Summer Block 1

Multiplication and division

White Rose MATHS

Small steps

Step 1	Count in 2s
Step 2	Count in 10s
Step 3	Count in 5s
Step 4	Recognise equal groups
Step 5	Add equal groups
Step 6	Make arrays
Step 7	Make doubles
Step 8	Make equal groups – grouping

White Rose MATHS

Small steps

| Step 9 | Make equal groups – sharing |

Count in 2s

Notes and guidance

In this small step, children explore counting both forwards and backwards in 2s. This builds on understanding from Autumn Block 2, when children added 1 and 2, as well as previous knowledge of doubles and finding 1 more and 1 less.

Begin by practically exploring counting in 2s using things that come in pairs, such as socks and wheels on a bicycle. Number lines and a 1–50 number grid are useful representations that allow children to spot patterns when counting in 2s. They should count both forwards and backwards in 2s, but always starting from an even number.

Begin to introduce children to the language of multiplication, for example "There are _____ equal groups of 2. There are _____ altogether." This will be built on in future steps.

Things to look out for

- Children may count the number of pairs, rather than count in 2s.

- Make sure children understand that a pair is two objects, and those objects do not need to look exactly the same.

- Children may count each object in a group, rather than counting in 2s.

Key questions

- How can you count the pairs?

- What pairs can you see/find?

- How can you use the number line/number grid to help you count in 2s?

- What patterns do you see when you count in 2s?

- When you count in 2s, what numbers will you say/not say?

- How many equal groups of 2 are there?

Possible sentence stems

- There are _____ in each pair.

  There are _____ pairs.

  There are _____ in total.

- There are _____ equal groups of 2

  There are _____ altogether.

National Curriculum links

- Count, read and write numbers to 100 in numerals; count in multiples of 2s, 5s and 10s

Count in 2s

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Key learning

Put children into groups of 10 and give each child 2 cubes.

Ask each group to show you an even number of cubes. Each child can either hold out zero or two cubes.

Get children to count the number of cubes individually. Then ask how many cubes each person has got. Then get children to count the number of cubes in 2s.
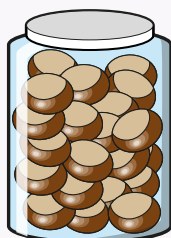
Read *Eggs and Legs* by Michael Dahl. Pause partway through the book and ask children to draw a picture predicting what the legs could be doing on the next page. How many legs will there be? How many eggs will there be?

Show an estimation jar.

Ask children to estimate how many objects are inside. Empty the jar and ask them to count the objects in 2s to check.

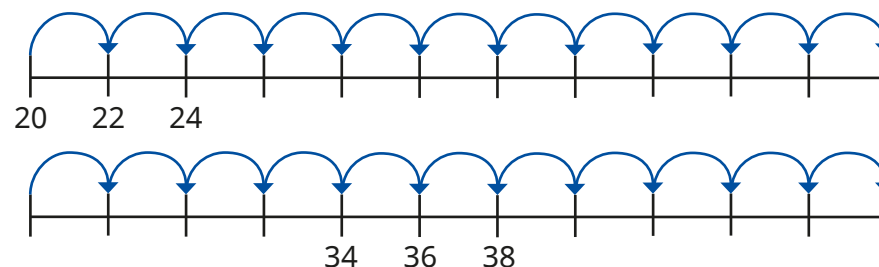- How many socks are there in total?

There are _____ socks in total.

- Continue to colour in 2s on the grid. What do you notice?

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

- Complete the number lines by counting in 2s.

20   22   24

34   36   38

Count in 2s

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Reasoning and problem solving

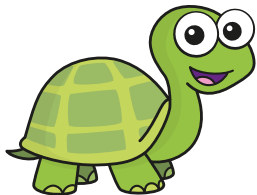Nine children are riding their bicycles.

How many wheels are there in total?

18

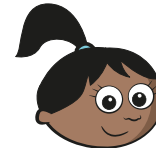Tiny is counting backwards in 2s.

36, 34, 32, 30, 27, 26

What mistake has Tiny made?

Tiny said 27 rather than 28

Sam counts back from 50 in 2s.

Max counts up from 12 in 2s.

Sam: 50, 48, 46, 44 …

Max: 12, 14, 16, 18 …

They say their numbers at the same time.

Who will say 30 first?

