LEAF TREE NURSERY PROJECT

HOW TO COLLECT AND GROW LOCAL TREE SEEDS



with **KERRY EARTH EDUCATION PROJECT**

&

LEARNING ABOUT FORESTS IRELAND



Kerry Earth Education Project



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Fáilte

Welcome to the LEAF **'Tree Nursery Project'** for teachers and students. This pack contains support material for schools that want to collect local native trees and to make a tree nursery in their school grounds. This process can take over 2-3 years, from the time the seeds are collected to the time that the young tree is ready for planting out.

Background This booklet was originally created in 2008, when Kerry Earth Education Project received funding from The Heritage Council to carry out a Tree Nursery Project with local schools/community groups using seed collected from Ballyseedy Woods near Tralee, Co. Kerry and was updated in collaboration with Learning about Forests (LEAF) Ireland in 2020.

Kerry Earth Education Project/Gortbrack Organic Farm Based at Gortbrack Organic Farm, KEEP is an environmental education company that works directly with schools, community groups and special needs groups in the development of sustainable ongoing organic food and biodiversity gardens and creating native habitat projects. KEEP has been providing practical environmental, organic and natural heritage education in County Kerry since 2000.

LEAF Ireland The Learning about Forests (LEAF) programme is operated by the Environmental Education Unit of An Taisce in Ireland and aims to reconnect students with nature. The programme explores all functions of forests and is theme based (Biodiversity, Climate, Water, Products and Community). LEAF is aligned with Education for Sustainable Development (ESD), the Global Action Programme (GAP) and the new Sustainable Development Goals (SDGs).

Objectives The main objective of this project is to show how simple it is to grow tree seeds in a tree nursery in the school grounds. This includes learning about:

- The variety of native trees in Ireland
- Basic botany
- Tree identification
- How to collect and grow tree seed

Learning how to collect and grow native trees and hedges from seed is the perfect way to show the full life cycle of trees as they grow and mature to become a woodland or forest habitat.

Trees, Woodlands, Forests and Hedges are critical habitats in terms of biodiversity, wildlife, food for pollinators and other insects, flood defence, storing carbon, soil protection. The ecological and wildlife corridors of hedges connect our small pockets of woodlands and forests to each other, which is why hedges are an essential part of this ecosystem. Local native trees and hedges have adapted to our local climate and growing conditions, so collecting local seed means these plants will be able to grow well in this area.

Global and Local Action Days Celebrate local trees and hedges during National Tree Day in October, National Tree Week and International Day of Forests in March, Biodiversity Week in May and Heritage Week in August.

Tree Seeds - Native Woodlands – Biodiversity Curriculum Links TEACHER SUPPORT SHEET 1

Native Trees are the oldest trees in Ireland; they came in after the last Ice Age, 12,000 years ago. Therefore, they have adapted to our climate, soil and other growing conditions. Our flora (plants) and fauna (creatures) have evolved side by side with these trees, which is why they are so important in terms of supporting our biodiversity.

Collecting native tree seeds means they are more adapted to local growing conditions.

This project is cross-curricular, including in the formal curriculum:

- Living Things (Plants and Pollinators, Web of Life, Habitats, Ecosystems, Photosynthesis, Nutrient Recycling, Genetic Diversity)
- **Geography** (Soil, Climate, Water Cycle, Air and Atmosphere, Carbon Cycle)
- History (Culture, Folklore and Storytelling, Ogham and Brehon Laws, Movement of humans and plants around the earth)
- Languages (Gaeilge, Béarla, New Words)
- Wellbeing (spending time in nature)

This project helps to fulfil aims of Global Citizenship (SPHE) and a number of the Global Goals in the informal curriculum:

- **Global Goal 13:** Climate Action
- Global Goal 15: Life on Land
- **Green-Schools Programme and Active Flag**
- Cifelong Skills: Plant identification, Collecting and growing seeds, Plants for free, Agriculture and Forestry

Building a tree nursery in the school grounds is the most sustainable way to grow trees and to teach a lifelong skill to students.

