

“All About Seeds” – Lesson Plan

Aim: To familiarise students with plant life-cycles, and to raise awareness about the role and importance of biodiversity in plant life-cycles and in food production generally.

Objectives:

- As part of a slideshow presentation, information will be shared using images, text and orally.
- Peer to peer learning will be facilitated through discussions and personal stories shared during interactive elements of the workshop presentation.
- Practical skills will be developed through a hands-on seed planting workshop element.

Audience: Junior and Senior Primary Students (content suitable for all ages, with adjustments on level of detail)

Resources Required:

- ✓ Slides for **Presentation** (see below) (laptop and projector (no sound required))
- ✓ **Script Notes** to accompany Slides (see below)
- ✓ Materials for the **Planting Workshop** element include:
 - **Seeds** – decide on what crop you would like to grow (make sure the time of year, your growing space, and number of seeds per pack are all appropriate for your setting). You can easily get enough seeds for a whole class (of many crops) with less than €5. If you can buy organic seeds, all the better. See the Green-Schools’ [Crop Cards here](#) for ideas.
 - **Compost or Soil** – get peat-free compost if you don’t have your own available. Peat in composts comes from bogs, which themselves are a very important habitat for biodiversity – so best to leave these habitats untouched; and avoid the peat!
 - **Pots/Containers** – enough items or space in containers for each student to plant a seed. These can be homemade containers, such as yogurt cartons or old fruit punnets; once they have holes for drainage at the bottom, and have been cleaned out before use.
 - **Labels** – lollipop sticks are a good option here. It’s important to always label your seed-planting work with crop type and date (and probably student’s name). So that you know what it is, and when it is due to germinate.
 - **Trowel** – or even a few light sand-castle spades, to help distribute the compost.
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Total Workshop Timetable – 1 hour approx. – see detailed outline below.

“All About Seeds” Workshop Outline

Element	Duration	Details	Resources Required
Presentation & Discussion	20 mins	Show the Slides. Discuss the various questions. Use the Script below.	Images and Script Notes below
Seed Planting Workshop	25 mins	Set up and Run the Seed planting workshop. Plant the seeds in accordance with the instructions on the back of the seed packet. Pay particular attention to: - Depth of seeds in soil - Watering the seeds after planting - Placing seeds in bright location, but out of direct sunlight, and not over a radiator	Seed packet instructions. Materials listed above for the planting workshop – seeds, containers, trowel etc.
Tidy up and wash hands	10 mins	Ensure all students wash their hands after working with the soil.	Clean running water and hand soap.

Script Notes for the “All About Seeds” PwrPt Slides

Slide 1	– Title Slide Hello and welcome. This lesson is an introduction to seeds. We will look at: • Some common seeds that we find around our homes and in our gardens. • Where they come from or how they're made and • How they grow into new plants. We will also look at some “clever” seeds; plants that have evolved and adapted to give their seeds unique features to help them to survive better in nature.
Slide 2	– Seed images from the garden Seeds come in all shapes and sizes here are a few images from the wild. • Picture top left = Dandelion • Picture bottom left = Oak tree (acorns) • Picture in middle = Cleavers (a plant found in many hedgerows that sticks/catches on to clothes) • Picture on right = Burdock (a plant with very large sticky seeds with tiny hooks all over them – if you have a dog you might sometimes find these seeds knotted/embedded into your dog's fur) And so, you can see these seeds all look very different to each other.
Slide 3	– Seeds around us Seeds are all around us every day – often in plain sight. Can you name any of the seeds that you see in these pictures?

