Fractions

Years 1, 2 and 3

A Guide for Parents

At North Park Primary, we believe that children should be confident and proficient mathematicians. We have a 'Can do' attitude towards maths and the support of parents in developing this is crucial. When working together as a partnership, parents and school can foster an enthusiasm in maths to support children in their mathematical self-belief. At North Park Primary we follow the White Rose Maths Hub schemes of learning.

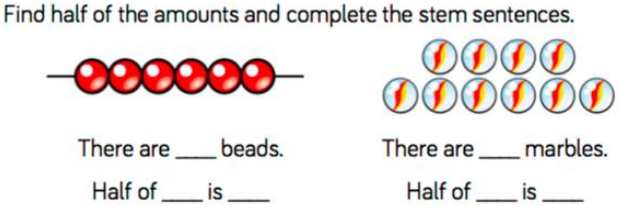
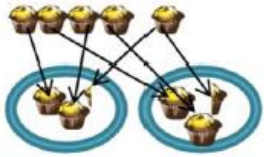
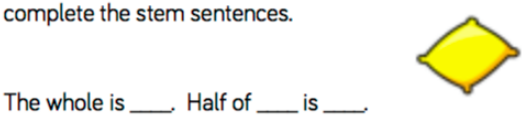
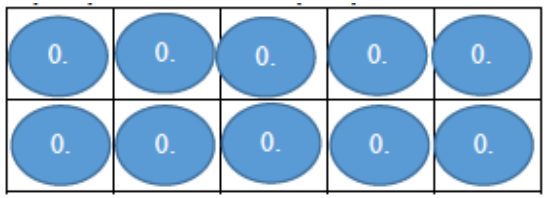
When planning lessons, teachers follow the cycle of 'concrete', pictorial, abstract' (CPA approach) and this guidance aims to set out examples of how we develop children's skills of calculating with fractions using this cycle of teaching.

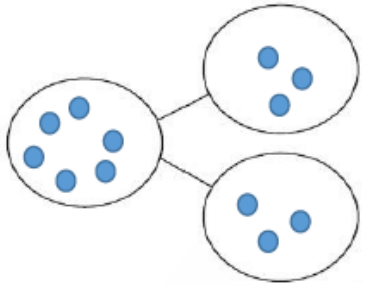
'Concrete'- Each skill is often first modelled with concrete materials (e.g. base ten, cubes, cuisenairre rods). This is the "doing stage". During this stage, students use concrete objects to model problems. The CPA approach brings concepts to life by allowing children to experience and handle physical (concrete) objects. For example, if a problem involves adding pieces of fruit, children can use counters or cubes which represent the fruit.

'Pictorial'- Pictorial is the "seeing" stage. Here, visual representations of concrete objects are used to model problems. This stage encourages children to make a mental connection between the physical object they just handled and the abstract pictures, diagrams or models that represent the objects from the problem.

'Abstract'- Abstract is the "symbolic" stage, where children use abstract symbols to model problems. Students will not progress to this stage until they have demonstrated that they have a solid understanding of the concrete and pictorial stages of the problem. The abstract stage involves the teacher introducing abstract concepts (for example, mathematical symbols). Children are introduced to the concept at a symbolic level, using only numbers, notation, and mathematical symbols (for example, +, –, x, /) to indicate addition, multiplication or division.

Fractions

Year 1	Year 2	Year 3
Identifying a half as 2 equal parts or a quarter as 4 equal parts of a **quantity.**	Find fractions 1/3, ¼, 2/4 and ¾ of a **quantity.** Recognise the equivalence of 2/4 and ½.	Recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10. Write fractions of a discrete set of objects. Add and subtract fractions with the same denominator (within and to beyond 1). Recognise equivalent fractions. Compare and order unit fractions, and fractions with the same denominator.
Identifying a half as 2 equal parts of a quantity: Children will have previously looked at identifying halves as 2 equal parts of a shape. **Concrete-**Using physical resources, children manipulate skittles, sweets, cubes, beads, marbles to link back to parts having to be equal.  One half of 12 is 6. "There are two equal parts, 6 is one equal part of the whole."  Find half of the amounts and complete the stem sentences. There are ___ beads. Half of ___ is ___ There are ___ marbles. Half of ___ is ___ **Pictorial-**Representations are chosen to support pupils' understanding of fractions, e.g. part-part-whole models.	**Find fractions 1/3, ¼, 2/4 and ¾ of a quantity:** **Concrete-**Children use their knowledge of unit and non-unit fractions of shapes to find fractions of quantities. Use fraction wall, fraction pieces, Numicon. Vary the shape of objects used e.g. not always 'pizzas' and 'chocolate bars'. Pupils will make links between division and fractions using denominators.   Share 20 beanbags equally between two containers, then complete the stem sentences. The whole is ___. Half of ___ is ___. **Pictorial-** A range of pictorial representations can be used to demonstrate fractions, **always linking back to equal parts in a whole.**	**Recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10.** **Concrete-**Use place value knowledge and a tens frame to identify that 1 splits into 10 equal parts- each equal part is 1 tenth.  Equally, 10 equal parts that are tenths combined is the same as one whole. If the frame represents 1 whole, what does each box represent? Use counters to represent: • One tenth • Two tenths • Three tenths • One tenth less than eight tenths  **Pictorial-**



