East Taieri School

Est 1853

Learning & Growing Together

Maths Information for Parents

Knowledge and Strategy Information for Stages 0/1 to 7

Numeracy & National Standards

The stages of Numeracy are:

Stage 0/1 – Emergent
Stage 2 – Counting from One
Stage 3 – Counting from One by Imaging
Stage 4 – Advanced Counting
Stage 5 – Early Additive
Stage 6 – Advanced Additive / Early Multiplicative
Stage 7 – Advanced Multiplicative / Early Proportional

National Standards:

- After 1 year at school – Achieving Stage 3
- After 2 years at school – Achieving Stage 4
- After 3 years at school – Working at **early** Stage 5
- At the end of Year 4 – **Secure** Stage 5
- At the end of Year 5 – Working at **early** Stage 6
- At the end of Year 6 – **Secure** Stage 6

What does AT and SECURE mean?

- **EARLY** means that the student is beginning to use some of the strategies for that stage, but has not yet fully mastered using them to solve a range of problems
- **SECURE** means that the student is able to use all of the strategies for that stage to solve a range of problems, and picks the one most appropriate for the task

Maths Vocabulary

The vocabulary and language used in maths can vary greatly. It is important that children learn that for each of the 4 operations they are learning, there are many different terms that can be used, but mean the same thing:

Addition (+)	Subtraction (–)
Add More Plus Increase Sum Altogether Join	Subtract Minus Less Take away Decrease Leave Fewer Difference
Multiplication (x)	**Division (÷)**
Multiply Lots of Times Groups of Multiply by Array Repeated Addition Product	Divide Remainder Share Share Equally Groups of Divided by Each

Resources:

We are lucky to have an excellent New Zealand based maths web resource that teachers, parents and students can use. This can be found at: www.nzmaths.co.nz

Basic Facts

Stage 1 - 3:			
Recall addition facts to five: e.g. 3 + 2	Recall subtraction facts to five: e.g. 4-2	Recall doubles to ten: e.g. 3+3, 4+4	Know groupings within 10: e.g. 6+4, 7+3

Stage 4:				
Recall addition facts to 10: e.g. 6+2, 3+?=10	Recall subtraction facts to 10: e.g. 4-3, 7-2	Recall doubles and halves to 20: e.g. 6+6, ½ of 14	Recall 'ten and teen' facts: e.g. 10+6, ?+10=13	Recall multiples of 10 that add to and subtract from 100: e.g. 30+70, 100-60

Stage 5:				
Recall addition facts to 20: e.g. 8+7, 6+9	Recall subtraction facts to 10: e.g. 9-6, 8-5	Recall multiplication facts for 2, 5, 10 times table	Recall division facts for 2, 5, 10 times table	Multiples of 100 that add up to 1000: e.g. 400+600, 300+700

Stage 6:			
Recall addition and subtraction facts to 20: e.g. 9+5, 13-7	Recall all multiplication facts for 3 and 4 times table	Recall all multiplication facts for 6, 7, 8, 9 and some corresponding division facts (3, 4, 5, 6, 7, 8, 9 times table)	Recall basic facts with tens, hundreds and thousands: e.g. 10x100=1000, 20x300=6000

Stage 7:			
Recall division facts up to 10 times table, including remainders: e.g. 72÷8, 35÷4	Know and use divisibility rules for 2, 5 and 10: e.g. 245 is divisible by 5 as the ones digit is a 5	Know and use divisibility rules for 3 and 9: e.g. 471 is divisible by 3 because 4+7+1=12 and 1+2=3	
Identify factors of numbers to 100, including some prime numbers: e.g. the factors of 35 are 1, 5, 7 and 35	Find common multiples of numbers to 10: e.g. the common multiples of 3 and 7 are 21, 42, 63	Recall fraction-decimals-percentages conversions for halves, thirds, quarters, fifths and tenths: e.g. ¾=0.75=75%	Knows some square numbers to 100 and the corresponding roots: e.g. $7^2=49$, so √49=7

Times Tables – the suggested order to learn them in:

- Zero, Ones,
- Twos, fives, and tens
- Fours, threes, and nines
- Sixes, eights,
- Sevens

Knowledge – STAGES 0/1 - 3	

Learning Outcomes Knowledge

The knowledge required for Stages 0/1 - 3…

Students should learn and know the forward and backward counting sequences of whole numbers to 100. This means students will know the forward number word sequence to 100 is the counting pattern of words and symbols, 0, 1, 2, 3, 4... while the backward sequence is the pattern 100, 99, 98, 97... Students will also be able to name the number before and after a given number since this relates to taking an item off or putting an item onto an existing set. Students should also learn and know groupings with five, within ten, and with ten. This means students will learn visual and symbolic patterns for the numbers to ten so they can be recognised without counting, groupings within and with five (for example 2 + 3, 5 + 4), names for ten (for example 6 + 4 therefore 10 – 4), doubles to ten at least (for example 4 + 4), and groupings with ten (for example 10 + 6, 8 + 10 - teen numbers).
NZ Maths Website - http://www.nzmaths.co.nz/elaborations-level-one-number-and-algebra

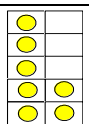
Stage 0 Knowledge

Read numbers to 5 first and then to 10	0, 1, 2, 3, 4, 5 6, 7, 8, 9, 10
Count forwards to 5 first and then to 10	0, 1, 2, 3, 4, 5…10
Count backwards from 5 first and then from 10	5, 4, 3, 2, 1, 0
Say the number after a number (in the range 1- 5)	3, 4, ____
Say the number before a number (in the range 1 – 5)	____, 4, 5
Order numbers to 5 first and then to 10	5 3 1 2 4

Stage 1 Knowledge

Read numbers to 10	7, 6, 8
Count forwards to 10	1, 2, 3, 4, 5,

Count backwards from 10	10, 9, 8, 7, 6
Say the number after a number (in the range 1- 10)	4, 5, ____
Say the number before a number (in the range 1 – 10)	____, 4, 5
Order numbers to 10	5 3 1 8 2 7
Instantly recognise patterns to 5	
Stage 2 Knowledge	
Read any number up to 20	17, 6, 18
Count forwards from any number up to 20	14, 15, 16
Count backwards from any number up to 20	15, 14, 13
Say the number after a number in the range 1- 20	14, 15, ____
Say the number before a number in the range 1 - 20	____, 14, 15
Order numbers to 20	6, 13, 17, 20
Know groupings within 5	3 and 2 4 and 1
Know groupings with 5	 5 and 2
Read symbols for halves and quarters	$^1/_2$ $^1/_4$
Read any number up to 20	17, 6, 18