	• Top left = thistle seeds that have been released from the top of the thistle plant and are blowing in the wind. • Middle picture = an oak tree a young oak tree growing up from the acorn seed. • Bottom pic = a mixture of nuts from a standard food pack that you'd find in any supermarket including almond nuts and walnuts • Large picture = face of a sunflower; we as humans eat sunflower seeds. Birds love sunflower seeds also So these are just a few seeds that we would come across on a regular basis
Slide 4	– Seeds in fruits Sometimes seeds are hidden right under our noses • Top left picture = Hawthorn and there's berries on Hawthorn - the seeds are actually buried inside of the red berries • Top right picture = a Rowan tree or 'Mountain Ash' and again the red berries are very attractive to birds to eat they're full of nutrients and energy; again hidden inside those berries are the seeds so we don't always see the seeds straight up when we're looking around • Bottom left image – Blackberries; it's the same with these - we as humans would regularly eat blackberries and sometimes you might find a tiny roundy things stuck in your tooth after eating them; that would be a seed from within the Berry • Bottom right picture = a lemon, an orange and a pear; fruits we would regularly eat and sometimes we would find seeds in the centre of those.
Slide 5	– Other words for Seeds Can you think of other common words that we use for seeds in everyday life? • Lemons & oranges contain "pips" • Peaches, plums and nectarines contain "stones" • Popcorn that's not popped we call "kernals" • Pistachios, cashews and almonds are called "nuts" but again are essentially the seeds of those nut bushes/trees.
Slide 6	– What is a Seed? So what exactly is a seed? Well the seed is like a baby plant; it is the body of the whole entire plant before it germinates and grows and matures into the adult tree/shrub/flower.
Slide 7	-Germination (Read slide text)
Slide 8	– Germination Recap (Read slide text)
Slide 9	– Pollination (Read slide text) Alternate/support text: Like many living things, most plants need a 'male' and a 'female' in order to produce offspring or "babies". Many flowering plants have both male and female parts, but they cannot self-fertilize; that is, they cannot make babies with their own male and female parts themselves. What they need to do is they need to receive the male parts from another flower; Pollen is in fact made by the male part of a flowering plant. And so, if the female parts of the flower receive pollen from another flower of the same type say tomato flower receives pollen from a different tomato flower, it can then go on to produce its own seeds; that's how it happens for most flowering plants. The process of pollen (male) being brought to the female parts of a flower is called pollination. This is an important process. Some plants rely on wind to disperse their pollen, but many species rely on insects moving from flower to flower, to transfer their pollen. Honey-bees, bumblebees and solitary bees are amongst the main "pollinators" at work in Ireland. Their presence/work is crucial for many of our food plants to produce seeds and fruit e.g. apples, berries, peas, beans, pears etc etc.

Slide 10	– Pollination Recap (Read slide text)
Slide 11	– Life-Cycle – Example 1 – Tomato Plant (Starting at the Seed, go through the life-cycle of the tomato plant, or ask students to volunteer to talk through it)
Slide 12	– Life-Cycle – Example 1 – Dandelion Flower (Starting at the Flower, go through the life-cycle of the Dandelion plant, or ask students to volunteer to talk through it)
Slide 13	– Life-Cycle – Example 1 – Apple Tree (Go through the life-cycle of the Apple tree, or ask students to volunteer to talk through it)
Slide 14	– Biodiversity – why it's important for plants in your garden (Read slide text)
Slide 15	– Biodiversity & Soil Health (Read slide text)
Slide 16	– Biodiversity & Pollination (Read slide text)
Slide 17	– Biodiversity & Pest control (Read slide text)
Slide 18	– Biodiversity & Seed Dispersal (Read slide text)
Slide 19	– Planting Activity (title) (Read slide text) Take out the materials that you are going to use for your Seed Planting Workshop. Give a brief overview of what seeds you have, what you are going to do, and how you are going to do it.
Slide 20	– What does a seed need to grow? (Read slide text) Discuss the needs of seeds in general. Read the directions on the back of your seed packet to your class.
Slide 21	– Discussion* (Read slide text and) Faciliate a discussion *This can be done as part of the preparation for the planting activity or it can be done in a more relaxed/informal way as you start to plant your seeds.

