Spring Farm Public School

Parent Support Kit

Numeracy Expectations

For Stage Two Children

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Introduction to Parent Support Kit in Numeracy

Maths is everywhere! This kit can help you and your child to make real-life connections to what they're learning in the classroom. When children see, hear and use maths in real life, it gives their learning purpose. Use maths whenever you see the chance! Play maths games in the car. Involve the kids when you're cooking, shopping or budgeting. Add up the footy and cricket scores together. Talk about fractions as you serve food.

This parent support kit in numeracy is designed to help parents understand what children learn in each grade. At school, teaching is adjusted for the needs of each student. Children who show they have the skills listed in this kit will be working at grade level and assessed as sound. This parent support kit uses parent-friendly language to explain the skills that children work to achieve by the end of each grade. We hope it empowers parents to help their children, and to participate in their child's education.

We know that every family is busy! The activities here are simple and straightforward. Any numeracy work you do at home with your child will help them in their learning. Your child's education is a partnership. Let's work together ...

How to use this kit

This parent support kit:

- lists and explains the skills of children working towards a sound level
- shows ways to develop that skill with your child, including links to online resources like videos and games.

Watch the videos to gain a deeper understanding of the skill. Work through the activities with your child. The suggestions here are a drop in the ocean – the internet has thousands! Use these as a starting point, and change them as you like.

Use the kit whenever and however you can! Your child will be working towards these skills all year. You might like to review the kit each term, or more regularly. If you have any questions about your child's learning, always talk to their teacher. Remember – we're all in this together!

Where do I learn more?

The key skills listed in this parent support kit are taken from the NSW Standards and Education Authority's (NESA's) Mathematics K-6 continuum of key ideas. You can find the complete mathematics syllabus for every grade at the NESA website.

Icon Key

Definitions are indicated by this icon throughout the kit. Lots of the definitions we use come from School A to Z

Why is it important? Next to this icon, you'll see 2 types of explanations:
1. Why this particular skill is important in the real world or for what children will be learning later on
2. Tips to help with learning

A closer look: This icon points the way to:

- an activity to help develop the skill or concept using familiar language for your child
- handy tricks to help remember skills

WEB link This icon points the way to online resources you can use at home, like games, videos and further explanations.

Notes: Learning maths: connecting school and home
Video: Helping your child with primary school maths
Notes: Talk Moves: supporting mathematical discussions with your child

Stage Two Parent Checklist

In Stage Two, children work towards the following key skills. How confident is your child with the skills on this checklist? If you would like to help your child with these skills, you have come to the right place!

Your child will be learning the skills on this checklist throughout the year. There is no specific order to learning them and you can revisit them at any time. While our school teaches students in stage classes, these checklists provide parents with a guide to support your child depending on which grade they are in within the stage.

Year 3

Whole Numbers

- ○ 1. Skip count forwards and backwards by 10s and 100s from any starting point
- ○ 2. State the place value of digits in numbers of up to 9 999 (4-digit numbers)
- ○ 3. Read, write and order numbers of up to 9 999 (4-digit numbers)

Addition and Subtraction

- ○ 4. Show that numbers can be added in any order to arrive at the same total. This is the associative law
- ○ 5. Use the jump strategy to add and subtract
- ○ 6. Use the split strategy to add and subtract
- ○ 7. Use the compensation strategy to add and subtract
- ○ 8. Perform calculations with money

Year 4

Whole Numbers

- ○ 1. State the place value of digits in numbers up to 99 999 (5-digit numbers)
- ○ 2. Read, write and order numbers up to 99 999 (5-digit numbers) in ascending and descending order
- ○ 3. Record numbers up to 99 999 (5-digit numbers) using expanded notation
- ○ 4. Round numbers to the nearest 10, 100, 1 000 or 10 000

Addition and Subtraction

- ○ 5. Use the inverse operation to check addition and subtraction questions
- ○ 6. Use and record a range of mental strategies for addition and subtraction of numbers up to 99 999 (5-digit numbers)
- ○ 7. Use the formal algorithm for addition and subtraction
- ○ 8. Solve word problems, including those involving money

- ○ 9. Use the equals sign to record number sentences that are equal on both sides

Multiplication and Division

- ○ 10. Recall multiplication facts for 2s, 3s, 5s and 10s
- ○ 11. Write number sentences using the symbols x (multiply), ÷ (divide) and = (equals)
- ○ 12. Link multiplication and division using arrays
- ○ 13. Show and apply the commutative law for multiplication
- ○ 14. Use mental strategies to multiply 1-digit numbers by multiples of 10
- ○ 15. Use and write mental strategies for multiplication of 2 x 1-digit numbers

Multiplication and Division

- ○ 9. Recall and use multiplication facts (times tables) up to 10 × 10
- ○ 10. Relate multiplication facts to their inverse division facts
- ○ 11. Determine multiples of whole numbers
- ○ 12. Determine factors of whole numbers
- ○ 13. Use the equals sign to show equivalent number relationships involving multiplication
- ○ 14. Use a range of strategies to multiply and divide 2-digit numbers by a 1-digit number
- ○ 15. Use mental strategies for division with remainders

Fractions and Decimals

- ○ 16. Model and show fractions with denominators 2, 3, 4, 5 and 8
- ○ 17. Count by halves, quarters and thirds, including with mixed numerals
- ○ 18. Show fractions on number lines, including number lines that go past 1

Fractions and Decimals

- ○ 16. Model and find equivalent fractions with denominators 2, 4 and 8; 3 and 6; and 5, 10 and 100
- ○ 17. State the place value of tenths and hundredths in decimals
- ○ 18. Make connections between fractions and decimals
- ○ 19. Model, compare and show decimals with 1 and 2 decimal places
- ○ 20. Show decimals on number lines

Patterns and Algebra

- ○ 19. Work with number patterns, including identifying, describing, continuing and creating patterns
- ○ 20. Identify odd and even numbers up to 9 999 (4-digit numbers)

Patterns and Algebra

- ○ 21. Find missing numbers in number sentences involving addition or subtraction on 1 or both sides of the equals sign
- ○ 22. Investigate and use the features of odd and even numbers
- ○ 23. Find, continue and describe number patterns that use multiplication
- ○ 24. Find missing numbers in number sentences involving 1 operation of multiplication or division

Whole Numbers: Key Skill 1

Skip count forwards and backwards by 10s and 100s from any starting point

Year 3

Skip counting is counting forwards or backwards in groups or multiples of a particular number.

Counting forwards and backwards helps children learn how numbers work in relation to each other. Learning to skip count helps children learn strategies for addition and subtraction. It builds confidence with numbers and strong multiplication skills. Skip counting helps children to move from counting by 1s, to using number facts to count e.g. starting at 7 to count on by 4s.
Children learn skip counting with 2s, 3s, 4s, 5s, 10s, 100s and then add in 6s, 7s, 8s, 9s, 11s and 12s. Children find skip counting forwards easier than skip counting backwards. Counting over 10s and 100s can sometimes be tricky too, especially backwards! Practice this skill often but for a short amount of time for maximum impact.

Play snakes and ladders! This game is a great example of moving around 100s chart.

Use counters on a numbers chart showing 100s. Put a counter on 47; add counters to the squares that are more than 10 and less than 10. (Here's a 120 chart you can print.)

Count together! See how high or low you can go taking turns to count the next number. Here are some examples:

- Start at 1 220 and count forwards by 10
- Start at 450 and count backwards by 100

WEB LINKS go to:

Notes: Interactive 120 chart
Notes: 1 to 1000 number chart
Game: Interactive snakes and ladders
Video: 10 less and 10 more

Whole Numbers: Key Skill 2

State the place value of digits in numbers up to 9 999 (4-digit numbers)

Year 3

A digit is a symbol used to write a numeral. The digits 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 are used to write all the numbers in our number system. A 4-digit number is any 4 numbers together e.g. 2 504 or 7 618.

Place value shows the amount a digit is worth due to its position in a number. Place value is how many ones, tens, hundreds and thousands are in a number e.g. the number 8 374 has 8 thousands, 3 hundreds, 7 tens and 4 ones or 8 000 + 300 + 70 + 4.

Understanding place value helps children understand the meaning and value of a number, which helps with maths strategies they learn later like trading in addition and subtraction. Dealing with 4-digit numbers builds confidence when working with numbers. Being able to read numbers easily and quickly helps children to work with them. Remember to include 0s when working with place value!

Use cards (Uno cards are great!) to make random numbers of 4 or more digits and ask questions e.g. shuffle the cards and make the number 1 472. Ask:

- How many hundreds are there in 1 472?
- Which number is in the tens column? Which number is in the ones column?
- What is the number after this one?
- What is the smallest number you can make with these cards? What is the second largest number you can make with these cards?
  *Try this with lots of different numbers. Have a race to see who can find the cards and make a said number.

