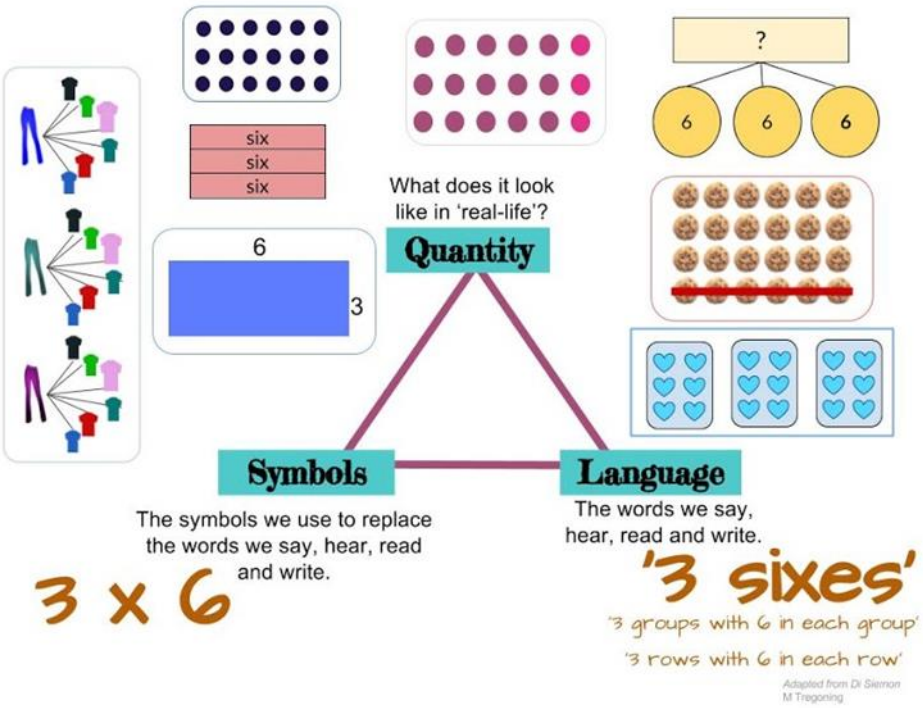
PARENT SUPPORT KIT

GRADE EXPECTATIONS IN NUMERACY

FOR YEAR 4 CHILDREN



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Year 4 Parent Numeracy Checklist

YEAR 4

In Year 4, children work towards the following key skills. How confident is your child with the skills on this checklist? If you'd like help to help your child with these skills, you've 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.

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)
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- ☐ 8 Solve word problems, including those involving money

Multiplication and Division

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- ☐ 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 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

- ☐ 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

*Introduction to **parent support kit in numeracy***

YEAR 4

Mathematics 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 mathematics in real life, it gives their learning purpose. Use mathematics whenever you see the chance! Play mathematics 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.

Definitions are indicated by this icon throughout the kit. Lots of the definitions we use come from ***www.schoolatoz.nsw.edu.au***.

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
- examples of problems
- 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.

Video: Helping young kids get mathematics

Video: Helping your child with primary school mathematics

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 the Grade Expectations 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.

Whole Numbers: Key Skill 1

YEAR 4

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

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 mathematics. 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
16205	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?
- How can I make the second largest 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 10472. Ask:

- How many hundreds are there in 10472?
- 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

Game: Bamzooki

Whole Numbers: Key Skill 2

YEAR 4

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

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 mathematics 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:

Notes: Place value game

Video: Reading whole numbers

Game: Arranging numbers

Game: Ordering numbers

Game: Place value yahtzee

Whole Numbers: Key Skill 3

YEAR 4

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

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 mathematics 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

YEAR 4

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

Rounding means to increase or decrease to the nearest 10, 100, 1000 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 8000.

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.

45 = 50 43 = 40 47 = 50

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.

152 = 200 126 = 100 201 = 200

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.

1152 = 1 000 5626 = 6 000 5500 = 6 000

Rounding Poem

Underline the digit,
Look next door.
If it's 5 or greater,
Add one more.
If it's less than 5,
Leave it for sure.
Everything after is a zero,
not more.

WEB LINKS go to:

Notes: Rounding numbers

Video: Rounding

Addition and Subtraction: Key Skill 5

YEAR 4

Use the inverse operation to check addition and subtraction questions

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 mathematics 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

YEAR 4

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

Children use **mental strategies** to figure out the mathematics 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. 26504 or 71618.

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:

- jump strategy (456 + 200 + 7)
- split strategy (400 + 200 + 50 + 6 + 7)

To find 456 – 207, children might use:

- jump strategy (456 – 200 – 7)
- compensation strategy (456 – 207 = 449 – 200)

WEB LINKS go to:

Notes: Compensation strategy

Notes: Jump strategy

Notes: Mental strategies

Notes: Addition and subtraction

Video: Split strategy

Addition and Subtraction: Key Skill 7

YEAR 4

Use the formal algorithm for addition and subtraction

The **formal algorithm** is a step-by-step method for solving problems in mathematics. 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		44

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
800	

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:

Notes: Addition vertically (with trading)

Video: Written addition methods

Video: Written subtraction methods

Game: Addition and subtraction

Addition and Subtraction: Key Skill 8

YEAR 4

Solve word problems, including those involving money

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 mathematics being used in everyday life, so they're great for children to see that mathematics 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?

