North Yorkshire County Council

National Curriculum for Mathematics 2014

Exemplification of the Programmes of Study for

YEAR 1

This document brings together the exemplification materials that are available on the NCETM website. Where there were gaps on the website, we have included other examples from past SATs papers and NCETM Mastery documents. We have also included appropriate links to Nrich problems, games and investigations. Click on  in each section to access the weblinks which relate to the programmes of study statements.

fluency, reasoning and problem-solving

Contents

Purpose of study

Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.

Aims

The national curriculum for mathematics aims to ensure that all pupils:

become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.

reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language

can **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge to science and other subjects.

The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.

The School Curriculum

The programmes of study for mathematics are set out year-by-year for key stages 1 & 2. Schools are, however, only required to teach the relevant programme of study by the end of the key stage. Within each key stage, schools therefore have the flexibility to introduce content earlier or later than set out in the programme of study.

YEAR 1 – Number and Place Value

Examples of what children should be able to do, in relation to each (boxed) Programme of Study statement

count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number

- count forwards from 80 to 110
- count backwards from 105

count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens

- Find p 39 in a book
- Make a label to show how many things were in your collection
- Count groups of 10 each of 2p, 5p and 10p coins
-

given a number, identify one more and one less

There are twenty-nine beads in this pot. I am putting one more bead in the pot. How many are in there now? How did you know? How can you check?

This time there are forty beads in the pot. I take out one bead. How many beads are left in the pot? How did you know? How can you check?

Start with a different number of beads in the pot. Ask your partner to put another bead in or take one out and then say how many there are in the pot. How will you know if your partner is right?

identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least

I'm giving each of you a strip of card with some numbers on [five numbers at random from 0 to 30].

Point to the number which is worth most. Now point to the number which is worth least.

Make these numbers using tens and ones apparatus and put them in order.

Why have you put this number there?

read and write numbers from 1 to 20 in numerals and words

Make some labels for collections using numbers and words.

YEAR 1 – Addition and Subtraction

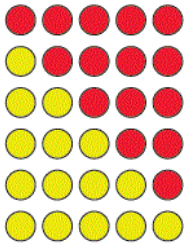
Examples of what children should be able to do, in relation to each (boxed) Programme of Study statement

read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs

- Use the vocabulary add, subtract, minus, equals, is the same value as, total, more than, fewer/less than.
- Explain that things on both sides of the equals sign have the same value
- Know that the 'total' can be presented on either side of the equals sign
- Complete 'empty box' number sentences

represent and use number bonds and related subtraction facts within 20

Use the pattern to complete the number sentences.



0 + 5 = 5
1 + □ = 5
2 + □ = 5
3 + □ = 5
4 + □ = 5
5 + □ = 5

Now do the same for rows of 6 counters, 7 counters, 8 counters, 9 counters and 10 counters.

Children should be able to recall all number bonds to and within 10. Exposing the structure of the mathematics supports this process. They should then apply this to number bonds to 20. so if 5+3 = 8. 15 +3 = 18

- I'm thinking of a number. I've subtracted 6 and the answer is 8. What number was I thinking of? Explain how you know.
- I'm thinking of a number. I've added 7 and the answer is 18. What number was I thinking of? Explain how you know.
- I know that 6 and 4 is 10. How can I find 7 + 4? How could you work it out?

add and subtract one-digit and two-digit numbers to 20, including zero

- What is 37 subtract 10? How did you work that out? How could you show that using cubes/a number line/a 100-square? What would 37 subtract 20 be?
- Make up some difference questions with the answer 5. Can you show how to solve them using counters? Can you show how to find the answer on a number line?

solve one-step problems involving addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = ? – 9.

- Make up some additions with the answer 15. Try to put them in different ways, like this: 10 + 5 = 15. The total of 10 and 5 is 15. 10 and 5 more makes 15.
- How many ways can you show me that 9 subtract 3 is 6?
- Make up some subtractions with the answer 5. Try to put them in different ways, like this: 11 – 6 = 5. The difference between 6 and 11 is 5.

YEAR 1 – Multiplication and Division

Examples of what children should be able to do, in relation to each (boxed) Programme of Study statement

solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of a teacher

Children should be able to:

- Use practical apparatus, arrays and images to help solve multiplication and division problems such as:

  Ben had 5 football stickers. His friend Tom gave him 5 more, how many does he have altogether?

  Share 12 sweets between two children. How many do they each have?

Show children pictures or groups of objects as below. Ask questions such as

"How many biscuits are they altogether?