Stage 3 Knowledge	
Read any number up to 20	17, 6, 18
Count forwards from any number up to 20	14, 15, 16
Count backwards from any number up to 20	15, 14, 13
Say the number after a number in the range 1- 20	14, 15, ____
Say the number before a number in the range 1 - 20	____, 14, 15
Order numbers to 20	6, 13, 17, 20
Skip count forwards & backwards in 2's, 5's & 10's	2, 4, 6, 8, 10……20 5, 10, 15, 20…….50 10, 20, 30. 40….100
Know groupings within 10	7 and 3 6 and 4 8 and 2
Instantly recognise patterns to 10 – doubles and 5 based	 
Know doubles to 10	3 + 3 =6 4 + 4 = 8 5 + 5 = 10
Read symbols for halves and quarters	$^1/_2$ $^1/_4$

Learning Outcomes Strategy

I am learning to solve addition and subtraction problems using…

At this stage these are the key pieces of knowledge that children need to learn.

Strategy	STAGE 1	One to one Counting

Joining

(Addition)

Splitting

(Subtraction)

Strategy	STAGE 2	Counting from One on Materials

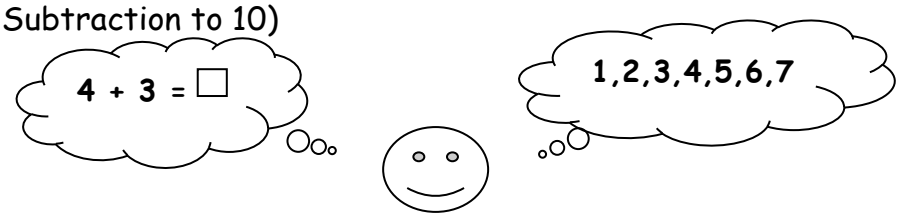
Counting all Objects

(Addition and Subtraction to 10)

Strategy	STAGE 3	Counting from One by Imaging

Counting all Objects

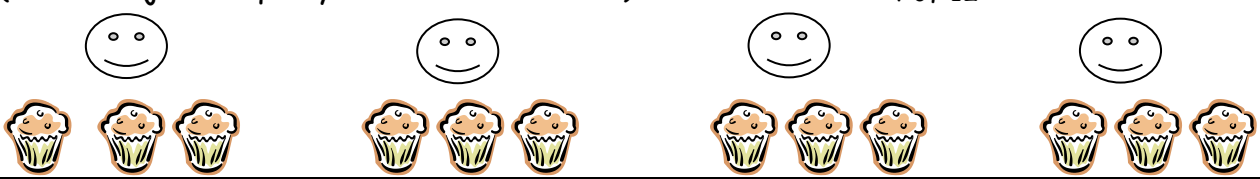
(Addition and Subtraction to 10)



Sharing

(Share objects equally to make $^{1}/_{2}$s and $^{1}/_{4}$s)

$^{1}/_{4}$ of 12 =



Knowledge – STAGE 4	Advanced Counting

Learning Outcomes Knowledge

The knowledge required for Stage 4…

Students will know the forward number word sequence to 100 is the counting pattern of words and symbols, 0, 1, 2, 3, 4... while the backward sequence is the pattern 100, 99, 98, 97... Students will also be able to name the number before and after a given number since this relates to taking an item off or putting an item onto an existing set. Students will learn visual and symbolic patterns for the numbers to ten so they can be recognised without counting, groupings within and with five (for example 2 + 3, 5 + 4), names for ten (for example 6 + 4 therefore 10 – 4), doubles to ten at least (for example 4 + 4), and groupings with ten (for example 10 + 6, 8 + 10 - teen numbers).
NZMaths Website - http://www.nzmaths.co.nz/elaborations-level-one-number-and-algebra

Writing Numbers and Words

Reading the Words and Writing the Numbers:	*Reading the Number and Writing the Words:*
Thirteen = 13 Forty Six = 46 One Third = 1/3	16 = Sixteen 35 = Thirty Five ¼ = One quarter

Counting Forwards and Backwards in 1's

Counting forwards in 1's:	*Counting backwards in 1's:*
13 → 14, 15, 16, 17, 18 etc 28 → 29, 30, 31, 32, 33, 34 etc	15 → 14, 13, 12, 11, 10, 9 etc 23 → 22, 21, 20, 19, 18, 17 etc

Knowing the Number BEFORE and AFTER a number	Continuing a Pattern in 2's, 5's and 10's
____, **11,** ____ = __**10**__, 11**,** __**12**__ ____, **29,** ____ = __**28**__, 29**,** __**30**__ ____, **38**, ____ = __**37**__, 38, __, **39**__	2, 4, 6, __, __ → 2, 4, 6, **8**, **10** 16, 14, 12, __, __ → 16, 14, 12, **10**, **8** 15, 20, 25, __, __ → 15, 20, 25, **30**, **35** 22, 32, 42, __, __ → 22, 32, 42, **52**, **62**

TEEN and TENS Facts	Ordering From Smallest to Largest
7 + 10 = 17 2 + 10 = 12 How many 10's in 30 = 3 How many 10's in 90 = 9	Question – 12, 8, 19, 11, 6 Answer – 6, 8, 11, 12, 19

Doubles and Halves	**Number Bonds to Decade/Hundred Numbers**
Double 3 = 6 Double 8 = 16 Half 10 = 5 Half 18 = 9	1 + 9 = **10** 17 + 3 = **20** 24 + 6 = **30** 80 + 20 = **100**
10's that Add to 100	**Missing Addends**
30 + _____ = 100 → 30 + **70** = 100 50 + _____ = 100 → 50 + **50** = 100 80 + _____ = 100 → 80 + **20** = 100	1 + _____ = 10 → 1 + **9** = 10 _____ + 12 = 20 → **8** + 12 = 20 13 + _____ = 18 → 13 + **5** = 18