Max

Count in 10s

Notes and guidance

In this small step, children count forwards and backwards in 10s. This builds on previous learning where children explored the multiples of 10 up to 50 as well as counting by making groups of 10

Use of ten frames, bundles of straws, bead strings and number grids will reinforce children's understanding of the multiples of 10. Introduce the language associated with multiplication, such as "_____ groups of 10 are equal to _____" to begin to develop understanding of multiplication, although children are not introduced to the multiplication symbol until Year 2

Focus on multiples up to 50, as children have not yet been exposed to numbers greater than 50. They may then begin to explore counting forwards and backwards from numbers that are not multiples of 10, for example 42, 32, 22, 12, 2

Things to look out for

- Children may confuse teen numbers and multiples of 10, for example 13 and 30
- Children may still rely on counting individual objects, for example counters, rather than using representations such as full ten frames to count in 10s.

Key questions

- When you count in 10s, what number comes after _____?
- When you count in 10s, what number comes before _____?
- How many groups of 10 are there? What number is this?
- How many groups of 10 are there in _____?
- If you count in 10s from _____, will you say _____?
- Which digit stays the same/changes when you count in 10s?

Possible sentence stems

- There are _____ groups of ten.
  There are _____ altogether.
- There are _____ full ten frames.
  There are _____ in total.

National Curriculum links

- Count, read and write numbers to 100 in numerals; count in multiples of 2s, 5s and 10s

Count in 10s

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Key learning

Read *Toasty Toes* by Michael Dahl. Give children examples from the book, for example "Fifty toes wiggle in the water." Ask how many children there will be.

Give each child a 50-bead string and explain that they are going to use it to count in tens. Ask how they can use the bead string to count forwards and backwards in 10s.
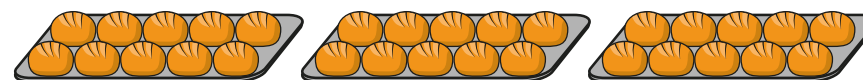
- How many flowers are there altogether?

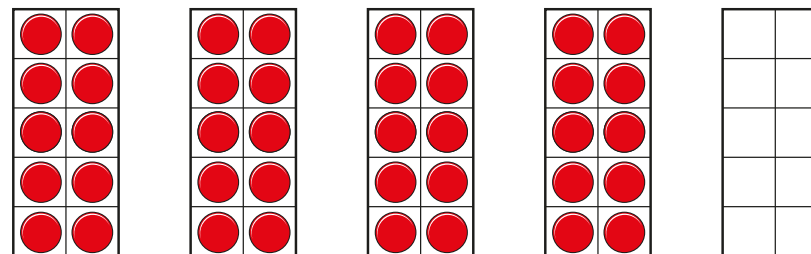There are _____ flowers in each bunch.

There are _____ bunches.

There are _____ flowers altogether.

- A baker has made 3 trays of 10 bread rolls.

How many rolls are there in total?

- How many counters are there?

Fill in the empty ten frame.

How many counters are there now?

- Complete the number tracks.

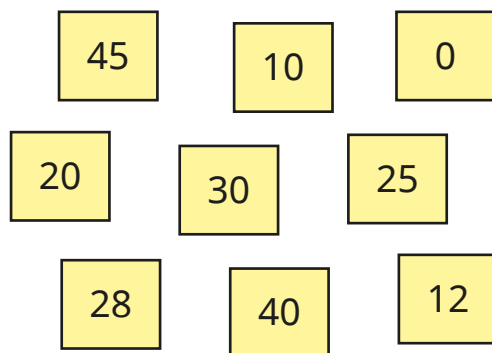|	10				50

4	14			

Count in 10s

Reasoning and problem solving

Tiny is counting back in 10s from 50
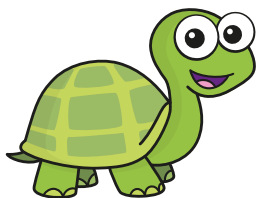
Which numbers will Tiny say?

45	10	0
20	30	25
28	40	12

How do you know that Tiny will say these numbers?

40, 30, 20, 10, 0

Ben and Kay count in 10s on the grid.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

Ben starts at 10

Colour all the numbers that Ben will say.

Kay starts at 6

Circle all the numbers that Kay will say.

What do you notice about the numbers that they say?

What is the same and what is different?

coloured: 10, 20, 30, 40, 50

circled: 6, 16, 26, 36, 46

Count in 5s

Notes and guidance

In this small step, children are introduced to counting in 5s.

Children practise counting on and back in 5s using a range of different representations such arms on a starfish or a dice showing 5. They will need lots of practice orally to embed this skill. Rhymes such as 'Five eggs and five eggs' can be sung to help reinforce this learning.

Ten frames can also be used, showing children the five-wise patterns. The 1–50 grid is another useful representation that can be used for children to spot and discuss patterns that emerge when counting in 5s.