$ 14.55 +
$ 11.35
$ 25.90

You now have $25.90.

There are 365 people in the school. If 145 go on an excursion, how many are left at school?

365 – 145 = 220

There are 220 people left at school.

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?

$ 14.50 +	$ 50.00 –	or	$50.00 –	$35.50 –	$19.90 –
$ 15.60	$ 47.30		$14.50	$15.60	$17.20
$ 17.20	$ 2.70		$35.50	$19.90	$ 2.70
$ 47.30					
You have $2.70 left for cake.			You have $2.70 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

YEAR 4

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

Children need to know their times tables as they are used in all areas of mathematics. They are extremely important and any progress in mathematics slows if they do not know their times tables. Knowing and using them with speed and accuracy makes mathematics 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. So we also teach times tables another way.

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).

The 4s, 6s, 7s, 8, and 9s may be new to your child. 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
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. Or build from 5. 6 x 7 = 5 x 7 + 7
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
Notes: Mental strategies
Video: 3 times tables – uptown funk
Video: 6 times tables – cheerleader
Game: Times tables shoot em up

Multiplication and Division: Key Skill 10

YEAR 4

Relate multiplication facts to their inverse division facts

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:

Notes: Inverse operations

Game: Interactive chart for skip counting

Multiplication and Division: Key Skill 11

YEAR 4

Determine multiples of whole numbers

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: What are factors and multiples?

Notes: Factor ninja and multiple monster

Video: Learning multiples

Game: Factors and multiples

Multiplication and Division: Key Skill 12

YEAR 4

Determine factors of whole numbers

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

Notes: What are factors and multiples?

Video: Factor tree demonstration

Video: Finding factors

Game: Factors and multiples

Game: Pobble arrays - find 2 factors

Multiplication and Division: Key Skill 13

YEAR 4

Use the equals sign to show equivalent number relationships involving multiplication

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:

- 3 x 6 = 2 x9
- 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 x0

WEB LINKS go to:

Notes: Commutative law

Video: Commutative law

Video: Multiplication laws

Multiplication and Division: Key Skill 14

YEAR 4

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

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.

Children will want to use these strategies:

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

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

Doubling or halving

23 x 5 = 23 x 2 = 46 x 2 = 92 + 23 = 115

24 ÷ 4 = 24 ÷ 2 = 12 ÷ 2 = 6

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:

Notes: Helping your child with mental calculation

Notes: Mental strategies for multiplication

Video: Multiplying 2-digit by 1-digit

Video: Area models

Game: The 4 operations

Multiplication and Division: Key Skill 15

YEAR 4

Use mental strategies for division with remainders

Mental strategies mean 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

Game: Division and multiplication

Video: Ride and divide book reading with fact family explained

Fractions and Decimals: Key Skill 16

YEAR 4

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

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. Play dough 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: Equivalent fractions using number strips

Video: Children exploring fractions

Game: Fraction match

Game: Triplets

Game: Haunted fractions

Fractions and Decimals: Key Skill 17

YEAR 4

State the place value of tenths and hundredths in decimals

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!

Play Celebrity head with decimals.

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

YEAR 4

Make connections between fractions and decimals

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

YEAR 4

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

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. So 46.25 look like

tens	ones	decimal point	tenths	hundredths
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.)

Play a game where you write a decimal down and then decide the goal (after you have written your decimals) e.g. the smallest decimal wins, the decimal closest to $\frac{1}{2}$ or 0.5 wins etc. Show your decimal numbers at the same time and work out who won. Keep score to find a winner.

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.

Play a game of Less than, more than. Use Uno cards to draw 4 cards and then work together to make these number sentences true. There are lots of different questions that can be asked or solutions that can be created.

□.□□ < 3.□

8.□ > □.□□

□.□ > □.45

WEB LINKS go to:

Notes: Decimals ***Video: Comparing decimals*** ***Game: Decimals***

Fractions and Decimals: Key Skill 20

YEAR 4

Show decimals on number lines

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.

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. How many numbers can you get onto your number line?

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

YEAR 4

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

A **number sentence** is an equation. It uses numbers and symbols to describe a mathematics 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 mathematics 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

YEAR 4

Investigate and use the features of odd and even numbers

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 mathematics questions.

Addition

Even + even = even
Even + odd = odd
Odd + odd = even

Subtraction

Even – even = even
Odd – odd = even
Even – odd = odd

Mutliplication

Even x even = even
Even x odd = odd
Odd x odd = odd

Division

Even ÷ even = even
Even ÷ odd = even
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

YEAR 4

Find, continue and describe number patterns that use multiplication

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

YEAR 4

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

A **number sentence** is an equation. It uses numbers and symbols to describe a mathematics 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 mathematics 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