Add/Sub Strategy – STAGE 4	Advanced Counting

Learning Outcomes Strategy

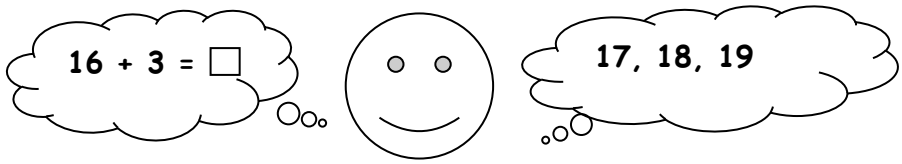
I am learning to solve addition and subtraction problems using…

Students who have mastered **Advanced Counting** will confidently use counting on, or counting back, to solve addition and subtraction problems. Advanced Counting is the most sophisticated of the counting stages and requires students to co-ordinate a number of counting concepts. For example, to solve 18 + 5, students need to: start the count at nineteen and not eighteen, say the next five numbers accurately, know when to stop when the last of the five numbers has been said, and know that the last of the numbers said is the answer. It is crucial that students extend their place-value understanding in preparation for using part-whole thinking to solve addition and subtraction problems.

Book 5 Teaching Addition, Subtraction and Place Value page 28.

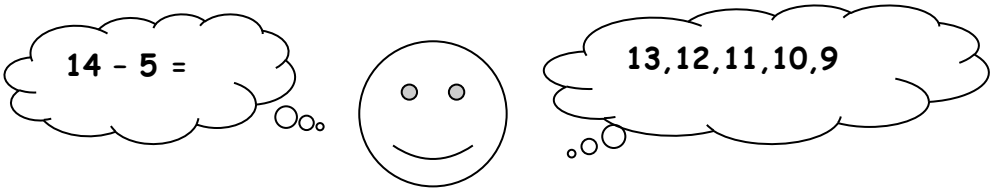
Counting On from the Biggest Number

Start from the largest number and count on… (in head or using materials)



Counting Back from the Biggest Number

Start from the largest number and count back… (in head or using materials)



Adding or Subtracting Groups of Ten

The children know that 34 is 3 groups of 10 and 4 ones

20 + 30 = 50 or 70 – 20 = 50 or 26 + 30 = 56

Rearranging the Equation

Addition is commutative, so the order of the numbers can be rearranged to make counting easier

3 + 11 = 11 + 3

4 + 23 = 23 + 4

3 + 21 + 2 = 21 + 3 + 2

2 + 94 = 94 + 2

Mult/Div Strategy – STAGE 4	Advanced Counting

Learning Outcomes Strategy

I am learning to solve multiplication and division problems using…

Students at the **Advanced Counting** stage for multiplication are learning to use addition strategies to solve problems that could be solved by multiplication and division. It is important that students learn the connection between multiplication and repeated addition, for example, 5 x 4 is the same as 4+4+4+4+4, and that changing the order of the factors gives the same results, for examples, 5 x 4 = 4 x 5 or 5 + 5 + 5 + 5. Students need to know why this commutative property is true and to have generalised this property to relate to larger numbers, e.g. 3 x 99 = 99 x 3.
The students also need to understand two different types of division situations. Equal sharing as in 12 lollies shared between four people, and measuring, as in 12 lollies put into sets (or bags) of three.
Book 6 Teaching Multiplication and Division page 11.

Solve Multiplication Problems Using Repeated Addition

Use repeated addition to solve multiplication problems

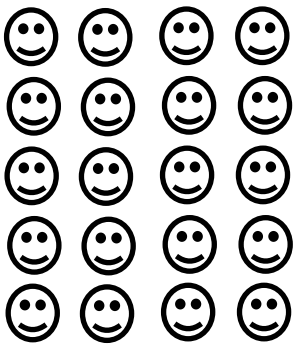
6 x 3 means 6 groups of 3, so 3 + 3 + 3 + 3 + 3 + 3 = 18

2 x 5 means 2 groups of 5, so 5 + 5 = 10

4 x 10 means 4 groups of 10, so 10 + 10 + 10 + 10 = 40

Using Arrays

Understanding in a visual form that there is a connection between repeated addition and multiplication

5 x 4 = 

4 + 4 + 4 + 4 + 4 = 20 **or** 5 x 4 = 20

2 x 7 

7 + 7 = 14 **or** 2 x 7 = 14

Skip Counting to Solve Multiplication Problems

Skip counting in 2's, 5's and 10's

4 x 5 = 20 because skip counting in 5's (5, 10, 15, 20)

7 x 2 = 14 because skip counting in 2's (2, 4, 6, 8, 10, 12, 14)

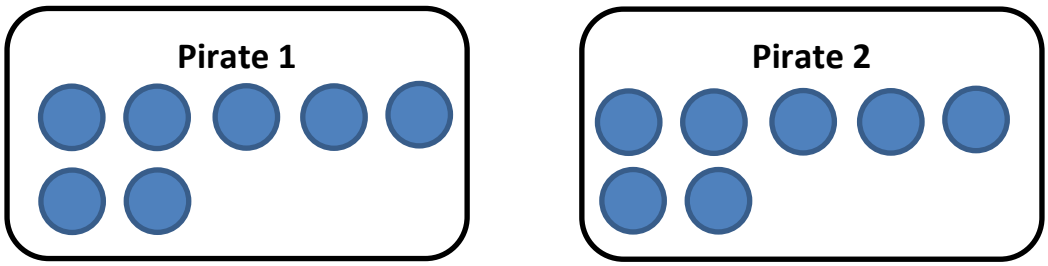
6 x 3 = 18 because skip counting in 3's (3, 6, 9, 12, 15, 18)

6 x 10 = 60 because skip counting in 10's (10, 20, 30, 40, 50, 60)

Equal Sharing

Equally sharing objects into groups

Fourteen coins shared between two pirates (14 ÷ 2 = 7) *because of sharing 14 coins between the two pirates – using materials and then imaging*



