



**Enhanced Learning**  
**Educational Services**  
*“the study skills specialist”*

# Study Skills Handouts for Mathematics *for High School Students*

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# ***Enhanced Learning Educational Services***

*“the study skills specialist”*

*First Published 2005 by Enhanced Learning Educational Services*

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## **Enhanced Learning Educational Services Profile**

### Our Organisation:

Enhanced Learning Educational Services (ELES) is the leading provider of study skills resources in Australia. Since 2001 over 500,000 students across Australia have benefited from our study skills worksheets and workbooks. An Australian business based in Sydney, our clients extend throughout Australia and to international schools overseas. We are committed to helping all students improve their ability to learn and study by providing study skills seminars and resources on the topics students need.

### Our Mission:

To provide a worthwhile and effective service to teachers, students and parents, enhancing students' learning skills and abilities through dynamic programs, resources and strategies to unlock the power of the mind and enable greater success at school and in life.

### Our Commitment:

As part of ELES' commitment to education, 5% of all gross income is donated to charities that help and assist children.

### Our Staff:

The majority of our resources are created by Prue Salter (B.A., B.Math., Dip.Ed., M.Acc., M.Ed.), founder and director of ELES. Prue has over 20 years' experience in the Education Industry in Australia. With a strong background in teaching and pastoral care, Prue was frustrated by the absence of high quality resources available to help students develop and maintain effective study skills. A committed scholar, passionate about learning, Prue combined her natural organisational and time management abilities with her research in how students learn to develop a series of resource kits designed to address the gaps and to present them in a format that is entertaining, as well as simple and effective.

## **For further information about ELES or our products or contact details:**

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SAMPLE





# Why do we Need to Study Mathematics?

*'When will we ever use this?'*

This is a very common question in a Mathematics classroom. You might have even asked it yourself at some stage.

Here's the answer:

*The truth is, most of you will never use much of the Mathematics you learn at school.*

WHAT????????????

Isn't this just what you suspected all along? Sure, mental arithmetic is necessary, and percentages and measurement are useful, and maybe you might use some of the things you learn in consumer arithmetic, but most of you are probably sceptical as to whether algebra, trigonometry and calculus (you may not even know what all of these are yet) will ever be of use in your daily life.

On the other hand, you may be surprised to find when you have left school that some of the Mathematics you learn definitely does come in handy.

For example, imagine you were looking at buying a large plasma flat screen TV. The measurement the shop advertises is the diagonal across the screen. You get home and discover you've forgotten to ask for the width of the TV. Will it fit in the space you have available on your wall? You know the ratio for widescreen is 16:9 so using Pythagoras' theorem you could work out what the diagonal for a 16:9 right angled triangle would be (18.4). Once you had that, you could use ratios to work out that the width of the 50 inch TV (and for some reason plasma TV diagonals are measured in inches not centimetres like normal TVs) had to be 44 inches, then you could use Maths to convert this to centimetres. This would take less than a minute (thanks to your calculator's help) and means you could work it out straight away without having to wait for the shops to open the next day or having to travel out to get the measurements.

And this is just one example! Having a good grasp of Mathematics also comes in extremely handy when you start to look at personal loans, home loans or anything where you might need to compare different interest rates that are presented in different forms or work out repayments (or even just understand what the bank is talking about so you can make sure they aren't ripping you off!).

If you plan on travelling (exchange rate conversions), investing (understanding different options), improving your nutrition (understanding food labels), buying a car or a home (calculating interest options) or even just spending money in your life, you will undoubtedly need some Mathematics. The amount of Mathematics you learn that will come in useful will vary from person to person depending also on what you do in life. Obviously engineers, accountants and architects, to name just a few, will require a much greater grasp of Mathematics than writers, artists or advertising executives.

So why then do we all have to study Mathematics at school? Why not just make those students who will need more Maths in their careers study Maths? Well, apart from the fact that your ideas change a lot at this age about what you want to do in later life, there are three good reasons why you need to study Mathematics at school.

