Newport Infant School

And Nursery

Maths Policy

Date of Policy Creation/Last Review	February 23
Policy Lead	Sarah Bowen
Date of Policy Adoption by Governing Body	May 23
Frequency of Review	Three yearly
Review Due	May 26
Policy Category	Curriculum

Rationale

Mathematics equips pupils with the uniquely powerful skillset to understand and change the world. These tools include logical reasoning, problem solving and the ability to think in abstract ways.

Mathematics is important in everyday life. It is integral to all aspects of life and, with this in mind, we endeavour to ensure that children develop a positive and enthusiastic attitude towards mathematics that will stay with them.

The National Curriculum order for mathematics describes in detail what pupils must learn in each year group. Our planning supports a cyclical approach, whereby subjects are revisited frequently, both within and across year groups. This encourages the children to reflect on their own progress and challenges them to show they "know more and remember more." Our planning structure ensures continuity and progression with high expectations for attainment.

It is vital that a positive attitude towards mathematics is encouraged amongst all our pupils in order to foster confidence and achievement in a skill that is essential in our society. At Newport we use the National Curriculum for Mathematics as the basis of our mathematics programme. We are committed to ensuring that all pupils achieve a degree of depth in the key concepts of mathematics, appropriate for their age group, in order that they make genuine progress and avoid gaps in their understanding that form barriers to learning as they move through education. Assessment for Learning, an emphasis on investigation, problem solving and the development of mathematical thinking and a rigorous approach to the development of teacher subject knowledge are therefore essential components of the Newport Infants approach to this subject.

Intent

At Newport Infants School we aim for all children to become functionally numerate and develop a deep conceptual understanding of number. We aim to provide the pupils with an engaging mathematics curriculum and high-quality teaching to produce individuals who are numerate, creative, independent, inquisitive, enquiring and confident. We also aim to provide a stimulating environment and adequate resources so that pupils can develop their mathematical skills to the full.

Our pupils should:

· have a well-developed sense of the size of a number and where it fits into the number system
· know by heart number facts such as number bonds, counting patterns, doubles and halves

· use what they know by heart to figure out solutions mentally
· calculate accurately and efficiently, both mentally and on paper,
· implement range of calculation strategies
· make sense of number problems, including non-routine/'real' problems and identify the operations needed to solve them
· explain their methods and reasoning, using correct mathematical terms
· judge whether their answers are reasonable and have strategies for checking them where necessary
· suggest suitable units for measuring and make sensible estimates of measurements
· explain and make predictions from the numbers in graphs, diagrams, charts and tables
develop spatial awareness and an understanding of the properties of 2d and 3d shapes

Pupils engage in:

· the development of mental strategies
· development of written methods
· practical work
· investigational work
· problem solving
· mathematical discussion
· consolidation of basic skills and number facts
· maths games

Implementation

We recognise the importance of a secure foundation in mental calculation and recall of number facts before standard written methods are introduced. We use accurate mathematical vocabulary in our teaching and children are expected to use it in their verbal and written explanations. A "Concrete, Pictorial, Abstract" approach is used throughout school which allows individuals to develop a deep and sustainable understanding of mathematical concepts. Teachers and children will move fluidly between each approach to reinforce concepts. Children are encouraged to show Maths problems in a variety of ways, for example drawing an array or using jottings to represent dienes. Varying the apparatus and methods they use to solve a problem helps children to make quicker mental connections between the 3 elements of our schema.

Mathematics contributes to many subjects, and it is important the children are given opportunities to apply and use Mathematics in real contexts. It is important that time is found in other subjects for pupils to develop their Numeracy Skills, e.g. there should be

regular, carefully planned opportunities for measuring in science and technology, for the consideration of properties of shape and geometric patterns in technology and art, and for the collection and presentation of data in history, geography and science.

We endeavour to set work that is challenging, motivating and encourages the pupils to think about how they learn and to talk about what they have been learning. Additional enrichment opportunities are provided for pupils to further develop mathematical thinking e.g. through cooking, music, and outdoor learning.

Teachers plan problem solving and investigational activities regularly to ensure that pupils develop the skills of mathematical thinking and enquiry and are able to explore mathematical ideas more deeply.