Knowledge – STAGE 5	Early Additive

Learning Outcomes Knowledge

The knowledge required for Stage 5…

Students will know the forward number word sequence to 1000 is the counting pattern of words and symbols, 0, 1, 2, 3, 4...1000 while the backward sequence is the pattern 1000, 999, 998, 997 ... At Stage 5 students should know these sequences in multiples of one ten (for example, 358, 348, 338...) and one hundred (for example, 247, 347, 447...) An important part of knowing these sequences is being able to name the number before and after a given number since this relates to taking an item off or putting an item onto an existing set. For example, if a set contains 800 items, 799 items are left if one is removed. This also applies to the sequence in tens and hundreds, for example, ten removed from a set of 503 results in 493 objects left.
NZMaths Website: http://www.nzmaths.co.nz/elaborations-level-two-number-and-algebra

Writing Numbers and Words

Reading the Words and Writing the Numbers:	*Reading the Number and Writing the Words:*
One Hundred and Thirteen = 113	126 = One Hundred and Twenty Six
Nine Hundred and Forty Six = 946	835 = Eight Hundred and Thirty Five
Four Thirds = 4/3	5/8 = Five Eighths

Counting Forwards and Backwards in 1's

Counting forwards in 1's:	*Counting backwards in 1's:*
133 → 134, 135, 136, 137, 138 etc	215 → 214, 213, 212, 211, 210,209 etc
298 → 299, 300, 301, 302, 303, 304 etc	723 → 722, 721, 720, 719, 718, 717 etc

Continuing a Pattern in 10's and 100's

115, 125, 135, ____, ____ → 115, 125, 135, **145, 155, 165**
259, 249, 239, ____, ____ → 259, 249, 239, **229, 219, 209**
234, 334, 434, ____, ____ → 234, 334, 434, **534, 634, 734**
709, 609, 509, ____, ____ → 709, 609, 509, **409, 309, 209**

Write a number 1, 10 or 100 more or less	Order from Smallest to Largest
1 more than 99 = **100**	Q = 5,158 2,565 6,202 1,525
1 less than 766 = **765**	A = **1,525 2,565 5,158 6,202**
10 more than 234 = **244**	Q = $^{6}/_{10}$ $^{1}/_{10}$ $^{9}/_{10}$ $^{4}/_{10}$
100 more than 980 = **1080**	A = **$^{1}/_{10}$ $^{4}/_{10}$ $^{6}/_{10}$ $^{9}/_{10}$**

Rounding to the Nearest 10 or 100	**Skip Counting in 2's, 3's and 5's**
54 to the nearest 10 = **50** 88 to the nearest 10 = **90** 641 to the nearest 100 = **600** 879 to the nearest 100 = **900**	2, 4, 6 → 2, 4, 6, **8, 10, 12, 14** 9, 12, 15 → 9, 12, 15, **18, 21, 24, 27** 35, 40, 45 → 35, 40, 45, **50, 55, 60**
Number Bonds to 100 and 1000	**How Many and Remainders**
30 + _____ = 100 → 30 + **70** = 100 500 + ____ = 1000 → 500 + **500** = 1000 850 + ____ = 1000 → 850 + **150** = 1000	2's in 19 = **9 r 1** 5's in 58 = **11 r 3** 90 ÷ 10 = **9**
Tens and Hundreds	**Missing Addends**
How many 10's in 280 = **28** How many 10's in 560 = **56** How many 100's in 1340 = **13** How many 100's in 5439 = **54**	_____ + 13 = 21 → __**8**__ + 13 = 21 15 + _____ = 24 → 15 + __**9**__ = 24 _____ + 11 = 19 → __**8**__ + 11 = 19

Digit Place Value
741 – The value of the 7 is: 7 Hundreds or 700 683 – The value of the 3 is: 3 Ones or 3 820 – the value of the 2 is: 2 Tens or 20

Add/Sub Strategy – STAGE 5	Early Additive

Learning Outcomes Strategy

I am learning to solve addition and subtraction problems using…

Students who have mastered **Early Additive** part-whole (Stage 5) will confidently use part-whole strategies that utilise their place-value knowledge of tens. They will use doubles initially, then with and through tens strategies. These strategies are both more sophisticated than the use of doubles and generalise to larger numbers, for example, 9+8=(9+1)+7=17 and then 889+8=(889+1)+7=897. *Book5 Teaching Addition, Subtraction and Place Value page 36.*

Doubles and Halves

(Change one number to make a double)

19 + 18 =

19 + 19 = 38 – 1 = 37

(Change one number to make a double)

19 + 18 =

18 + 18 = 36 + 1 = 37

(Using halves for subtraction)

30 – 16 = 30 – 15 – 1 = 14

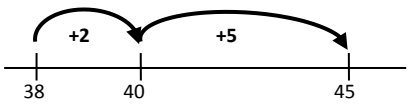
Tidy Numbers – Jumping the Number Line

Addition

(Take 2 from 7 and add it to make 38 into a tidy number - 40)

38 + 7 =

(38 + 2) + 5 = 45

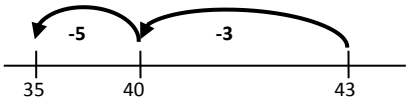


Subtraction

(Take 3 from 43 to make it to 40, then take 3 from the 8 to make it 5, then take 5 away from 40)

43 – 8 =

(43 – 3) – 5 = 35



Place Value

Addition – *adding ones and tens*

55 + 37 = (50 + 30) + (5 + 7) = 92 or

124 + 142 = (100 + 100) + (20 + 40) + (4 + 2) = 266

Subtraction – *subtracting ones and tens*

98 – 56 = 98 – 50 = 48 – 6 = 42 or

145 – 32 = 140 – 30 = 115 – 2 = 113

Note:

These strategies are often not used exclusively on their own when solving a problem. The children may use a combination of these strategies; the important concept is that they understand how to use each of the strategies and that they can independently pick the best strategy/strategies to use.

Mult/Div Strategy – STAGE 5	Early Additive

Learning Outcomes Strategy

I am learning to solve multiplication and division problems using…

Students at the **Early Additive** stage are learning to derive their multiplication facts. This means that they can apply a range of addition and subtraction strategies to work our unknown multiplication facts from those they already know. They need to know that 5 x 4 gives the same answer as 4 x 5 (commutative property – changing the order of fractions), 5 x 6 = 30, so 6 x 6 = 36 (distributive property – splitting the factors), 4 x 10 = 40, so 8 x 5 = 40 (associative property/proportional adjustment – doubling and halving) and 36 ÷ 4 can be answered by solving 4 x ? = 36 (reversibility). Importantly children **MUST** know their multiplication basic facts up to at least 10 x 10.
Book 6 Teaching Multiplication and Division page 24.

