

BRANCHING OUT



An Roinn Talmhaíochta,
Bia agus Mara
Department of Agriculture,
Food and the Marine



AGRI AWARE

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HAND IN HAND WITH THE LAND – FARMERS AND FORESTS!

Lesson Objective:

- To learn how farmers utilize forests on their land
- To understand the importance forests have on the environment

Curriculum Links:



Geography: Human environments; Natural Environments; Environmental Awareness and Care

Science: Living things; Energy and Forces; Materials; Environmental Awareness and Care

SPHE: Myself; Myself and Others; Myself and the Wider World



Keywords and Concepts:

- Agroforestry
- Carbon Dioxide
- Grazing
- Oxygen
- Shelter

Earth's Natural Filters

Oxygen is vital to all living things on the planet. Both humans and animals need oxygen to breathe. Where though, do we get all of our breathable oxygen from? The answer... Trees!

Trees are extremely important in helping clean the air, much like a filter. Plants and trees absorb **carbon dioxide** that humans and animals breathe out. The plants and trees use the carbon dioxide to create their own plant food, and in return, release fresh oxygen into the atmosphere. Trees also store some of the carbon dioxide that they take in. The plant cells within a tree then changes the carbon from carbon dioxide (CO₂) to a solid in the form of sugars (such as carbohydrates, glucose and starch) that can be kept in the tree's leaves, branches, stems, trunks, and roots. This carbon storage process also contributes to tree growth!

As farmers are caretakers of the land, they make sure that there are lots of trees on the farm so that all the animals and people living in the countryside, have lots of fresh air to keep them healthy.

Agriculture and Forestry

Ireland's forests are estimated to be 770,020 ha (1,902,760 acres) or 11% of the total land area of the country (National Forest Inventory, 2017) and

is at its highest level in over 350 years. Farmers account for 82% of private lands afforested from 1980 to 2018 (DAFM, 2019). **Agroforestry** is the practice of combining forestry and agriculture in a mutually beneficial way (Teagasc, 2019). One example of a mutual forest and farm benefit it when farmers plant rows of trees alongside their productive grassland or crops. This partnership allows for many shared benefits such as preventing soil erosion, improvement within the ecosystem (including water retention) and provide a natural **shelter** (cover) for animals **grazing** beneath the trees.

Many farmers that currently have forestry on their land are the ones that supply the timber we use in Ireland (e.g. the wood used in the roof of your house).

There are currently a list of 12 Grant and Premiums (different forest types and tree species) that are available for farmers who wish to grow their own farm forest. For more information on this, visit www.teagasc.ie.

Suggested Activities:

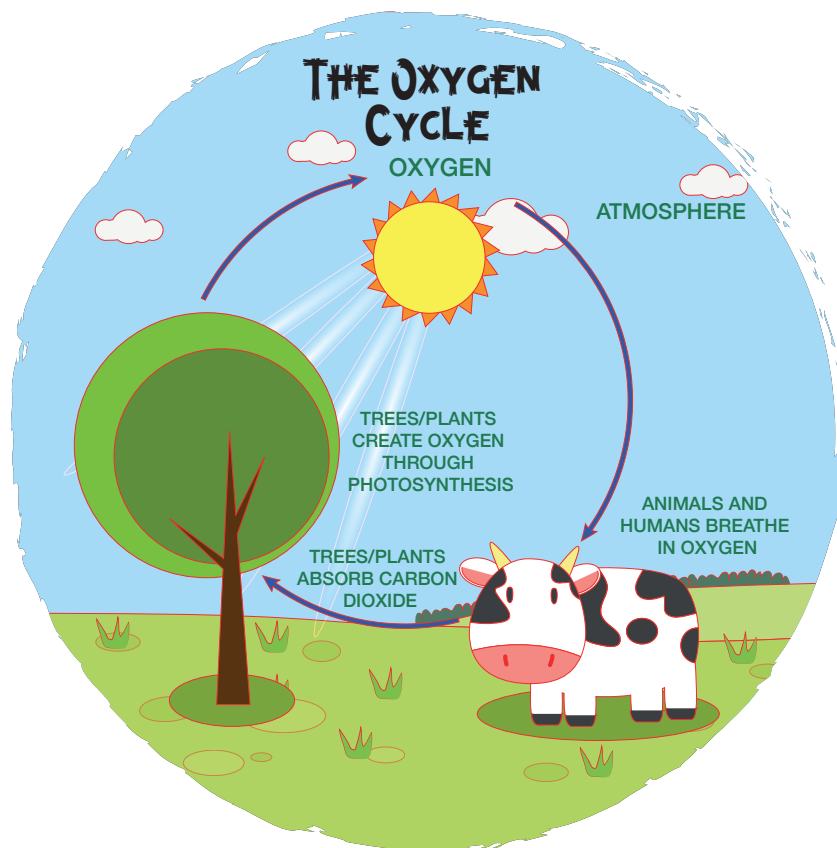
- "Phone a Farmer or Forester" – video chat with a local farmer or forester who is managing some woodland.
- Have the students draw a diagram of humans/ animals exhaling carbon dioxide and plants absorbing it and then giving off oxygen.