There are 28 species of **native trees** in Ireland. During the **Brehon Era** in Ireland, the Brehon Laws and the **original Irish alphabet (Ogham)** were based on the native trees of Ireland. Trees and woods were considered sacred. People were penalised if they harmed any of the 'noble trees' of Ireland such as the oak, ash and yew. Penalties included the payment of two cows for cutting down an oak tree.

Sycamore, beech, lime and **horse chestnut** are not native. People brought them into Ireland. For instance, beech was brought to Ireland by the Normans, approximately 1000 years ago. They have become **naturalised** and are an important part of the Irish landscape.

Please note that if your local wood or forest is an SAC **(Special Area of Conservation)** you will need permission to collect the seeds from the National Parks and Wildlife Services (www.npws.ie). Contact your Local Biodiversity Officer also in the Local Authorities also as they are a good point of information.

Trees - Native Woodlands - Biodiversity TEACHER SUPPORT SHEET 2

Why are trees so important?

- Trees provide oxygen for us to breathe and filter pollutants in the air. Trees produce more oxygen than any other single living organism.
- Trees absorb CO_2 (which contributes to global warming) and convert it into wood. Trees are a vital 'carbon sink'.
- Trees provide shelter and shade for pollinators, insects, wild plants, animals and humans. They create microclimates, which creates warmer spaces for growing.
- Trees are an important food source for pollinators, animals and humans.
 Wild Crab, Cultivated Apples, Sloes, Hazelnuts, Plums, Cherries, Pears, Damsons and Walnuts all grow in Ireland.



- Woodland and forests protect soil against erosion, prevent flooding and store and recycle nutrients.
- Trees provide renewable firewood (heat and energy) and products such as timber for building houses, furniture and fencing, if managed sustainably.



Why are native trees so important?

- Native trees provide a habitat (home / shelter) to a huge variety of insects, fungi, wild plants and animals that help maintain a healthy environment specific to Ireland.
 - Oak supports 284 kinds of insects
 - Birch supports 229 kinds of insects
 - Hazel supports 73 kinds of insects
 - They feed many of our essential pollinators, other insects, birds and wild animals
 - Birds are critical as they help to spread tree seeds, such as Hawthorn and Yew
 - Red squirrels and bank voles hide nuts, often these nuts are forgotten about and grow into a tree.

Why are native hedgerows so important?

There are approximately 300,000 kms of **native hedgerows** in Ireland, which are critical as they connect pockets of woodlands, acting like ecological or wildlife corridors. This keeps the ecosystem, genetic and species diversity of the trees, plants and wildlife healthy.