Repeated Addition

Using addition facts to solve multiplication problems

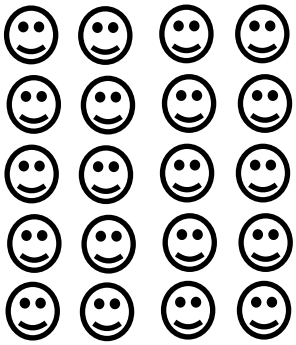
2 x 6 = 6 + 6 = 12 **SO** 3 x 6 = 12 + 6 = 18 **SO** 4 x 6 = 18 + 6 = 24

4 x 5 = 5 + 5 + 5 + 5 = 20 **SO** 5 x 5 = 20 + 5 = 25 **SO** 6 x 5 = 25 + 5 = 30

Using Arrays

Understanding in a visual form that there is a connection between repeated addition and multiplication

5 x 4 =



4 + 4 + 4 + 4 + 4 = 20 **or** 5 x 4 = 20

2 x 7

7 + 7 = 14 **or** 2 x 7 = 14

Change the Order

Commutative Property – changing the order of the equation

5 x 6 = 6 x 5

9 x 2 = 2 x 9

Fun with Fives

Distributive Property – using the five times tables to solve the 6, 7 8 and 9 times tables.

8 x 6 = (8 x 5) + (8 x 1) = 40 + 8 = 48

6 x 7 = (6 x 5) + (6 x 2) = 30 + 12 = 42

9 x 8 = (9 x 5) + (9 x 3) = 45 + 27 = 72

6 x 9 = (6 x 5) + (6 x 4) = 30 + 24 = 54 **or** 6 x 9 = (6 x 10) – (6 x 1) = 60 – 6 = 54

Doubles and Halves

Associative Property / Proportional Adjustments – using the double and halve strategy

4 x 10 = 40, SO 8 x 5 = 40 (double the 4 = 8, halve the 10 = 5)

3 x 8 = 24, SO 6 x 4 = 24 (double the 3 = 6, halve the 8 = 4)

Reversibility

Using multiplication to solve division/sharing problems

36 ÷ 4 can be solved by changing the equation to 4 x ? = 36, so 4 x 9 = 36

12 ÷ 3 = ?, so 3 x ? = 12 or ? x 3 = 12, so 3 x 4 = 12

Learning Outcomes Knowledge

The knowledge required for Stage 6…

Students will know the forward number word sequence for whole numbers is the counting pattern of words and symbols, 0, 1, 2, 3, 4..., ∞ (infinity) while the backward sequence is the pattern 1000 000, 999 999, 999 998, 999 997... beginning with any whole number. At Stage 6 students should know these sequences in multiples of one, ten, for example 358, 348, 338..., one hundred, for example 247, 347, 447..., one thousand, etc. An important part of knowing these sequences is being able to name the number before and after a given number since this relates to taking an item off or putting an item onto an existing set, for example If a set contains 43 560 items, 43 559 items are left if one is removed and 43 561 items are in the set if one is added. This also applies to the sequence in tens, hundreds, thousands, etc. for example ten thousand removed from a set of 701 000 results in 691 000 objects left. At Stage 6 students should also have experience with counting sequences in tenths, for example 4.6, 4.7, 4.8, 4.9, 5...
NZMaths Website - http://www.nzmaths.co.nz/elaborations-level-three-number-and-algebra

Writing Numbers and Words

Reading the Words and Writing the Numbers:

Three Hundred and Thirty Thousand, One Hundred and Thirteen = **330,113**

Nine Hundred Thousand and Forty Six = **900, 046**

Nine Eighths = **9/8**

Reading the Number and Writing the Words:

10,626 = **Ten Thousand, Six Hundred and Twenty Six**

678,412 = **Six Hundred and Seventy Eight Thousand, Four Hundred and Twelve**

Write a number 1, 10, 100 or 1000 more or less

One less than 500,000 = **499,999**

One more than 789,999 = **790,000**

Ten more than 111,171 = **111, 181**

100 more than 903,439 = **903, 539**

1000 less than 800,000 = **799,000**

Order from Smallest to Largest

Q = 552,155 525,525 555,225 555,522

A = **525,525 552,155 555,225 555,522**

Q = 1/9 1/ 3 1/8 1/4 1/2

A = **1/9 1/8 1/4 1/3 1/2**

Round to the Nearest 10, 100, 1000 or Whole Number	**Complete the Pattern – Decimals and Fractions**
87 to the nearest 10 is **90** 453 to the nearest 100 is **500** 6390 to the nearest 1000 is **6000** 4.7 to the nearest whole number is **5**	3.5, 4.5, 5.5 → 3.5, 4.5, 5.5, **6.5, 7.5** 6.03, 6.13, 6.23 → 6.03, 6.13, 6.23, **6.33, 6.43, 6.53** ¾, 1, 1 ¼ → ¾, 1, 1 ¼, **1 ½, 1 ¾, 2**
Number Bonds to 100 and 1000	**How Many and Remainders**
_____ + 38 = 100 → __**62**__ + 38 = 100 28 + ____ = 100 → 28 + __**72**__ = 100 35 + 65 = _____ → 35 + 65 = __**100**__ 496 + __ = 1000 → 496 + _**504**_ = 1000	5's in 85 = **17** 5's in 63 = **12 remainder 3** 100's in 3516 = **35 remainder 16** Tenths in 3.60 = **6**
Tens, Hundreds and Thousands	**Adding Fractions**
112 x 100 = **11,200** 10 x 46 = **460** 80 x 1000 = **80,000**	½ + ½ + ½ + ½ = **2** 1/3 + 1/3 + 1/3 + 1/3 = **1 1/3** 1/10 + 1/10 + 1/10 + 1/10 = **4/10**
Write the Percentages for:	**Digit Place Value**
½ = **50%** ¼ = **25%** 1/10 = **10%**	The value of 3 in 32,560 = **30 Thousand or 30,000** The value of 5 in 365,784 = **5 Thousand or 5,000** The value of 7 in 3,798,802 = **7 Hundred Thousand or 700,000**