Learning Outcomes:

- At the end of the lesson, students should know how farmers can benefit from forests on their land and how forests help the environment.

Additional Resources:

- <https://www.agriaware.ie/>
- <https://www.coillte.ie/>
- <https://www.societyofirishforesters.ie/>
- <https://www.forestryservices.ie/>
- <https://www.teagasc.ie/crops/forestry/>
- <https://www.ifa.ie/sectors/forestry/>





CURBING CARBON AND SPEARHEADING SUSTAINABILITY

Lesson Objective:

- To learn about how trees and forests can help reduce and combat greenhouse emissions.
- To explore ways forests can promote sustainable resources, economy and a sustainable industry.

Curriculum Links:

Geography: Human environments; Natural Environments; Environmental Awareness and Care

Science: Living things; Energy and Forces; Materials; Environmental Awareness and Care

SPHE: Myself; Myself and Others; Myself and the Wider World



Keywords and Concepts:

- Carbon Footprint
- Non-renewable Resource
- Renewable Resources
- Climate Change
- Fossil Fuels
- Wind Turbine



Our Global Climate

Have you ever walked through a muddy puddle then left a trail of muddy shoe tracks through your house? Your **carbon footprint** is similar to this experience; however, this term refers to the amount of carbon dioxide that is released into the atmosphere as the result of an individual, event, organisation or product.

Our carbon footprint is also directly related to **climate change**. Climate change is any significant or abnormal changes to the climate/weather around the globe. The more carbon expelled into the atmosphere, the warmer the Earth's temperature gets. These slight increases of temperature have a

negative impact including melting icecaps, loss of animal habitats and rising sea levels.

Another culprit that adds to the emissions of carbon dioxide into the atmosphere is the use of **fossil fuels**. These are fuels such as coal, oil and natural gas that have been buried deep into the earth for millions of years. There are two major problems with fossil fuels: 1) They create lots of carbon dioxide when harvested or used and 2) They are a **non-renewable resource**, meaning they cannot be made again.

Unlike fossil fuels, trees are a **renewable resource**. They can regrow into new trees! Forests play an important role in capturing the carbon emissions



Non-renewable

VS



Renewable

in our atmosphere. It is estimated that over 300 million tonnes of carbon are stored in Irish forests! Furthermore, the carbon stored in trees makes up approximately 50% of the dry mass of the tree. Even when the wood from harvested trees are used to make various wood products (like the roof of a house), the carbon is stored for life in the wood product!

Sustainable is Attainable

Farmers are always doing their best to make sure the environment around them remains clean and healthy. Many farmers are now turning to the use of renewable resources (such as sunlight, wind and water) to produce the energy needed to power the farm. These types of **renewable resources** (sunlight, wind, water) means that they will never run out and can be used again and again.

The next time you are in the countryside, keep an eye out for some **wind turbines**. These are massive fans that turn in a circle when the wind blows into them. The spinning fan blades creates electricity!

There are also structures called water-wheels or water turbines that turns a fan-like blade under rushing/moving water. The rotating wheel/blades is what generates energy (just like a wind turbine).

