



# Welcome to Maths Mastery at Kineton Green Primary School!

You have eight coins that all look identical but only one is solid gold.

The solid gold coin weighs slightly more than the fakes.



You can use the balance only twice. How can you work out which is the real gold coin?

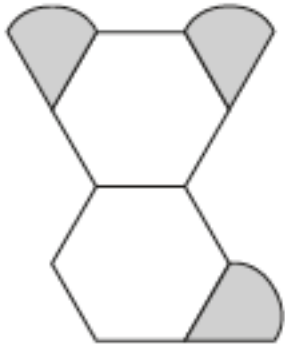


# “The Mastery Curriculum”

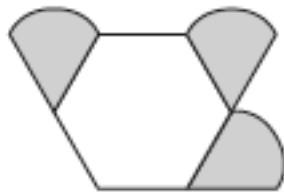
21

Amina is making designs with two different shapes.

She gives each shape a value.



Total value is 147



Total value is 111

Calculate the value of each shape.

$$\text{Hexagon} = \boxed{\phantom{000}}$$

$$\text{Semi-circle} = \boxed{\phantom{000}}$$

23

The length of a day on Earth is 24 hours.

The length of a day on Mercury is  $58\frac{2}{3}$  times the length of a day on Earth.

What is the length of a day on Mercury, in hours?

Show your method

hours



# Maths Mastery



KINETON GREEN PRIMARY SCHOOL  
METROPOLITAN BOROUGH OF SOLIHULL

## Maths Parents' Survey

Please complete and return to the school office by **Friday, 11<sup>th</sup> May 2018**.

Child's name: \_\_\_\_\_ Year group: \_\_\_\_\_

- 1) I will/will not be attending the INSPIRE workshop about ways in which I can support my child in maths (delete as appropriate).
- 2) I already feel that I am able to support my child's learning in maths.



*Strongly Agree*

*Agree*

*Unsure*

*Disagree*

*Strongly Disagree*

- 3) I would like to know more about the following (tick all that apply);

\_\_\_\_ The Maths Mastery approach to teaching and learning

\_\_\_\_ Use of physical resources to support learning

\_\_\_\_ Mixed ability paired and group work

\_\_\_\_ Supporting with homework

Other comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Thank you for your time!



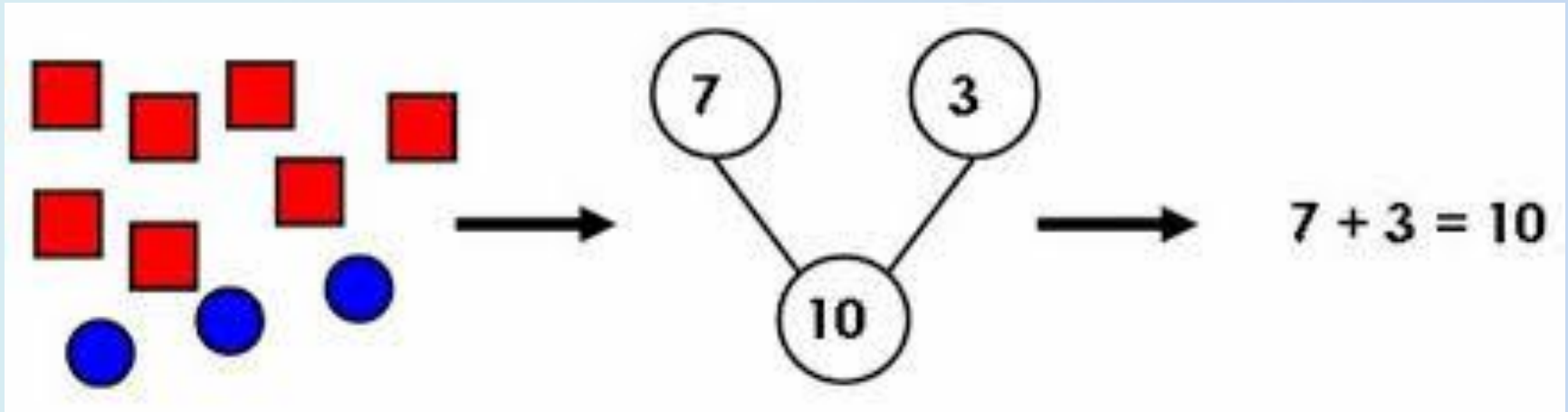
# You wanted to find out...

- What does Maths Mastery mean?
- What does Maths Mastery look like in lessons?
  - Are all children challenged in lessons?
  - How can I support my child at home?
- How can I learn the strategies my child learns in class?