Make a table and use it to work out the place value of a number. Fill one out and leave gaps to be filled in. Here are some examples:

number	thousands	hundreds	tens	ones
4 518	4	5	1	8
3 602		6	0	
	2	4	7	7
1198	1		9	8

WEB LINKS go to:

Video: Place value explained
Notes: Counting and place value explained
Game: Place value pandemonium

Whole Numbers: Key Skill 3

Read, write and order numbers up to 9 999 (4-digit numbers)

Year 3

A digit is a symbol used to write a numeral. The digits 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 are used to write all the numbers in our number system. A 4-digit number is any 4 numbers together e.g. 2 504 or 7 618.

Place value shows the amount a digit is worth due to its position in a number. Place value is how many ones, tens, hundreds and thousands are in a number e.g. the number 8 374 has 8 thousands, 3 hundreds, 7 tens and 4 ones or 8 000 + 300 + 70 + 4.

Dealing with big numbers builds mathematical confidence. Being able to read big numbers easily and quickly helps children to work with them later on e.g. when we see a number with
3 zeros on the end, we know it's in the thousands, and we can think of it as 1 thousand or 1 000.

It helps to remember that we group place value in sets of 3. In Europe, a comma is used as a decimal point! So we leave a space and not a comma when writing big numbers e.g. 23 000 not 23,000.

Order numbers together! Show your child 4 numbers and ask them to put them in order, from biggest to smallest or vice versa. Work together to find the 2nd largest or 2nd smallest number.

Talk about numbers as you go about your day. Ask your child to tell you about the numbers they notice. Which ones are big? Which ones are small? Make comparisons.

Make 4-digit numbers using playing cards/Uno cards/dominoes. Have a race to see who can make a number the fastest.

Play 'I'm thinking of a number'. Choose a number, give the guesser 15 guesses, answers can only be higher or lower. See if you can find the number with only 15 guesses! It helps to repeat the field as it narrows
e.g. 'We now know that it is higher than 5 000, but lower than 6 000.'

WEB LINKS go to:

Video: Highest and lowest card game
Game: Using blocks to show place value

Addition and Subtraction: Key Skill 4

Show that numbers can be added in any order to arrive at the same total. This is the associative law

Year 3

The associative law shows that numbers can be grouped and added in any way and the answer will be the same. This law only works for addition and multiplication - not subtraction or division.

Look at 3 + 5 = ?
3 + 5 = 8 or 5 + 3 = 8 the answer is the same! So, 3 + 5 = 5 + 3. It can be added in *any* order!

The associative law is an essential skill for mental maths strategies (working out answers in your head).
It helps children work with numbers and find answers. If children prefer a group of numbers to work with, they can shuffle the numbers around to answer questions faster and easier!

Let's look at 5 + 6 + 15 and shuffle the numbers to add.
5 + 6 + 15 or 15 + 5 + 6 or 20 + 6 = 26

Create an 'addition machine' from recycled materials that has 2 paths (holed out cups or rolled up cardboard) that join to a box underneath. Drop each group of objects through the different paths to combine them in the box below. Count up the amount in the box to find your answer! Explore if the order the objects are dropped in is important.

Write a group of 3 numbers down and work together to find which combinations make adding 3 numbers together easier. Friends of 10 (Kindergarten Key Skill 9) are useful here. Let's add 6, 7 and 4.
6 and 4 are friends of 10, so they are easy to add together, then add 7 to 10! Is this the easiest way? Are there any other ways? Show me! (There is no right or wrong answer.)

Become scientists and test this law! Make some questions and swap the numbers around to see if this theory always works. Does it only work when adding 3 numbers? Now test it on subtraction. Did it work? Why/why not?

WEB LINKS go to:

Notes: Addition machine
Video: Associative property of addition
Video: Associative and commutative explained

Addition and Subtraction: Key Skill 5

Use the jump strategy to add and subtract

Year 3

The jump strategy is a mental strategy of jumping numbers to add or subtract. Using a number line, children jump forwards to add and backwards to subtract. Children count in jumps, by 10s, 5s, 2s or 1s along the line to get to the answer. A number line is a line of any length that can be used to show the position of numbers in relation to each other. The line can start and end on any number. Number lines use measurements to locate the place of numbers.

The jump strategy is 1 way to answer an addition or subtraction question. The jump strategy works best when trading is needed. The aim of the jump strategy is to show children how to mentally add or subtract to find the answer. We begin learning the jump strategy using drawings (jumps) on a number line. In later years, children are encouraged to continue to use this strategy to find answers mentally (in their head). There are 3 strategies that are taught to answer addition and subtraction questions. The jump strategy, split strategy and compensation strategy. Children can choose which strategy they prefer or which strategy is best for the question based on the numbers in the question.
Split – when no trading is needed
Jump – when trading is needed
Compensation – when 1 of the numbers is close to 10s or 100s

Use a number line to practise the jump strategy. Plot the first number on the number line, and add or subtract the second number by jumping along the number line. Try jumping by 2s, then 5s, then 10s. Look to jump from the biggest number in the question. Remember to jump forwards to add and backwards to subtract. It is easier to jump starting with the larger number on the number line. With the jump strategy we;

1. Start by writing an empty number line (see Notes: Empty number lines)
2. Write the larger number on the left for addition and on the right for subtraction.
3. Split the second number into 10s and 1s
4. Jump by 10s until you have used all the 10s in the second number
5. Jump by 5s, 2s or 1s, until you have used all the 1s in the second number
6. The number you finish at is your answer!

You can also jump using a 100s chart. Jump forwards for adding and backwards for subtracting in groups of 10s, 5s, 2s or 1s until you have your answer.

WEB LINKS go to:

Notes: Jump strategy explained
Notes: Empty number lines
Video: Jump strategy in action
Video: Jump strategy examples
Video: Using the jump strategy to subtract numbers
Video: Using the jump strategy to add and subtract numbers

Addition and Subtraction: Key Skill 6

Use the split strategy to add and subtract

Year 3

The split strategy is mental strategy where numbers are 'split' into their place value to make it easier to add or subtract them. Children 'split' (expand) numbers to work with them e.g.

42 + 33 = 40 + 2 + 30 + 3 = 40 + 30 + 2 + 3
= 70 + 5 = 75

The split strategy is 1 way to answer an addition or subtraction question. The split strategy works best used when there is no trading needed. There are 3 strategies that are taught to children to answer addition and subtraction questions. The jump strategy, split strategy and compensation strategy. Children can choose which strategy they prefer or which strategy is best for the question based on the numbers in the question.
Split – when no trading is needed
Jump – when trading is needed
Compensation – when 1 of the numbers is close to 10s or 100s

To solve addition or subtraction problems with the split strategy we
1. Split the numbers into their place value being 100s, 10s and 1s
2. Group the 100s together, 10s together and 1s together
3. Add/subtract the 100s, add/subtract the 10s and add/subtract the 1s
4. Add the 100s, 10s and 1s together.

*Sometimes it is helpful to draw circles (1 for each place value) and link it to the number to help children split the numbers (see Video: Using the split strategy to add numbers). Here are some examples for you (see Notes: Split strategy to add).

21 + 48 = (20 + 1) + (40 + 8) (split)
= 20 + 40 + 1 + 8 (group then add) = 60 + 9 (add)
= 69

86 – 45 = (80 + 6) – (40 + 5) (split)
= (80 – 40) + (6 – 5) (group then subtract) = 40 + 1 (add)
= 41

WEB LINKS go to:

Notes: Split strategy explained
Video: Using the split strategy to add numbers
Video: Split strategy to add
Video: Using the split strategy to subtract numbers
Game: The amoeba addition game

Addition and Subtraction: Key Skill 7

Use the compensation strategy to add and subtract

Year 3

The compensation strategy is a mental strategy of rounding numbers up or down to add or subtract.

The compensation strategy is 1 way to answer an addition or subtraction question. It works best used when 1 of the numbers close to 10s or 100s. Children need to be able to round numbers to be able to use this strategy. There are 3 strategies that are taught to children to answer addition and subtraction questions. The jump strategy, split strategy and compensation strategy. Children can choose which strategy they prefer or which strategy is best for the question based on the numbers in the question.
Split – when no trading is needed
Jump – when trading is needed
Compensation – when 1 of the numbers is close to 10s or 100s

There are 2 ways to use the compensation strategy. Children can choose which 1 they want to use.

