

THE MEETING PLACE**Project - (Measurement: Outdoor Mathematics)**

As part of a program to enhance the school environment and improve student facilities, the school council has voted to provide funds for an informal, outdoor meeting area for upper school students.

Students will be asked to have their input by submitting detailed proposals to the school council for consideration. One of these proposals will be selected and used.

Problem

Prepare a **plan** and **budget** for a brick paved outdoor area for the use of upper school students.

Name: _____

Activity One - The Meeting Place**Outcome Addressed: Clarifying**

- Identify keywords and restate the problem in your own words.
- List the information you will need to know and collect for this submission.
- Explain how you will collect this information.
- State any assumptions you may be required to make.

Activity Two – The Meeting Place**Outcome Addressed: Choosing**

- Select an appropriate site and give reasons for your choice. Collect all essential measurements and clearly display this data.
- Collect all information in relation to the budget. Choose a suitable method to classify and display this information.

Activity Three – The Meeting Place**Outcome Addressed: Using**

- Prepare a plan showing the area to be paved and the paving design you intend to use.
- Prepare a budget for the outdoor area. Your costing must be realistic and supported with some evidence, for example, newspaper cuttings or quotes.

Activity Four – The Meeting Place**Outcome Addressed: Checking and Interpreting**

- Give a copy of your Activity Three to another student for checking. The checking must include both the plan measurements and budget calculations. Show sufficient details to support the checking.
- The person checking must state what they like about the design and how they could improve this plan.

Note: you must submit *your* checking of another student's work with *your* project. Don't submit their work and expect it to count towards your outcome (although it could be useful for you to comment on any constructive criticism you receive).

Activity Five – The Meeting Place**Outcome Addressed: Communicating**

- Write a cover letter to the school council to accompany your submission. In your letter you will need to explain why you chose this site, how you went about completing the task and highlight the positive aspects of your design. Give the practical and economic reasons why your design should be chosen.

Name: _____

WINDOW CLEANING

Project – (Measurement: Outdoor Mathematics)

To accurately quote for window cleaning at the Saint Stephens Carramar campus, the successful tenderer needs to measure the area of all the windows. This task was easy for most areas of the school, but the Primary building posed a few problems.

Problem

Take measurements to enable you to accurately determine the area of all the windows on the side of the Primary building facing the common.

Name: _____

Activity One – Window Cleaning**Outcome Addressed: Clarifying**

- Identify keywords and restate the problem in your own words
- List the information you will need to know and collect for this task
- Explain how you will collect this information
- It will not be necessary to measure every single window separately if we make a reasonable assumption. State this assumption.
- State any other reasonable assumptions you think you should make.

Activity Two – Window Cleaning**Outcome Addressed: Choosing**

- Decide how you are going to calculate areas, including listing any applicable formulas
- How are you going to find the size of windows too high to measure directly? (e.g. Will you use trigonometry? Will you use a scale diagram?)
- Choose how you will present your measurements, calculations and results. (That is, will you prepare a written report, a poster or chart, a Powerpoint or oral presentation or a combination of these?)

Activity Three – Window Cleaning**Outcome Addressed: Using**

- Take all the necessary measurements, and record them
- Perform all the necessary calculations to determine a total area.

Activity Four – Window Cleaning**Outcome Addressed: Checking and Interpreting**

- Make sure your answer is clearly expressed in the context of the original problem.
- Give a copy of your Activity Three to another student for checking. Checking must include checking that your measurements are reasonable, that your calculations have been performed correctly and that your overall answer makes sense. The checking should involve making estimates and comparing them with the measured and calculated results. Include sufficient details to show how the checking was done.
- The person checking must comment on the **method** you have chosen to use, listing either strengths or weaknesses or both, and suggesting how it might be improved.
- The name of the student checking your work must be included when you submit the project.
- Comment on anything you would do differently if you were to do a similar task another time, giving reasons.

Activity Five – Window Cleaning**Outcome Addressed: Communicating**

- Present your measurements, calculations and results using the method you chose in Activity 2.

LEAVING HOME**Project - (Number: Budgeting and Credit)**

Kim and Nikky have both recently left school and found full time employment. They have been discussing the possibility of leaving home and sharing rented accommodation.

Their parents are concerned that Kim and Nikky cannot afford such a commitment at this stage and suggest that they prepare a budget to see whether their idea is feasible.

Problem

Consider the **financial implications** of Kim and Nikky leaving home and living independently.

What advice would you give them?