Calendar for Tree Nursery

TEACHER SUPPORT SHEET 3

June or September	Activity	Notes – Tips – Resources and Curriculum
Meitheamh go dtí Mean Fómhar - Get to know your local woods and start identifying trees! -	 Visit the local forest in either June or September when it is easier to identify the trees with their leaves Plan your route and select the trees you want to collect from 	 This will make the preparation easier for wh Carry out simple risk benefit assessment Use identification charts and dials to identification
September to November	Activity	Notes – Tips – Resources and Curriculum
Mean Fómhar go dtí Samhain - Collect seed -	 Go on a trip to your local woodlands with your class Collect seeds, nuts and berries from as many trees as possible Use cloth or paper bags and cover with some damp leaves Store in damp leaves until you are ready for planting - don't let them dry out With the students divide the seeds up into their different types of seed, those for 'direct seeding' - acorns, hazel etc. and those for 'stratifying' - haws, holly berries etc. Label the different types of seed, with their name, date of collection and location. 	 Some years will be good for certain seeds the If you want to gain confidence, start with nuryear Collect seed from the ground and gently from Discuss benefits and importance of trees an Discuss seasons and observe changes in nate Take photos or collect leaves to help with ide
September to November	Activity	Notes – Tips – Resources and Curri
Mean Fómhar go dtí Samhain - Make Tree Nursery -	 Build a raised bed in your school grounds (See 'HOW TO TEACHER SUPPORT SHEET 1' below) Plant the 'direct seeding' seeds in this, e.g. Acorn, Hazel Stratify berries and seeds in a bucket, tin or pot and store somewhere dry and safe (See 'HOW TO TEACHER SUPPORT SHEET 2' below) Make signs for the nursery bed and keep a written record of what is planted where, as you will forget by the time spring comes around! 	 Cover the tree nursery with a wire mesh to p Use identification charts and dials to identified Suggestions: if you have no space to make a cardboard and fill with leaf compost
September to November	Activity	Notes – Tips – Resources and Curri
Mean Fómhar go dtí Samhain - Make leaf mould -	 Collect lots of leaves Make a leaf pile, in a compost box, loose pile or black plastic bag) Cover over with carpet and leaves to make leaf mould (compost) for next year 	 It can take a year or two for leaves to break Use identification charts and dials to identification
Spring	Activity	Notes – Tips – Resources and Curri
An t-Earrach - Observe, care and maintenance -	 Remove wire mesh when trees have started growing and are touching off mesh Keep the bed weed free 	 Be careful not to weed the trees! Observe buds bursting into leaf Use identification charts and dials to identified Discuss photosynthesis
Spring to summer	Activity	Notes – Tips – Resources and Curri
An t-Earrach go dtí Samhradh - Observe, care and maintain -	 The beds should not need watering Try to use rainwater If they do Check the stratified seeds in the biscuit tins and sand from time to time and make sure that it is still damp 	 Collect rainwater from school guttering Mulch the nursery or pots with leaves or gra Discuss germination Discuss Web of Life
Spring to summer	Activity	Notes – Tips – Resources and Curri
An Fómhar arís - Pot on – Transplant – Collect more seeds -	 When the leaves have fallen from the young tree saplings, use a hand trowel or spade to dig them up (take care not to damage the roots) Pot on or plant out the trees that are 45-60cm in height 	Smaller trees or trees that do not have a hor holes in the bottom)
	They may need another year growing in a pot before they are ready to be planted out	Collect more seeds!!!
		And so, the cycle starts again – re-use your bed to replicate the forest floor



Link

nen you return in the Autumn with a class

y leaves (see resources)

Link

nis is why it is important to collect seeds every year uts year one and progress on to berries the following

om trees. Make sure to leave some for the wildlife! Ind hedges

ture

lentification and recording

culum Link

protect them from being eaten!

- fy winter buds (see resources)
- a nursery bed, use crates with holes, line with wet

culum Link

down fully and make mature leaf mould fy winter buds (see resources)

culum Link

y winter buds (see resources

culum Link

ass clippings to help conserve moisture

culum Link

me yet can be potted into recycled milk cartons (with

to plant more seeds and always add a layer of leaf mould

Steps to make a Tree Nursery Bed

- 1. Build a small raised bed, roughly 1m x 2m x 20cm in your school garden (use left over wood ask caretaker or parents)
- 2. Put a layer of damp cardboard at the base to help suppress grass. Or use carpet
- 3. Place a layer of twigs at the bottom layer if they are in the school grounds
- 4. Cover with a 10-15cm layer of old soil/compost if you have access to it
- 5. Cover this with a 10-15cm layer of leaf mould (old leaves that have broken down)
- 6. Plant seeds in rows according to type
- 7. Seeds should be 3cm apart and rows should be 10cm apart
- 8. Label and record in notebook (as labels can fade with rain)
- 9. Cover with loose leaves on top to retain moisture
- 10. Use wire mesh or netting to protect (see below)
- 11. Do not let the bed dry out

Protect from birds and rodents

- Make a rodent and bird proof screen for the top
- Use 5cm x 5cm wood for the frame and fine wire mesh (ask caretaker or source from a local hardware shop)
- Tack wire onto the frame and place on top of the bed
- Alternatively use netting to cover the bed.