Option 1 1 Round 1 of the numbers. 2 Solve the question. 3 Add or take away the amount you used to round the number from the answer	Option 2 1 Round 1 of the numbers 2 Add or take away the amount you used to round the number from the other number in the question 3 Solve the question.
Option 1 – Addition 29 + 44 = 44 + 30 (+1) = 74 = 74 (–1) = 73 *Option 1 – Subtraction* 82 – 34 = 82 – 30 (–4) = 52 = 52 (-4) = 48	*Option 2 – Addition* 29 + 44 = 43 + 30 (1 from 44 is given to 29) = 43 + 30 = 73 *Option 2 – Subtraction* 82 – 34 = 78 – 30 (4 from 34 is taken away from 82) = 78 – 30 = 48

WEB LINKS go to:

Notes: Compensation strategy explained
Video: Adding with option 1
Video: Adding with option 2
Video: Subtracting with option 1
Video: Compensation strategy with number line

Addition and Subtraction: Key Skill 8

Perform calculations with money

Year 3

Learning the value of coins helps children to order the coins. This is the first step in learning to count, then to add and subtract money. Children will count money 1 coin at a time in the order the coins are given to them. So if they start with a 5c coin then a 50c coin and then a 20c coin, they will add 5c + 50c + 20c in that order.

Work together at the shops to find the right money needed to make purchases.

Have your child help you to make purchases at the shops. Ask them to find the right money and check the change.

Make towers of coins that all add up to the same amount and explore the similarities and differences between them.

Play board games that have money as part of the game like Monopoly or the Game of Life.

Work together to set up a market stall. Open your stall for people to come and purchase your goods. This can be real or pretend.

WEB LINKS go to:

Notes: Board games that teach kids about money
Video: Counting coins
Video: Funny money

Addition and Subtraction: Key Skill 9

Use the equals sign to record number sentences that are equal on both sides

Year 3

The equals sign is a symbol used to show that 2 or more amounts have the same value e.g. 5 + 3 = 9 -1 A number sentence is an equation. It uses numbers and symbols to describe a maths problem.

The equals sign is like a balance beam! The numbers on either side must always be equal. It doesn't just mean 'write the answer here'. The equals sign's job is easily and quickly forgotten and children need reminding of this often! Talk to your child about number sentences and the equals sign. Use words like 'value', 'same', 'different' and even 'balance beam'.

The key is to be able to explain *how* they got their answer (show working out).

Play with questions like 4 + 6 = 25 – 15.

Play a missing number game where you leave a number out of a number sentence and work together to find out what the number is.

Play a detective game where 1 of the numbers in a number sentence puts the sentence out of balance. Work together to fix the sentence and put it back in balance (see Video: True or false number sentences).

WEB LINKS go to:

Video: Equal number sentences
Video: The equals sign
Video: True or false number sentences

Multiplication and Division: Key Skill 10

Recall multiplication facts for 2s, 3s, 5s and 10s

Year 3

Multiplication is a process of repeatedly adding the same number a given amount of times. Multiply, product of, times and lots of all mean the same thing.

Children need to know their times tables as they are used in all areas of maths. They are extremely important and any progress in maths slows if they do not know their times tables. Knowing and using them with speed and accuracy makes maths so much easier. Times tables are easily forgotten and need to be practised often! It can be challenging to fill the gaps of unknown facts so it is important to spend more time on learning these. Check your child remembers their times tables as often as you can!

We teach times tables in 2 ways. Both ways need to be taught:

1 Rote learning – repeating them over and over until they are stuck in childrens' minds. Sing along to times tables songs, write out times tables, and test your child each day. This can be effective for many children but doesn't help to build a deep understanding of multiplication and how numbers work. For instance, many children can quickly tell you that 4 x 6 = 24 but not 24 ÷ 4 = 6. So we also teach times tables another way.

2 Meaningful learning – This way helps children to find the answer to a multiplication problem from what they know with the other times tables, e.g. skip counting (e.g. 3, 6, 9, 12 etc.) and the commutative law (which means multiplication problems can be solved in any order, e.g. 7 x 3 = 3 x 7). Your child may not know 7 x 5, but they can easily find 5 x 7 using these strategies.

(Notes: Rote vs meaningful learning)

Work together using a combination of songs, playing with arrays, skip counting, races, charts and online games to help your child convert the times tables into their long-term memory. Here are some useful strategies to help children learn times tables:

2 x tables: Double the number

3 x tables: Double plus 1 more set. 3 x 5 = 2 x 5 + 5 5 x tables: Skip count by 5s. Always end with 5 or 0 10 x tables: Multiples of 10. Always end in 0.

Work together to fill out the 2s, 3s, 5s, and 10s of a multiplication grid. Race against a clock and track your progress. (Here's a multiplication grid you can print.)

WEB LINKS go to:

Notes: Times tables
Video: How to easily memorise times tables
Video: 3 times tables – uptown funk
Notes: Help with times tables
Game: Times tables shoot em up

Multiplication and division: Key Skill 11

Write number sentences using the symbols x (multiply), ÷ (divide) and = (equals)

Year 3

A number sentence is an equation. It uses numbers and symbols to describe a maths problem.

Being able to read and write symbols helps children to create their own maths questions and understand how to use symbols in the right way.

Play a game of memory, go fish or old maid using maths symbols as the cards.

Play a game of celebrity head where each person has a number sentence on their head and they have to guess what it says. The other player can only answer yes or no to questions. The first person to guess their number sentence correctly wins! Solve your number sentences for bonus points.

Roll 2 dice and use the numbers rolled to create multiplication and division number sentences. Work together to solve them with multiplication. Attempt to solve them with division, or work together to change the number sentence so that it can be solved with whole numbers as the answer.

WEB LINKS go to:

Notes: DIY celebrity head game

Multiplication and Division: Key Skill 12

Link multiplication and division using arrays

Year 3

An array is a rectangle divided into rows and columns.
Multiplication is a process of repeatedly adding the same number a given amount of times.

Multiply, product of, times and lots of all mean the same thing.

Division is to share into equal groups or parts. Divide, split, quotient, distribute, share equally and separate all mean the same thing.

Arrays create a picture to help children understand multiplication and division. Learning to create and use arrays helps children to learn how to skip count to multiply or divide.

Children often begin by counting each object in the array and then learn to skip count the rows to find the answer. It is helpful to show that you can count from the rows or the columns of the rectangle
e.g. in 4 x 2 you can count 4 rows twice (4 + 4) or 2 columns four times (2 + 2 + 2 + 2).

Knowing that multiplication and division questions are opposites helps to make learning division easier.

Make arrays and work together to create division and multiplication questions from them. Write down the possible questions could be made from that array e.g. An array of 12 (3 rows of 4) questions could be:

12 ÷ 3 = 4 12 ÷ 4 = 3 3 x 4 = 12 4 x 3 = 12 12 = 3 x 4

Play a game where you make an array and quickly flash the entire array. Then cover all the pieces except for 1 row and 1 column with a piece of paper. Work together to work out the total of the array. Challenge yourselves to write them as division and multiplication questions.

WEB LINKS go to:

Notes: Arrays
Video: Repeated addition
Video: Repeated addition and array
Game: The array
Game: Pobble arrays

Multiplication and Division: Key Skill 13

Show and apply the commutative law for multiplication

Year 3

The commutative law shows that numbers can be added or multiplied in any order and the answer will be the same. Commutativity and turn around facts mean the same thing.

Multiplication is a process of repeatedly adding the same number a given amount of times. Multiply, product of, times and lots of all mean the same thing.

This is a maths skill needed for mental maths strategies (working out answers in your head).
Children can spin the numbers around to answer questions faster and easier! Remember that this works only for addition and multiplication - not subtraction or division. 20 x 5 = 5 x 20 20 ÷ 5 ≠ 5 ÷ 20

This is very handy in teaching children to spin the numbers around to make the question easier e.g. 4 x 5 by skip counting or 4 x tables might be hard to work out but 5 x 4 by skip counting or using their 5 times tables is easier.

Encourage your child to spin the numbers around when multiplying if they are more confident with 1 of the numbers in the question.

Associative law (Key Skill 4) – we *shuffle* numbers to add or multiply (4 + 9 + 1 = 9 + 1 + 4)
Commutative law – we *spin* numbers to add or multiply (6 x 5 = 5 x 6).

Play a dice game! Roll 2 dice, put them next to each other, and multiply. Switch the order, and multiply again. Explore if the order changes the result.

Explore a multiplication grid and map pairs of multiples to so see if they have the same answer. 4 x 5 and 5 x 4 etc. (Here's a multiplication grid you can print.)

Test the commutative law using arrays! Build arrays and see if you can spin the numbers in the question and keep the array the same shape e.g. 4 rows with 5 columns or 5 rows with 4 columns.

WEB LINKS go to:

Video: Commutative law of multiplication
Video: Commutative law
Video: Commutative law in the classroom

Multiplication and Division: Key Skill 14

Use mental strategies to multiply 1-digit numbers by multiples of 10

Year 3

Children use mental strategies to figure out the maths problem in their head.

