

Cambridge Park Academy

Number & Calculation Policy

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| Created By: | S French |
| Approved by; | Full Governing Body |
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Number and Calculation

Cambridge Park Academy



At Cambridge Park Academy, we recognise that maths is a critical skill and vehicle for success in the wider world. Understanding maths in the wider world supports greater understanding of life itself and is an essential social tool to serve preparation for adulthood.

This document acts as our guide to Number and Calculation at Cambridge Park. Our entire curriculum is designed with the fundamental goal: to support every child to maximise their unique potential. We provide a nurturing and supportive learning environment, with a curriculum specifically adapted for children with moderate, profound and multiple learning difficulties.

We believe that a true understanding of mathematics begins with hands-on, sensory exploration. Learning starts not with numbers on a page, but with the world around us. Your child will explore concepts through play with sand and water, learning about 'full' and 'empty'. They will learn to count by combining groups of their favourite objects, and they will be introduced to fractions in the most practical way possible—by sharing snacks into equal parts. These meaningful, real-world experiences build a solid and lasting foundation for all future learning.

Our curriculum is structured into progressive stages, but this is a journey taken at each child's own pace. We ensure that a skill is secure and understood before introducing the next concept. As confidence grows, children are gradually introduced to the symbols and language of mathematics, like the '+' and '-' signs, to describe the actions they are already able to do. This ensures that abstract ideas are always connected to concrete experiences.

Our ultimate aim is to foster confidence, build independence, and empower your child to use mathematical skills in their daily lives. From exchanging a coin for an item in a role-play shop to sequencing the events of their day, we celebrate every step of progress. This guide is here to show you the path your child will take as they become a confident and capable mathematician.

Cambridge Park Progressive Pathways Model - Mathematics

Our curriculum at Cambridge Park Academy is a curriculum for all. It aims to provide rich, exciting and ambitious opportunities for all pupils throughout their journey with us. It has been designed and developed to build upon those aspects of education and social development that are important for our pupils and which best prepare them for adulthood.

Depending on their individual needs, abilities and aspirations for the next stage of their lives, students follow our **Progressive Pathways Model** which is a highly adapted concept based around the more traditional 3 learning pathways of formal, semi-formal and personalised.

We are aware that all students progress and develop at different rates so our adapted curriculum pathways model, in conjunction with timely and accurate assessment, is fluid and progressive to ensure it meets the academic, social and personal developmental needs of our pupils at every point of their learning journey

| | | | | |
|-----------------------------|--|---|-----|------|
| Functional (Formal) | Stage 9-10 | <p>To ensure that our most cognitively able pupils are given the opportunity to deepen their knowledge, skills and vocabulary across a wide and ambitious curriculum in a safe and informed way, we have developed and extended our curriculum plans to ensure there is no limit on learning and progress. As pupils prepare to play a full and active role in society, we highlight the need to ensure that they are prepared to become independent and develop resilience, developing good communication skills and learn how to work with others respectfully.</p> <p>Our most cognitively able pupils are provided with carefully planned opportunities to extend their learning through deeper reasoning, problem-solving and conceptual exploration. They are encouraged to make connections across different areas of mathematics, apply their understanding in unfamiliar contexts, and use mathematical language to explain and justify their thinking. This approach ensures that all learners are appropriately challenged and supported to reach their full potential.</p> | | |
| | Stage 5-8 | <p>Pupils working within stage 5-8 are working securely at subject specific learning through the Functional Curriculum. They are continuing to develop increased attention and work habits and are able to purposefully engage in discrete subject lessons.</p> <p>Pupils access a curriculum that builds secure foundations in knowledge and supports the development of key skills across a range of subjects. Learning is structured, meaningful, and adapted to individual needs, offering opportunities to explore, practise, and apply concepts in practical and engaging ways. Pupils are supported to develop greater independence, improve communication and reasoning, and deepen their understanding of the world around them. The curriculum fosters curiosity, confidence, and social interaction, encouraging pupils to make connections across subjects and engage purposefully with learning both in and beyond the classroom.</p> <p>Typically, pupils working around stage 7 and onwards, will undertake an entry level qualification at Key Stage 4 and leave the academy at Year 11, moving on to FE provision.</p> <p>Mathematics on our Functional Pathway develops pupils' confidence and understanding across key areas including number, calculation, shape, space, measure and data handling. Learning is practical and engaging, giving pupils opportunities to explore, reason and problem-solve in meaningful, real-life contexts. As their understanding deepens, pupils build fluency and begin to apply their mathematical thinking across subjects and everyday situations. The pathway supports pupils to become independent, resilient learners with a secure foundation for future mathematical learning, using the maths mastery flow to support mathematical understanding.</p> | | |
| | Stage 1-4 | <p>Pupils working within stage 1-4 are starting to develop subject specific learning and are accessing the Foundations Curriculum. They still require high levels of support in the 4 areas of need but are able to access areas of the curriculum delivered using a literacy-led thematic approach. The literacy-led thematic approach offers a vehicle for building attention, engagement and communication skills across the breadth of the curriculum.</p> <p>Pupils are given rich, play-based and exploratory opportunities to develop communication, physical skills, personal and social understanding, and early thinking in ways that are meaningful and relevant to them. Learning happens through real-life experiences that spark curiosity, build confidence, and support independence. Children are encouraged to express themselves, make choices, develop relationships, and begin to make sense of the world around them through hands-on, sensory, and interactive experiences tailored to their developmental stage.</p> <p>Mathematics in our Foundations Pathway supports pupils to develop a broad understanding of mathematical concepts through active, practical learning. Pupils explore number, shape, space and measure, alongside developing key skills such as sorting, comparing, sequencing, estimating and problem solving. Learning is embedded within meaningful, real-life experiences that encourage curiosity, reasoning and independence. Through exploration and play, pupils build the confidence to apply their mathematical thinking across all areas of learning and everyday life following the maths mastery flow.</p> | | |
| Fundamentals (Personalised) | <p>Pupils accessing the Fundamentals curriculum are predominantly working within the Engagement Model. The curriculum is planned around the 4 areas of need, with a core focus on supporting pupils in developing social communication skills. An adapted continuous provision model is in place, with learning activities planned through a thematic approach. Pupils may access aspects of the Foundations curriculum where appropriate.</p> <p>Mathematics plays a vital role in our Fundamental Pathway and is often a motivating and sensory-rich driver for learning, providing meaningful opportunities to explore number, pattern, shape and space. Through practical, hands-on experiences, pupils develop early number awareness while building confidence and curiosity in the world around them.</p> | | | |
| | C&L | Cognition | P&S | SEMH |



Summary of Calculation Methods by Operation and Stage

At Cambridge Park Academy, pupils are supported to develop secure conceptual understanding of number and calculation through the maths mastery flow. Many of our learners benefit from working with concrete apparatus well beyond the typical age expectations, as this provides essential sensory and visual support for building mathematical understanding.

Concrete resources enable pupils to:

- Explore mathematical ideas in a hands-on, practical way
- See and feel the structure of number and calculation
- Develop mathematical language and reasoning
- Build secure foundations before moving towards pictorial and abstract representations

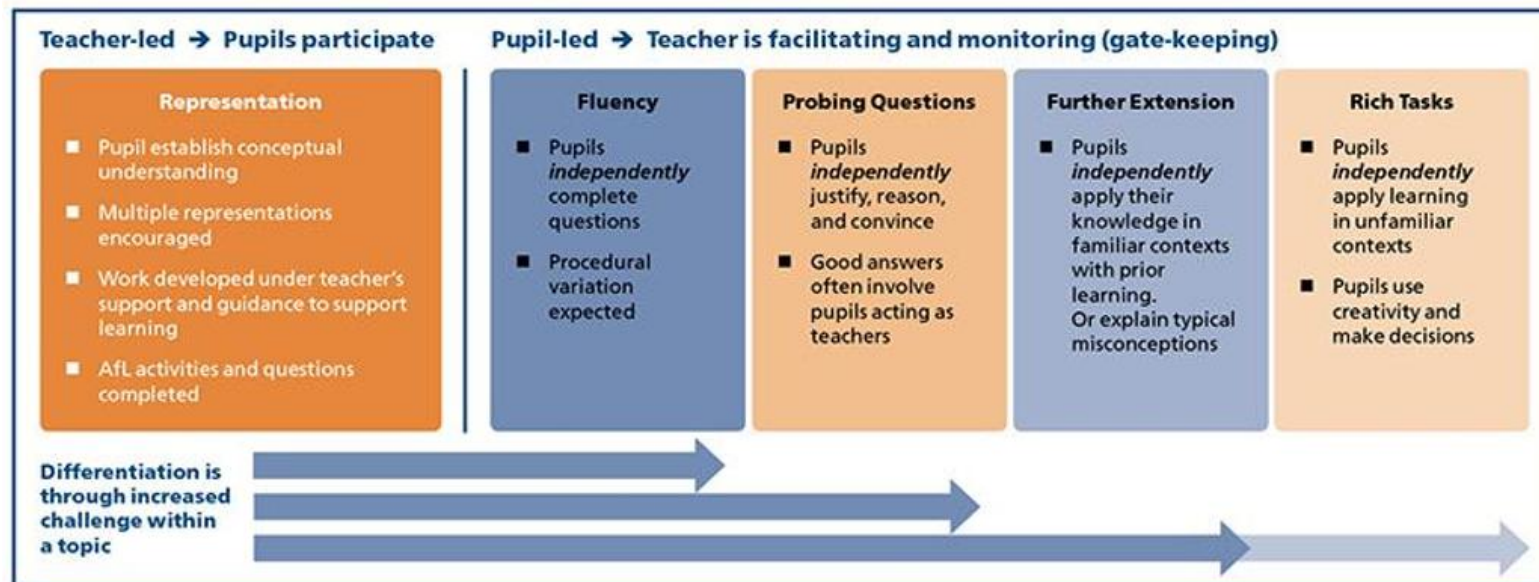
Concrete resources that may be found in classrooms:

(This list is not exhaustive and teachers will adapt resources based on themes and appropriateness to pupils)



Maths Mastery Flow

The Maths Mastery Flow approach supports all learners, by providing a carefully sequenced journey through mathematical concepts that builds deep, long-term understanding. Lessons progress in small, manageable steps using the Concrete–Pictorial–Abstract (CPA) model, enabling pupils to move from hands-on exploration to visual representation and finally to abstract reasoning. This structured and consistent approach reduces cognitive overload, supports different learning styles, and fosters confidence and independence. The emphasis on depth rather than speed allows all pupils to secure understanding before moving on, while the use of discussion, reasoning, and sentence stems promotes mathematical language and communication skills. Overall, the Maths Mastery Flow creates an inclusive learning environment where every pupil can experience success and develop a secure foundation in mathematics.