Add/Sub Strategy – STAGE 6	Advanced Additive

Learning Outcomes Strategy

I am learning to solve addition and subtraction problems using…

At Stage 6 students will use a range of additive and simple multiplicative strategies with whole numbers, fractions, decimals, and percentages. **T**his means students will use a range of mental strategies based on partitioning and combining to solve addition and subtraction problems with multi-digit whole numbers and simple decimals (tenths). Students should know the decimals and percentage conversions of simple fractions (halves, quarters, fifths, tenths) and use these to solve simple percentage of amount problems, for example 50% is fifty out of one hundred. 50% is one half so 50% of 18 is 9 or five is half of ten.
NZMaths Website - http://www.nzmaths.co.nz/elaborations-level-three-number-and-algebra

Rounding and Compensation

$$\overset{-2}{25} + \overset{+2}{38} =$$

(Take 2 off 25 to make 38 into 40)

23 + 40 = 63

Addition and Subtraction are Inversely Related

(Change the operation to make it easier to solve)

72 – 45 = ? as 45 + ? = 72

Or

142 – 67 = ? as 67 + ? = 142

Compatible Numbers

77+27+23=

(77+23) +27= 127

35 + 78 + 65 =

(35 + 65) + 78 = 178

Equal Additions

(Add the same number to both sides)

$$\overset{+2}{33} - \overset{+2}{18} =$$

(33 + 2) – (18 + 2) =

35 – 20 = 15

Near Doubles

267 + 263 = 263+263
= 526+4
= 530

503 + 508 = (503 + 503) + 5 =1011 **or** (508 + 508) – 5 = 2011

Place Value

235 + 164 = (200 + 100) + (30 + 60) + (5 + 4) =399

668 – 476 = 668 – 400
= 268 – 70
= 198 – 7
= 192

Algorithm – taught ONLY when all other strategies are secure

25
+98
13 → (5 + 8)
110 → (20 + 90)
123

Note:
These strategies are often not used exclusively on their own when solving a problem. The children may use a combination of these strategies; the important concept is that they understand how to use each of the strategies and that they can independently pick the best strategy/strategies to use.

Add/Sub Strategy – STAGE 7	Advanced Multiplicative

Learning Outcomes Strategy

I am learning to solve addition and subtraction problems using…

Students who are working at Stage 7 – Advanced Multiplicative, will confidently choose between, and apply a range of strategies to solve addition and subtraction of decimal numbers, fractions and integers. By looking carefully at the numbers presented in the problems, students will flexibly choose and use mental strategies.

Ideas that are developed in Stage 7:

- **Adding or subtracting fractions requires and understanding of equivalent fractions**
- **Addition and subtraction problems involving decimal numbers can be solved with the same mental strategies as those used for problems with whole numbers**
- **The same 'ten for one' or 'one for ten' canons that apply to whole numbers apply to decimal numbers**
- **Decimal fractions are vital for solving problems of measurement and sharing problems in the real world**
- **Integers are introduced through contexts such as bank balances and temperature**

Book 5: Teaching Addition, Subtraction and Place Value.

Mult/Div Strategy – STAGE 6	Advanced Additive

Learning Outcomes Strategy

I am learning to solve multiplication and division problems using…

Students at Stage 6 Advanced Additive are developing a broad range of multiplication and division strategies. This requires development of a diverse range of strategies and the transfer of these strategies to division.
Children at this stage need to be able to instantly recall their multiplication basic facts and know their division facts to the 10 times tables.
Book 6 - Teaching Multiplication and Division, page 41

Deriving Facts

(Use known tables and add)

2 x 6 = 12 so 3 x 6 = (12 + 6) = 18

5 x 7 = 35 so 6 x 7 = (35 + 7) = 42

Using Reversibility

(Change the operation to make it easier to solve)

36 ÷ 4 = ?

4 x ? = 36

Halving and Doubling

(Halve one side and double the other)

double		halve
4	x	18 = 72
8	x	9 = 72

24 ÷ 4 = 6 so 24 ÷ 8 = 3

36 ÷ 3 = 12 so 36 ÷ 6 = 6

Multiplying 10s

6 x 5 = 30 so

6 x 50(5 tens) = 300

Algorithm

9 x 28 =

28

X9

72 → (9 x 8)

180 → (9 x 20)

252

Place Value

6 x 18 = (6 x 10) + (6 x 8)

60 + 48 = 108

Division using pen and paper

$36 \div 4 = 4\overline{)36}$ (9)

$84 \div 4 = 4\overline{)84}$ (21)

Dividing with Remainders

$21 \div 4 = 4\overline{)21}$ (5 r1 or 5 r1)

East Taieri School

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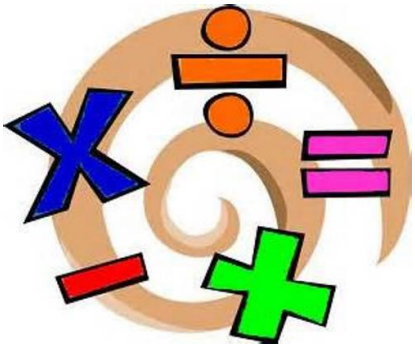
Learning & Growing Together

Some Ideas for Helping Your Child with Numeracy at Home



Activities to do at home with Emergent children (Stage 0):

At this stage counting is the most important skill to master. Counting is learnt through repetition, so take lots of opportunities to rote count (just saying the numbers) and counting objects. Count with your child, and help them count right up to 100, or demonstrate it to them so that they hear the patterns of the numbers. Children can begin to explore the number of fingers on their hands and show numbers to 5 on them, perhaps more.

Practise counting up to 10 eg number rhymes “Ten Little Indians”, “Once I caught a fish alive” etc.

Practise counting down from 10 eg a rocket blasting off. “Ten Fat Sausages” song.

Watch children’s programmes as often there is counting or a number focus.

Count groups of objects eg how many knives, forks, spoons on the table, buttons on shirts, counting the number of stairs you’re walking, counting how long it takes to do things e.g. to walk to the door, get undressed for a bath, have a drink.