A multiple is the result of multiplying a number by another number. The multiples of 3 are 3, 6, 9, 12, 15, 18, 21 etc. (times tables can help here: 3 x 1 is 3, 3 x 2 is 6, 3 x 3 is 9, 3 x 4 is 12 etc.) The first multiple of a number is always the number itself (because it can be multiplied by 1).

When children understand multiples, they find it easier and faster to work with numbers. Multiples help with fractions, decimals, multiplication, division and much more.

Multiplying by 10 is an important skill because it shows an understanding of place value. When we multiply by 10, the digits move 1 place to the left. It is the same with 10s, 100s, 1 000s etc.

question	thousands	hundreds	tens	ones
43			4	3
43 x 10		4	3	0
43 x 100	4	3	0	0

Help your child to multiply a number by 10. Work together to find all the different ways you can work to reach the same answer.

Use multiplying by 10s to round and estimate answers.

A little trick to use is to multiply the 2 digits furthest to the left, and then however many 0s in the question behind them, is however many 0s will be in the answer e.g. 3 x 40 = ? The 2 digits furthest to the left are 3 and 4, so 3 x 4 = 12. There is one 0 in the question, so there will be one 0 in the answer. 3 x 40 = 120. This only works when the numbers end with 0s. When 0 is being used as a place holder, this trick doesn't work.

WEB LINKS go to:

Video: Multiplication mental strategies

Multiplication and Division: Key Skill 15

Use and write mental strategies for multiplication of 2 x 1-digit numbers

Year 3

Children use mental strategies to figure out the maths problem in their head. Multiplication is a process of repeatedly adding the same number a given amount of times.

Multiply, product of, times and lots of all mean the same thing.

Children need to be able to use strategies to work out unknown multiplication facts. These strategies include:

- Skip counting
- Repeated addition
- Commutative law

Play a game where you start on any number and take turns to say the next number while skip counting (forwards or backwards). See how high you can go!

Pull a group of objects (like pegs) and work together to move them as you skip count. This is really helpful in reinforcing the idea that this can be used to find multiplication facts. Try to write the numbers as you are adding on a piece of paper to show what this would look like if you only had pen and paper.

Use sticky dots, textas, M&Ms, playdough or Lego to make groups and work together to write the repeated addition facts to match.

Try a multiplication grid and colour in the numbers as you repeatedly add to find the answer to your question. Can you find any patterns? (Here's a multiplication grid you can print.)

WEB LINKS go to:

Notes: 6 Skip counting strategies
Video: Multiplication and division relationships
Video: Year 3 multiplication and division examples
Game: Bubble skip counting

Fractions and Decimals: Key Skill 16

Model and show fractions with denominators 2, 3, 4, 5 and 8

Year 3

A fraction is part of a whole that has been broken into equal parts. It has a:

- numerator (top number: how many parts we have)
- denominator (bottom number: how many parts the whole has been broken up into)
- fraction bar (the line in between).

It will help your child to use these words when talking about fractions.

Pictures are hugely helpful in understanding fractions. A common mistake is thinking the larger denominator creates a larger fraction. It is the opposite for fractions. The smaller the denominator, the larger the fraction. Use circles for odd denominators and rectangles for even denominators when drawing fractions.

Use food! Slice in half a pizza, cake, banana etc. Explain that both sides are equal, so the item has been halved.

Divide other objects into halves, thirds, quarters, fifths and eighths. Talk about what different fractions look like and how they are made.

Read “My Half Day” by Doris Fisher. This book talks about lots of different sized fractions. Can you find them all and work out how much they are? Can you order them from smallest to largest or plot them on a number line?

WEB LINKS go to:

Video: Fractions song
Video: “My half day” book reading
Video: Basic fractions

Fractions and Decimals: Key Skill 17

Count by halves, quarters and thirds, including with mixed numerals

Year 3

A fraction is part of a whole that has been broken into equal parts. It has a:

- numerator (top number: how many parts we have)
- denominator (bottom number: how many parts the whole has been broken up into)
- fraction bar (the line in between).

It will help your child to use these words when talking about fractions.
A mixed numeral is a number made up of a whole number and a proper fraction.

Counting forwards and backwards helps children learn how numbers work in relation to each other. Children will find counting forwards easier than counting backwards. Counting over whole numbers can be tricky for children e.g. $1\frac{1}{2}$ $2\frac{1}{2}$ $3\frac{1}{2}$ ...

Number lines are extremely helpful in showing how fractions work with whole numbers.

Use number lines and diagrams together to show fractions. Plot the fractions on the number line and draw a picture underneath each fraction to show its size. Remember to go past 1.

Use groups to show how fractions work. If there are 4 socks, and 3 of them are yellow, then $\frac{3}{4}$ of the socks are yellow.

Play a game. Start from 0, and take turns to count by halves, quarters, thirds etc. See how far can you go!

Draw a number line and plot a group of fractions on it. Leave gaps to fill in at the end. Give a set of 3 or 4 fractions to be grouped on the same fraction number line. This is trickier than it sounds!

Count by fractions taking turns to say the next number. Deliberately make a mistake and work together to fix it!

WEB LINKS go to:

Video: Fractions on a number line
Video: Counting fractions on a number line
Video: Fractions song
Video: Comparing fractions

Fractions and Decimals: Key Skill 18

Show fractions on number lines, including number lines that go past 1

Year 3

A fraction is part of a whole that has been broken into equal parts. It has a:

- numerator (top number: how many parts we have)
- denominator (bottom number: how many parts the whole has been broken up into)
- fraction bar (the line in between).

A number line is a line of any length that can be used to show the position of numbers in relation to each other. The line can start and end on any number. Number lines use measurements to locate the place of numbers. Equivalent fractions are fractions that are equal in value but have different names e.g $\frac{1}{2}$, $\frac{3}{6}$ and $\frac{5}{10}$

This skill helps children to understand that a fraction is a part of a whole. Children sometimes see the numerator and denominator as 2 separate whole numbers joined together to make the fraction and not the fraction as a number itself. Working with a number line helps to explain where fractions are in comparison to whole numbers. An understanding of equivalent fractions helps greatly with this skill.

Write some fractions on paper and use 1 length of your clothesline to be a horizontal number line. Work together to peg your fractions on the clothesline in the right places.

Use the door frame as a vertical number line. Use post it notes to create fractions and then work together to stick the fractions in the right places.

Draw a number line, add some of the numbers, and ask your child to fill in the rest. Draw a number line and fill in the fractions (make sure you go past 1) but make deliberate errors. Work together to find the mistakes and fix them.

WEB LINKS go to:

Video: Equivalent fractions year 3
Video: Fractions on a number line
Video: Fractions on a number line
Video: Fractions number line song
Video: Fractions on number lines
Video: Plotting fractions on number lines

Patterns and Algebra: Key Skill 19

Work with number patterns, including identifying, describing, continuing and creating patterns

Year 3

Patterns are formed by rules. A rule is used to work out the value of any part of the pattern. Rules also help children to continue patterns.

Number patterns are patterns created by numbers.

Patterns help children to apply rules, check answers, and see relationships between numbers. Children learn a lot about numbers and build strong operation skills when working with patterns.

Identifying and describing patterns are the easier of these skills, with continuing and creating patterns being harder.

On a 100s chart colour in multiples of 3. Now use a different colour for multiples of 6 and so on. What patterns can you see? (Here's a 120 chart you can print.) Now use your coloured 100s chart to practise counting in multiples of 3, 6 etc. Go forwards and backwards!

Work together to create patterns by arranging coloured blocks, crayons, different sized objects, or stringing beads and more. Ask open-ended questions. Here are some questions to ask:

Do you see a pattern? Tell me about it.
What comes next? Could you make a pattern with these different materials? How could we make pictures that would help us remember this pattern?
Can you show me a pattern with your body? What would you do first? Second? What happens over and over again with these blocks?
How would you read this pattern?
What would happen to the pattern if I changed _____?

WEB LINKS go to:

Video: Finding patterns in numbers

Patterns and Algebra: Key Skill 20

Identify odd and even numbers up to 9 999 (4-digit numbers)

Year 3

Even numbers are whole numbers ending in 0, 2, 4, 6, or 8.

Odd numbers are whole numbers ending in 1, 3, 5, 7 and 9.

A digit is a symbol used to write a numeral. The digits 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 are used to write all the numbers in our number system. A 4-digit number is any 4 numbers together e.g. 2 504 or 7 618

Even and odd numbers help children with skip counting, doubling, halving, and division. Later, they'll help with prime numbers.

When you talk about numbers, ask your child whether they are odd or even. Talk about how many letters are in the names of people in your family, house numbers of people you know, the number of cousins your child has etc. Odd or even?