The Maths mastery flow is represented in workbooks through a colour coded system.

Representation

Fluency

Probing questions

Further extension

Rich tasks

Representation Stage



10.09.2025
L.O. To recognise numbers.

Today we played a game of Number Bingo Numbers were shown in lots of different ways, such as Numicon, Dienes blocks, counters, ten frames, and objects. We worked hard to recognise and identify the number being represented and then checked if we had that number on our bingo boards. This helped us practise matching numbers to their numerals and strengthened our number recognition skills in a fun and interactive way.

Fluency Stage

Count in 2s to complete the number lines.

a

b

c

d

2. Complete the number sentences.
- ___,281 rounded to the nearest 1,000 is 1,000
 - ___,542 rounded to the nearest 1,000 is 10,000
 - 5,___34 rounded to the nearest 1,000 is 5,000
 - 3,___00 rounded to the nearest 1,000 is 4,000
 - 5,8___0 rounded to the nearest 1,000 is 10000
 - 5,3,___ rounded to the nearest 1,000 is 5000
 - Explain your answers to e and f.

A) 2,811 is rounded to 1000
 B) 75,42 is rounded to 10000
 C) 5,34 is rounded to 5000
 D) 3,00 is rounded to 4000
 E) 5,810 is rounded to 10000
 F) 5,321 is rounded to 5000
 5,321 is closer to 5000 because the hundreds shows us 3 and the tens is closer to the smaller ten in the number itself.

Probing Questions Stage

4 is one more than 3 which is one more than 2

7 is one more than 6 which is one more than 5

2 is one more than 1 which is one more than

10 is one more than 9 which is one more than

7 is one more than 6 which is one more than

Complete the sentences by finding one more.

- 18 is one more than 17.
- One more than 25 is 26.
- 25 is one more than 34.
- One more than 48 is 49.

Check the patterns below. Tick the patterns which are correct.

AB

AB

AB

ABC

ABC

AB

Further Extension Stage

30, 10, 2, 4

1. Ben and Jess have both drawn bar models to show 3×5 .

Ben

Jess

What is the same? What is different?

2. Draw your own bar models to represent:

- 4×5
- 2×5
- 6×5

Mo counts up to 50 in 2s.

Kay counts up to 50 in 5s.

What numbers do they both say?

Can you spot a pattern?

$5 \times 3 = 15$
 $3 \times 5 = 15$
 $3 \times 5 = 15$

They both the same but in different way.

20
 $5 \ 5 \ 5 \ 5$

10
 $5 \ 5$

30
 $5 \ 5 \ 5 \ 5 \ 5$

2 4 6 8 10 12
 14 16 18 20 22 24
 26 28 30 32 34 36
 38 40 42 44 46 48 50

5 10 15 20 25
30 35 40 45 50

Rich Task Stage


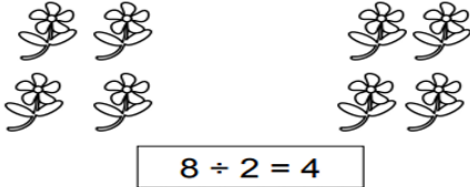
Ordering Journeys

Here are the distances (as the crow flies) in kilometres from London to various cities in the world:

| | | |
|-----------------|----------------|------------------|
| Abu Dhabi 5480 | Barcelona 1139 | Cape Town 9680 |
| New Delhi 6718 | Edmonton 6805 | Florence 1309 |
| Gothenburg 1938 | Houston 7012 | Istanbul 2691 |
| Jerusalem 3611 | Karachi 6314 | Leamington 17425 |

Put these journeys in order according to the distances involved.



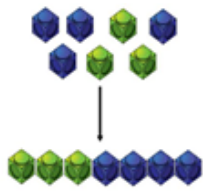



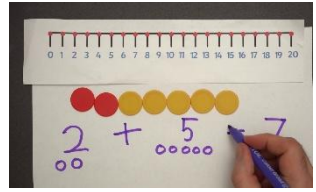
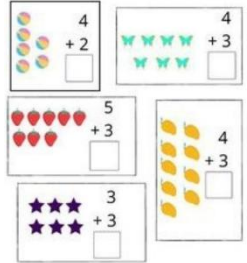

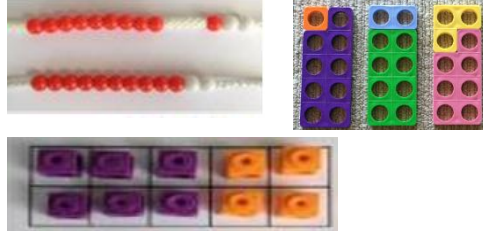
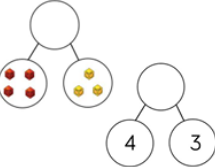
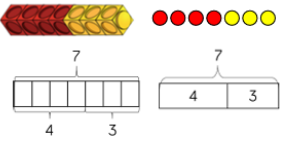

Concrete, Pictorial and Abstract Representation in Mathematics

| Concrete | Pictorial | Abstract |
|--|---|---|
| This is when pupils use real objects to help their understanding of maths for example blocks, dienes or counters | After using real objects, pupils learn to draw or see mathematical problems with pictures to represent their concrete resources. Instead of drawing two blocks, pupils may draw two squares | This is when pupils will use numbers and symbols to represent maths. E.g. $2+3=5$ |
|  |  | $9 \div 3 = 3$ |

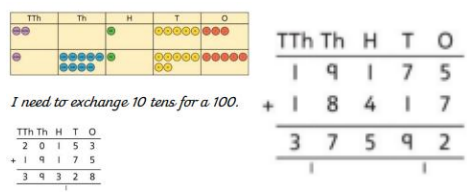
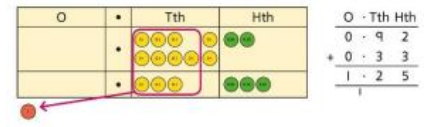
Correlation Between Maths Mastery Flow and Concrete/Pictorial/Abstract

| Maths Mastery Flow Stage | CPA Connection | Purpose |
|--|--|---|
| Representation (Developing understanding, mathematically supported) | Concrete → Pictorial | Children manipulate and visualise concepts to understand meaning. |
| Fluency (Mathematically independent, behaviourally supported) | Pictorial → Abstract | They begin to link models and diagrams with number sentences and symbols. |
| Probing Questions | Abstract (with reference to Pictorial if needed) | Children develop efficiency, flexibility and accuracy using abstract notation. |
| Further Extension Rich Tasks | Across all CPA stages as needed | Learners select the most useful representation to explain, justify and solve problems |



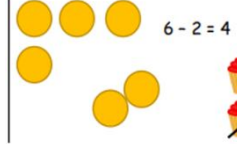

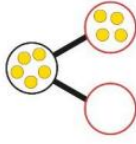


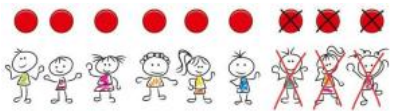


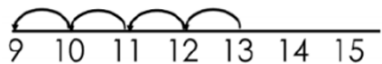

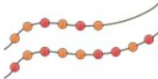
Operation: Addition

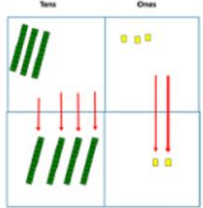

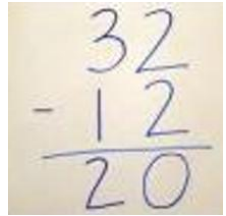

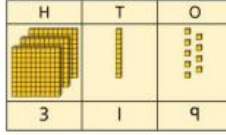

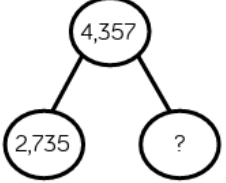
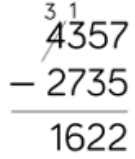
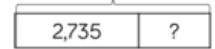
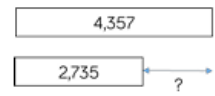
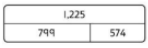
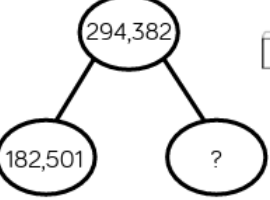

