

National Literacy and Numeracy Week 2009 Project Report

Project title: The Maths involved in Building Our School
Project description: This project looked at the building programs being funded by the current government and how this can be used as a springboard for mathematics in the classroom. The project aimed to connect real-life activities with mathematical concepts, and build on students' knowledge and experiences. It is hoped that this will enable students to connect the content they are studying with the outside world - <i>Our Building Program</i> . During Literacy and Numeracy Week, students completed 3 investigation tasks linked to the work being done on our playground and buildings (with the pride money and the BER money.) These 3 tasks were rich tasks adapted from k-6, focusing around key concepts which linked to the building. They facilitated the working mathematically strand giving children opportunities to problem solve, justify and reason. The project was launched with a talk given by the project manager of Universal Landscape. His talk focused around the need for mathematics in building the Bush Playground from the plans to the implementation stage. Three teachers worked on developing these "rich" mathematical tasks and then presented these at an afternoon staff meeting. At this meeting the whole staff engaged in the tasks so they had a deeper understanding of the concepts and mathematics involved.
Person responsible for project: Catherine Mathews- Assistant Principal West Pymble
School, region, diocese: Our Lady of Perpetual Succour West Pymble Broken Bay Diocese
Contact person's email: cmathews@olps.dbb.catholic.edu.au
Number of students, teachers, parents, other community members directly involved: <ul style="list-style-type: none">• 8 teachers• Project officer• 165 students
Intended numeracy outcomes: For children to: <ul style="list-style-type: none">• see the connection between real life activities and mathematical concepts• realise the need for accuracy in measurement• view and understanding building plans• be involved in real life problem solving experiences involving area, cost etc and to solve them effectively• be engaged in mathematical tasks which have direct relevance to their lives• develop a further love of mathematics; seeing it as enriching their lives and creating opportunities for them For teachers to: <ul style="list-style-type: none">• build experiences in planning activities which link to real life experiences• develop greater capabilities in planning "rich tasks" which are applicable with small

adaptations across the various stages

- be mathematicians and engage in mathematical tasks further extending their mathematical capabilities

Evidence of achievement of intended numeracy outcomes:

- The *Rich tasks* which leant themselves to cover various strands and capabilities. (See attachment)
- Student work samples clearly demonstrate accuracy, detail and experiences in Real Life Problem Solving. (See attachments)
- Engagement of students in the tasks. Students were keen to complete tasks as they were relevant to them. "The tasks are about us and our school."
- The questions students asked the Project Manager related to the Bush Playground and how it was constructed
- The positive feedback from parents

Other information:

- Please find below the teaching notes and tasks with work samples and photos

Feedback about making grants available for such projects: Thank you for the opportunity to complete this grant it was a valuable opportunity for the entire school community with multiple learning gains.

Project Launch

Representative from Universal Landscape to talk to the students about the 'Bush Playground', discussion about shapes, scale, plans.