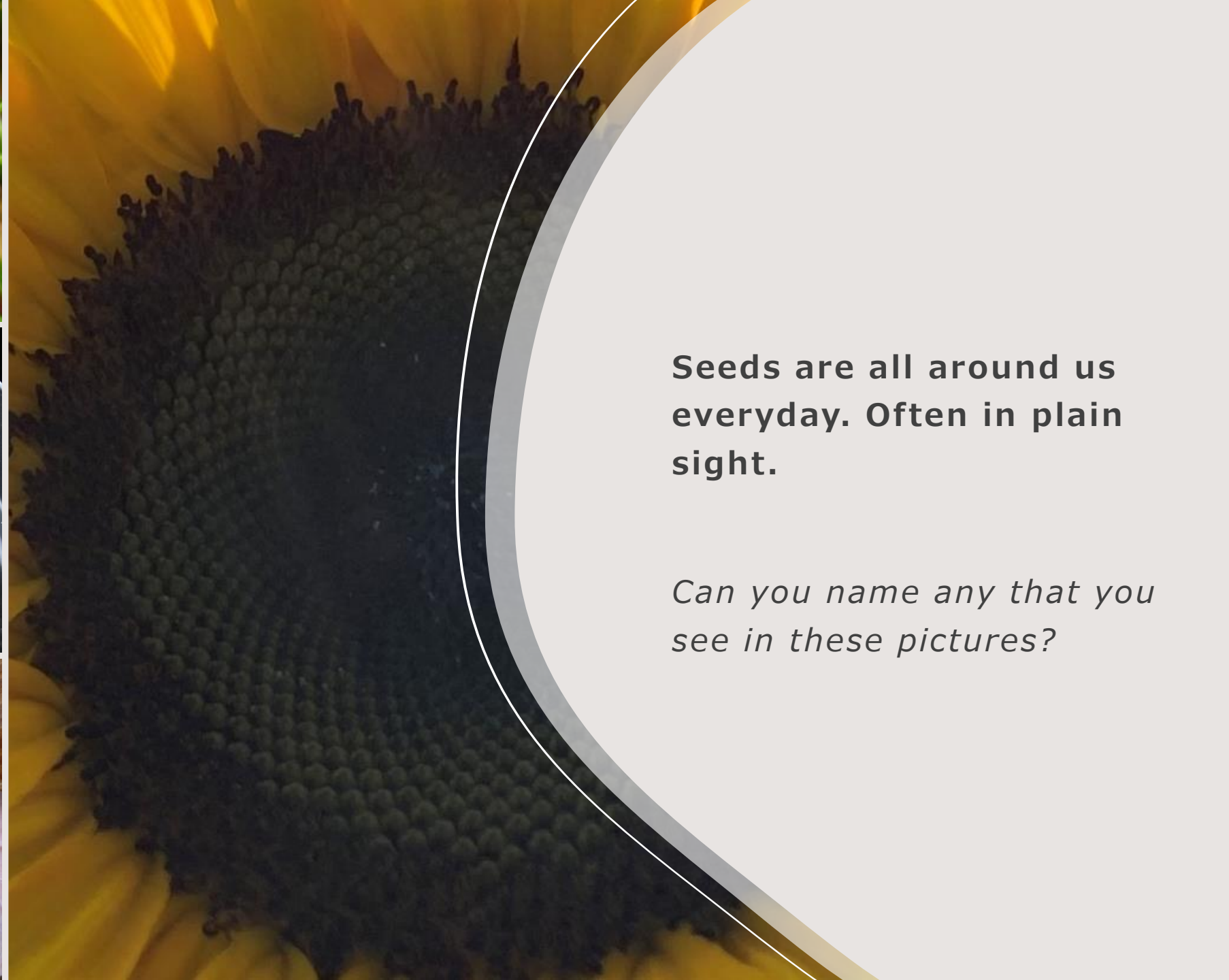
All about Seeds

Green-Schools' Global Citizenship
Food and Biodiversity Theme



Seeds – come in all shapes and sizes.

Here are a few from the wild
(see wildflowersofireland.net for these and more seed images)



**Seeds are all around us
everyday. Often in plain
sight.**

*Can you name any that you
see in these pictures?*



**Sometimes seeds are
hidden;
very often they are
hidden inside fruits!**

*Can you name any of the
berries or other fruits that
you see in these pictures?*



Can you think of any other names that we use instead of the word 'seed' in every-day foods?