Read the book "Even Steven and Odd Todd" by Kathryn Christaldi. Make puppets of Even Steven and Odd Todd and write the even and odd numbers they like from the book on their jumpers. Make a puppet show (or a new story) where Even Steven and Odd Todd explore bigger numbers (into the 1000s).

Colour in the even and odd numbers on 100s chart. See if you can find a pattern! (Here's a 120 chart you can print.)

WEB LINKS go to:

Video: Even and odd numbers
Video: Even and odd numbers explained
Video: Even Steven and odd Todd book reading
Video: Odd and even numbers
Video: adding even and odd numbers
Game: Odd and even
Game: Number jumbler

Whole Numbers: Key Skill 1

State the place value of digits in numbers up to 99 999 (5-digit numbers)

Year 4

Place value shows the amount a digit is worth due to its position in a number. Place value is how many ones, tens, hundreds and thousands are in a number. For example, the number 62 has 6 lots of 10 and 2 lots of 1.

A digit is a symbol used to write a numeral. The digits 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 are used to write all the numbers in our number system.

A strong knowledge of place value is essential in maths. It helps children to read numbers, understand the size of numbers, round numbers and operate with them. By Year 4, children should be able to say the place value of all digits in numbers up to 99 999. A place value chart can help children understand place value (see below). Remember to use 0s when working with place value!

number	ten thousands	thousands	hundreds	tens	ones
16 205	1	6	2	0	5

Work together to find the place value of digits in numbers. Ask other questions about big numbers, such as:

- What happens if I rearrange the digits in the number 12 345?
- How can I rearrange the digits to make the largest number? How can I make the smallest number?

Use cards (Uno cards are great!) to make random numbers of 5 or more digits and ask questions e.g. shuffle the cards and make the number 10 472. Ask 'How many hundreds are there in 10 472?', 'Which number is in the tens column?', 'Which number is in the ones column?' 'What is the number after this one?' 'What is the smallest number you can make with these cards?' 'What is the second largest number you can make with these cards?'*Try this with lots of different numbers. Have a race to see who can find the cards and make a said number.

Make a place value chart and use it to work out the place value of a number. Fill one out and leave gaps to be filled in.

WEB LINKS go to:

Notes: Place value
Video: Rounding to the nearest hundred
Video: Rounding to the nearest thousand
Game: Wishball

Whole Numbers: Key Skill 2

Read, write and order numbers up to 99 999 (5-digit numbers) in ascending and descending order

Year 4

Ascending order is when numbers are getting bigger, e.g. 1, 2, 3, 4, 5, 6 ...

Descending order is when numbers are getting smaller, e.g. 20, 19, 18, 17, 16 ...

Reading, writing and ordering numbers are basic maths skills. To help remember the difference between ascending and descending, the idea of stairs can be helpful. We go *up* stairs so ascending numbers go up (up for ascending). We go down stairs so descending numbers go *down* (down for descending).

In Europe, a comma is used as a decimal point! So we leave a space and not a comma when writing big numbers e.g. 23 000 not 23,000.

Practice this skill often giving your child many chances to read and write numbers down.

Use playing cards or Uno cards to make simple games where children have to read, arrange or write numbers.

For example, take turns drawing cards, 1 at a time, to see who can make the highest number.
Then read the number aloud. The highest number wins. Keep a running score of the highest number made of all time!

WEB LINKS go to:

Video: Reading whole numbers
Game: Arranging numbers
Game: Ordering numbers
Game: Place value Yahtzee

Whole Numbers: Key Skill 3

Record numbers up to 99 999 (5-digit numbers) using expanded notation

Year 4

A digit is a symbol used to write a numeral. The digits 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 are used to write all the numbers in our number system. A 5-digit number can be made from any 5 digits, e.g. 54 341 or 10 985.

Expanded notation shows the amount each digit is worth because of its place in a number. So, in the number 345, the 3 is worth 300, the 4 is worth 40 and the 5 is worth 5. We write it as 345 = 300 + 40 + 5

Understanding place value helps children understand the meaning and value of a number, which helps with maths strategies they learn later like trading in addition and subtraction. Expanding a number helps children to solve problems mentally e.g.

156 + 35 = 100 + 50 + 30 + 6 + 5 = 191
Remember to include 0s when working with expanded notation!

Dealing with 5-digit numbers builds confidence when working with numbers. Being able to read numbers easily and quickly helps children to work with them.

Make an expanded notation machine with cups or a paper snake.

Expand numbers to help you add, subtract, multiply and divide when answering questions.

Create a game where 1 person tries to make a tricky number to expand and see if the other person can expand it. Can you reverse and start with an expanded number that needs to be contracted? 1 point for every right answer!

Remember to use numbers where the 0 is being used as a place holder. Numbers like 3 085 where there are 3 thousands, no hundreds, 8 tens and 5 ones.

WEB LINKS go to:

Video: Expanded notation
Video: How to make expanded notation cups
Game: Expanded notation pacman
Game: Walk the plank

Whole Numbers: Key Skill 4

Round numbers to the nearest 10, 100, 1 000 or 10 000

Year 4

Rounding means to increase or decrease to the nearest 10, 100, 1 000 or 10 000. For 1, 2, 3 and 4 we round down to 0. For 5, 6, 7, 8 and 9, we round up to 10.

Rounding helps children check their answers, or come up with an educated guess they can work towards. For example, 416 x 23 is roughly 400 x 20. So the answer should be around 8 000.

Try to have your children round numbers in everyday life. They could round distances they travel to the nearest 10km. They could round the cost of shopping to the nearest $100. They could round people's ages to the nearest 10 years. Round questions and estimate before answering them to help your child check if their answer is right.

When we round to the nearest ten, we look at the number in the units place. If it's 4 or below, we round down. If it's 5 or above, we round up.	When we round to the nearest hundred, we look at the number in the tens place. If it's 4 or below, we round down. If it's 5 or above, we round up.	When we round to the nearest thousand, we look at the number in the hundreds place. If it's 4 or below, we round down. If it's 5 or above, we round up.	Rounding poem 5 626 = 6 000 Underline the digit, Look next door. If it's 5 or greater, Add one more. 5 500 = 6 000 If it's less than 5, Leave it for sure. Everything after is a zero, not more.
45 = 50 43 = 40 47 = 50	152 = 200 126 = 100 201 = 200	1 152 = 1 000	

WEB LINKS go to:

Notes: Rounding numbers
Video: Rounding

Addition and Subtraction: Key Skill 5

Use the inverse operation to check addition and subtraction questions

Year 4

Inverse operations are functions that are the opposite of each other. This is a way of checking if answers are correct.

Addition and subtraction are inverse operations. Multiplication and division are inverse operations.

Learning inverse operations help children to build confidence with numbers. This skill is essential for learning algebra in later years.

Children will have learned a range of strategies they can use to add and subtract numbers in their head, including the jump strategy, split strategy and compensation strategy (Year 3 Key Skills 5–7). The key is to use the best strategy for the numbers.

Children will want to use 1 of 3 strategies:

Split – when no trading is needed
Jump – when trading is needed
Compensation – when 1 of the numbers is close to 10s or 100s.

Use this skill often to check for answers while working out any maths problem! Have your child complete a set of addition and subtraction problems and work together to check their answer using an inverse operation.

Test this theory out and make up your own questions to see if this skill always works. Use a calculator to test bigger numbers!

Be a novice and ask your child to teach you about inverse operations!

WEB LINKS go to:

Video: Inverse operations
Game: Inverse operations quiz

Addition and Subtraction: Key Skill 6

Use and record a range of mental strategies for addition and subtraction of numbers up to 99 999 (5-digit numbers)

Year 4

Children use mental strategies to figure out the maths problem in their head, without writing anything down.

A digit is a symbol used to write a numeral. The digits 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 are used to write all the numbers in our number system. A 5-digit number is any 5 numbers together e.g. 26 504 or 71 618.

Mental calculation, or doing sums in your head, is an important everyday skill – we use it at the shops, when we're playing sport, when we're in the car to figure out when we'll get there. When children can add and subtract in their head, it builds their confidence and lays the groundwork for skills they'll need later.

Children will have learned a range of strategies they can use to add and subtract numbers in their head, including the jump strategy, split strategy and compensation strategy (Year 3 Key Skills 5 -7). The key is to use the best strategy for the numbers.

Children will want to use 1 of 3 strategies:
Split – when no trading is needed
Jump – when trading is needed
Compensation – when 1 of the numbers is close to 10s or 100s.

To find 456 + 207, children might use:	To find 456 – 207, children might use:
• jump strategy (456 + 200 + 7) • split strategy (400 + 200 + 50 + 6 + 7)	• jump strategy (456 – 200 – 7) • compensation strategy (456 – 207 = 449 – 200)

WEB LINKS go to:

Notes: Compensation strategy
Notes: Jump strategy
Notes: Mental strategies
Video: Split strategy

Addition and Subtraction: Key Skill 7

Use the formal algorithm for addition and subtraction

Year 4

The formal algorithm is a step-by-step method for solving problems in maths. Written algorithm and vertical algorithm mean the same thing.

