**Primary School Booklet** 

# SCEACE WEEK #scienceweek 7-14 Nov 2021



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Supported by Science Foundation Ireland

# CREATING OUR FUTURE: HEALTH

**Classroom Resource Booklet** 





Discover Primary Science and Maths www.primaryscience.ie



#### **INTRODUCTION**

DPSM/ ESERO

# CREATING OUR FUTURE

Creating Our Future is a Government of Ireland campaign to stimulate a national conversation between everyone in Ireland on their ideas on how to make our country better for all. While we might not always think about it, research and innovation affect nearly every part of our lives. The COVID-19 pandemic in particular has shown the importance and value of research and innovation in our lives – medically, socially, politically, and economically. Ideas are the starting point for all research and innovation. Anyone, anywhere can have an idea that inspires research and innovation. It could be based on an opportunity or challenge that someone has identified in their own life, for their community, for Ireland or for the world. Or it could be based on a topic that someone is curious or passionate about. Creating Our Future wants to hear them all – in particular from primary school learners. All ideas will be captured and will help inform the future direction of research and innovation in Ireland.

Science Foundation Ireland is inviting primary schools to get involved in the process of generating ideas. We will be introducing six themes over a period of six weeks and presenting a lesson resource on these themes. Each resource will incorporate some different ideas for introducing the topic in your classroom with trigger questions to aid discussion, a related science investigation or design and make project and some ideas for carrying out your own research on the topic. The resource is not designed as a complete lesson plan but rather some suggestions to inspire you to create your own lesson on the theme. Teachers can choose to engage with any of the resources or even all six.

For Science Week, we are asking teachers to capture their learners' ideas and submit them to Creating Our Future to ensure that the ideas and voices of primary school students are incorporated into Creating Our Future. Fill out our PowerPoint template during Science Week or in the weeks leading up to Science Week. Each learner will create a slide with their idea for the future of research in Ireland in one sentence, along with any images, drawings or anything extra that they would like to add in. Email this presentation back to creatingourfuture@ sfi.ie and present your ideas to another class in your school as part the show and tell step (step 5) of your Discover Primary Science and Maths Award! More information can be found at CreatingOurFuture.ie

## BACKGROUND

This week's theme is Health. We often think of health in terms of doctors, hospitals and medicines but it is just as important to think about the health of our environment. To keep our bodies healthy we need access to healthy food, clean water, shelter and clean air to breathe. In order to have all of these things we need to look after the environment around us. We also need to exercise the keep our bodies strong and healthy.



Science Sfl Foundation Ireland For what's next



## TRIGGER QUESTIONS FOR DISCUSSION



How does protecting biodiversity benefit people? See what services nature provides for us.

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Source: YouTube - Dún Laoghaire-Rathdown County Council

What do we need to do to protect Biodiversity and our own health?



Source: YouTube - Convention on **Biological Diversity** 

Can we use technology to help clean the air?



Source: YouTube - RTÉ News

Our air and water quality improved during Covid 19 lockdowns. Do you think this change was permanent? What lessons can we learn for the future and what changes could we make to reduce air and water pollution?



Source: YouTube - On Demand News

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## TRIGGER QUESTIONS FOR DISCUSSION

How can trees help clean and purify the air that we breathe?



Source: YouTube - Vox

Do we have enough trees in our towns and cities? What would life be like if we had no trees?



Source: YouTube - MovieStation

How can space research can help with people's health on Earth?



Source: ESA Euronews

#### How do astronauts keep healthy in space



Source: YouTube - ESA

## **RESEARCH PROJECT IDEAS**

Can a smart watch or pedometer help you keep healthy? Try a step count challenge and record and graph your class results. Measure out the steps across the school yard and compare the distance to another location. How many times would your class need to traverse the school yard to get to the International Space Station?



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## **CLASSROOM INVESTIGATION**

## INVESTIGATING THE IMPORTANCE OF TREES

One of the most important things we can do to look after our own health is to ensure that we have a healthy environment. Trees can provide us with healthy fruit, enrich the soil and prevent soil erosion, protect waterways, regulate soil water to both prevent flooding and alleviate drought, produce oxygen and absorb both carbon dioxide and air pollutants.



## INVESTIGATING THE IMPORTANCE OF TREES

#### Class Level: All

INVESTIGATION

#### Curriculum Links

Strand: Environmental Awareness and Care; Living Things.

Strand Unit: Environmental Awareness; Caring for the Environment.

