Maths Language/Procedures

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Language of addition

Junior & Senior Infants	and, makes, is the same as, count on, more (horizontal addition)

1st & 2nd class	* and, =, add, plus = * is, equals, is the same as, the sum of, makes, gives me

3rd class	As above, altogether, more

4th class	As above, extra, total of, amount
5th and 6th classes	As above, whole amount, complete amount, addition, additional

2 + □ = 5

- I have 2 how many more do I need to make 5 (concrete materials)
- I am at 2 how many more steps do I need to take to get to 5 (number line)
- 2 counters and how many more counters = / makes 5
- 2 and what makes 5?
- What do I need to add to 2 to make 5?
- Make a story eg: I have 2 euro I want to buy something for 5 euro how much more do I need?

4
3
start at the bottom 3 and 4 is seven

9
-6
start at the bottom 6
from 9 is 3

Examples:

29
+36

6 and 9 is 15 put down the 5 and carry the 1 ten.
1 and 3 is 4 and 2 is 6

The answer is 65
*Remember to put only one digit in each box

Language of subtraction

Junior & Senior Infants	take away, count back

1st & 2nd	6. *take away, minus, cannot take, from, spent, left, = leaves, *is, equals

3rd	As above

4th	Less or less than, difference

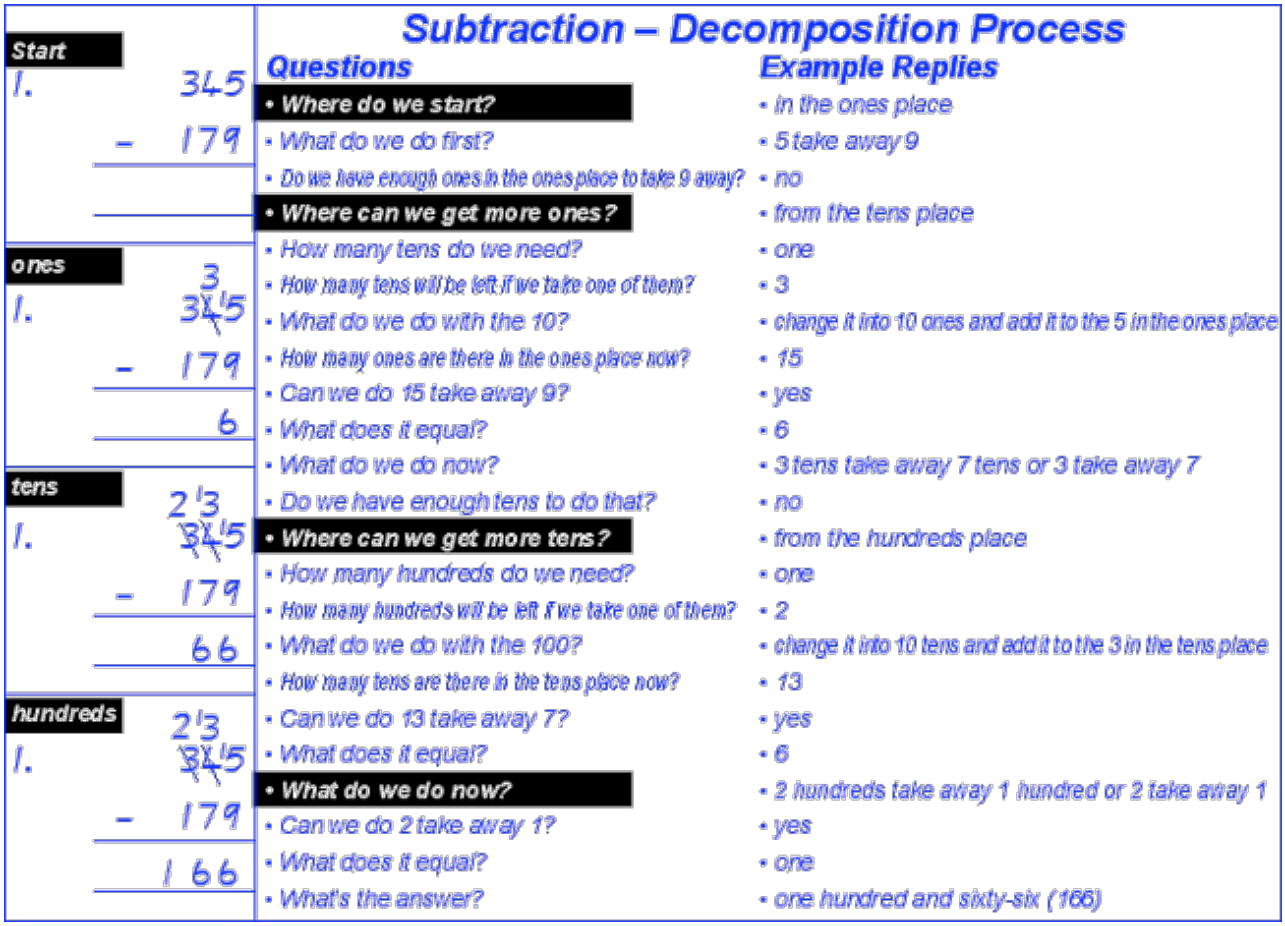
5th-6th	Borrow, pay back, carry, subtraction

