**MATHS**

**LANGUAGE**

**BOOKLET**

**of**

**Dunhill N.S.**

**This Mathematics Language Booklet has been devised to be used by parents, pupils and staff to maintain a consistent approach to Maths and Mathematical language in Dunhill National School.**

Tables

***Schematic Teaching of Addition Tables***

1. When beginning to learn tables for the first time **+ 0 →**When I add 0, we say, I make no change –“ 0” does nothing –i.e. it’s a lazy number.
2. **+ 1** **→** When I add 1, move forward one or move on one step.
3. **+ 2 →** When I add 2, move forward 2 steps…….and so on for +3, +4……
4. When learning tables we, as a school, will use the Fallon’s Tables Book. (See the language of tables further on in this booklet).
5. Emphasis is also placed on**:**
* **Doubles**  **→** Learning them as number facts, for instance 2+2=4, 3+3=6 etc. all the up to 12+12=24

 4 + 4 = 8

* **The story of 10** – What makes up ten e.g. 3+7=10, 2+8=10, 4+6=10 etc.
* **Commutative Law** **→** 4 + 3 is the same as 3 + 4. 4+3=7 is the same as 3+4=7

 (Buy one get one free)

* **Through ten** **→** 10 + 2 = 12 ; 10 + 4 = 14 etc.
* **Repeated/Skip Counting** in 2’s, 3’s, 5’s, 10’s. For instance skip counting in 2’s – 2, 4, 6, 8, 10 etc. Skip Counting in 5’s – 5, 10, 15, 20, 25 etc.

## ***Subtraction/Take Away Tables***

Usually subtraction begins at the end of 1st Class.

4 – 1 = 3 (Four take away one equals three / Four take one equals three).

Subtraction tables are taught as the opposite of addition.

## ***Multiplication/Division Tables***

* Multiplication/Division will be taught as repeated addition and subtraction.

We begin multiplication at the beginning of 3rd Class.

First tables learned are the two times table, then 4 times, then 8 times. The reason we do it this way is that children can see the relationship between 2, 4, and 8 and they are all even numbers. We then progress to 3, 6 and 9 followed by 5 and 10 & finally 7, 11 and 12.

4 x 6 = 24 - Four multiplied by six equals twenty four / Four by six equals twenty four.

When learning 9 times tables we draw attention to the patterns in the answers. For instance, Up to 10 x 9=90 the two digits in each answer ads up to nine.

e.g 4 x 9 = 36 (3+6=9)

**Emphasis is put on**

* Doubles - 4x4=16, 8x8=64 etc.
* Multiplying by 10 - We stress you put a zero behind the number e.g. 4x10=40 put a zero behind the four to get 40.
* All the answers in multiplication tables 2, 4, 6, 8, 10 and 12 will be even numbers
* All the answers in multiplication tables 5 end in 5 or 0.
* The order of the numbers in multiplication tables doesn’t matter e.g. 4x3=3x4

4x3=12 and 3x4=12.

**Problem Solving**

**1. Developing Problem Solving Strategies:**

Problem solving is the primary function of mathematics education. The child must learn how and when to use the computational skills that he/she develops. In problem solving the most important thing that we teach the child is how to sift out the key information from all the facts that are presented to him/her.

**There are four basic steps to problem solving**:

*1. Understanding the Problem*

 The teacher focuses the pupil’s attention on the relevant information in the problem through the use of questions.

2. *Planning to solve the problem*

 The pupil considers possible ways to solve the problem. The teacher may need to offer suggestions using the whiteboard and by making concrete resources available.

3. *Attempting a Solution*

 The pupil now attempts, through trial and error, to solve the problem.

4. *Consider again*

 The pupil looks at the problem again to check if their solution is what was asked for

**2. Steps towards Problem Solving:**

*In the Junior section of the we will use the RUDE strategy*

R- Read the problem

U – Underline the key word/s

D – Draw a picture/diagram/table of the information you have and what you will need

E – Estimate a possible answer

*Solving the problem in the Senior Classes*

***RAVECCC STRATEGY***

* R - Read the problem
* A – Attend to the key words. Identify key information. Underline the numbers and the key words. Ignore irrelevant information. Discuss the problem
* V - Visualise the problem (Draw a picture if necessary)
* E - Estimate
* C - Choose the numbers/Write a number sentence
* C - Calculate
* C - Check