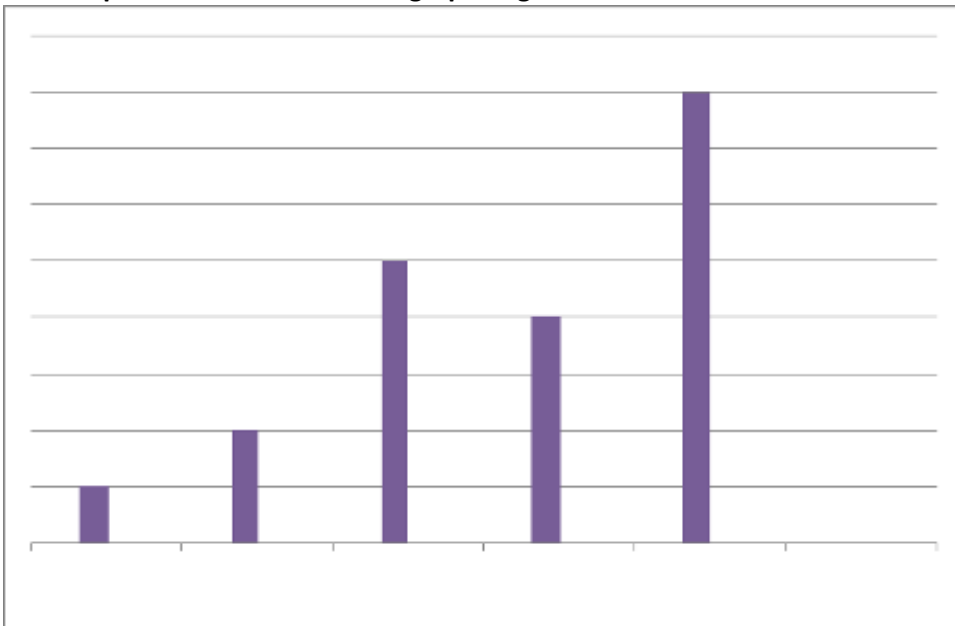
ACTIVITY ONE

Big idea- DATA – Graphs are powerful data displays because they quickly reveal a great deal of information.

Warm Up Tasks:

K -2

Work in pairs to decide what this graph might be about.



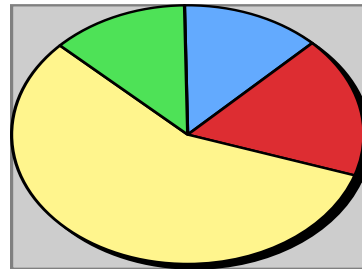
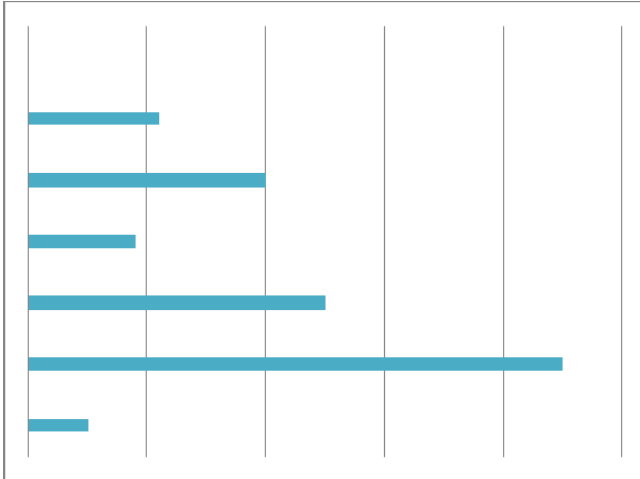
Teacher Talk – Examine the graph, discuss and interpret the data.

Suggest values for each bar.

If K children have no prior knowledge of graphs create a column picture graphs using post it notes. Present graph to students on IWB or large image.

3 - 4

How are these graphs alike and how are they different?



Teacher talk; Examine the graphs, discuss and interpret the data.

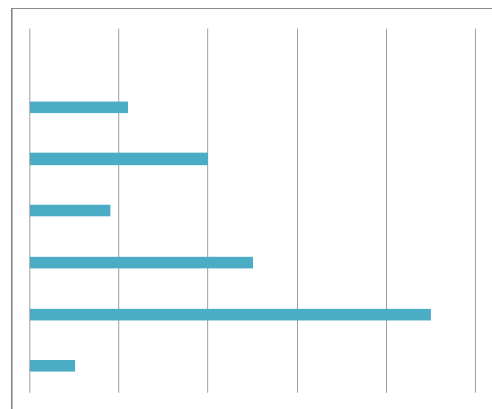
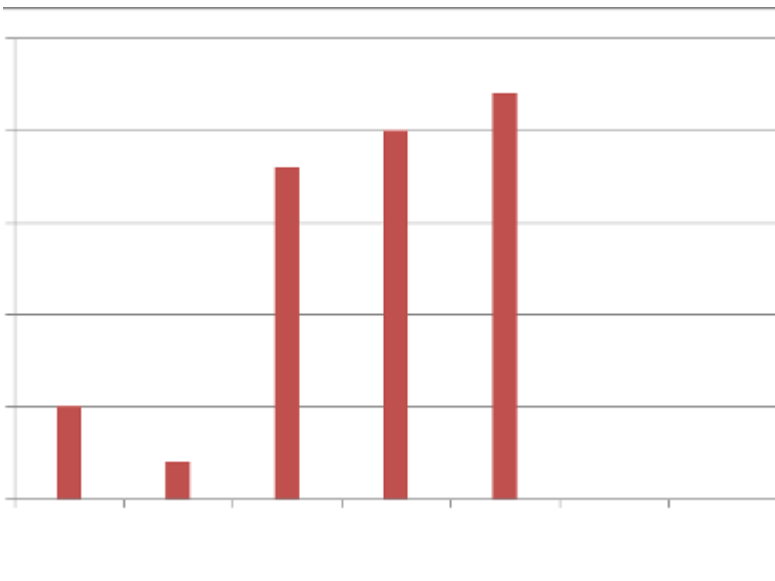
What could the values be for each graph?