## *Why do we need to study Mathematics at school?*

### 1. TO TEACH LOGICAL THINKING SKILLS

There is a theory that developing the right side of your brain will enhance your creativity while developing the left side of your brain will enhance your ability to think logically and analytically. But how can you teach people to improve their logical thinking skills? What sorts of things could you do to teach something like this? You can see what is coming. In order to teach you how to take a problem, think it through, analyse it step by step and come up with a solution, there needs to be content for you to work with. Mathematics is the vehicle through which schools try to develop the analytical part of your brain. By pushing your brain to understand new concepts within Mathematical topics, you are training your mind to look at and analyse a problem, to think procedurally and to systematically find a solution. These analytical problem solving skills become transferable to problems that arise in daily life. No matter what job you end up doing, the ability to think critically and access the logical left side of your brain will be a major advantage for you. No-one has yet found a more effective way to teach this style of thinking than through the study of Mathematics. Taking you through the process of learning Mathematics content is the best 'tool' we know of to help you develop these essential life thinking skills.

### 2. TO INCREASE YOUR BRAIN'S CAPACITY TO LEARN

If you wanted to run a 20km marathon, then you wouldn't get up one morning, having never even gone for a light jog, and expect that you would complete it with ease. Instead you would train beforehand, starting off with short distances and building up to longer distances. You would exercise your muscles so they could handle the challenge. If you want to be able to effectively learn things in later life that interest you, you need to exercise your brain and develop it during these crucial formative years. Studying Mathematics will help do this for you! We may all be born with a certain fixed number of brain cells, but research indicates that it is not the number of brain cells that determines intelligence; it is the number and strength of connections you build between these cells. Every time you find something difficult and have to put in effort to understand or master the concept, you are building strong connections and expanding the capacity of your brain. It doesn't really matter what the content actually is that you are learning, it is the process of training your mind to learn that is important. The more effort you put into the experience of learning Mathematics, the greater capacity you are creating in your brain to learn new things in later life, things that you are really interested in and passionate about.

### 3. TO HELP YOU UNDERSTAND AND FUNCTION IN THE WORLD IN WHICH YOU LIVE

Mathematics is one of the tools we use to describe and develop our world. Everyone needs a solid core of Mathematics in order to function efficiently in the world in which we live. You just can't avoid numbers! Without Mathematics, our society would probably still be in the Stone Age. Many students can't see the relationship between what they are learning in the classroom and the Mathematics that applies to our world. The problem is that much of the applications of Mathematics in real life such as rocket technology, the building of bridges, car design, microbiology, insurances and tax systems require the use of difficult and high level Mathematics that is well beyond the scope of what you are doing in the classroom up to Year 12. So much of the time you are learning the basic building blocks without being able to reach the point where you would see how this content develops into Mathematics that is actually useful, and necessary, in the real world. Unless you go onto a Mathematics related field after school, you may never get to the 'good stuff' where Mathematics is actually making a difference to our day to day lives. But even though you may not know the Mathematics behind the computers you use, the medical equipment that helps you, or the mobile phones you own, you can appreciate that it is there, silently working behind the scenes to make your life easier and more fulfilling.

*Throughout high school you will be doing around 1000 hours of Mathematics. That is a lot of opportunities to exercise your brain and improve your thinking skills. Although some students may find Mathematics comes more naturally to them than others, everyone has the ability to develop their ability to think Mathematically. Putting the effort in to learn new concepts and challenge yourself helps you achieve the main goal of school: to develop your ability to think, to learn and to achieve.*



# Steps to Success in Mathematics (Part 1)

There are a number of things you can do to help yourself achieve good results in Mathematics. Read the following carefully (maybe highlight key points) and rank yourself in each area.

