Post-Primary School Booklet

SCIENCE WEEK

#scienceweek

10-17 Nov 2019

Supported by Research Ireland

TREES AND CLIMATE

Taighde Éireann
Research Ireland

BACKGROUND

Pupils explore the relationship between trees and climate, looking at how trees can tell us about past climate, the role of trees in climate change mitigation, the carbon capture potential of trees and the role of trees in the Government Climate Action Plan. This activity ties in with many of the learning outcomes from the Junior Cycle Science Specification or could also be a Transition Year activity.

Junior Cycle Science Specification, Relevant Learning Outcomes

NOS6: conduct research relevant to a scientific issue, evaluate different sources of information including secondary data, understanding that a source may lack detail or show bias.

NOS7: organise and communicate their research and investigative findings in a variety of ways fit for purpose and audience, using relevant scientific terminology and representations.

NOS8: evaluate media-based arguments concerning science and technology.

E&S7: illustrate how earth processes and human factors influence Earth's climate, evaluate the effects of climate change and initiatives that attempt to address those effects.

BW10: evaluate how humans can successfully conserve ecological biodiversity and contribute to global food production; appreciate the benefits that people obtain from ecosystems.

INVESTIGATION 1

DENDROCHRONOLOGY
looking at how tree rings are a record of climate.

Did you know that tree rings not only tell us about the age of a tree, but they can also be a record of past climate conditions?

- Find a tree stump in your area or use a picture if you can't find one. Consider type of tree (oak produces clear tree rings, pine can often 'skip' a year), what can you tell about prior environmental conditions from the rings? See this document for an example of a tree ring: https://www.trocaire.org/sites/default/files/resources/edu/creating-futures-lesson-3.pdf Other information on dendrochronology can be found at https://climatekids.nasa.gov/tree-rings/
- If you can find an older tree that has been cut down, the cross section of the tree stump can offer a slice of that tree's history. In each growth season, trees create a new ring that reflects the weather conditions of that growth season. Very old trees can offer clues about what the climate in an area was like long before measurements were recorded.
- In Ireland, where we have four seasons, the light-coloured rings represent wood that grew well in the spring and early summer. The dark rings represent wood that grew more slowly in the autumn. One light ring plus one dark ring equals one year of the tree's life.

Evidence from Tree Rings

- **Thickness:** The width of a ring indicates if the environmental conditions were good (thick) or bad (thin). Wet conditions are usually good for tree growth.
- **Shape:** If rings are thinner on one side than another the tree might have been leaning to one side.
- **Strange Marks:** scars can be left by insects, disease or fires.
- Can we find information on past weather conditions and correlate it with information gained from the tree rings? Talk to older relatives about weather in the past or look at historical weather data on https://www.met.ie/climate/available-data/historical-data

INVESTIGATION 2

TREE SURVEY

What can we find out about trees in our local area? Do we have space for more trees?

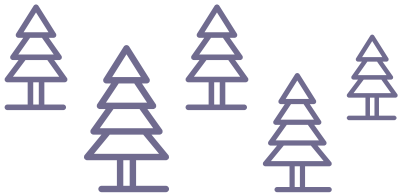
Investigate tree cover in your local area by using satellite view on Google Maps. You can look at the area close to the school or the wider area. You can also find more information on woodlands at http://map.geohive.ie/mapviewer.html including an inventory of ancient and long established woodlands.

Carry out a local survey of trees looking at tree species and location.

- Are the trees native or introduced species? Can we identify the tree species? If trees have already lost their leaves, the following website may help: https://naturedetectives.woodlandtrust.org.uk/naturedetectives/activities/2015/09/twig-id/
- Can we estimate the age of the trees, find records of when they were planted or talk to older people in the community who may remember them being planted?
- Have there been any trees planted recently in the local area or any trees removed?
- Do you think the trees chosen were suitable for the area i.e. size, space, species?
- Can you identify any areas where more trees could be planted?

DISCUSSION / DEBATE

The role of trees in the government's Climate Action Plan



8,000 ha

on average, of **newly planted forest** per year

Climate Action Plan 2019 infographic, Government of Ireland.

Among the proposed measures for tackling climate change is the plan to plant 8000ha of new forest per annum until 2030. There has been debate on what trees are suitable for planting to ensure this plan is effective.

- Research the government's Climate Action Plan especially in relation to tree planting.
- Research the current level of forest cover in Ireland and the breakdown of species.
- Why are trees important for climate change mitigation?
- Can you find information on the carbon capture potential of different tree species?
- Research the opinions of government bodies and NGOs - see web links provided below.
- What factors do we need to take into consideration when planning forestry? - Economic benefits, carbon capture, biodiversity, suitability for urban / rural environments, available space, nitrous oxide production from artificial fertilisers, alternative land uses.
- Discuss or debate the pros and cons of the plan.
- Do you agree with the government's plan? What is the alternative? What would you recommend?

EXTENSION
Taking Action

Plan a tree planting initiative in the school or local community. Consider suitable locations and choice of trees.

- How much space should be set aside for tree planting in the school?
- Is there a suitable local area where the school could plant trees?
- What type of trees should we plant - consider suitability, space, room to grow, species? For ideas see: https://treecouncil.ie/tree-advice/right-tree-right-place/
- What will be the benefits to our school? For example, shelter, increased biodiversity in the school, ecology studies, student wellbeing and the wider community and world (climate change mitigation).