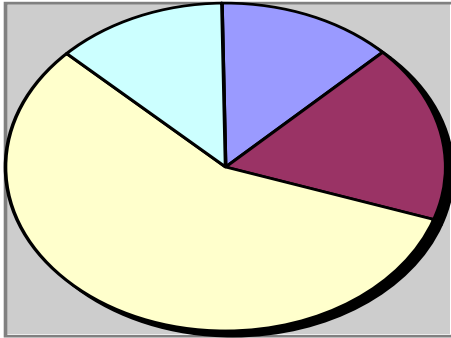
Is there another way that the graph could be presented?

Which graph do you prefer and why?

5 - 6

How are these graphs alike and how are they different?





Teacher talk; Examine the graphs, discuss and interpret the data.
 What could the values be for each graph?
 Is there another way that the graph could be presented?
 Which graph do you prefer and why?

Rich Task:

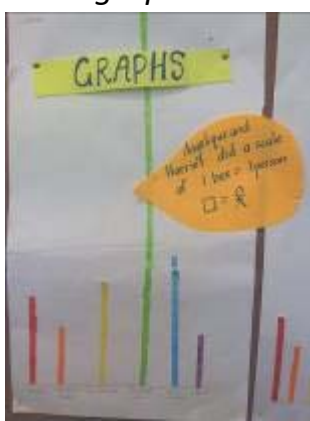
Collect DATA about a part of our building project and represent the data in a graph of your choice. Justify why you selected to use this graph.

Teacher notes;

- Children may collect data by surveying various classes. This could be completed as a whole class task however the graphing component could be completed on an individual basis. (As a staff plan which classes the children will be survey so classes are not bombarded with too many surveys).
- Children may survey an aspect of the bush e.g. Types of plants, the best parts of the bush or facilities and furniture in the new Library.

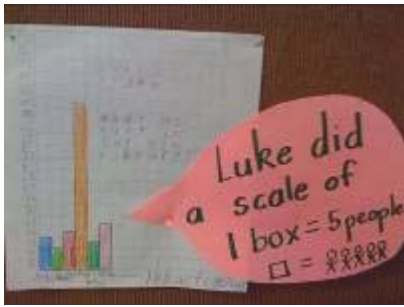
Follow Up Tasks:

- Whole class discussion around: the graphs used, the scale used visual impact of various graphs
- Children may use the computer and Excel Word documents to export their data into a graph
- It is important to listen to why children selected the various graphs to use. Use their justification as part of your assessment.
- A further extension task could involve students designing questions related to their graphs.

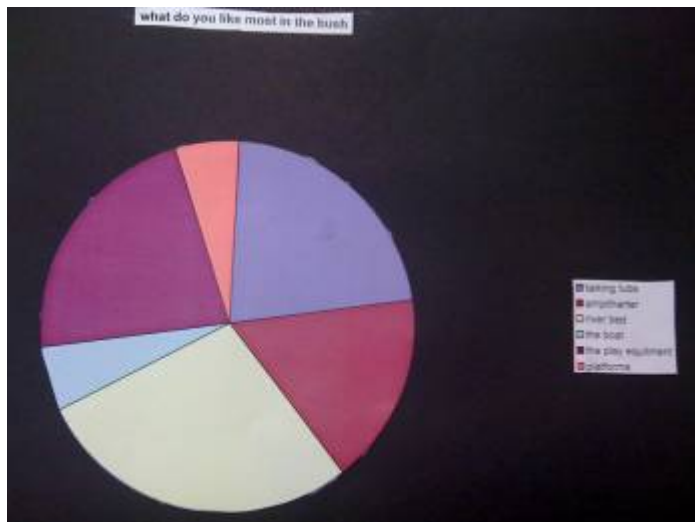
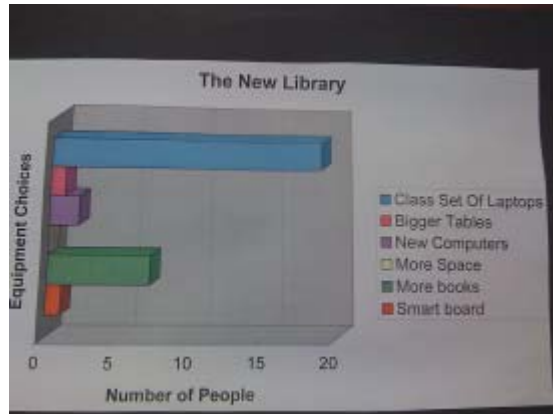
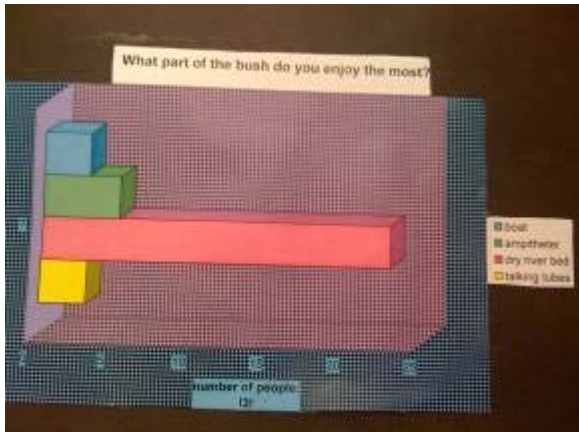