To provide adequate time for developing mathematics, maths is taught daily and discretely. Maths lessons may vary in length but will usually last for about 45 minutes to 1 hour. There is opportunity for children to revisit key number concepts regularly in order to aid the development of their fluency and long-term memory.

Teachers use a range of teaching strategies to engage the children in maths and ensure progress is made by all children within a class; no set formula is used. A typical lesson would include:

· Both teaching input and pupil activities,
· A balance between whole class, guided grouped and independent work, (groups, pairs and individual work)
· effectively differentiated activities/objectives and appropriate challenge.

Sometimes the focus for the session will be new learning, at other times pupils may be practising a concept they have learned previously. The focus of the lesson will be consistent for all children, with adaptive teaching being used to support the needs of all. Teachers plan learning that is targeted to meet the needs of all pupils, whether they have a specific learning difficulty in maths or are particularly able.

Assessment

By the end of the Key Stage, we expect children to know, apply and understand the concepts, skills and processes specified in the Key Stage 1 programme of study.

Formative Assessment

Maths assessment is on-going throughout school and used to inform planning and teaching. Teachers integrate the use of formative assessment strategies such as effective questioning, clear learning objectives, the use of success criteria and effective feedback and response in their teaching.

Summative Assessment

Using half termly tests to assess the units of work covered, pupils are assessed against the national expectations. The school's progress tracking system is updated termly. National Curriculum tests are used at the end of KS1. Teachers use past and sample papers to inform their assessments as they prepare pupils for these assessments. Maths is monitored throughout all year groups using a variety of strategies such as book looks, learning walks and pupil voice.

The school's Assessment and Marking Policies inform high quality feedback and pupils' response to it in Mathematics.

Early Years Foundation Stage (EYFS)

At Newport Infants we believe that if firm foundations are established in key mathematical concepts then children are able to develop a deeper and more cohesive understanding of mathematics as they grow. Throughout EYFS we achieve this by creating a well-balanced and enriching mixture of adult-led, and child-led learning supported by an enabling environment to deliver the EYFS Curriculum developed by our school. We focus on promoting the four main principles and fostering learning on numbers and numerical patterns and describing shapes, spaces, and measures.

We have developed a bespoke curriculum and are committed to ensuring the confident development of number sense and key early concepts. Pupils initially explore numbers to 10 through a wide range of models, images and a learning environment that is rich in Maths.

Special Educational Needs

Teachers follow the Personal Learning Plan for each child, incorporating the necessary resources, support, and teaching methods. Where a child has an EHCP it may be appropriate for their learning to be on a one to one or small group basis.

Interventions for small groups may take place if assessment shows that they would be appropriate. These are designed and set within year groups.
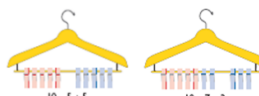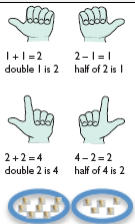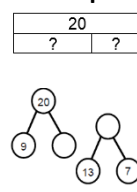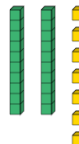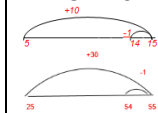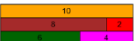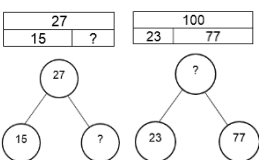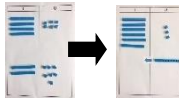
Resources
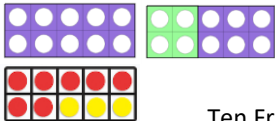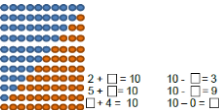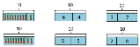
A bank of essential mathematics resources including Numicon, Dienes, Number lines and Cuisenaire rods are kept in each class base. The children have access to maths areas that are well resourced. This enables them to "Choose what they use" to tackle a problem. Teachers have access to online resources such as Primary Stars to help them deliver their teaching but the planning that we follow is very much of own design.

Role of the Subject Leader

To work with colleagues in developing confidence and skills necessary for the teaching of mathematics.

· To network with colleagues form other schools.

· To have an overall responsibility for monitoring the planning and assessment.

· To analyse data and identify trends and areas for improvement.