## 1. BRING ALL EQUIPMENT TO CLASS

*If you are a sports person, you know that turning up to a soccer match, for example, without things like soccer boots and a soccer ball would severely limit your chances of playing a good game. It is the same for Mathematics. There is specialised equipment that is necessary to make your time in class more effective.*

Some of the things you need to bring to class are:

- Textbook!
- Exercise book, workbook or paper.
- Calculator (if your class is currently using calculators).
- Ruler.
- Pen, pencil and eraser.
- Geometric equipment (protractor, compass etc) if relevant to the topic.



Rank yourself. How good are you at bringing all equipment to class?

EXCELLENT      VERY GOOD      GOOD      OK      NEED TO IMPROVE

## 2. BE READY TO START WORK STRAIGHT AWAY

*Many students come into class and just sit there chatting while waiting for the teacher to arrive and tell them to open their books before they do anything. The problem with this is that by the time you locate everything and are ready to start, your teacher is probably half-way through the first explanation and you are already beginning to be left behind.*

As soon as you enter the classroom, take your books and equipment out and open up to wherever you are up to before you start chatting with your friends. You are now ready to start as soon as the teacher arrives.



Rank yourself. Do you get ready to start work straight away?


ALWAYS      MOST OF THE TIME      SOMETIMES      NOT OFTEN      NEVER

## 3. REALLY LISTEN TO INSTRUCTIONS

*Have you ever thought you were sitting there listening but then at the end of the instructions discovered that you had absolutely no idea what you were supposed to be doing in the lesson? It is easy for this to happen. Training your mind to listen is a skill that you can learn and develop. It simply requires a bit of effort in the beginning until it becomes a habit to listen rather than just hear. Then it will just happen automatically.*



The way to keep your mind focused and prevent day-dreaming is to keep it occupied. You do this by asking yourself questions as opposed to just letting your mind roam free. Develop the habit of questioning as you listen: 'What equipment will I need?', 'Do I understand what we are expected to do?'

 Rank yourself. Do you always know what you are supposed to be doing in class?  
ALWAYS      MOST OF THE TIME      SOMETIMES      NOT OFTEN      NEVER

#### 4. USE CLASSTIME EFFECTIVELY

*There are a number of really good reasons to make the most of classtime. You learn more when you work in class and have the teacher there to ask questions. If you work in class you don't get into trouble, your report comments are positive, but most of all it is just common sense - time you waste in class means time you have to make up at home!*


Using class time effectively means staying on task (i.e. doing what you are supposed to be doing) throughout the whole lesson. To improve in this area, in your workbook keep a tally each lesson of how many times you are NOT using your classtime effectively. (Either you will realise yourself or your teacher will point it out to you.) Try and reduce the number of tally marks (and how long you are off task for as well).

 Rank yourself. How effective is your use of classtime?  
EXCELLENT      VERY GOOD      GOOD      OK      NEED TO IMPROVE

#### 5. CHOOSE CAREFULLY WHO YOU SIT NEXT TO

*Of course it is natural to want to sit next to your friends. But just because you are compatible with respect to friendship, does not mean you are compatible as workmates. Some friends work really well together. They keep each other focused and they help out each other when there are problems in understanding the work. Other friends always prove to be a major source of distraction. There are just some people that you will not be able to work well with.*

Face reality about the person you sit next to. Are they making it harder for you to do well in Maths? If this is the case, and your teacher has not moved you, simply say: 'Look mate, (you can leave out the 'mate' if you are a girl) I just can't get any work done when I sit next to you! I think we should move seats for awhile'. You can give reasons if you want to like you are falling behind, your parents will freak out at the bad report comments etc. etc. but most likely your friend will just be relieved that one of you admitted it. If you feel the peer pressure is too strong to do this, have a quiet word to your teacher and ask them to move you without giving away that it was your idea. They will be more than willing to help!