Stage One work samples

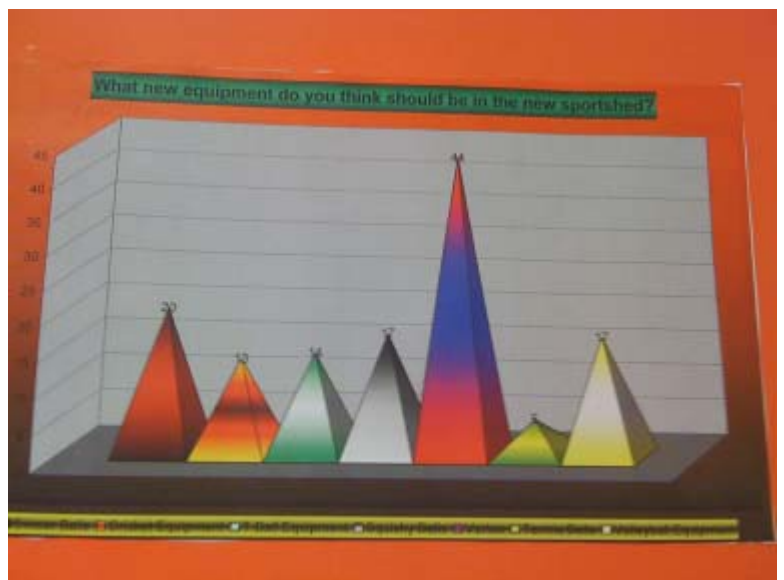
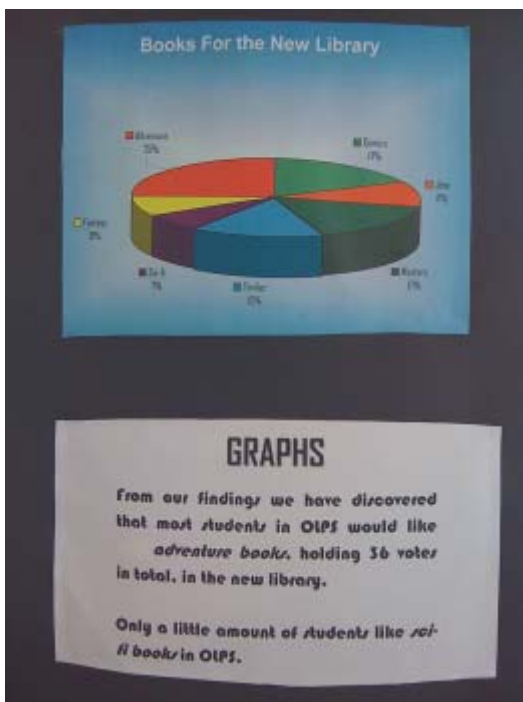
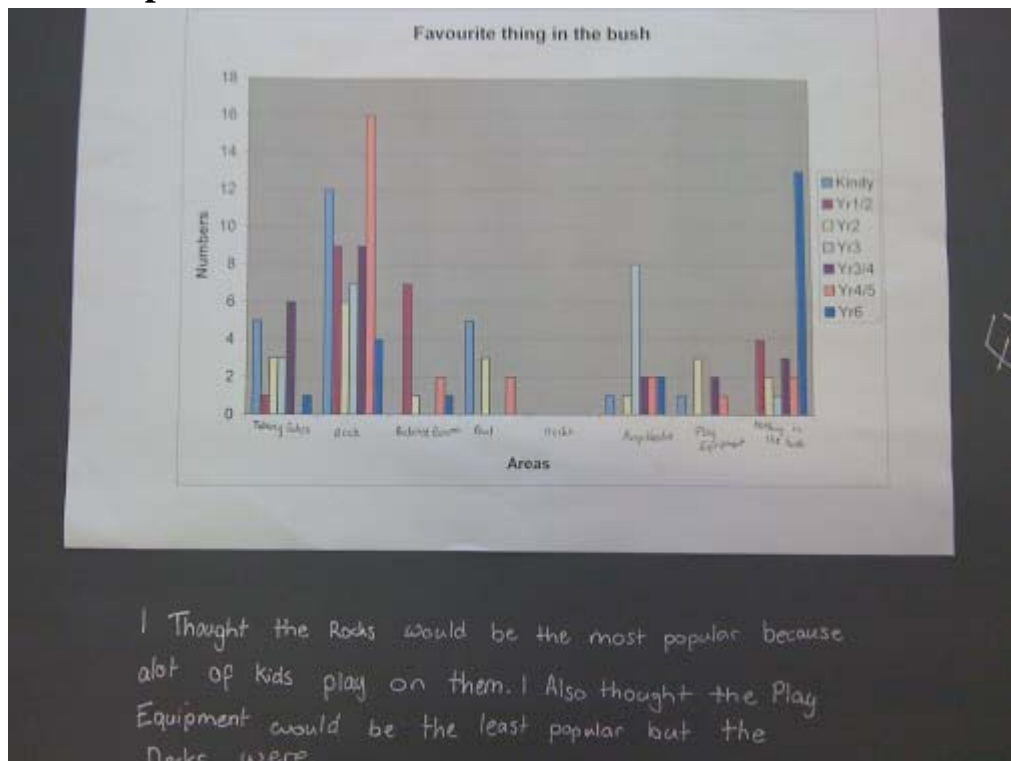
Some used a scale of 1=1person others 1=5people