Make your own Leaf Mould

- In the meantime, you can start making your own leaf mould by collecting leaves and putting them in piles/containers/black bags with holes and letting them rot for at least a year
- Or source leaf mould from elsewhere (wider community/local council)

Notes re. Birch and Alder seeds

- Dry cones out in containers in class for a few days
- Cones will open and seeds will drop out
- Sprinkle on top of bed, do not bury under soil

Tree seeds in rows, labelled, cover with leaves and wire mesh Suitable Seeds: Acorns - Hazel Nuts - Green Ash Keys -

Alder - Birch

Making raised bed

Im x 2m x 20cm

Stratifying Seeds

Some seeds will not germinate for 18 months to 2 years. These tend to be the seeds inside berries, e.g., Holly, Hawthorn, Sloes. Some seeds are stratified for 6 months, for example: crab apple, elder, spindle.

This is a bit more advanced but do not let that stop you!

- 1. Remove flesh from seed by rubbing in a sieve in bucket of water
- 2. Use sandpaper to rub the seeds in the sieve
- 3. Clean thoroughly with water
- 4. Shake on to paper to let the water dry off a bit and to separate seeds from each other and seed flesh
- 5. Put any waste material out under a hedge
- 6. Make some holes at the bottom of an old biscuit tin
- 7. Place some gritty sand (not from beach) in biscuit tin
- 8. Store in damp sand in biscuit tin
- 9. Label and record in notebook
- 10. Keep in a cool place
- 11. Check regularly so it doesn't dry out
- 12. Check seeds from around the 6-month mark onwards
- 13. At first signs of germination, plant out as for above.



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Additional tip

Some of these seeds benefit from being scarified but is not essential. In nature, these seeds would travel through the gut of a bird or animal. Scarifying replicates this process, using sandpaper and a sieve.

Care and maintanance TEACHER SUPPORT SHEET 6

Maintenance of Tree Nursery Bed

- There should not be much maintenance to do!
- Check regularly to make sure that no birds or rodents are eating the seeds
- Check for germination in late Spring
- Identify and remove any weeds

Mulching

- Ensure the soil is damp
- Keep covered with damp leaves

Maintenance of Stratified Seeds in Tin

Check the biscuit tin for germination and to check that sand is still damp

Transplanting

- Autumn/Winter is the best time to transplant your young tree seedlings, when leaves have fallen
- One-year old seedlings should be about 45 60cm in height
- They can be transplanted to a bed, planted about 20cm apart
- Or transplant into pots (use recycled milk and juice cartons, as these biodegrade into the ground when planting into final position)
- Keep the trees well watered and clear of weeds
- Vou can do this by putting a layer of wet cardboard as mulch around the base of each tree.

The Tree Council of Ireland have a useful resource that can be downloaded for free from their website: Our Trees - A Guide to Growing Ireland's Native Trees in Celebration of the New Millennium.

Observe - Monitor - Investigate - Record

The table below is a quick guide

Tree	Time	What To Do
Alder (alder cone)	Sept-Oct	Dry green catkin, shake out, stratify until March
Ash (ash key)	Aug-Oct	Plant immediately if green, stratify if brown
Beech (beech masts)	Sept-Oct	Plant immediately or stratify for 6 months
Birch (birch catkin)	Aug-Nov	Dry green catkin, shake out, store dry until March
Blackthorn (sloe)	November	Stratify, 18 months
Cherry (fruit)	July-Aug	Plant immediately or stratify for 6 months
Crab Apple (fruit)	Oct	Extract seed and plant immediately
Elder (berry)	Sept-Oct	Squash and plant immediately
Elm (Wych, key)	June	Plant immediately after collection
Hazel (hazelnut)	Sept-Oct	Plant immediately
Hawthorn (haw)	Sept-Dec	Stratify, 18 months
Holly (berry)	Nov-Feb	Stratify, 18 months
Hornbeam (key)	Sept-Oct	Collect from tree, plant immediately
Oak (acorn)	Sept-Oct	Plant immediately, both Pedunculate and Sessile
Rowan (berry)	Aug-Sept	Stratify, 6 months
Yew (berry)	Sept-Nov	Stratify, 18 months

We have included Beech tree seeds, which are not native - they are naturalised. Beech and other naturalised trees are common, are part of our landscape and easy for students to collect

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It also possible to simply plant all your collected seeds in the tree nursery bed and hope for the best!