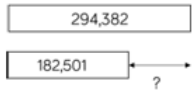
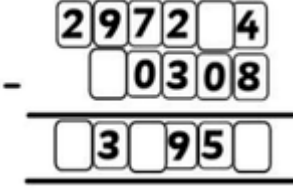
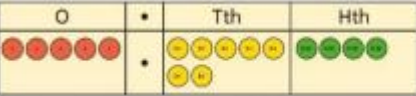
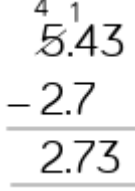
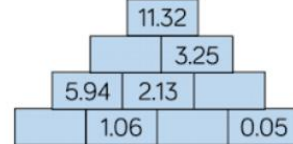
| | | Respresentation - (Developing understanding, mathematically supported) – I do, We do! Fluency - (Mathematically independent, behaviourally supported) – You do! | Examples beyond Fluency |
|----------------|---|--|--|
| Stage 2 | <ul style="list-style-type: none"> Combining groups of objects to find 'how many altogether'. Adding one more object to a group and recounting. |    | <p>Bella had 4 pencil crayons in her case. She added the pencil crayons shown below:</p>  <p>Circle the matching number sentence.</p> <p>A. $4 + 6 = 10$ B. $4 + 5 = 9$ C. $4 + 4 = 8$</p> <p>Use a number line to understand how to link counting on with finding one more.</p>  <p><i>One more than 6 is 7. 7 is one more than 6.</i></p> |
| Stage 3 | <ul style="list-style-type: none"> Formalising (within 5): Finding the total of two groups by counting all items Using vocabulary like <i>add</i> and <i>plus</i>. Writing statements with $+$ and $=$. |    | <p>Mystery Bucket Ask the children to close their eyes; drop three items into a bucket/cup. Ask them to count how many of the items there are in the cup without looking (the children should count the sounds). Then ask them to tell you how many there would be if you added one more? The items can then be removed and their answer checked. This can be repeated with different numbers. Children could use number lines or drawings to help work out their answers.</p>  |
| Stage 4 | <ul style="list-style-type: none"> Calculation to 10: Combining groups by counting all items. Using number bonds to 10. |    | <p>Secret Bag Have the children help you count out 4 objects into a bag. Without indicating to the child what you are doing add one more object into the bag. How many are in the bag now?</p>  |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------|---|---|---|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|---|---|---|---|---|---|---|--|---|---|---|--|---|---|---|---|---|---|---|--|---|---|---|
| <p>Stage 5</p> | <ul style="list-style-type: none"> Calculation to 20: Adding one-digit numbers. Using number bonds to 20. Understanding the inverse relationship. | | <p>Convince me that $6 + 2$ gives me the same answer as $2 + 6$</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Stage 6</p> | <ul style="list-style-type: none"> Two-digit numbers (within 100): Adding ones, tens, or another two-digit number. Adding three one-digit numbers. | | <p>There are 3 plates. Each plate has 2 star biscuits on. How many biscuits are there?</p> <p>Robert has 5 more cherries than John. John has 11 cherries. How many does Robert have?</p> <p>Write a number sentence you would use to solve the problem.</p> <p><input type="text"/> <input type="text"/> <input type="text"/> = <input type="text"/></p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Stage 7</p> | <ul style="list-style-type: none"> Mental calculation: Adding ones, tens, or hundreds to a three-digit number. Formal written method: Column addition for up to three digits. | <p>Make both numbers on a place value grid.</p> | <p>1. Marvann is trying to work out $203 + 368$ Here is her working out.</p> <table border="1" style="margin-left: 20px;"> <tr><td></td><td>2</td><td>3</td></tr> <tr><td>+</td><td>3</td><td>6</td><td>8</td></tr> <tr><td></td><td>3</td><td>9</td><td>1</td></tr> </table> <p>Explain what Maryann has done wrong and help to correct her error.</p> | | 2 | 3 | + | 3 | 6 | 8 | | 3 | 9 | 1 | | | | | | | | | | | | | | | | | | | | | |
| | 2 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| + | 3 | 6 | 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 3 | 9 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Stage 8</p> | <ul style="list-style-type: none"> Formal written method: Column addition for numbers with up to four digits. | <p>Use number bonds to add the 1s.</p> | <p>9 digits Take the digit cards 1-9 and arrange them to make a correct sum:</p> <table border="1" style="margin-left: 20px;"> <tr><td><input type="text"/></td><td><input type="text"/></td><td><input type="text"/></td></tr> <tr><td><input type="text"/></td><td><input type="text"/></td><td><input type="text"/></td></tr> <tr><td><input type="text"/></td><td><input type="text"/></td><td><input type="text"/></td></tr> </table> <p>Are any other solutions possible?</p> <p>1. Marvann is trying to work out $203 + 368$ Here is her working out.</p> <table border="1" style="margin-left: 20px;"> <tr><td></td><td>2</td><td>3</td></tr> <tr><td>+</td><td>3</td><td>6</td><td>8</td></tr> <tr><td></td><td>3</td><td>9</td><td>1</td></tr> </table> <p>Explain what Maryann has done wrong and help to correct her error.</p> <table border="1" style="margin-left: 20px;"> <tr><td></td><td>2</td><td>1</td><td>7</td></tr> <tr><td>+</td><td>6</td><td>2</td><td>6</td></tr> <tr><td></td><td>8</td><td>3</td><td>3</td></tr> </table> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | | 2 | 3 | + | 3 | 6 | 8 | | 3 | 9 | 1 | | 2 | 1 | 7 | + | 6 | 2 | 6 | | 8 | 3 | 3 |
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| | 2 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| + | 3 | 6 | 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 3 | 9 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 2 | 1 | 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| + | 6 | 2 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 8 | 3 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

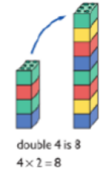







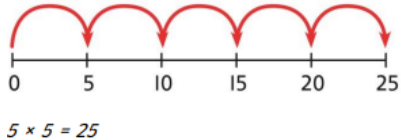


| | | | |
|-----------------|--|--|--|
| <p>Stage 9</p> | <ul style="list-style-type: none"> Mental calculation: Adding increasingly large numbers. Formal written method: Columnar addition for numbers with more than four digits. |  <p>I need to exchange 10 tens for a 100.</p> | <p style="text-align: center;">Deeper understanding</p> <p>Use each of the digits 0-9 only once to complete these addition number sentences. 0, 1, 2, 3, 4, 5, 6, 7, 8, 9</p> <p><input type="text"/><input type="text"/><input type="text"/><input type="text"/><input type="text"/> + <input type="text"/><input type="text"/><input type="text"/><input type="text"/><input type="text"/> = 99,999</p> |
| <p>Stage 10</p> | <ul style="list-style-type: none"> Formal written method: Fluent use of column methods to add large numbers and decimals. | <p>Represent exchange where necessary.</p>  | <p>The chef is making 10.5 batches of dinner rolls. For each batch, he kneaded dough for 0.7 hours and let the dough rest for 1.6 hours. Then he baked the dough for 0.4 hours. How long does it take to make each batch of dinner rolls?</p> |

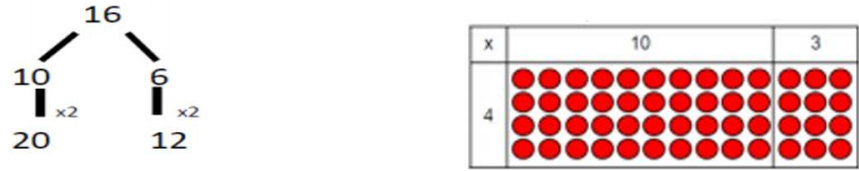

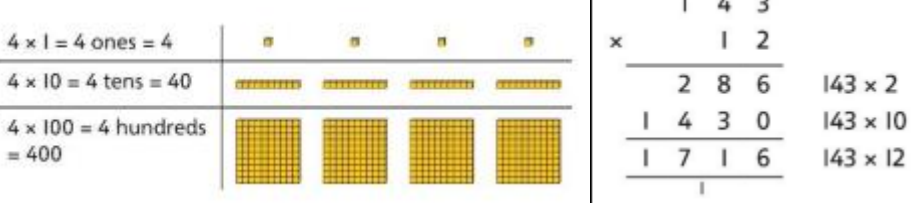
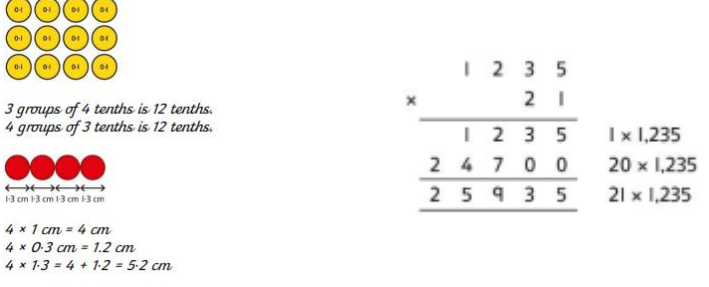
Operation: Subtraction

| | | Respresentation - (Developing understanding, mathematically supported) – I do, We do! Fluency - (Mathematically independent, behaviourally supported) – You do! | Examples beyond Fluency |
|---------|--|--|---|
| Stage 2 | <ul style="list-style-type: none"> Taking away objects from a group and recounting to find how many are left. |  <p>1 less than 6 is 5. 6 subtract 1 is 5.</p> | <p>Rose buys 4 kites. She gives 2 away. How many kites are left?</p>  <p>4 - 2 = _____</p> |
| Stage 3 | <ul style="list-style-type: none"> Formalising (within 5): Taking objects away and recounting. Using vocabulary like <i>take away</i> and <i>minus</i>. Writing statements with – and =. | <p>Use physical objects, counters, cubes etc. to show how objects can be taken away.</p>    <p>5 - 4 = □</p> | <p>There are 10 . 5  swim away. What is 10 minus 5? _____</p> |
| Stage 4 | <ul style="list-style-type: none"> Calculation to 10: Subtracting one-digit numbers by removing objects. Using related facts from number bonds to 10 |  <p>9 - □ = □ There are □ children left.</p> <p style="text-align: center;">Difference between 9 and 6</p>  | <p>What's the same and what's different? 9-5, 8-4, 10-6, 7-4</p> <p>1. Which two fruits can I buy with a 10p coin?</p>  |
| Stage 5 | <ul style="list-style-type: none"> Calculation to 20: Subtracting one-digit numbers. Using related facts from number bonds to 20. Understanding the inverse relationship. | <p style="text-align: center;">13 - 4 =</p>   | <p>Compare amounts. What's the same? What's different? Children compare the bead strings and notice: One has 9 beads and the other has 6 beads. 9 is 3 more than 6. 6 is 3 less than 9.</p>  |

