Summer 2016

Maths Magic

Weaverthorpe CE (VC) Primary School

Maths Magic

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'The Die is Cast'

Investigate how many different ways there are of throwing two dice so that the total is even, and how many so that the total is odd.

The singular of dice is die, as used in the expression of finality 'The Die is Cast'. In the western world dice are commonly cubes with their faces marked with one to six spots, the sum of the opposite faces adding up to seven.

Many years ago I purchased a set of dice which included the rules for 20 different games using up to six dice. This simple and inexpensive gift has proved, over time, very popular with my own son. When he was younger he found great pleasure in just rolling a die and getting a greater number than his mum. He did not realize that he had learnt to count dots and recognise pattern.

Dig out those dice and try the following games.

<u>Macao</u>

Each player must throw the die three times. The aim of the game is to get a total of 12. A player who throws less than 12 may throw a fourth time to try and reach the target.

<u>The 21st One</u>

Taking turns, throw the die and count the number of times the 1 falls. The winner is the player who throws the 21st one.

<u>Xanthippe</u>

Each player throws with 2 dice as often as he likes. He tries to make 7, made up of 6+1, 5+2 or 3+4. The player to get 7 with the least number of throws is the winner.

<u>Twelve Minus Nine</u>

You will need 6 dice for this game. The name of the game comes from the sum of the even numbers (2, 4 and 6) and the sum of the odd numbers (1, 3 and 5).

Three rounds are thrown in each turn. Each player adds up all the even numbers and subtracts all the odd numbers. The winner is the player with the highest score after the final calculation.

<u>House Number</u>

The aim of this game is to reach the highest house number. Each player has 3 throws. After each throw the player must decide immediately whether the number thrown should belong to the units, tens or hundreds position in a three digit house number. The same game can be played the other way around. The winner is the player who can put together the lowest house number with 3 throws. Adapt the game by using more dice.

There are 12 animals in a farm.
Some are cows

The rest are chickens

There are 28 animal legs in all.
How many cows are there?
How many chickens are there?

Going Mental!

Mental mathematics means any situation in which the learner has to think about the maths involved. Articulating the thinking and sometimes writing it down helps the thinking become more developed. There are two main types of mental mathematics:

- Number bond instant recall.
- Talking about mathematical thinking.

Number bond instant recall means the recall of addition /subtraction; and multiplication / division bonds, and includes multiplication facts.

Talking about mathematical thinking falls into three categories:

- Teacher led mental mathematics activities, including calculations. This is where the teacher stands at the front of the class and sets tasks which involve mathematical thinking and talking.
- Children's activities that involve mental mathematics.
- Class sharing activities.

Getting children to talk about the mathematics they have been involved in extends their mental ability. Children begin to make connections between the different areas of mathematics.

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What the National Curriculum says about Maths.

Purpose of study

Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.

Aims

The national curriculum for mathematics aims to ensure that all pupils:

- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can solve problems by applying their mathematics to a variety of routine and nonroutine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge to science and other subjects. The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.

What numbers are considered lucky or unlucky and why?

How many different multiplication and division facts can you make using what you know about 56?

What if you started with 5.6?

Spread out 0 to 9 digit cards. Arrange five of the digits to make a five digit number, and add up the digits.

Repeat.

How many 5—digit numbers can you make whose digits add up to 30?

Which is the largest?

Having fun with tables!

Multiplication facts are amongst the most important 'tools of the trade' for mathematics. Children who know the multiplication tables and, just as importantly, understand why and how they work, are better equipped to deal successfully with the mathematics they will encounter.

Children need to know why multiplication facts are helpful to them. They should have the opportunity to link them to their everyday living—e.g. knowing whether 50p pocket money is enough to buy seven 6p marbles.

Having learned a set of facts children must be able to make connections that will help them to make use of those facts. For example, knowing that 7x30 or 70x3 can both be worked out from knowing that 7x3 = 21.

And, of course, once learned they must not be forgotten, which means they need to be regularly practiced. As parents you can help your child on a day-to-day basis, both to learn multiplication facts and to make sure they are remembered.

More tables for your money.

Drop 2p coins into a tin and count the sound of them falling as 2, 4, 6, 8 etc. Ask, after dropping, say six coins, 'How many coins in the tin?' and, 'How much money altogether in the tin?'

It isn't as bad as it looks!

This shows that there are 100 facts to be learnt - BUT take a closer look!

The order in which you multiply makes no difference to the answer - 6x3=3x6. If your child understands this then there are only 55 facts to learn.

Of course the 1 times table is just like counting, so that means you can take out another ten facts.

Most children learn the 10 times table quite naturally so take out 9 more facts (1x10 as already gone!)

The square is now down to 36 facts! Not bad considering it started with 100!

So it really isn't as bad as it looks!

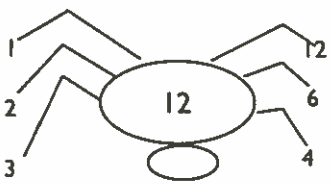
Snap

Make four sets of cards (paper will do), two sets showing the questions from a table (1x6, 2x6, 3x6 etc) and the other two sets showing the answers (6, 12, 18 etc). You should have 40 cards in all.

Shuffle and deal the cards and play a game of snap.

'Snaps' can be between two questions the same (3x6 and 6x3), two answers the same (18 and 18) or between a question and its answer (3x6 and 18).

Spiders



Draw some spiders.

This is a 12 spider; all the numbers on its feet will divide exactly into 12. We call these numbers the factors of 12.

The more spiders you make, the more you will find out.

⇒ Some spiders have only two legs. Which numbers are these?

⇒ Some spiders have an odd number of legs. Which numbers are these?

⇒ Which spiders have lots of legs and which have only a few?

Secret Word

Your friend chooses a random word out of a dictionary and concentrates on it. Amazingly, you are able to read his mind and reveal the secret word in just a few seconds!

What You Need

- A dictionary with more than 150 pages.
- Paper and pencil.

Preparation

Look at page 108 in the dictionary and memorize the 9th word down in the first column.

What to Do

1. Ask your friend to write any 3-digit number on a piece of paper without letting you see it. Tell him the first digit must be *at least 2 greater* than the last digit. (Example 752)
2. Ask him to reverse the three digits and write this new number (257) below the first number. Tell him to subtract the second number from the first.
3. (752—257 = 495)
4. Tell him to reverse the difference and add this new number (594) to the calculator total. (495 + 594 = 1089)
5. Remind your friend he was free to chooses any 3-digit number. Then when your back is turned, ask him to look at the *first 3 digits* of his final total and turn to that page in the dictionary (108). Next, tell him to look at the *last digit* of his final total and carefully count that many words down in the first column (9). It will be the word that you memorized.
6. Finally, ask him to concentrate on that word for about 10 seconds. You should have no problem 'reading his mind' and revealing the secret word!

Secret—No matter which 3-digit number your friend starts with, the final total will always be 1089.

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What is your favourite number and why?

Three dice are rolled and the scores are multiplied together. The product is 90. What were the scores on the three dice?

Three numbers add up to 14. Multiplied together they come to 84. Find the numbers.

How much earth is there in a freshly dug hole that is 20cm deep, 15cm wide and 45cm long?