**Language and methods of each operation**

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| **ADDITION** |
| **Language**Altogether, makes, add, total, sum of, move on, increase, plus, more than, count on, together |
| **Recording** 5 + 3 = 8 5 + 3 8 T U  2 3 + 1 4  \_\_\_\_\_\_\_3 7 T U  2 3 + 4**1** 7 Put small ‘1’ above the line \_\_\_\_\_\_\_1. **0**

Remind children that time is **not** added like tens and units Hrs Mins  3 28  + 2 35  \_\_\_\_\_\_\_\_\_\_\_  5 hr**s 6**3min = 6hrs 03mins  | **Oral*** 5 and 3 together make 8
* 5 plus 3 equals 8

Tens and Units:* Start at the unit side (U)
* 4 and 3 make 7

 Then add the tens side (T)* 1 and 2 make 3

Tens and Units with carrying* Start at the unit side
* 7 and 3 are 10
* 10 is 1 ten and 0 units
* Put 0 under the units line
* Bring over my 1 ten with its family and then add the tens (carry over the ten)

Hours and Minutes:Add the minutes and the hours separately* 35 mins and 28 mins = 63 mins
* 2 hours and 3 hours = 5 hours
* We cannot have an answer greater than 59 mins on the mins side. Here we have 63 mins so we need to convert it to 1 hour and 3 mins

(63 mins = 1 hour and 3 mins) We put the 03 mins in mins side (under the mins) and add on the hour to the hour side to get 6 hours. Our final answer is then 6 hours and 03 mins.  |

**Language and methods of each operation (continued)**

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| **SUBTRACTION** |
| **Language**Subtract, take away, minus, decrease, less than, find the difference (between) |
| **Recording** 5-2=3 5 -2 3  T U 4 9 - 1 8 3 1   T U   4 2  - 1 8  \_\_\_\_\_\_\_\_\_  T U  34 2 Cross out ten and rename - 1 8  \_\_\_\_\_\_\_\_\_ T U  34  12 Change ten to units - 1 8  \_\_\_\_\_\_\_\_\_2 4  T U 4 510 - 2 4 2 6     H T U  4 9  5 010 - 1 2 3 3 7 7  (i) Hrs Mins 3 47 - 2 25 1 hr 22mins  (ii) Hrs Mins Hrs Mins 3 23 2 83 - 1 47 - 1 47 \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_ 1 36 Answer 1 hour and 36 minutes Remind children that time is **not** subtracted like tens and units are.(iii)  Hrs Mins 2 83 3 23 - 1 47 1 36Answer 1 hour and 36 minutes | **Subtraction**5 take 2 equals 3 We begin at the units side. Remember to start at the top. 9 take 8 equals 1. Then we move to the tens side. 4 take 1 equals 3. So the answer is 31. Subtraction with renaming.* 2 take 8, I cannot do
* Take a ten from tens and change to ten units
* Now I have 3 tens and 12 units
* 12 – 8 equals 4
* Then go to the tens and subtract. 3 take 1 = 2
* Your answer is 24.

  Subtraction with a Zero. Renaming.We begin our subtraction by taking away the units. Zero take 4 …we cannot do, so we rename 50. We take a ten from 5 tens leaving 4 tens and add it to the units creating 10 units. The way the question looks has changed but the value of 50 remains. Now we have 40 and 10. (40+10=50). We now take away the units, Ten take 4 equals 6. Then we move onto the tens, 4 tens take 2 tens equals 2 tens. Answer 26. In the case of subtracting from a hundred e.g 400, 700 etc., we again begin with the units. Zero take three is not possible. We rename the 50 as 49 (tens) and add a ten to the Units. (50 tens -1 ten = 49 tens). We have not changed the value of 500 but renamed it as 490 and 10. Now we can subtract as usual. Ten take 3 equals 7 (units). 9 take 2 equals 7 (tens). 4 take one equals 3 (hundreds). When taking hours and minutes we begin with the minutes. 47 take 25 leaves 22 minutes. Then we take away the hours. 3 take two equals 1. The answer is 1 hour and 22 minutesWhen the number of minutes you are taking away is greater we start on the minute side also. 23 take 47, I cannot do. I need to rename an hour. 1 hour is equal to 60 minutes. I take an hour from the hours (3 changes to 2) and rename as 60 minutes and add it to the minutes (23 changes to 83 because 23+60=83). Then you subtract the times as in section (i) above. In 5th or 6th class the pupils may be taught a short cut to section (ii) above. This involves leaving a gap of a line between Hrs and Mins and 3 23. We begin the subtraction question by taking the minutes:- 23 take 47, I cannot do so I cross out 23 and put 83 above it (23 changes to 83 because 23+60=83) and also adjusting the hours appropriately by crossing out the 3 and replacing it by 2 above it (3 changes to 2). Now we take 1hour 47mins from 2hrs 83 mins as we did in section (ii) with a similar answer.  |