Biodiversity value of our trees TEACHER SUPPORT SHEET 8

Tree	Insects Supported	Conservation Value
Alder FEARNÓG	90	Early flowering, seeds good for birds and red squirrels
Ash FUINSEÓG	41	Light shade, good for ground flora, seeds good for birds and small mammals
Birch BEITH	229	Light shade, good for ground flora, seeds good for birds and red squirrels, good for fungi
Blackthorn DRAIGHEAN	109	Early flowering, good nesting cover, berries good for birds
Cherry (WILD) SILÍN FIÁIN	Many	Early flowering good for insects, fruit excellent for birds
Crab Apple FIA-ÚLL	93	Early flowering, fruit good for insects and birds
Elder TROMÁN	19	Berries good for insects and birds
Elm (Wych) LEAMHÁN SLÉIBHE	83	Early flowers important for insects, seeds good for squirrels
Hazel COLL	73	Rich ground and lichen flora, nuts important food for mammals and birds
Hawthorn SCEACH GHEAL	20	Early flowering good for insects, berries food for birds and insects
Holly CUILLEANN	7	Berries important food for thrushes, food plant of the holly blue butterfly
Oak DAIR	284	Excellent for birds, mammals, insects and flora
Rowan CAORTHANN	28	Good for insects, berries important bird food
Yew IÚR	4	Berries good food for birds

Native and Naturalised Trees and Uses

Our Native Trees and their Seeds Here since the last ice-age ended 12,000 years ago

Alder	Fearnóg	Alder cones
Ash	Fuinseóg	Ash keys
Birch	Beith	Birch catkins
Blackthorn	Draighean	Sloes
Crab Apple	Crann fia-úll	Pips
Elder	Tromán	Elderberries
Hawthorn	Sceach gheal	Haw berries
Hazel	Coll	Hazelnuts
Holly	Cuileann	Holly berries
Oak	Dair	Acorns
Rowan	Caorthann	Rowan berries
Yew	lúir	Yew berries

Naturalised Trees and their Seeds Special guests introduced by humans

Beech	Beech Masts
Sycamore	Helicopters
Horse Chestnut	Conkers
Lime	Lime key seed
Field Maple	Maple keys
Hornbeam	Hornbeam cone

Tree	Some uses
Ash	Makes hurls
Alder	Shields, clogs, bridges, old milk churns (water resistant)
Beech	Excellent for furniture making
Blackthorn	Walking sticks (Shillelaghs were used long ago as weapons)
Cherry, Apple, Pear, Plum	Fruit
Hazel	Hurdles, gates, fences and wattle for building
Larch	Boat building
Oak, Ash, Scot's Pine	Their timber is used for furniture making and building purposes
Pine	Good for firewood and building (water resistant)
Sycamore	Wooden spoons and other wooden kitchen utensils
Spruce & Maple	Used to make violins
Willow	Used for making cricket bats, baskets, living fences

Some Interesting Trees Facts



The tallest native tree in Ireland is a 40 m tall Ash tree near Clonmel, Co. Tipperary.

The oldest tree in Ireland is thought to be a yew tree in Co. Wexford, which is over 1,000 years old. The Brian Boru Oak in Co. Clare is also said to be over 1,000 years old.

The tree with the largest girth is an exotic tree, a Monterey cypress, commonly known as Macrocarpa. This tree is in Killyleigh, Co. Down and is over 12. metres in diameter

Trees are essential for our wellbeing and health. Go for a walk in the woods or forest. Plant trees in your school grounds and spend time in nature.

