

LESSON PLAN

CREATED FOR TEACHERS BY EDEN'S EDUCATION TEAM

ESTIMATING AND MEASURING WITH LEAVES

Overview

This is a simple set of activities inspired by the humble leaf; reinforcing our mantra that outdoor learning is easy, cheap and doesn't need tonnes of planning.

Who: Key Stage 2

How long: 1 hour

Objectives and Curriculum links:

This lesson enables students to:

- Estimate and measure leaves in a number of ways.
- Learn different techniques to measure a complex shape.
- Think about fair tests and be asked to organise and display their data.

We've designed the lesson to help teachers cover the following subject areas:

KS2 Maths – measurement, geometry and statistics.

Resources

Leaves (obviously)

String

Squared paper

Rulers

Cards giving simple measuring instructions see below

A playground with a number of species of trees and shrubs

or

A local space with a similar collection of leaves

or, as a last resort

A bag of leaves collected by the pupils as homework

Getting started (20 minutes)

Divide the class into teams and ask them to predict whether all leaves are the same shape and size. They could discuss this in pairs. Once you have gathered the collective wisdom of the class you could write it on the board to refer to when you get back.

Then head outside and ask each team to collect a number of leaves. Depending on where you are working it's worth laying down some fairly strict rules about picking live leaves off

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plants. Once people have picked a handful, challenge them to find two identical leaves; it's best to mention this after they have selected their leaves.

Ask for feedback as to what methods they used to identify the differences between leaves and check if they have found two the same. It still amazes me that every leaf I have ever seen is unique (and I am old enough to have seen a lot of leaves!)

Main Activity [30 minutes]

Collect a variety of leaves; again, being strict about respecting live plants is a good idea. You could gently introduce the idea of a fair test by asking pupils about their collecting methods; do they just pick big leaves, easy to measure leaves, pretty ones, etc.

This exercise can be made as complicated or as simple as you like by choosing how open or closed your initial instructions are and by the range of resources you give each group.

- (i) Show the class all the methods and give each group access to all the equipment and ask them to choose which method they like best.
Or
- (ii) Each group is given the right equipment and a set of instructions for their specific method of measuring leaves.

Ultimately their method needs to be consistent. As long as each team measure the same part of each leaf in the same way every time, they will be carrying out a fair test.

Each team should be asked to make estimates and then make their measurements. If you want to measure;

- The **perimeter** of a leaf, you will need string and a ruler.
Lay the string around the edge of the leaf and then measure how long the string is.
- The **area** of a leaf, you will need squared paper.
Draw around the leaf and count the number of squares inside the shape.
- **Length, width, dimensions** of a leaf. You will need a ruler and notepaper.
Make sure this group always measure the same dimension.

Ask students to write down three reasons why they think their method is the best way of measuring a leaf. Challenge each team to explain their method to another team.

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Displaying your results [30 minutes]

Doing large scale graphs or histograms on the floor or in the playground is always a firm favourite, the axes can be drawn with chalk or made with string, canes etc.

Pupils can contribute by labelling the axes, adding their leaves and coming up with a title. If you do it outside wind will be your greatest enemy so be prepared and plan for it.

Alternatively there is any number of opportunities to creatively display your leaf maths in the classroom.



Miss Marple getting to the bottom of another set of data

And finally [10 minutes]

Ask the pupils to discuss what they have learnt using their mathematical skills. Each team could come up with some rules about the leaves they studied.



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Extension Activities

Leaves are great! There are plenty of opportunities to use them to bring maths alive.

Putting leaves into sets is also a worthwhile activity, especially if you ask the pupils to write their own rules to describe each set.

Laying out hula hoops in the playground provides instant results; again it only really works outside on a still day.

Activities around symmetry in nature can raise a lot of questions and inspire interesting artwork.

Draw around a leaf, cut out the shape and fold it in half. If the two halves mirror each other then you have found the only symmetrical leaf in the world.

and, as a handy hint...

Have a look at the Nature Detectives website, hosted by the Woodland Trust. They create and collect mountains of brilliant outdoor activities that will inspire and help with planning outdoor learning and play sessions.

www.naturedetectives.org.uk/download/autumn/

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To measure the perimeter of a leaf

You will need:

some leaves
some string
a ruler
paper and pencil

- Place your leaf on a flat surface.
- Run the string around the edge of the leaf making sure it follows the shape accurately. This will be fiddly so make sure everyone has a go and that the team help each other out.
- Measure the length of string that has been run around the edge of the leaf.
- Record your results neatly.



To measure the length or width of a leaf

You will need:

some leaves
a ruler
a pencil and paper

- Lay your leaf on a flat surface.
- Choose what you are going to record and take the same measurement with every leaf.
- Write your results down on a piece of paper. You might want to draw a table to make it neater.