· To be responsible for auditing resources and staff skills.

· To bring new developments and ideas to the attention of the staff and Headteacher

· To contribute to the School Development Plan

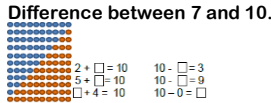· To attend CPD and feedback on new initiatives.
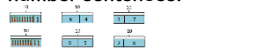
· To report to governors

EYFS	**Reception: ELG 2021**	**Subtraction**
	Number	
	Have a deep understanding of number to 10, including the composition of each number	
	Subitise up to 5	
	Automatically recall number bonds up to 5 and some number bonds to 10, including doubles	
	Numerical Patterns	
	Verbally count beyond 20, recognising the pattern of the counting system	
	Compare quantities up to 10 in different contexts, **recognising when one quantity is greater than, less than or the same as the other quantity**	
	Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally	

Year	1	2
Layers of vocabulary **Appendix 1a** Beck's Tiers of Vocabulary **Appendix 1b:** Vocabulary book	**Basic to subject specific (Beck's Tiers):** +, add, more plus make, sum, total altogether score double, near double one more, two more… ten more how many more to make…? how many more is… than…? how much more is…? **Instructional vocabulary:** start from, start with, start at look at point, to show me	**Basic to subject specific (Beck's Tiers):** +, add, addition, more, plus make, sum, total altogether score double, near double one more, two more... ten more... one hundred more how many more to make…? how many more is… than…? how much more is…? **Instructional vocabulary:** tell me, describe, name, pick out, discuss, talk about, explain, explain your method, explain how you got your answer, give an example of… show how you…
NC 2014	Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs.	Recording addition in columns supports place value and prepares for formal written methods with larger numbers.
	Concrete, pictorial, abstract	Concrete, pictorial, abstract

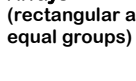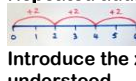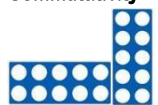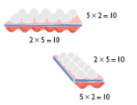| Developing Conceptual/ Procedural Understanding | **Number bonds**

 We have 10 pegs on the coathangers, how can we split them into 2 groups? Is there |
 1 + 1 = 2 double 1 is 2   2 – 1 = 1 half of 2 is 1
 2 + 2 = 4 double 2 is 4   4 – 2 = 2 half of 4 is 2 | **Whole-part model**
 | 20 | |
 | ? | ? |

 Fill in the missing numbers | **Base 10**
  | **Adjustment strategy**
 5 + 9 =
 5 + 10 – 1 = 14
  | **Partition and recombine**
 Record partitioned steps in number sentences then add mentally.
 40+20=60
 6+7 =13 |

another way? How can we be sure we have got them all? Ten Frames Hungarian frames Use the pattern to complete the number sentences. Use bonds of 10 to calculate bonds of 20.	**Recognise small quantities** **Count on** **Count on, on number track in 1s.** **Develop knowledge of fact families.** 10 = 3+7 10 = 7+3 10 – 7 = 3 20 = 3 + 17 20 = 17 + 3 20 – 3 = 17	**Balance image for concept of equality.** 9 = 9 9 = 8 + 1 9 = 7 + 2 8 + 1 = 7 + 2 10 = 10 10 = 8 + 2 10 = 6 + 4 8 + 2 = 6 + 4	**Whole-part model** Fill in the missing numbers All answers to be recorded in a number sentence following any informal recording. **Adding more than two numbers** Strategy to include looking for facts or bonds that are useful e.g. bonds up to and including 10, doubles or adding 10 to a given number. 6 + 3 + 4 = 13 6 + 3 + 4 + 7 +2 = 22 Record thinking.	(Round and adjust) **Doubles then near doubles** 5 + 6 = 5 + 5 + 1 = 11 7 + 8 = 8 + 8 - 1 = 15 47+50 = **Re-arranging** 18+4 = Tell me what you know about 4, e.g. 3+1, 2+2 18+4= Rearrange the 4 into 2+2 18+2+2= 20+2 =22 59+24 = Partition the 24 into 20 +4 and rearrange the 4 into 1+3. So 59+24= 59+20+1+3 = 59+1+20+3 = 83	60+13=73 Moving on to: 46 + 27 = 60 + 13 = 73 Regrouping the 10. **Balance in the equation** 14 = 8 + 6, 7+6=8+5 □= 13+9 3+ □+6 =16 14+ ◇= 15+27 **Decision making** Using statements such as: Ben did 14 + 9 = 23 How could he have done it?

