

Calculation Policy: Y1

Mathematical **Manipulatives** | Key Representations
Progression in **Procedures**



Avonwood Primary School

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Key vocabulary

Place value: ones, tens, column

Addition: sum, addend, add

Subtraction: difference, subtrahend, subtract, partition

Multiplication: product, multiply, multiple, array

Division: quotient, divide, repeated subtraction

Fractions: denominator, numerator, equal part, whole, equivalent, ascending, descending, unit fraction, non-unit fraction, tenth

Manipulatives: place value counters, Dienes, 10 frame

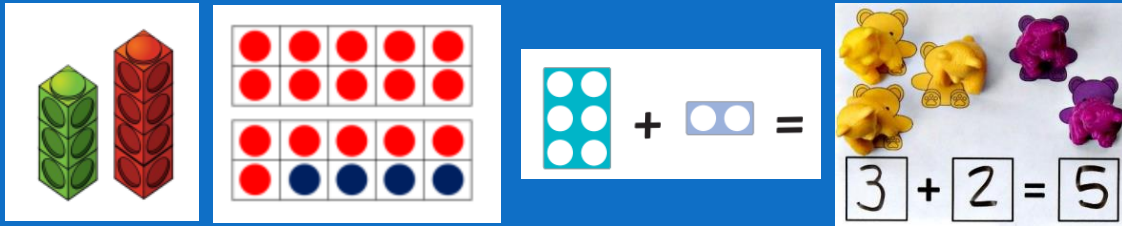
Representations: represent, representation, numberline, array, row/column, Part-Part-Whole diagram, bar model



YEAR 1: Addition

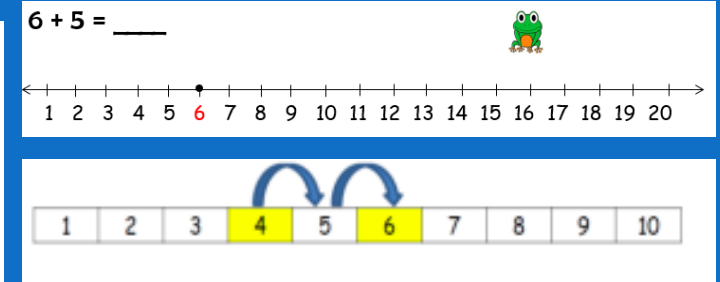
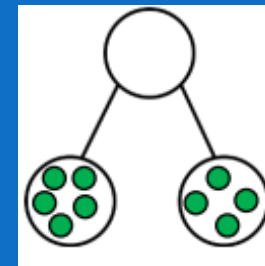
Manipulatives

The recommended manipulatives (physical resources) for adding 1- or 2-digit numbers to 20 are **Counters, cubes and 10 frames and numicon and real life objects.**



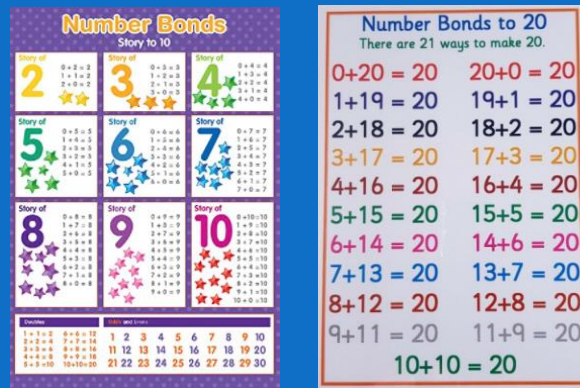
Representations

The key representations used are, number tracks, **populated number lines, blank number lines and part-part-whole diagrams** (which encourage children to apply their knowledge of place value).



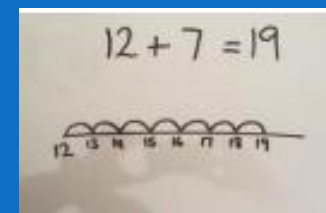
Factual knowledge

The key factual knowledge includes recall of addition/subtraction facts to 20, doubling/halving facts to 20.