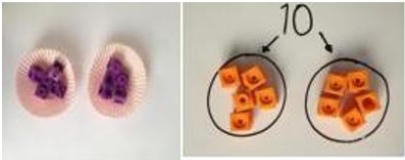
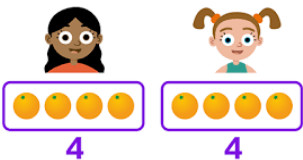
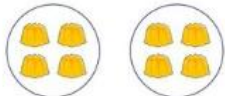
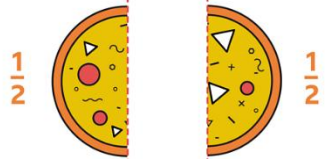

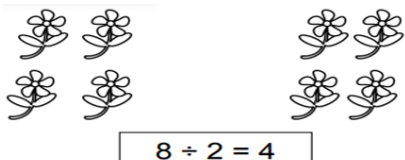
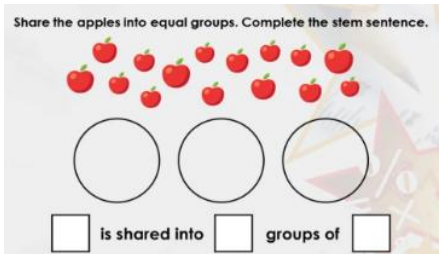


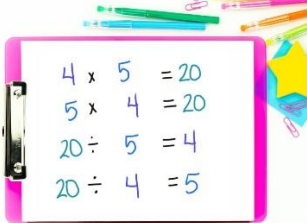
| <p>Stage 6</p> | <ul style="list-style-type: none"> • Two-digit numbers (within 100): Subtracting ones, tens, or another two-digit number. • Using the inverse to check answers. |    |  <p>What are the missing numbers? Can you find another answer? How many possible answers are there?</p> | | | | | | | | | | | | | | | | |
|-----------------|---|--|--|-----|-----|---|---|---|---|---|---|--|---|---|--|---|---|---|---|
| <p>Stage 7</p> | <ul style="list-style-type: none"> • Mental calculation: Subtracting ones, tens, or hundreds from a three-digit number. • Formal written method: Column subtraction for up to three digits. |  <p>$319 - 4 = ?$</p>  | <p>Use bar models to represent subtractions.</p> <p>'Find the difference' is represented as two bars for comparison.</p> <p>Team A <input type="text" value="454"/></p> <p>Team B <input type="text" value="128"/> ← ? →</p> <p>Bar models can also be used to show that a part must be taken away from the whole.</p> | | | | | | | | | | | | | | | | |
| <p>Stage 8</p> | <ul style="list-style-type: none"> • Formal written method: Column subtraction for numbers with up to four digits. |     | <p>Use inverse operations to check subtractions.</p> <p>I calculated $1,225 - 799 = 574$. I will check by adding the parts.</p>  <table border="1" data-bbox="1668 774 1758 837"> <thead> <tr> <th>Th</th> <th>H</th> <th>T</th> <th>O</th> </tr> </thead> <tbody> <tr> <td>7</td> <td>9</td> <td>9</td> <td></td> </tr> <tr> <td>5</td> <td>7</td> <td>4</td> <td></td> </tr> <tr> <td>1</td> <td>3</td> <td>7</td> <td>3</td> </tr> </tbody> </table> <p>The parts do not add to make 1,225. I must have made a mistake.</p> | Th | H | T | O | 7 | 9 | 9 | | 5 | 7 | 4 | | 1 | 3 | 7 | 3 |
| Th | H | T | O | | | | | | | | | | | | | | | | |
| 7 | 9 | 9 | | | | | | | | | | | | | | | | | |
| 5 | 7 | 4 | | | | | | | | | | | | | | | | | |
| 1 | 3 | 7 | 3 | | | | | | | | | | | | | | | | |
| <p>Stage 9</p> | <ul style="list-style-type: none"> • Mental calculation: Subtracting increasingly large numbers. • Formal written method: Columnar subtraction for numbers with more than four digits. |    |  | | | | | | | | | | | | | | | | |
| <p>Stage 10</p> | <ul style="list-style-type: none"> • Formal written method: Fluent use of column methods to subtract large numbers and decimals. | <p>$5.74 - 2.25 = ?$</p>  <table border="1" data-bbox="940 1252 1075 1340"> <thead> <tr> <th>O</th> <th>Tth</th> <th>Hth</th> </tr> </thead> <tbody> <tr> <td>5</td> <td>7</td> <td>4</td> </tr> <tr> <td>2</td> <td>2</td> <td>5</td> </tr> </tbody> </table>  | O | Tth | Hth | 5 | 7 | 4 | 2 | 2 | 5 | <p>In this number pyramid, each number is calculated by adding the two numbers underneath.</p>  | | | | | | | |
| O | Tth | Hth | | | | | | | | | | | | | | | | | |
| 5 | 7 | 4 | | | | | | | | | | | | | | | | | |
| 2 | 2 | 5 | | | | | | | | | | | | | | | | | |

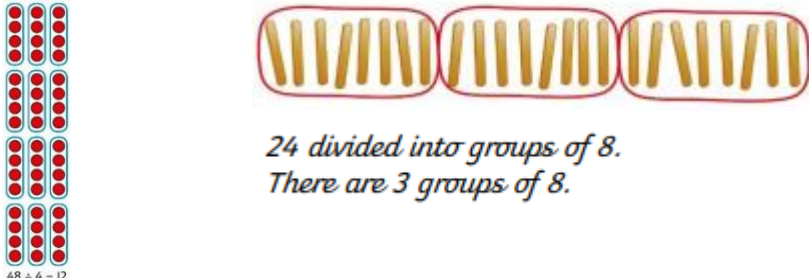

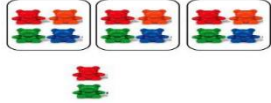
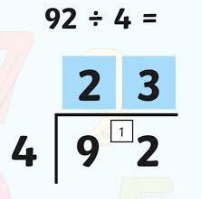

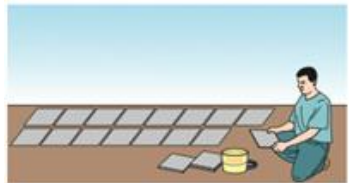
Operation: Multiplication

| | | Representation - (Developing understanding, mathematically supported) – I do, We do! Fluency - (Mathematically independent, behaviourally supported) – You do! | Examples beyond Fluency |
|---------|--|---|--|
| Stage 2 | | | |
| Stage 3 | <ul style="list-style-type: none"> Doubling: Introduced as adding the same number to itself for numbers up to 5. |  <p style="text-align: center;">Double 4 is 8</p>  | <p>Dominos</p> <p>I have a double domino piece with the same number of dots on each half. The total dots is 8.</p> <p>What does my domino look like?</p> |
| Stage 4 | <ul style="list-style-type: none"> Count in 2's up to 10 Represent doubles up to 10 and begin to understand the value of the double. |   | <p>Show me that double 9 is 18</p> <p>Convince me that double 7 is 14.</p> |
| Stage 5 | <ul style="list-style-type: none"> Introduction: Solving problems with doubling and repeated addition ('lots of'). Using objects and arrays for x2, x5, and x10. |   <p style="text-align: center;">$3 + 3 + 3$</p>   | <p>1. Guess my number</p> <p>If I find two more than my number and then double it. My answer is 18.</p> <p>What number did I start with?</p> <p>Now can you make up your own challenge?</p> |
| Stage 6 | <ul style="list-style-type: none"> Times tables: Recalling and using facts for the 2, 5, and 10 tables. Writing statements using the x and = signs |  <p style="text-align: center;">$5 \times 5 = 25$</p>  <p style="text-align: center;"><i>3 groups of 10 ... 10, 20, 30</i> $3 \times 10 = 30$</p> | <p>Captain Conjecture says, 'When I count in tens from any number the units digit stays the same.'</p> <p>Do you agree?</p> <p>Explain your reasoning.</p>  |

| | | | |
|-----------------|---|---|--|
| <p>Stage 7</p> | <ul style="list-style-type: none"> Times tables: Recalling and using facts for the 4 and 8 tables. Partitioning: Multiplying a two-digit number by a one-digit number. |  | <p>Use the digits 0-9 once each to make the statements below true</p> $8 \square \div 8 = \square + \square$ $8 \times 3 = \square \times 6$ $\square 4 = \square \times \square$ $\square \square \div 8 = \square$ <p>How many possible ways are there to do this?</p> |
| <p>Stage 8</p> | <ul style="list-style-type: none"> Times tables: Knowing all facts up to 12 x 12. Formal written method: Multiplying two- and three-digit numbers by a one-digit number. |  | <p>Find the missing digits.</p> $\begin{array}{r} 2 \square \\ \times 8 \\ \hline 176 \end{array}$ $\begin{array}{r} 2 \square \\ \times \square \\ \hline 112 \end{array}$ $\begin{array}{r} 1 \square 4 \\ \times \square \\ \hline 736 \end{array}$ |
| <p>Stage 9</p> | <ul style="list-style-type: none"> Powers of 10: Multiplying by 10, 100, and 1000. Formal written method: Using long multiplication for up to four digits by two digits. |  | <p>Find numbers to complete these number sentences.</p> $736 \div 23 = \square$ $\square \times 100 = 2400$ $\square \times 100 = 10 \times \square$ $7360 \div 230 = \square$ $25 \times \square = 200$ $25 \times \square = 4 \times \square$ $230 \times 24 = \square$ $23 \times \square = 161$ $23 \times \square = 161 \times \square$ $240 \times 23 = \square$ $24 \times \square = 168$ $24 \times \square = 168 \times \square$ $1668 \div 8 = \square$ $161 \div \square = 23$ $161 \div \square = 23 \times \square$ $2085 \times 8 = \square$ $\square \div 25 = 9$ $\square \div 25 = 9 \times \square$ |
| <p>Stage 10</p> | <ul style="list-style-type: none"> Formal written method: Using long multiplication. Multiplying one-digit numbers with up to two decimal places by whole numbers. |  | <p>Which calculation is the odd one out?</p> <ul style="list-style-type: none"> 753 x 1.8 (75.3 x 3) x 6 753 + 753 ÷ 5 x 4 7.53 x 1800 753 x 2 - 753 x 0.2 750 x 1.8 + 3 x 1.8 <p>Explain your reasoning.</p> |