Stage 2 work samples, graphs completed using excel



Stage 3 work samples



NSW Syllabus Outcomes:

DES1.1

Represents and interprets data displays made from objects and pictures

DS1.1

Gathers and organises data, displays data using column and picture graphs, and interprets the results

DS2.1

Gathers and organises data, displays data using tables and graphs, and interprets the results

DS3.1

Displays and interprets data in graphs with scales of many-to-one correspondence

ACTIVITY TWO

Big idea- GEOMETRY –There are many different representations of a shape.

Prior to warm-up task –

Examine the landscape plan for construction. (Multiple copies of the plan have been provided by Universal Landscape.)

Examine the scale used, legend/key and view point/cross section. Walk through the new landscaped area with the plan and locate landmarks, observe differences between the plan and the actual bush area.

Look at the bush from different viewpoints.

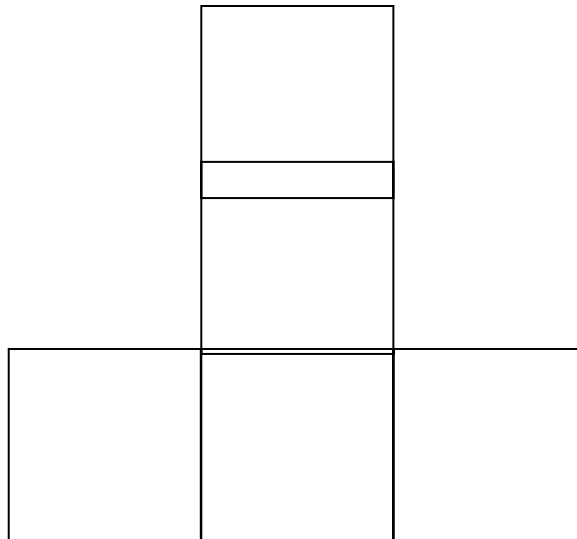


WARM-UP TASK

K -2

Equipment – multilink cubes

A 3D shape is made with linking cubes. When you look at it from one side, it looks like this;



Build the 3D shape.