 Rank yourself. What effect does the person you sit next to have on your results?  
HELPS YOU IMPROVE      NO EFFECT      MAKES IT HARD FOR YOU TO WORK





# Steps to Success in Mathematics (Part 2)

Have you started to implement and improve the first 5 Steps to Success in Mathematics? Read the next 5 carefully (maybe highlight key points) and rank yourself in each area.

## 6. THINK DURING EXPLANATIONS

*Have you ever found you totally tuned out during an explanation only to come back at the end and discover you have no idea what the teacher was talking about?*

The first part of the lesson is usually when your teacher explains new concepts. This is THE most crucial time of the lesson. But just looking at the worked examples and watching what is happening is not enough. You have to actively explain them to yourself. It is almost like talking to yourself in your head: 'Where did that come from?', 'How did he get that?', 'Why did she do that?'. And most importantly, if you can't work it out yourself - ask a question! There are probably 10 other people in the class who would like to know the answer to the same questions that you have.



Rank yourself. How hard do you try to follow explanations in class?

VERY HARD

I JUST REALLY LISTEN

I DON'T EVEN LISTEN

## 7. ASK LOTS OF QUESTIONS

*It is an undeniable fact that students who ask questions generally do better in Mathematics than students who don't. If you do NOT ask questions then your problems will certainly multiply as each section generally builds on the previous section of work. Think about what stops you from asking questions. Maybe you are a bit shy (start with small questions or see your teacher after class) or maybe you just can't be bothered (in which case remember that NOT asking questions just creates more hassles later on).*

First try and work it out or understand it yourself. When you think you can go no further, have pinpointed where your problem is, or are getting left behind in an explanation, it is time to ask some questions. Some teachers like students to ask questions during an explanation while others prefer it at the end. Think about how your teacher reacts to questions at different times. You can also ask questions as your teacher is walking around the room or at the beginning or end of the lesson. If you feel you have too many questions to ask in class, make an appointment to see your teacher at lunch time (they would rather you fixed any problems earlier rather than later!).



Rank yourself. Do you ask questions when you don't understand something?

ALWAYS

MOST OF THE TIME

SOMETIMES


NOT OFTEN

NEVER

## 8. USE CLEAR SETTING OUT

*Clear and logical setting out will help you learn Mathematics much more effectively.*


Learn the correct way to set out a problem right at the beginning. It is much easier to understand and correct your work if you set your problems out clearly as demonstrated by the teacher. Space problems out rather than crowd them up close. Use any guidelines your teacher provides. Look at the work of your friends and see which style is clearest and easiest to follow.

 Rank yourself. How clear is your setting out?  
VERY CLEAR                      OK                      A BIT HARD TO FOLLOW                      A REAL MESS

## 9. SHOW ALL WORKING

*Many students don't seem to understand how marks are allocated in Mathematics. Getting the correct answer is not enough to guarantee full marks. Instead you need to ensure that you have shown all the steps necessary as each step is often allocated part of the total marks for the question. Often students become lazy in the classroom and just write down the final answer or leave out steps in their solution.*


Change the way you think about your work. In a test or examination, you need to be able to explain to the examiner how you got to each step. You are not showing the working just for your benefit, but also for theirs. The problem is that many students plan just to do this in the test and not bother doing it in the classroom. Unfortunately this approach causes problems. You need to practise showing all working in order to do it correctly and it is essential you do it with every single question in order to improve your speed and accuracy for a test situation. If it becomes a habit not to bother showing working, you'll find yourself automatically skipping steps in tests and examinations as well. In addition to this, if you do show your working at all times it is easy to go back and review how you did questions or ask for help from teachers if you cannot solve a question.

 Rank yourself. How often do you show all working?  
ALL THE TIME                      MOST OF THE TIME                      SOME OF THE TIME                      HARDLY EVER

## 10. ONLY REFER TO THE ANSWERS TO CHECK YOUR WORKING

*The 'answers' can either help or hinder your learning of Mathematics.*

The best way to use the answers is to complete the questions first, then check that section, correct your work and redo the questions you got wrong. Two poor ways of using answers are checking your work ages after you completed it so you are not getting immediate feedback, or looking at the answers too early (or even copying the answers) without giving yourself a real chance to think about the question and have a proper go at it.