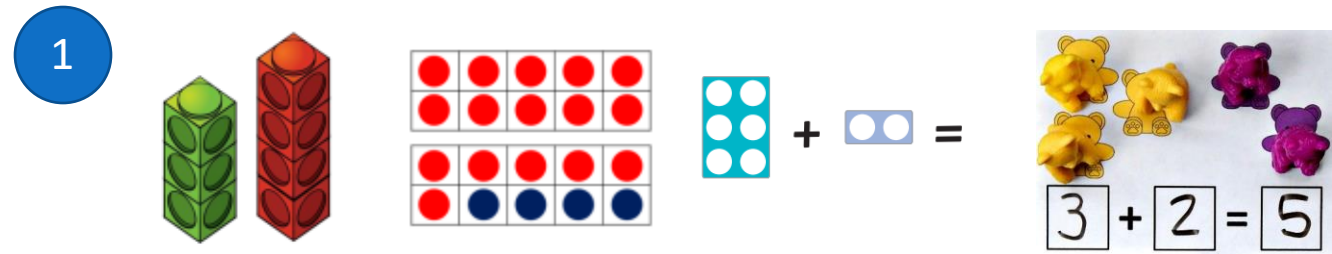
Procedural knowledge

The key method used is a blank number line. Children are encouraged to draw their own number line alongside physical resources

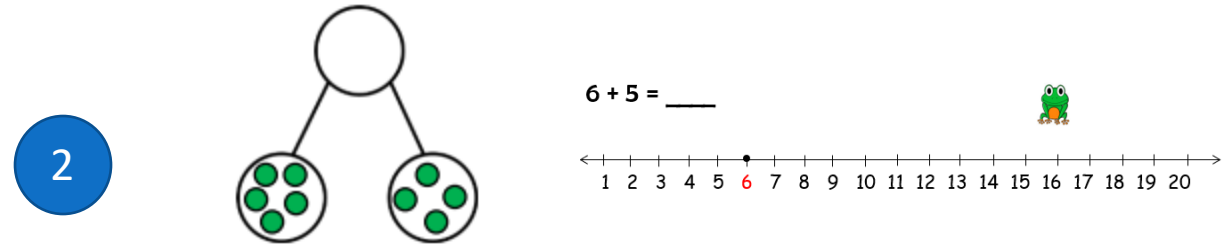


Addition in Year 1

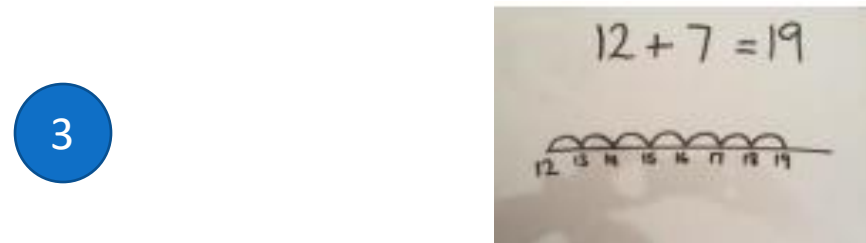
1. The recommended manipulatives (physical resources) for adding two 2- digit numbers are Counters, cubes and 10 frames and numicon.



2. The key representations used are: **number tracks, populated number lines, blank number lines, bar models and part-part-whole diagrams** (which encourage children to apply their knowledge of place value).



3. The key method (procedural knowledge) is a blank number line. Children are encouraged to draw their own number line alongside physical resources