Continue to use the language associated with multiplication, for example "There are _____ equal groups of 5. There are _____ altogether."

Things to look out for

- Children may confuse 15 and 50, because they sound very similar.

- Children may not recognise the relationship between two 5s making a 10. The use of five and ten frames can help children to understand that a full row makes 5 and two 5s make 10

Key questions

- Will you say _____ when you count in 5s? Why/why not?

- How many 5s are there altogether?

- When you count in 5s, what number comes after _____?

- When you count in 5s, what number comes before _____?

- What patterns do you notice when you count in 5s?

- What do you notice about counting in 5s and counting in 10s?

Possible sentence stems

- There are _____ groups of 5.
  There are _____ altogether.

- There are _____ 5s.
  There are _____ in total.

- There are _____ 5s in 10

National Curriculum links

- Count, read and write numbers to 100 in numerals; count in multiples of 2s, 5s and 10s

Count in 5s

Key learning

Read *Starry Arms* by Michael Dahl.

Ask children what they notice about the starfish.

How many starfish are there?

How many arms are there altogether?

Ask children to make their own *Starry Arms* page.

Choose a group of five children to come to the front of the class.

Ask the children to show two hands, one hand or no hands. Each child can choose to hold up both their hands, one hand or no hands.

The rest of the class say how many fingers they can see altogether.

As a further challenge, say a multiple of 5 and ask children to work together to show that number of fingers.

- How many fish are there?
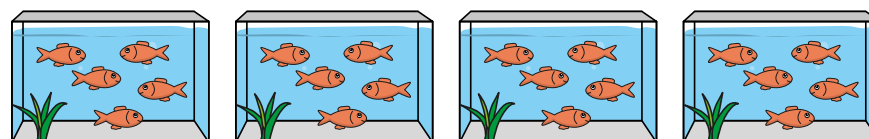
There are _____ fish in each tank.

There are _____ tanks.

There are _____ fish altogether.

- How many grapes are there?

- Continue to count in 5s on the grid.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

What patterns can you see?

Count in 5s

Reasoning and problem solving

Ann counts the number of fingers she can see.

She counts 20 fingers.

How many hands can she see?

4

Ron has some number cards.

| 25 | 27 | 30 | 45 |
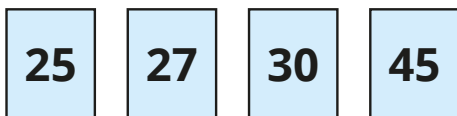
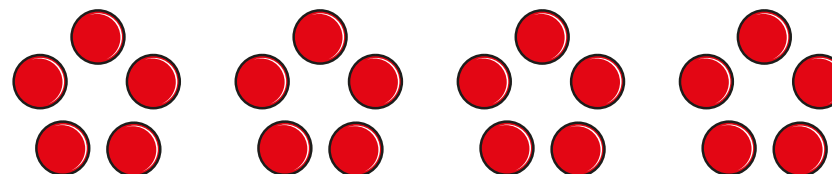I am counting in 5s from zero.

Which numbers will Ron say?

How do you know?

25, 30, 45

Tiny makes a flower pattern with counters.
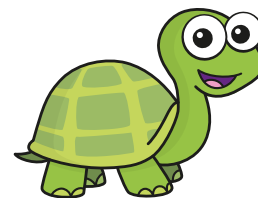
If I make 9 flowers, I will use 46 counters.

How do you know that Tiny is incorrect?

46 does not have a 0 or 5 in the ones column.

Recognise equal groups

Notes and guidance

In this small step, children begin by using stories that link to pictures and concrete resources to help support them in recognising equal groups. They recognise and explain how they know when there are equal groups and when there are not. In order to do this, children need to see lots of different examples of equal groups in different contexts, for example trays of buns or bunches of flowers.

It is important for children to see equal groups that are arranged differently, so they understand that groups can look different but still be equal in number. For example, 5 dots arranged as on a dice, 5 dots in a row close together and 5 dots spaced further apart are all groups of 5

Children can begin to explore ways of making unequal groups equal by adding to or removing from some of the groups.

Things to look out for

- If objects are arranged differently, children may not think that the groups are equal.

- Children may be less confident with more unfamiliar representations.

Key questions

- What does "equal" mean?

- How do you know that the groups are equal/unequal?

- Do the groups have to look exactly the same to be equal? Why/why not?

- How many equal groups are there? How many are there in each equal group?

- How can you make the groups equal?

