PARENT SUPPORT KIT

GRADE EXPECTATIONS IN NUMERACY

FOR YEAR 6 CHILDREN

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Year 6 Parent Numeracy Checklist

YEAR 6

In Year 6, 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 Find negative numbers on a number line
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- ☐ 16 Solve word problems involving fractions, decimals and money problems
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- ☐ 18 Calculate 10%, 25% and 50% of amounts, including as discounts

Patterns and Algebra

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- ☐ 20 Locate and record the coordinates of points in all 4 quadrants of the Cartesian plane

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

YEAR 6

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.

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.

Notes: Helping young kids get maths

Video: Helping your child with primary school maths

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 6

Find negative numbers on a number line

Negative numbers mean numbers that are less than 0. They are on the left of 0 when we look at a number line.

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.

Negative numbers are used in real life to show something is less than 0. Number lines are helpful for explaining negative numbers. Use real life examples involving temperature and money to help your child understand negative numbers.

Map the temperatures over winter of a cold place like Antarctica, Russia or Canada. Graph your results.

Some liquids freeze at a temperature lower than 0 degrees celcius. Explore what liquids freeze at a lower temperature and see if you can find their freezing point.

Use a number line to jump over the 0 as you solve the questions. See who can make the trickiest question with the most jumps over 0.

$5 + 2 - 8 - 2 + 4 = 1$

$4 - 10 + 5 - 6 + 9 = 2$

$-7 + 4 + 8 - 7 = -2$

Here are some examples of negative number questions:

If an undersea valley is 64m below sea level and the nearby mountain is 26m above sea level, what is the distance between the depth of the valley and the top of the mountain?

Answer: 90m

I want to buy a phone but I don't have the money. The phone costs $128 but I have to pay my parents $50 that I owe them first. How much money do I need to save?

Answer: $178

I have $16 in the bank. I spend $21. How much money do I now have?

Answer: – $5

WEB LINKS go to:

Notes: Negative numbers on the number line

Notes: Empty number lines

Video: Negative numbers

Video: Explanation of negative numbers

Game: Negative numbers

Whole Numbers: Key Skill 2

YEAR 6

Identify and describe prime numbers and composite numbers

A **prime number** has 2 factors (1 and the number itself).

A **composite number** has more than 2 factors.

A **factor** is a whole number that can be divided exactly into another whole number. For example, the factors of 12 are 12, 6, 4, 3, 2 and 1.

Knowing prime and composite numbers helps children to divide larger numbers and work with fractions. It helps when simplifying fractions. 1 is neither prime nor composite. It has only 1 factor: itself.

Create factor trees for numbers to find if they are prime or composite.

Use playing cards to make a game. Flip a card, and ask your child whether it is a prime or composite number, and why. Flip 2 cards to create bigger numbers. See who can get the most right in a row.

We can explain whether a whole number is prime, composite or neither by finding its factors:

13 has 2 factors (1 and 13). Therefore, 13 is a prime number.

21 has more than 2 factors (1, 3, 7, 21). Therefore, 21 is a composite number.

WEB LINKS go to:

Video: Factor tree demonstration

Video: Prime and composite numbers

Video: What are factors?

Game: Prime numbers

Game: Number factors

Game: Factor trees

Whole Numbers: Key Skill 3

YEAR 6

Create and describe square numbers and triangular numbers

Square numbers are the result of multiplying a number by itself. The first 10 square numbers are 1, 4, 9, 16, 25, 36, 49, 64, 81, 100.

Triangular numbers can be represented by a triangular pattern of dots. The first triangular number is 1, followed by 3, 6, 10, 15, 21… Notice that the difference between 2 numbers increases by 1 each time.

1→3 = 2 3→6 = 3 6→10 = 4

Working with square and triangular number patterns helps to find patterns.

Build arrays that show that triangular numbers are made by forming triangles that are even on all 3 sides. Work together to add the amounts of items used to build a bigger triangle. Can you find the pattern? This can also be done with square numbers, only with a square shape!