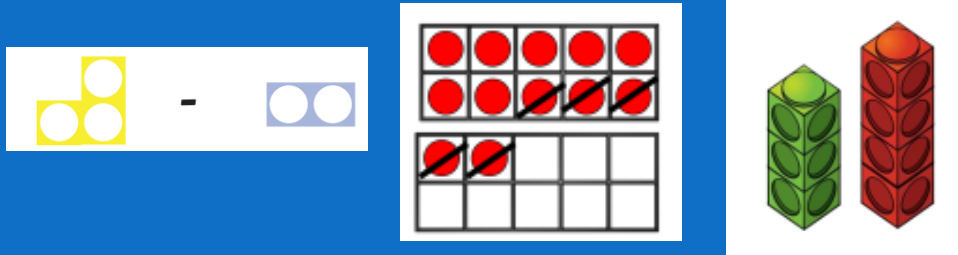




YEAR 1: Subtraction

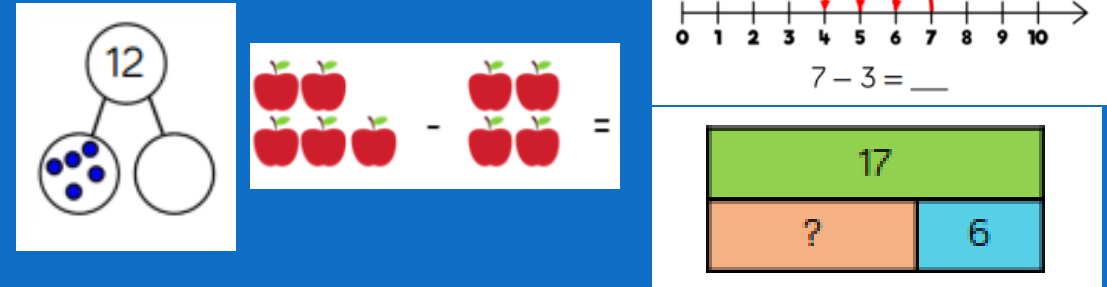
Manipulatives

The recommended manipulatives (physical resources) for subtracting 1 or 2- digit numbers to 20 are ten frames, counters, snap cubes and numicon.



Representations

The key representations used are populated **number lines**, **part-part whole models**, **real life objects** and **bar models** (which encourage children to apply their knowledge of place value).



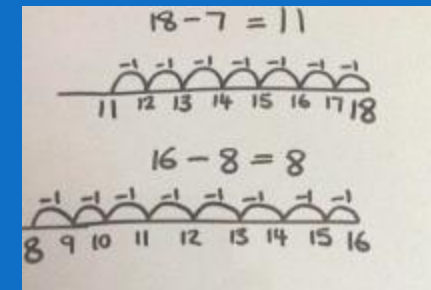
Factual knowledge

The key factual knowledge includes recall of addition/subtraction facts to 20, doubling/halving facts to 20.

| + | | Addition and Subtraction Facts to 20 | | - | |
|---------------|--|--------------------------------------|--|----------------|--|
| $20 + 0 = 20$ | | | | $14 + 6 = 20$ | |
| $0 + 20 = 20$ | | | | $6 + 14 = 20$ | |
| $20 - 0 = 20$ | | | | $20 - 14 = 6$ | |
| $20 - 20 = 0$ | | | | $20 - 6 = 14$ | |
| $19 + 1 = 20$ | | | | $13 + 7 = 20$ | |
| $1 + 19 = 20$ | | | | $7 + 13 = 20$ | |
| $20 - 19 = 1$ | | | | $20 - 13 = 7$ | |
| $20 - 1 = 19$ | | | | $20 - 7 = 13$ | |
| $18 + 2 = 20$ | | | | $12 + 8 = 20$ | |
| $2 + 18 = 20$ | | | | $8 + 12 = 20$ | |
| $20 - 18 = 2$ | | | | $20 - 12 = 8$ | |
| $20 - 2 = 18$ | | | | $20 - 8 = 12$ | |
| $17 + 3 = 20$ | | | | $11 + 9 = 20$ | |
| $3 + 17 = 20$ | | | | $9 + 11 = 20$ | |
| $20 - 17 = 3$ | | | | $20 - 11 = 9$ | |
| $20 - 3 = 17$ | | | | $20 - 9 = 11$ | |
| $16 + 4 = 20$ | | | | $10 + 10 = 20$ | |
| $4 + 16 = 20$ | | | | $20 - 10 = 10$ | |
| $20 - 16 = 4$ | | | | | |
| $20 - 4 = 16$ | | | | | |
| $15 + 5 = 20$ | | | | | |
| $5 + 15 = 20$ | | | | | |
| $20 - 15 = 5$ | | | | | |
| $20 - 5 = 15$ | | | | | |

Procedural knowledge

The key methods used is a blank number line. Children are encouraged to draw their own blank number line alongside physical resources.

