# Curious Minds/ESERO Framework for Inquiry

| THEME | Biodiversity Through the Seasons | |
|---|---|---|
| CURRICULUM | **Strand:** | Living Things, Environmental Awareness and Care, Energy and Forces, Materials, Data. |
| | **Strand Unit:** | Plants and Animals, Caring for my Locality, Light, Properties and Characteristics of Materials, Representing and Interpreting data. |
| | **Curriculum Objectives:** | Use all the senses, separately or in combination, to explore living things, observe, discuss and identify a variety of plants and animals in different habitats in the immediate environment, observe gradual changes in living things and familiar objects and events over a period, identify the interrelationships and interdependence between plants and animals in local and other habitats Understand the role of sunlight in photosynthesis and appreciate that the sun gives us heat and light without which people and animals could not survive, Understand how materials may be used in construction. |
| | **Skills Development - Working Scientifically:** | Questioning, Observing, Predicting, Investigating and Experimenting, Analysing, Recording and Communicating. **Designing and Making:** Explore, Plan, Make and Evaluate. |

## ENGAGE

### THE PROMPT

- Indoors: Video Clips / Presentations.
- Paxi Video: Day and Night and the Seasons https://www.youtube.com/watch?v=TagG32gwiBo
- Benefits of Biodiversity DLRC https://www.youtube.com/watch?v=cAg0TVPsZdM&feature=emb_logo
- How to make a Biodiversity Map of Your Garden online tutorial - Michèle Castiaux: http://www.heritageinschools.ie/online-tutorials
- Outdoors: Bring children outdoors in different seasons to look at biodiversity in school.
- Ash and Horse chestnut spotters guides.

### WONDERING

**The Seasons**

- What causes the seasons? Can we see changes in the Earth's vegetation through the seasons?

**Biodiversity**

- What is Biodiversity? What are the main threats to biodiversity? How does biodiversity impact on our lives? Why is it important to protect biodiversity? Is our school a good place for biodiversity? Can we make improvements?

**Trees**

- What types of trees are in our school grounds? What types of seeds do they have? What other species do they support? Could we plant more trees?

**Birds**

- What types of birds visit our school? Do they have enough food, water and shelter? How could we help birds in our school?

**Pollinators**

- What is pollination and why is it important? What are the main types of pollinators? Are our school grounds pollinator friendly?

### EXPLORING

**The Seasons**

- Look at trees in the school grounds through the seasons. What colour changes do we see?

**Autumn**

- Explore trees: leaf shape, bark, nuts / seeds / berries Identify trees and plants if possible Make not of different habitats in the school grounds Make a biodiversity map of the school.

**Winter**

- Look at winter twigs and buds Look at the differences between deciduous and evergreen trees Watch birds in the school and try to identify the main ones.

**Spring**

- Observe and record the signs of spring: trees coming into leaf, first wildflowers, birds making nests, Bumble Bee Queens waking from hibernation Start planting in the school garden.

**Summer**

- Leave areas of grass long to allow wildflowers to grow Minibeast hunts Observe and record pollinators.

### Considerations for inclusion

Consider potential area of difficulty for students with Special Educational Needs.

Ask students to describe observations verbally or nonverbally using an increasing vocabulary.

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## INVESTIGATION 1 – DAY, NIGHT AND THE SEASONS

| STARTER QUESTION | PREDICTING | CONDUCTING THE INVESTIGATION | SHARING: INTERPRETING THE DATA / RESULTS |
|---|---|---|---|
| • Why are there different seasons on Earth? | • Discuss the seasons as a class<br>• What do you think causes the seasons?<br>• What does the sun have to do with the seasons?<br>• Why are days shorter in winter and longer in summer? | • Construct a model of the Earth.<br>• Draw a circle on paper to represent the Earth's orbit around the sun.<br>• Use a torch to represent the sun shining on Ireland in different seasons.<br>• Observe the differences in light levels http://esamultimedia.esa.int/docs/edu/PR45_One_year_on_Earth.pdf | • What differences did you notice in the sunlight in different seasons?<br>• Do you think there is a relationship between sunlight levels and plant growth in different seasons?<br>• Look at satellite images of the Earth from different seasons. Can we see changes in vegetation? https://www.sentinel-hub.com/explore/eobrowser/ Tutorial for EO browser https://www.youtube.com/embed/ |