Counties in Ireland are named after native trees: Derry - Doire (Oak), Antrim - Aon - Doire (Oak), Kildare - Cill Dara Trim (Elder), Kildare - Mayo -Trim (Elder), Kildare - Mayo -Maigh Eo (Plain of the Yews) Maigh Eo (Plain of the Yews)

Trees produce more oxygen than any other single living organism

Native & Naturalised Seeds and Berries

TEACHER SUPPORT SHEET 9



Acorn	Willow Catkin	Hawthorn Berry	Crab Apple
Oak Leaf	Willow Leaf	Hawthorn Tree	Crab Apple Leaf
Hazel Nut	Alder Cone	Ash Key	Rowan Berries
Hazel Leaf	Alder Leaf	Ash Leaf	Rowan Leaf
Holly Berries	Rose Hip	Elder Berries	Sloes
Holly Leaf	Dog/Wild Rose	Elder Leaf	Black-thorn

(14)

Native Tree Leaves and Seeds Identification Sheet

STUDENT SHEET 1



Match Seed and Leaf (draw arrows)





My Visit to the Woods STUDENT SHEET 2



Native Tree Nursery Project			
Why are trees important?			
Why are native trees important?			
Name 3 native trees you saw today:			
2	3		
	oject nt? nportant? ou saw today: 2		

Seedsaving Record

Gather seed from 3 different native trees, record its name, draw a picture of its seed and its leaf

Name of tree:	Name of tree:	Name of tree:
Name of seed:	Name of seed:	Name of seed:
Draw picture of seed:	Draw picture of seed:	Draw picture of seed:
Draw picture of leaf:	Draw picture of leaf:	Draw picture of leaf:

GLOSSARY FOCAL NUA EXPLORE NEW WORDS AND NEW PLANTS!

Glossary

Stratification: Is the process of storing seeds to copy natural conditions that a seed must go through before germination

Scarify: Involves slitting or softening the outer coat of seeds in order to speed up germination. This can be done with sandpaper, rubbing in a sieve etc.

Leaf Mould: is what forms when fallen leaves rot down on the woodland floor and turns into leaf compost

Biodiversity: The variety of plants, animal species, other organisms and ecosystems within particular habitats and their interactions with each other

Native: Plants that were here before humans arrived on the island after the last ice-age, over 10,000 years ago, e.g. Oak

Naturalised: Plants that have been here for the past couple of hundred years, brought by humans, e.g. Beech

Broadleaf: Trees with broad flat leaves rather than needle-like or scale-like leaves. Mostly deciduous.

Conifer: Trees with needles for leaves, or scale-leaved, chiefly evergreen, e.g. Scots Pine

Evergreen: Trees that retain their leaves or needles throughout the year, e.g. Yew

Deciduous: Trees that drop their leaves in winter, e.g., Oak, Alder

Layers in the woodlands and forest: - Canopy – Understory – Climbing - Herb - Ground Covering – Underground -

Canopy – mature tall trees over 8m (25ft) in height (Oak, Ash, Alder, Birch). Usually single trunk.

Understory (Sub-Canopy and Shrub):

Sub-Canopy – Grows to max. 8m (25ft) (Hawthorn, Holly, Hazel). Can be single or multi-stemmed. **Shrub Layer** – from 2-6m (6-18ft) (Guelder Rose, Usually multi-stemmed.

Climbing Layer – Dog Rose, Honeysuckle, Ivy

Herb Layer – includes Bracken, Bilberry, Foxglove, Hard Fern, Hart's Fern, Rosebay Willowherb

Ground covering plants (Leaf Litter) – Bluebells, Dog Violet, Herb Robert, Ivy, Ground Ivy, Lesser Celendine, Lichens, Lords and Ladies, Primrose, Saxifrage, Wood Avens, Wild Garlic, Wild Strawberry, Woodruff, Wood Rush

Underground Layer – Soil creatures, Nitrogen Fixing Bacteria, Molds, Yeasts. Fungi produce flowers as mushrooms and their threadlike mycelium help trees to communicate with each other and to transfer water and other nutrients

Wildlife to look for on walks in the wood:

Birds – often heard and not seen. Listen to and get familiar with their beautiful songs!

Insects, Spiders, Oak and other *Galls* on leaves (made by gall wasps), *earwigs, woodlice*

Mammals and evidence of their actions e.g. **badger** or **fox**, snuffle holes, droppings, footprints

Evidence of **mice**, **voles** or **squirrels** eating hazel nuts - they have different shaped teeth!



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