 Rank yourself. How do you use any 'answers' you are given?  
MAINLY FOR MARKING                      IF I GET STUCK                      I SOMETIMES COPY ANSWERS



# Steps to Success in Mathematics (Part 3)

Read the following carefully (maybe highlight key points) and rank yourself in each area.

## 11. COMPLETE ALL HOMEWORK

*What do you think the purpose of homework really is? There is a wide range of opinions among students as to why teachers actually give you homework. In Mathematics, there are a number of reasons as to why you might be given homework: there wasn't time to finish everything in class, you need extra practice to help you understand the work or you have a test approaching and you need to revise. The main reason though is to help you consolidate what you learnt in class - coming back to the work later that day, and by yourself, helps you reinforce the new concepts learnt and also tests your understanding.*


**It is essential that you complete any homework you are given and keep up-to-date. You might not see the reason for it, but your teacher has been teaching this subject for a long time and knows what is needed to succeed in Mathematics. To make the most of homework, complete it, then correct it if possible, try and redo or understand any questions that were incorrect and, finally, on a post-it note write a list of the questions you need to ask your teacher about next lesson and stick it in your workbook or textbook.**

 Rank yourself. How often do you complete your homework fully and completely?  
ALL OF THE TIME      MOST OF THE TIME      SOME OF THE TIME      NOT VERY OFTEN

## 12. CORRECT YOUR WORK REGULARLY

*The purpose of correcting your work or checking the answers is not to find out which questions you got right - those ones don't really matter because if you know how to do them then you'll probably be fine with them in a test situation. The purpose of correcting your work is to locate the questions you got wrong so you can learn how to do these types of questions properly.*

**Lots of students will just randomly tick their work to pretend to their teacher that they checked the answers. What a waste of time! This is not the way to improve your results in Maths. You might think you don't need to bother as you are sure you had all the answers correct, but many times that is not the case after all. It is essential you locate the questions you got wrong then try and understand what you were doing incorrectly. This is the action that will lift your results as it is where the most learning takes place. And it is more effective if it takes place almost straight after you completed the exercise (ie not a week later!). If you still cannot understand the answer, see your teacher about that question the next day in class.**

 Rank yourself. How well do you use the learning opportunities in marking?  
I ALWAYS REDO ONES I GOT WRONG      I RARELY CHECK WORK PROPERLY



### 13. KEEP A SUMMARY BOOK

*Without a summary book, you need to go through your textbook and class workbook in order to locate the rules and formulas that you need to learn for tests and examinations. A fabulous habit to develop for Maths is to have a separate summary book as well.*

Your summary book can be an exercise book or a separate section in your folder. On a regular basis, look through the work you have done so far for Mathematics and in your summary book write down the main rules and formulas, and include examples of different types of questions. Studying Mathematics has two parts - learning the rules and content and practising the skills of the subject. A summary book helps you do the first stage most efficiently.

 Rank yourself. Do you make summaries of the main content in Maths?  
YES                      MOST OF THE TIME                      SOMETIMES                      NOT REALLY

### 14. FILE AWAY EVERYTHING

*It is definitely worth keeping all past tests, assignments and worksheets so that you can review them before a test or examination.*


In addition to your exercise books or folders for class, have a folder at home that you use to file sheets for Mathematics. Keep absolutely everything and use dividers to separate the different topics (label these clearly). When you next have a test that includes that topic, go back and redo any questions from your sheets that you got wrong in the past. This is a quick and effective way to target the areas you are weakest in.