Hints:

- What do we call the white seeds we find in oranges and lemons?
- What do we call the hard part of a peach, plum or nectarine?
- What name do we give to the small balls for un-popped popcorn?
- What are cashews, pistachios and almonds?

What is a seed?

A seed is like a “baby plant” – it is the plant body before it ‘germinates’, grows and matures into the adult form.



Germination

How a plant grows from a seed



Once the conditions are right (e.g. optimal temperature, water availability etc.) the seed will '**germinate**'. The optimal conditions for germination vary with plant type.

The **root** grows first; stabilising the plant and searching for water.

Once the root absorbs water the **shoot** begins to emerge.

Using energy stored in the seed the plant continues to develop and the **leaves** emerge over ground.

Once the leaves unfold, they start to absorb energy from the sun, and through the process of **photosynthesis** they take over supplying the energy to the plant.

The **seedling** will continue to grow in this way until eventually it reaches a size and shape similar to the **parent** plant from which the seed came.

How a plant grows from a seed



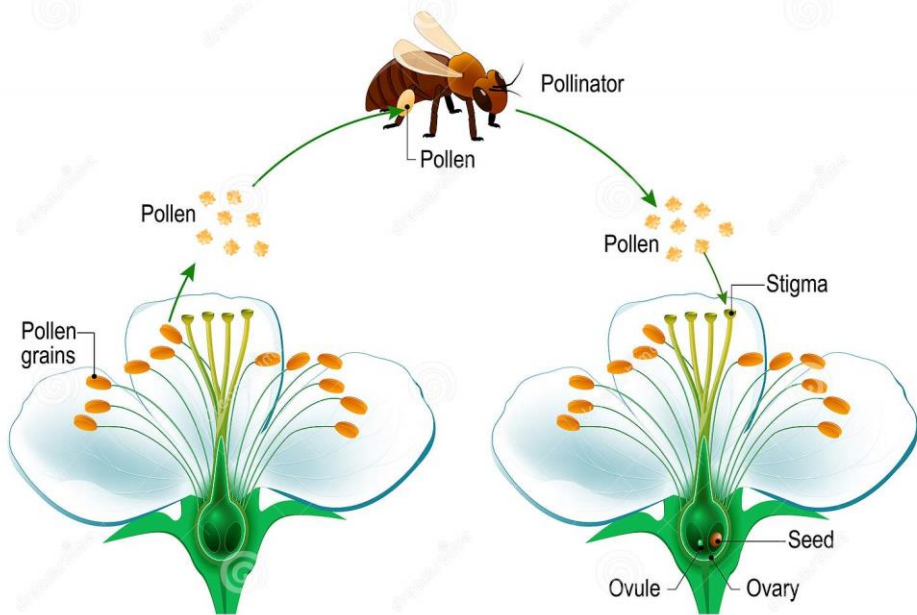
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Germination

Can you explain it in your own words?