"How many cherries are there altogether?"

Observe how children count the objects. Do they count in twos, fives etc or do they count in ones?

- Find half of and double a number or quantity:

  16 children went to the park at the weekend. Half that number went swimming. How many children went swimming?

  I think of a number and halve it. I end up with 9, what was my original number?

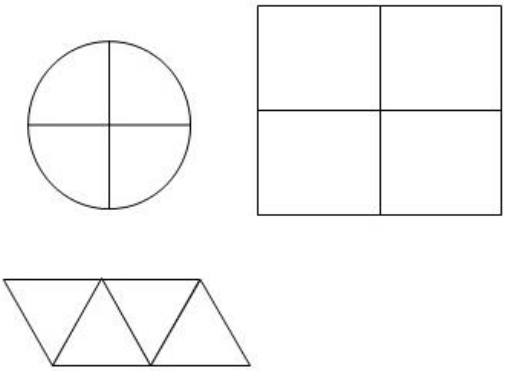
YEAR 1 - Fractions

Examples of what children should be able to do, in relation to each (boxed) Programme of Study statement

recognise, find and name a half as one of two equal parts of an object, shape or quantity

Shade one half of each shape.

Can you find different ways to do this?



Here is a set of pencils.

How many is half of the set?

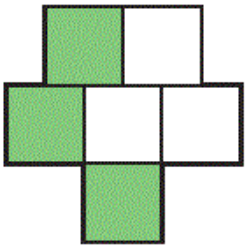
recognise, find and name a quarter as one of four equal parts of an object, shape or quantity

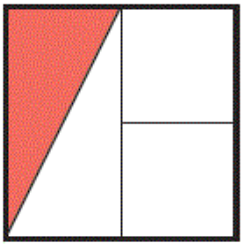
Four children share 12 strawberries into equal parts.

How many strawberries will each child get?

What fraction of the whole shape is shaded?

Explain your answer.





YEAR 1 - Measurement

Examples of what children should be able to do, in relation to each (boxed) Programme of Study statement

compare, describe and solve practical problems for:

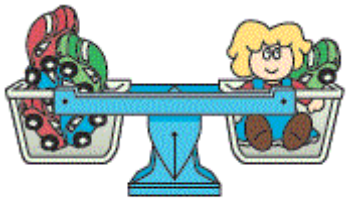
- **lengths and heights (e.g. long/short, longer/shorter, tall/short, double/half)**
- **mass or weight (e.g. heavy/light, heavier than, lighter than)**
- **capacity/volume (full/empty, more than, less than, quarter)**
- **time (quicker, slower, earlier, later)**

Use their experience of standard units to make realistic estimates, answering questions such as:

- Is the table taller or shorter than a metre?
- Is this doll taller or shorter than one of the class rulers?
- Does this bottle hold more or less than the litre jug?
- Which of these things do you think will weigh less than a kilogram?

There are five cars in one side of the scales. The scales are balanced.

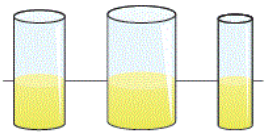
What could the doll weigh?



Captain Conjecture says “Each of these glasses contains the same amount of juice”

Do you agree?

Explain your answer.



measure and begin to record the following:

- **lengths and heights**
- **mass/weight**
- **capacity and volume**
- **time (hours, minutes, seconds)**

Use standard units to measure and compare objects. For example, they place metre sticks end-to-end to find out how much wider the hall is than the classroom. They use a litre jug to measure how much more the washing-up bowl holds than the cola bottle.

recognise and know the value of different denominations of coins and notes

Distinguish coins by sorting them and start to understand their value. They begin to recognise that some coins have a greater value than others, and will buy more: for example, 2p is worth more than 1p; 5p is worth more than 2p; £2 is worth more than £1. They play money games and collect 1p or 2p coins to the value of 10p and begin to count up ‘how much this is altogether’. They extend their activities in the classroom shop, paying for items that cost 1p, 3p, 5p, 7p or 9p using only 2p

coins, and receiving the appropriate amount of change in 1p coins. They use coins to help them to respond to questions such as:

- Michael had £5. He spent £3. How much did he have left?
- Rosie had a 10p coin. She spent 3p. How much change did she get?
- How much altogether is 1p and 2p and 5p?
- Sunita spent 5p and 6p on toffees. What did she pay altogether?
- Chews cost 2p each. How much do three chews cost?
- An apple costs 12p. Which two coins would pay for it? What combinations of 3 coins would pay for it?

sequence events in chronological order using language such as: before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening

Continue to develop the concept of time in terms of time passing and sequencing events in familiar story or day-to-day routines.

