Make Leaf Calculations

Having determined which calculations are needed, I can solve problems involving whole numbers using a range of methods, sharing my approaches and solutions with others. ***MNU 2-03a***

Use leaves to represent numbers in calculations.
Make a collection of leaves and arrange into groups according to shape.. Study their outlines and assign a value to each leaf type according to the complexity of its shape. Some are very simple like beech leaves (a simple oval giving it a value of 1) and others more complex like horse chestnut (has 5 'fingers' so give it a value of 5). To see the variety of leaf shapes you might find see https://www.woodlandtrust.org.uk/media/48345/leaf-id-sheet.pdf

Once you have decided on values for your leaf types, draw a leaf outline for each group and write the value you have given it in the centre. Refer to this as you work out and create some calculations for yourself or challenge a partner.

Here are some to get you thinking.
3 beech leaves is the same as 3x1= 3; 3 chestnut leaves is the same as 3x5=15

Using the values you have given the leaves, use addition, subtraction, multiplication or division to make a calculation with the total 23, for example.

I can apply my knowledge of number facts to solve problems where an unknown value is represented by a symbol or letter. ***MTH 2-15a***

If 7 beech leaves + ? = 10, what is the missing value.

Angles in Nature

I have investigated angles in the environment, and can discuss, describe and classify angles using appropriate mathematical vocabulary. ***MTH 2-17a***

Find and classify the angles made between tree trunk and branches, between branches and twig.
Select a single tree to study. Look at the angles formed by branches meeting the tree trunk and twigs meeting the branches. Be aware that 2 angles will have been formed. Use a tally sheet to record the number of the different types of angle (right, acute, obtuse, reflex, straight) Which angle is the most common? Compare with findings from another tree.

I can accurately measure and draw angles using appropriate equipment, applying my skills to problems in context. ***MTH 2-17b***

Select instruments and measure angles
What instruments would be appropriate for measuring angles? Do you need instruments to classify angles?

If you have equipment, check some of the angles you have identified.

I have carried out investigations and surveys, devising and using a variety of methods to gather information and have worked with others to collate, organise and communicate the results in an appropriate way. ***MNU 2-20b***

Compare angles found on a different tree
With a partner who has studied a different tree, compare results. Are there similarities or differences? What accounts for the similarities and differences?

Measuring Time and Distance

I can carry out practical tasks and investigations involving timed events and can explain which unit of time would be most appropriate to use. ***MNU 2-10b***
Find out how long tree seeds can stay in the air
Collect sycamore or ash seeds – sometimes known as helicopters. Find a safe place to stand and drop a seed from a height or throw into the air. How long does the seed stay in the air? What is the best unit of measure to use in this case?
I can use the common units of measure, convert between related units of the metric system and carry out calculations when solving problems. ***MNU 2-11b***
Find out how far tree seeds can travel
Using standard or non standard units, measure the distance across the ground from launch point to landing point.
Would you get the same results in a different place/time? Explain.
Why is it beneficial for tree seeds to travel and not just fall straight down?

Outdoor Learning Numeracy and Mathematics Second Level

Context – Trees

Trees, big or small, can provide the context for maths investigations. These activities can the beginnings of more general discussion about maths in nature. Different seasons will afford different investigations. Return to the same tree(s) at different times of the year.

Exploring and Creating Symmetry

I can illustrate the lines of symmetry for a range of 2D shapes and apply my understanding to create and complete symmetrical pictures and patterns. ***MTH 2-19a / MTH 3-19a***

Identify the line of symmetry in a leaf
Many leaf shapes have (at first glance) mirror symmetry. Check, are the leaves you have found symmetrical? Can you suggest why they do not always have perfect symmetry?

Make your own pictures and designs which display 1. Mirror 2. Rotational symmetry
Using a collections of leaves, nuts, seeds and sticks collected from the ground, create your own designs or pictures which display rotational and mirror symmetry. Examples: https://creativestarlearning.co.uk/art-music-outdoors/wet-weather-symmetrical-nature-circles/

Extension: Maths in Nature – Symmetry
Starfish display rotational symmetry. Scientists believe that their symmetry gives them an advantage when attacking prey. Can you make suggestions for how rotational symmetry helps starfish?
Can you suggest other reasons for symmetry in nature?

Developed by Numeracy SAC Team and COACh, East Ayrshire Council

East Ayrshire Council
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Estimating and Rounding

I can use my knowledge of rounding to routinely estimate the answer to a problem then, after calculating, decide if my answer is reasonable, sharing my solution with others.
MNU 2-01a

Estimate and calculate the number of leaves/twigs on a tree. Stand so that you can see the whole tree at once. Use view finder to view a section of the tree leaves/twigs. Count what you see through the frame. How many frames would you need to view the entire tree? Multiply your leaf/twig count by the number frames you would need.This will give you the approximate number of leaves or twigs on the whole tree.
Why would scientists find this way of counting useful? What could they learn from these estimations?
Viewfinder
Sheet of paper, fold in ½, cut out a smaller rectangle from the centre and unfold.