

MATHS learning springboards



Data handling and percentages

Using natural objects in mathematical problems

Aim: Pupils create tally charts, Carrol diagrams and pie charts

Using a range of natural resources, such as leaves found in the grounds, pupils create

1. A Carrol diagram, using their own sorting criteria, for example green/not green. Toothed margin/non toothed margin.
2. A composite tally chart of all resources found - identify the most abundant item. Express this as a percentage.
3. Devise a pie chart of the results, using the actual found objects to make the chart.
4. Answer a percentage word problem, such as "What % of the leaves are cordate?" Write word problems for other groups in the class to answer.

Check out the Maths Learning Springboard - Algebra and Carrol/Venn Diagrams.

Estimating, sampling and multiplication

How many blades of grass are there in a field?

Aim: Pupils use sampling to estimate answers to 'impossible' questions such as, 'How many leaves are on a tree' or 'How many blades of grass are there in the playing field?'

- Ask pupils to devise questions about the school grounds that they would like answers to. Pupils discuss in groups how they might find out the answer.
- Demonstrate or explain how to sample a small area.
- Each pupil uses a ruler to mark 1cm x 1cm of grass on the school field. Remind them that the area = 1cm². Count the blades of grass in this cm².
- Find the mean number of blades of grass in 1cm² – add up each pupil's 'blade count' and divide by the number of pupils. Use this number to calculate the 'sample' number of blades of grass in 1m².

Measure the whole area. This is easy with a trundle wheel on a playing field, but pupils will need to be creative to estimate the area or volume of a tree or shrub.

- Multiply the sample answer to scale up to the whole.
- How could pupils refine the exercise to be sure that the area they choose to sample is typical?

Estimating the area of irregular shapes

Estimating area with leaves

Aim: Pupils practice estimating area

Pupils collect leaves from the school grounds and compare them. A variety of leaf shapes challenges pupils to estimate area more effectively than all the same shape.

- Which is the smallest leaf?
- Which is the largest leaf?
- Which tree or plant consistently has the largest leaves?
- How do we know?

Using squared paper, carefully draw around each leaf.

- Pupils should estimate the number of squares inside their shape and record the figure before carefully counting whole and partial squares within the leaf perimeter.
- Analyse the data. How accurate was the estimate?
- Which tree or plant actually had the largest and smallest leaf?

Collecting and using data

Does the tallest tree have the largest leaves?

Aim: Pupils use data to prove or disprove a theory: Investigate the statement that the 'Tallest trees have the largest leaves'

Select a method of tree height measurement – there are many ways to do this so research online or make the clinometer in the Maths Learning Springboard – Stick clinometer. If it's a sunny day, try this method:

- Measure your own height and then the distance from your heels to the tip of your shadow. Calculate your shadow:height ratio – for example, 1m of shadow = 0.75 of height.
- Quickly determine the length of the tree's shadow from the base of the tree to the tip of the shadow. Use the ratio to calculate the height of the tree. Using the sample ratio above, a tree shadow of 40m would indicate a height of 30m. This activity needs to be done swiftly, because shadow lengths change remarkably fast on a sunny day!

Now use this data with the 'estimating area' exercise above. Pupils create a chart to show data.



Measure the height of a tree