Possible sentence stems

- There are _____ equal groups of _____

- I know that the groups are equal/not equal because …

- To make the groups equal, I could …

National Curriculum links

- 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

Recognise equal groups

Key learning

Get children to collect some stones or pebbles.
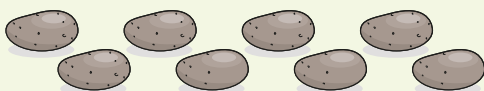
Ask children to put them in equal or unequal groups.

How many different equal groups can they make?

Give children 12 counters.

Can they show you equal and unequal groups?

How many different equal groups can they make?

What happens if they have 13 or 15 counters?

In pairs, children take turns to roll two dice.

The first player to identify equal groups and correctly shout "equal" gets a point.

The winner is the first player to reach 5 points.

- Are the groups equal or unequal?

- Complete the sentence to match the picture.

There are _____ equal groups of _____ pencils.

- Dan is drawing equal groups of 3
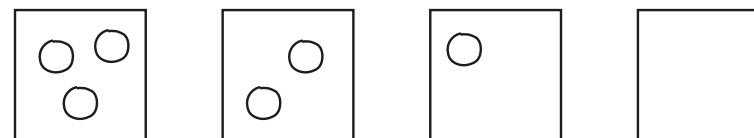
Finish his drawing.

Recognise equal groups

Reasoning and problem solving

Kim and Mo are having a picnic.

Kim

Mo

Who has made equal groups?

Explain how you know.

Kim

These groups are not equal because they look different.

No

Do you agree with Tiny?

Explain your answer.

Here are some groups of counters.

How can you make the groups equal?

multiple possible answers, e.g.

Move 1 from the second box to the first box.
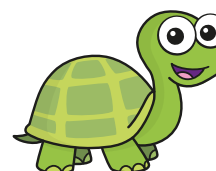
Add equal groups

Notes and guidance

In this small step, children use their knowledge from previous learning of recognising equal groups to now add equal groups together to find a total.

Children focus on counting equal groups of 2, 5, and 10 and explore this within 50. They move on to identifying and recording the number sentence to match the groups. For example, show children 5 pairs of socks and allow them to represent them in a different way, such as with counters, then encourage them to write the number sentence to represent it: 2 + 2 + 2 + 2 + 2 = 10

At this point, children do not need to use the multiplication symbol and should record number sentences as repeated additions. However, they should be exposed to the language of multiplication, for example "There are 5 equal groups of 2, so there are 10 in total."

Things to look out for

- Children need to be secure in recognising equal and unequal groups.

- Children may confuse the number of groups with the amount in each group, for example 2 groups of 5 rather than 5 groups of 2

Key questions

- Are the groups equal? How do you know?

- How many _____ are there in each group?

- How many equal groups can you see? What can you use to show this?

- How many are there altogether? How can you write this as a number sentence?

Possible sentence stems

- There are _____ equal groups.
  There are _____ in each group.
  There are _____ altogether.

- There are _____ groups of _____
  _____ + _____ + _____ + _____ + _____ = _____

National Curriculum links

- 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

Add equal groups

Key learning

Ask two children to show a total of three hands. Ask how many fingers there are altogether and record the addition.

5 + 5 + 5 = ☐

Repeat with different numbers of hands.

Ask children to line up some bikes or scooters. As a class, count how many bikes/scooters there are.

Ask how many wheels there are altogether. Encourage children to write the number sentence to match the bikes.

Hide some pictures of ladybirds around the playground. Each ladybird must have 2, 5 or 10 spots. When each child has found a ladybird, they need to find other children who have a ladybird with the same number of spots. They then add their equal groups together to find the total number of spots.

• How many apples are there?
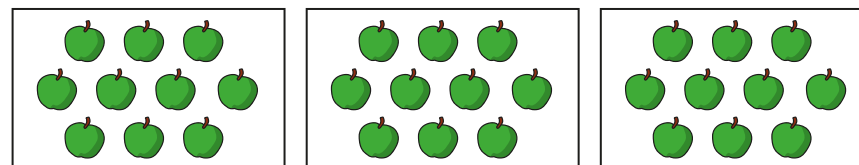
Use ten frames and counters to help you complete the sentences.

10 + 10 + 10 = _____

There are _____ apples altogether.

• How many fish are there?