Known facts	Represent & use number bonds and related subtraction facts within 20 Add and subtract 1 digit and 2 digit numbers to 20, including zero		Recall and use addition and subtraction facts to 20 fluently and derive and use related facts up to 100.	
Essential Knowledge	1 more	Number bonds: 5 and 6	10 more	Number bonds:20,12 and 13
	Largest number first.	Number bonds: 7 and 8	Add 1 digit to 2 digit by bridging	Number bonds: 14 and 15
	Add 10.	Number bonds:9 and 10	Partition second number and add tens then ones.	Number bonds: 16 and 17
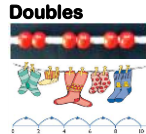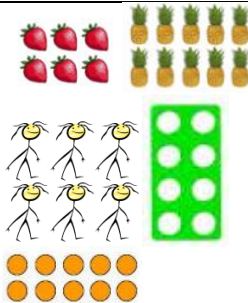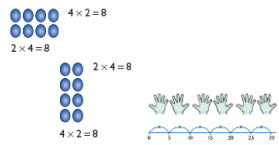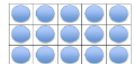
	Ten plus ones.	Use number bonds of 10 to derive bonds of 11	Add 10 and multiples of 10.	Number bonds: 18 and 19
	Doubles up to 10.		Doubles up to 20 and multiples of 5.	Partition and recombine.
			Add near multiples of 10.	
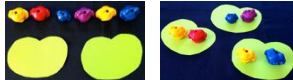
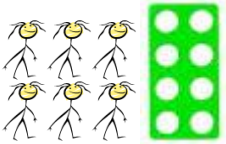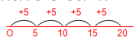|			
EYFS	**Reception: ELG 2021** **Number** Have a deep understanding of number to 10, **including the composition of each number** **Subitise up to 5** **Automatically recall number bonds up to 5 and some number bonds to 10**, including doubles **Numerical Patterns** Verbally count beyond 20, recognising the pattern of the counting system Compare quantities up to 10 in different contexts, **recognising when one quantity is greater than, less than or the same as the other quantity** Explore and represent patterns within numbers up to 10, **including evens and odds, double facts** and how quantities can be distributed equally		**Addition**

Year	1	2
Layers of vocabulary **Appendix 1a** Beck's Tiers of Vocabulary **Appendix 1b:** Vocabulary book	**Basic to subject specific (Beck's Tiers):** take away, distance between, difference between, less than. How many more? How much greater? How many fewer? how much more is…? – subtract, take (away), minus, leave, how many are left/left over? how many have gone? one less, two less, ten less… how many fewer is… than…? how much less is…? difference between half, halve = equals, sign, is the same as **Instructional vocabulary:** start from, start with, start at look at point, to show me	**Basic to subject specific (Beck's Tiers):** subtract, subtraction, take (away), minus leave, how many are left/left over? one less, two less… ten less… one hundred less how many fewer is… than…? how much less is…? difference between half, halve = equals, sign, is the same as tens boundary difference, partition, rearrange, inverse, place value **Instructional vocabulary:** tell me, describe, name, pick out, discuss, talk about, explain, explain your method, explain how you got your answer, give an example of… show how you…
NC 2014	Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs.	Recording subtraction in columns supports place value and prepares for formal written methods with larger numbers.
	Concrete, pictorial, abstract	Concrete, pictorial, abstract