## INVESTIGATION 2A – ACORN / HAZELNUT FLOTATION TEST (AUTUMN)

| STARTER QUESTION | PREDICTING | CONDUCTING THE INVESTIGATION | SHARING: INTERPRETING THE DATA / RESULTS |
|---|---|---|---|
| • Statement: Acorns that float are no good for planting.<br>• Which acorns float and which ones sink?<br>• Can we verify the truth of the original statement?<br>• Which group of acorns will germinate best? | • Look at the acorns.<br>• Are they all the same?<br>• In what way are they different?<br>• Can you predict which ones will float? | • Drop the acorns into the water and see which ones float.<br>• Record the observations in a table (use sticks to make the table and the words sink and float). Place acorns in it. | • How many of our acorns floated? Which ones? Record the results in a table.<br>• Examine these acorns. Why do you think they floated?<br>• Can we see anything wrong with them? Cut some of them open and examine them.<br>• Plant some samples of both groups of acorns to see which ones germinate. |

## INVESTIGATION 2B – DISPERSAL OF ASH / SYCAMORE SEEDS (AUTUMN)

| STARTER QUESTION | PREDICTING | CONDUCTING THE INVESTIGATION | SHARING: INTERPRETING THE DATA / RESULTS |
|---|---|---|---|
| • Which sycamore seeds will travel the furthest when dropped from the same place? How might we make this a fair test?<br>• Both Ash and Sycamore seeds are wind dispersed. They spin around in the wind. Ash is a native Irish tree while sycamore is an introduced species. | • How are the seeds different from each other? – length, surface area, mass?<br>• Can we predict which one will travel the furthest. | • Drop each of the seeds from the same location – preferably from a height if possible Measure how far each one travelled.<br>• Repeat results for each seed and calculate average distance travelled. | • What did you do? What did you find out? Was it easy to answer the starter question? Was it a fair test?<br>• Was it easy to make it a fair test?<br>• Why not – too many variables, size, shape, mass. Also, wind speed and direction change slightly. |

**Considerations for inclusion**

Display findings from investigations; sing, do drawings or take pictures.

Practice recording the passing of time, establish classroom routines that draw the students' attention to the measurement of time.

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## INVESTIGATION 3 – DESIGN AND MAKE A BIRD FEEDER (WINTER)

| STARTER QUESTION | PREDICTING | CONDUCTING THE INVESTIGATION | SHARING: INTERPRETING THE DATA / RESULTS |
|---|---|---|---|
| • Can we name any of the birds that visit our school?<br>• Is it easy to spot birds? Is there enough food, water and shelter for birds?<br>• Could we design and make a bird feeder to attract more birds into our gardens? | • What materials can we use to make our bird feeder?<br>• Can we use biodegradable materials?<br>• What types of food should we put in our feeders? | • Bird feeders can be made using natural materials such as pinecones coated in lard and seeds.<br>https://www.sfi.ie/site-files/primary-science/media/pdfs/col/sci_at_home_bird_feeder.pdf | • Are birds using your bird feeders?<br>• Have you noticed more birds or any new types?<br>• Different food sources attract different bird species – can we increase the number of bird species by using a variety of feeders and food types?<br>• Take part in the Garden Bird Survey from Dec to February and record the birds you find https://birdwatchireland.ie/ |

## INVESTIGATION 4 – CONDITIONS FOR SEED GROWTH (SPRING)

| STARTER QUESTION | PREDICTING | CONDUCTING THE INVESTIGATION | SHARING: INTERPRETING THE DATA / RESULTS |
|---|---|---|---|
| • What conditions do plants need to grow? Soil, Water, Air, Light, Temperature?<br>• What depth of soil is best for seed germination?<br>• What types of seeds should we plant to help biodiversity in our school? Herbs, fruit and vegetables, native trees and wildflowers http://wildflowers.ie/ https://pollinators.ie/wordpress/wp-content/uploads/2018/04/AIPP-Garden-Plants_A5-Flyer-PRINT.pdf | • Will my seeds grow without air?<br>• Will my seeds grow without light?<br>• Will my seeds grow without water?<br>• Will my seeds grow without soil?<br>• Will my seeds grow if they are too cold / too hot? | • How will we conduct our investigation?<br>• Can we investigate all questions at once?<br>• Why not? – Importance of Fair Testing. If we change more than one thing, we don't know which gave us our result. For ideas see: http://esamultimedia.esa.int/docs/edu/PR42_AstroFarmer.pdf Set up all tests separately.<br>• Consider getting each group to choose a separate starter question and decide how they will investigate.<br>• Maybe look at other variables such as depth of soil, location of pots, pots versus direct sowing in ground. | • Did all of the seeds grow?<br>• Which conditions are necessary for plant growth?<br>• We have looked at what plants need to grow from seed. What about planting trees or plants outdoors? We need to look at suitability.<br>• Are the plants native?<br>• Are they invasive plants that may be harmful to wildlife?<br>• Are they good for pollinators? |

