

SCIENCE WEEK

#scienceweek

11-18 Nov 2018

Supported by Science Foundation Ireland

TREES IN DIFFERENT SEASONS

Classroom Resource Booklet



FRAMEWORK FOR INQUIRY

THEME	OVERALL THEME	
CURRICULUM	Strand:	
	Maths:	
	Strand Unit:	
	Curriculum Objectives:	
	Skills Development:	

ENGAGE		
THE TRIGGER	WONDERING	EXPLORING

INVESTIGATE			
STARTER QUESTION	PREDICTING	CONDUCTING THE INVESTIGATION	SHARING: INTERPRETING THE DATA / RESULTS

TAKE THE NEXT STEP		
APPLYING LEARNING	MAKING CONNECTIONS	THOUGHTFUL ACTIONS

REFLECTION

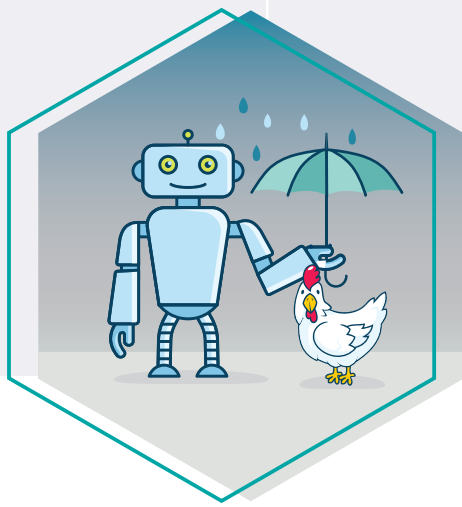
Considerations for inclusion



FRAMEWORK FOR INQUIRY

THEME	TREES IN DIFFERENT SEASONS
CURRICULUM	<p>Strand: Living Things, Environmental Awareness and Care, Data</p> <p>Strand Unit: Plants and Animals, Caring for my Locality, Representing and interpreting data</p> <p>Curriculum Objectives: Use all the senses, separately or in combination, to explore living things, observe differences and similarities in the environment, observe gradual changes in living things and familiar objects and events over a period. Begin to look for and recognise patterns and relationships in observations. Carry out simple investigations where the problem, materials and methods are set by the teacher</p> <p>Skills Development: Questioning, Observing, Predicting, Investigating and Experimenting, Analysing, Recording and Communicating</p>

ENGAGE		
THE TRIGGER	WONDERING	EXPLORING
<p>Night and the Seasons”</p> <p>http://www.esa.int/esaKIDSen/SEM1J54JWXI_Earth_0.html</p> <p>Then Outdoors: Bring children out to look at trees in the school grounds.</p>	<ul style="list-style-type: none"> • How do trees change from one season to another? • Why do some trees lose their leaves in winter? • Does the shape of the tree matter? What about the leaves? • When should we collect seeds? • When should we plant them? • How do trees spread their seeds? • Do all seeds become trees? What can happen to stop them? • Why do trees produce fruit? 	<p>Deciduous and evergreen leaves</p> <ul style="list-style-type: none"> • Look at a selection of deciduous and evergreen leaves from around the school. • What is the same / different about them? <p>Getting to Know Trees</p> <ul style="list-style-type: none"> • Each group has a tree to explore • Take a leaf rubbing and a bark rubbing. • Describe the tree. Each child writes one sentence about the tree (leaves, bark, tree size and shape, fruit/nuts, insects). Combine sentences together - tree poetry. • Using the senses - Meet a tree. • Plant the Acorns in pots. <p>Trees and Fruit</p> <ul style="list-style-type: none"> • Examine autumn fruits on trees and shrubs.