Pollination

Pollination



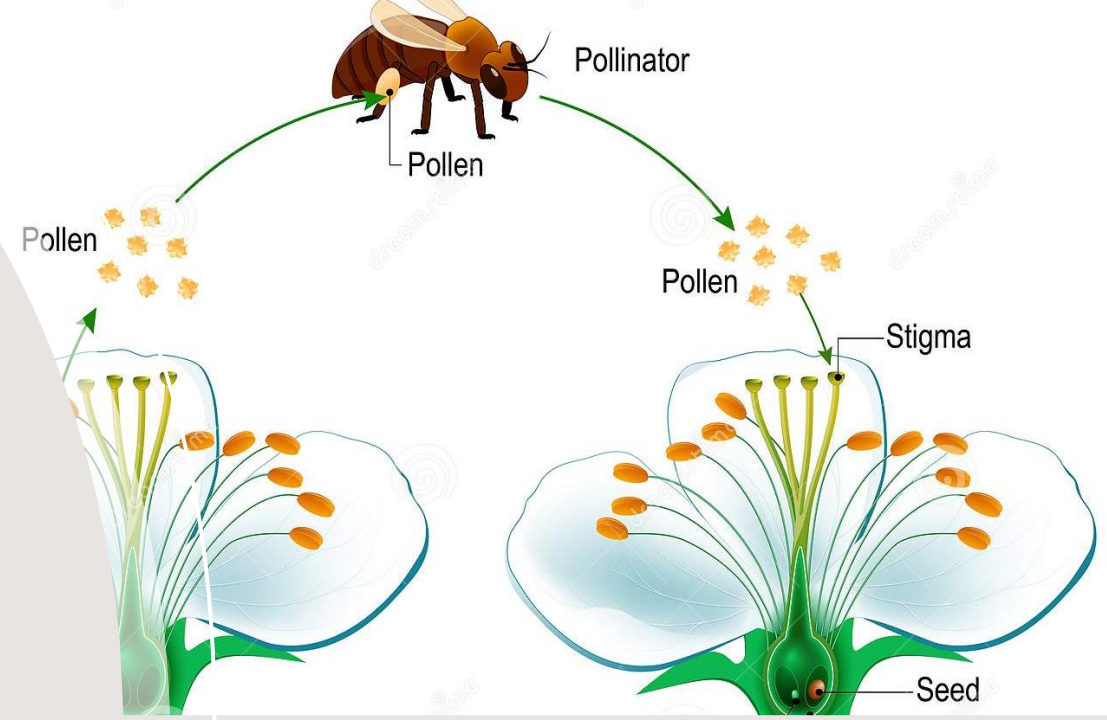
- POLLINATION is when a flower receives pollen (male) onto its female parts, and thus FERTILISATION occurs.
- Once fertilized, the flower will produce SEEDS; e.g. the flowers on a pea plant, drop their petals and the base of the flower transforms and swells into a pea (seed) pod.
- In some plants the seeds develop hidden within fruit; e.g. apple seeds are hidden in the apple core.

Some plants rely on the wind to transfer the pollen. Other plants rely on animals to transfer pollen from flower to flower e.g. bees, butterflies and moths, collect and carry pollen on their hairy bodies as they busily feed (mainly) on the flowers' nectar. This pollen falls off on visits to subsequent flowers, thus enabling fertilization to take place. These creatures are thus often referred to as POLLINATORS

POLLINATION

Can you describe 'pollination' in your own words?