# Maths Mastery

This year, Kineton Green Primary School has adopted the “Maths Mastery” approach to the teaching and learning of Maths.



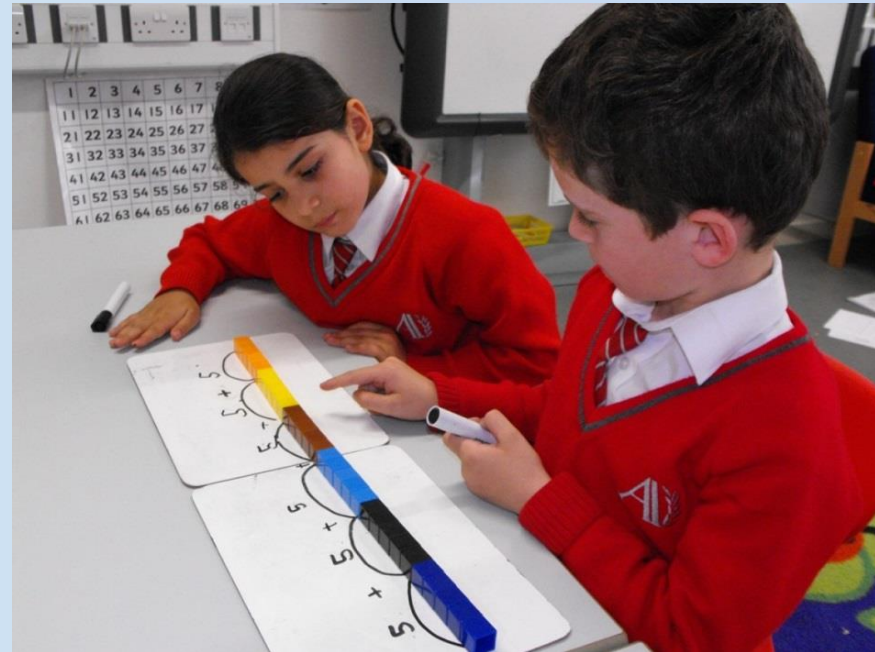
But what does “Maths Mastery” look like at Kineton Green Primary School?



# “Depth before breadth”

Central to the Maths Mastery approach is that more time is spent on key mathematical concepts in order to provide opportunities to model, discuss and develop the children’s reasoning skills in these areas.

Although the pace may appear to be slower at first, this approach allows children to develop a deeper understanding of key concepts enabling them to build on this knowledge in later years.





# The “CPA” approach

To further develop understanding, teachers and children explore the maths they are studying using **C**oncrete apparatus.



Children will also represent their understanding using **P**ictorial methods

Children are also expected to use **A**bstract methods (numbers/symbols, etc) to answer questions.

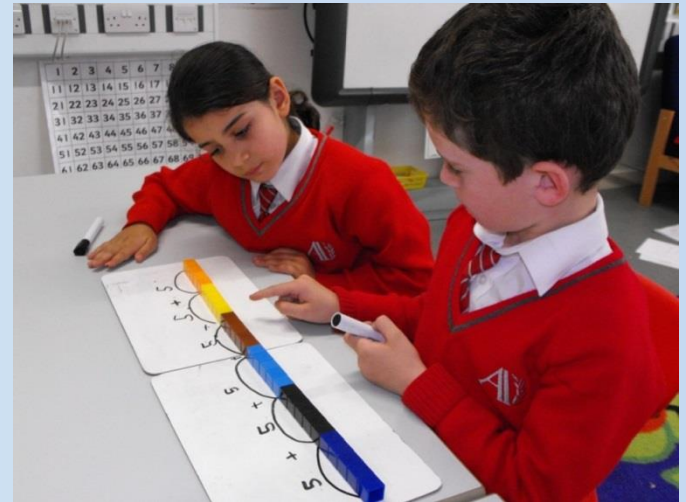
The ability to move between these approaches is key to developing understanding in ALL learners!



# Challenge for ALL children!

Countries which have developed a mixed ability approach to learning have more positive outcomes for all children!

In the Maths Mastery approach, all children are challenged by tasks which are simple to grasp but difficult to master.



Mixed ability grouping allows children to benefit from each other's understanding whilst continuing to provide challenge for those who have grasped the concept more rapidly.





