Shapes and Sizes

Maths: Shape, space and measures 4a, b, c
Aim: To use a variety of methods and calculations to take estimates and measurements from trees.

Equipment

tape measure

pencil

clipboard

calculator

Shapes and Sizes 1

Try and describe the shape of the leaf.

Draw the leaf in detail looking at the colours, holes, stem and veins.

Using different trees leaves, measure the amount of time it takes for each to drop to the floor from an agreed height. Discuss if the shape and the size of the leaf makes a difference to how fast it falls. If it is autumn the same activity can be completed using seeds from ash, sycamore and maple trees.

Shapes and Sizes 2

It is important to emphasise that the final calculation is an estimate because it is based on a number of estimates.

Shapes and Sizes 3

Compile a list of all the different objects made of wood, the children can find in the classroom, school grounds or at home. This will help inform the children of the vast amount of everyday uses of trees. Discuss sustainable sources of timber for example forests where young trees are planted to replace the larger trees which have been cut down.

Shapes and Sizes

Visit a tree on your doorstep and take five leaves from the tree. To estimate the area of one of these leaves you will need to draw round the outline of the leaf on a piece of 1cm² graph paper.

1 **How many whole squares are there inside the leaf shape?**

2 **How many half squares are inside the leaf shape?**

Add together the whole and half squares and this will give you the surface area in cm^2 of the leaf. **This area is used by the tree to absorb sunlight.**

Repeat this calculation for all five leaves collected from the same tree and complete the table.

Area of Leaf 1	cm^2
Area of Leaf 2	cm^2
Area of Leaf 3	cm^2
Area of Leaf 4	cm^2
Area of Leaf 5	cm^2
Total	cm^2
Divide by 5	
Average area	cm^2

Shapes and Sizes 2

Now that you have calculated the average area of one leaf of your tree you can estimate the area of the whole canopy.

Estimate the number of leaves on a branch.

x

Estimate the number of branches on the tree.

=

Multiply the number of leaves by the number of branches.

This will give you an estimate of how many leaves are on the tree.

Now multiply the number of leaves on the tree by the average area of one leaf.

This is an estimate of the surface area of the canopy and of how much area the tree uses to absorb sunlight.

Leaves on the tree

x

Average area of one leaf

=

Surface area of canopy

Finally can you convert your canopy area from cm^2 to m^2?

Compare your results with other people in your class.

Which leaves have the largest surface area? - are they from the same type of tree as yours? Which tree canopy has the largest surface area? Is this the tree which produces leaves with the largest surface area?

Shapes and Sizes 3

Here is a calculation to estimate the volume of timber in one tree trunk. First work out the approximate height of the tree trunk.

Guess the height of your tree trunk

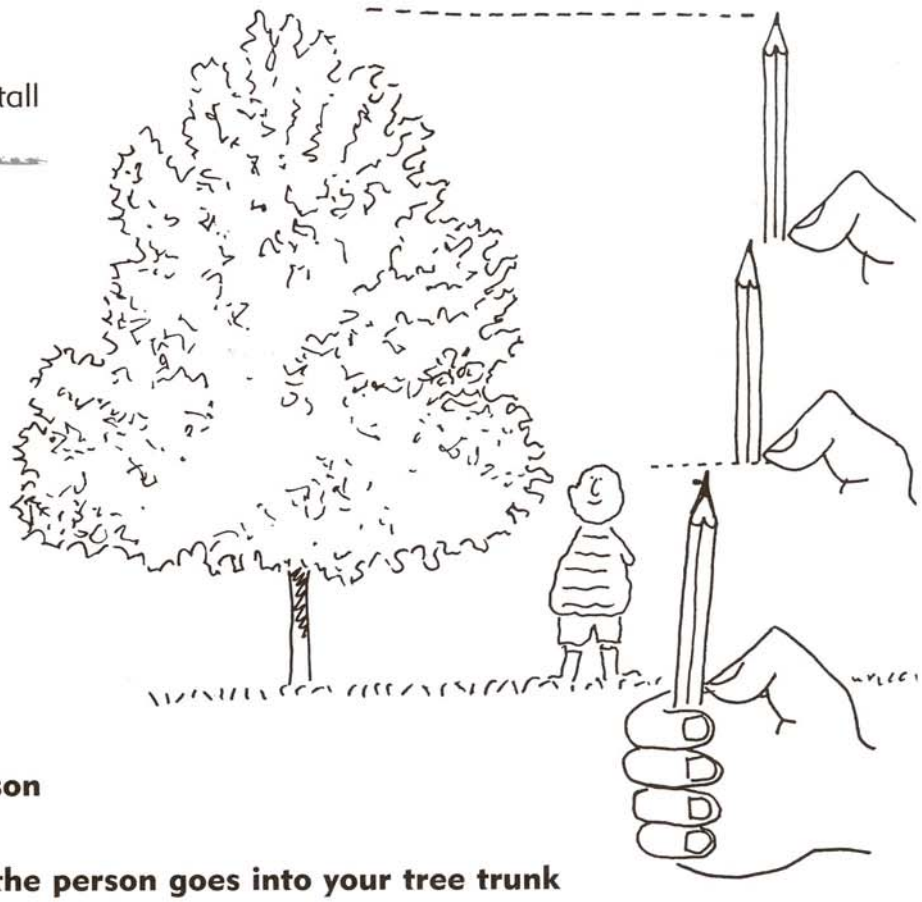
My tree trunk is ( ) cm tall

Using a metre stick find the height of your friend.

My friend is ( ) cm tall.

Get your friend to stand next to your tree trunk. Stand back from your tree.

Work out how many times your friend goes into the height of the tree trunk as shown in the diagram.



( ) **The height of person**

x

( ) **Number of times the person goes into your tree trunk**

=

( ) **The height of your tree trunk**

Using a tape measure at shoulder height, measure around the trunk of the tree.

The circumference of the tree trunk is ( ) cm

Divide the circumference by π (3.14) to get the diameter. Divide the diameter by 2 to get the radius of the tree trunk.

Circumference = ( ) **cm** **Diameter =** ( ) **cm** **Radius =** ( ) **cm**

To calculate the volume of wood in the tree trunk, use this formula.(π radius2 x height)

The volume of wood in your tree trunk is ( ) cm^3.