**Considerations for inclusion**

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## INVESTIGATION 5 – RECORDING POLLINATORS (SUMMER)

| STARTER QUESTION | PREDICTING | CONDUCTING THE INVESTIGATION | SHARING: INTERPRETING THE DATA / RESULTS |
|---|---|---|---|
| • What types of pollinators are visiting our school?<br>• Do we have enough of the right types of flowers to attract pollinators?<br>• Can we tell the different groups of pollinators apart? https://pollinators.ie/wp-content/uploads/2020/03/FIT-Counts-guide-to-identifying-the-different-insect-groups.pdf | • How many insects will visit our flower patch in 10 minutes?<br>• What is a FIT count? https://www.youtube.com/watch?v=MHCp4uP5C8U<br>• FIT Count demo https://www.facebook.com/136168046462621/videos/238600367220535 | • Choose a patch of flowers 0.5m x 0.5m to watch (see flower list in link).<br>• Set a timer for 10 minutes and record the numbers of each type of pollinator you see (be as accurate as you can but don't worry if you're not sure) Record your results with National Biodiversity Data Centre. For full instructions see https://pollinators.ie/record-pollinators/fit-count/ Irish butterflies website – food plants | • Did many pollinators visit your flower patch?<br>• Were you able to tell the different types apart?<br>• How could we improve the school grounds in order to attract more pollinators? https://www.facebook.com/136168046462621/videos/609675456327255 https://pollinators.ie/schools/ |

## TAKE THE NEXT STEP

| APPLYING LEARNING | MAKING CONNECTIONS | THOUGHTFUL ACTIONS |
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**European Space Agency (ESA) Climate Detectives Competition**

- Use Earth observation from Satellites or ground measurements to identify a local Climate problem, investigate it and find ways to make a difference https://climatedetectives.esa.int/develop/

**National Biodiversity Data Centre - Citizen Science**

- Participating in Citizen Science Projects – how does it work? https://www.facebook.com/136168046462621/videos/611486446098404

**Other Outdoor Investigations**

- Science Week 2019 Framework – Trees and Climate Change https://www.sfi.ie/__uuid/c650af41-58c9-4c9c-a2f4-969298b860b6/SW-2019-Primary-School-Booklet-(2).pdf
- Science Week 2018 Framework – Trees in Different Seasons http://www.sfi.ie/__uuid/136a942f-959a-46bd-b558-e65c014ad7dc/13119-SFI-Science-Week-2018-Primary-School-Booklet-Updated-Final.pdf
- Engineers Week Framework 2020 – Biodiversity and Waste Design Challenge https://www.sfi.ie/engagement/discover-primary-science-and-maths/resources/engineers-week/Engineers-Week-2020-Classroom-Resource-Bio-and-Waste.pdf
- Which trees come into leaf first and when do the leaves appear? Can we spot the flowers on trees and when do they flower? Collect and record data. https://carlowsports.ie/wp-content/uploads/2020/05/CW2001-Spring-Diary-Challenge.pdf

**Additional Website Links for Activities and Identification**

- https://www.engagewithnature.ie/
- https://www.schoolearthed.ie/index.html
- https://carlowsports.ie/nature-on-your-doorstep-august/
- http://www.irishbutterflies.com/butterfly_species.html
- http://www.wildflowersofireland.net/
- https://www.irishwildflowers.ie/
- https://www.treecouncil.ie/native-irish-trees
- http://www.treetoolsforschools.org.uk/menu/
- Links to awards – remind of links to specific steps

**Considerations for inclusion**

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| **REFLECTION** | • Did I meet my learning objectives?<br>• Are the children moving on with their science skills?<br>• Are there cross curriculum opportunities here?<br>• What went well, what would I change?<br>• Did I take into account the individual learning needs of my students with SEN? What differentiation strategies worked well? |

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