# Anchor Task

## Squared Numbers

$1^2$



$1 \times 1 = 1$

$2^2$



$2 \times 2 = 4$

$3^2$



$3 \times 3 = \underline{\quad}$

<b>ADDITION</b>	<b>SUBTRACTION</b>
add plus and total	take away minus less remain
+	-
increase more use together	take from fewer take difference how many more
<b>MULTIPLICATION</b>	<b>DIVISION</b>
multiply times product multiplied by	divides share split divides into
×	÷
groups of lots of shared times tables	divides in share split each share equally

**Challenge** - Is 20 a square number?

# WALT - To investigate squared and cubed numbers.



## Cubed Numbers

$1^3$



$$1 \times 1 \times 1 = 1$$

$2^3$



$$2 \times 2 \times 2 = 8$$

$3^3$



$$3 \times 3 \times 3 = \underline{\quad}$$

What is the same?

What is not the same?

<b>ADDITION</b> add plus and total +	increase more use together
<b>MULTIPLICATION</b> multiply times product multiplied by	groups of lots of repeated times tables
<b>SUBTRACTION</b> take away minus take minus difference less	less than fewer take difference how many more
<b>DIVISION</b> share divide into divided by	divisible groups each share equally



## Core Task

Place 5 odd and 5 even numbers in the diagram below.

	Not cubed	Cubed
Over 100		
100 or less		

Put at least one number in each section.

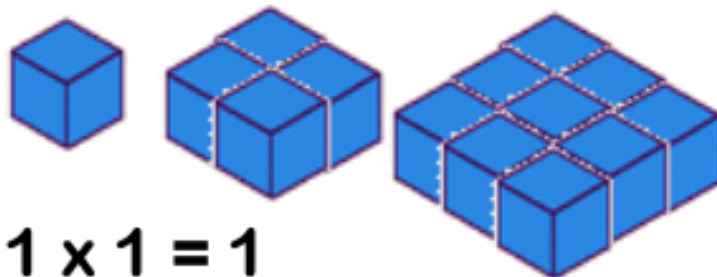
Challenge - Write the first 10 **squared** numbers in order.

Can you see a pattern?

Use the "Steps to Reasoning" to help you answer.

## Scaffold Task

Make the first 10 squared numbers using cubes. Write the equation.



$$1 \times 1 = 1$$

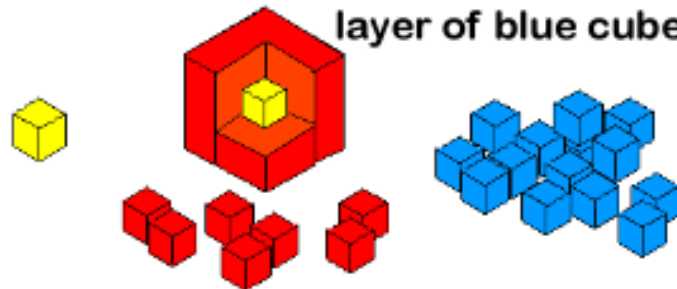
$$2 \times 2 = 4$$

$$3 \times 3 = \underline{\quad}$$

Challenge - Repeat with cubed numbers.

## Greater Depth Task

I started with one yellow cube, then covered it all over with a layer of red cubes, which I then covered with a layer of blue cubes.



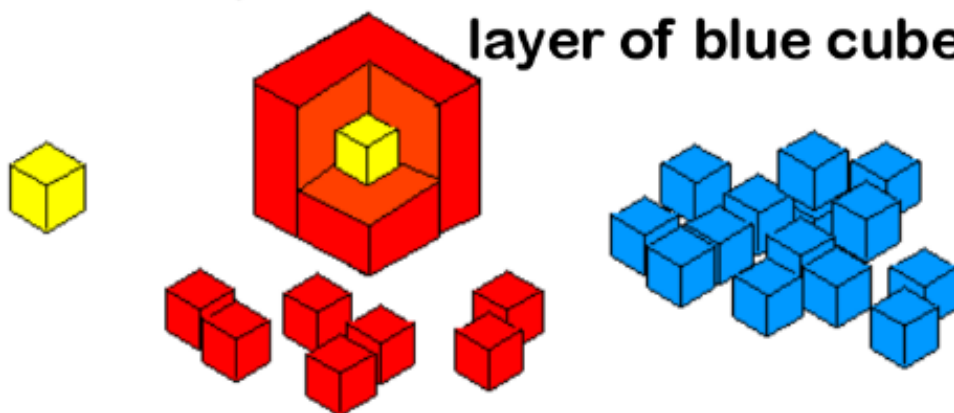
How many blue cubes did I use?