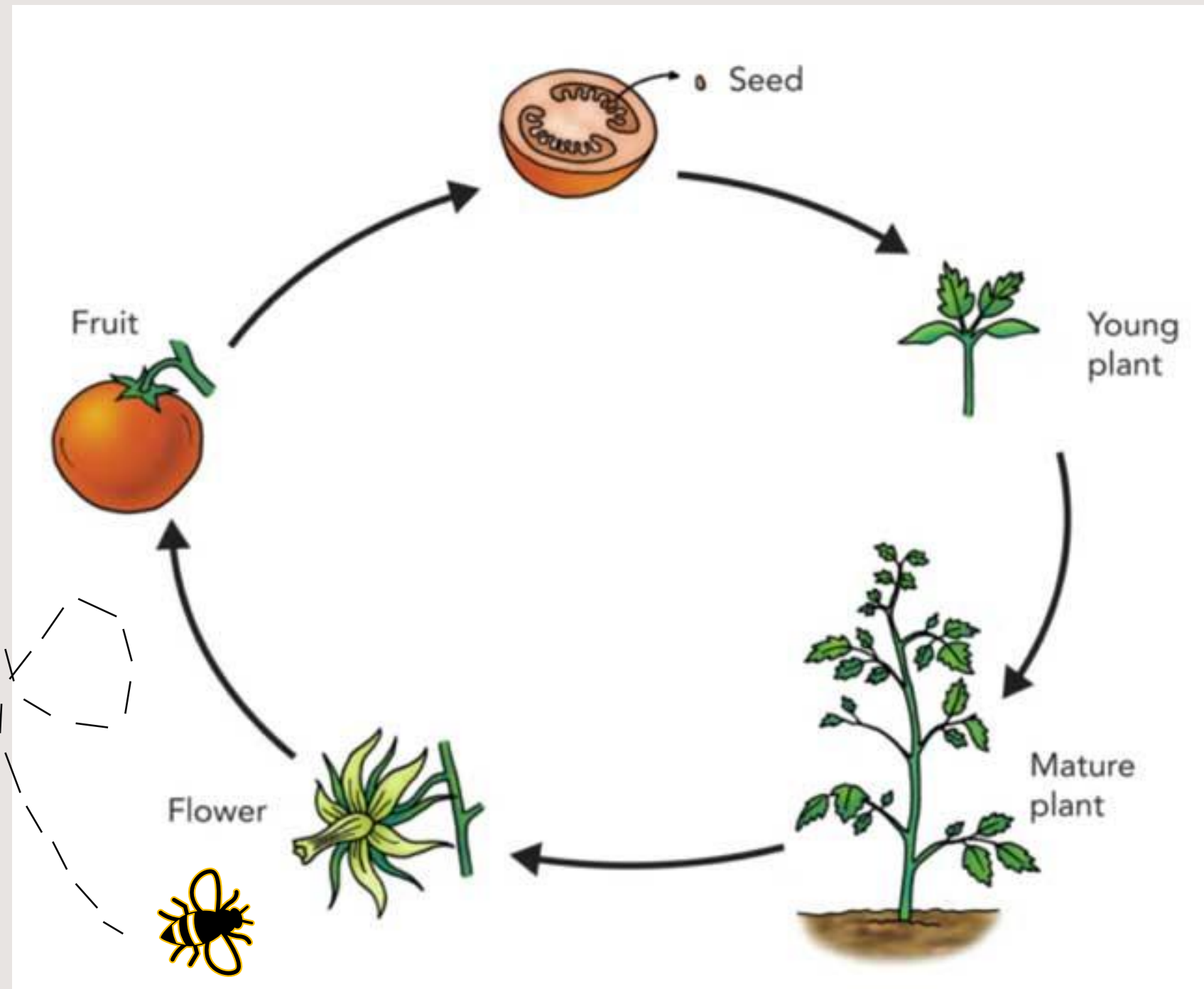
Can you describe the work of pollinators in your own words?