**Curriculum Objectives:** Appreciate that people share the environment with plant and animal life; Begin to recognise that people animals and plants depend on each other; Observe similarities and differences among plants and animals in different local habitats; Use simple keys to identify common species of plants and animals, Develop an awareness that air, water, soil, living and non-living things are essential to the environment.

**Skills Development:** Questioning; Observing; Exploring; Predicting; Planning; Investigating; Estimating and measuring; Recording and communicating.

New Words/Vocabulary: Photosynthesis, Air Quality, Waterways, Organic Matter, Biodiversity.

**Focail Nua:** Tree height (Airde crainn), Roots (Fréamhacha), Biodiversity (Bithéagsúlacht), Photosynthesis (Fótaisintéis) Air Pollution (Truailliú aeir), Air Quality (Caighdeán aeir), Lichen (Léicean).

**Cross Curricular Links:** (General) Geography: the local natural environment); Maths: Estimating and measuring, data, angles.

#### **Equipment/Materials**

- Simple keys for ID of trees, lichens and invertebrates (see Take the Next Step).
- White Sheet, Magnifying viewers, paper, pens, pencils.
- Drinking straw, card, tape, string and plasticine / small weight (for clinometer)









## INVESTIGATING THE IMPORTANCE OF TREES

#### Engage

#### **Trigger questions**

- Why are trees important?
- Where are the nearest trees? Are there any trees in our school?
- What lives in trees?
- How could we find the height of a tree?
- Why is the quality of the air we breathe important?
- What is air pollution and what causes it?
- What other plants and organisms can live on trees?
- What is a lichen?

#### Background



Trees are of major importance to our quality of life, wellbeing and air quality. They take in Carbon Dioxide and provide oxygen through the process of photosynthesis. Animals need to breathe oxygen to survive. As mammals we breath in Oxygen through to our lungs. Without Oxygen we would die. By taking in Carbon Dioxide trees can reduce the effects of Climate Change. Trees can also filter pollutants from the air. The air we breathe can be polluted with tiny particles called fine particulates, which can be caused by excessive smoke and pollution.

Tree roots hold soils together along waterways, preventing erosion and protecting against flooding. Their leaves enrich the soil and add organic matter. They provide food and shelter for all kinds of wild creatures from birds and mammals, such as bats, to insects. These insects in turn are food for other creatures making up the food web. Trees can often be very long-lived and can grow a lot taller than humans. Perspective and time can be investigated through the life cycle of a tree.

Lichens are organisms that are both an algae and a fungus that live in symbiosis (that is they live together). The algae harness the light energy from the sun through photosynthesis, the fungi benefit from that energy and the algae benefit from the shelter provided by the fungi. Lichens are very susceptible to poor air quality and can be observed as an indicator of air quality in a locality, as they are particularly affected by sulphur dioxide found in acid rain and caused by air pollution. Lichens are often found growing on trees but can also grow on many other surfaces such as wall or rocks.

A Clinometer is a useful piece of equipment for measuring angles and calculating approximate heights. It is used frequently in forestry and engineering. It is also called an Astrolabe on account of being used in astronomy. It was invented over 1,000 years ago and was an important piece of equipment for early navigators. You can use it here to estimate the height of a tree.









## INVESTIGATING THE IMPORTANCE OF TREES

#### Investigation

#### Explore

- Make a rough map of the school grounds or local park (you can use online maps or aerial photographs as a guide).
- Identify different trees within the school grounds or local park using a tree identification book or chart or leaf key.
- Write the names of the trees on the rough map.

#### Part 1: Investigating Invertebrates Living in Trees

#### Prediction

Based on information gained by observing each tree, for example, height, width, number of leaves, evergreen or deciduous etc., predict which tree would be best for biodiversity or home to the most invertebrate (minibeast) species. Record learners' predictions.

#### **Conducting the Investigation**

- At each tree set up the white sheet under some low hanging branches. Learners can sit around the sheet with simple invertebrate keys and recording sheets.
- Shake the branch carefully, count and record the invertebrate varieties that fall on to the sheet.

#### Sharing: interpreting data/results

- Learners can compare numbers and varieties of invertebrates from each of the different species of trees.
- Which species has the largest variety of different invertebrates using the tree as a home or for food? Which trees do you think are most important for biodiversity?
- How will you record your data: bar chart, table, photographs, video, mark on your map?
- Review and discuss predictions.

