
 - *What will happen to the fruits?*
 - *Why are they important to the plant?*
 Remind children that flowering plants produce fruits and seeds from their flowers and that these grow into new plants and ask them to draw a simple sequence of pictures to illustrate this.

- ◆ Help children to make a collection of fruits with seeds eg *apple, tomato, cherry, strawberry, avocado, mango* and some seed cases and seeds which are not fleshy fruits eg *wheat, maize (sweet corn), dandelion, poppy, winged seed cases (ash and sycamore)* together with pictures of the parent plant. Talk with the children about seed dispersal and use observation and secondary sources to find out and record how the seeds are dispersed including the role of humans and other animals in the process. Using examples or pictures ask children to suggest how an unfamiliar seed is dispersed. Ask children to suggest why plants produce so many seeds. Talk with them about reasons why seeds may not grow into new plants eg *including humans growing some plants to provide food.*

- ◆ Remind children that once seeds have been dispersed they need to germinate. If it is spring, look for new plants and ask children to describe where they grow. Ask children to suggest what seeds need in order to germinate and how they could investigate this. Remind children of the need for a fair test and ask them how many seeds they should use in order to get reliable evidence. Help children to set up their investigation and ask them to write an account of how they set up the work. Discuss children's results with them and relate their findings to seeds germinating in the spring after the cold winter. If possible use secondary sources to show the germination and flowering of plants in a desert after rain.

- ◆ Talk with children about what happens to seeds once they have germinated and refer back to what they know about the conditions needed for healthy growth. Visit park or school grounds to look at flowers and insect pollination. Talk to children about the role of the insects and ask them to think about how pollination takes place early in the year when there are few insects about. Relate to hay fever and pollen count.

- ◆ Using examples and drawings of flowers help children to observe flower structure and to learn the names and function of parts. Using pictures and other secondary sources, explain to children the processes of pollination and fertilisation and the distinction between them. Using a hand lens or microscope or using secondary sources, observe stamen with pollen and pollen grains from a number of different sources. Challenge children to speculate how the differences might be useful.

LEARNING OUTCOMES

CHILDREN

- recognise that flowering plants produce seeds from their flowers which grow into new plants

- explain why seeds need to be dispersed eg *to have the best chance of growing into a new plant*
- explain that seeds are dispersed by water, wind, explosion and animals eg *coconuts are dispersed by seawater and dandelions have parachutes and are dispersed by wind*
- identify by observation how an unfamiliar seed might be dispersed
- suggest reasons why some seeds may not grow into plants


- suggest suitable factors eg *light, warmth, water, soil* to investigate and how they will carry out a fair test of these
- use several seeds in each set of conditions in order to get reliable results
- state that the seeds in the dark germinated as well as those in the light
- state that water and warmth are also needed for germination

- explain that pollen has to be transferred from one flower to another during pollination eg *by insects, wind*

- name the parts of the flower eg *stamen, stigma, style, petal, sepal* and explain the function of each
- explain that seeds are formed after pollination when pollen fertilises the ovum
- state that pollen can be transferred by different means eg *by wind, by insects*
- identify differences between pollen grains and suggest a reason for differences eg *pollen from one flower can't pollinate flowers of other types of plant, pollen from some flowers needs to stick to insects' bodies*

POINTS TO NOTE


This unit is best carried out at a time of year when there are plants in flower or in the autumn when plants can be seen bearing fruit.


 **SAFETY** – Children should not taste any of the seeds and fruits provided. Avoid using nuts, especially peanuts, as some children are allergic to these.

Some seeds take a long time to germinate. Radish, lettuce and spring onion seeds which germinate in 7 – 14 days can be obtained. Cress and broad beans can also be used. As the germinated seeds do not need to grow into adult plants this investigation can be carried out over a relatively short period.


This work focuses on germination not on growth. Many children think that because light is needed for growth it is also needed for germination.

This activity offers children the opportunity of carrying out a whole investigation. It may be helpful to focus on the aspects of investigation highlighted in the learning objectives.

 **SAFETY** – Seeds from garden centres are usually treated with pesticides but those from health food shops should be safe to handle. Avoid red kidney beans.

 **SAFETY** – All off-site visits must be carried out in accordance with LEA/school guidelines.

Simple flowers eg *buttercup and mallow* are suitable. It is essential to avoid composite plants eg *daisy*, and those with coloured sepals eg *tulip* because at this stage, they are confusing.

 **SAFETY** – Some children may be allergic to pollen (hay fever).

LEARNING OBJECTIVES

CHILDREN SHOULD LEARN

- about the life cycle of flowering plants including pollination, fertilisation, seed production, seed dispersal and germination

- that adults have young and that these grow into adults which in turn produce young
- that human young are dependent on adults for a relatively long period

- that if living things did not reproduce they would eventually die out

POSSIBLE TEACHING ACTIVITIES

- ◆ Review with children their knowledge of flower structure, pollen dispersal, pollination, fertilisation, and seed development and dispersal. Ask children to choose a familiar plant and introduce the term 'life cycle', create a display sheet to illustrate the complete life cycle of the plant. With the children compare the life cycles of different plants pointing out similarities *eg in the processes* and differences *eg in the types of fruit or the mechanism for seed dispersal*.

- ◆ Talk with children about the growth and development of humans and discuss different stages *eg babyhood, childhood, adolescence, adulthood*. Ask children to devise a time line to demonstrate stages in the growth and development of humans and talk with them about the relative lengths of each stage. Use secondary sources to compare lengths of stages *eg gestation period* for different animals and to illustrate the differences between newly born animals of different species in terms of dependence on their parents, ask children about the implications of these differences.

- ◆ Review work on life cycles of plants and animals asking children why it is important for both plants and animals to reproduce. Discuss some examples of animals *eg panda, tiger, cheetah* that are facing extinction and how conservationists attempt to deal with the issue.

LEARNING OUTCOMES

CHILDREN

- distinguish between pollen dispersal and seed dispersal and the mechanisms for these
- order correctly the steps in the life cycle of a plant

- recognise stages in the growth and development of humans
- describe differences in capabilities of newly born humans and other animals *eg in movement, feeding*
- recognise differences in the length of time humans and other animals are dependent upon parents

- identify one or two species facing extinction and describe a programme *eg breeding in captivity* which tries to overcome the problem

POINTS TO NOTE

This section of work is likely to be undertaken in relation to the school's programme for personal, social and health education and must be consistent with the school's sex education policy.



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