- They use terms such as morning, afternoon and evening, yesterday and tomorrow.
- They learn to order the days of the week and learn that weekend days are Saturday and Sunday.
- They listen to stories and rhymes about time, such as The Very Hungry Caterpillar or The Bad-Tempered Ladybird by Eric Carle, Monster Monday by Susanna Gretz or Hard Boiled Legs by Michael Rosen and Quentin Blake

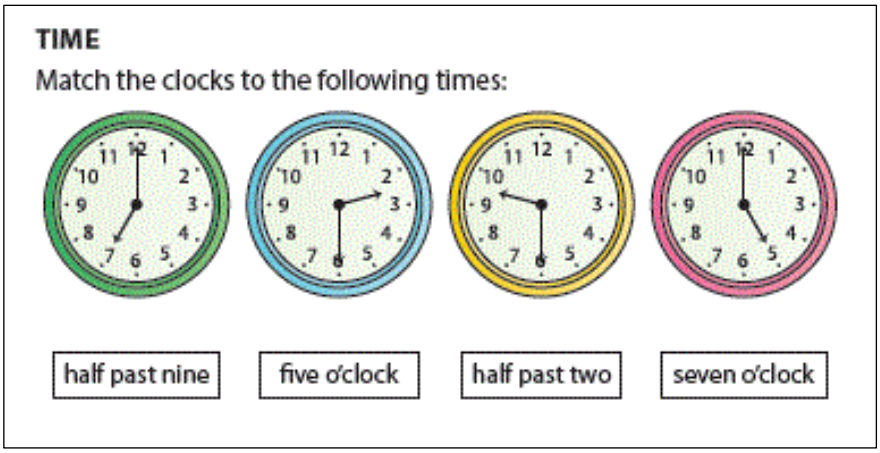
recognise and use language relating to dates, including days of the week, weeks, months and years

order the months of the year and make a 12-page classroom calendar with pictures of each month, writing significant events underneath, such as Diwali, Pancake Day or Midsummer's Day, or the dates of their birthdays.

tell the time to the hour and half past the hour and draw the hands on a clock face to show these times

Read time to the hour and half hour on a clock with hands and recognise half past the hour in day-to-day routines. They use time lines or clocks to help them to respond to questions such as:

- It's half past seven. What time will it be in four hours' time? What time was it two hours ago?
- John went to the park at 9 o'clock. He left at half past eleven. How long was he at the park?

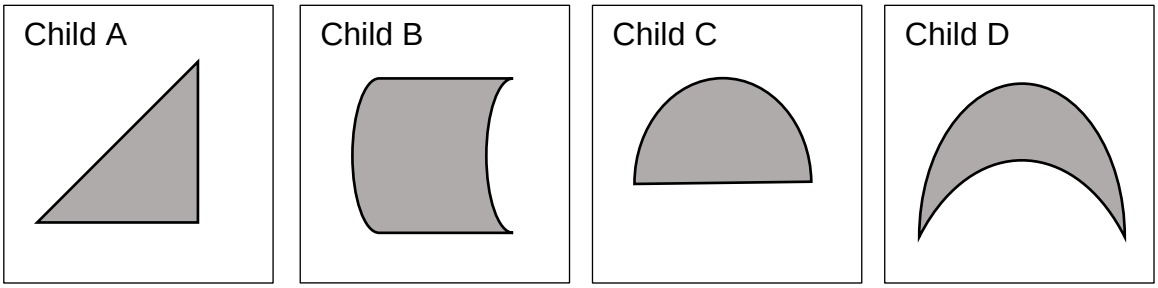


YEAR 1 – Geometry: Properties of Shapes

Examples of what children should be able to do, in relation to each (boxed) Programme of Study statement

Pupils should be taught to recognise and name common 2-D and 3-D shapes, including [for example] rectangles (including squares), circles, triangles, cuboids (including cubes), pyramids and spheres.

Give each child a shape -



Look at the shape I have given you. Tell me one thing about the shape.

Hand each child a solid -

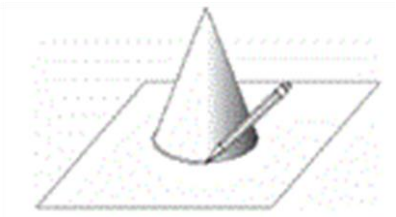
Child A: cylinder Child B: triangular prism Child C: cone Child D: cube

Look at what I have given you. Tell me one thing about it.