Use a multiplication grid to find all the square numbers and colour them in. Can you see a pattern? (Here's a multiplication grid you can print).

2 consecutive triangular numbers can be added to create a square number. Test this theory and see if it works.

Work together to find;

The next triangular number after 10?

Answer: 15

The square number before 64?

Answer: 49

WEB LINKS go to:

Notes: Triangular numbers

Video: Explanation of square and triangular numbers

Game: Magic triangle

Addition and Subtraction: Key Skill 4

YEAR 6

Solve addition and subtraction word problems

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 are important because children must be able to choose and apply a strategy, estimate, solve it and check their answer. Most children will have difficulties in understanding what they need to do. Ask them to read the question carefully and decide what the most important information is and what operation they need to solve the question.

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.

At the shops, give your children problems to work out like; I have $10. I need to buy milk, bread and some apples. Help me work out how many apples I'll be able to buy after I buy the milk and bread.

Isla scored 134 in her first test, 56 in her second and 389 in her third. What was her total score for the 3 tests?

134 + 56 + 389 = 579

Isla scored 579 in total for 3 tests.

WEB LINKS go to:

Video: How to solve word problems using newman's error analysis

Video: Explanation of newman's prompts

Games: Logic and problem-solving

Multiplication and Division: Key Skill 5

YEAR 6

Solve multiplication and division word problems

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 are important because children must be able to choose and apply a strategy, estimate, solve it and check their answer. Most children will have difficulties in understanding what they need to do. Ask them to read the question carefully and decide what the most important information is and what operation they need to solve the question.

Newman's Analysis is a 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's an example question and some different strategies to solve it.

I earned $126 per day for 7 days of work. How much money did I earn in total?

Area model. This involves drawing the multiplication problem as rectangular areas (see Notes: Area model of multiplication).

Split strategy. This involves splitting the question into its place values

$7 \times 126 = (7 \times 100) + (7 \times 20) + (7 \times 6)$

$= 700 + 140 + 42$

$= 882$

Extended multiplication

$$\begin{array}{r} 126 \\ \times \quad 7 \\ \hline 42 \\ 140 \\ +\ 700 \\ \hline 882 \end{array}$$

Contracted multiplication

$$\begin{array}{r} 126 \\ \times \quad 7 \\ \hline 882 \end{array}$$

Short division (different question)

$126 \div 7 =$

$$7\overline{)\,126}\quad 18$$

WEB LINKS go to:

Notes: Area model of multiplication

Video: Mental strategies

Video: Split strategy for multiplication

Video: Multiplication written methods

Video: Short division with remainders

Video: Short division with a decimal remainder

Multiplication and Division: Key Skill 6

YEAR 6

Identify and use grouping symbols

Grouping symbols, i.e. ( ), [ ], are used to separate operations (+, –, x, ÷) in an equation. Always do the operation inside the grouping symbols first, then any operations outside the grouping symbols. Parentheses and brackets mean the same thing.

An **equation** is a number sentence. It uses numbers and symbols to describe a maths problem.

When an equation contains more than 1 operation, grouping symbols help us to know which order to work in. This skill is important to help with the order of operations and high school algebra.

When there is more than 1 grouping symbol, start with the one in the middle

e.g. $3 + [20 \div (9 - 5)] = 3 + [20 \div 4] \rightarrow 9 - 5$ was done first

$= 3 + 5$

$= 8$

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

Explore maths questions with 2 operations and play around with moving the brackets. How do the brackets change the answer?

$(5 + 6) \times 3 = 11 \times 3$

$= 33$

$5 + (6 \times 3) = 5 + 18$

$= 23$

WEB LINKS go to:

Video: Grouping symbols

Video: Parentheses worked examples

Multiplication and Division: Key Skill 7

YEAR 6

Apply the order of operations

The **order of operations** is a step by step method to solve complex calculations.

Exponents – A small number placed to the upper right of number which shows how many copies of the number are multiplied together. Indices and ordinals mean the same thing.

e.g. $5^2 = 5 \times 5 = 25$ $6^4 = 6 \times 6 \times 6 \times 6 = 1\,296$

The order of operations is a mathematical law that makes sure equations are solved correctly. We use acronyms to help us remember the order of operations. They all mean the same thing; they're just different ways of explaining it.