T.U.
5 4
-2 7

1. 7 from 4 , I cannot take
2. Take 1 ten from the 5 tens and I have 4 tens left
3. Bring over the 1 ten and it changes to 10 units
4. and 4 is 14
5. 7 from 14 is 7
6. 2 from 4 is 2

H T U
1 0 0
- 9 2 7

- 7 from 0 , I cannot take I look at the tens and I cannot take.
- I take one ten from the hundred and change it into 10 tens
- I bring one of the tens to the units side and I have 9 tens left
- 7 from 10 is 3
- 2 from nine is seven



Language of Multiplication

3rd	X, times, multiplied by, groups of, or just multiples e.g. three two`s equals, are

4th	Factors, product

5th – 6th	`of' multiples of , multiplication

Language of Division

3rd – 4th	÷ *divided by, how many groups / sets of, times can I take away, how many threes in, are, goes, *is

5th – 6th	Dividend, Divisor, Division (Long)

Language of Division

6/264

1. How many 6`s are in 264?
2. How many 6`s are in 2? None
3. How many 6`s are in 26? 4 and 2 left over / remainder 2
4. How many 6`s in 24 ? 4
5. There are 44 6`s in 264 prove using X

Language of Long Division

1. It is school policy that Long Division should be taught according to the method detailed below.
2. It is very important that pupils understand what they are being asked to do when it comes to long division.
3. Example 564 divided by 23 **means** "How many 23s can I get from 564?" or "How many times can I take 23 from 564 ?"
4. Only small numbers should be used in Long Division Samples.
5. The teaching of long division should not be laboured. i.e. a reasonable length of time be devoted to it but time should not be wasted going over and over same.
6. Children should be encouraged to use calculators to check answers.
7. Children who struggle with the concept should be taught how to do long division using a calculator.
8. **Learning Support** time should not be wasted doing Long Division as a method. Use a calculator.

Method

- Estimate
- Multiply
- Subtract
- Bring Down

Repeat four steps as often as necessary.

23)564

Step 1

How many 2s in 5 ? (Two)

Step 2

Multiply 23 by 2 and write the answer under the 56.

Can it be subtracted ? Yes. If not, try again with a lower multiplier).

Put the number you multiplied by (i.e. **2**) in the answer.

23

X**2**

46

Step 3

Sub

tract

2

23)564

-46

10

Step 4

Bring Down next number

```
      2
23 )564
   -46

    104
```

Repeat

Step 1

"How many 2s in 10 (5). "

Repeat

Step 2

23 x5

115

" But 5 times 23 is more than 104."

"Try 4 times"

23 x4

92

"4 times 23 can be subtracted from 104 so put 4 in the answer."

