

When the students report their results you will find the number of Smarties will vary. Discussion of this fact helps to reassure students that their estimates may have varied but are still valid.

There are numerous activities that can follow depending on the skills and interests of the learners. These include:

- Counting
- Sorting by colour
- Compiling tables of estimates, actual counts, colours
- Making graphs
- Converting statements to Fractions (3 out of 14 smarties were red, etc.)
- Converting units to percentages
- Estimating weight and length
  - Of Smarties
  - Of the box
- Measuring the weight and length
  - Of Smarties
  - Of box
- Identifying the shapes
  - Of Smarties
  - Of the box
- Calculating the Volume of the box
- Reading the names of the ingredients and the information on the nutritional panel
- Calculating the
  - Cost per pack
  - Cost per box
  - Cost per unit.



These are two of a number of websites with activities for using Smarties in the classroom:  
<http://www.det.nt.gov.au/data/assets/pdf/0016/5290/mathswithsmarties.pdf>

<http://www.primaryresources.co.uk/maths/pdfs/15smartie.pdf>

Forget the debate about the health benefits of eating chocolate – it definitely has benefits in improving Numeracy skills.

**Go on – have some fun with Numeracy and chocolate.**



## TUTOR TIPS

Department of Employment, Economic Development and Innovation  
Funded under the *Skilling Queenslanders for Work* initiative

# Numeracy with Chocolate

By Denyse Hampson

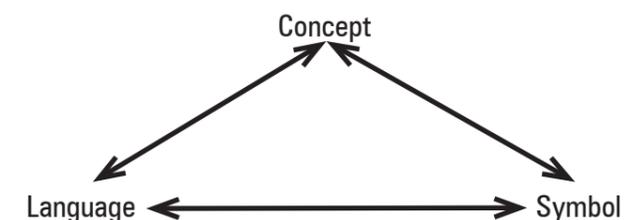
Despite the best efforts of Numeracy teachers and tutors, Numeracy classes can still carry the negative connotations associated with school Maths lessons. What better way to add a psychological sweetener than to introduce some chocolate?

In the same way that the generic term “chocolate” encompasses many styles and flavours, Adult Numeracy students are a diverse group with different skills and needs.

- Some adults, for whom English is their first language, have poor numeracy skills and suffer from Maths anxiety. Often they do not recognise their own existing skills used in everyday tasks such as cooking, calling family and friends on their mobile phones and handling money. Their lack of confidence has led them to develop avoidance strategies so the use of familiar activities is an important part of overcoming the learner’s fears.
- ESL learners may have sound mathematical knowledge in languages other than English but lack the language skills to be numerate in English. There may also be cultural differences which affect their practice of numeracy in Australia. Other NESB learners may have little or no formal education and hence limited opportunity to acquire and use numeracy skills.

Rathmell’s Triangle ([http://www.dest.gov.au/literacynumeracy/innovativeprojects/Baturo\\_Train\\_Maths\\_Tutor/appendixA.htm](http://www.dest.gov.au/literacynumeracy/innovativeprojects/Baturo_Train_Maths_Tutor/appendixA.htm)), shown below, provides a useful model which encompasses the different aspects of being numerate. The diagram below is often called the Rathmell triangle after the man who first wrote about it. It is a very good guide for teaching all new mathematics. It focuses on the following three steps:

1. Develop the concept:
  - Start with a real-world problem (“story”) of interest to the learner.
  - Use materials to show/represent this problem.
2. Develop the appropriate mathematical language.
3. Understand the symbols that go with the number or the mathematical action.



Adult Literacy students may know the words and recognise the symbols but may lack the underpinning conceptual understanding. ESL learners may have learnt the concepts and may even know the symbols but need to develop the language skills. By recognising the interrelationship of the three different aspects, numeracy teachers and tutors can use this to build on existing skills to assist the learner to become functionally numerate.

To put this into practice, consider this real life situation.



> **A loaf of bread costs \$3. What is the cost of 5 loaves?**

The most efficient method to solve this problem is to use multiplication. This involves:

- the concept of groups of equal numbers and the use of number facts i.e. times tables
- the language of multiplication (e.g. words such as "multiply", "times", "groups of", "lots of" and "of")
- the use of the symbols X and @ to represent multiplication and the writing of the mathematical sentence  $5 \times 3 = 15$  or  $5 \text{ loaves } @ \$3 = \$15$
- the employment of the symbol for "equals". Because the problem involves money the word "dollars" and the symbol "\$" are present.

This commonplace activity illustrates how the three aspects of concept, language and symbols are interconnected and need to be used together to solve the problem.

Learning is also enhanced by the use of concrete objects that the learner can manipulate. For example, counters can be used to develop the concept of equal groups. This activity will also help to establish a foundation for the understanding of division as the inverse operation to multiplication. Using notes and coins to explore different ways of making up the total amount of money is another good strategy.

Other familiar chocolate concrete objects can serve as the bases for numeracy lessons. Two such objects which serve as the basis for numeracy lessons are Tim-Tams and Smarties..

## Numeracy with Tim-Tams

> **Now to one of life's big questions:  
How many Tim Tams in a standard packet?**

Non-chocoholics may be surprised to learn that the 200g packet of Original Tim Tams contains 11 biscuits. This seemingly insignificant fact opens up many opportunities to investigate the numeracy of Tim Tams. For example,

> **How can you share out a packet of Tim Tams?**

If you use the term "prime number" with most Adult Numeracy learners you will probably be met with blank stares. However, anyone who has had any dealings with children will understand the importance of equal sharing (i.e. division). By posing the questions and allowing the learners the opportunity to attempt various methods, they soon come to realise eleven has no factors other than itself and one. Unless you have a group of eleven in the class, the only fair solution is for one person to have the lot. Invariably someone will suggest cutting the biscuits so the discussion moves to the concept of fractions. Thus, from the students' engagement in these activities, specific mathematical language and concepts can be nurtured.

There are many numerical concepts embedded in the packaging as well. These include:

- Weight and associated words and symbols
- Units such as kj and mg and percentages used on the nutritional panel
- Cost per biscuit
- Use of numbers as codes
  - Bar code
  - Telephone number
  - Address
  - Use by date
- Shape of the biscuit
- Shape of the packaging
- Volume of the packaging



Different varieties of Tim Tams contain differing numbers of biscuits and weight of contents so these can be used for comparisons. The concept of Critical Numeracy related to marketing and packaging can be discussed and explored using questions such as :-

> **Why do you think there are 11 Tim Tams in a packet?**

> **Why do you think some varieties only have 9 biscuits in the packet?**

## Numeracy for Smarties

Stephanie Morris from Wide Bay Institute of TAFE introduced me to the idea of using Smarties at a conference several years ago. For these activities, you will need a Share Pack of Smarties or similar product packaged in small boxes. Smarties come in a pack of eleven boxes. These activities work well with a class but could be adapted to be used for one-on-one tutoring. I prefer each student to have a separate box but it can be done in pairs.

> **Before the boxes are opened ask: "How many Smarties do you think there are in your box?"**

Students are being asked for an estimate but I find many students are uncomfortable with estimation. The hangover from Maths at school makes them feel that every answer should be exact and estimating is seen as nothing better than a guess so I avoid using the term in this situation. When everyone's estimate has been recorded and discussed, the learners can then open the box and count the contents.