Operation: Division

| | | Respresentation - (Developing understanding, mathematically supported) – I do, We do! Fluency - (Mathematically independent, behaviourally supported) – You do! | Examples beyond Fluency |
|---------|---|--|--|
| Stage 2 | | | |
| Stage 3 | <ul style="list-style-type: none"> Sharing into equal groups as an introduction to finding fractions. |   |  <p> ____ jellies are divided equally into ____ groups. There are ____ jellies in each group. </p> |
| Stage 4 | <ul style="list-style-type: none"> Recognise a half (as a fraction) |  | <p>5. There are 10 cats on a wall. Half of them are male. How many are female?</p>  |
| Stage 5 | <ul style="list-style-type: none"> Introduction: Solving one-step problems by sharing objects into equal groups. |  <p style="text-align: center;">$8 \div 2 = 4$</p>  <p style="text-align: center;"> ____ is shared into ____ groups of ____ </p> | <p>1. Count the sweets. How many are there? _____</p>  <p>2. Jordan and Chang Song want to share them equally. How many sweets will they each have? Jordan will have _____ sweets and Chang Song will have _____ sweets.</p> |
| Stage 6 | <ul style="list-style-type: none"> Times tables: Recalling and using division facts for the 2, 5, and 10 tables. Writing statements using the \div and $=$ signs. |  <p>Eg.</p> <p style="text-align: center;"> $15 \div 3 = 5$ $5 \times 3 = 15$ $15 \div 5 = 3$ $3 \times 5 = 15$ </p>  <p style="text-align: center;"> $4 \times 5 = 20$ $5 \times 4 = 20$ $20 \div 5 = 4$ $20 \div 4 = 5$ </p> | <p>Two friends want to buy some marbles and then share them out equally between them.</p> <p>They could buy a bag of 13 marbles, a bag of 14 marbles or a bag of 19 marbles. What size bag should they buy so that they can share them equally?</p> <p>What other numbers of marbles could be shared equally?</p> <p>Explain your reasoning.</p> |

| <p>Stage 7</p> | <ul style="list-style-type: none"> Times tables: Recalling and using division facts for the 4 and 8 tables. |  <p>48 divided into groups of 4. There are 12 groups.</p> <p>$4 \times 12 = 48$ $48 \div 4 = 12$</p> <p>24 divided into groups of 8. There are 3 groups of 8.</p> | <p>Show me how you can represent this problem visually: Jay has 18 hats. He shares the hats equally into 3 bags. How many hats will there be in each bag?</p> <p>Show me the missing number:</p> $20 \div \square = 5$ $\square \div 3 = 7$ | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------|---|---|--|-----|-----|------|---|---|---|--|---|---|---|---|---|-----|-----|------|---|---|--|--|---|---|---|---|---|
| <p>Stage 8</p> | <ul style="list-style-type: none"> Times tables: Knowing all division facts up to 12 x 12 Formal written method: Using short division ('bus stop') and interpreting remainders. | <p>Make 29 from place value equipment. Share it into 2 equal groups.</p>  <p>There are two groups of 14 and 1 remainder.</p> <p>$14 \div 2 =$</p> <p>Divide objects between groups and see how much is left over.</p>  <p>$92 \div 4 =$</p>  | <p>A 50 cm length of wood is cut into 4 cm pieces. How many 4 cm pieces are cut and how much wood is left over?</p>  <p>Roger has 96 patio slabs. Using all of the slabs find three different ways that he can arrange the slabs to form a rectangular patio.</p>  | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Stage 9</p> | <ul style="list-style-type: none"> Powers of 10: Dividing by 10, 100, and 1000. Formal written method: Using short division for up to four digits by one digit. | <table border="1" data-bbox="499 874 689 946"> <thead> <tr> <th>O</th> <th>Tth</th> <th>Hth</th> <th>Thth</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>8</td> <td>5</td> <td></td> </tr> <tr> <td>0</td> <td>0</td> <td>8</td> <td>5</td> </tr> </tbody> </table> <p>$0.85 \div 10 = 0.085$</p> <table border="1" data-bbox="499 1050 689 1121"> <thead> <tr> <th>O</th> <th>Tth</th> <th>Hth</th> <th>Thth</th> </tr> </thead> <tbody> <tr> <td>8</td> <td>5</td> <td></td> <td></td> </tr> <tr> <td>0</td> <td>0</td> <td>8</td> <td>5</td> </tr> </tbody> </table> <p>$8.5 \div 100 = 0.085$</p> $5 \overline{) 432} \begin{array}{r} 86 \\ \underline{40} \\ 32 \\ \underline{30} \\ 2 \end{array} \text{ r } 2$ | O | Tth | Hth | Thth | 0 | 8 | 5 | | 0 | 0 | 8 | 5 | O | Tth | Hth | Thth | 8 | 5 | | | 0 | 0 | 8 | 5 | <p>Fill in the missing numbers:</p> $\square + 120 = 117 + 13 = 10800 + \square = 234 + \square$ <p>Sally's book is 92 pages long.</p> <p>If she reads seven pages each day, how long will she take to finish her book?</p> |
| O | Tth | Hth | Thth | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 8 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 8 | 5 | | | | | | | | | | | | | | | | | | | | | | | | |
| O | Tth | Hth | Thth | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 8 | 5 | | | | | | | | | | | | | | | | | | | | | | | | |

Stage
10

- **Formal written method:** Using **long division** for up to four digits by two digits.
- Interpreting remainders as whole numbers, fractions, or by rounding

$$\begin{array}{r} \text{t o} \\ 2 \overline{) 58} \\ -4 \\ \hline 18 \end{array}$$

$$\begin{array}{r} 113 \\ 3 \overline{) 339} \\ -3 \\ \hline 03 \\ -3 \\ \hline 09 \\ -9 \\ \hline 0 \end{array}$$

**Division: Leaving
Remainders as Fractions**

$$\begin{array}{r} 07\frac{2}{8} \\ 8 \overline{) 58} \\ \hline \end{array} \quad 2 \div 8$$

7 and $\frac{2}{8}$

This chart shows the vital statistics of some Roosters Football Club players.

| Name | Height | Weight |
|--------------|--------|------------|
| Lanky | 2.06 m | 79.054 kg |
| Crusher | 1.96 m | 110.652 kg |
| Crumber | 1.73 m | 79.934 kg |
| Nugget | 1.84 m | 88.91 kg |
| Stomper | 1.81 m | 99.552 kg |
| Whale | 2.01 m | 118.236 kg |
| Twinkle Toes | | 65.789 kg |



- Who is tallest? Who is shortest?

- Put these players in order of lightest to heaviest: Crumber, Stomper, Nugget.

- Who do you want to throw the ball over the other players? (It would help to be really tall.)

- Who would you least like to have tackle you? Why?

- Twinkle Toes twirled out of the club before his height was measured. We know he is taller than Crumber and shorter than Nugget. What could his height be? Add it to the table.

Additional guidance for each stage (inclusive of shape and measure)

A Guide to Number and Calculation: Stage 1

This guide outlines the key skills and concepts for children in Stage 1 of their mathematical development. The focus is on building a strong foundation in number sense, counting, and early problem-solving through practical, hands-on activities.

1. Early Number and Counting to 5

At this stage, children develop an initial awareness of numbers and counting. They learn to connect number words to quantities through songs, rhymes, and direct interaction with objects.

Core Skills:

- **Saying Number Names:** Children begin to say number names to 5 in the correct order, often by joining in with songs or an adult.
 - **One-to-One Correspondence:** This is the crucial skill of saying one number for each item in a small group of up to five objects. Children learn this with adult support to arrange and point to items. They also apply this understanding by giving one item to each person, such as one cup to each pupil.
 - **Understanding Quantity:**
 - **'One' and 'Lots':** Children can distinguish between a single object ('one') and a group of objects ('lots'). They can demonstrate their understanding by giving an adult just one item when asked.
 - **Making Small Groups:** They learn to gather the correct number of objects up to five when asked for a specific amount (e.g., "Can you give me 3?").
 - **Recognising Numerals:** Children practise overwriting the written numbers from 0 to 5.
-

2. Early Measurement Concepts

Before using formal units, children explore measurement through direct comparison and sorting.

Core Skills:

- **Comparing Size:** In their play, children identify objects as 'big' or 'small'. They can sort everyday items based on these characteristics and can pick out the big or small object from a choice of two.
- **Exploring Capacity:** When playing with different containers, such as with water, children explore the concepts of 'full' and 'empty'.

3. Introduction to Pattern and Money

Early problem-solving skills are introduced through simple patterns and role-play involving money.