Another way farmers can create power or electricity from renewable resources is through the use of **solar panels**. Think of the sunlight as microscopic balls of energy. When these balls of energy hit the solar panel, they bounce around and this is what creates the power for the electricity.

All of these methods are innovative ways to help reduce the amount of fossil fuels on farms. Technology such as this, paired with the planting of more trees, will help combat further carbon emissions.

Suggested Activities:

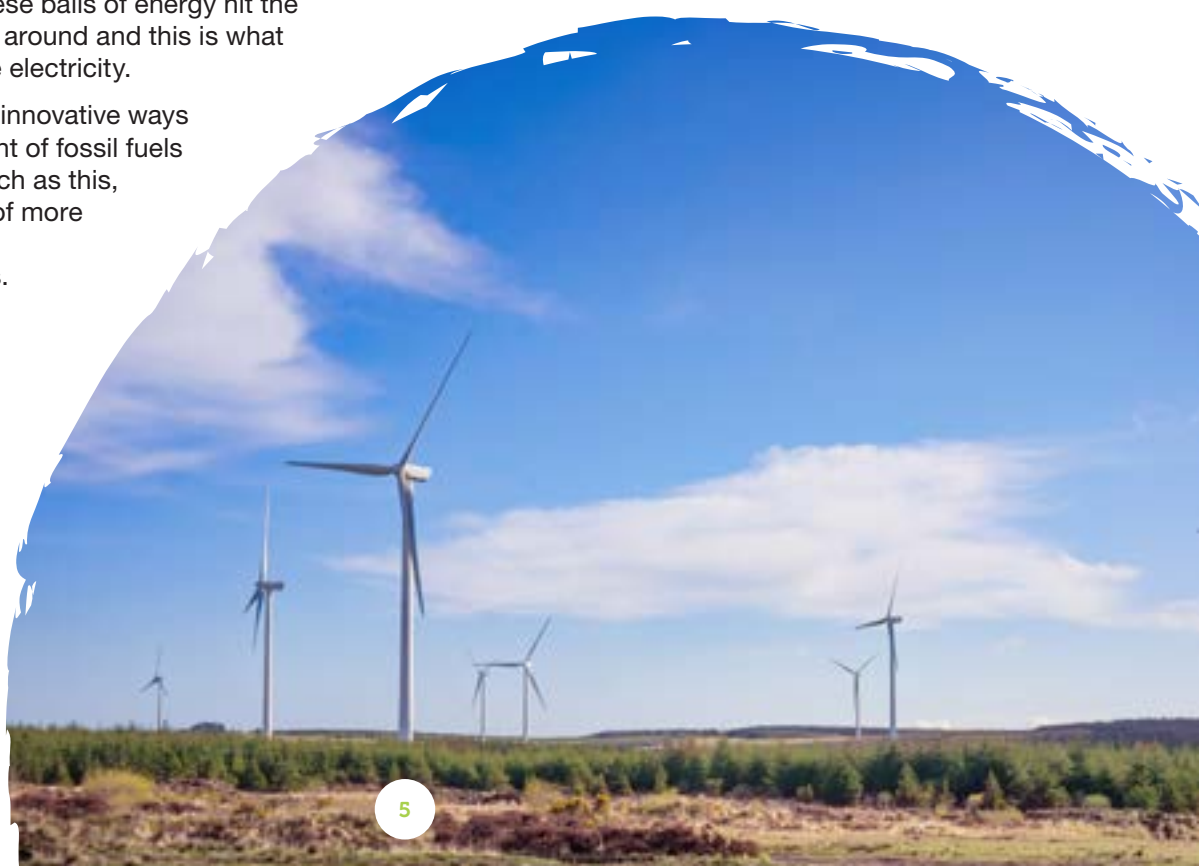
- Watch the film “The Lorax” and discuss what happened in the film.
- As a class, list as many renewable resources and non-renewable resources into two columns.
- As a class, conduct some research to see if any fossil fuels can be found in Ireland.
- Have the students create their own “wind turbine” (pin wheel).

Learning Outcomes:

- At the end of the lesson, students should know how forests can help reduce greenhouse emissions as well as new ways to promote sustainability.

