

Teacher's Guide to
Mathematwist: Number Tales from Around the World

(Tulika Publishers, Chennai, India, 2007)

by

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Author's note

This short work is the first version of a teacher's guide to *Mathematwist: Number Tales from Around the World*. Parents and Teachers may feel free to download one copy of this work for their personal use without written permission from the author. However, the author prefers to be notified when her book is used in the classroom. She is most happy to visit schools where the book is in use and speak to the teachers about creative ideas in the teaching of mathematics.

The author intends to follow this with a more detailed edition and is working on lesson plans to go with the book. Feel free to contact her if you would like more information (use the contact form on her website www.ciofindia.com/padma or visit her blog <http://www.padmasbooks.blogspot.com/>).

1. The Eighth Donkey

This is a good way to get children enthusiastic about counting. Young children will enjoy exercises in different systems of finger counting, such as the Kamba counting system of Kenya, or the hand signals for numbers employed by some of the Native American Tribes on the Plains.

2. Shortening a Line

Use this story to look at comparisons, and, for younger children, the use of the $>$ and $<$ symbols. You may wish to draw older children into a discussion on types of numbers e.g. ordinal numbers, continuous versus discrete data, categorical data.

3. Double Trouble

This story can be used as a demonstration of powers, but I prefer to use it as a starting point for discussions on money, exchange rates, and inter-conversions between different monetary systems and systems of measurement. Encourage children to research Greek and other ancient systems of measurement, and to convert measurements from the metric system to others. This story, as well as the one that follows (Magic Squares) may be used to introduce children to the ancient Chinese numeral system, and compare this with the Roman and Indo-Arabic systems, and to explain the concept of place value.

4. Magic Squares

Magic squares are a playful means of getting children to explore relationships among numbers. This is also a good way to introduce children to the ancient Chinese numeral system, and compare this with the Roman and Indo-Arabic systems, and to explain the concept of place value. Younger audiences should be given simpler magic squares to start with, and older children can be introduced to more complex “sudoku” and to ways that magic squares can be solved, other than trial and error.

5. Powerful Moves

This is an elegant demonstration of power series and how quickly these “get out of control.” Use this story to discuss the concept of powers and as a point of departure for examining other types of number series.

6. Dividing a Goose

An interesting addition to classes devoted to learning long division techniques.

7. Rounding up Camels

This is a good starting point for discussions on prime numbers, factors, multiples, and rounding. For older children, try more in-depth discussions on prime numbers, introduce

them to the concept of “significant digits” versus “rounding”, and the correspondence between decimals and fractions.

8. Filling a Space

Use this story to discuss the concepts of Mass, Length, and Time. You may also tie this story into a discussion of perimeter, area, and volume identities. For older children, you may get as complicated as you wish – how would you measure the inner volume of a circular (hemispherical) room or the outer volume of a pyramid?

9. The Weight of a Crown

This is a wonderful way to introduce children to Archimedes’ principle. You may wish to perform simple experiments on floating and sinking in the classroom. You may also use this story to explain the tight connection between mathematics and physics, and the practical use of mathematical equations.

10. How Many Stars?

Use this story to explain the concept of infinity and the fact that there is no end to large numbers in mathematics – no absolute, final, largest number. Speak to the children about large numbers, such as the googolplex, and go on to explain that for every large number one can think of, there is always a larger number that can top it. Older children can be introduced to the concept that the number line extends infinitely in two directions. Another interesting twist for older children would be to look at the life of the mathematician Ramanujam as described in his biography “The Man Who Knew Infinity.”

11. Gourmet Roulette

The story and discussion in the book discuss factorials. Obviously, this is a perfect point of departure for deeper discussions on permutations and combinations.

12. A Fair Division

This is a good place to discuss properties relating to division and the four basic mathematical operations.

13. Criss-Cross Logic

Explain the place and importance of logic to higher mathematics.

14. Sixty-Four Rings to Heaven

This story works best when children actually try out the experiment.