#### **Part 2: Investigating Lichens on Trees**

#### Prediction

Learners can predict where they are most likely to have better quality air and what types of lichens they might find in the school / park / local area

#### Conducting the Investigation:

In their chosen area, learners observe different types of lichens growing on trees and on walls etc. in different locations around the school. They can write lists or tables, make drawings, take photographs or record videos.











## INVESTIGATION

## INVESTIGATING THE IMPORTANCE OF TREES

What types of lichens can be found on different trees / in different locations? Perhaps different groups of learners might investigate different areas of the school.

If possible compare the findings from your school to another location such as a local park.

#### Sharing: interpreting data/results

Learners compare notes and discuss findings. Were you surprised at the results? Do you think there is much air pollution in your school / area? Why do you think this is?

You could also mark areas of highest and lowest pollution on your map.

#### Part 3: Using a clinometer to estimate the height of a tree

#### Prediction

What way could you estimate the height of a tree? Could you compare it to the height of a building or a person? Estimate the height of the tree using any method you can think of.

#### **Conducting the Investigation**

Print out the clinometer pattern at the end of this resource, cut it out and stick it to heavy card.

Assemble the clinometer as shown by taping the straw across the top and attaching a string with a small weight to point x so that it can swing freely.

Use the clinometer to get a more accurate estimate of the height of the tree as shown in the diagram below.











## INVESTIGATING THE IMPORTANCE OF TREES

• Face the tree whose height you want to estimate.

INVESTIGATION

- Looking through the straw at the end away from the string, adjust the angle of the card until the string hangs at 45°.
- Now walk towards or away from the tree until you see the top of the tree through the straw. (This is easier to do with two people - one looking through the straw while the other keeps an eye on the string.)
- Estimate and then measure the approximate distance from you to the base of the tree. What instrument would you use to measure the distance?
- What sort of triangle is made in this diagram? (Isosceles triangle)
- Add in your own height to get a more accurate estimate for the height of the tree
- Try getting different people in your group to estimate the height using the clinometer or repeat the investigation from a different side of the tree. Are the results always the same? Why or why not? (hand shake, human error) Take an average of your results
- Different groups in the class might estimate the height of different trees

#### Sharing: interpreting data/results

- How will you record your results and share them with the class?
- Do you think all of the trees in your school were planted at the same time?
- Can you find out when any of them were planted?
- Are they all the same height?
- Do you think some species of trees grow faster than others?
- Do they grow at different rates in different locations?



#### Take the Next Step

Would your school ground or local park benefit from more trees? Organisations such as CRANN can supply trees and advise on school plantings. The Tree Council of Ireland also provides excellent resources for primary schools on our native trees. Why not book a visit with an expert from the Heritage in Schools Scheme to investigate the heritage and biodiversity on the school's doorstep? Visit the Heritage In Schools website for details.

If you are planting new trees, record their height at planting so that height measurements can be taken in subsequent years to track growth rates.

Try investigating invertebrate numbers in other locations in the school: grass, soil, flower or vegetable beds, walls. Are there different numbers or different types in different locations?









## INVESTIGATION

## INVESTIGATING THE IMPORTANCE OF TREES

Download tree and lichen identification keys from the OPAL Air Pollution survey https://www. imperial.ac.uk/opal/surveys/airsurvey/ and an invertebrate identification key from their Bugs Count Survey.

What could be done to improve biodiversity in your school? Do a biodiversity survey and come up with some plans.

#### Follow-up challenge/project/citizen science link

If any of your finds can be identified to species level, upload your records to the National Biodiversity Data Centre at https://biodiversityireland.ie/.

Try planting some native flowering trees and shrubs and allowing areas of your grass to grow longer. Get involved with the All Ireland Pollinator Plan and pledge your school for pollinators at https://pollinators.ie/

#### **Adapt for Home**

Similar investigation can be encouraged in learners' own gardens and local parks. Perhaps comparisons could be made between urban and rural locations for a wider study.

#### Adapt for Junior/Senior level

Younger classes could focus on investigating the different types of trees in school and take leaf and bark rubbings. Investigation 1 is suitable for all classes from infants up.

Older classes could expand out the activities into an overall biodiversity or air pollution survey of the school and local area and then take action on improving biodiversity or reducing traffic congestion through sustainable travel.



#### Have your ideas heard!

Now that you have discussed your ideas for Health, collect the classes ideas using this <u>template</u> and email them to <u>creatingourfuture@sfi.ie</u>







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#### **Clinometer Template**

Attach a straw along this edge



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