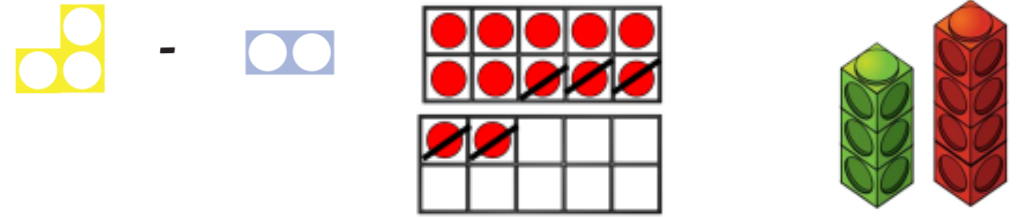


Key vocabulary: difference, minuend, subtrahend, subtract, partition

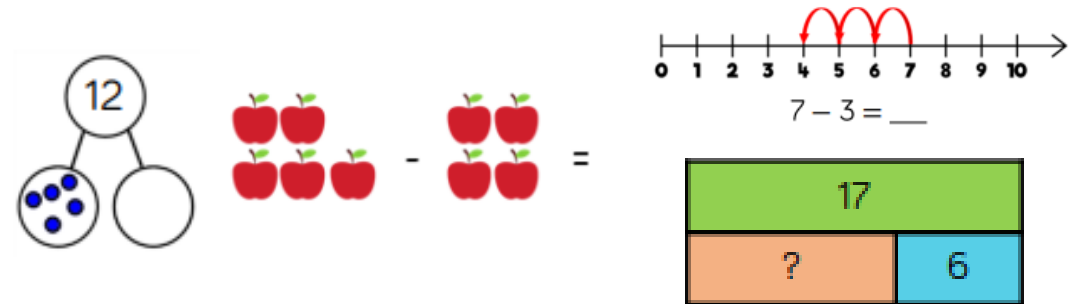
Subtraction in Year 1

- The recommended manipulatives (physical resources) for subtracting 1 or 2-digit numbers to 20 are **ten frames, counters, snap cubes and numicon**.
- The key representations used are **populated number lines, part-part whole models, real life objects and bar models** (which encourage children to apply their knowledge of place value).
- The key method (procedural knowledge) is a **blank number line**. Children are encouraged to draw their own blank number line alongside physical resources.

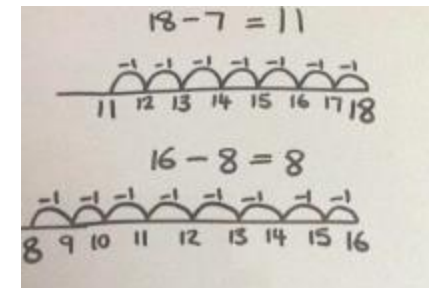
1



2



3

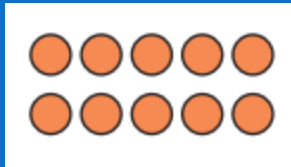




YEAR 1: Multiplication

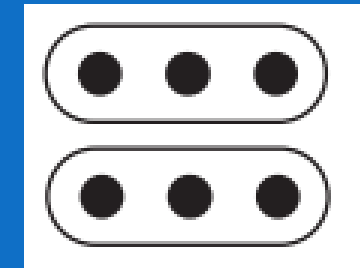
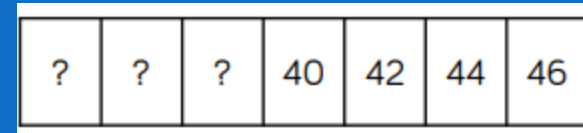
Manipulatives

The recommended manipulatives (physical resources) for solving 1- step problems involving multiplication are **numicon, counters, cubes and real-life objects** .



Representations

The key representations used are **arrays, real- life objects and partially completed number tracks**.



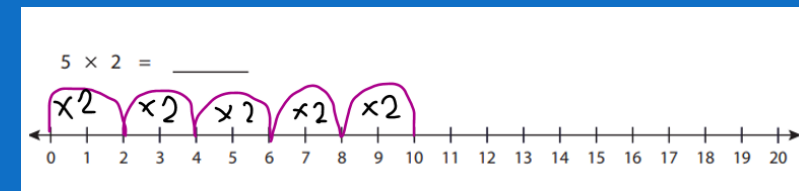
Factual knowledge

The key factual knowledge includes recall of 2, 5 and 10 multiplication tables.

| 2 times table | 5 times table | 10 times table |
|---------------|---------------|----------------|
| 0 x 2 = 0 | 0 x 5 = 0 | 0 x 10 = 0 |
| 1 x 2 = 2 | 1 x 5 = 5 | 1 x 10 = 10 |
| 2 x 2 = 4 | 2 x 5 = 10 | 2 x 10 = 20 |
| 3 x 2 = 6 | 3 x 5 = 15 | 3 x 10 = 30 |
| 4 x 2 = 8 | 4 x 5 = 20 | 4 x 10 = 40 |
| 5 x 2 = 10 | 5 x 5 = 25 | 5 x 10 = 50 |
| 6 x 2 = 12 | 6 x 5 = 30 | 6 x 10 = 60 |
| 7 x 2 = 14 | 7 x 5 = 35 | 7 x 10 = 70 |
| 8 x 2 = 16 | 8 x 5 = 40 | 8 x 10 = 80 |
| 9 x 2 = 18 | 9 x 5 = 45 | 9 x 10 = 90 |
| 10 x 2 = 20 | 10 x 5 = 50 | 10 x 10 = 100 |
| 11 x 2 = 22 | 11 x 5 = 55 | 11 x 10 = 110 |
| 12 x 2 = 24 | 12 x 5 = 60 | 12 x 10 = 120 |

Procedural knowledge

The key methods used is a number line alongside physical resources to secure understanding.