Children begin to expand their ability to solve addition and subtraction problems using the formal algorithm. It uses the same steps in the same order every time to find the answer and is essential for more complex questions.

Before they use the formal algorithm, children should be encouraged to estimate an answer first by using rounding. This can help them to limit simple errors in calculations. If there is no operation written next to the question, it is always an addition question. It is important to practice questions where trading across 2 place values is needed as children find it the most difficult. Use questions where 0s are needed.

Examples without trading:

14	21	89 –	97 –
85 +	23	54	23
99	50	35	31
	94		43

Examples with trading:

95 +	34	60 –	72 –
48	57	39	34
143	62	21	11
	153		27

Examples where trading across 2 place values is needed:

299 +	400 –
498	327
24	73
821	

Addition Poem

Adds up to 9,
Everything is fine.
10 or more,
take the extra next door!

Subtraction Poem

More on top?
No need to stop!
More on the floor?
Go next door and get ten more! Numbers the same?
Zero's the game!

WEB LINKS go to:

Video: Written addition methods
Video: Written subtraction methods
Game: Addition and subtraction

Addition and Subtraction: Key Skill 8

Solve word problems, including those involving money

Year 4

For word problems, children need to read a story about a problem (often a real-life problem!), and then figure out what operations are needed to reach the answer.

Word problems often involve examples of maths being used in everyday life, so they're great for children to see that maths is everywhere.

Try using the CUBES strategy for problem solving:

C Circle the numbers
U Underline the question
B Box the keywords
E Eliminate information not needed S Solve by showing your working out

Newman's Analysis is another strategy to help with word problems.

1 Read the question to me.
2 Tell me what the question is asking you to do.
3 Tell me how you are going to find the answer.
4 Show me what to do to get the answer.
5 Now, write down your answer.

Here are some examples of word problems.
I have $14.55 and my dad gives me another $11.35. How much money do I have now?
I have $50 to spend on a party. If I need to buy balloons for $14.50, drinks for $15.60 and food for $17.20, how much do I have left for cake?

WEB LINKS go to:

Notes: Word problems (khan academy)
Notes: Word problems
Video: How to solve word problems

Multiplication and Division: Key Skill 9

Recall and use multiplication facts (times tables) up to 10 × 10

Year 4

Children need to know their times tables as they are used in all areas of maths. They are extremely important and any progress in maths slows if they do not know their times tables. Knowing and using them with speed and accuracy makes maths so much easier. Times tables are easily forgotten and need to be practised often! It can be challenging to fill the gaps of unknown facts so it is important to spend more time on learning these. Check your child remembers their times tables as often as you can!

We teach times tables in 2 ways. Both ways need to be taught:

1 Rote learning – repeating them over and over until they are stuck in the children's mind. Sing along to times tables songs, write out times tables, and test the children daily. This can be effective for many children but doesn't help to build a deep understanding of multiplication and how numbers work. For instance, many children can quickly tell you that 4 x 6 = 24 but not 24 ÷ 4 = 6.	2 Meaningful learning. This way helps children to find the answer to a multiplication problem from known times tables. Skip counting (e.g. 3, 6, 9, 12 etc.) and the commutative law (which means multiplication problems can be solved in any order, e.g. 7 x 3 = 3 x 7) are some of these strategies. Your child may not know 7 x 5, but they can easily find 5 x 7 using these strategies. Notes: Rote vs meaningful learning

Work together using a combination of songs, playing with arrays, skip counting, races, charts and online games to help your child convert the times tables into their long term memory.

Play the I have, who has? game (see Game: I have, who has? printable game) with your family.
The 4s, 6s, 7s, 8, and 9s may be new to your child. Here are some useful strategies to help children learn

2 x tables: Double the number 3 x tables: Double plus 1 more set. 3 x 5 = 2 x 5 + 5 4 x tables: Double and double again 5 x tables: Skip count by 5s. Always end with 5 or 0 6 x tables: Double 3 x. 6 x 4 = (3 x 4) x 2.	7 x tables: Build from known facts. That is, work from one you know. 7 x 8 = 7 x 5 + 3 x 7 8 x tables: Double, double, and double again. 3 x 8 = 3 x 2 x 2 x 2 9 x tables: 1 less than 10 x. 9 x 8 = 10 x 8 – 8 10 x tables: Multiples of 10. Always end in 0.

WEB LINKS go to:

Notes: Times tables
Video: How to easily memorise times tables
Video: 4 times tables
Game: I have, who has? printable game
Game: Tables games
Game: Times tables shoot em up
Video: 3 times tables – uptown funk
Video: 6 times tables – cheerleader

Multiplication and Division: Key Skill 10

Relate multiplication facts to their inverse division facts

Year 4

Multiplication is a process of repeatedly adding the same number a given amount of times. Multiply, product of, times and lots of all mean the same thing.

Division is to share into equal groups or parts. Divide, split, quotient, distribute, share equally and separate all mean the same thing.

Inverse operations are functions that are the opposite of each other. This is a way of checking if answers are correct.

Addition and subtraction are inverse operations. Multiplication and division are inverse operations. A fact family is a group of related facts in addition and subtraction, and multiplication and division. It helps children understand the relationship between operations.

4 x s = 20 s x 4 = 20 20 ÷ 4 = s 20 ÷ s = 4

Children find division a tricky skill to learn but knowing that multiplication and division are opposites helps to make learning division easier. Using a fact family helps greatly with this skill.

Children begin to learn about multiplication and division by making arrays and using pictures.
Using everyday events to give your child experiences using multiplication and division will help develop this skill.

Use this skill often to check for answers while working out division and multiplication problems! Have your child complete a set of division and multiplication problems and work together to check the answer using the inverse operation.

Test this theory out and make up your own questions to see if this skill always works. Use a calculator to test bigger numbers!

Be a novice and ask your child to teach you about inverse operations!

WEB LINKS go to:

Video: Inverse property of multiplication
Game: Interactive chart for skip counting

Multiplication and Division: Key Skill 11

Determine multiples of whole numbers

Year 4

A multiple is the result of multiplying a number by another number. For example, the multiples of 3 are 3, 6, 9, 12, 15, 18, 21 etc. (Times tables can help here: 3 x 1 is 3, 3 x 2 is 6, 3 x 3 is 9, 3 x 4 is 12 etc.) The first multiple of a number is always the number itself (because it can be multiplied by 1).

A whole number is any number that is not or does not include a fraction or a decimal.

When children understand multiples, they find it easier and faster to work with numbers.

Multiples help with fractions, decimals, multiplication, division and much more. Times tables help children with multiples and factors (Key Skill 9).

What are the first 6 multiples of 4?

4, 8, 12, 16, 20, 24 This is the same as skip counting.

Taking turns skip counting out loud can be a fun car game. See how high you can go!

Use the concept of the 'Multiple Monster' who makes numbers bigger to help your child to remember how to find multiples. Create a multiple monster poster or artwork!

WEB LINKS go to:

Notes: Factor ninja and multiple monster
Notes: Multiples
Game: Pobble arrays: make multiples

Multiplication and Division: Key Skill 12

Determine factors of whole numbers

Year 4

A factor is a number that we multiply to get another number or product.
A factor is a number that can be divided exactly into a whole number. For example, the factors of 12 are

12, 1, 6, 2, 3 and 4 (because 12 x 1 = 12, 6 x 2 = 12 and 3 x 4 = 12).
A whole number is any number that is not or does not include a fraction or a decimal.

Being able to find factors is essential to solve multiplication, division , fraction and decimal problems. We use knowledge of factors to solve division. In Years 5 and 6, children need a strong knowledge of factors to solve problems involving fractions.

Times tables help children with multiples and factors (Key Skill 9).

Create factor trees.

Use an array to find the factors of whole numbers. The row and columns make the factors of the whole number. How many arrays and factors can you find? Try a number like 36 which has lots of factors.

Use the concept of the 'Factor Ninja' who chops numbers up to help your child to remember how to find factors. Create a factor ninja poster or artwork!

WEB LINKS go to:

Notes: Factor ninja and multiple monster
Video: Factor tree demonstration
Video: Finding factors
Game: Factors and multiples
Game: Pobble arrays - find 2 factors

Multiplication and Division: Key Skill 13

Use the equals sign to show equivalent number relationships involving multiplication

Year 4

The equals sign is a symbol used to show that 2 or more amounts have the same value e.g. 5 + 3 = 9 –1

Equivalent number relationships are 2 questions that calculate to the same answer e.g. 4 x 3 = 2 x 6 (both sides equal 12)

Knowing that the equals sign (=) means 'both sides are equal and balanced' is very important. The equals sign doesn't just mean 'here's the answer!' The equals sign is like a balance beam! The numbers on either side must be equal (it doesn't just stand for the answer to a sum).