Additional Resources:

- <https://www.agriaware.ie/>
- <https://www.coillte.ie/>
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FOREST FLORA AND FAUNA

Lesson Objective:

- To discover the biodiversity that resides within an Irish forest and learn the various roles that native woodland flora and fauna play.

Curriculum Links:

Geography: Human environments; Natural Environments; Environmental Awareness and Care

Science: Living things; Energy and Forces; Materials; Environmental Awareness and Care

SPHE: Myself; Myself and Others; Myself and the Wider World

Keywords and Concepts:

- Biodiversity
- Fauna
- Food Chain
- Flora
- Species

Biodiversity in the Forest

The forest is home to a lot of different types of **flora** (plants) and **fauna** (animals). Trees not only absorb greenhouse gasses but provide habitats for wildlife. Some of Ireland's native trees include

- Ash – The wood of the ash tree is the wood used in hurley sticks, snooker cues, hockey sticks and boat oars.
- Alder – Some of your furniture at home is made from alder wood, which is also known as 'Irish Mahogany'. Alders are found in damp areas, beside freshwater loughs and along river banks, where their strong roots can help to keep the bank in place.
- Oak – The oak is known as the king of the forest and there are many oak woodlands across the country. They can be found in Killarney, Co. Kerry; Glen of the Downs, Co. Wicklow and Glenveagh, Co. Donegal.

- Hazel - Hazel woodland often cover areas of limestone, particularly on the Burren of North Clare. You will recognise the hazel tree from its yellow 'lambs tail' catkins which appear in Spring.

Did you know that the Oak tree supports over 280 different types of wildlife species? This is a prime example of how forests encourage **biodiversity**. Biodiversity is the variety of life, from the smallest insect to the largest animal.

Another important tree in Ireland that also promotes biodiversity is the Sitka Spruce. The Sitka Spruce is actually the most commonly planted tree species in Ireland and accounts for over 50% of all the forested land in the country. Studies have shown that the Sitka Spruce have more macrofungal **species** (different types of fungus, aka mushrooms) richness (per m²) than native Sitka Spruce forests in Canada and also to be as high as the native Irish Oak forests. Fungi (such as a mushroom) help forest ecosystems with its nutrient cycling (using and returning nutrients), retention and formation of soil structure and forest food webs (O'Hanlon & Harrington, 2016).

Since forests provide a home to many plants, insects and animals, they play an important role in the **food chain** balance. Food chains are made up of different living things that depend on the next, as a source of food.



Here are some examples of forest food chains:



Grass



Rabbit



Fox

Sun ➤ Leaf ➤ Caterpillar ➤ Bird

Dead Leaves ➤ Woodlice ➤ Mouse ➤ Owl

Soil ➤ Earth Worm ➤ Hedgehog

Suggested Activities:

- Play 'Biodiversity Bingo' as a class.
- Look up and research different plants and animals that can be found living in the forest.
- Have the students create their own forest food-webs.
- Create a matching game with pictures of different trees found in Ireland and their names.

Additional Resources:

- <https://www.agriaware.ie/>
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- <https://www.teagasc.ie/crops/forestry/>
- <https://www.ifa.ie/sectors/forestry/>

Learning Outcomes:

- At the end of the lesson, students should know some of the different types of plants and animals found in a forest as well as the roles they play within a food-web.





WONDERFUL WOODWORKS

Lesson Objective:

- To discover the various uses of forestry and learn about different wood products.

Curriculum Links:



Geography: Human environments; Natural Environments; Environmental Awareness and Care

Science: Living things; Energy and Forces; Materials; Environmental Awareness and Care

SPHE: Myself; Myself and Others; Myself and the Wider World



Keywords and Concepts:

- Silviculture
- Sawmill
- Wood Energy
- Timber

Timber!

When trees grow to be an appropriate size and age, a **forester** is able to cut it down to be used for **timber** (wood prepared for use in building or carpentry) or the forest can be retained on a continuous basis. The age and size of the trees will be different based on the type of tree. For example, the life of a Sitka Spruce varies between 30-40 years, while that of an Oak and Beech tree can be upwards of 120+ years (Teagasc, 2019). This process of growing, managing and harvesting/retaining trees is what's known as **silviculture**.

