

MATH + MAGIC = FUN

Grades 3-5

CONCEPTS COVERED IN THIS PROGRAM:

- Addition, Subtraction, Division, Multiplication
- Fractions, Percentages, Decimals, Decimal Point
- The history of Numerical Systems
- Fibonacci - Leonardo of Pisa
- Zero as a place holder - The Power of Zero

NUMERICAL SYSTEMS

Decimal	0	1	2	3	4	5	6	7	8	9	10
Arabic		١	٢	٣	٤	٥	٦	٧	٨	٩	١٠
Chinese/ Japanese	〇	一	二	三	四	五	六	七	八	九	十
Roman		I	II	III	IV	V	VI	VII	VIII	IX	X
Classical Greek		α'	β'	γ'	δ'	ε'	ς'	ζ'	η'	θ'	ι'

- The decimal system is the system that is used worldwide because of zero - 800 - 1400 AD
- The Hindu-Arabic systems was the first system to use a zero or a dot. 700 - 300 BCE
- Roman Numerals had no zero so writing large numbers was not very efficient.
838 = **XXMXXLVIII**
- The Greeks used the Alphabet with apostrophes to indicate numbers

THE VALUE OF ZERO

Zero is a **PLACE HOLDER**. It holds the value of the number until other numbers are substituted or added....Thus, 100 can become 125 because the zero has held the place value.

For more information google - Numerical Systems

FIBONACCI - LEONARDO OF PISA 1170-1250

Fibonacci was an Italian Mathematician who introduced the Hindu-Arabic Numeral System to Europe. His book, Liber Abaci (Book of Calculations) was written in 1202 AD.

For more information google - Fibonacci



The Power of Zero

TEN	10	10 Seconds
HUNDRED	100	1 min 40 sec
THOUSAND	1000	16 min
TEN THOUSAND	10,000	3 hrs
HUNDRED THOUSAND	100,000	1 day, 3 hrs
MILLION	1,000,000	11 days
BILLION	1,000,000,000	32 years
TRILLION	1,000,000,000,000	32,000 years

If you counted one number every second, this chart indicates how long it would take to count to one trillion.

As human civilizations grew, people had more things to count. People needed to count faster so the system of multiplication was invented.

It is called **“The Times Table”** because it is how many TIMES you count a number. ie. If you count to 2, two times, you get 4.

$$\text{Thus } 2 \times 2 = 4$$

The fastest and easiest way to memorize multiplication facts is to practice counting by 2, 5, 9, 10 (*the easy numbers*).

Then practice 3, 7, 8 (*the most difficult to remember*).

The numbers 4 and 6 follow a repeating pattern in the 2nd digit.

(4, 8, 2, 6, 0) (6, 2, 8, 4, 0)

1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100

TO GET GOOD AT ANYTHING, YOU MUST PRACTICE!



Addition, Multiplication, Subtraction and Division are all Mathematical Operations that can make numbers larger or smaller. Multiplication and Division are a faster way to Add and Subtract. Thus....

If $2 + 2 = 4$ then $4 - 2 = 2$

If $2 \times 2 = 4$ then $4 \div 2 = 2$

If a student masters the multiplication table then they have also mastered the division table.

USING MULTIPLICATION, ADDITION, DIVISION AND SUBTRACTION

Here is a Mathematical Game!

	For Example	Your Number
Think of any number between 1 and 100	<input type="text" value="50"/>	<input type="text"/>
MULTIPLY that number by 2	$\begin{array}{r} 50 \\ \times 2 \\ \hline \end{array}$	$\begin{array}{r} \\ \times 2 \\ \hline \end{array}$
ADD 10 to that number	$\begin{array}{r} 100 \\ + 10 \\ \hline \end{array}$	$\begin{array}{r} \\ + 10 \\ \hline \end{array}$
DIVIDE that number by 2	$\begin{array}{r} 110 \\ \div 2 \\ \hline \end{array}$	$\begin{array}{r} \\ \div 2 \\ \hline \end{array}$
SUBTRACT your original #	$\begin{array}{r} 55 \\ - 50 \\ \hline \end{array}$	$\begin{array}{r} \\ - \\ \hline \end{array}$ YOUR ORIGINAL NUMBER
	<input type="text" value="5"/>	<input type="text"/>

Your number will always be 5

Can you figure out why your number will always be 5?

Can you figure out how to change the game so that your number will always be 10 or 2?



DIVISION, FRACTIONS, PERCENTAGES AND DECIMALS ARE ALL THE SAME THING.

These mathematical operations all describe what happens when we divide something into smaller pieces.

Division	Fraction	Percentage	Decimals
$1 \div 2 =$	$1/2 =$	$50% =$	$.50$
$1 \div 4 =$	$1/4 =$	$25% =$	$.25$
$1 \div 8 =$	$1/8 =$	$12.5% =$	$.125$
$1 \div 3 =$	$1/3 =$	$33.3% =$	$.333$

FRACTIONS

Fractions are generally used for measuring physical things like wood or liquids. It is generally used in the USA which has a measuring system based on feet and inches, cups and pints and gallons.

PERCENTAGE MEAN PER 100. (CENTURY - 100 YEARS)

Percentages are generally used to calculate things having to do with money or probability.
ie. There is a 50% chance of rain tomorrow

DECIMALS

The decimal point (.) allows us to indicate a number smaller than the number 1.

Beware....the Decimal System works backwards

The more zeros **BEFORE** the decimal point the **LARGER** the # will be.

The more zeros **AFTER** the decimal point the **SMALLER** the # will be.

<u>Ten</u>	<u>Tenth</u>	<u>Hundred</u>	<u>Hundredth</u>	<u>Thousand</u>	<u>Thousandth</u>
10	0.1	100	0.01	1000	0.001

Attention - **100** has 2 zeros **BEFORE** the decimal point.
(one hundred)

However - **0.01** has only 1 zero **AFTER** the decimal point.
(one hundredth)