Abstract-Pupils are confident to use a range of abstract written versions.
e.g. Half od 16 is 8. These are also seen in the stem sentence examples in the concrete section.

<u>Identifying a quarter as 4 equal parts of a quantity:</u>
Concrete-Using physical resources, children manipulate skittles, sweets, cubes, beads, marbles to link back to parts having to be equal.

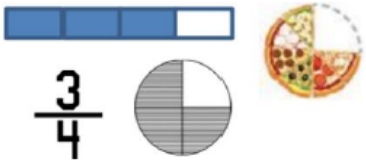
One quarter of 12 is 3.
"There are four equal parts, 3 is one equal part of the whole."

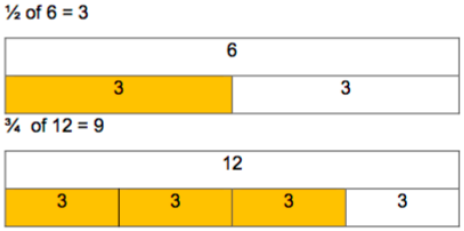
Share each quantity into four equal groups.

There are ___ cakes.
There is ___ cake in each quarter.
A quarter of ___ is ___

There are ___ sweets.
There are ___ sweets in each quarter.
A quarter of ___ is ___

There are ___ peaches.
There are ___ peaches in each quarter.
A quarter of ___ is ___





Abstract-

$\frac{1}{2}$ of 12 = ☐ $\frac{1}{4}$ of 12 = ☐

$\frac{1}{2}$ of 20 = ☐ $\frac{1}{4}$ of 20 = ☐

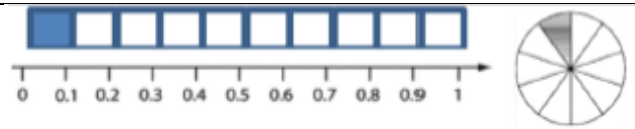
$\frac{1}{2}$ of 8 = ☐ $\frac{1}{4}$ of 8 = ☐

$\frac{1}{3}$ of 9 = ☐

$\frac{1}{3}$ of 12 = ☐

When working out ¾, make 4 groups and then group together 3.

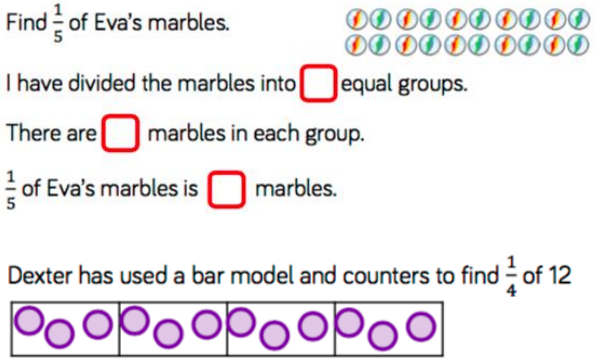
<u>Recognise the equivalence of 2/4 and ½.</u>



These pictorial representations demonstrate what happens on a number line, with blocks or cubes or with circles when sharing into 10 equal parts. (Consider how these represent the decimals between 0 and 1, i.e. 6 of the 10ths is the same as 0.6. 10 of the 10ths is the same as 1.)

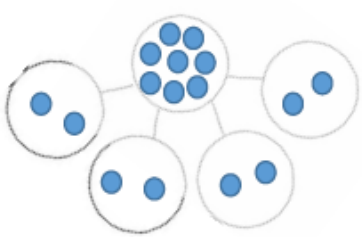
Abstract-Divide an object into 10 equal parts and you have ten tenths. If you divide whole numbers into 10ths, each whole is divided into 10 equal parts. Each part is 1 tenth. If you divide 3 into tenths, each whole provides 1/10 which combined total 3/10.