_____ + _____ + _____ + _____ + _____ = _____
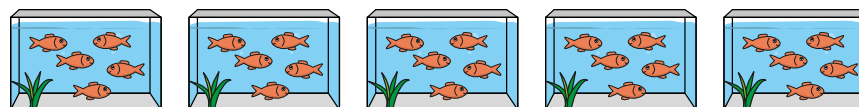
There are _____ fish in total.

There are 20 counters.
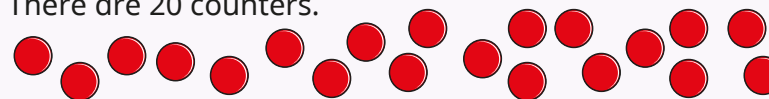
Arrange the counters into equal groups.

Write the number sentence to match your groups.

Add equal groups

Reasoning and problem solving

2 groups of 10 is greater than 4 groups of 5, because 10 is greater than 5

Do you agree with Jo?

Explain your answer.

No
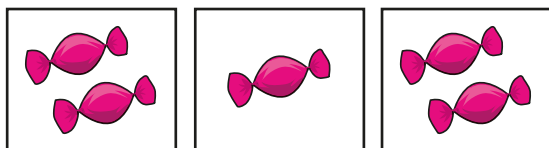
3 groups of 2 are equal to 5

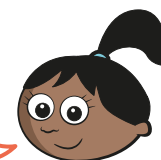What mistake has Max made?

Max does not have equal groups.

Ron and Sam bake these cakes.

They put them into equal groups.

We need 10 more cakes to make 40

Ron

We need one more group to make 40

Sam

Who do you agree with?

Explain your answer.

Both children are correct.

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Make arrays

Notes and guidance

In this small step, children use their knowledge of recognising and adding equal groups to arrange objects in columns and rows as arrays. This arrangement helps children to see the equal amounts and how they are grouped.

An effective way to introduce arrays to children is by using real-life examples such as bun trays and egg boxes that have these patterns already built in.

Once they are confident with describing given arrays, encourage children to build and draw their own arrays to represent a story. They may begin to explore the fact that they can describe arrays in two ways, for example 3 rows of 2 and 2 columns of 3

Children could continue to practise writing repeated addition number sentences to describe the arrays.

Things to look out for

- Children may confuse the language of column and row.

- Children may not arrange the rows or columns evenly, or leave a gap in the middle of the array.

- Children may not recognise that any objects or pictures can be an array.

Key questions

- What is a column? Can you show me a column in the array?

- What is a row? Can you show me a row in the array?

- How many equal rows/columns are there?
  How many are there in each row/column?
  How many are there altogether?

- How can you write a number sentence to match the array?

Possible sentence stems

- There are _____ rows.

  There are _____ in a row.

  There are _____ in total.

- There are _____ columns.

  There are _____ in a column.

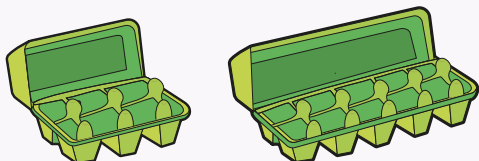 There are _____ altogether.

National Curriculum links

- 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

Make arrays

Key learning

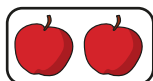Use cubes and a range of containers such as bun trays, egg boxes and paint pallets.

Allow children to explore using the cubes and discuss all the different ways to fill the containers.
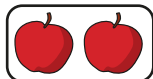
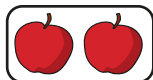There are _____ rows/columns.

There are _____ cubes in each row/column.

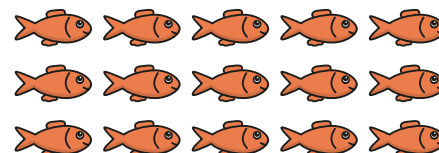- Use counters to make an array that matches the apples.

Complete the sentences.

There are _____ apples in each row.

There are _____ rows.

There are _____ apples altogether.

- Here are some arrays.

▶ Count the **rows** and complete the sentences to describe each array.

There are _____ rows of _____

There are _____ altogether.

▶ Count the **columns** and complete the sentences to describe each array.

There are _____ columns of _____

There are _____ altogether.

What do you notice?

- Draw an array to match the story.

There are 5 trees.
There are 2 birds in each tree.

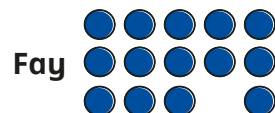Write a number sentence to match your array.

Make arrays

White Rose MATHS

Reasoning and problem solving

Tom and Fay are making arrays with 14 counters.
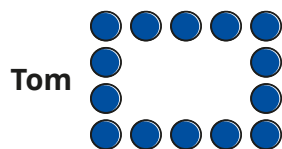
Tom   **Fay**
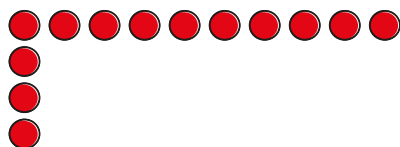
What mistake has each child made?