# Plenary

## Greater Depth Task

I started with one yellow cube, then covered it all over with a layer of red cubes, which I then covered with a layer of blue cubes.

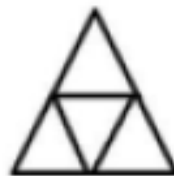


How many blue cubes did I use?

**Challenge** - I want to add a new layer of green cubes.

How could I work out how many green cubes I need without making the model?

<b>ADDITION</b>	<b>SUBTRACTION</b>
add plus and total	take away minus less subtract difference remain
+	-
increase more use together	take from fewer take difference how many more
<b>MULTIPLICATION</b>	<b>DIVISION</b>
multiply times product multiplied by	divides share divide divided into share equally
×	÷
groups of lots of shared times tables	divisible groups each share equally



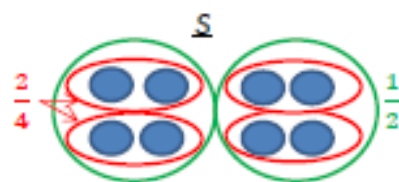
Shade  $\frac{1}{2}$



$$\frac{1}{4} \text{ of } 12 =$$

$$\frac{1}{2} \text{ of } 12 =$$

$$\frac{2}{4} \text{ of } 12 =$$



$\frac{1}{2}$  is equal to  $\frac{2}{4}$

Half of 8 is 4

A quarter of 8 is 2

2 quarters of 8 is 4

$$\frac{1}{2} \text{ of } 16 \text{ is } \square$$

$$\text{so } \frac{2}{4} \text{ of } 16 \text{ is } \square$$

GD

I have 2 quarters of the sweets.



what is the total number of sweets. Explain.



# Mastery in the Foundation Stage



# Homework

We set two kinds of maths homework at Kineton Green:

## 1) Key Instant Recall Facts (KIRFS)

KIRFs are number facts that children need to learn by heart to help develop their mathematical fluency.

We have been learning about fractions in Year 6 this week. We have learnt that we can simplify fractions by dividing the denominator and the numerator by their highest common factor.

Factors of 3: 1, 3  
Factors of 6: 1, 2, 3, 6  
Highest common factor = 3

We have also learnt that we can find compare unlike fractions by finding the lowest common multiple of both the denominators to change them to equivalent like fractions.

Multiples of 5	Multiples of 10
5	10
10	20
15	30
20	40
25...	50...

The lowest common multiple of 5 and 10 is 10.

$\frac{4}{5} \times 2 = \frac{8}{10}$   
 $\frac{7}{10} \times 1 = \frac{7}{10}$

$\frac{8}{10} > \frac{7}{10}$  so  $\frac{4}{5} > \frac{7}{10}$

### KIRFS (Key Instant Recall Facts)

Dear parents and carers,

We are introducing KIRFs (Key Instant Recall Facts) which your child will be practising at school until they know by heart. Please support your child's learning by practising these facts with your child as often as possible.

Please contact Mr Jones if you have any questions or comments.

These are the number facts your child will need to learn each half term.

**Key Vocabulary**

These are the words your child will be using in school to show their understanding.

**Top Tips**

These are suggestions for ways in which you can make the learning fun and engaging. Your class teacher may be able to suggest more ways in which your child can practise.

**Useful Websites** - Play games, sing songs and have fun while practising!

## 2) Homework to reinforce prior learning.

Each week, your child will use their homework as a prompt to discuss with you the learning they have done at school. The homework will include strategies to help you to support your child.



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Useful Websites - Play games, sing songs and have fun while practising!





# KIRFs (Key Instant Recall Facts)

## Year 3 – Summer 2

I can know multiplication and division facts for the 8 times table.

Your child is expected to know these facts by heart by the end of this term.  
Please support your child by practising with them regularly (3 times a week).

