



This booklet is packed
with games and
activities to help you
practice maths while
having fun outdoors

WILD MATHS

**Games and activities for you
to play outdoors**

Do these activities alone
or with friends and family!



Outdoor &
Woodland
Learning

DUMFRIES & GALLOWAY



TREE AGES

Estimate how old a tree is by the circumference of its trunk.

At 1m height, measure around the tree in cm. Divide that by 2.5, e.g. a tree that is 25cm circumference, is 10 years old.

(This is an average, different types of trees grow at different rates.)



Can you find a tree that is about the same age as you?

Which is the oldest, or youngest tree in the area?

TREE HUNT

Pick an area with trees, it could be a woodland, some planted trees, or even a hedge (a hedge is a line of trees that have been kept small).

Decide which trees are in (and out) of your area.

Count the number of each different type of tree you can find. Keep a tally using sticks.

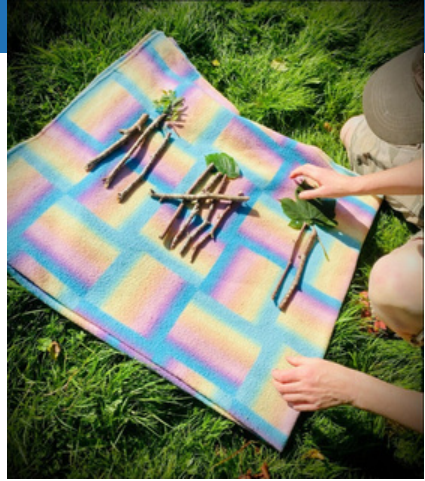


Make a bar model to show how many of each different type of tree you have (a bar model shows the fraction).

What's the total number of trees in your area?

What fraction are each type?

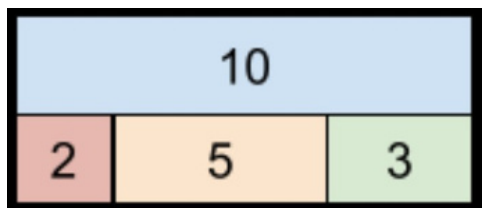
→ The tallies in this picture show that there are 3 rowan, 5 beech and 2 sycamore trees.



This is a nature bar model showing the same trees

← In the picture above there are 10 trees, 2 are sycamore trees, so $\frac{2}{10}$ are sycamore. This can also be written $\frac{1}{5}$ or 0.2

This is a standard bar model





Tawny owls like to nest in holes in trees, typically 3–8 m up the trunk.

OWL HEIGHTS

Can you find a tree that is tall enough for an owl to nest in?

- Get a friend, a metre stick, and a tree that is on a flat piece of land that you can easily walk 30 metres away from.
 - The first person walks 30 metres from the tree. The second person walks 27 metres from the tree, and holds the metre stick upright on the ground.
 - The second person moves their finger up or down the metre stick until the lying down child tells them that their finger is in line with the top of the tree (shout 'stop!').
-
- What number on the metre stick is the standing up person pointing to?
 - The height of the tree is ten times this height.



HUMAN SUN DIAL

Make your own sun dial.



On a sunny day draw around your feet.
On the hour (e.g. 9am) stand on your footprints and get someone to mark on the ground where your shadow's head lands, and write the hour (e.g. '9'). Repeat this every hour on the hour.



Now you can tell the time by your shadow.

At exactly midday in British Summer Time (March to October) the sun is in the South.

Mark on your dial South, then add North, East & West.

Is the shadow different at different times of year?

What happens when the clock changes?



Create an 8 point compass with the cardinal points, North, South, East and West.

DIRECTION



Use a compass or a phone compass to find out North.

Mark an N for North at the top.
Directly below that, mark an S for South.

Draw a line between these points and mark a spot in the middle.

From the centre point you can work out the remainder of the compass. Clockwise from North - East, South and West. These can all be placed at 90 degrees (right angles).

Now, to add in the other 4 points - NE, SE, SW and NE.

If North is 0° , East is 90° , South is 180° , West is 270° , what are SE, NE, SW, NW?

Would these angles be acute, straight-line, obtuse or reflex?



BUG HUNT



Roll over a large stone to see how many different types of minibeast you can find.

Count each type.

Add them up to see how many you found altogether!
Don't forget to put the stone back so the minibeasts can live happily.

If you roll over different stones, can you calculate the average number of minibeasts?