Make an array with 14 counters.

2 × 7 or 7 × 2 array

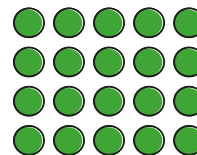Kay has started to make an array using 40 counters.

Finish making Kay's array.

Write two number sentences to describe your array.

10 + 10 + 10 + 10 = 40

4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 = 40

Kim and Mo write number sentences to match the array.

Kim

5 + 5 + 5 + 5 = 20

Mo

4 + 4 + 4 + 4 + 4 = 20

Who is correct?

Explain your answer.

They are both correct.

Make doubles

Notes and guidance

In this small step, building on learning from Spring Block 2, children again explore doubles. They progress from describing doubling as the addition of the same amount to describing it as 2 equal groups, linking to the work done on multiplication in this block so far. They should now be more confident with doubling numbers up to 20

Give children opportunities to build doubles and explain what a double is using real objects, mathematical equipment and pictures. This will help to reinforce understanding of a double being 2 groups of a number. Encourage children to say doubles as they build them, for example "Double _____ is _____ ." They can use repeated addition to represent doubles in the abstract. Give children opportunities to look at representations and decide whether they show doubles or not.

Now that children have explored numbers to 50, they could also start to explore doubles beyond 20, for example double 12 or double 20

Things to look out for

- Children may not make/draw 2 equal groups.

- Children may think that double 4 is 44, because they see the digit twice.

Key questions

- What is double _____?

- How can you show me double _____ ?

- Is this a double? How do you know?

- How many equal groups are there? How many are there in each group? How many are there altogether?

- Is double _____ equal to _____ ? How do you know?

Possible sentence stems

- Double _____ is _____

  _____ + _____ = _____

- This is double _____

- _____ is/is not a double. I know this because ...

National Curriculum links

- 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
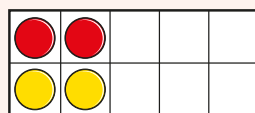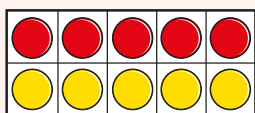
Make doubles

White Rose MATHS

Key learning

Show children a number of counters up to 10 on ten frames.

Ask children to make the double with double-sided counters on two ten frames.

Hide lots of number pieces outside. Children work in pairs to find two number pieces that are the same to make a double. The winners are the pair who find the most doubles. Children could be challenged to write their doubles as number sentences.
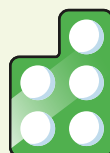
Read *Minnie's Diner* by Dayle Ann Dodds, where all the food orders are doubled. Set up a double cafe in the classroom. Encourage children to make up their own double diner menus.

If you get 8 specials, what have you doubled?

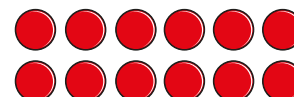- Complete the sentences to match the picture.
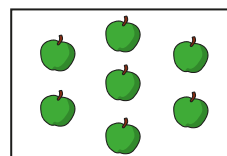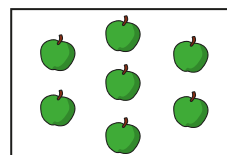
There are _____ equal groups.

There are _____ in each group.

There are _____ apples altogether.

_____ + _____ = _____

Double _____ is _____
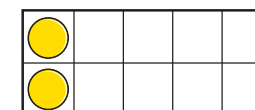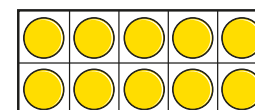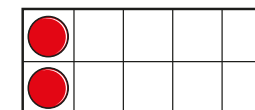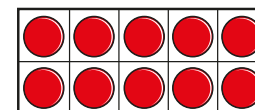
- Complete the sentences to match the array.

_____ + _____ = _____

Double _____ is _____

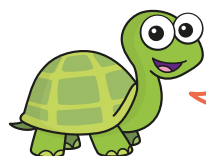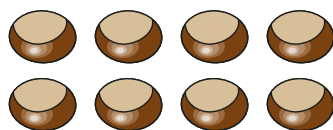- Use the ten frames to work out double 12

Make doubles

Reasoning and problem solving

Jo doubles some conkers.

Here are the conkers **after** she has doubled them.

Tiny: Jo started with 8 conkers and ended with 16 conkers.