Activity One - Leaving Home**Outcome Addressed: Clarifying**

- Identify keywords and restate the problem in your own words
- Select a suitable occupation for both Kim and Nikky and research the appropriate salary to fit the occupations.
- List some essential factors that Kim and Nikky will need to consider for living independently. Explain why these factors are important to living away from home.
- Compile a detailed list of the costs involved in day-to-day living.
- Clearly state any assumptions Kim and Nikky may have to consider for salary and costs.

Activity Two - Leaving Home**Outcome Addressed: Choosing**

- Choose a suitable method to classify the costs you have collected as fixed, variable, essential or extra costs.
- Collect any other relevant information to assist Kim and Nikky in solving the problem and choose an appropriate method to record and display this information.

Activity Three - Leaving Home**Outcome Addressed: Using**

- Use the collected information and appropriate mathematical calculations to assist in making an informed decision for Kim and Nikky. All working and calculations must be clearly shown.

Activity Four - Leaving Home**Outcome Addressed : Communicating**

- Write a letter to Kim and Nikky advising them as to whether it is feasible for them to leave home or not.
- In your letter you must present all research, collected data and necessary calculations to support your recommendation.

Activity Five - Leaving Home**Outcome Addressed : Checking and Interpreting**

- Check the completed work of Activities One to Three of another student. Pay special attention to information collected and budget calculations. Give evidence on how the checking is done.
- Identify limitations/constraints which indicate that an adjustment may be required within their budget. Make any necessary adjustments where possible.
- From this information, comment whether the recommendation is appropriate. If not, make a new recommendation with supporting reasons. If yes, state the strength of the recommendation.

WHICH BANK? WHICH CREDIT CARD?**Project - (Number: Budgeting and Credit)**

Some people stick with the same bank all their lives without ever really considering whether their bank is giving them the best service possible. Different banks and similar financial institutions (credit unions and building societies) offer a variety of different services, and there is plenty of opportunity for customers to shop around.

Problem

Your task is to shop around and make some decisions about which bank you think offers the best deal on two types of accounts:

- (1) A savings account for you
- (2) A credit card account for your parents

Activity One – Which bank? Which credit card?**Outcome Addressed: Clarifying**

- Identify keywords and restate the problem in your own words.
- Make a list of the features that you would look for in a ‘good’ savings account. Identify which features you consider to be most important.
- Make a list of the features that you would look for in a ‘good’ credit card account. Identify which features you consider to be most important.

Activity Two - Which bank? Which credit card?**Outcome Addressed: Choosing**

- Make a list of as many banks, credit unions, building societies as you can find in the Carramar/Wanneroo/Joondalup area. Keep a record of where you found the information you use in making up the list.
- Choose four institutions from your list to investigate further.
- Choose a way of presenting your information so as to make comparisons easy.

Activity Three - Which bank? Which credit card?**Outcome Addressed: Using**

- For each of the four institutions you have chosen in Activity Two, find out information about the features you listed in Activity One for savings accounts
- For each of the four institutions, find out information about the features you listed in Activity One for credit card accounts
- Present the information in the way you chose in Activity Two.

Activity Four - Which bank? Which credit card?**Outcome Addressed : Checking and Interpreting**

- Make a recommendation for a savings account
- Make a recommendation for a credit card account
- Explain the reasons for your recommendations with reference to the work done in activity Three

Activity Five - Which bank? Which credit card?**Outcome Addressed : Communicating**

- Prepare a **brochure** or a **web page** for young adults that compares the different banks and recommends one bank over the others for the two types of accounts investigated and makes recommendations.

IS IT FAIR?**Project - (Chance and Data)**

The game of Paxis is a gambling game played with three dice. One player is called “the *house*” and all the other players play against the *house*. Each player (except the *house*) rolls three dice. The player wins if he or she rolls any double or rolls three the same; the player loses if he or she rolls three different numbers.

Problem

Determine the probability of a player winning in Paxis and explain whether or not you would recommend Paxis to a friend and why.

Activity One – Is it fair?**Outcome Addressed: Clarifying**

- Identify keywords and restate the problem in your own words.
- The problem as stated does not say anything about the amounts bet or how much is paid for a win. What reasonable assumptions need to be made about this?
- Is there anything else implied in the problem but not actually stated?

Activity Two – Is it fair?**Outcomes Addressed: Choosing**

- Decide which of the methods covered in class will be most suitable for determining the probability of getting one pair or three of a kind.
- It may be useful to start with a simpler situation (e.g. rolling just two dice) and when you have a sound understanding of that to extend it to the game of Paxis.

Activity Three – Is it fair?**Outcome Addressed: Using**

- Using the method selected in Activity two, calculate the probability of winning Paxis.

