

Language of Number Operations

Number Operations ~ Addition

Addition Algorithm (Written recording)	Language Used
Junior Infants $3 + 4 = 7$	Junior Infants Three and four altogether makes seven Three and four is the same as seven
Senior Infants $3 + 4 = 7$	Senior Infants Three and/plus four makes seven Three and/plus four equals seven
First Class $3 + 4 = 7$ $\begin{array}{r} 3 \\ + 4 \\ \hline 7 \end{array}$ Explore, develop and apply the: <i>Commutative:</i> $6+2=8 / 2+6=8$ <i>Associative:</i> $(2+3)+5=10 / 2+(3+5)=10$ <i>Zero:</i> $7+0=7$ properties of addition Addition with renaming: $\begin{array}{r} 14 \\ + 9 \\ \hline 23 \end{array}$	First Class Three and/plus four equals seven Start at the top saying " three plus four equals seven" Children are also taught the Commutative Property informally using concrete materials Start at the top on the units side saying "Four plus nine is thirteen. Thirteen is one ten and three units. I put the three in the units place under the line. I put the ten with the other tens. One ten and one ten is two tens. I put the two under the line in the tens place". Note: The one ten is recorded ON the line between the tens and units.

Number Operations ~ Subtraction

Subtraction Algorithm (Written recording)	Language Used
First Class	First Class

Develop an understanding of subtraction as deducting, as complementing and as difference 0-20 e.g.

Deducting:

I had 10 sweets, I ate 3. How many have I left?

Complementing:

There are 10 stickers in a set. I have 4. How many more do I need to make a full set?

Difference:

I have 12 crayons. Mary has 6 crayons. How many more have I? How many fewer has Mary?

Use the symbol '-'

$$\begin{array}{r} 5 \\ -2 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 16 \\ -4 \\ \hline 12 \end{array}$$

Emphasis is placed on subtraction as the inverse of addition.

Subtraction is recorded concretely, orally, pictorially, in number sentences, in jumps on the number line, and on notation boards.

Formal introduction of the symbols occurs only after sufficient oral and exploratory work has been completed.

The meaning of the symbols is discussed frequently. Children are taught that the equals sign does not signal 'the answer comes next' but means 'the same' or 'equivalent'.

Start at the top saying

"Five take away two leaves three. I write three under the line."

Start at the top saying

"Six take away four leaves two. I write two under the line in the units place. One ten take away zero tens leaves one ten. I write one under the line in the tens place."

Second Class

Subtraction with renaming

$$\begin{array}{r} 01 \\ \cancel{1}2 \\ -9 \\ \hline 3 \end{array}$$

Second Class

Start at the top on the units side saying:

"Two take away nine. I cannot do. I need more units. I go to my tens side. I change one ten for ten units. I have no tens left. I bring over my ten units. I had ten units. Now I have twelve units. I can take away. Twelve take away nine leaves 3. I write the three under the line in the unit's side. Zero tens take away zero tens is zero. I write zero under the line in the tens side."

Number Operations ~ Multiplication

Multiplication Algorithm (Written recording)	Language Used
<p>Third - Sixth Class</p> <p>Develop an understanding of multiplication as repeated addition and vice versa</p> <p>Explore, understand and apply the:</p> <p>Zero: $5 \times 0 = 0 / 0 \times 7 = 0$ Commutative: $3 \times 4 = 4 \times 3$ Distributive: $5 \times 4 = (3 \times 4) + (2 \times 4)$</p> <p>properties of multiplication</p> $\begin{array}{r} 6 \\ \times 5 \\ \hline 30 \end{array}$ $\begin{array}{r} 26 \\ \times 5 \\ \hline 130 \end{array}$ $\begin{array}{r} 26 \\ \times 25 \\ \hline 130 \\ + 520 \\ \hline 650 \end{array}$	<p>Third - Sixth Class</p> <p>Emphasis is placed on subtraction as the inverse of addition.</p> <p>Subtraction is recorded concretely, orally, pictorially, in number sentences, in jumps on the number line, and on notation boards.</p> <p>Start at the bottom saying: "Five groups of six equals 30. I write 30 under the line."</p> <p>Start at the bottom saying: "Five groups of six equals thirty. Thirty is three tens and zero units. I put the zero under the line in the units place. I put the three tens on the line to add to the other tens. Five groups of two tens are ten tens plus three tens is thirteen tens. I write thirteen under the line."</p> <p>Start at the bottom saying: "Five groups of six equals thirty. Thirty is three tens and zero units. I put the zero under the line in the units place. I put the three tens on the line to add to the other tens. Five groups of two tens are ten tens plus three tens is thirteen tens. I write thirteen under the line. Five groups of twenty six are one hundred and thirty. What am I multiplying by next? By two tens. Because I am multiplying by a multiple of ten, I put down a zero. Two groups of six are twelve. Two groups of two are four and one is five. Twenty groups of twenty six are five hundred and twenty. Now I must add one hundred and thirty and five hundred and twenty ...".</p>

	<p>Emphasis is placed on the teaching of multiplying by ten and how it changes a number e.g.</p> 6×10 53×10 254×10 <p>Children are taught that when a number is multiplied by ten, the number gets ten times bigger. Each digit is then moved one place to the left.</p> <p>In numbers with a decimal point, it is emphasised that the digits move and the decimal point always remains in the same position.</p>
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Number Operations ~ Division

Division Algorithm (Written recording)	Language Used
<p>Third - Sixth Class</p> <p>Develop an understanding of division as sharing and as repeated subtraction, without and with remainders</p> <p>$6 \div 6 = 1$</p> <p>$12 \div \square = 2$</p> <p>$\square \div 4 = 5$</p> <p>6 $\overline{)32}$ 05R 2</p> <p>25 $\overline{)458}$ 018</p> <p style="text-align: center;">↓</p>	<p>Third - Sixth Class</p> <p>"Six shared between six equals one".</p> <p>"Six divided by six equals one" (Sixth Class).</p> <p>"Twelve shared between how many equals two".</p> <p>"Twelve divided by what number equals two" (Sixth Class)</p> <p>"How many shared between four equals five" or "What number divided by four equals five"</p> <p>"Thirty two shared between six. Can I share three tens between six? I cannot. I write down zero below the line. Thirty two shared between six. Each gets five. There are two left over".</p>

$$\begin{array}{r} \underline{25} \\ 208 \\ \underline{200} \\ 8 \end{array}$$

Children are taught a number of strategies to help them become more efficient when working on long division:

1. Estimation - using rounding
2. Calculating multiples of a number using the front-end strategy

"Four hundred and fifty eight shared between twenty five.

Can I share four hundreds between twenty five?

I cannot. I write zero above the line.

Can I share forty five tens between twenty five?

Yes, each gets one ten. I write one ten above the line.

Twenty five get one ten each - this is twenty five.

I take away twenty five to see how many I have left.

I write twenty five under forty five and I take away.

I bring down my eight units.

Two hundred and eight units shared between twenty five. Each gets eight. I write the eight above the line.

Twenty five get eight units each. This is two hundred.

I take away two hundred to see how many I have left.

I have eight left.

Four hundred and fifty eight shared between twenty five - each gets eighteen and there are eight left over.

The answer is 18 R 8."