

curriculum

CURRICULUM STRANDS & ACHIEVEMENT OBJECTIVES

Mathematics

Number, Measurement, Geometry, Statistics

Problem Solving

- effectively planning mathematical exploration
- using equipment effectively when exploring mathematical ideas

Logic and Reasoning

- interpreting information and results within the context used

Communicating Mathematical Ideas

- record, organise and talk about the results of mathematical exploration

ESSENTIAL SKILLS

- understanding and responding to information displayed in graphs and tables
- presenting information clearly, logically and accurately
- calculating accurately
- cooperating with others to achieve accurate information and statistics

Links to Science and English
Levels 2-4

- How many evergreen trees are there?
- How many deciduous trees are there?
- Make two tables of your results, one table for shrubs and one for trees.
- Make your tables like this -

Types of Trees		Running Tally Total	
Evergreen trees		Below 2m	
Evergreen trees		Above 2m	
Evergreen trees		Above 3m	
Deciduous trees		Below 2m	
Deciduous trees		Above 2m	
Grand Tree Total			

- Try the same for shrubs. Compare them.
- Can you put both sets of results on a bar graph?
- Have students study the graphs and see if they can come up with some interesting statements about trees and shrubs in the school grounds. Write these down.
- Present findings to the class and display the work. Compare results with others.

ACTIVITY TWO

Learning more about our school trees

Preparation:

- Using a library books and 'gardener parents' to help, have students identify, name and recognise the types of trees and shrubs in the school grounds.
- Identify and list the number of different types of trees/shrubs in the school grounds.
- Using string and later a ruler or tape measure, find the distance around the trunks of several trees. Find the tree/shrub with the largest and smallest girth or circumference.
- What is the average girth of trees/shrubs in the school grounds?
- Divide your results into trees and shrubs.
- Record your results in a table, bar graph or pie graph. Present and display your results.

ACTIVITY THREE

Measuring the height of a tree

Preparation:

- Tell students there are several ways to measure the height of a tree without having to climb to the top and risking falling out of it.
- Here are two ways. Have students try them both and compare the results. Try this on several trees.

Teacher Notes

How much do your students really know about the trees and shrubs in your school? Can they imagine the school environment without them!

The following are a series of stimulating real maths activities which can be used by individuals or groups to free you while you deal with the teaching component. The study will also provide much useful language work, focus on the school environment and lead to an interesting display.

ACTIVITY ONE

Trees and Shrubs in Our grounds

Preparation:

- Go on a tree and shrub count. Find answers to the following questions. Before you go, students should conduct some library research to know the difference between a tree, a shrub, an evergreen and a deciduous tree.

Questions to Answer

- How many trees are there in the school grounds?
- Work out a way you will be able to estimate/measure 1 metre, 2 metres, 3 metres...
- How many shrubs are above/below one metre tall?
- How many trees are above/below two and three metres tall?

environmental maths

MATHEMATICAL ACTIVITIES FOR YEARS 4-8 USING AN ENVIRONMENTAL THEME (Page 2)

Method One

Measure the shadow of the tree from the trunk outwards. Use centimetres.

- Measure the shadow of a 100cm (metre) ruler.
- Multiply the shadow of the tree by the length (100cm) of the ruler.
- Now divide the answer by the length of the shadow of the ruler. This will give an answer in centimetres. Change to metres & centimetres. This method is called the **ratio method**.

Method Two

- Use a 45° set square. Hold the long side up to your eye.
- Move away from the tree keeping the bottom side of the set square parallel with the ground until your eye is in line with the top of the tree.
- The height of the tree is the distance y the tree, plus the height of the bottom set square above the ground.



- Have groups, prepare an 'Our Tree' display using all the information gathered. Add other interesting facts about the tree to the display, e.g.
 - colour of flowers,
 - birds that nest or are attracted to the tree,
 - how to care for the tree
 - is there a mathematical shape that is like the tree?

FURTHER DIRECTIONS TO DEVELOP WITH STUDENTS

- Scale map of school showing where major trees and shrubs are planted.
- Have students calculate tree density. (Divide area of school grounds by number of trees). Compare this with areas of buildings and hard surface areas.
- From scale map, identify areas for new plantings.
- Create a native bush area.
- Identify and count insects and birds that are attracted to a tree/shrub.
- Have students keep regular records in graph form of growth of shrubs and trees in school grounds.

Use Both Methods to ...

- Find the height of many trees in school grounds. How high is the tallest tree in the grounds?
- Using string, find the height of the shortest tree in the grounds.
- Compare your results with other groups. If the results are too different, combine with another group and try again.
- Find the tallest tree of four types in the school grounds. e.g. tallest oak, tallest totara...
- Present your findings to the class using a pictograph combined with a bar graph.

ACTIVITY FOUR

Really getting to know a tree

- Have groups of two select their favourite tree and find out the following.
- Name of the tree.
- Height of the tree.
- Length of the lowest branches.
- Distance of lowest branch is above the ground.
- Number of leaves on one branch.
- Length of the leaves on one branch under 5cm/over 10cm.
- Average width of leaves.
- Circumference of the tree at ground level/ at one metre.
- Number of leaves to a bunch.
- Record and present information using tables and graphs.

assessment

CHOOSE FROM THE FOLLOWING

Mathematics Evaluation

- can the students perform measuring tasks accurately using different methods of measurement?
- are the students able to accurately record and interpret the results from the measuring tasks set?
- are the students able to interpret the information and results in an environmental context?

Science Evaluation

- how accurately are students able to identify plants from external features using identification keys and oral information provided?
- are the students able to identify and describe different parts of trees and shrubs?

English Evaluation

- are the students able to assess the effectiveness and accuracy of the information, they and other groups presented to the class?
- did students display an increasing confidence in using and understanding new vocabulary related to the study and survey?