Teacher talk; Present 2D shape to students;

Whilst students are completing task, ask them can you use more than 5 cubes? How many cubes could you use? How many different combinations of cubes?

Keep checking the side view to make sure that your 3D shape is correct.

Questions after the task.

Did you visualize the 3D shape before you made it?

Examine the 3D shapes made by the children.

was the plan made from – justify.

Examples of the various

shapes all with the same side What viewpoint

view



3 - 4

Equipment – multilink cubes

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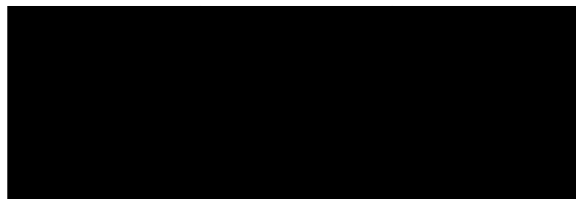
What viewpoint was the plan made from – justify.

5 – 6

Equipment – multilink cubes

A 3D shape is made with linking cubes. When you look at it from one side, it looks like this;





Build the 3D shape.

Teacher talk; Present 2D shape to students;

Whilst students are completing task, ask them how many cubes could you use? How many different combinations of cubes?

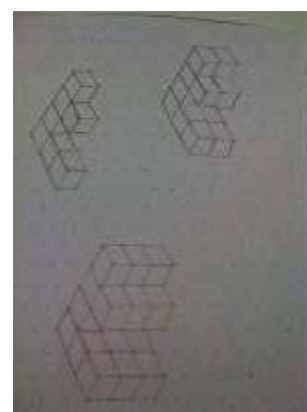
Keep checking the side view to make sure that your 3D shape is correct.

Questions after task.

Did you visualize the 3D shape before you made it?

Examine the 3D shapes made by the children.

What viewpoint was the plan made from – justify.



Rich Task:

Create a plan with a key/legend for your ideal backyard.

Teacher Notes:

K/1 - Children can use concrete materials to represent their plan

1 – 2 – grid paper

3 – 4 – grid paper

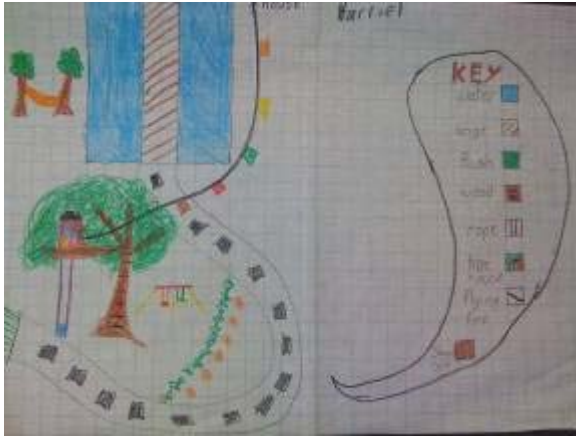
5 – 6 – grid paper

-For older children the dimensions of the backyard could be given

-Encourage children to use a scale, proportion, accuracy, compass points, legend/key and top view by constructing a whole class rubric on; *WHAT WOULD MAKE A GOOD PLAN?*

Design rubric prior to children completing the task and after examining the bush plan.





NSW Syllabus Outcomes:

SGES1.1

Manipulates, sorts and represents three-dimensional objects and describes them using everyday language

SGS1.1

Sorts, describes and represents three-dimensional objects including cones, cubes, cylinders, spheres and prisms, and recognises them in pictures and the environment

SGS2.1

Makes, compares, describes and names three-dimensional objects including pyramids, and represents them in drawings

SGS3.1

Identifies three-dimensional objects, including particular prisms and pyramids, on the basis of their properties, and visualises, sketches and constructs them given drawings of different views

SGES1.3

Uses everyday language to describe position and give and follow simple directions

SGS1.3

Represents the position of objects using models and drawings and describes using everyday language

SGS2.3

Uses simple maps and grids to represent position and follow routes

SGS3.3

Uses a variety of mapping skills

ACTIVITY THREE

Big Idea: GEOMETRY New shapes can be created either by combining or dissecting existing shapes

Warm Up tasks:

K-2

Draw a design or shape made up of 3 shapes. The design should involve symmetry

Teacher Talk; *Symmetry is a geometric property that is important for students to understand because it is evident in the everyday world. This particular task is open in that students can use simple or more complex shapes.*

Begin with a shape of your choice cut it into 3 pieces using straight cuts. Give it to a friend to put back together.