 Rank yourself. How many of your papers for Maths are filed away?  
EVERYTHING                      MOST THINGS                      SOME THINGS                      NOT MUCH

### 15. FOCUS ON AREAS THAT NEED IMPROVEMENT

*In order to do well in Mathematics, everyone will have certain areas that they need to do more work on. You have to expect that you will find some topics more difficult than others and so may need to do extra work for particular topics.*

Try and focus on the areas that you most need to improve on rather than just spending an equal amount of time on all sections or topics. If you find a particular section difficult, ask your teacher for some extra worksheets on this topic or see if you can borrow a different textbook in order to have some more questions to attempt on this topic. The best way to tackle an area you find difficult is to attempt some extra questions and try and work out where the point is that you get stuck. Then go and ask your teacher for some help, then go back and try again. Keep repeating this pattern: doing questions and asking for help until you have mastered it all.

 Rank yourself. How much effort do you put into improving areas of weakness?  
LOTS                      A BIT                      NOT MUCH                      NONE





# Mathematics Self Evaluation

1. How would you rate your ability in Maths (circle a number below)?

1 - *I am excellent at Maths*

5 - *I am OK at Maths*

10 - *I am really bad at Maths*

1

2

3

4

5

6

7

8

9

10

2. What things about this Maths class do you enjoy and why?

.....  
.....

3. What things about this Maths class don't you like and why?

.....  
.....

4. What types of Maths questions do you like doing and why?

.....  
.....

5. What types of Maths do you not like doing and why?

.....  
.....

6. If you could make one change to this class what would it be?

.....  
.....

7. Do you ask for help when you need it? If not, why not?

.....  
.....

8. How often do you understand the work that is taught in your Maths class?

- a. *all the time*
- b. *most of the time*
- c. *sometimes*
- d. *hardly ever*

9. If you answered c or d, why don't you understand the work?

- a. *I don't do enough work or homework.*
- b. *I don't listen enough in class.*
- c. *I find it difficult to understand the explanations.*
- d. *I don't ask enough questions.*
- e. *Other reasons:*

10. Comment on the following:

a) Your effort in class so far this year:.....

.....

b) Your completion of homework:.....

.....

c) Your general attitude:.....

.....

d) What changes you need to make:.....

.....

11. Do you....

- |  |          |
|--|----------|
| a. <i>Correct your own homework?</i>   | YES / NO |
| b. <i>Try to understand when you make a mistake?</i>   | YES / NO |
| c. <i>Ask other people to help you when you get stuck?</i>   | YES / NO |
| d. <i>Do extra questions if you have trouble with a question?</i>  | YES / NO |
| e. <i>Ever write down the correct answer when you have made a mistake but don't try and understand it?</i> | YES / NO |
| f. <i>Ignore your mistakes sometimes?</i>  | YES / NO |

12. Complete the following sentences:

a) My Maths would improve if I .....

.....

b) When I don't understand something in class, I.....

.....

c) At the end of the year I would like to be better at.....

.....



# Improving Your Setting Out

## WHY IS SETTING OUT SO IMPORTANT?

Good setting out is essential in Mathematics in order to ensure:

- Your teacher can read and understand your working.
- You can read and understand your working.
- Your work is easy to correct.
- Mistakes can be located and corrected.
- You show all working necessary to get all the marks available.
- That you can still be given marks for the working even if you make a mistake.

Look at the simple example below. Both students have made the same mistake, but Student A receives 2 of the 3 marks allocated to the question while Student B receives zero! You can also see how easy it will be for Student A to work out where their error was while Student B has probably long forgotten how they even arrived at their answer!

Student A

2c) Weekly wage  
= \$6 × 40  
= \$240 ✓

Income  
= \$240 × 50 × *50 weeks in the year!* *mistake here*  
= \$12000

∴ Each person receives  
= \$12000 ÷ 2  
= \$6000 ✓

(2 marks)

Student B

2c) Each person gets \$6000  
X  
(0 marks)

It is not enough to *intend* to do proper setting out in an examination situation either. Many students justify their laziness in class by saying that showing all working out and setting work out clearly isn't important in class and when they are in a test *then* they will set the work out properly. There are a number of problems with this:

1. By not practising correct setting out you don't learn what you are doing wrong and can't improve the way you set your work out.
2. Unless you have done it so often that it has become an automatic habit, you often forget to set work out correctly when it is really needed.
3. The more often you set your work out properly, the easier it becomes to do and you become faster and more efficient at doing it.
4. It just doesn't make sense not to do it all the time - if you are not convinced go back and read the reasons at the top of the page again!