BODMAS – Brackets, Ordinals, Division, Multiplication, Addition, Subtraction

PEDMAS – Parentheses, Exponents, Division, Multiplication, Addition, Subtraction

PIDMAS – Parentheses, Indices, Division, Multiplication, Addition, Subtraction

BIDMAS – Brackets, Indices, Division, Multiplication, Addition, Subtraction

Remember to work from left to right if there is a division and multiplication grouped together, and addition and subtraction grouped together.

Children will often be unaware that they have used the order of operations in the wrong order and have the wrong answer. Practice this skill often but for a short amount of time for maximum impact.

Using word problems can help children to apply the order of operations. For example: I buy 6 goldfish costing $10 each and 2 water plants costing $4 each. What is the total cost? This can be written as the number sentence 6 x 10 + 2 x 4.

Right (multiply 1st) – $6 \times 10 + 2 \times 4 = 60 + 8 = 68$

Wrong (add 1st) – $6 \times 10 + 2 \times 4 = 6 \times 12 \times 4 = 288$

Give your child lots of opportunities to apply the order of operations. Write out equations with multiple operations, grouping symbols and exponents. This skill needs lots of practice!

$2 \times 5 - (3+7) =$

$6^2 + 3 \times 6 =$

$14 - 2 \times 3 \div 2 =$

WEB LINKS go to:

Notes: Order of operations with worked examples

Video: Order of operations explained

Video: Order of operations – introduction

Video: BODMAS with examples

Video: PEDMAS with examples

Video: BODMAS song

Fractions and Decimals: Key Skill 8

YEAR 6

Show, compare and order fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12 and 100

A **numerator** is the number above the line in a fraction which shows how many parts are being considered.

A **denominator** is the number below the line in a fraction. It shows the number of parts a whole has been divided into.

The line in between the numerator and the denominator is called the **fraction bar**. Division bar and vinculum mean the same thing.

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.

From Year 5, children start working with fractions where the numerator changes the size of the fraction too. For example, $\frac{7}{8}$ is larger than $\frac{1}{2}$

Plotting fractions on a number line helps children to see fractions as a (smaller) number in their own right. This is important for learning to multiply and divide fractions in later years.

Write a group of fractions out and work together to plot them on a number line. This can be trickier than it seems!

Ask your child to write down 15 fractions between 3 and 4. Look for your child using only $\frac{1}{2}$ and $\frac{1}{4}$

Use drawings or a number line to show how this is possible and what answers there could be. There are lots of different answers you can make!

Play a game of Less than, more than. Use Uno cards to draw 4 cards and then work together to make number sentences true. There are lots of different questions that can be asked and solutions created. You can choose to move the greater than or less than symbols or challenge yourselves to keep them as they are!

Here is an example:

$$\frac{\blacktriangle}{\blacktriangle} > \frac{\blacktriangle}{8} < \frac{3}{\blacktriangle}$$

WEB LINKS go to:

Notes: Empty number lines

Game: The legend of dick and dom comparing fractions

Game: Fraction monkeys

Fractions and Decimals: Key Skill 9

YEAR 6

Find, create and write equivalent 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 represent equal parts of a whole. To help children to find equivalence between fractions use number lines or pictures.

This key idea focuses on the denominators:

- 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.

To create equivalent fractions

Larger – multiply the numerator and denominator by the same number

$\frac{1}{2} \times \frac{2}{2} = \frac{2}{4}$

$\frac{3}{4} \times \frac{3}{3} = \frac{9}{12}$

Smaller – divide the numerator and denominator by the same number.

$\frac{6}{12} \div \frac{3}{3} = \frac{2}{6}$

$\frac{25}{100} \div \frac{5}{5} = \frac{5}{20}$

WEB LINKS go to:

Video: Equivalent fractions on a number line

Game: Equivalent fractions easy

Game: Equivalent fractions

Game: Equivalent fractions baseball

Fractions and Decimals: Key Skill 10

YEAR 6

Write fractions in their simplest form

A fraction is in its **simplest form** when the denominator is the smallest it can possibly be (while still being a whole number). It is never an improper fraction but can be a mixed numeral.