Activity Four – Is it fair?**Outcomes Addressed : Checking and Interpreting**

- Based on the probability you determined in activity Three, decide whether you would recommend Paxis.
- Test-play Paxis, keeping a record of the number of times you win and lose. Do your results reflect what you expect to get based on your probabilities? If not, can you explain the discrepancy, or do you need to re-do some of the earlier work?
- If you had to re-do the task, would you choose a different method of finding the probabilities? Give reasons why or why not.

Activity Five – Is it fair?**Outcome Addressed: Communicating**

- Decide who your calculations would be of most interest to. This is your target audience.
- Assemble the work done in the other activities into a single report suitable to be read by your target audience. Remember, you will be assessed on both clarity and your appropriate use of mathematical language, symbols, etc.

THE INTERVIEW**Project - (Chance and Data: Chance)**

Bill has a dental appointment after school. The last time he went to see the dentist he arrived ten minutes early for a 3.45 pm appointment. Bill actually got to see the dentist at 4.05 pm. He was wondering if he would have to wait to see the dentist this time.

As Bill walked down the school corridor, pondering his dental appointment, he read a notice on the pin-up board:

All year ten students will be interviewed individually by the counsellor with regard to the subject choices for their chosen career pathway.

Bill wondered how the interviews would run in light of his experience at the dentist.

Problem

Devise and **test** a timetable that will allow the year 10 counsellor to interview **twenty five** of the students in the year group. They will be discussing their performance in Year 10 and their prospects for upper school.

Name: _____

Activity One – The Interview

Outcome Addressed: Clarifying

- Identify key words and restate the problem in your own words.
- List the factors that need to be considered when setting up the timetable.
- Set up a draft interview schedule for ten students. Consider carefully the headings you could use.
- Explain how you may test the timetable without actually interviewing the ten students.
- List some assumptions that need to be considered before it is possible to perform the test.

Activity Two – The Interview**Outcome Addressed: Choosing**

- Use your answers from Activity One and the discussion following the return of your first activity, devise a timetable that will schedule interview times over a day for twenty five students to see their counsellor regarding subject selections for upper school. **(Assume each interview lasts for 10 minutes)**
- Describe how you would simulate testing of the schedule.

Outcome Addressed: Using

- Carry out the simulations to allocate the amount of time each student spends with the counsellor. Show details of your simulation by recording all data in an appropriate format.
- Analyse your data by calculating
 - average length of time for the interviews
 - average waiting time per student
 - total waiting time for the counsellor.

Outcome Addressed: Interpreting

- Are these results reasonable? If not, how could you change the interview schedule to develop a better timetable?

If the counsellor requires the interview time for each student to be lengthened, discuss how this would affect the schedule?

Activity Three- The Interview**Outcome Addressed: Using and Interpreting**

- Simulate and analyse the schedule if the allotted time is lengthened.
- Repeat any necessary steps from Activity Two and comment on your results.

Activity Four – The Interview**Outcome Addressed: Communicating**

- Write a report to the counsellor. In your report you will need to outline the processes you have used to devise the recommended schedule for twenty five students. Include in the report the schedule you have chosen and reasons for your choice.

JAMIE'S GARDENING SERVICE

Project - (Space: In Two Dimensions)

Jamie is a Year 12 student, has his drivers licence and is saving to buy a car. He works as a part-time gardener on Saturdays and has acquired a number of customers. Some want him to come weekly, others only once a fortnight.

He has made a sketch map of the location and nature of his jobs. Jamie's brother Will has agreed to lend Jamie his car on Saturdays.