Try the same places on different days, does the weather affect the number of minibeasts?



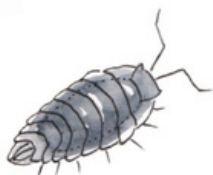
How many legs are there altogether?



millipede (40-400 legs)

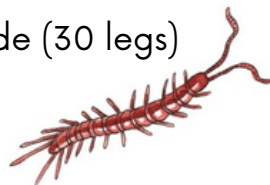


leopard slug (0 legs)



slater/woodlouse (14 legs)

centipede (30 legs)



garden tiger beetle (6 legs)



CLOUD SPOTTING

When the weather is blue skies with passing clouds, lie on your back and look at the clouds.



Clouds are tiny droplets of water that stay in the air because they are so tiny.

The sky here is about 50% clouds (this could be written 0.5, $\frac{1}{2}$, or half)

What shapes and patterns can you spot?

Estimate what fraction or percentage of the sky is cloudy.



RAIN



In Dumfries on average the wettest month (the month with the highest rainfall) is August (89mm).

The driest month (with the least rainfall) is April (33mm).

Leave a parallel-sided (same diameter at the top as bottom), transparent container outside where it won't fall or get knocked over.

After rain, use a ruler to measure the number of millimetres of rain that fell.



Is it more or less than the average for a month?



1mm of rain over 1 square metre gives 1 litre of water.
i.e. $1\text{mm over } 1\text{m}^2 = 1\text{l}$

Measure an area (area = width x length) and calculate the number of litres of rain that fell on it.



ANIMAL WEIGHTS



I found an animal that weighs 1kg, that's the same as 1 litre of water! What animal could it be?

Can you find a stone that weighs about the same?



Animal	Weight	Length
Badger	8-12kg	90cm
Hedgehog	Up to 2kg	25cm
Basking shark	4,500 to 7,000kg	8m
Sparling (fish)	50g	30cm
Hawker dragonfly	1g	12cm
Wren	10g	17cm
Golden eagle	4-7kg	2m

1000g=1kg 100cm=1m

All the animals in this table can be seen in Dumfries & Galloway

Fun fact: a sparling smells like a cucumber, you can see them in the River Cree.



LARGEST ON

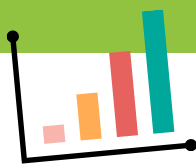
LAND, SEA & SKY

Make a huge bar graph showing the actual lengths of the different animals on land, sea and sky.



Bar graph example

You could put the shortest at one end and longest at the other. Make the chart the actual length of the animals! Or, if you don't have enough space, scale them down by dividing the animals' lengths by a number (e.g. 2) then use your result to represent the animal.



SYMMETRICAL FLOWER

Can you make your own flower?

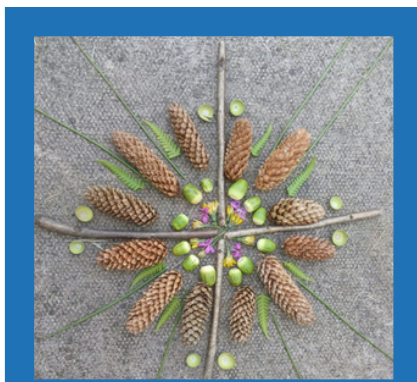
The cuckooflower has a long stalk with narrow leaves that are home to the eggs of the Orange-tip butterfly! And its four (symmetrical) lilac petals make up one of the first wildflowers to bloom in spring.



Place 4 sticks of the same length together to make a cross. Place a natural item in one of the quadrants. If each stick is a line of symmetry, what do you have to add, where, in order to make a pattern with two lines of symmetry?

Can you make something with 3 lines of symmetry?

Hunt for something natural with 3 or more lines of symmetry!



LADYBIRD SPOTS



Use sticks to mark out a grid for units, tens, hundreds and thousands.

Use different natural items in each box to represent a number.

Challenge your friend to find a number nature fact and you can place the natural items in the grid to match that number.



There are 26 different species (types) of ladybirds in the UK.

In these grids we used pine cones for thousands, mussel shells for hundreds, stones for tens and acorns for ones.



E.g. oak trees in the UK support 2,300 species of bird, mammal, fungi, invertebrate, bryophyte and lichens



LEAF BUNTING

As the autumn days get shorter and cooler trees begin to rest. Deciduous trees stop making chlorophyll (the pigment that makes their leaves green) and leave behind the other colours of the leaf: yellow, orange and red.