Look at the calendar to see the number today is. What number was it yesterday? What will it be tomorrow?

Look at the numbers on letter boxes.

Learn the child’s phone number and read it as well.

Practise showing numbers on fingers eg “Show me 5 fingers (hi five!), show me 2 fingers,” etc.

Play ‘Snap’ and dominoes – these help the children count in a fun way and see similarities.

Activities to do at home with One to One Counting children

(Stage 1):

These children can count a small group of objects but have not yet learnt to add two numbers together. At this stage finger patterns to 10 are a very important tool to have (you always carry your fingers with you and don't need a container of counters). Support your child with these activities. They are not yet ready to do them by themselves.

Continue becoming proficient at showing numbers to 10 on fingers. "Show me 5 fingers (high five!), show me 7 fingers," etc.

"Show me 3 fingers on one hand and 2 fingers on the other hand. How many altogether?" *(Help the child count from one to find out. They will not yet be able to start from 3 and count on).*

Show the child 5, 3, 7, 8, etc fingers on your hands and see if they can tell you how many there are. As they get more proficient at this they may recognize patterns instantly. *Build up to five fingers on one hand first, then some more eg 7 will be one whole hand and 2 more. This helps the children see patterns more quickly and will link to the tens frames and other representations of numbers by building to 5 first at school.*

Three big plates on the table and three small plates. How many plates altogether?

(Count from one)

Practise counting up to 10 eg number rhymes "Ten Little Indians", "Once I caught a fish alive" etc.

Practise counting down from 10 eg a rocket blasting off. "Ten Fat Sausages" song.

Look at the calendar to see the number today is. What number was it yesterday? What will it be tomorrow?

Look at the numbers on letter boxes.

Learn the child's phone number and read it as well.

Use everyday happenings to discuss numbers – counting people, food, cars in the driveway, wheels on the cars, etc.

Include subtraction with addition. We have 9 muffins. How many will be left when we have eaten 2? Find out by eating 2 muffins to see if you were right!

Halve and quarter oranges and apples and name the pieces. Count how many quarters there are in two apples when cut, etc.

Activities to do at home with Counting From One on Materials children (Stage 2):

These children can now solve addition and subtraction problems to 10 using their fingers, by counting from the first finger. They now need to learn to hold an image of these numbers in their head. They will need patience and support to do this. They can now explore problems with bigger numbers – to 20, and start to group objects into tens to learn about our place value system.

Cut up a calendar so that you have the numbers to 31. Help the child to reassemble the numbers into the right order (you could start with smaller sections first eg 1 – 10, 1 – 20, etc) Use a complete page of a month to check whether it's correct, or use a complete month to use as a guideline. Count the numbers and point to each number in order. Count backwards while pointing to the numbers. Cover up some numbers and see if the child can tell you what they are. E.g. cover 15. The child might count from one to find out, or just know. Uncover the number to see if they were right.

Use fingers to learn the groupings to 5. eg 2 and _?, 4 and _?, 3 and _? And groupings to 10: "How many more do we need to make ten? We have 6; we have 8; we have 2, etc"

Pizza night! "We have 2 pizzas cut into 6 pieces each. How many pieces altogether? How many will the 4 of us have each if we share them evenly?" Do it with your child to find out.

"Nana gave us 20 lollies. Two people will get half each. How many is half of 20?" Share the lollies out to find out.

Use fingers to solve addition and subtraction problems to 10, then when really good at that, do it on your fingers behind your back. Check if you're right by looking at the fingers afterwards.

Activities to do at home with Counting From One by Imaging children (Stage 3):

These children can now hold numbers in their heads without having to look at all the objects and need to learn to **count on** eg 9 + 4 – is 10, 11, 12, 13 (counting from the 9 now and not from one) and **back down** for subtraction eg 12 – 3 is 11, 10, 9. It is important that the second number added is no bigger than 4 while learning this skill, as it is the optimum number that can be kept track of in their head. Children can keep track of what they're adding on either by their fingers or in their head.

Count with or for your child in 10s to 100, 2s to 20 or more, 5s to 50 or more. Then back again. Write the numbers down so the child can use them as a guide.

Keep skip counting in 2's, 5's 10's etc. To work out three 2's, use fingers to track – 2, 4, 6. Or use pictures cut out and group into twos etc.

Board games eg snakes and ladders, etc help counting on because the child moves the counter from the number they're on (at earlier stages children want to move right back to one each time they have a turn as they don't yet understand about 6 more, 4 more, etc)

Bundle iceblock sticks with pipe cleaners into 10s, or haricot beans (uncooked!) into empty film canisters (these are often freely available at photo shops) to see how many there are. Count the 'tens' in tens and the ones left over in ones. Start with numbers up to 40 or so. Start calling the bundles of ten 'a ten'. "Let's get 30 sticks. How many bundles of 10 will that be? How many tens have we got here? How many is that altogether?"

Play a game with 2 dice and the iceblock sticks or haricot beans and film canisters. Roll the dice and work out how many has been thrown. Collect that number of sticks or beans. The rule is that every time you have ten they must be bundled up or put in the canister. Keep playing and see who gets the most. (*Often interesting talk will be generated by this game as the children work out who has got the most, how many more they need to have the same number, etc. As adults we can generate this talk without dominating the game too much, to keep the game fun.)*

Activities to do at home with Advanced Counting children

(Stage 4):

These children are now heading towards the transition to Part-Whole thinking. They may have trouble believing there are strategies beyond 'counting on', as counting on is a milestone in itself and the children are often very proud they have reached this stage! We now need to let them know that they're very clever at counting on, but now they need to use the knowledge they have of numbers to try to use other clever ways to add numbers. This is a very difficult and lengthy transition to make so remain patient and support the child's efforts. It may take a while.

Part-Whole thinking is the ability to split numbers into parts and rejoin them to solve sums, without having to count on or back in ones, etc.

Eg working out 9 + 4 by just knowing that 9 + 1 = 10, so we can take one from the four and add it to the 9, making ten, then we'll have 3 left.

Or, 8 + 7 = 15 because if I know that 8 + 8 = 16 off by heart, I can take one off to get the answer, because 7 is one less than 8.