Highest common factor (HCF) of 2 or more whole numbers is the largest number that will divide exactly into each of the numbers.

Reducing fractions to their simplest form makes fractions easier to work with especially when learning algebra in high school. Knowing your times tables helps children to find the highest common factors and simplify fractions easily.

Knowledge of factors and multiples, equivalent fractions and converting improper fractions to mixed numerals is essential for this skill. (See video: HCF with factor tree)

When simplifying fractions:

1 Convert any improper fractions to mixed numerals.
2 What are the factors of the numerator?
3 Does the denominator share any of those factors? (If yes, then it can be reduced!)
4 Use the HCF and divide both the numerator and denominator by that number.

Here are some examples:

$\frac{3}{9}$ Factors of 3 are 1, **3**

Factors of 9, 1, **3**, 9 (3 is the HCF)

$\frac{3}{9} \div \frac{3}{3} = \frac{1}{3}$

$\frac{3}{9} = \frac{1}{3}$

$\frac{5}{20}$ Factors of 5 are 1, **5**

Factors of 20 are 1, 20, 2, 10, **5**, 4 (5 is the HCF)

$\frac{5}{20} \div \frac{5}{5} = \frac{1}{4}$

$\frac{24}{18} = 1\frac{6}{18}$ Factors of 6 = 1, **6**, 2, 3

Factors of 18 = 1, 18, 2, 9, 3, **6** (6 is the HCF)

$\frac{6}{18} \div \frac{6}{6} = \frac{1}{3}$

$\frac{24}{18} = 1\frac{1}{3}$

WEB LINKS go to:

Notes: Fractions

Notes: Converting fractions

Video: HCF with factor tree

Video: HCF

Video: Simplifying fractions

Video: Simplifying fractions song

Game: Simplifying fractions

Fractions and Decimals: ***Key Skill 11***

YEAR 6

Add and subtract fractions, including mixed numerals, with the same denominators

A **mixed numeral** is a number made up of a whole number and a proper fraction.

A **denominator** is the number below the line in a fraction. It that shows the number of parts a whole has been divided into.

When adding and subtracting with the same denominator, the numerator is added or subtracted and the denominator stays the same. With mixed numerals, the whole numbers are added or subtracted together and the fractions are added and subtracted together, then the whole numbers and fractions are added together. Show answers in their simplest form.

Level 1 Adding and subtracting

$\frac{2}{6} + \frac{2}{6} = \frac{4}{6}$ $\quad \frac{3}{8} + \frac{4}{8} = \frac{7}{8}$ $\quad \frac{8}{9} - \frac{5}{9} = \frac{3}{9}$ $\quad \frac{5}{10} - \frac{3}{10} = \frac{2}{10}$

Level 2 Adding and subtracting with mixed numerals

$1\frac{2}{5} + 2\frac{1}{5} = (1+2) + (\frac{2}{5} + \frac{1}{5})$

$= 3 + \frac{3}{5}$

$= 3\frac{3}{5}$

$7\frac{3}{6} - 4\frac{2}{6} = (7-4) + (\frac{3}{6} - \frac{2}{6})$

$= 3 + \frac{1}{6}$

$= 3\frac{1}{6}$

Level 3 Adding and subtracting when conversions are needed

$\frac{4}{5} + \frac{4}{5} = \frac{8}{5} = 1\frac{3}{5}$

$\frac{4}{6} + \frac{5}{6} = \frac{9}{6} = 1\frac{3}{6}$

$1\frac{1}{5} - \frac{4}{5} = \frac{6}{5} - \frac{4}{5} = \frac{2}{5}$

$1\frac{2}{4} - \frac{3}{4} = \frac{6}{4} - \frac{3}{4} = \frac{3}{4}$

Level 4 Adding and subtracting with mixed numerals when conversions are needed

$1\frac{5}{7} + 3\frac{4}{7} = (1+3) + (\frac{5}{7} + \frac{4}{7})$

$= 4 + \frac{9}{7}$

$= 4 + 1\frac{2}{7}$

$= 5\frac{2}{7}$

$3\frac{1}{8} - 1\frac{5}{8} = 2\frac{9}{8} - 1\frac{5}{8}$

$= (2-1) + (\frac{9}{8} - \frac{5}{8})$

$= 1 + \frac{4}{8}$

$= 1\frac{4}{8}$

WEB LINKS go to:

Video: Add and subtract fractions with same denominator

Video: Add and subtract fractions of different denominators

Video: Add and subtract uncommon denominators with mario

Game: Computation adding fractions

Game: Fraction word problems

Game: Adding and subtracting fractions

Game: Adding and subtracting fractions with different denominators

Fractions and Decimals: Key Skill 12

YEAR 6

Find a simple fraction of a group

Fraction of a group is the same as the fraction of a whole. We find a fraction of a group of objects. So to find $\frac{1}{2}$ of 10 objects is 5 objects. Fractions of a quantity and fractions of a collection mean the same thing.

Multiplying fractions is the main way to find a fraction of a quantity. That is, if we need to find $\frac{1}{5}$ of 50, we can calculate $\frac{1}{2}$ x 50 = 25. Fractions of a group or fractions of a collection mean the same thing.

Start by multiplying fractions where the numerator is 1. When the numerator changes to more than 1, questions become harder e.g. $\frac{1}{3}$ of 12 first, then try $\frac{2}{3}$ of 12.

Use the multiplication symbol (x) and the word 'of' to multiply fractions by whole numbers. $\frac{2}{6}$ of 12 and $\frac{2}{6}$ x 12 mean the same thing.

The simplest way of multiplying a fraction by a whole number is to use the inverse operation. When we look at the example of $\frac{1}{2}$ x 50, we think 'How many times does 2 fit into 50?' (That is, 50 divided by 2 equals 25). Therefore $\frac{1}{2}$ x 50 = 25.

Another way is to:

- divide the whole number by the denominator
- then times the answer by the numerator.

Level 1

$\frac{1}{4}$ x 20 = 20 ÷ 4 (divide whole number by denominator)

= 5 x 1 (times answer by numerator)

= 5

Level 2

$\frac{3}{5}$ of 30 = 30 ÷ 5 (divide whole number by denominator)

= 6 x 3 (times answer by numerator)

= 18

Ask your child to find fractions of different amounts in daily life, e.g. Our shopping cost $125. What is $\frac{1}{4}$ of this?

WEB LINKS go to:

Video: Multiplying fractions by whole numbers visual

Video: Multiplying fractions by whole numbers

Game: Multiplying fractions

Fractions and Decimals: Key Skill 13

YEAR 6

Add and subtract decimals up to 3 decimal places

Decimal places are the numbers after (to the right of) the decimal point.

When working with decimals, it is important children estimate before working out an answer. This will help them remember the decimal and put it in the right place.

When adding or subtracting decimals mentally, children can use the split, jump or compensation strategy (Year 3 Key Skills 5–7)

Split – when no trading is needed

4.9 + 6.4 = (4 + 6) + (0.9 + 0.4)

= 10 + 1.3

= 11.3

Jump – when trading is needed

6.4 – 3.5 = 6.4 – 0.5

= 5.9 – 3

= 2.9

Compensation – when you can round 1 of the numbers easily.

9.999 – 4.576 = 10 – 4.576 (+0.001)

= 5.424 (– 0.001)

= 5.423

When we add or subtract decimals using a written strategy, we do it the same way as with whole numbers with and without trading (Year 4 Key Skill 7). When adding and subtracting – the decimal point never moves! Remember to include decimals where 0s are needed. If you have 1 decimal that is longer than the other, you can make them the same by adding 0s to the end. This is especially important in subtraciton.