$8 \times 1 = 8$

$8 \times 2 = 16$

$8 \times 3 = 24$

$8 \times 4 = 32$

$8 \times 5 = 40$

$8 \times 6 = 48$

$8 \times 7 = 56$

$8 \times 8 = 64$

$8 \times 9 = 72$

$8 \times 10 = 80$

$8 \times 11 = 88$

$8 \times 12 = 96$

$1 \times 8 = 8$

$2 \times 8 = 16$

$3 \times 8 = 24$

$4 \times 8 = 32$

$5 \times 8 = 40$

$6 \times 8 = 48$

$7 \times 8 = 56$

$8 \times 8 = 64$

$9 \times 8 = 72$

$10 \times 8 = 80$

$11 \times 8 = 88$

$12 \times 8 = 96$

$8 \div 8 = 1$

$16 \div 8 = 2$

$24 \div 8 = 3$

$32 \div 8 = 4$

$40 \div 8 = 5$

$48 \div 8 = 6$

$56 \div 8 = 7$

$64 \div 8 = 8$

$72 \div 8 = 9$

$80 \div 8 = 10$

$88 \div 8 = 11$

$96 \div 8 = 12$

$8 \div 1 = 8$

$16 \div 2 = 8$

$24 \div 3 = 8$

$32 \div 4 = 8$

$40 \div 5 = 8$

$48 \div 6 = 8$

$56 \div 7 = 8$

$64 \div 8 = 8$

$72 \div 9 = 8$

$80 \div 10 = 8$

$88 \div 11 = 8$

$96 \div 12 = 8$

### Key Vocabulary

What is 8 multiplied by 7?

What is 9 times 8?

What is 40 divided by 8?

They should be able to answer these questions in any order, including missing number questions e.g.  $8 \times \bigcirc = 32$  or  $\bigcirc \div 8 = 10$ .

### Top Tips

The key to learning number facts by heart is to practise **little and often** and by making it fun. Play “fast facts”, take turns to call out a question and the first to answer correctly asks the next question.

Is there a song or a chant your child loves which they can sing these facts over?

Useful Websites - Hit the button! [www.topmarks.co.uk/maths-games/hit-the-button](http://www.topmarks.co.uk/maths-games/hit-the-button)



# TIMES TABLES

# ROCK STARS

Next:  $3 \times 7$

31

$10 \times 11$

30

110

7	8	9
4	5	6
1	2	3
Delete	0	Enter

11

BREAKTHROUGH ARTIST 10

UNSIGNED ACT 9

CHOOCH 8

BUSKER 7

GARAGE ROCKER 6

WANNABE 5

4

3

2

1

0



# Homework

Your child will have been taught the strategies shown in the homework and should be able to explain them to you and apply them to solving problems.

We have been learning about fractions in Year 6 this week. We have learnt that we can simplify fractions by dividing the denominator and the numerator by their highest common factor.

$\frac{3}{6} \xrightarrow{\div 3} \frac{1}{2}$

Factors of 3: 1, 3

Factors of 6: 1, 2, 3, 6

Highest common factor = 3

Please support your child or leave a short comment if you feel they have not yet fully grasped the strategy.



# Homework

This week we have been learning about division. We have been dividing numbers by 2, 3 and 4 where whole number answers are found e.g.  $20 \div 4 = 5$ .

The children have learnt that to divide you must share the amount equally between the number you are dividing by. They have been practising representing/ drawing groups to share equally between like this



and drawing crosses  $\times$  to represent the quantity that they are sharing.

We have also been using our 'shared equally between symbol'  $\div$  to write some number sentences.

Have a go at answering the questions below

$$12 \div 3 =$$

Write the number sentence that this pictorial representation represents:



# Homework

## A Maths Dictionary For Kids 2018



▶ terms of use

by Jenny Eather

▶ help

Aa Bb  
Cc Dd  
Ee Ff  
Gg Hh  
Ii Jj  
Kk Ll  
Mm Nn  
Oo Pp  
Qq Rr  
Ss Tt  
Uu Vv  
Ww Xx  
Yy Zz

data  
date  
day  
deca- deka-  
decade  
decagon  
decahedron  
decimal  
decimal fraction  
decimal system  
decomposition  
decrease  
deduct  
deficient number  
degree  
denominator  
depreciation  
descending  
diagonal  
diameter  
dice, die  
difference  
digit  
digital clock  
dimension

direction  
discount  
discrete data  
displacement  
distance  
distributive law  
divided bar graph  
division  
· divide, divisor  
· dividend  
· divisible, divisibility  
dodecagon  
dodecahedron  
dollar  
dot plot  
double  
dozen

denominator

· bottom number in a fraction.

· the number of parts the whole is divided into.

EXAMPLES:

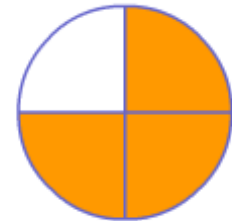
Repeat  
click.



$$\frac{1}{4}$$



$$\frac{2}{4}$$



$$\frac{3}{4}$$

numerator  
denominator

fraction calculator

Enter your numbers and click the button, eg  $\frac{1}{2} \times 10$

x

=



OR  
as a decimal

**Any questions?**