Considerations for inclusion

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



FRAMEWORK FOR INQUIRY

INVESTIGATION 1 – ACORN FLOTATION TEST			
STARTER QUESTION	PREDICTING	CONDUCTING THE INVESTIGATION	SHARING: INTERPRETING THE DATA / RESULTS
<p>Which acorns float and which ones sink?</p> <p>Acorns that float are no good for planting.</p>	<p>Look at the acorns. Are they all the same? In what way are they different?</p> <p>Can you predict which ones will float?</p>	<p>Drop the acorns into the water and see which ones float.</p> <p>Record the observations in a table (use sticks to make the table and the words sink and float). Place acorns in it.</p>	<p>How many of our acorns floated?</p> <p>Examine these acorns. Why do you think they floated?</p> <p>Can we see anything wrong with them? Cut them open and examine them.</p>

INVESTIGATION 2 – CONDITIONS FOR PLANTING ACORNS			
STARTER QUESTION	PREDICTING	CONDUCTING THE INVESTIGATION	SHARING: INTERPRETING THE DATA / RESULTS
<ul style="list-style-type: none"> • What depth of soil is best for acorn germination? • Where should pots be placed for best results? • Where is the best location for planting acorns? • Directly in the ground, large container, separate small containers. • How do we stop acorns being eaten? • Will acorns germinate more easily if planted in Autumn or Spring? 	<ul style="list-style-type: none"> • Gather acorns in Autumn (from trees or from ground). • Each group makes a prediction based on their chosen starter question. 	<ul style="list-style-type: none"> • Plant the acorns in pots / in the ground and vary conditions based on the chosen starter question (plant as many as possible for best results). • Mark the planting locations. • Wait until spring. • Once spring arrives, check for shoots. • Record results. 	<ul style="list-style-type: none"> • Which acorns germinated? • Why do you think these ones germinated? • What percentage of acorns germinated? • Combine class results to find optimum germination conditions.

Considerations for inclusion

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

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



FRAMEWORK FOR INQUIRY

INVESTIGATION 3 – INVESTIGATING FRUIT			
STARTER QUESTION	PREDICTING	CONDUCTING THE INVESTIGATION	SHARING: INTERPRETING THE DATA / RESULTS
<p>Can we match the seed to the fruit? <i>Teacher extracts the seeds from Autumn fruits in advance for children to examine.</i></p>	<p>Children make their prediction by matching each type of seed to the fruit they think it belongs to.</p>	<p>Using a plate and a table knife, spoon or their hands, children open up the fruit to find the seeds inside.</p>	<ul style="list-style-type: none"> • Did the results match your predictions? • Were any of the seeds bigger or smaller than expected compared to the size of the fruit?

APPLYING LEARNING	MAKING CONNECTIONS	THOUGHTFUL ACTIONS
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- What have we learned about acorns? Will all acorns turn into oak trees? What conditions might prevent germination?

Autumn / Winter

- ESERO Activity 'Trees in Different Seasons'
http://esero.ie/wp-content/uploads/2015/01/31_Trees-in-different-seasons.pdf
- Go for a walk through the woods in Autumn. Can you find out which leaves belong with each fruit. Bring this knowledge back to the classroom and use it to design an Electric Quiz
https://www.sfi.ie/site-files/primary-science/media/pdfs/col/electric_quiz.pdf
- Seed dispersal – sort the different type of fruits / leaves / berries. What different methods of seed dispersal do you think they use?
- Winter twigs and buds – what do we notice about them?
- What are the differences between deciduous and evergreen trees and why can evergreen trees keep their leaves?
- Which deciduous trees lose their leaves first? Collect and record data.

Spring / Summer

- Which trees come into leaf first and when do the leaves appear? Collect and record data.
- Can we spot the flowers on trees and when do they flower? Collect and record data.
- Can we spot the fruit / nuts / seeds appearing and when do they appear? Collect and record data.

Long-term Investigations

- Investigate growing conditions for other trees in other years - hazel, ash etc. Reference: "Our Trees: A Guide to Growing Ireland's Native Trees in Celebration of a New Millennium" – People's Millennium Forests Project
<http://www.woodlandsofireland.com/publications/our-trees>
- Keep the data on leaf loss, first flowers, first leaves, first fruit etc. and compare from year to year. Record weather data and compare.
- As seedlings from investigation 2 grow into saplings and young trees, use them to carry out investigations on optimal growing conditions (location, pot vs. ground, soil type etc.). Measure and record data (height of trees, number of branches, time of leaf and flower).