Developing Conceptual/ Procedural Understanding	**Number bonds** **Ten Frames** Difference between 7 and 10. 2 + ☐ = 10 10 - ☐ = 3 5 + ☐ = 10 10 - ☐ = 9 ☐ + 4 = 10 10 - 0 = ☐ Use the pattern to complete the number sentences. 6 less than 10 is 4. **Count out, then count how many are left. Remove from the set.** 7 – 4 = 3	**Count back on a number track.** 15 – 6 = 9 **Difference between.** 13 - 8 =__ 8+ __= 13 **Subtraction-take away** 8-3=? **Subtraction-finding the difference** How many more cakes does Peter have than Jenny? 8-3=?	**Develop knowledge of fact families.** **Whole-part model** Fill in the missing numbers	**Whole-part model** Fill in the missing numbers All answers to be recorded in a number sentence following any informal recording. **Adjustment strategy** 77 - 9 = 77-10 +1 =67+ 1 =68 **(Round and adjust)** What is the nearest 10? 55 – 27 = 55 – 30 +3 =25 + 3 = 28 91 – 48 = 91-50 +2=41 +2 =43	**Re-arranging** 35 - 8 = Tell me what you know about 8, e.g. 2 + 6, 5 + 3 35 - 8= Rearrange the 8 into 5 + 3 So 35 - 5 - 3= 30 - 3 =27 55 - 27 = Partition the 27 into 20 +7 and rearrange the 7 into 5 + 2. So 55 – 27 = 55 -20 -5 -2 = 35 – 5 - 2 = 28 **Taking away and exchanging** 73 – 46 = What do we know Exchange to make about 76? '60 and 13'. 73 - 46 = 27 Now take away the 46.	**Subtract mentally pairs of multiples of 10 using known facts** 60 – 20 = 40 because 6 – 2 = 4 **Partitioning of the second number strategy** 74 – 47 74 – 40 = 34 34 – 4 – 3 = 27 **Balance in the equation** 35 - ☐ = 31 ☐ - 12 =34 20 - ☐ = 14 - 3 (Open-ended) 18 - ☐ = 15 - ☐ **Decision making** 27 - ☐ = 12 Sam works out 27 – 15 = 12. How could he have done this?
Known facts	Represent & use number bonds and related subtraction facts within 20 Add and subtract 1 digit and 2 digit numbers to 20, including zero			Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100.	
Essential knowledge	1 less	Number bonds: subtraction 5 and 6	10 less		Number bonds: subtraction 20,12 and 13
	Count back	Number bonds: subtraction 7 and 8	Subtract 1 digit from 2 digit by bridging		Number bonds: subtraction 14 and 15
	Subtract 10.	Number bonds: subtraction 9 and 10	Partition second number and count back in tens then ones.		Number bonds: subtraction 16 and 17
	Teens subtract 10	Difference between	Subtract 10 and multiples of 10.		Number bonds: subtraction 18 and 19
			Subtract near multiples of 10.		Difference between
			Add near multiples of 10.		

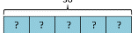| EYFS	**Reception: ELG 2021**	**Multiplication**
	Number Have a deep understanding of number to 10, including the composition of each number Subitise up to 5 Automatically recall number bonds up to 5 and some number bonds to 10**, including doubles** **Numerical Patterns** Verbally count beyond 20, recognising the pattern of the counting system Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity Explore and represent patterns within numbers up to 10, including evens and odds, **double facts and how quantities can be distributed equally**	

Year	1	2
Layers of vocabulary **Appendix 1a** Beck's Tiers of Vocabulary **Appendix 1b:** Vocabulary book	**Basic to subject specific (Beck's Tiers):** count in ones, twos… tens… array, groups of, equal groups odd, even **Instructional vocabulary:** carry on, continue repeat what comes next? find, choose, collect use, make, build tell me, describe, pick out, talk about, explain, show me, read, write, record	**Basic to subject specific (Beck's Tiers):** lots of, groups of ×, times, multiply, multiplied by multiple of once, twice, three times… ten times… times as (big, long, wide… and so on) repeated addition array row, column double, halve share, share equally **Instructional vocabulary:** carry on, continue, repeat, what comes next? predict describe the pattern describe the rule find, find all, find different, investigate
NC 2014	Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.	Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (x), division (÷) and equals (=) signs.
	Concrete, pictorial, abstract	Concrete, pictorial, abstract

| Developing Conceptual/ Procedural Understanding | **Grouping** 2 frogs on each lily pad | **Arrays** (rectangular arrangements to show equal groups) | **Repeated addition** Introduce the x symbol once repeated addition is understood. | **Commutativity** |