## GUIDELINES FOR IMPROVING YOUR SETTING OUT

<i>Tick whether or not you are doing the following:</i>	<i>YES</i>	<i>sometimes</i>	<i>NO</i>
<p>1. Don't try and save the environment in Mathematics classes by squishing your work up all tightly together. Space your work out so it is clear where one question starts and the next begins. Leave at least one blank line between questions. <span style="float: right;"><i>Do you do this?</i></span></p>			
<p>2. Avoid zigzagging. If you are using columns, you are better to work straight down one column and then straight down the other column rather than going back and forth between the columns. <span style="float: right;"><i>Do you do this?</i></span></p>			
<p>3. Unless otherwise directed by your teacher, get in the habit of using pencil for diagrams and blue or black pen for everything else. Try and stick to the same type of pen as well so your book does not become a mass of multi-colours! And while it might be fun in junior years to write question numbers in red each time then working in blue, clear setting out can be achieved without wasting the time doing this. Remember, speed in Maths can be really important! <span style="float: right;"><i>Do you do this?</i></span></p>			
<p>4. The Golden Rule of equal signs is only <u>one</u> per line. This means:  <math>A = L \times B</math>  <math>= 5 \times 6</math>                      rather than <math>A = L \times B = 5 \times 6 = 30 \text{ m}^2</math>  <math>= 30 \text{ m}^2</math> <span style="float: right;"><i>Do you do this?</i></span></p>			
<p>5. Avoid using liquid paper. It wastes time, can be messy, you might forget to go back and write in the correct answer and even worse, you may have been correct and your teacher may be generous enough to give you some marks if you had left it. Don't do a great big scribble over the incorrect working either, instead just draw a neat line through the incorrect working and move on. <span style="float: right;"><i>Do you do this?</i></span></p>			
<p>6. Use words to explain what you are doing where necessary - particularly in topics like Consumer Arithmetic. Using words like 'Weekly Pay =' or 'Interest Owing =' makes the solution so much clearer. <span style="float: right;"><i>Do you do this?</i></span></p>			
<p>7. Don't leave out any steps when you are writing your answers down. Often something which is very clear in your head will not be clear to the marker. Imagine you have to explain how you got your answer to someone who isn't very clever and so you need to explain every single step as clearly as possible. Don't skip things that you think are obvious: this step might be where you make a simple calculation error that gives you the wrong answer. <span style="float: right;"><i>Do you do this?</i></span></p>			
<p>8. Write legibly so your writing is easy to read and ensure there is no confusion between the different numbers. <span style="float: right;"><i>Do you do this?</i></span></p>			

*Note: Your teacher may arrange a time for you to have a look at a few different styles of bookwork within the class. You can learn a lot from looking at how different students set out their work. Look at which books you think have the best setting out and think about what makes them so clear.*





# Group Work in Mathematics

At times in Mathematics you may be given work to do as a group such as a Statistics or Data Assignment or a problem solving exercise. Sometimes group meetings will take place in class and sometimes you may need to meet outside of class to work on a group assignment or task. The following guidelines can be useful for helping your group to work more effectively and efficiently. Your teacher may ask you to read and discuss the following at the start of the year in order to prepare for group work that may come up during the year, or they may give you this handout at the start of a group project to work through.