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

REFLECTION
<ul style="list-style-type: none"> • Did I meet my learning objectives? • Are the children moving on with their science skills? • Are there cross curriculum opportunities here? • What went well, what would I change? • Did I take into account the individual learning needs of my students with SEN? What differentiation strategies worked well?

ACORN FLOTATION TEST

Equipment

- Acorns
- Bowls / basins of Water
- Magnifying Glasses

Oak Trees

There are two types of Oak tree that are native to Ireland, The Sessile Oak (*Quercus petraea*) is often called the Irish Oak and the Pedunculate Oak (*Quercus robur*) is often called the English Oak. Oak trees grow very big so are generally found in areas where they have plenty of space to grow but if planted close together they can be used as a hedge. The seed of the Oak tree is called an acorn. There is only a very good crop of acorns every 3-5 years with smaller crops in between.

Preparation

Identify oak trees in a local park or forest and gather the acorns when they are ripe. The best time to gather them is in October. They can be picked from the tree if ripe or there will generally be a big fall of acorns on the morning after the first frost. Acorns are green when they are still growing and turn brown as they ripen. They are ready to be harvested when they are brown and come away from the cup easily. Sometimes acorns fall before the first frost, but these may not be viable (they may not germinate when planted). The flotation test can help to sort out the acorns before planting to increase the chances of germination.

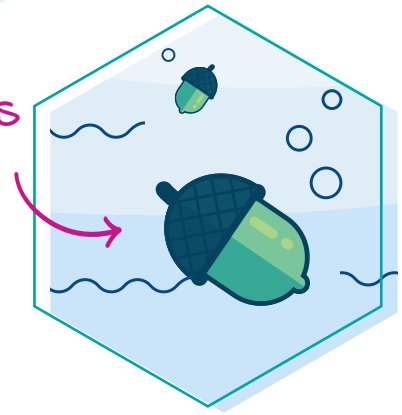
Investigation: Which Acorns Will Float?

1. The children examine the acorns before testing
 - What colour are the acorns? Are they brown or green?
 - Do they have any marks or breaks on the outside surface?
 - Are the cups still attached to the end of the acorns?
 - Do the cups come away easily?
2. The children predict which acorns will float and which will sink.
3. The children give reasons for their predictions.
4. The children divide the acorns into two groups and record their predictions.
5. The children then test the acorns to see which ones float and which ones sink.
6. The children then record their answers.
 - The children examine the acorns again
 - Were they able to predict which ones would float?
 - Did colour make a difference?

Taking the Next Step: Planting Acorns

Now that we have tested the acorns, we can plant the ones that sank. Can we carry out an investigation to see which conditions are best for germination?

WHICH ACORNS
WILL FLOAT?



Equipment:

- Acorns
- Pots of different sizes
- Different types of compost
- Outdoor space for planting

Planting Acorns

Acorns can be stored over winter and planted in spring, but they can be difficult to store and stored seeds may not germinate. They need to be stored in a hessian sack in a cool, well ventilated place. They also need to be checked regularly to make sure they don't dry out or heat up. Because of this it is often better to sow them straight away. Advice says that acorns should be planted at a depth of 5cm*. If planting in Autumn, they should be planted at a depth of 10cm to stop them being eaten by mice or birds and the top 5cm of soil scraped back in March. Seedlings will need plenty of space.

Preparation

1. Collect as many acorns as possible ideally from native Irish species of Oak.
2. Test the acorns for viability by putting them in water (See Acorn Flotation Test investigation).
3. Prepare the pots or ground for planting.
4. Talk about different ways of planting acorns and discuss questions that could be investigated.
5. Different groups within a class could undertake different investigations.

Investigation: What Conditions are best for acorn germination?