Without trading		**With trading**		**When to add 0s**	
4.9	8.65 –	6.795	4.823 –	4.6 –	4.600
6.4 +	5.43	4.556 +	2.798	3.456	3.456
11.3	3.22	11.351	2.025	1.144	1.144

WEB LINKS go to:

Video: Adding and subtracting decimals

Game: Adding and subtracting decimals

Fractions and Decimals: Key Skill 14

YEAR 6

Multiply and divide decimals by 1-digit and 2-digit whole numbers

We use these skills everyday when working with money! Estimating answers first and then using inverse operations to check answers are excellent maths habits to adopt. They also help to avoid simple mistakes.

When **multiplying with decimal questions**, the number of numerals behind the decimal point in the question is how many are behind the decimal point in the answer. So multiply ignoring the decimal point, then at the end, count how many numerals are behind the decimal point in the question, and then count in from the right to that number to place your decimal.

Here are some examples:

5.67 x 8 = ?

1 Round and estimate 6 x 8 = 48 (look for an answer around 48)
2 567 x 8 = 4536
3 5.67 x 8 = 45.36 (2 numbers behind the decimal point in the question and answer)

8.3602 x 9 = ?

1 Round and estimate 9 x 8 = 72 (look for an answer around 72)
2 83602 x 9 = 752428
3 Solve 8.3602 x 9 = 75.2428 (4 numbers behind the decimal point in the question and answer)

When **dividing with decimal questions** using long division, the decimal point never moves. If you find a remainder, add as many 0s as you need to the end of the decimal until you no longer have a remainder. Look for repeating patterns as these will continue forever! If you find a repeating pattern, stop after the second set. We place a dot above the first and last number in the pattern to show that the pattern repeats e.g. 4.235235 is written as $4.\dot{2}3\dot{5}$.
The same is with a recurring decimal e.g. 4.333333333333. We write $4.\dot{3}$ to show it continues forever.

Here are some examples:

16. 934 ÷ 5 = ?

1 Round and estimate – 17 ÷ 5 = $3\frac{2}{5}$ or 3.4 (look for an answer around 3.4)
2 Solve 16.934 ÷ 5 =

$$5\overline{)16.9340}\quad 3.3868$$

= 3.3868

9.58 ÷ 3 = ?

1 Round and estimate – 9 ÷ 3 = 3 (look for an answer around 3)
2 Solve 9.58 ÷ 3 =

$$3\overline{)9.580000}\quad 3.193333$$

$= 3.19\dot{3}$

WEB LINKS go to:

Video: Multiplying decimals
Video: Dividing decimals (long division)
Game: Dividing decimals
Game: Multiplying decimals

Fractions and Decimals: Key Skill 15

YEAR 6

Multiply and divide decimals by 10, 100 and 1000

Decimal places are the numbers after (to the right of) the decimal point.

Children need to know how to multiply decimals by 10, 100 and 1000 because it helps them to estimate answers, find percentages and better understand decimal place value. This helps children to solve problems involving decimal numbers.

There is a rule for powers of 10 (10, 100, 1 000, 10 000 etc)

To **multiply**, we teach the children to move the decimal point to the **right** 1 place when we multiply by 10, 2 places when we multiply by 100 and 3 places when we multiply by 1000.

e.g. 3.4 x 10 = 34 3.4 x 100 = 340 3.4 x 1000 = 3400

To **divide**, we teach the children to move the decimal point to the **left** 1 place when we divide by 10, 2 places when we divide by 100 and 3 places when we divide by 1000.

e.g. 356.2 ÷ 10 = 35.62 356.2 ÷ 100 = 3.562 356.2 ÷ 1000 = 0.3562

WEB LINKS go to:

Notes: Multiplying and dividing decimals by powers of 10

Video: Multiplying decimals by powers of 10

Video: Dividing decimals by powers of 10

Game: Multiply by 10 machine

Game: Place value headings

Game: Bingo – times or divide

Fractions and Decimals: Key Skill 16

YEAR 6

Solve word problems involving fractions, decimals and money problems

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 are important because children must be able to choose and apply a strategy, estimate, solve it and check their answer. Most children will have difficulties in understanding what they need to do. Ask them to read the question carefully and decide what the most important information is and what operation they need to solve the question.