Core Skills:

- **Copying Patterns:** Children can copy a simple repeating pattern made of two different items. They can also match items that are the same, such as two identical Numicon shapes.
 - **Understanding Transactions:** In role-play scenarios like a shop, children show an understanding of a transaction by exchanging a coin for an item.
-

A Guide to Number and Calculation: Stage 2

This guide outlines the key skills and concepts for children in Stage 2. Learning extends to numbers up to 10, introduces formal addition and subtraction within 5, and develops understanding of position, measure, time, and early fractions through practical application.

1. Number and Counting to 10

Children deepen their understanding of numbers and counting principles, working with quantities up to 10.

Core Skills and Principles:

- **Counting Fluency:** Children can say the number names to 10 in the correct order. They are also introduced to counting backwards from 5 and starting their count from different numbers, not just from one.
 - **Subitising:** They develop the ability to instantly recognise a small number of items (up to 10) without needing to count them one by one.
 - **Cardinality:** Children understand that the last number they say when counting a group represents the total amount in that group.
 - **Abstraction:** They learn that anything can be counted, including things they cannot touch, such as claps, jumps, or sounds.
 - **Order-Irrelevance:** They begin to understand that the order in which objects are counted does not change the final total.
 - **Recognising and Ordering Numerals:** Children consistently recognise and begin to order the numerals from 0 to 5. They can also show numbers up to 5 on their fingers.
 - **Understanding Zero:** The concept of zero meaning 'nothing' is introduced, often through activities like tidying up until no items are left.
-

2. Early Calculation (within 5)

Children are introduced to addition and subtraction using practical objects and scenarios.

Core Skills:

- **Addition:**
 - With adult support, children add one more object to a group (up to 5) and recount to find the new total.
 - They learn to combine two separate groups of objects to find out 'how many altogether'.
- **Subtraction:**
 - Children learn to take away objects from a group (up to 5) and recount to find out how many are left.
 - They understand that the quantity changes when something is added or taken away.

- **Making Totals:**

- They explore separating a group of up to 5 objects in different ways, recognising that the total number remains the same (e.g., 5 can be made from 2 and 3, or 4 and 1).
-

3. Pattern and Position

Logical thinking and spatial awareness are developed through exploring patterns and positional language.

Core Skills:

- **Pattern:** Children copy and continue simple repeating patterns (e.g., apple, orange, apple, orange) and can move on to more advanced patterns (e.g., apple, apple, orange).
 - **Position:** They learn to move themselves and objects **forwards** and **backwards**. They can also use and understand language to describe where things are, such as **in front** and **behind**.
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4. Introduction to Measure and Time

Children explore concepts of size, weight, capacity, and time through comparison and sequencing.

Core Skills:

- **Measure:**
 - They sort and compare objects using descriptive language like **big/small**, **heavy/light**, and **tall/short**.
 - They fill different containers and can identify if they are **full**, **half full**, or **empty**.
 - **Time:**
 - They learn to sequence daily events using words like **before**, **after**, **next**, and **first**.
 - They can label key parts of the day, such as **morning** and **afternoon**, and begin to name the days of the week.
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5. Money and Fractions

These concepts are introduced in their simplest forms using practical, real-world contexts.

Core Skills:

- **Money:**

- Children become familiar with coins by sorting them according to colour.
 - In role-play, they learn to correctly count out up to five 1p coins to pay for items priced up to 5p.
 - **Fractions:**
 - Children are introduced to a **half** as one of two **equal** parts of a whole.
 - They understand that combining two equal halves makes one **whole**. This is explored by sharing snacks or folding symmetrical shapes.
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A Guide to Number and Calculation: Stage 3

This guide outlines the key skills and concepts for children in Stage 3 of their mathematical development. The focus is on extending number knowledge to 20, formalising early calculation, solving simple problems, and exploring new concepts in fractions, measure, and shape through practical activities and reasoning.

1. Number and Counting to 20

Children deepen their understanding of the number system up to 20, focusing on counting fluency, representation, and comparison.

Core Skills:

- **Counting Fluency:** Children learn to say the number names to 20 in the correct order. They can count forwards and backwards and understand that the next number in a count is **one more** and the previous number is **one less**.
 - **Representing Numbers:** They can read and write the numerals from 0 to 20. They learn to represent these numbers using physical objects, drawings, and number lines.
 - **Comparing and Ordering:** Children learn to compare groups of objects using vocabulary like **more than**, **less than (fewer)**, **most**, **least**, and **equal to**. They can place numbers and quantities in order from smallest to largest.
 - **Subitising:** They develop the ability to instantly recognise the number of items in a group up to 10 without needing to count them one by one.
 - **Understanding Zero:** Children understand that zero means 'nothing' and also recognise its role as a placeholder in numbers like 10 and 20.
 - **Secure Counting Principles:** Children solidify their understanding of fundamental counting rules: counting each item only once (one-to-one correspondence), saying numbers in the correct sequence (stable-order), and knowing that the last number said is the total (cardinality).
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2. Calculation and Number Bonds

At this stage, children formalise their understanding of addition and subtraction within 5, begin to use mathematical symbols, and explore doubles.

Core Skills:

- **Addition (within 5):**
 - Children find the total of two groups by combining them and counting all the items.
 - They use addition vocabulary such as **add**, **plus**, **total**, and **altogether**.
 - They understand the effect of adding zero to a number (the quantity does not change).

- **Subtraction (within 5):**
 - Children subtract by taking objects away from a group and recounting how many are left.
 - They understand subtraction as a decrease in quantity and use vocabulary like **take away**, **subtract**, **minus**, and **how many are left**.
 - They understand what happens when you subtract zero or when you subtract the entire amount.
 - **Making Totals and Number Sentences:**
 - Children can select two groups of objects to make a given total up to 5.
 - They begin to read, write, and interpret mathematical statements involving the addition (+), subtraction (−), and equals (=) signs.
 - **Doubles:**
 - Children are introduced to the concept of doubling and can represent doubles for numbers up to 5 (e.g., double 3 is 6).
 - They understand that doubling means adding the same number to itself.
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3. Fractions

Children are introduced to fractions as equal parts of a whole, learning to recognise, name, and find simple fractions of shapes and quantities.

Core Skills:

- **Understanding Equal Parts:** A key concept is that to create a fraction, a whole shape or quantity must be divided into **equal** parts.
 - **Recognising and Naming Fractions:** Children learn to recognise, name, and write simple fractions:
 - A **half (1/2)** as one of two equal parts.
 - A **quarter (1/4)** as one of four equal parts.
 - A **third (1/3)** as one of three equal parts.
 - They also work with non-unit fractions like **two quarters (2/4)** and **three quarters (3/4)**.
 - **Finding Fractions:** They learn to find a fraction of a shape by splitting it into equal parts and find a fraction of a set of objects by sharing them into equal groups.
 - **Early Equivalence:** Children begin to visually recognise that two quarters (2/4) is the same as one half (1/2).
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4. Shape, Pattern, and Position

Children expand their knowledge of 2D and 3D shapes, create more complex patterns, and use a wider range of positional language.

Core Skills:

- **2D and 3D Shapes:**

- They learn to recognise a wider range of shapes, including 2D shapes like the **pentagon, hexagon, and oval**, and 3D shapes like the **pyramid, cylinder, and triangular prism**.
 - They use mathematical language to describe shape properties, such as **sides, corners, curved, straight, faces, and edges**.
 - They understand that a shape keeps its name even when it is rotated or is a different size.
 - **Pattern:**
 - Children learn to copy and continue more advanced repeating patterns, such as AAB (e.g., red, red, blue) or ABC (e.g., circle, square, triangle).
 - They can create these patterns using different objects, colours, sizes, actions, and sounds.
 - **Position:**
 - They develop their spatial awareness by using a wider range of positional language.
 - They can describe the relative position of objects using words like **on top, under, next to, below, above, in between, left, right, beside, outside, inside, around, and through**.
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5. Measure, Time, and Money

Children develop their understanding of measurement through comparison, learn more about time sequences, and become more familiar with coins.

Core Skills:

- **Measure (Length, Weight, and Capacity):**
 - Children compare and order objects using specific mathematical language like **taller/shorter, heavier/lighter, and longer/longest**.
 - They begin to measure and record length and weight using non-standard units, such as counting how many cubes long an object is.
 - They continue to explore capacity with vocabulary like **full, half full, and empty**.
 - **Time:**
 - They learn to sequence events using time-related words like **before, after, next, first, today, and yesterday**.
 - They can name the **days of the week** and the **months of the year**.
 - They talk about the main parts of the day: **morning, afternoon, and evening**.
 - **Money:**
 - Children learn to sort different coins by their colour and size.
 - They can recognise common coins.
 - They practise making a total of 10p by counting out 1p coins and are introduced to using 2p coins.
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Stage 4: Number and Calculation Guide

This stage focuses on building foundational number sense, including counting, representing numbers, and performing simple calculations. Practical, hands-on activities are central to developing these skills.

Number

- **Counting:** Children learn to say number names in the correct order up to **20**, and later up to **50**. They practise counting forwards and backwards, starting from various numbers. A key concept is understanding that the next number in a count is **one more** and the previous number is **one less**.
- **Number Recognition:** Children learn to **read and write numerals from 0 to 20**, and progress to reading and writing numbers up to 50. They learn to link a number symbol (like '7') with its value (seven objects).
- **Representing Numbers:** Understanding of numbers up to 50 is developed by representing them with physical **objects, pictures, and on a number line**. Children use tools like **tens frames** to organise objects and see the structure of numbers. They learn to find numerals in their environment, such as on doors or in books.
- **Comparing Quantities:** Children begin to use language to compare groups of objects, such as '**equal to**', '**more than**', '**less than**' (or '**fewer**'), '**most**', and '**least**'. They learn to compare quantities using terms like 'larger', 'smaller', and 'enough' or 'not enough'.
- **Core Counting Principles:** Secure counting is based on understanding five key principles:
 1. **One-to-one correspondence:** Assigning one number name to each object being counted.
 2. **Stable order:** Saying numbers in the correct, fixed order.
 3. **Cardinality:** Understanding that the last number counted represents the total number of objects in the group.
 4. **Abstraction:** Realising that anything can be counted, including things that cannot be touched like sounds or jumps.
 5. **Order irrelevance:** Understanding that the order in which objects are counted does not change the total number.