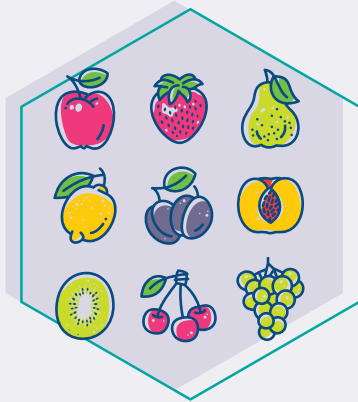
1. Groups decide on a starter question. Questions could include:
 - What depth of soil is best for acorn germination?
 - What is the best place to plant acorns – small pot, large pot, in the ground?
 - Where should pots be placed for best results? – choose a variety of indoor and outdoor locations around the school.
 - What type of soil is best? – potting compost, topsoil etc.
2. If possible, some acorns could be stored over winter and the flotation test repeated in March before planting. These could then be compared to acorns planted in the same conditions in October.
3. Groups decide how they are going to make their investigation a fair test – what one thing will they change and how will they keep all other conditions the same?
4. Groups make a prediction on which acorns will germinate.
5. Groups plant and place according to their chosen investigation – the more acorns can be planted the more data will be available.
6. Extra soil is removed in spring (if appropriate for the chosen investigation).
7. Acorns are monitored from Springtime onward for signs of germination.
8. Results are recorded and discussed.

*Reference: "Our Trees: A Guide to Growing Ireland's Native Trees in Celebration of a New Millennium"

– People's Millennium Forests Project

<http://www.woodlandsofireland.com/publications/our-trees>

ACTIVITY - Investigating fruit



Equipment

Activity 1

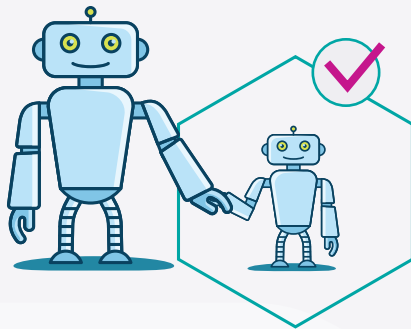
- Different fruits (e.g. apples, oranges, bananas, pears, etc.)
- Paper plates
- Plastic knife

Activity 2

- Picture of fruits
- Crayons
- Poster for bar chart
- Scissors
- Glue stick

Suggested class level

Junior



Preparation

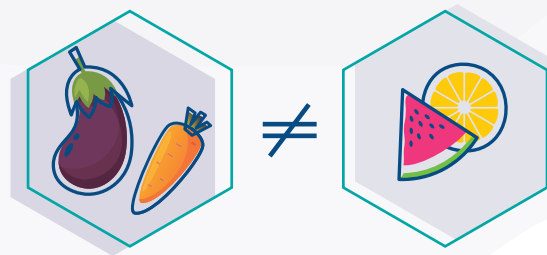
Collection of different fruits.

Photocopy picture of fruits. Some preparation with vocabulary would be helpful, e.g. banana (smooth, soft, bendy, mushy, smiley-shaped!) apple (hard, shiny, waxy}, pear (teardrop shape). Tastes: sweet, juicy, chewy, slimy, crunchy.

Background information

Difference between fruit and vegetables
(fruit have seeds)

Healthy eating —the benefits of fruit to health, good to have fruit in lunchbox.



Content

Science: Living Things: Plants and Animals: variety and characteristics of plants
Myself

Number: counting; fractions (half-1st class, quarter — 2nd class)

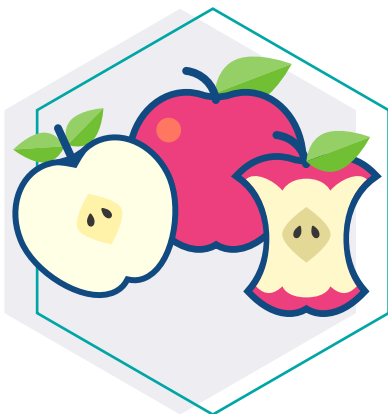
Data: Representing and Interpreting Data