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.

Real-life money problems are always helpful. For example:

- Add the cost of each item in a shopping list to create a shopping budget.
- What is 10% off the cost of items at the supermarket?
- If you eat $\frac{1}{6}$ of a pizza and a friend eats $\frac{1}{5}$, how much is left?

WEB LINKS go to:

Notes: Money smart workbook

Video: Super cyril's circus supplies

Game: Running the school canteen

Game: Fraction word problems

Game: Add and subtract money word problems

Fractions and Decimals: Key Skill 17

YEAR 6

Convert between equivalent percentages, fractions and decimals

Percentages, **fractions** and **decimals** can all can mean the same thing, they represent a part of a whole number. That is, $\frac{1}{2} = 0.5 = 50\%$. Also, $\frac{1}{4} = 0.25 = 25\%$.

It is important children can swap between decimals, percentages and fractions to solve questions. Children will find converting decimals to percentages and vice versa the easiest with converting to and from fractions the hardest.

Decimals to percentages

Dr Pepper – The name Dr Pepper shows which way to move the decimal point. Dr always moves 2 decimal places towards Pepper (in this case right). 0.43 as a % is 43%

Percentages to decimals

Pepper Dr – The name Pepper Dr shows which way to move the decimal point. Dr always moves 2 decimal places towards Pepper (in this case left). 58% as a decimal is 0.58

Fractions to decimals

Cowboy Method – This story helps to set your working out correctly. It is also easy to remember!

Cowboy Story – The cowboy rides the horse. The cowboy goes inside the house. Takes off his boots, hangs up his hat and eats 3 donuts. The horse stays outside the house.

The cowboy is the numerator, the horse is the denominator. The cowboy goes into his house (the long division symbol) and the horse stays outside (the left of the long division symbol.) His boots and hat are the 2 decimal points (1 inside the question next to your numerator and 1 on top in the same place) and the 3 donuts are 0s added to the right of the decimal point after the cowboy. Then solve the division question (see Video: Cowboy method).

$\frac{3}{5} = 5\overline{)3.000}^{0.600}$

$\frac{3}{5} = 0.6$

Fractions to Percentages

Free Dr Pepper – To convert fractions to percentages, we convert fractions to decimals, and then decimals to percentages.

Here are some examples:

$\frac{1}{4} = \frac{25}{100} = 0.25 = 25\%$ $\frac{4}{5} = \frac{80}{100} = 0.80 = 80\%$

Percentages to Fractions

Reverse Free Doctor Pepper and change percentage to a decimal, then the decimal to a fraction.

WEB LINKS go to:

Notes: Decimal fractions

Notes: Percent

Video: Cowboy method

Game: Fractions, decimals and percentages

Notes: Equivalent fractions

Notes: Percentage

Game: Fractions and decimals

Fractions and Decimals: Key Skill 18

YEAR 6

Calculate 10%, 25% and 50% of amounts, including as discounts

Calculating percentages is a skill that is used in everyday life. We use this skill to find statistics in sport, compare growth and in money.

Here are some examples:

Ena gets 32 out of 40 shots in during her netball match. Using a calculator, what is her shooting percentage?
32 ÷ 40 = 0.8 x 100 = 80
Answer: Ena's shooting percentage is 80%

It's 25% off all DVDs at JB Hi-Fi. The DVD Emily wants is $20. How much will she save?

To find 25% of a quantity, we divide it by 4, because 25% = $\frac{1}{4}$
25% of 20 = 20 ÷ 4 = 5.
Answer: Emily sill save $5

Lisa's bank account has halved over this month. It started at $20. How much is in her back account now?

To find 50% of a quantity, we divide it by 2, because 50% = $\frac{1}{2}$
50% of 20 = 20 ÷ 2 =10.
Answer: There is $10 left in Lisa's bank account.

Children also need to know how to calculate a discounted price. We do this by finding the dollar amount of the percentage discount, and subtracting it from the original price.