Key vocabulary: product, multiply, multiple, repeated addition

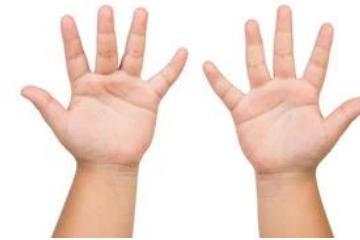
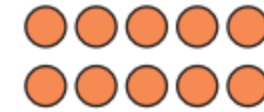
Multiplication in Year 1

1. The recommended manipulatives (physical resources) for solving 1-step problems involving multiplication are **numicon, counters, cubes and real-life objects**.

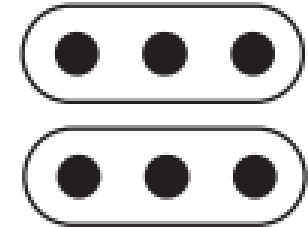
2. The key representations used are **arrays, real-life objects and partially completed number tracks**.

• The key method used is a number line alongside physical resources to secure understanding.

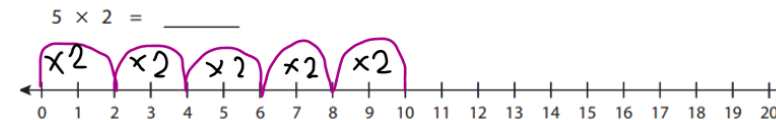
1



2



3





YEAR 1: Division

Manipulatives

The recommended manipulatives (physical resources) for one step problems involving division are **place value counters** and **real life objects**.

$10 \div 2$

Sharing

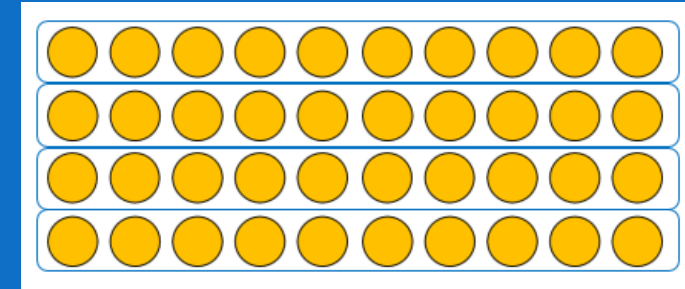


Grouping



Representations

The key representations used are **arrays**.



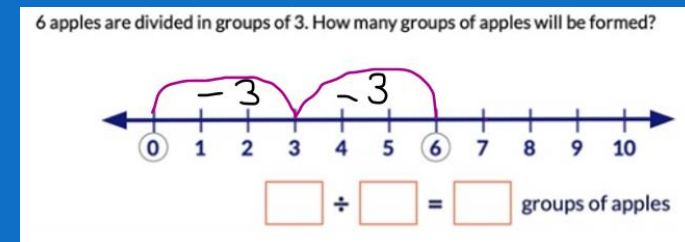
Factual knowledge

The key factual knowledge includes recall of 2, 5 and 10 multiplication tables.

| 2 times table | 5 times table | 10 times table |
|--------------------|--------------------|----------------------|
| $0 \times 2 = 0$ | $0 \times 5 = 0$ | $0 \times 10 = 0$ |
| $1 \times 2 = 2$ | $1 \times 5 = 5$ | $1 \times 10 = 10$ |
| $2 \times 2 = 4$ | $2 \times 5 = 10$ | $2 \times 10 = 20$ |
| $3 \times 2 = 6$ | $3 \times 5 = 15$ | $3 \times 10 = 30$ |
| $4 \times 2 = 8$ | $4 \times 5 = 20$ | $4 \times 10 = 40$ |
| $5 \times 2 = 10$ | $5 \times 5 = 25$ | $5 \times 10 = 50$ |
| $6 \times 2 = 12$ | $6 \times 5 = 30$ | $6 \times 10 = 60$ |
| $7 \times 2 = 14$ | $7 \times 5 = 35$ | $7 \times 10 = 70$ |
| $8 \times 2 = 16$ | $8 \times 5 = 40$ | $8 \times 10 = 80$ |
| $9 \times 2 = 18$ | $9 \times 5 = 45$ | $9 \times 10 = 90$ |
| $10 \times 2 = 20$ | $10 \times 5 = 50$ | $10 \times 10 = 100$ |
| $11 \times 2 = 22$ | $11 \times 5 = 55$ | $11 \times 10 = 110$ |
| $12 \times 2 = 24$ | $12 \times 5 = 60$ | $12 \times 10 = 120$ |

Procedural knowledge

The key method (procedural knowledge) for dividing is **repeated subtraction** on a number line.