So in order to use these strategies the child needs to have certain knowledge

eg Know their doubles to 20 off by heart (6+ 6, 7 + 7, 4 + 4, etc)

Know combinations to 10 off by heart (7 + 3, 2 + 8, 9 + 1, etc)

Know 10 + some more off by heart (10 + 2 = 12, 10 + 6 = 16, etc)

When playing board games see if the child can work out which number they're going to land on without having to move space by space. Eg I'm on 26 and I've thrown a 5. Where will I land?

Games such as Ludo and backgammon can involve split moves. Eg instead of moving one counter 6, they could move another counter 4 and another 2.

Continue playing grouping to 10 games with iceblock sticks or haricot beans, etc (mentioned in 'Counting From One By Imaging' section.) Try using 3 dice to make adding the totals a little more challenging.

Board games could be played using two multi-sided dice so that the children are adding bigger numbers together.

Practise basic facts – doubles (4 + 4, 9 + 9, etc), facts to 20 (eg 16 + 4, 2 + 12, 9 + 11)

Practise counting forwards to 100 and back to 0 again (or lower!), counting in 2s 5s 10s.

Use the odometer reading of the car to practise reading large numbers. See how many kilometres were travelled on a long trip.

Activities to do at home with Early Additive Part-Whole children

(Stage 5):

Early Additive children have now become capable of part-whole thinking. Part-Whole thinking is the ability to split numbers into parts and rejoin them to solve sums, without having to count on or back in ones, etc.
Eg working out 9 + 4 by just knowing that 9 + 1 = 10, so we can take one from the four and add it to the 9, making ten, then we'll have 3 left.
Or, 8 + 7 = 15 because if I know that 8 + 8 = 16 off by heart, I can take one off to get the answer, because 7 is one less than 8.

Car journeys – we've travelled 25 km today. If we travel that far tomorrow, how far will we have gone? If we'd stopped 8 km back, what would the odometer reading be? (Children at this stage might mentally solve the problem by using 25 – 5 –3 = 17. Taking away 5 first takes us to a 'tidy' number of 20, then their basic fact knowledge should help them know that 20 – 3 = 17. Because they are part-whole thinkers they know that the 8 can be split into 5 and 3 to make working out the problem easier.)

Explain to your child the strategies you are using to work things out as they occur. You may be surprised by the number of mental strategies you have. See if your child can use your strategy and you use theirs. See if they can think of other ways it could be worked out. E.g. when shopping, you may have bought something for $12 and something for $9. How would you work out the total in your head? You may know that $12 and $8 is $20, then one more is $21. Or that $9 + $9 = $18, and $3 more is $21.

Children at this stage need to learn a lot about the Base Ten nature of our number system.

Continue playing grouping to 10 games with iceblock sticks or haricot beans, etc (mentioned in 'Counting From One By Imaging' section.) Try using 3 dice to make adding the totals a little more challenging.

Continue checking doubles to 20 (4 + 4, 9 + 9, 14 - 7 etc) have been remembered and facts to 20 (eg 16 + 4, 2 + 12, 9 + 11, 17 - 4)

Practise automatically knowing facts from the 2, 5 and 10 times tables (multiplication and division) , and beginning to learn counting patterns and groupings for the others eg 3's, 4's etc, forwards and backwards.

Take opportunities to share your maths strategies with your child and encourage them to share their own. Play board games and card games together– crib, 500, etc.

Never say "I was no good at maths at school". This gives children the idea that maths is not fun or interesting and could affect their attitude. Even if we as adults have negative memories of maths, we should try to be positive about it. Remember, the way we were taught may have been quite different to the way maths is taught in schools today. And you may be far better at maths than you realise!

Activities to do at home with Advanced Additive Part-Whole children (Stage 6):

Advanced additive children use a variety of ways to solve and estimate the answers to addition and subtraction problems. They see numbers as whole units in themselves but are also able to split numbers up and see lots of possibilities for subdivision and recombining.

Children working at this stage need lots of reinforcement of their basic facts both in addition, subtraction, multiplication and division.

Making small flash cards of all the basic facts and then putting them into piles of those you know and those you don't' know. Work on the pile you don't know, gradually getting that pile less.

Continue reading large numbers up to trillions. Use the odometer of the car and read these numbers. What is one more? One less? Ten more? Twenty more? A hundred less? A hundred more?

Gather some decimal numbers from magazines, newspapers, advertising flyers etc. Place these in order. Be careful to use more than just prices. Do the same with fractional numbers.

Use the car sales pages or house sale pages in a Saturday paper and get the children to say and then order some large numbers. Which is the most expensive car? The cheapest?

Activities to do at home with Advanced Multiplicative Part-Whole children (Stage 7):

Advanced Multiplicative Part-Whole thinkers use a variety of ways of partitioning, manipulating and recombining numbers to solve problems.

Using flash cards of the basic facts get the children to state what the basic family of facts are.

8 x 4 =, ☐	☐ x 4 =32	4 x ☐ = 32
4 x 8 =, ☐	☐ x 8 = 32	8 x ☐ = 32
32 ÷ 4 = ☐	☐ ÷ 4 = 8	32 ÷☐ = 4
32 ÷ 8 = ☐	☐ ÷ 8 = 4	32 ÷☐ = 8

Use addition and subtraction facts as well.

3 + 6 = ☐	☐ + 6 = 9	3 + ☐ = 9
6 + 3 = ☐	☐ + 3 = 9	6 + ☐ = 9
9 – 6 = ☐	☐ – 6 = 3	9 - ☐ = 3
9 – 3 = ☐	☐ – 3 =6	9 - ☐ = 6

Gather some decimal numbers from magazines, newspapers, advertising flyers etc. Place these in order. Be careful to use more than just prices. Do the same with fractional numbers.

Use the car sales pages or house sale pages in a Saturday paper and get the children to say and then order some large numbers. Which is the most expensive car? The cheapest? What is the difference between the two?

Some Questions You Can Ask Your Child's Teacher to Support Your Child's learning

What is my child learning now?

What will they be learning next?

What is my child good at?

Are they struggling with anything?

How do you know this?

What can I do to help my child progress?

Can I see some of my child's work?