Here are some examples:

For example, to calculate 25% off $40 we would find $\frac{1}{4}$ x $40 (25%) Then subtract the answer from $40.
$40 ÷ 4 = $10. So $40 – $10 = $30.
The new price is $30.

George can get 10% off his $20 t-shirt. How much will he pay for the t-shirt?

To find 10% of $20, we divide 20 by 10.
10% of 20 = 20 ÷ 10 = 2.
$20 – $2 = $18
Answer: George will pay $18 for his t-shirt

WEB LINKS go to:

Game: Percent shopping

Game: Balloon invaders

Game: Legend of dick and dom

Game: Wise park percentages

Patterns and Algebra: Key Skill 19

YEAR 6

Find and apply the rule for geometric patterns and number patterns.

Geometric patterns are patterns created by shapes and **number patterns** by numbers.

A **rule** works out the value of any part of the pattern. Rules help to continue patterns. **Term** is one of the numbers in a sequence e.g. in 2, 4, 6, the 3 terms are 2, 4, and 6.

Finding and applying patterns are vital for children in algebra in Year 7.

The **function rule** finds the value of ***any*** term in a pattern. Look for an operation that finds the bottom number every time. Both the top and bottom numbers must follow this pattern for every term.

To find a pattern we:

1 **Work out what happens** to the top number to get the bottom number.
2 **Check it works** for the next term.
3 **If yes**, you have found your function rule! Apply it to find your missing number.
4 **If no**, try something else and start the process again. You may have used the wrong operation.

Here are some examples:

24	21	18	15	6
19	16	13	10	

1 To get from 24 to 19, you can –5. 24 – 19 = 5
2 21 – 5 = 16.
3 It works! The function rule is –5. 6 – 5 = 1. The missing number is 1

George earned $2 for each hour he worked. How much did he earn in 10 hours?

Hours	1	2	3	4	10
$ Earned	$2	$4	$6	$8	

1 To get from 1 to 2, you can +1. 1 + 1 = 2
2 2 + 1 = 3, we needed 4 to be our answer.

Another way to get from 1 to 2 is 1 x 2 = 2
1 2 x 2 = 4,
2 3 x 2 = 6 – The function rule is x2!
3 10 x 2 = 20. George earnt $20 in 10 hours.

WEB LINKS go to:

Game: Number patterns

Video: Finding function rules

Patterns and Algebra: Key Skill 20

YEAR 6

Locate and record the coordinates of points in all 4 quadrants of the Cartesian plane

The **Cartesian plane** is 2 number lines that cross at 0; 1 line is horizontal and the other is vertical. It is used to plot points. Negative numbers are to the left of or below 0; positive numbers are to the right of or above 0. Cartesian plane, number plane and coordinate plane mean the same thing.

The Cartesian plane is an extension of a number line. The concept helps us to describe and visualise algebraic relationships and to better understand algebra. It is an important concept for all areas of high school maths. Children find finding and reading a point on a plane easier and plotting on a plane harder.

Children work from 1st quadrant (+, +), to 2nd quadrant (+, – and 3rd (–, +) and 4th (–, –) quadrants last (see Video: Coordinate Plan).

Play Battleships.

When we work with maps, we use coordinates. This is very similar to the Cartesian plane so any opportunity to read and use maps helps children to understand the Cartesian plane. Use a map when you go for a drive or a bushwalk. Work together to read the map as you make your journey.

Read maps in an atlas and use coordinates to find countries or places of interest. Have a race to see who can find a location in an atlas the fastest. Start with the book closed and use the index to find the coordinates of the place and page number.

Create a shape or a picture on the Cartesian plane and then work together to write the coordinates out so that someone can copy your shape or picture on another plane perfectly.

WEB LINKS go to:

Notes: Importance of cartesian plane

Video: Coordinate plane

Video: The cartesian plane

Video: Cartesian plane song

Game: Stock the shelves

Game: Cartesian coordinates printable games

Game: Practice reading and plotting coordinates

Game: Cartesian plane online games