<u>Write fractions of a discrete set of objects.</u>
<u>Unit fractions-</u> Children find a unit fraction of an amount by dividing an amount into equal groups.
Concrete/ Pictorial-



They build on their understanding of division by using place value counters to find fractions of larger quantities including where they need to exchange tens for ones.

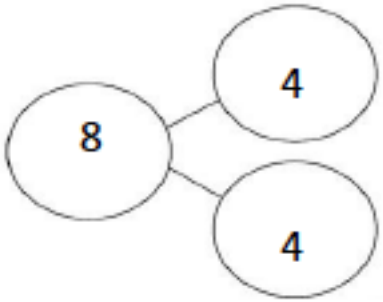
Pictorial- Representations are chosen to support pupils' understanding of fractions, e.g. part-part-whole models.



Abstract- Pupils are confident to use a range of abstract written versions.

$12 \div 4 = 3$

Or they use pictorial representation with abstract numbers.



Concrete/Pictorial- Children will tackle this practically, using strips of paper and concrete apparatus (e.g. counters, Cuisenaire rods, number pieces).

Using two identical strips of paper, explore what happens when you fold the strips into two equal pieces and four equal pieces.
Compare one of the two equal pieces with two of the four equal pieces. What do you notice?

Give children an amount of counters or concrete objects, ca you find one half of them? Can you find two quarters of them? What do you notice?

Abstract- Children can use the equal sign to show that ½= 2/4.

Amir uses a bar model and place value counters to find one quarter of 84

Abstract-

Use Amir's method to find:

$\frac{1}{3}$ of 36 $\frac{1}{3}$ of 45 $\frac{1}{5}$ of 65

Non-unit fractions- Children need to understand that the denominator of the fraction tells us how many equal parts the whole will be divided into. They need to understand that the numerator tells them how many parts of the whole there are e.g. 2/3 means dividing the whole into 3 equal parts, then counting the amount in 2 of these parts. Children should begin to make the link that you divide the amount by the denominator and multiply by the numerator.

Concrete/ Pictorial-

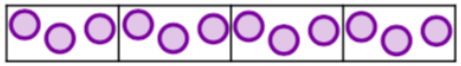
Find $\frac{2}{5}$ of Eva's marbles.

I have divided the marbles into ☐ equal groups.

There are ☐ marbles in each group.

$\frac{2}{5}$ of Eva's marbles is ☐ marbles.

Dexter has used a bar model and counters to find $\frac{3}{4}$ of 12



Use Dexter's method to calculate:

$\frac{5}{6}$ of 12 $\frac{2}{3}$ of 12 $\frac{2}{3}$ of 18 $\frac{7}{9}$ of 18

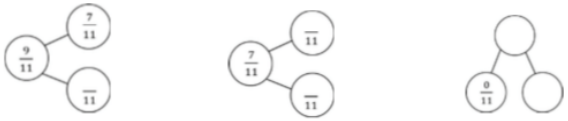
Amir uses a bar model and place value counters to find three quarters of 84

		Abstract- Use Amir's method to find: $\frac{2}{3}$ of 36 $\frac{2}{3}$ of 45 $\frac{3}{5}$ of 65 **<u>Add and subtract fractions with the same denominator (within and to beyond 1).</u>** **Concrete-**Children use practical equipment to add two or more fractions with the same denominator where the total is less than 1. Take a paper circle. Fold your circle to split it into 4 equal parts. Colour one part red and two parts blue. Use your model to complete the sentences. _____ quarter is red. _____ quarters are blue. _____ quarters are coloured in. Show this as a number sentence. $\frac{\square}{4}+\frac{\square}{4}=\frac{\square}{4}$ **Pictorial-** Use a range of representations to demonstrate two fractions being like fractions, i.e. each part is always the same.  4/7 + 2/7 = 6/7 I have split the whole into seven equal parts. I take 4 of those 7 equal parts and combine it with 2 more of those equal parts – how many of the 7 equal parts do I have in total? You can also represent this:  4/7 + 6/7 = 10/7 **or 1 and 3/7** **Subtraction works with the same model:**

9/10 – 4/10 is:

I have split the whole into ten equal parts. I take 9 of those 10 equal parts and subtract 4 of those equal parts – how many of the 10 equal parts do I have left?