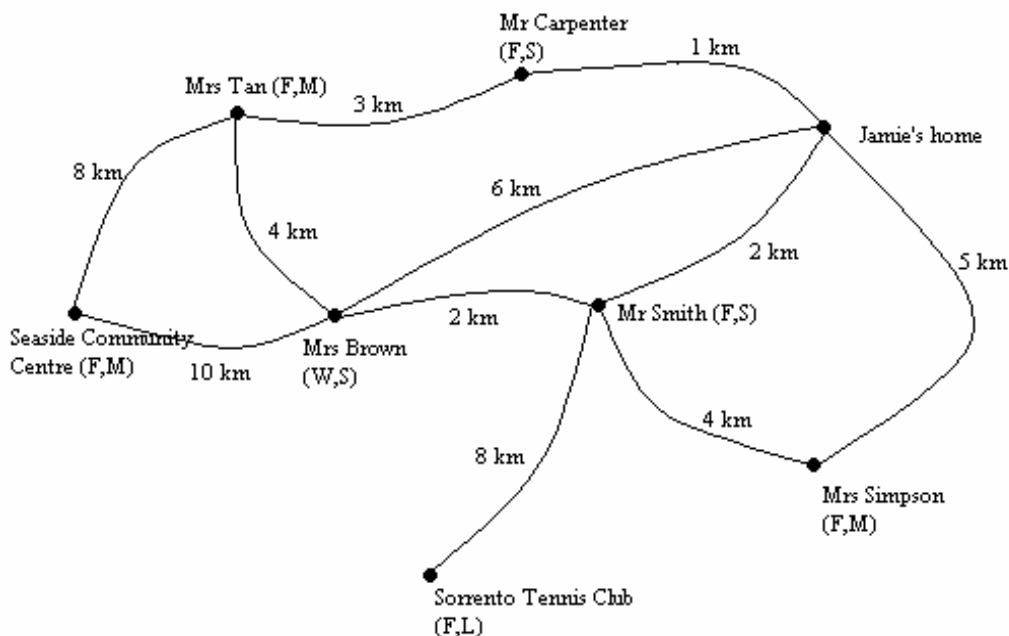
W = weekly

F = fortnightly

S = small job, eg weeding (45 minutes)

M = medium job, eg lawn mowing plus general garden maintenance (1 hour 15 minutes)

L = large job at community and recreation centre (3 hours)



Note: The time stated for each job includes an allowance for travelling time.

Problem

Construct a plan of work for Jamie that will minimise his travelling distances and give him approximately the same number of hours of work each Saturday.

Prepare a clear timetable for Jamie to give to each of his customers so they know when to expect him.

Name: _____

Activity One - Jamie's Gardening Service**Outcome Addressed: Clarifying**

- Identify keywords and restate the problem in your own words.
- List the factors that Jamie will need to consider when making his plan.
- List some assumptions that Jamie must take into account when making his plan.
- List any restrictions that will affect Jamie's plan.

Activity Two - Jamie's Gardening Service**Outcome Addressed: Choosing**

- Choose a suitable model to display the work plan.

Activity Three - Jamie's Gardening Service**Outcome Addressed: Using**

For each Saturday:

- prepare a work plan
- show the route taken
- calculate the total distance travelled
- calculate the time taken

Activity Four - Jamie's Gardening Service**Outcome Addressed: Checking and Interpreting**

- Give your work plan to another student to check.
- The person checking must explain how the checking was done.
- Comment on the plan and make recommendations on how it may be improved.

Activity Five - Jamie's Gardening Service**Outcome Addressed: Communicating**

- Write a standard letter for Jamie to use with all his customers.
(Remember to include a clear timetable for each customer.)

A SMALL BUSINESS DECISION

Project - (Space: In Two Dimensions)

Dominique wishes to open a florist shop in Grid City.

The diagram below represents a map of Grid City, where the intersection of each of the streets have been numbered. The Princess Diana Hospital (PDH) is located at position 5 and the Royal Grid City Hospital (RGCH) is located at position 21. A five star restaurant is located at position 7. Dominique intends to focus her business on delivering flowers to the hospitals and is assured of a contract of supplying flowers to the restaurant each day.

A new hospital is to be guild but it is not known where. Dominique would rather wait until the position of the new hospital is announced before deciding where to locate her florist shop. She knows that she will have to act quickly once the announcement is made.

It is possible for Dominique to open a shop at any of the intersections of the city.

GRID CITY

	1	2	3	4	5
6	7	8	9	10	
11	12	13	14	15	
16	17	18	19	20	
21	22	23	24	25	

Problem

You must find a 'system' or 'rule' that Dominique could use to decide the best position for her florist shop, once the announcement of the fourth delivery point is made. Once you have worked it out, you will need to fax Dominique all of the details of the rule or system that you develop.

Name: _____

Activity One – A Small Business Decision**Outcome Addressed: Clarifying**

- Identify keywords and restate the problem in your own words.
- List the factors that Dominique will need to consider when making a decision about where to locate her shop.
- List any assumptions that are reasonable or necessary to the task.
- List any restrictions that will affect Dominique's plan.

Activity Two – A Small Business Decision**Outcome Addressed: Choosing**

- Choose a suitable model to allow investigation of the problem and to display information.

Activity Three – A Small Business Decision**Outcome Addressed: Using**

- Investigate the different possibilities for location of the shop using your chosen model. Repeat this for several different locations of the new hospital until you can identify a pattern.

Activity Four – A Small Business Decision**Outcome Addressed: Checking and Interpreting**

- From the pattern you have found, make a system or rule for finding the best place for the new florist shop
- Check that your rule works by testing it with other possible locations for the new hospital than those used in Activity Three.

Activity Five – A Small Business Decision**Outcome Addressed: Communicating**

- Write a fax to Dominique explaining your system or rule.
- Include a suitable fax cover sheet.