Repeat

Step 3

Subtract

```
 24 23
)564
   -46

    104
    -92

     12
```

"Make sure the remainder is LESS than the number you are dividing by"

"Answer is 24 with 12 left over (remainder)"

"You can get 24 '23s' from 564 and have 12 left over" or
"You can take 23 away from 564, 24 times and have 12 left over"

"No ***Step 4*** this time because you have used all your numbers. "

Language of Tables

$12 \div 3 = 4$

12 divided by 3 is 4

$4 \times 7 = 28$ four sevens
are twenty eight

$10 - 3 = 7$
ten takeaway three is seven

$5 + 9 = 14$
five and nine is fourteen

Activities and Strategies

Algebra

Number pyramids:

Place three digits in the bottom level of the pyramid. Each pair of adjacent digits is added together and the total placed in the square directly above. Continue until you reach the top of the pyramid.
This activity can be further developed by using the same three digits on the base each time and re-arranging them to make different answers in the top of the pyramid. The centre block in the base of the pyramid is the most important. Placing the largest digit in this block will result in the largest total possible and vice versa with the smallest digit.

Example: Put the digits 4,6,9, in the bottom of the pyramid in that order. The next row will read 10 (4+6) and 15 (6+9) and the sum of these two numbers will sit at the top of the pyramid i.e. 25. Now re-arrange those same digits to result in a total in the top block larger/smaller than 25.

Early mathematical activities

Teacher Guidelines page 40

Number

Transition boards:

Used for introducing and demonstrating addition and subtraction with and without renaming/regrouping.

Ref. page 42 Teacher Guidelines.

Estimation Strategies:

Teacher Guidelines pgs 32-34

Calculator Games

Teacher Guidelines pgs 60/61

Wipe-out

Type 35; wipe-out the 5, type number again; now wipe-out the 3.This can be increased to include hundreds, thousands etc depending on relevant number ceiling.

Zap the Digit

A digit is zapped when it is reduced to 0. You have to zap a 3-digit number in 3 inputs, a 4 digit in 4 inputs etc.

"185 zap 8; zap 1; zap 5 472 zap 4; zap 2; zap 7" *Target*

Can only use 4 keys (2,3,x,=) to reach targets of 6,8,9,16,18,36,54, etc.

The Broken Key

"The number 9 key is broken. But we have to do this sum: 85+97; how can it be worked out? (97=100-3) 85+100-3

Missing Digits

93 x 8_ =7_ _8 3_ _4 / 8_ = 48

1_+_1=55 _5_+714=10_1

Missing Operations

(37 _ 21) _ 223= 1000

27 _ (36 _ 11)= 675

Develops an understanding of what each operation does.

Product Pairs

Two spinners with 8 two-digit numbers on each. Roll the spinners and estimate the product. Select the range in which the estimate falls and then check answer on calculator.

Hat-trick

47x8 39x9 64x6 Ans: 384 376 351

Guess which answer belongs to each sum. Then use calculator to check your guesses.

Fractions and Decimals

Suggested materials suitable for teaching these areas include fraction pie pieces, fraction walls, money and lollipop sticks.

<u>Shape & Space</u>

Attribute blocks:

These are also called logic blocks. The following are some ways of using Attribute Blocks.

***Undirected play*:** The children explore, make pictures and sort. Informal discussion to develop awareness of differences and

similarities in the blocks. Children gradually become familiar with the four different attributes of each block, size, colour, thickness and shape. In activities it is advisable to limit the number of blocks available

***Gate game*:** Select a set of blocks. One of the children is chosen to act as a 'gate keeper' who will check tickets. The tickets are attribute blocks chosen by the children. Each child in turn selects a ticket and shows it to the gatekeeper who has secretly decided what he/she will allow to proceed. The first child who can identify correctly what is being collected becomes the new gatekeeper.

Difference of one : Teacher picks a block, describes its four attributes , children select a block which is the same but difference in <u>one</u> way. This could be extended to a difference of 2 /3 /4.

<u>Paper-folding</u>

Teacher Guidelines pg 38

Tangrams

Tangram pictures can be downloaded from a variety of websites (just type in "tangrams" on a search engine) or alternatively the children can construct their own pictures for use in the class. There are also many books available on this area of mathematics. Exploration of the individual tangram pieces is also very useful. Activities include classifying the pieces (according to shape, size, number of sides) and making other shapes using the tangram pieces (use the two small triangles to make a square/larger triangle/parallelogram, use 3 pieces to make a triangle, make a trapezium …)

Language cards

These cards can help to develop an understanding of the terminology of shape and space.