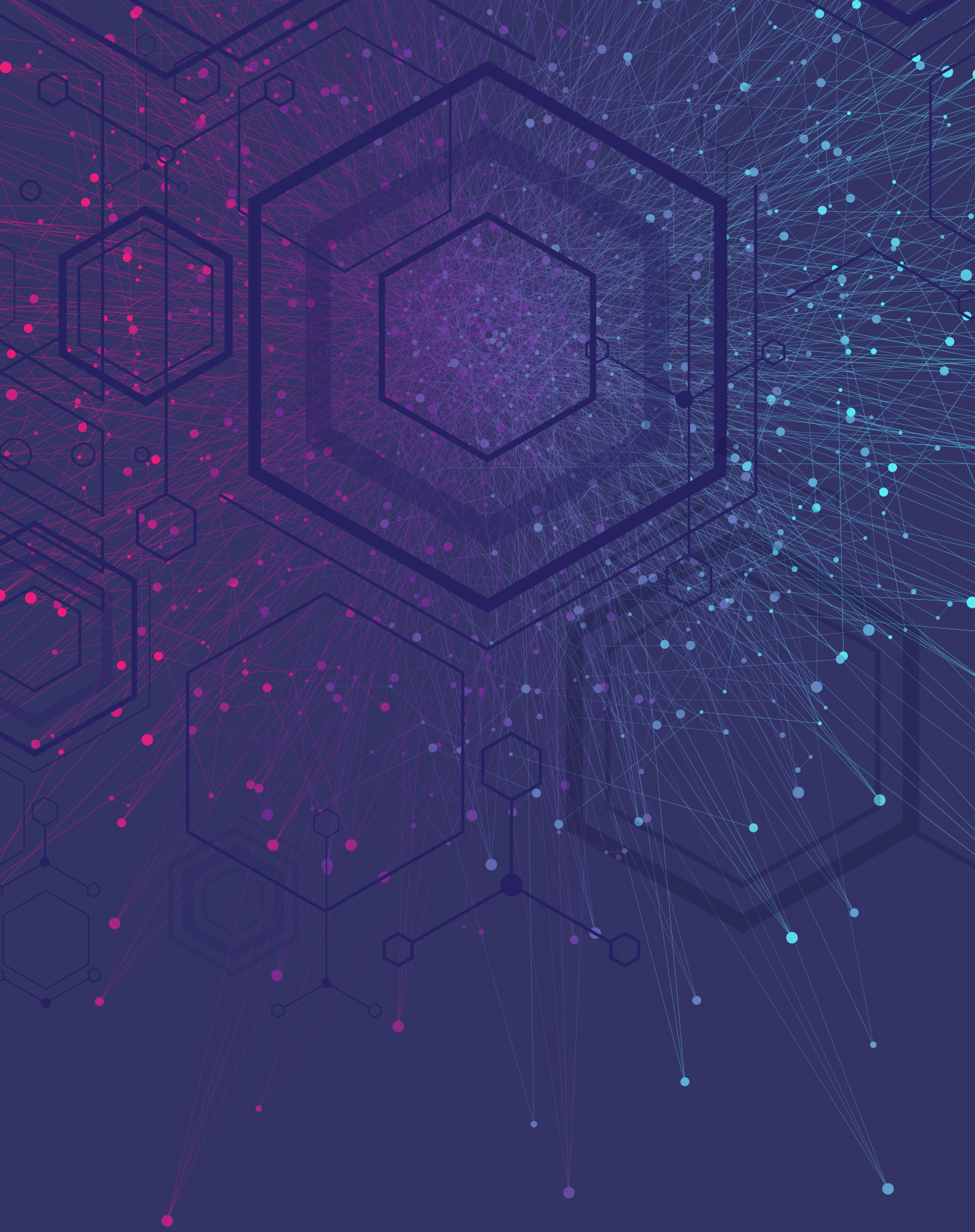
LINKS AND RESOURCES

Tree, Biodiversity and Climate Related Organisations in Ireland (Government and NGOs)

- Tree Council of Ireland
  https://treecouncil.ie/
- Native Woodland Trust
  https://www.nativewoodlandtrust.ie/
- Woodlands of Ireland
  https://www.woodlandsofireland.com/
- Coillte
  https://www.coillte.ie/
- Coford
  http://www.coford.ie/
- The Forest Service
  https://www.agriculture.gov.ie/forestservice/
- Environmental Protection Agency
  https://www.epa.ie/
- Sustainable Energy Authority of Ireland
  https://www.seai.ie/
- Irish Wildlife Trust
  https://iwt.ie/
- The Woodland League
  http://www.woodlandleague.org/
- Irish Peatland Conservation Council
  http://www.ipcc.ie/
- National Parks and Wildlife Service
  https://www.npws.ie/

Other Links

- EPA Report on Biodiversity in Irish Plantation Forests
  https://www.epa.ie/pubs/reports/research/biodiversity/ERTDI%20Report%2051.pdf
- The Guardian - Planting Trees to tackle Climate Change
  https://www.theguardian.com/environment/2019/jul/04/planting-billions-trees-best-tackle-climate-crisis-scientists-canopy-emissions
- Forest Structure and Carbon Capture
  https://www.sciencedaily.com/releases/2019/08/190812130843.htm
- Carbon Storing Trees - Species listed are specific to USA but general guidelines are good
  https://learn.eartheasy.com/articles/10-carbon-storing-trees-and-how-to-plant-them/
- Biodiversity and Ecosystem Services
  https://www.youtube.com/watch?v=cAg0TVPsZdM
- UK Woodland Trust
  https://www.woodlandtrust.org.uk/



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