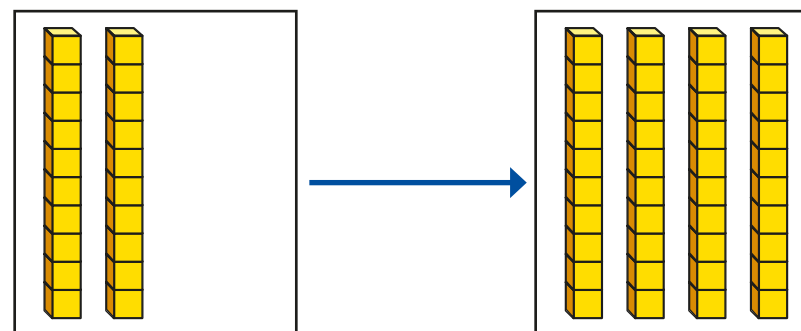Max: Jo started with 4 conkers and ended with 8 conkers.

Who do you agree with?

Explain your answer.

Max

Tiny uses base 10 to double 20

What is double 20?

Use base 10 to work out the double.

Double 15 is ☐

40 | 30

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Make equal groups – grouping

Notes and guidance

In this small step, children build on their knowledge of recognising equal groups to begin to explore division through grouping. This is the first time that they are explicitly introduced to the idea of division.

Children start with a given total and make groups of an equal amount. Give them opportunities to make groups with concrete resources. Circling groups when using pictures can also help them to see the groups and identify if they are equal. Further develop children's understanding of equal groups by exposing them to numbers that do not group equally.

At this stage, children do not need to be introduced to the division symbol, but they should become familiar with the language of division, for example "There are _____ groups of _____ in _____ ."

Things to look out for

- When dividing, children may be more familiar with sharing from real-life experiences and may therefore confuse sharing with grouping.

- Children may be confused by groups that do not look similar, but they should be encouraged to focus on how many are in each group.

Key questions

- Are the groups equal? How do you know?

- Do the groups have to be the same size/shape/pattern to be equal?

- How many _____ are there altogether?
  How many are there in each group?
  How many groups are there?

- How many different ways can you put the _____ into equal groups?

Possible sentence stems

- The groups are equal/not equal because …

- There are _____ altogether.
  They can be put into equal groups of _____
  There are _____ groups.

National Curriculum links

- 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

Make equal groups – grouping

White Rose MATHS

Key learning

Take children into the playground. As a class, count how many children there are.

Ask children to get into groups of three. Are all the groups equal?

What other equal groups can they get into?

Provide children with 20 counters or cubes. Ask them to put them into equal groups. How many different sets of equal groups can they make?

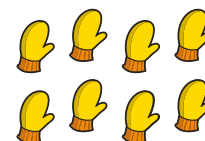Repeat with other numbers of counters or cubes.

Show children a picture of a gingerbread person and explain that each one needs three buttons.

Give the children 15 buttons and ask how many gingerbread people they can give buttons to.
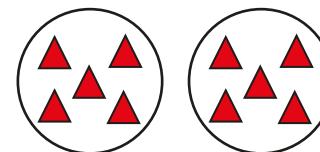
What if they had 18/21/24 buttons?

- Circle groups of 2 mittens and complete the sentence.

  There are _____ groups of 2 mittens.

  If you had 10 mittens, how many equal groups of 2 mittens could you make?

- Complete the sentences to match the pictures.

  ▶

  There are _____ altogether.

  There are _____ equal groups of _____

  ▶

  _____ has been sorted into _____ equal groups of _____
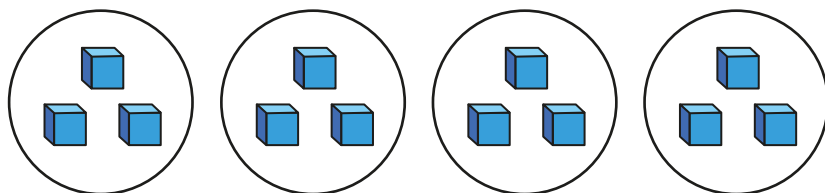
- Draw a picture to match the sentence.

  20 has been sorted into 4 equal groups of 5

Make equal groups – grouping

Reasoning and problem solving

Here are some groups of cubes.

Ron: The cubes are in groups of 4

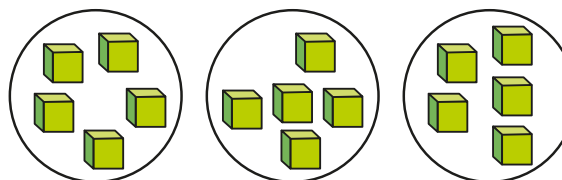Jo: The cubes are in groups of 3

Who do you agree with?