This means that 4 x 5 = 5 x 4 and 10 x 3 = 3 x 10 We can then extend this to examples like:

- 3x 6= 2x 9
- 2 x 20 = 10 x 4

Play a game where you ask questions like '5 x 6 = 10 x ?' and race each other to find the answer. Talk about how you each found your answer and if there was another way that you could find the answer out. Hint: there is always more than 1 way to solve the problem!

Write out questions where the question is on the other side of the equals sign to remind your child of the equals sign's job.

Here are some examples: = 3 x 5 = 4 x 2 =8 x 5 =6 x 0

WEB LINKS go to:

Notes: Commutative law
Video: Commutative law
Video: Multiplication laws

Multiplication and Division: Key Skill 14

Use a range of strategies to multiply and divide 2-digit numbers by a 1-digit number

Year 4

Multiplication is a process of repeatedly adding the same number a given amount of times. Multiply, product of, times and lots of all mean the same thing.

Some strategies work better than others depending on the question. Work together to find different ways of answering the same question using as many different strategies as you can. Strategies may include:

- split strategy – when no trading is needed
- compensation and rounding – when 1 of the numbers is close to 10s or 100s
- doubling or halving
- repeated addition or subtraction.

Practice this skill often but for a short amount of time for maximum impact.

Split Strategy
23 x 5 = 20 x 5 + 3 x 5
= 100 + 15
= 115

23÷ 5 = 20 ÷ 5 + 3 ÷ 5 (3 ÷ 5 is a remainder) = 4 + r3
= 4 r3

Doubling or halving
23 x 5 = 23 x 2 = 46 x 2 = 92 + 23 = 115

24 ÷ 4 = 24 ÷ 2 = 12 ÷ 2 = 6

Compensation Strategy and rounding
21 x 5 = 20 x 5 (-1 x 5)
= 100 + (1 x 5)
= 100 + 5
= 105

21 ÷ 5 = 20 ÷ 5 (–1 ÷ 5) - remainder
= 4 r1

Repeated addition or subtraction
23 x 5 = 23 + 23 + 23 + 23 + 23 = 46 + 23 + 23 + 23
= 69 + 23 + 23 = 92 + 23
= 115

23 ÷ 5 = 23 – 5
= 18 – 5
= 13 – 5
= 8 – 5
= 3 so the answer is 5 r3

WEB LINKS go to:

Video: Multiplying 2-digit by 1-digit
Video: Area models

Multiplication and Division: Key Skill 15

Use mental strategies for division with remainders

Year 4

Mental strategies means calculating in your head. It is an important everyday skill – we use it at the shops, when we're playing sport, when we're in the car to figure out when we'll get there. When children can multiply and divide in their head, it builds their confidence and lays the groundwork for skills they'll need later.

Division is to share into equal groups or parts. Divide, split, quotient, distribute, share equally and separate all mean the same thing.

A remainder is the number left over when the problem cannot be divided equally. For example, if we want to divide 12 slices of cake among 5 people, there would be 2 pieces left over – these are the remainder.

Sometimes division is not exact and this is an important concept for children to understand. Moving objects and dividing them into groups that will leave a remainder is a great way to introduce this concept to children.

Use real-life examples to explain remainders. Talk about sharing out food, money and other items, and ask how many would be left over.

Read "Ride and Divide" by Stuart J. Murphy and work together to work out the solutions to each ride that the friends go on.

Use a number line to repeatedly subtract to build mental division skills and reinforce the idea of a remainder.

WEB LINKS go to:

Notes: Division
Notes: Empty number lines
Video: Repeated subtraction on a number line
Video: Division with remainders
Video: Ride and divide book reading with fact family explained

Fractions and Decimals: Key Skill 16

Model and find equivalent fractions with denominators 2, 4 and 8; 3 and 6; and 5, 10 and 100

Year 4

A fraction is part of a whole that has been broken into equal parts. It has a:

- numerator (top number: how many parts we have)
- denominator (bottom number: how many parts the whole has been broken up into)
- fraction bar (the line in between).

It will help your child to use these words when talking about fractions.

Equivalent fractions are fractions that are equal in value, but have different names e.g. $\frac{4}{8} = \frac{1}{2}$

It's important to remember that fractions show equal parts of a whole. Making fractions using pictures of objects helps children to understand the idea of equivalent fractions.

Equivalent fractions focus on fractions with denominators that are multiples of each other.

- 2, 4 and 8, e.g. $\frac{1}{2} = \frac{2}{4} = \frac{4}{8}$
- 3 and 6, e.g. $\frac{1}{3} = \frac{2}{6}$ or $\frac{2}{3} = \frac{4}{6}$
- 5, 10 and 100, e.g. $\frac{1}{5} = \frac{2}{10} = \frac{20}{100}$ or $\frac{3}{5} = \frac{6}{10} = \frac{60}{100}$

Children find it easier to double to find equivalent fractions than to reduce.

Make fractions with circles and cut them to help you find equivalent fractions. Playdough or paper would be an easy way to make circles to cut into fraction pieces.

To help children to find equivalent fractions we can use visual prompts such as number lines or pictures. Use Lego pieces to create a fraction wall and use this to help find equivalent fractions.

Break apart wholes of objects (or groups of objects) and experiment to find equivalent fractions.

WEB LINKS go to:

Notes: Fraction activities to do at home
Video: Equivalent fractions song
Video: Equivalent fractions
Video: Children exploring fractions
Game: Fraction match
Game: Triplets
Game: Haunted fractions
Video: Equivalent fractions using number strips

Fractions and Decimals: Key Skill 17

State the place value of tenths and hundredths in decimals

Year 4

Place value shows the amount a digit is worth due to its position in a number. Place value is how many ones, tenths and hundredths are in a number. For example, the number 6.25 has 6 ones, 2 tenths and 5 hundredths.

number	tens	ones	decimal point	tenths	hundredths
16.25	1	6	.	2	5

Decimal places are the numbers after (to the right of) the decimal point. Decimals are part of a whole.

0.1 means $\frac{1}{10}$ of a whole number, and 0.01 means $\frac{1}{100}$ of a whole number.

A tenth is 1 part of a whole that is divided into 10 equal parts. A hundredth is 1 part of a whole that is divided into 100 equal parts.

Children use their knowledge of place value to build on their understanding of which decimals are larger, smaller or equal. Comparing decimals is an essential activity for understanding decimals. Look for children thinking more digits means bigger. 0.35 is not larger than 0.8.
Look for children thinking smaller is larger. 0.4 is not larger than 0.87.

Play Decimal dash. 1 person reads out a decimal. Have a race to see who can write the decimal down the fastest. Keep score and see who wins!

Use Uno cards to create decimals and order them together from smallest to largest. Use 0s as place holders to help order decimals.

Use a 100s chart to help you create and compare decimals up to hundredths. Colour in the different fractions and compare their sizes. The 100 squares makes 1 whole. Mix up using tenths and hundredths to help learn the difference between the 2 and how they work together. (Here's a 100s chart you can print.)

WEB LINKS go to:

Notes: Fractions and decimals
Notes: DIY celebrity head game
Video: Fractions with denominators of 10 and 100
Game: Decimals and fractions

Fractions and Decimals: Key Skill 18

Make connections between fractions and decimals

Year 4

A fraction is part of a whole that has been broken into equal parts. It has a:

- numerator (top number: how many parts we have)
- denominator (bottom number: how many parts the whole has been broken up into)
- fraction bar (the line in between).

It will help your child to use these words when talking about fractions.

Decimal places are the numbers after (to the right of) the decimal point. Decimals are part of a whole.

0.1 means $\frac{1}{10}$ of a whole number, and 0.01 means $\frac{1}{100}$ of a whole number.

Fractions and decimals show the same thing. They are both parts of a whole number e.g $\frac{1}{4}$= 0.25.

It is important for children to understand this idea so that they can swap decimals and fractions to solve questions in later years more effectively. We use fractions and decimals in everyday life!

We also use fractions and decimals in everyday life!

Create a table and fill it with numbers and pictures that show fractions and decimals that equal the same amount.

Cut paper, cake, pizza or play dough into 10 equal pieces and then work together to work out the fraction and the decimal for each of the pieces. Combine 2 or more pieces to work out more fractions and decimals!

WEB LINKS go to:

Video: Decimals vs fractions
Video: Common fractions and decimals
Video: Converting fractions to decimals
Game: Fractions to decimals

Fractions and Decimals: Key Skill 19

Model, compare and show decimals with 1 and 2 decimal places

Year 4

Decimal places are the numbers after (to the right of) the decimal point. Decimals are part of a whole.