After a tree is felled in the forest, it is then brought to a **sawmill** to be cut down and processed into different shapes and sizes of wood boards. These wood boards are used to build houses, shops, schools and more! Harvested trees can also be turned into other products such as chairs, desks, shelves and paper.

Fuel

Besides building incredible structures, wood from forests can be used as a source of renewable fuel! Trees with smaller diameter trunks are just one source of renewable fuel that are easily obtained from forest thinings (the removal of small and low performing trees to allow better performing trees to grow). Wood such as Willow, is an example of a type of tree that can also be used as fuel to heat our houses and create electricity.

Sporting and Recreation

Although forests can be used for wood products and renewable fuel, they can also be enjoyed for sport and recreation. With their mixture of trees, plants, animals and streams, forests provide a beautiful landscape to enjoy a lovely stroll or hike through. They are also a favourite location for avid birdwatchers; a unique and enjoyable hobby to many people in Ireland.

Furthermore, forests also serve as setting for the old-time shooting sport of game hunting. Some of these game animals that hunters chase includes deer, fox and pheasants.

Suggested Activities:

- Use lollipop sticks to build a fun structure or insect house for your school garden.
- Watch a documentary about how trees are cut down and processed at a sawmill.

Learning Outcomes:

- At the end of the lesson, students should know the various ways a forest can provide the materials for building as well as playing a renewable fuel resource. Furthermore, students will understand how trees are processed into different products via a sawmill.

Additional Resources:

- <https://www.agriaware.ie/>
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WALK THROUGH THE WOODLANDS

Lesson Objective:

- To apply all of the newfound knowledge discovered in the previous modules and experience nature first-hand, on a field trip through the woods.

Curriculum Links:



Geography: Human environments; Natural Environments; Environmental Awareness and Care

Science: Living things; Energy and Forces; Materials; Environmental Awareness and Care

Physical Education: Outdoor and adventure activities

SPHE: Myself; Myself and Others; Myself and the Wider World



Keywords and Concepts:

- Trail
- Trail Marker
- Compass
- Wildlife Ranger

Into the Woods

Numerous national forests in Ireland provide maintained **trails** that people can walk on and follow. In fact, there are 18 million visits to forests per year! Sometimes the trails can be paved with cement or simply covered with grass/dirt/bark-mulch. These trails have **trail markers** such as signs or objects, laid out and posted to help people stay on track. These trail markers can also provide some information as to the way people are going. These trails don't take care of themselves though! **Wildlife Rangers** make sure that these trails are clear of any major debris and trash, as well as ensure that the trail markers are visible, unbroken and up-to-date.

People are free to walk off the trail path, however caution must be taken when doing so! It is easy to fall over something hidden on the forest floor or even get lost amongst the trees, since many of them look the same in the forest! Always try to keep track of your surroundings in this case.

If you are ever in the woods, it is also important to bring a **compass** with you in order to provide you with some direction if you ever get lost. A compass won't give you exact directions like a GPS-enabled directional application on your mobile phone, however it will let you know if you are heading North, South, East or West. This is done by a tiny, balancing needle in the centre of the compass that turns based on Earth's magnetic fields.



Suggested Activities:

- Research if there are any public forests in your county and if they offer hiking trails.
- Learn how to use a compass and as a class, determine where North, South, East and West is, in the classroom.
- Break the class up into groups of 2-4 and provide each group with a compass. In the school courtyard place some tiny object or markers around the courtyard and see if the groups can use the compass to orienteer themselves to each of the objects using the compass and clues.
- Visit a local forest and take a walk through the woods! See if your students can point out the different types of trees, plants, animals or insects.
- Take a virtual field trip through the woods! See if you can find a virtual tour of a forest in Ireland or even somewhere else in the world! Have the students write down all the things they see along the way.

Learning Outcomes:

- At the end of the lesson, students should gain an appreciation of the forest. They should also be able to understand how a compass works.

Additional Resources:

- <https://www.agriaware.ie/>
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