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| **MULTIPLICATION** |
| **Language**Multiply, square, power of, product of, of, times |
| **Recording** T U   2 3  x 9 Carry 2 tens above the line \_\_2\_\_\_\_\_\_ 2 0 7 Write 20 T U  2 3  x 41 7  \_\_\_\_\_\_\_\_ 2\_\_\_\_ 1 6 1 (23 x 7) +9 2 **0** (23 x 4**0**) \_\_\_\_\_\_\_\_\_\_\_\_\_ 1 0 8 1 (23 x 47) T U  7. 25  - 1. 5  \_1\_1\_2\_\_3625 7250 \_\_\_\_\_\_\_\_\_10.675  | **Oral**Short Multiplication:* Estimate first
* Start with 9: 9 x 3 is 27
* Put down the 7 and carry the 2
* 9 x 2 is 18
* 18 + 2 = 20. Put down my 20

Long Multiplication:* Start with 7 (using above method): 23 x 7 = 161
* Multiply by 40: Put down **0** and then multiply by 4

 4x3=12 put down the 2 and carry the 1. (The carry for the tens goes above the 47). 4x2=8 plus 1 (the carry) equals 9 * Then add the two answers

(At the initial stages write the explanation in brackets beside each result)Multiplication of Decimals:* Estimate (rounding off to the whole numbers in 5th/6th)
* Ignore the decimal points until the end.
* Multiply by 15 as normal (using the long multiplication method above) before counting the decimal places
* Count the number of decimal places in the sum. You must have the same number of decimal places in the answer. In this example there are three decimal places in the sum and so insert the decimal point three decimal places from **right in the answer**.
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| **DIVISION** |
| **Language**How many go many into, division, divide, split, group, share, into |
| **Recording** 06 R1 3 1 9 or 3 19  0 6 r 1 0123 R.W.C. 19 **2345**  - 19 19 4**4 ×** 2 - 38 38 6**5**  - 57 19 08 × 3 57 Ans. 123 R 8 R.W.C. 1**.**23 19 23**.**37  - 19  04 3  - 3 8 0 57 - 57 00 | **Oral**Short Division:* 3 into 1 won’t go/doesn’t go. Put up/down my ‘0’
* 3 into 19 goes 6 times, 3 × 6 = 18 so there is a remainder of 1 or 1 left over.
* Put up/down my 6r1. Answer 6r1

Long Division:*‘Divide, Multiply, Subtract, Bring Down’* *“Don’t Mention Sums Before Dinner” helps us to remember the steps.*We use estimation strategies to estimate our answer first. Then: **Divide*** 2 divided 19 won’t go/doesn’t go. Put up my 0.
* 23 divided 19 goes 1 time/once.

**Multiply** * Put up my 1 and multiply: 1 x 19 = 19

Place the 19 directly under the 23**Subtract*** 23 – 19 is 4

**Bring down*** Cross out your 4 and bring it down. Draw an arrow to show this. ˅

**Round 2: Divide*** 44 divided 19 goes 2 times/twice

**Multiply*** Put up my 2 and multiply: 2 x 19 = 38

(Do a multiplication sum in rough work column)**Subtract*** 44 – 38 = 6

**Bring down*** Bring down 5. Draw arrow to show this.

**Round 3: Divide*** 65 divided by 19 goes 3 times.

**Multiply*** Put up my 3 and multiply: 3 x 19 = 57

**Subtract*** 65 take 57 equals 8.

**Bring down*** There is nothing left to bring down.

**Check that the remainder is smaller than the divisor**. The answer is 123r8Division of Decimals:* Divide as normal long division ensuring that there are the same number of decimal places in the answer as there are in the sum.
* Place the decimal point directly above the decimal point in the question.
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***GLOSSARY OF TERMS***

**Factor**: A factor of a number is a number that will divide evenly into that number.

Eg. The factors of 12 are: 1, 2, 3, 4, 6 and 12.

 12÷1=12, 12÷2=6, 12÷3=4, 12÷4=3, 12÷6=2, 12÷12=1

**Multiple**: a multiple of a number is that number multiplied by other whole numbers. eg.

5x1 = 5, 5x2 = 10, 5x3= 15, 5x4= 20............so 5, 10, 15 and 20 are all multiples of 5.