Gather different coloured and different sized leaves.

Can you identify them?

Arrange them into a pattern and thread onto string to make natural bunting. Assign different leaves different values, e.g. a green leaf is 9 points, a brown leaf is worth 5 points.

In the picture below this would be:
 $5+9+9+5+9+9+5+9+9$, which can also be
calculated $3 \text{ brown leaves } (3 \times 5 = 15) + 6 \text{ green leaves } (6 \times 9 = 54) = 69$



CIRCLES

This links to the tree ages activity.

There are lots of circles in nature.

Have you heard of tree rings? Each ring is a year in the life of a tree. Trees grow well in the summer so their cells are big and soft. They grow less in the winter so the cells are small and dense, this makes the patterns of rings.

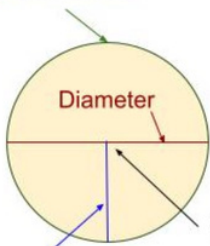
Tie one piece of string to a stick at each end.

One person puts one stick into the ground and holds onto it, to be the centre of the circle. Another person draws a circle in the ground with the other stick (this is the circumference) they can mark it more clearly with stones. If you make the string longer or shorter, you can add rings like a growing tree!

How old would your tree be?



Circumference



Radius

Centre point





DIG LIKE A MOLE

Moles are only 15cm long but they can use their claws to dig up to 20m of tunnel a day, using their spade-like front paws to effectively breaststroke their way through the soil!

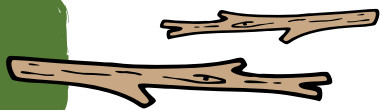
Find a pile of sand or soil, and experiment - How much sand/soil can you move in 5 minutes?
Try with different tools.

A mole can dig 2-3 litres of soil (about 2-4 kg) in 5 minutes!

If you are 1.5 metres tall, and a mole is 15cm long (15cm = 0.15m), then that's like you moving 20-40kg of soil in 5 minutes!



STICK BALANCING



Have you noticed that all twigs, branches and tree trunks have one end that is thicker and heavier?
Which end of a tree's trunk, branch or twig is thicker?

Find 2 straight sticks. Try to balance one stick on the other, like a see-saw.

Try it with another stick, this time, before you balance it, estimate where the balance point will be. Do you think it is exactly in the middle, half on each side (50% to 50%), or to one side (more like 40% to 60%), or even 30% to 70%? Now find out where the balance point really is.

Try with different sticks, they could be curvy, bigger in diameter or longer.

If you add something onto one end, does the balance point move?



FIND THE BIRDIE

A blue tit on average lays 10 eggs which hatch into chicks.

Each chick needs 100 caterpillars each day, what a lot of work for their parents! Sometimes chicks fall out of their nest but the parents still feed them.

Can you be good parents and find all of your chicks?

Make a grid with something like chalk or sticks with each square big enough for a person to stand in. Put numbers along the bottom (x-axis) and letters up the side (y-axis).



One team has a clipboard with the same grid drawn on it but smaller. The clipboard team colour in 4 grid squares all together to represent the nest. Around that they mark 10 squares representing 10 blue tit chicks.



The second team (parents) guess where they think the nest and chicks are on the large grid, by standing on that square. The clipboard team tells them if they have found a chick or not.

Parents place something (e.g a stone) on the squares that have a chick and mark with something else (e.g. a stick) if that square doesn't have a chick. The parents must find all their chicks, as they need to be fed.

To make it harder, the parents can just call out the coordinates, rather than standing on the grid.

Swap over so that everyone has a chance to look for their chicks. You use the same grids to scale a picture up, or down.

EAGLE EYED



Scotland's top predator, the golden eagle can fly up to 4,500m high! How much higher is that than Scotland's highest mountain, Ben Nevis, which is only 1,345m tall!?

Imagine you are an eagle, flying way up high, how does the ground below you look?

Use natural materials to make a bird's-eye view of where you are.



Make the 'map' as simple, or to scale, or as artistic as you like.





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Animal illustrations by Shalla Gray.

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BEING OUTSIDE MAKES YOUR BRAIN WORK BETTER

GO EXPLORE PLAY & LEARN



**Remember to wash your hands
after these activities**

Contact email: dgowlgp@gmail.com