Division in Year 1

1. The recommended manipulatives (physical resources) for division are **place value counters** and **dienes**.

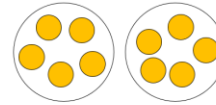
2. The key representations used are: **arrays, bar models and number lines**.

3. The key method (procedural knowledge) for dividing is **repeated subtraction** on a number line.

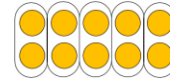
1

$10 \div 2$

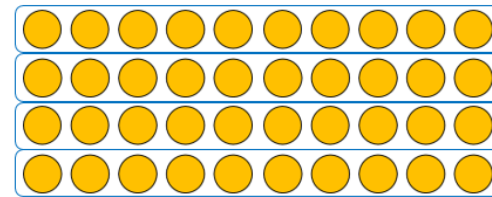
Sharing



Grouping

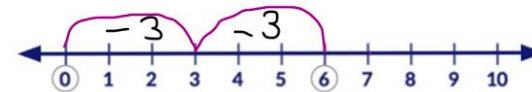


2



3

6 apples are divided in groups of 3. How many groups of apples will be formed?



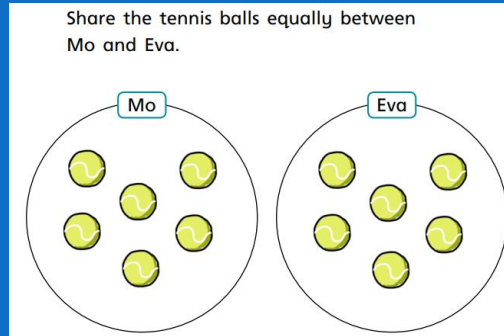
$\square \div \square = \square$ groups of apples



YEAR 1: Fractions

Manipulatives

The recommended manipulatives (physical resources) for fractions are **counters or real-life objects**.

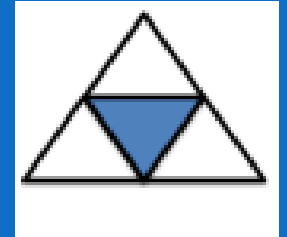
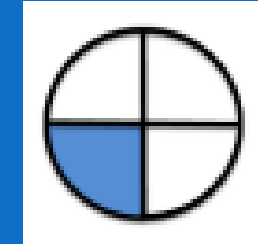
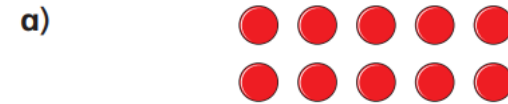


Representations

The key representations are **shapes, bar models and arrays**.



Find half of each group.



Factual knowledge

The key factual knowledge includes the recall and recognition of equivalent fractions of half and two quarters.



Procedural knowledge

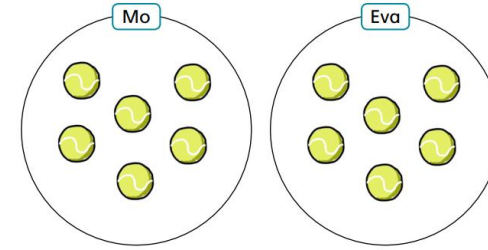
Fractions in Year 1

1. The recommended manipulatives (physical resources) for fractions are **counters or real-life objects**.

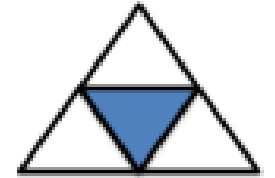
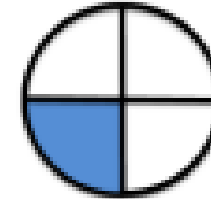
2. The key representations are **shapes, bar models and arrays**.

1

Share the tennis balls equally between Mo and Eva.

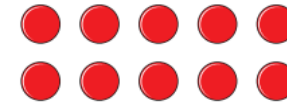


2



Find half of each group.

a)



3