5 of the 10 equal parts remain (or I have 5/10 left over).



Abstract-

5/8 and 1/8 are like fractions as they have the same denominator.

How much of a pizza / chocolate bar would this be all together?

5/8 + 1/8 = 6/8

$\frac{1}{5}+\frac{2}{5}=\frac{\square}{5}$ $\frac{2}{7}+\frac{3}{7}+\frac{1}{7}=\frac{\square}{\square}$ $\frac{7}{10}+\frac{\square}{\square}=\frac{9}{10}$

<u>Recognise equivalent fractions</u>

Concrete-Children will use Cuisenaire rods, paper strips to investigate and record equivalent fractions.

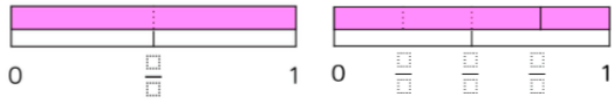
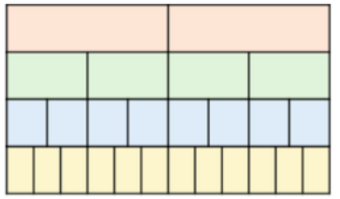
The pink Cuisenaire rod is worth 1 whole.

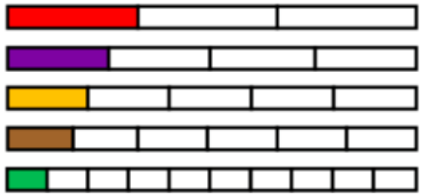
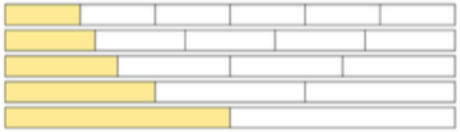
Which rod would be worth $\frac{1}{4}$?

Which rods would be worth $\frac{2}{4}$?

Which rod would be worth $\frac{1}{2}$?

Use Cuisenaire to find rods to investigate other equivalent fractions.

		Use two strips of equal sized paper. Fold one strip into quarters and the other into eighths. Place the quarters on top of the eighths and lift up one quarter, how many eighths can you see? How many eighths are equivalent to one quarter? Which other equivalent fractions can you find? **Pictorial/Abstract-**Children will explore equivalent fractions with bar models , fraction walls and number lines. Use the models on the number line to identify the missing fractions. Which fractions are equivalent?  Place these equivalent fractions on the number line. $\frac{1}{4}$ $\frac{3}{4}$ $\frac{1}{6}$ $\frac{1}{3}$ $\frac{2}{3}$  Are there any other equivalent fractions you can identify on the number line? Use the fraction wall to complete the equivalent fractions. $\frac{1}{2} = \frac{\square}{4} = \frac{\square}{8} = \frac{6}{\square}$ $\frac{1}{4} = \frac{2}{\square} = \frac{3}{\square}$  **<u>Comparing Fractions</u>** Children compare unit fractions or fractions with the same denominator. Children will use >,< or = to compare. They will use concrete and pictorial methods to calculate. They are not expected to change denominators. **Concrete-**Use strips of paper to compare fractions.

		Use paper strips to compare the fractions using >, < or = $\frac{3}{4} \bigcirc \frac{1}{4}$ $\frac{1}{6} \bigcirc \frac{5}{6}$ $\frac{3}{8} \bigcirc \frac{5}{8}$ **Pictorial-** Children will use a fractions wall to compare. Use >, < or = to compare the fractions.  $\frac{1}{10} \bigcirc \frac{1}{4}$ $\frac{1}{3} \bigcirc \frac{1}{6}$ $\frac{1}{5} \bigcirc \frac{1}{4}$ **<u>Ordering fractions</u>** Children order unit fractions and fractions with the same denominator. **Concrete-** Children will use strips of paper to order fractions. Divide strips of paper into halves, thirds, quarters, fifths and sixths and colour in one part of each strip. Now order the strips from the smallest to the largest fraction.  When the numerators are the same, the _____ the denominator, the _____ the fraction. **Pictorial-** Children will use number lines to order fractions. Place the fractions on the number line. $\frac{2}{4}$ $\frac{3}{4}$ $\frac{1}{4}$  0 1 **Abstract-**

		Order the fractions in descending order. $\frac{3}{8}$ $\frac{5}{8}$ $\frac{1}{8}$ $\frac{8}{8}$ $\frac{7}{8}$