## GUIDELINES FOR GROUPS:

### Step 1 : Group Dynamics

Decide how your group will work together by working through the following questions:

- *Do we need a scribe to write the group's ideas down?*
- *How will we decide who will be the leader of the group (or will we take turns being the leader each time we meet)? Do we need a leader?*
- *What will the role of the leader be? To keep us on track? To help direct us? To make sure everyone gets a fair chance to share their views?*
- *What sorts of things are people in our group good at?*
- *Are there any rules or specific guidelines our group thinks are necessary to help the group work well together? (For example, group members are not to interrupt each other or be negative or criticise other people's ideas.)*
- *Who will hang onto and keep the group work safe (i.e. the papers and work etc)?*

### Step 2 : Understand Requirements

Discuss and become clear on exactly what the group needs to do to complete the task you have been given. If there are written instructions, have someone in the group read the instructions out loud before you start discussing. Give everyone in the group a chance to say what they think the group is supposed to do and discuss what needs to be done until everyone in the group agrees and is clear.

### Step 3 : Brainstorm Ideas

Set aside a specific period of time (anywhere from 5 to 50 minutes depending on how big the task is) for everyone in the group to contribute their ideas. While doing this, don't write off or look for the negative in any thoughts that are expressed. When brainstorming you should just let all the ideas flow and build upon everyone else's ideas (and it is a good idea to have someone record the ideas so they aren't forgotten). You may need a number of meetings for this.

### Step 4 : Decide Who Will Do What and By When

At the end of the brainstorming session, decide which ideas you are going to run with and exactly what steps need to be taken to complete the task or solve the problem. If the work requires a number of meetings, create an action plan of who will do which tasks and by when. Set the time and place for the next meeting before you finish.

## CHARACTERISTICS OF GOOD GROUP MEMBERS:

At the end of each group meeting, you might like to take a minute or so for each group member to read through the checklist below and think about what they did well as a group member and what they need to improve on. It is best if each person does this silently themselves and it is important not to criticise other members of the group.

In the group meeting, did you....

- *Listen to others when they were speaking?*
- *Try to do your share and be involved?*
- *Look at other people when they were speaking?*
- *Encourage shy students to be involved in group discussions?*
- *Try not to butt in or interrupt the middle of a discussion?*
- *Make sure you were not overly aggressive in expressing your opinions?*
- *Encourage others by commenting favourably on their ideas?*
- *Make sure you weren't trying to be the centre of attention the whole time?*
- *Take the lead if needed?*
- *Try and respect other people's feelings and ideas?*
- *Work at keeping the group on track and preventing digressions?*
- *Let others take a central role as well?*
- *Treat everyone in the group with respect and courtesy?*
- *Try to contribute equally to the group work?*

## RESOLVING PROBLEMS IN GROUPS:

*What do you do if you can't do the work you have been allocated by the group?*

Don't feel uncomfortable about it. The whole point of group work is that you can learn from each other and support each other. The main thing is to not leave the task until the last minute. Talk to other people in your group, let them know you are having trouble and ask for some help and suggestions. If they are not able to help you, and your task is not completed before the next meeting, at least the group will know you were putting in the effort to solve the problem.

*What do you do if someone is very overbearing and bossy?*

It is important not to gang up on the person or make them feel too uncomfortable. If someone in the group is willing, you can take a side approach. Have them talk to the person on their own saying something like 'We need to try and get the other people in the group more involved, maybe next meeting we can both really back off and not say much and let the rest of the group take charge'.

*What do you do if someone is not doing their share?*

Frustrations can occur if members of the group are not pulling their weight equally. These sorts of problems usually arise when the group has not decided on specific tasks for each group member. At the end of each meeting, make sure it is really clear what each member is expected to do and by what date. Ensure that the work is distributed fairly so there will not be issues later on. If there are problems, it is best if the group can try and bring these out into the open. Rather than direct accusations, a good way to start the dialogue is for a group member to say something like 'let's talk for a bit about how we are going so far'. If the group is unable to resolve the issues through discussion, you may need to approach your teacher about the issue.

**This resource continues for another 30 pages**

SAMPLE