Plant Life-Cycle

Example 1 – Tomato Plant

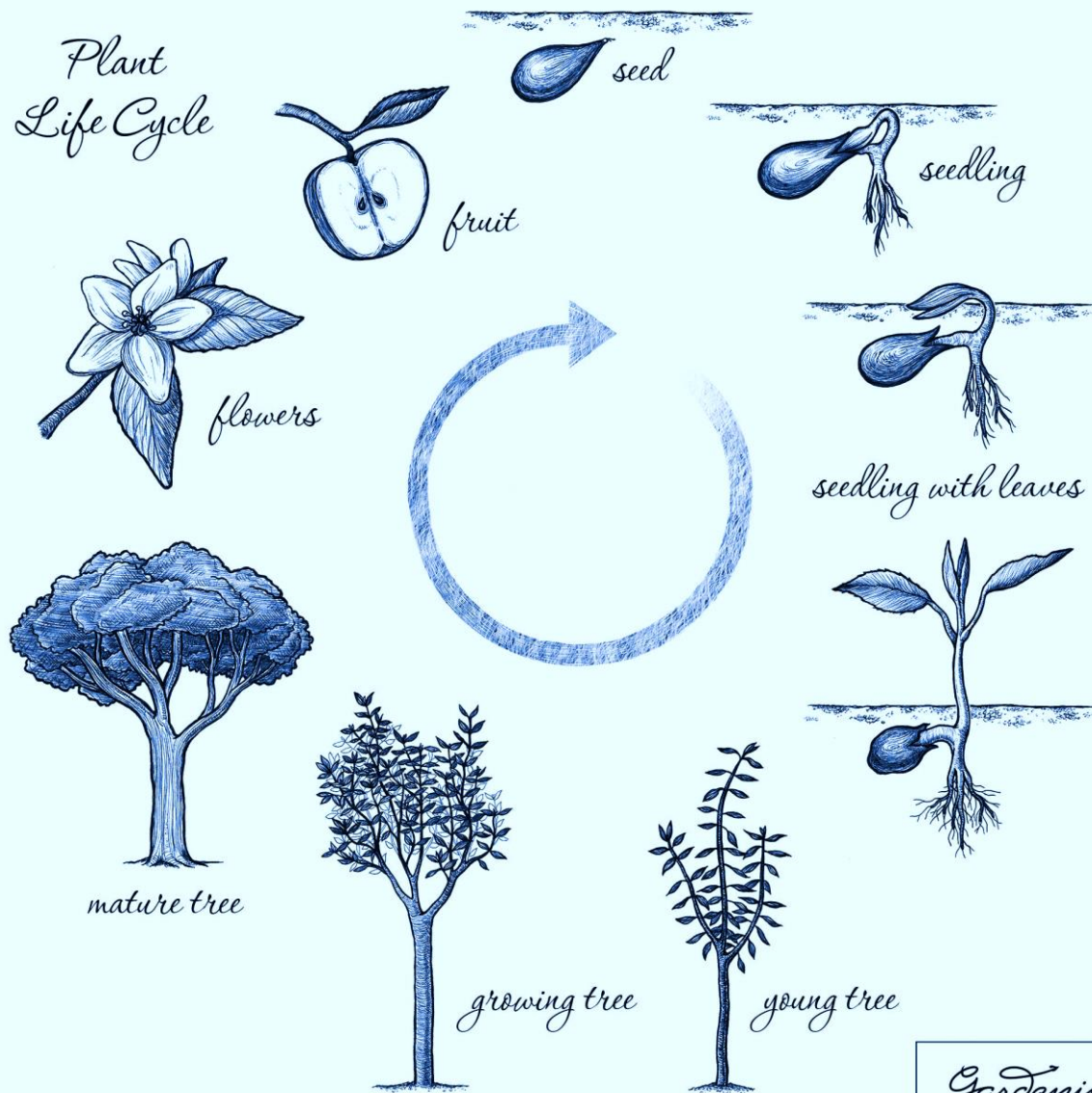
pollination



Plant Life-Cycle 2 Example 2 – Dandelion Flower



How is a Seed made? – Describe in your own words



Plant Life-Cycle

Example 3 – Apple Tree

BIODIVERSITY

is important for flowering plants' lifecycles, for many reasons including:

- ü Soil Health
- ü Pollination
- ü Pest Control
- ü Seed dispersal



Importance of Biodiversity: Soil Health



Soil should be packed full of bacteria & fungi which help release nutrients for the roots of plants to absorb.



Little animals such as earthworms, slugs, woodlice, centipedes also provide a vital service by breaking down old vegetation and making the nutrients available in the soil, for the new plants to use.

Importance of Biodiversity: Pollination

Animals interact with and can help flowering plants at different stages of the plants' lifecycle. Pollination is one such example.

Creatures including honeybees, bumblebees, solitary bees, butterflies and moths (and even birds and bats in some parts of the world!) help with the transfer of pollen between flowers, thus enabling fertilisation of flowers, and ultimately fruit and seeds to be formed.



Importance of Biodiversity: Pest Control



This garden has lots of healthy crops, because there are very few green-fly pests; that is thanks to the ladybirds, whose favourite food is green-fly!