Calculation

- **Addition:** Children are introduced to addition by finding the '**total**' or '**how many altogether**' when combining two groups of objects (up to a total of 10). They achieve this by counting all the items. They understand addition as an **increase** in quantity and begin to use vocabulary like '**plus**' and '**add**'. The effect of adding **zero** is also explored.
- **Subtraction:** Subtraction is understood as '**taking away**'. Children learn to subtract one-digit numbers from a total of up to 10. They use physical objects to count a group, remove a certain number, and then recount what is '**left**'. They learn vocabulary like '**minus**' and '**subtract**'.

- **Mathematical Statements:** Children begin to read, write, and understand mathematical statements that involve the **addition (+), subtraction (–), and equals (=)** signs.
 - **Number Bonds:** A key focus is on representing and using **number bonds to 10** (e.g., 3 and 7, 4 and 6) and the related subtraction facts (e.g., if $3 + 7 = 10$, then $10 - 7 = 3$).
 - **Fractions:**
 - Children learn to recognise and name a **half ($\frac{1}{2}$)** as one of two **equal** parts of a shape or object.
 - They learn to recognise and name a **quarter ($\frac{1}{4}$)** as one of four **equal** parts.
 - They also work with **one-third ($\frac{1}{3}$), two-quarters ($\frac{2}{4}$), and three-quarters ($\frac{3}{4}$)**.
 - This understanding is extended to finding fractions of a quantity, for example, by finding **half of 8 counters** or a **quarter of 12 sweets**.
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Stage 5: Number and Calculation Guide

This stage builds on earlier learning by extending the range of numbers, introducing place value, and developing formal calculation skills within 20.

Number

- **Counting and Number Recognition:** Children solidify their ability to say number names in order up to **50**. They read and write numbers up to **100** in numerals and start to recognise the number words. They practise counting forwards and backwards from any number up to 50.
- **Place Value:** A critical new concept is understanding the **place value** of each digit in a two-digit number. Children learn that in a number like 36, the '3' represents **three tens** and the '6' represents **six ones**. They use equipment like Base 10 blocks to represent numbers in this way.
- **Representing and Estimating:** Children represent numbers up to 100 using various tools, including objects, number lines, and bead strings. They also begin to **estimate** the number of objects in a group and then count to check their answer.
- **Comparing and Ordering:** Children learn to **compare and order numbers from 0 up to 100**. They use the mathematical symbols for greater than ($>$), less than ($<$), and equal to ($=$) to make comparisons, for example, $45 > 29$.

Calculation

- **Addition and Subtraction:** Children add and subtract **one-digit numbers to 20**, including zero. They build on their understanding of the **inverse relationship** between addition and subtraction (e.g., knowing that if $8 + 2 = 10$, then $10 - 2 = 8$). They learn to read, write, and interpret mathematical statements involving the +, −, and = signs.
- **Number Bonds:** Children work on representing and using **number bonds to 20** and the related subtraction facts.
- **Multiplication:** This stage introduces the concept of multiplication through practical activities. Children solve one-step problems involving:
 - **Doubling** numbers.
 - **Repeated addition**, which they begin to see as 'lots of' or 'groups of'. For example, $5 + 5 + 5$ is 3 lots of 5.
 - Using concrete objects, pictures, and **arrays** to represent multiplication by **2, 5, and 10**.
- **Division (Sharing):** Children solve one-step problems involving **sharing** objects into equal groups. This lays the foundation for understanding division.
- **Fractions:** Children continue to work with fractions, learning to:
 - Recognise, find, and name a **half** ($\frac{1}{2}$) and a **quarter** ($\frac{1}{4}$) of a shape, object, or quantity.
 - Understand that finding a half or a quarter requires dividing a whole into **two or four equal parts**.
 - Begin to write simple fractions like $\frac{1}{3}$, $\frac{1}{4}$, **$\frac{2}{4}$** , and $\frac{3}{4}$.

Stage 6: Number and Calculation Guide

At this stage, children deepen their understanding of the number system up to 1000 and become more fluent with all four operations, using more formal methods and applying their knowledge to solve problems.

Number

- **Counting:** Children become proficient at counting in steps of **2, 5, and 10 from 0**. A new skill is counting forwards and backwards in **tens from any number** (e.g., 37, 47, 57).
- **Place Value:** Understanding of place value is extended to **three-digit numbers**, recognising the value of **hundreds, tens, and ones**. Children read and write numbers up to **1000** in numerals and words.
- **Comparing and Ordering:** Children compare and order numbers up to **1000** using the **>**, **<**, and **=** signs.
- **Odd and Even Numbers:** Children learn to **recognise odd and even numbers**. They understand that even numbers are multiples of 2.

Calculation

- **Addition and Subtraction:** Calculation skills are extended to include:
 - Adding and subtracting a **two-digit number and ones** (e.g., $45 + 7$).
 - Adding and subtracting a **two-digit number and tens** (e.g., $45 + 30$).
 - Adding and subtracting **two two-digit numbers** (e.g., $45 + 37$), working within 100.
 - Adding **three one-digit numbers** (e.g., $6 + 7 + 4$).
 - They learn that **addition can be done in any order (is commutative)**, for example, $5 + 8 = 8 + 5$, but that **subtraction cannot**.
- **Multiplication and Division:**
 - Children begin to **recall and use multiplication and division facts** for the **2, 5, and 10 times tables**.
 - They learn to write and calculate mathematical statements using the **multiplication (\times), division (\div), and equals ($=$) signs**.
 - They solve problems using a range of methods, including physical materials, **arrays**, repeated addition, and mental strategies.
- **Fractions:**
 - Children continue to recognise, find, name, and write fractions, including $\frac{1}{3}$, $\frac{1}{4}$, **$\frac{2}{4}$** , and $\frac{3}{4}$ of a shape, a set of objects, or a quantity.
 - They are introduced to **comparing and ordering unit fractions** (fractions with a numerator of 1, like $\frac{1}{2}$ and $\frac{1}{4}$) and fractions with the same denominator (like $\frac{1}{4}$ and $\frac{3}{4}$).
 - They learn that **two quarters ($\frac{2}{4}$) is equivalent to one half ($\frac{1}{2}$)**.
- **Problem Solving:** A key focus is applying calculation skills to solve problems. This includes missing number problems (e.g., $17 - \square = 7$) and understanding how the inverse relationship between addition and subtraction can be used to check answers.

Stage 7 Number and Calculation Guide

This guide covers the key skills for number and calculation at Stage 7, focusing on numbers up to 1000, formal calculation methods, and an introduction to a wider range of fractions.

Working with Numbers up to 1000

- **Reading and Writing Numbers:** You will learn to read and write numbers up to **1000** in both numerals (e.g., 672) and words (e.g., six hundred and seventy-two).
- **Place Value:** It is important to recognise the place value of each digit in a three-digit number. For example, in the number **475**, the 7 has a value of **70** (seventy or 7 tens).
- **Representing Numbers:** You will practise showing numbers in different ways. This can include using physical objects like **Base 10 blocks** or **place value counters**, as well as drawing them on a **number line**.
- **Partitioning:** This involves splitting numbers into their component parts. For example, **462** can be partitioned into **400 + 60 + 2**. You will also explore "non-standard" ways to partition, such as seeing **462** as **300 + 160 + 2**.

Comparing, Ordering, and Estimating

- **Ordering Numbers:** You will arrange numbers up to 1000 from smallest to largest. You'll use the symbols **<** (less than), **>** (greater than), and **=** (equals) to compare them.
- **Finding the Midpoint:** A key skill is using a number line to find the middle number between two values, such as the **midpoint** between 300 and 400 (which is 350).

Calculation: Addition and Subtraction

- **Mental Calculations:** You will practise adding or subtracting ones, tens, or hundreds to or from a three-digit number in your head. Examples include calculations like **456 + 7**, **264 - 50**, and **356 + 400**.
- **Formal Written Methods:** You will use **column addition and subtraction** for numbers with up to three digits. This includes learning how to **exchange** (sometimes called 'carrying over' or 'borrowing') between columns.
- **Checking Your Work:** It is crucial to check your answers. You can do this by using the **inverse** (opposite) operation. For instance, to check if **281 + 376 = 657** is correct, you can calculate **657 - 376** to see if you get 281.

Calculation: Multiplication and Division

- **Counting in Multiples:** You will practise counting from zero in steps of **4, 8, 50, and 100**.
- **Times Tables:** You will need to recall and use the multiplication and division facts for the **4 and 8 times tables**.
- **Multiplying Larger Numbers:** You will begin to multiply a **two-digit number by a one-digit number** (e.g., 25×3). A useful method for this is partitioning, for example: $20 \times 3 + 5 \times 3$.

Fractions and Decimals

- **Understanding Fractions:** You will recognise and name fractions of shapes and groups of objects, like $\frac{1}{3}$, $\frac{3}{4}$, and $\frac{2}{5}$. It is important to remember that the parts of the whole must be equal.
 - **Comparing Fractions:** You will compare and order unit fractions (where the top number is 1) and fractions that have the **same denominator** (the bottom number).
 - **Fraction Calculations:** You will begin to **add and subtract fractions** that have the same denominator, such as $\frac{2}{9} + \frac{3}{9} = \frac{5}{9}$.
 - **Tenths:** You will practise counting up and down in **tenths**, understanding that they are created by dividing a whole into 10 equal parts.
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Stage 8 Number and Calculation Guide

This guide outlines the progression in Stage 8, which involves working with much larger numbers, developing formal written methods for all four operations, and deepening your understanding of decimals and fractions.