Skills

Experimenting
Observing
Sorting and classifying
Recording
Analysing

Cross-curricular links**Geography:** Where do bananas, pineapples, etc. come from?**Weather:** why can't we grow certain fruits, e.g. bananas, here in Ireland?**SPHE:** Healthy Living ('5-a-day')**Trigger Questions**

- What fruits do you know?
- Are they all the same colour? Size?
- Do they feel the same?
- Do they taste the same?
- Can you describe the taste of any fruit?
- Do you grow any fruit at home?
- How do they grow? (Trees — apple, pear, plum; Plants— strawberries; Bushes: blackberries, gooseberries.)
- What about bananas?
- Do we grow them here in Ireland?
- Why not?
- Do you think fruit is good or bad for you?

Activity I*Wash hands before this activity*

In groups, children:

- Feel the different fruit and describe how they feel (e.g. rough/smooth, hard/soft)
- Look at them and describe their colour, shape, etc.
- Look at them through a hand lens (if available) and describe any more detail which they might see
- Cut up the fruit with a plastic knife (teacher may need to help with this)
- Describe the inside of the fruit; smell the fruit and describe the smell; taste the fruit and describe the taste

The children then wash their hands.

What is the favourite fruit of our class?



Activity 2

Children can then:

- Draw and/or colour in the fruits on the sheet of paper and cut them out
- Choose their favourite fruits and stick them up on a large piece of black paper to make a bar chart
- Answer the question “What is the favourite fruit of our class?”



Safety

Careful with knife (or teacher may need to cut up fruit for younger juniors).
Wash hands before and after activity. Be aware of any children with allergies.

Follow-up activity

Younger juniors:

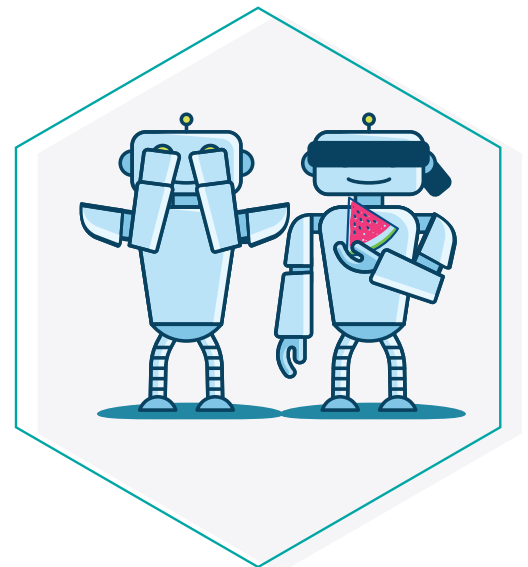
Try to identify cut-up pieces of fruit— by looking at them; by tasting them (perhaps with eyes closed).

Older juniors (e.g. Second class):