Explain your answer.

Jo

Here are some groups of cubes.

Sam: The cubes are not in equal groups.

Do you agree with Sam?

No

Ben and Tom each have the same number of sweets.

Ben has 8 equal groups of 2

Tom puts his sweets into equal groups of 4

How many equal groups of sweets does Tom have?

4

Make equal groups – sharing

Notes and guidance

In this small step, children explore division in the form of sharing.

Children first explore this practically using concrete resources and physically sharing them into groups. They should see that each group will then have the same amount. At this stage, children do not need to write number sentences using the division symbol, but they should be encouraged to explain what is happening using the language of division, for example "There are _____ counters shared equally into _____ groups. There are _____ in each group."

It may be helpful to explore the similarities and differences between sharing and grouping, once children are confident with the two structures separately.

As an extension, children can look at situations where the objects cannot be shared equally and there are some left over.

Things to look out for

- Having just explored grouping in the previous step, children may confuse that knowledge with the new learning on sharing.

- When sharing, children may miss out some objects or place too many in one group.

Key questions

- What does "sharing" mean?
  What does "sharing equally" mean?

- How many _____ are there altogether?
  How many equal groups are you sharing them into?
  How many are there in each group?
  Are there any left over?

- Can you share the _____ into any other number of equal groups?

Possible sentence stems

- The _____ have/have not been shared equally.
  I know this because …

- There are _____ altogether.
  They are shared equally between _____ groups.
  There are _____ in each group.

National Curriculum links

- 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
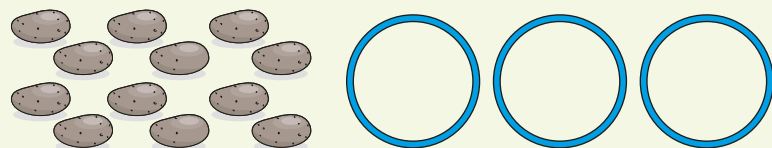
Make equal groups – sharing

Key learning

Take children outside to collect 12 sticks or pebbles. Ask them to share their items equally between 3 hoops.

Can they share them equally between 2/4/6 hoops?

Can they share them equally between 5/7 hoops?

Repeat for other numbers.

Provide modelling clay to represent cupcakes and counters to represent sweets.

Children can then explore different ways of decorating the cupcakes.

Tell children to make 3 cupcakes. Give them 15 sweets to share equally between the 3 cupcakes. Ask how many sweets there are on each cupcake.

Repeat for different numbers of cupcakes and sweets.
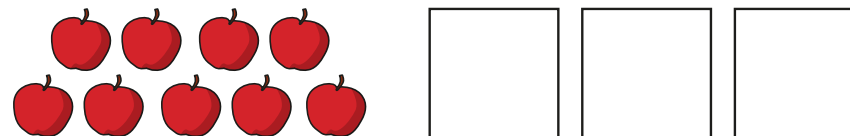
- Share the muffins equally between the 2 plates.

Complete the sentences.

There are _____ muffins.

They are shared equally between _____ plates.

There are _____ muffins on each plate.

- Share the apples equally between the 3 boxes.

Complete the sentences.

_____ apples are shared equally between _____ boxes.
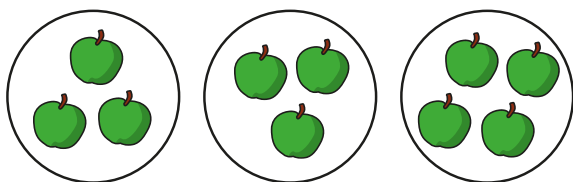
There are _____ in each group.

- Fay has 16 bananas.

She shares them equally between 4 people.

How many bananas does each person get?

Make equal groups – sharing

White Rose MATHS

Reasoning and problem solving

Tiny makes some groups of apples.

10 shared between 3 is 4

Do you agree with Tiny?

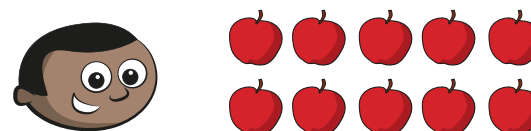Explain your answer.

No

Dan shares 20 cookies equally between his friends.

How many friends could Dan share his cookies between?

1, 2, 4, 5, 10 or 20 people

Mo has 10 apples.

How many apples will there be in each bag if Mo shares them equally?

He shares the apples between 10 bags.

He shares the apples between 5 bags.

He shares the apples between 2 bags.

He puts all the apples into 1 bag.

What do you notice?

1

2

5

10