Working with Larger Numbers and Decimals

- **Reading and Writing Numbers:** You will learn to read, write, order, and compare numbers up to **1,000,000**.
- **Place Value:** You will extend your understanding of place value to **four-digit numbers** (thousands, hundreds, tens, ones) and beyond.
- **Negative Numbers:** You will be introduced to **negative numbers** and learn how to use them, for instance, by counting backwards past zero on a number line.
- **Rounding:** You will practise rounding any whole number to the nearest **10, 100, or 1000**. For larger numbers, you will also round to the nearest 10,000 and 100,000.

Calculation: Addition and Subtraction

- **Formal Written Methods:** You will use **column addition and subtraction** for numbers with up to **four digits**.
- **Two-Step Problems:** A key focus is solving problems that require more than one step. For example: "A stadium has 2500 seats. 1350 people arrive, and then 210 people leave. How many empty seats are there?"
- **Estimating and Checking:** You will use **estimation** by rounding numbers to get a rough idea of the answer before you calculate. You will also continue to use the **inverse operation** to check if your final answer is correct.

Calculation: Multiplication and Division

- **Times Tables:** You will need to know all multiplication and division facts up to **12 x 12**.
- **Counting in Multiples:** You will practise counting in steps of **6, 7, 9, 25, and 1000**.
- **Mental Calculation:** You will use your times table knowledge to multiply and divide mentally. This includes multiplying three numbers together (e.g., $2 \times 8 \times 5$) and knowing the rules for multiplying by **0 and 1**.
- **Formal Written Multiplication:** You will use a formal written method to multiply **two- and three-digit numbers by a one-digit number** (e.g., 576×4).
- **Formal Written Division:** You will use the formal short division method (often called the 'bus stop' method) to divide numbers by a one-digit number (e.g., $384 \div 6$). You will also learn how to interpret **remainders**.
- **Dividing by 10 and 100:** You will learn what happens to the digits when a number is divided by 10 or 100, creating decimal answers with **tenths and hundredths** (e.g., $78 \div 10 = 7.8$).

Fractions and Decimals

- **Hundredths:** You will practise counting up and down in **hundredths**.

- **Equivalence:** You will learn to recognise and write decimal equivalents for any number of tenths and hundredths (e.g., $47/100 = 0.47$). You will also memorise the key decimal equivalents for $1/4$ (**0.25**), $1/2$ (**0.5**), and $3/4$ (**0.75**).
- **Equivalent Fractions:** You will use diagrams to show that some fractions are equal, even if they look different (e.g., $1/2$ is the same as $2/4$).
- **Calculations with Fractions:** You will continue to add and subtract fractions with the same denominator and solve problems by finding a **fraction of an amount** (e.g., find $2/3$ of 24).
- **Rounding Decimals:** You will round decimals with up to two decimal places to the nearest whole number or to one decimal place.

Stage 9: Number and Calculation Guide

1. Working with Whole Numbers and Decimals

- **Reading, Writing, and Comparing Numbers:** You will work with numbers up to **1,000,000** and numbers with up to **three decimal places**. This includes being able to write numbers in both numerals and words, order them from smallest to largest, and use the symbols **< (less than)** and **> (greater than)** to compare them.
- **Place Value:** Understand the value of each digit in a number up to 1,000,000. This involves partitioning numbers into hundred thousands, ten thousands, thousands, hundreds, tens, and ones. For decimals, you will identify the value of digits in the tenths, hundredths, and thousandths columns.
- **Rounding:**
 - Round any whole number up to 1,000,000 to the nearest **10, 100, 1000, 10,000, and 100,000**.
 - Round decimals with two decimal places to the **nearest whole number** and to **one decimal place**.
- **Negative Numbers:** Read, write, and interpret negative numbers in context, for example, when working with temperature.
- **Roman Numerals:** Read Roman numerals up to **1000 (M)** and recognise years written in this format.

2. Number Properties

- **Factors and Multiples:**
 - Identify all the **factors** of a number by finding its factor pairs.
 - Find the **common factors** of two numbers.
 - Identify **multiples** of a given number.
- **Prime, Composite, Square, and Cube Numbers:**
 - Know the vocabulary of **prime numbers, prime factors, and composite numbers**.
 - Establish whether a number up to 100 is prime and be able to recall prime numbers up to 19.
 - Recognise and use **square numbers** (e.g., 7^2) and **cube numbers** (e.g., 5^3).

3. The Four Operations

- **Mental Addition and Subtraction:** Practise adding and subtracting increasingly large numbers mentally, often using jottings to keep track.
- **Written Addition and Subtraction:** Use formal columnar methods to add and subtract whole numbers with **more than four digits**.
- **Multiplying and Dividing by 10, 100, and 1000:** Multiply and divide whole numbers and decimals by these powers of ten, understanding how the digits shift in place value.
- **Written Multiplication:**
 - Multiply numbers up to four digits by a **one-digit number** using a formal written method.

- Multiply numbers up to four digits by a **two-digit number** using **long multiplication**.
- **Written Division:**
 - Divide numbers up to four digits by a **one-digit number** using the formal method of **short division**.
 - Interpret remainders appropriately for the context of a problem (e.g., as a whole number, or by rounding).
- **Solving Multi-Step Problems:** Solve problems that require a combination of addition, subtraction, multiplication, and division. Use rounding and inverse operations to check the reasonableness of your answers.

4. Fractions

- **Adding and Subtracting Fractions:** Add and subtract fractions that have the **same denominator**.
 - **Fractions of Amounts:** Find a fraction of a quantity where the answer is a whole number. This includes both **unit fractions** (e.g., $1/5$) and **non-unit fractions** (e.g., $3/5$).
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Stage 10: Number and Calculation Guide

1. Working with Larger Numbers and Decimals

- **Reading, Writing, and Comparing Numbers:** Extend your skills to read, write, order, and compare numbers up to **10,000,000**.
- **Place Value:** Determine the value of each digit in numbers up to 10,000,000 and in numbers with up to **three decimal places**.
- **Rounding:** Round any whole number to a required degree of accuracy (e.g., to the nearest 1000, or the nearest million).
- **Negative Numbers:** Use negative numbers in context and be able to **calculate intervals that cross zero** (e.g., finding the difference between -3°C and 10°C).
- **Multiplying and Dividing by Powers of 10:** Multiply and divide integers and decimals by 10, 100, and 1000, giving answers with up to three decimal places.

2. The Four Operations

- **Mental Calculations:** Perform mental calculations with large numbers, including problems with mixed operations.
- **Written Addition and Subtraction:** Fluently use formal column methods to add and subtract large numbers and decimals, including numbers with different numbers of decimal places.
- **Written Multiplication:**
 - Multiply multi-digit numbers (up to four digits) by a **two-digit number** using **long multiplication**.
 - Multiply one-digit numbers with up to two decimal places by whole numbers.
- **Written Division:**
 - Divide numbers up to four digits by a **two-digit number** using the formal method of **long division**.
 - Interpret remainders as whole numbers, **fractions**, or by **rounding**, depending on the context.
 - Use written division methods for problems where the answer has up to **two decimal places**.
- **Order of Operations:** Use your knowledge of the order of operations (e.g., **BODMAS/BIDMAS**) to carry out calculations involving brackets and all four operations.
- **Estimation and Checking:** Use rounding and estimation to check the accuracy of answers to complex calculations.
- **Solving Multi-Step Problems:** Solve complex problems involving all four operations, deciding on the appropriate methods to use. This includes problems set in the context of measures (length, mass, volume, money).

3. Number Properties

- **Common Factors and Multiples:** Identify **common factors** and **common multiples** of two or more numbers.
- **Prime Numbers:** Identify prime numbers and use this knowledge to solve problems.

4. Fractions, Decimals, and Percentages

- **Simplifying and Comparing Fractions:**
 - Use common factors to **simplify fractions** to their lowest terms.
 - Use common multiples to find a **common denominator** to compare and order fractions, including fractions greater than 1.
- **Adding and Subtracting Fractions:** Add and subtract fractions with **different denominators** and **mixed numbers**, using the concept of equivalent fractions.
- **Multiplying and Dividing Fractions:**
 - **Multiply** simple pairs of proper fractions (e.g., $1/4 \times 1/2 = 1/8$).
 - **Divide** proper fractions by whole numbers (e.g., $1/3 \div 2 = 1/6$).
- **Converting Between Forms:**
 - Convert fractions to decimals by seeing a fraction as a division (e.g., $3/8$ is $3 \div 8$).
 - Recall and use equivalences between common **fractions, decimals, and percentages**.
- **Calculating with Percentages:**
 - Solve problems involving the calculation of **percentages of amounts** (e.g., 15% of 360).
 - Use percentages to compare different quantities.

5. Ratio and Proportion

- **Scaling:** Solve problems involving scaling where a **scale factor** is known or can be found. This includes problems with similar shapes.
- **Unequal Sharing:** Solve problems involving unequal sharing and grouping using your knowledge of fractions and multiples.

6. Statistics

- **Calculating the Mean:** Calculate the **mean** as a measure of average for a set of data.

7. Algebra and Formulae

- **Using Formulae:** Substitute numerical values into simple formulae and expressions to find a result.
- **Expressing Problems Algebraically:** Use letters to represent unknown numbers and express missing number problems algebraically (e.g., if a plant is x m tall and grows by $1/4$ m, its new height is $x + 1/4$).
- **Solving Equations:** Find pairs of numbers that satisfy an equation with two unknowns (e.g., for $x + y = 17$, find possible pairs of whole numbers for x and y).