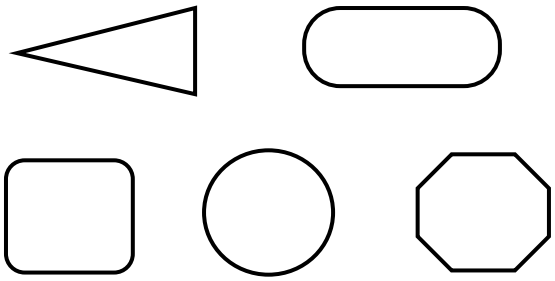
Give each child two different shapes/solids.

Tell me something that is the same about these. Now tell me something that is different about these.

Fred draws round the bottom of a cone.

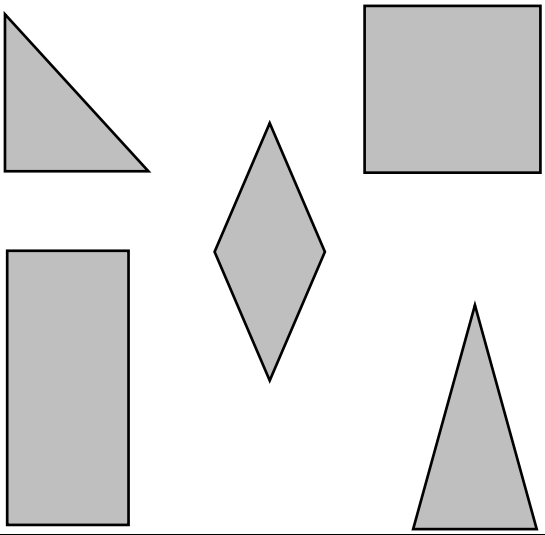


Tick (✓) the shape that Fred draws.



One shape has 2 long sides and 2 short sides.

Tick (✓) it.

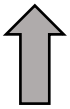


YEAR 1 – Geometry: Position & Direction

Examples of what children should be able to do, in relation to each (boxed) Programme of Study statement

Pupils should be taught to describe position, direction and movement, including whole, half, quarter and three-quarter turns.

Look at this map –



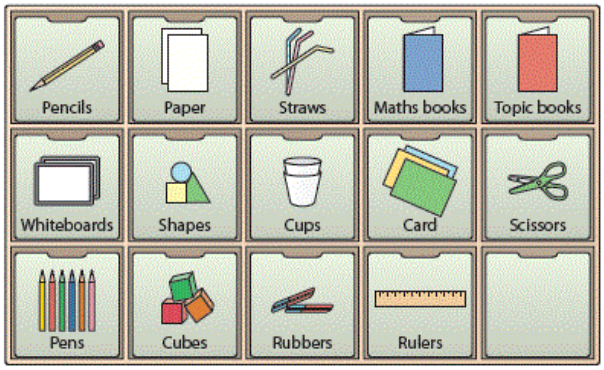
Desi starts here

Desi's house is the 2nd on the left.

Tick (✓) it.

Look at the shelves with the objects.

The cups are in the middle row and third from the right. They are below the straws.



How could you describe the positions of other things on the shelves?

I am thinking of an item. You may ask questions but I can only answer yes or no.

You could guess the item in four questions, what questions could they be?

Acknowledgements –

This resource has been collated by the North Yorkshire Mathematics Team using the exemplification of the 2014 National Curriculum which is freely available from NCETM website. The resource has been adapted and revised where there were gaps; errors or further clarification seemed appropriate. We have also included weblinks to appropriate Nrich activities.

Here is a list of other resources you may find useful –

Archimedes Maths Hub/NYCC Mixed age planning:
http://carmelarchimedesmathshub.org.uk/mixed-age-planning/

NCETM Resource Tool:
https://www.ncetm.org.uk/resources/41211

NCETM Teaching for Mastery Y1:
https://www.ncetm.org.uk/public/files/23305576/Mastery_Assessment_Y1_High_Res.pdf

Nrich Curriculum Maps for KS1 and KS2:
http://nrich.maths.org/8935

STEM centre resources:
https://www.stem.org.uk/audience/primary#section--resources

Testbase:
http://www.testbase.co.uk/sec/index.php

White Rose Maths Hub Resources:
https://www.tes.com/teaching-resource/reasoning-and-problem-solving-questions-collection-ks1-and-ks2-11249968

http://www.trinitytsa.co.uk/maths-hub/free-learning-schemes/