One side of the card holds a word (e.g. equilateral) and the other side has 4 related terms (e.g. sides, triangle, length, same). The four terms can be read out allowing the children to come up with the first word. The cards can be adapted to be used with any class by changing the level of the language used.

Measures

Formula by deduction not by rote:
Get the children to draw four rectangles with no side greater than 4cm. Get them to count the number of squares inside the rectangle.. Through talk and discussion the children discover that the lengths of the sides of their rectangles are multiplied together to equal the number of squares contained within.

Problem-solving

Teacher Guidelines page 35 gives a good overview of problemsolving
Examples of problems which can be solved orally, by drawing pictures or by creating a number sentence for the story. By using different forms of response or by giving different groups ability appropriate numbers this can work particularly well in multi-class situations.

1. I am sitting in company at a round table. I want to share out my 25 sweets, one at a time around the table, so that I get the first and the last sweet. How many are sitting at the table?
2. A farmer rears free-range pigs in a large walled field; she wants to keep them in a pen some of the time, but she has just 24 fence panels, each 1 metre long.
3. Investigate possible arrangements to give the pigs as much space as possible?
4. Mary's age is a multiple of 2; next year it will be a multiple of 3. What age will she be when this happens again? How often does it happen?
5. How long is it between these times?
6. A furniture store sold 16 tables, some with 3 legs and some with 4.
7. The tables had 52 legs in total; how many of each did they sell?
8. My 9 coins look identical but one is lighter than the rest. How can I use a balance twice to find the counterfeit coin?

Sources of Problems

- Pupils' own interests
- Incidents in school/home/locality
- Situations or themes
- Books/websites
- Modify problems used … change the numbers etc.

From Junior Infants – Second Class the children of Scoil Chiaráin are encouraged to use R.D.D. as a problem solving strategy. Read, Draw and Do.

In the Senior Classes, R.U.D.E. is the main problem solving strategy referred to:

R.U.D.E.

R. : Read the word problem at least three times

U.: Underline key numbers and words

D: Draw a picture/table/diagram of the information being presented in the problem

E: Make an estimation as to what the answer may be.

Thinking Strategies

Thinking Strategies and Addition Facts

¬ **Add 0, 1, 2**
Counting on: Children can count on 1 or 2 without overloading their memory ¬ **2+3 = 3+2**
Children need to understand the commutative property of addition

¬ **Adding 10** ¬ **Subtraction is the inverse of addition** ¬ **Doubles**
10 + 6, 10 +8 etc.

5+5, 8+8, 4+4, etc. It is very important for children to know their doubles in order to allow work to be done on near doubles. This is also a good forerunner to multiplication.

¬ **Near doubles** ¬ **Facts of Ten*** ¬ **Adding to 9*** ¬ **Through 10***
This is any sum that is one away from being a double. 8+9, 4+3, etc.

The numbers that add to 10: 6+4, 3+7, 9+1, etc.

One less than 10

Bridging the ten.
*The 10 Frame can be used to teach these three groups.

Thinking Strategies and Multiplication Facts

¬ **Repeated Addition**

¬ **Skip Counting**

Get the children to make up 3 groups using 5 cubes. 5+5+5=15 or 3 groups of 5 is 15

This can be done concretely on the number line or the 100 square before moving towards oral and written work.

¬ **4 x 6 = 6 x 4** Commutative property

¬ **Multiplying by 10**

¬ **Doubles** ¬ **One set more/less**

Doubling the numbers (exponents). 6 x 6, 3 x 3, 7 x 7, etc.

This is a way to teach 4 and 6 times tables but the facts of 5 must be taught first. Therefore the 6 times tables are introduced as one set more than 5, i.e. 5 times 8 is 40 so 6 times 8 is 40 +8 = 48.

In the same way, 4 times tables are one set less.

Addition needs to be well known.

¬ **10s to teach 9s**

9 groups of a numbers is one set less than 10 groups of that number

¬ **9 times tables on the fingers**

¬ **Twice a known fact**

4 x 7: 2 sevens is 14 so twice as much is 28. This can be a useful way of teaching parts of the 2,4,8 and 3,6 times tables.