**Fraction definitions:**

**Numerator**: This is the number above the line in a fraction, e.g. in ¾, three is the numerator.

**Denominator**: This is the number below the line in a fraction, e.g. in ¾, four is the denominator.

**Improper fraction**: This is when the numerator (no. above the line) is greater than the denominator (no. below the line), e.g. $^{4}/\_{3}$ , $^{9}/\_{4}$ , $^{8}/\_{2}$.

**Mixed number**: A number which comprises a whole number and a fraction, e.g. 2¾

**Simplifying fractions**: When we divide both the numerator and denominator by the same number to write the fraction in lower terms. e.g. $^{2 }/\_{4}$we can divide both numerator & denominator by 2. This simplifies the fraction to ½.

**LCD**: This means the lowest common denominator.

***FRACTIONS***

**1 - Finding a fraction of a number:**

(a) Example: Find ⅜ of 72

We do this using Maths sentences.

First sentence 🡪 $^{8}/\_{8}$ = 72

 $^{1}/\_{8}$ = 9

 $^{3}/\_{8}$ = 27 8 72

 9

 x3

 27

 (b) When the word ‘of’ appears in a fraction sum e.g. this means multiply the fractions

 Find ¾ of ⅓ → ¾ x ⅓

Therefore in fractions - of = multiply

**2 - Given a fraction find the whole number:**

e.g. $^{7}/\_{9}$ of a number is 42 find the whole number.

$^{7}/\_{9}$ = 42

 $^{1}/\_{9}$ = 6

 $^{9}/\_{9}$ = 54

 $^{9}/\_{9}$ = 6 x 9 = 54

**3 – Addition of Mixed Numbers**

Place one Mixed Number under the other. The numbers under the line (the denominators) must be the same. We find the **lowest** common denominator of 6 and 4 which is 12 (both 6 and 4 divide into 12)

The LCD = 12.

 2 $^{5}/\_{6}$ = 2 $^{10}/\_{12}$

 + 3 ¾ = 3 $^{9}/\_{12}$

1. $^{19}/\_{12}$ = 6 $^{7}/\_{12}$ As $^{19}/\_{12} $is an improper fraction (top heavy) it must be renamed. $^{19}/\_{12}$ = 1 $^{7}/\_{12}$

**4 - Subtraction of Mixed Numbers:**

Place the smaller mixed number under larger one. Find the Lowest Common Denominator = 10 (in this example)

 3 $^{1}/\_{5}$ = 3 $^{2}/\_{10}$= 2 $^{12}/\_{10}$

- 2 $^{7}/\_{10}$= 2 $^{7}/\_{10}$ = 2 $^{7}/\_{10}$

 = $^{5}/\_{10} $= ½

As we cannot take $^{7}/\_{10} $from $^{2}/\_{10}$ we need to rename the $^{2}/\_{10}$. We do so by changing/renaming the Mixed Number - 3 $^{2}/\_{10}$ but not its value. We take 1 unit from the 3 units leaving 2 units. We convert the 1 unit to $^{10}/\_{10}$ and add it to the $^{2}/\_{10}$ leaving us altogether with 2 $^{12}/\_{10}$

(which is equivalent in value to 3 $^{2}/\_{10}$). Now we can take away.

**5 - Multiplication of fractions:**

The rule is: multiply the numerator by the numerator and the denominator by the denominator. We may then need to simplify our answer.

Example 1: ½ x ¼ = ⅛ (there is no need to simplify this answer as it is the fraction in its lowest form)

Example 2: ⅜ x ⅔ = $^{6}/\_{24}$

(this is not the fraction in its lowest form so we must simplify. Simplifying a fraction involves dividing the numerator and the denominator by the highest number possible. In this dividing top and bottom by 6)

$^{6}/\_{24}$ can be simplified to ¼

**6 – Division of Fractions:**

*Dividing a whole number by a fraction.*

6 ÷ ⅓ We write 6 as a fraction and it becomes $^{6}/\_{1}$

$^{6}/\_{1}$ ÷ ⅓

We then flip the second fraction to $^{3}/\_{1}$ and we change the sign to multiplication

$^{6}/\_{1}$ x $^{3}/\_{1} $and then multiply giving us an answer of $^{18}/\_{1}$ which then is written as 18.

*Division of a fraction by a fraction*

½ ÷ ¼

Again we flip the second fraction and then multiply

½ x $^{4}/\_{1}$ = $^{4}/\_{2}$ This fraction is an improper fraction (is top heavy) and we need to simplify it by dividing the top and bottom by the biggest number possible. In this case it is 2.

 $^{4}/\_{2}$ = $^{2}/\_{1}$= 2