	GROUPING ITP Pictures to show 2 groups of 3 or 3 groups of 2 etc. **Doubles**		**Grouping** 5 frogs on each lily pad 5 x 3 = 15 **Building tables** Build tables using counting stick- forwards and backwards and with missing jumps	**5 x2 = 2 x 5** **Decision making** How many number sentences can you write to describe this array? Can you use addition, multiplication and division? Explain your answers.
Known facts	Count in multiples of twos, fives and tens.		Recall and use x and ÷ facts for the 2, 5 and 10 x tables, including recognising odd and even numbers.	
Essential Knowledge	Count in 2s	Doubles up to 10	2 x table	Doubles up to 20
	Count in 10s	Double multiples of 10	10 x table	Doubles of multiples of 5
	Count in 5s	Count in 2s, 5s and 10s	5x table	Count in 3s

	Reception: ELG 2021	**Division**
EYFS	**Number** Have a deep understanding of number to 10, including the composition of each number Subitise up to 5 Automatically recall number bonds up to 5 and some number bonds to 10, including doubles **Numerical Patterns** Verbally count beyond 20, recognising the pattern of the counting system Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity Explore and represent patterns within numbers up to 10, including evens and odds, double facts and **how quantities can be distributed equally**	

Year	1	2
Layers of vocabulary **Appendix 1a** Beck's Tiers of Vocabulary **Appendix 1b:** Vocabulary book	**Basic to subject specific (Beck's Tiers):** count in ones, twos… tens… share, groups of, equal groups odd, even **Instructional vocabulary:** count out, share out, left, left over	**Basic to subject specific (Beck's Tiers):** share, share equally one each, two each, three each… group in pairs, threes… tens equal groups of ÷, divide, divided by, divided into left, left over **Instructional vocabulary:** tell me, describe, name, pick out, discuss, talk about, explain, explain your method, explain how you got your answer, give an example of… show how you
NC 2014	solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.	Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (x), division (÷) and equals (=) signs.
	Concrete, pictorial, abstract	Concrete, pictorial, abstract

Developing Conceptual/ Procedural Understanding	**Grouping/Sharing models** Using practical contexts and cross-curricular links (PE) such as socks and shoes; animals in the ark to get into groups. Sharing models such as sharing pieces of fruit. Sharing into equal groups 6 frogs shared equally between 2 lily pads gives 3 frogs on each lily pad or Grouping in equal groups 6 frogs grouped in 2s need 3 lily pads to sit on **GROUPING ITP** How many twos? 	**Arrays** (rectangular arrangements to show equal groups) **Decision making** How many cars can you make if you have 8 wheels? How many different ways can you arrange 12 buttons in equal groups? 	**Grouping/Sharing models** Introduce the ÷ symbol 15 frogs shared equally between three lily pads 15 ÷3 = 5 or 15 frogs grouped in 5s need 3 lily pads to sit on 15 ÷5 = 3 15 ÷ 3 = 5 groups of 3 (grouping) 20 ÷ 2 = 10 There are 7 cakes and 2 children. How many cakes will they get each? (Leftovers/remainders introduced) 7 ÷ 2 = 3r1	**Arrays representing the dividend** 10 ÷ 2 = 5 and 10 ÷ 5 = 2 **Repeated addition (to reach a given target)** There are 20 sweets in a bag. How many children can have 5 each? **Repeated subtraction (from a given quantity)** **Links to tables** Use language of division linked to tables using counting stick **Representing problems** Jane has 30 cakes. She wants to share them equally between 5 boxes. How many cakes should go in each box? 30 ÷ 5 = 6 Number of cakes in each box = 6
Known facts	Count in multiples of twos, fives and tens.		Recall and use x and ÷ facts for the 2, 5 and 10 x tables, including recognising odd and even numbers.	
Essential Knowledge	Count back in 2s	Halves up to 10	Division facts (2 x table)	Halves up to 20
	Count back in 10s	Halve multiples of 10	Division facts (10 x table)	Review division facts (2 x, 5 x, 10 x tables)
	Count back in 5s	How many 2s? 5s? 10s?	Division facts (5 x table)	Count back in 3s
Tests of divisibility	All even numbers will divide by 2		All numbers ending in 0 will divide by 10	All numbers ending in 5 and 0 will divide by 5