0.1 means $\frac{1}{10}$ of a whole number, and 0.01 means $\frac{1}{100}$ of a whole number.
A tenth is 1 part of a whole that is divided into 10 equal parts. It is the digit that holds 1 decimal place. A hundredth is 1 part of a whole that is divided into 100 equal parts. It is the digit that holds the 2nd decimal place after the tenth.

	tens	ones	decimal point	tenths	hundredths
46.25	4	6	.	2	5

Children use their knowledge of place value to build on their understanding of decimals, so that they know which decimals are larger, smaller or equal. Comparing decimals is an essential activity for understanding decimals.

Look for children thinking longer means bigger. 0.35 is not larger than 0.8. Look for children thinking shorter is larger. 0.4 is not larger than 0.87.

Write a range of decimals and ask your child to place them in order from smallest to largest. This will help you to find any misunderstandings that they have about decimals and their sizes. Draw pictures to show the size of the decimals and work together to place them in the correct order.

Use a 100s chart to help you create and compare decimals up to hundredths. Colour in the different fractions and compare their sizes. The 100 squares make 1 whole. Mix up using tenths and hundredths to help learn the difference between the 2 and how they work together. (Here's a 100s chart you can print.)

Ask your child to write down 10 numbers between 3.1 and 3.4. Look for your child thinking that there are only 2 numbers – 3.2 and 3.3. This is a sign more work with decimal place value is needed. Use drawings, a 100s chart or model with any blocks to show how more numbers are possible.

Use Uno cards to create decimals and order them together from smallest to largest. Use 0s as place holders to help order decimals.

WEB LINKS go to:

Notes: Decimals
Video: Comparing decimals

Fractions and Decimals: Key Skill 20

Show decimals on number lines

Year 4

Decimal places are the numbers after (to the right of) the decimal point. Decimals are part of a whole.

0.1 means $\frac{1}{10}$ of a whole number, and 0.01 means $\frac{1}{100}$ of a whole number.
A tenth is 1 part of a whole that is divided into 10 equal parts.
A hundredth is 1 part of a whole that is divided into 100 equal parts.

	tens	ones	decimal point	tenths	hundredths
46.25	4	6	.	2	5

A number line is a line of any length that can be used to show the position of numbers in relation to each other. The line can start and end on any number. Number lines use measurements to locate the place of numbers.

Number lines reinforce knowledge of decimal place value as well as the idea that a fraction is a number smaller than 1. When children write decimals on number lines, it helps them to use mental strategies to solve problems involving decimals. First, children will be able to create a 'counting line' where decimals are ordered in the correct order. Number lines use measurements to locate the place of a decimal between 0 and 1. Look for decimals being marked in the location appropriate for their size. Start with tenths and then work with hundredths. Look for children confusing the number of digits with the size of the number. For example, children sometimes think 0.55 is larger than 0.7 because 55 is bigger than 7. Use 0s as place holders to help children learn that 0.7 is the same as 0.70 and 70 is bigger than 55.

Use pen and paper to plot decimals on the number line. This is a simple, but effective activity to learn decimals. Start with decimals in the tenths like 0.3, 0.5 and 0.8 and then work towards adding in hundredths e.g. plot 0.4 and 0.45 on the same number line.

Create a big number line at home using string. You could use the clothes line or the door frame and use post it notes or paper to plot the decimals in the right place on the number line. Grab 5 decimals each and time each other to see who can place their decimals in the right place the fastest.

Play a game of Number between. Write 0 and 1 far apart from each other. Give a number and the child writes this number in between the 0 and 1. Then give another number to be written between either the 0 or 1 and then new number. You can alternate between larger or smaller than the new number.

WEB LINKS go to:

Notes: Empty number lines
Video: Decimals on a number line
Game: Battleship number line
Game: Decimal pecking order

Patterns and Algebra: Key Skill 21

Find missing numbers in number sentences involving addition or subtraction on 1 or both sides of the equals sign

Year 4

A number sentence is an equation. It uses numbers and symbols to describe a maths problem.
A fact family is a group of related facts in addition and subtraction, and multiplication and division.

It helps children understand the relationship between operations.

4 + s = 10 s + 4 = 10 10 – 4 = s 10 – s = 4

These skills will be used by the children for the rest of their maths careers! To find missing numbers, we focus on the idea of equivalence and the role of the equals (=) sign. Remembering that the equals sign means 'the same on both sides' makes it easier to find missing numbers.

Children use their knowledge of numbers to find what is missing. Strategies include:

- guess what the missing number is, and test it to see if the equation works with that number
- use the fact family to help solve the question.

The key is to be able to explain *how* they got their answer (show working out).

Here are some examples of equations with missing numbers.

4 + s = 16 18 – s = 5 25 = s + 21 75 = 130 – s

Using playing or Uno cards, pull out 2 numbers and make a number sentence. Swap the cards around and see how many number sentences you can make using addition and subtraction. Solve your number sentences and find your mystery numbers.

WEB LINKS go to:

Notes: Finding missing numbers
Notes: Finding missing numbers guide
Video: Finding a missing part
Video: Finding missing numbers in subtraction

Patterns and Algebra: Key Skill 22

Investigate and use the features of odd and even numbers

Year 4

Odd numbers are any number ending in 1, 3, 5, 7 and 9.

Even numbers are any whole number ending in 0, 2, 4, 6, and 8.

Working with odd and even numbers helps children to build their mental strategies which helps with speed and efficiency when solving maths questions.

Addition	**Subtraction**
Even + even = even	Even – even = even
Even + odd = odd	Odd – odd = even
Odd + odd = even	Even – odd = odd
Mutliplication	**Division**
Even x even = even	Even ÷ even = even
Even x odd = odd	Even ÷ odd = even
Odd x odd = odd	Odd ÷ odd = odd

Test these rules out and see if they are always true. Are there any number combinations that do not work for these rules?

WEB LINKS go to:

Notes: Odd and even numbers
Video: Odd and even number

Patterns and Algebra: Key Skill 23

Find, continue and describe number patterns that use multiplication

Year 4

Number patterns are patterns created by numbers.

Patterns are formed by rules. A rule is used to work out the value of any part of the pattern. Rules help to continue patterns.

Patterns help children to apply rules, check answers, and see relationships between numbers. Children learn a lot about numbers and build strong operation skills when working with patterns.

Children work with skip counting patterns and look at a sequence of numbers and try to figure out which multiple it is increasing or decreasing by. They will usually need to find missing numbers in a pattern and then write the rule.

Children will first be able to work out the gaps in a pattern, then the numbers further along in the pattern e.g. the 10th number in the pattern. Children sometimes prefer to work with addition and avoid multiplication. This makes working past the numbers they see hard and children often find it difficult to find numbers further along in the pattern e.g. the 10th number.

Use a 100s chart to map out a pattern and work out what the 10th number in a pattern you make would be. (Here's a 100s chart you can print.)

Here is an example of a repeating pattern.

4, 8, ___ , 16, ___ , ___ , 28

The missing numbers are 12, 20 and 24

What would be the 10th number (or term) in this pattern? The rule is: 'increasing by 4' so 4 x 10 = 40. *Answer:* 40

WEB LINKS go to:

Notes: Number patterns
Video: Finding multiplication patterns

Patterns and Algebra: Key Skill 24

Find missing numbers in number sentences involving 1 operation of multiplication or division

Year 4

A number sentence is an equation. It uses numbers and symbols to describe a maths problem. Multiplication is a process of repeatedly adding the same number a given amount of times. Multiply, product of, times and lots of all mean the same thing.

Division is to share into equal groups or parts. Divide, split, quotient, distribute, share equally and separate all mean the same thing.

A fact family is a group of related facts in addition and subtraction, and multiplication and division. It helps children understand the relationship between operations.

4 x s = 20 s x 4 = 20 20 ÷ 4 = s 20 ÷ s = 4

These skills will be used by the children for the rest of their maths careers! To find missing numbers, we focus on the idea of equivalence and the role of the equals (=) sign. Remembering that the equals sign means 'the same on both sides' makes it easier to find missing numbers.

Children use their knowledge of numbers to find what is missing. Strategies include:

• guess what the missing number is, and test it to see if the equation works with that number • use the fact family to help solve the question.

The key is to be able to explain how they got their answer (show working out).

Here are some examples of equations with missing numbers.

4 x s = 36 18 ÷ s = 6 49 = s x 7 15 = 150 ÷ s

Using playing or Uno cards, pull out 2 numbers and make a number sentence. Swap the cards around and see how many number sentences you can make using multiplication and division. Solve your number sentences and find your mystery numbers.

WEB LINKS go to:

Video: Finding patterns
Video: Finding missing numbers