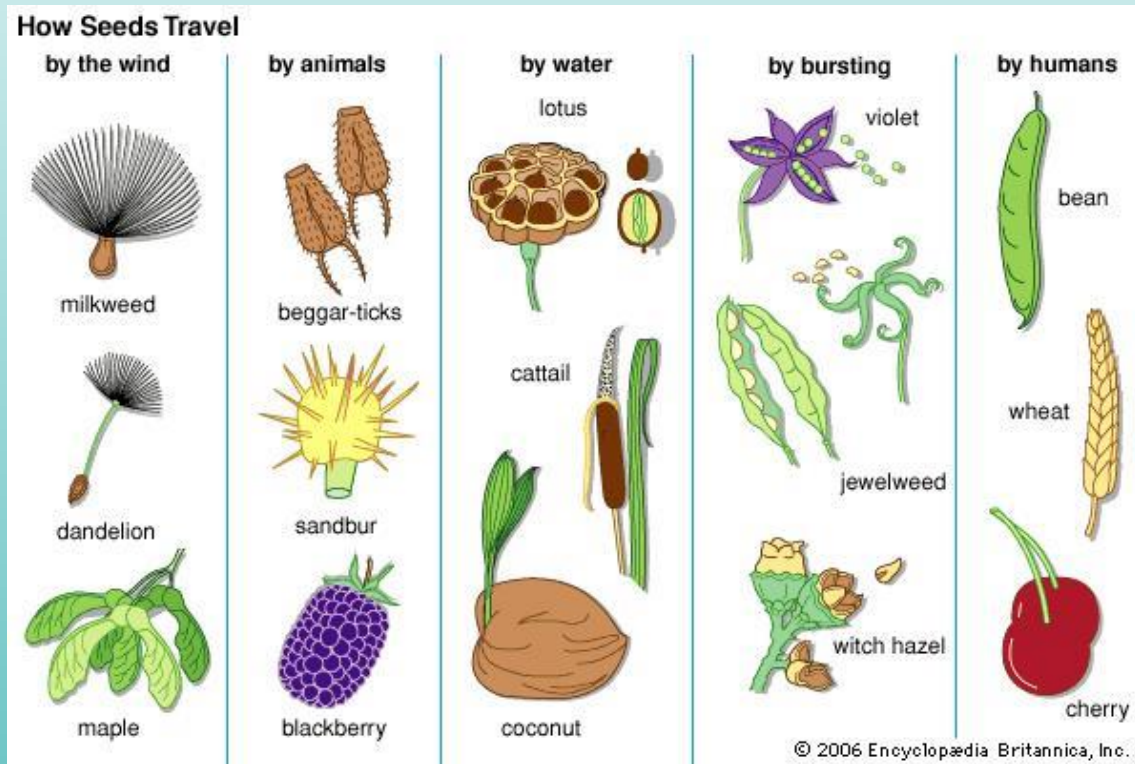


Whereas this garden needs more wild birds visiting if the cabbages are going to be saved! Wild birds eat caterpillars and can thus help prevent crop damage.



Importance of Biodiversity: Spreading Seeds

Different plants have different ways of getting their seeds to be spread – see the diagram below:



Animals can help spread plant seeds – Some Irish Examples:

Blackbird's poop out **Bramble**/blackberry seeds; as this happens a number of hours after eating the berries, it guarantees that the seeds are planted far and wide in the countryside, maximising chances of at least some Bramble offspring surviving.

Foxes' fur catches **Burdock** and **Cleaver** seeds, again carrying them far and wide, before they naturally fall away. Again this maximises the chances of offspring surviving.

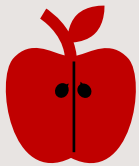
Jays (a member of the crow family) bury **acorns** in the Autumn for safe keeping during the Winter for when other food is in short supply; however they often don't need to eat their entire stash, so the seeds that are untouched will germinate and grow into new **Oak** trees the following Spring.

Planting Seeds Activity



What does a seed need to grow into an adult plant?

- ✓ Soil/Compost
- ✓ Water
- ✓ Sunlight
- ✓ Air



In the wild, survival varies from year to year

- Weather
- Insects (pollinators and pests)
- Disease
- Internal cycles within the plants themselves

Discussion - Have you grown food?

- *Have you grown food?*
- *If so, what was it?*
- *Did it look, taste and feel the same as the same kind of food in the shops? If not, what was different?*
- *Do you think that food you grow at school or home would be the same, or better or worse for you, than the food you normally get in the shops?*
- *Do you think that food you grow at school or home would be the same, or better or worse for wildlife, than the food you normally get in the shops?*



A close-up photograph of several black plastic seedling trays filled with dark brown soil. Numerous small green seedlings with two leaves are emerging from the soil in various compartments. A wooden plant marker is visible in one of the trays. A large, semi-transparent white circle is overlaid on the left side of the image, containing the text 'Happy Planting!'.

Happy Planting!