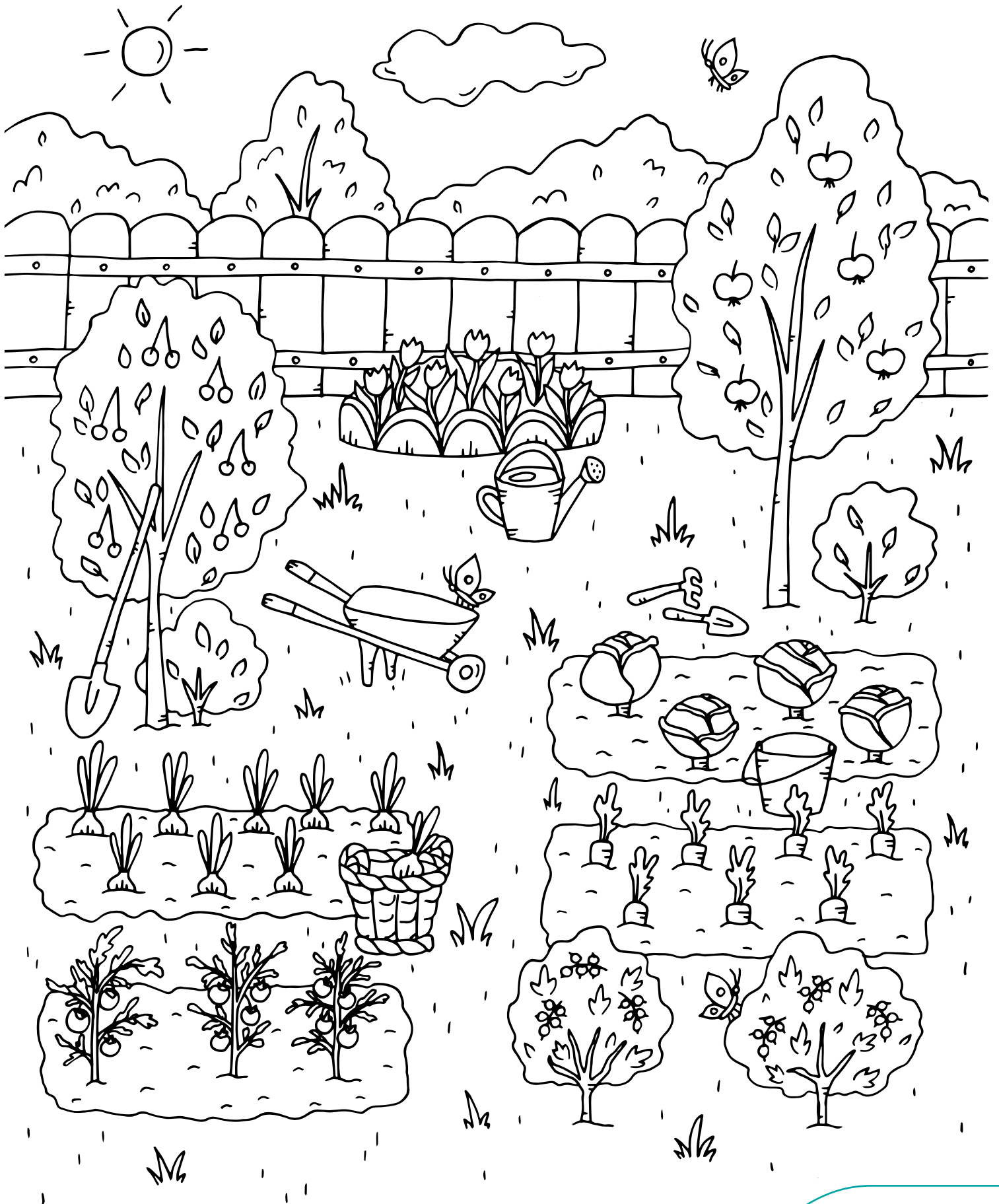
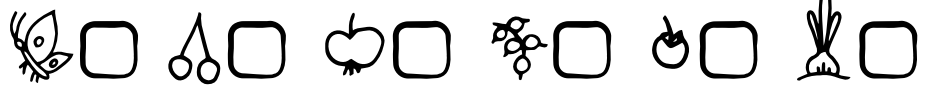
The above activities could be extended by asking the question: ‘What do all fruits have in common?’ (Fruits have seeds). They could also be asked to try to match the seeds with the fruit.

Tasting without Smelling!

Cut up small pieces of peeled potato and apple exactly the same shape and size. Ask the children to close their eyes and hold their noses and eat a piece of each. Can they tell the difference? (Probably not because the nose and mouth are connected through the same airway, so that you taste and smell food at the same time. Remember how food tastes – or doesn’t taste! - when your nose is blocked with a cold!).



HOW MANY?





FRAMEWORK FOR INQUIRY - PROMOTING INCLUSION

When planning science activities for students with Special Educational Needs (SEN), a number of issues need to be considered. Careful planning for inclusion using the framework for inquiry should aim to engage students in science with real purpose. Potential areas of difficulty are identified below along with suggested strategies. This list is not exhaustive, further strategies are available in the Guidelines for Teachers of Students with General Learning Disabilities (NCCA, 2007).