Teacher Talk: *Students need experiences of putting shapes back together and dissecting shapes. These skills support later work with fractions, area and volume. Students can cut familiar and unusual shapes.*

3-4

How many different shapes can be made by using five green pattern block triangles? Triangles must match along full sides.

Students using pattern blocks means the problem is accessible to all students. Some students will use more sophisticated recording patterns others will be random. The problem provides an opportunity to discuss congruence.

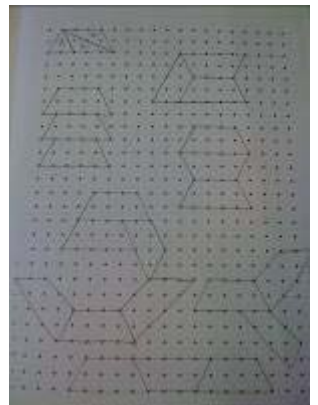
5 - 6

What can you make if you put together 3 identical Trapezium?

You can cut a trapezium along a line and end up with 2 triangles. What other pairs of shapes can you make by dividing the trapezium with one straight line?

Teacher Talk; *Students can be provided with red pattern blocks (trapezium) so they can experiment concretely. Some students will think of more possibilities and more complex shapes.*

Modification for 3-6: Vary the choice of pattern blocks. Don't put constraints on the number of pattern blocks used.



Rich Task:

OLPS has approached Ku-ring-gai Council to construct a pathway from Grayling Road through Burrows Grove to meet our new pathway. The new pathway in the bush has a series of various shapes, which tessellate. Design your own pathway from shapes that tessellate.

Teaching Notes:

K-1

Give children pattern blocks to create a tessellating pathway. Photograph.

2

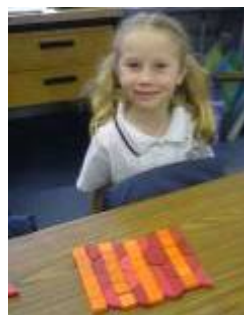
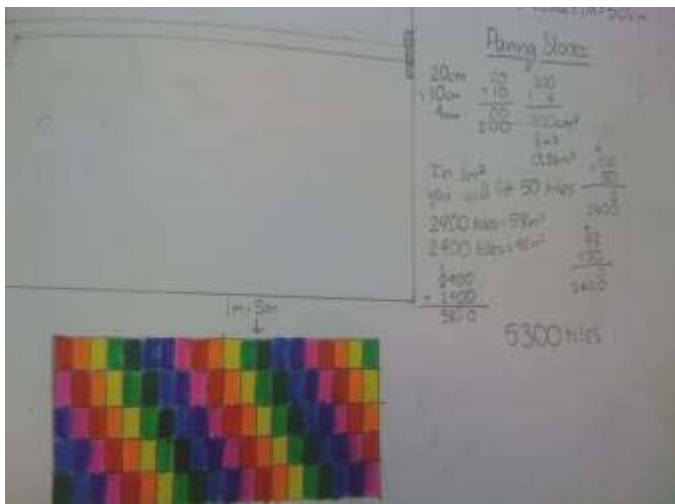
Give children a pathway stencil.

3 – 4

Measure Burrows Grove pathway as a class, draw a pathway scaffold for students to use.

5 – 6

Measure the Burrows Grove pathway, create a scale and draw the new pathway. Calculate the area as a class. Children use rectangles to plan the pathway. Rectangles can be cut to make different shapes e.g. triangle, square.





NSW Syllabus Outcomes:

SGES1.2

Manipulates, sorts and describes representations of two-dimensional shapes using everyday language

SGS1.2

Manipulates, sorts, represents, describes and explores various two-dimensional shapes

SGS2.2a

Manipulates, compares, sketches and names two-dimensional shapes and describes their features

SGS3.2a

Manipulates, classifies and draws two-dimensional shapes and describes side and angle properties

Reference Material:

Good Questions: Great Ways to Differentiate Mathematics Instruction

by [Marian Small](#), Teachers College Press, 2009

Open-ended Maths Activities by Peter Sullivan and Pat Liburn, Oxford University Press, 1997