ENGAGE	
POTENTIAL AREA OF DIFFICULTY Delayed language development/poor vocabulary/concepts	STRATEGIES <ul style="list-style-type: none"> Teach the language of science demonstrating meaning and/or using visual aids (material, property, strong, weak, textured, dimpled, absorbent, force, gravity). Have the student demonstrate scientific phenomena, for example gravity —using ‘give me, show me, make me,’ as much as possible. Assist the student in expressing ideas through scaffolding, verbalising a demonstration, modelling. Use outdoor play to develop concepts.
INVESTIGATE	
POTENTIAL AREA OF DIFFICULTY Fear of failure/poor self-esteem/fear of taking risks Understanding Time and Chronology Fine/Gross Motor Difficulties Short Term Memory	STRATEGIES <ul style="list-style-type: none"> Model the speculation of a range of answers/ideas. Repeat and record suggestions from the students and refer back to them Practice recording the passing of time, establish classroom routines that draw the students’ attention to the measurement of time. Teach and practice the language of time. Allow time to practice handling new equipment. Allow additional time for drawing diagrams, making models etc. Give students the option to explain work orally or in another format. Provide the student with visual clues/symbols which can be used to remind him/her of various stages of the investigation.
TAKE THE NEXT STEP	
POTENTIAL AREA OF DIFFICULTY Developing Ideas Communicating Ideas	STRATEGIES <ul style="list-style-type: none"> Keep ideas as simple as possible, use visuals as a reminder of earlier ideas. Discuss ideas with the whole group. Repeat and record suggestions from students and refer back to them. Encourage work in small group and in pairs. Ask students to describe observations verbally or non-verbally using an increasing vocabulary. Display findings from investigations; sing, do drawings or take pictures. Use ICT: simple written or word-processed accounts taking photographs, making video recordings of an investigation.
REFLECTION	
<ul style="list-style-type: none"> Did I take into account the individual learning needs of my students with SEN? What differentiation strategies worked well? Did I ensure that the lesson content was clear and that the materials used were appropriate? Was I aware of the pace at which students worked and the physical effort required? Are there cross curriculum opportunities here? Are the students moving on with their skills? Did the students enjoy the activity? 	
More strategies, resources and support available at www.sess.ie	



CURRICULUM LINKS

TREES IN DIFFERENT SEASONS

ENGLISH / IRISH

- Tree Poetry – Children work in groups to compile their observations on the tree into a poem and perform it.
- Write a diary of a tree and record any changes that happen to it throughout the year.
- Write the life story of the tree from seed to large tree and beyond.

GEOGRAPHY

- Environmental Awareness and Care: The role of trees in our immediate environment. Why do we plant trees? Why do we need to look after our trees and how can we do that?
- Maps: Where are our nearest hedgerows, parks and forests?
- Planet Earth in Space: What makes the seasons?
- Weather, climate and atmosphere: Record the weather. How does the weather affect trees?

HISTORY

- Find a large tree and find out or estimate how old it is (Is there a record of when it was planted or can we estimate by its size? Are there any similar sized trees nearby that have been cut down so we can count the rings?). What historical events has the tree witnessed during its lifetime? Can we draw up a timeline?
- History of forest cover in Ireland.
- Ogham and the trees of the Ogham alphabet.
- The Brehon Laws relating to trees.

THE ARTS

- Art: Leaf and bark rubbings and art with autumn leaves.
- Music: Vivaldi's Four Seasons.
- Drama: Drama based on historical events in the lifetime of the tree, creatures that live in the tree, night- time in the forest.

SPHE

- Healthy Eating: What food do we get from trees?

PE

- Outdoor and Adventure Activities: Nature walks to look at trees in different seasons. Children can collect their own acorns or other seeds, nuts or berries for testing and planting.
- Team challenges: Acting out a tree-based drama in an outdoor setting.
- Trust Games: Meet a tree activity.
- Orienteering or treasure hunts in the woodlands.



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