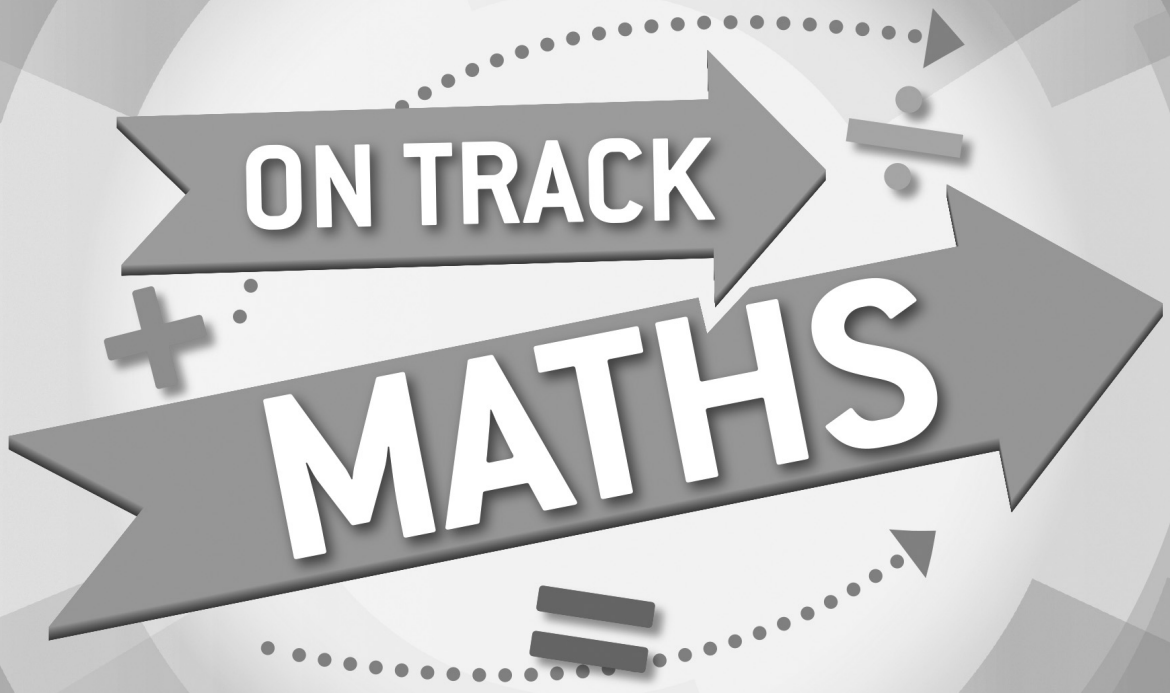
RISING STARS



KEY STAGE

2

Teacher's Guide and Activities

A targeted approach to mathematics intervention

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Table of contents

Strand: Number

DAY 1

Sub-strand: Counting in steps and multiples

TEACH

ACTIVITY 1: Counting up and down in multiples of 100 to and beyond the 1,000 barrier

- Lay out the cards from 100 to 1,200 on the table. Start by reciting from 0 to 1200 in hundreds with the children joining in. Make the numbers using Base 10 apparatus (or similar). Start at 200 and go up to 1,200 in hundreds. Next, start at 900 and go down to 0 in hundreds.

✓ **TIP:** Remove the support of the Base 10 apparatus as the children become more confident.

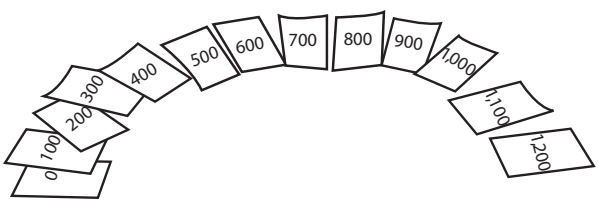
! **WATCH OUT:** The children may struggle when crossing the 1000 barrier. Model this as you would crossing the 100 barrier when counting in tens – give the children a practical representation of exchanging ten lots of 100 for one lot of 1,000. Continue to make the numbers using Base 10 apparatus (or similar).

- Now show the children the staircase made from books (see image below). This represents the number track and the children can physically count up and down.
- Each child chooses a counter and takes a turn to roll both the die. All counters start at zero on the staircase.
- When the children roll the die (e.g. to get three and six), they predict the number their counter will rest on (e.g. 900), then check by counting and moving a counter up the staircase the correct number of steps (e.g. nine), counting aloud. E.g. if a six and a five (total 11) are rolled, the counter ends up on 1100.

ACTIVITY 2: Fluency with numbers using a number arc

- The children work in pairs. Each child makes an arc with the number cards in order from 0 to 1,200.
- Ask Child 1 to close their eyes while Child 2 removes one of the cards. Child 1 then works out which card is missing and says the number.
- To extend the activity once the children are confident, Child 1 can write down the missing number.

! **WATCH OUT:** Watch for any errors – especially as you cross the 1,000 boundary to 1,100 and 1,200. If the children write 1,001 or 1,002, their understanding of place value is still insecure. Check that they are secure with writing 101, 111, 110, 120 and then explain the link with the thousands.



Number arc facing the child

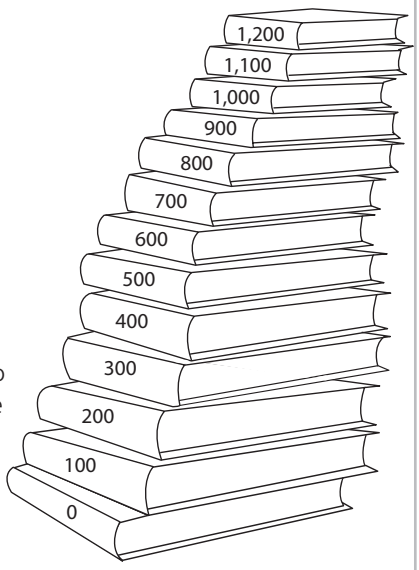
OBJECTIVE

- Find 10 or 100 more or less than a given number

Rising Stars Progression Framework: 3.1.a.1, 3.1.a.2

RESOURCES

- Activity 1: Numbers cards from 100 to 1,200 in hundreds; Base 10 apparatus or similar; books to make a staircase; counters; two die
- Activity 2: Number cards from 0 to 1200 in hundreds



Hundreds staircase up to 1200

Strand: Number

DAY 2

Sub-strand: Counting in steps and multiples

TEACH

ACTIVITY 1: Finding ten more and ten less using a 100 square

- Point to number 2 on the 100 square. Ask: *What number do we get if we add on* **ten more***?* Put a ring around the 2 and the 12.

✓ **TIP:** The children may identify the answer 12 without counting, but may not have noticed the pattern yet. Encourage them to check the answer by counting.

- Now ask: *What number do we get if we add on ten more? Can anyone show the pattern we are starting to get?* Encourage use of Base 10, for example, as well as the 100 square to find the answer. Then put a ring around 32.
- Ask again: *What number do we get if we add on ten more?* (42)
- Now ask: *What do you notice?* Elicit that adding on ten more alters the number in the tens column while leaving the ones the same. Make sure they can see that the answers are in the same column on the 100 square.
- Now start with another number, but this time ask the children to find **ten less**. Say*: Let's see if we can find the number that is ten less than 56.*
- Continue with other numbers, e.g. *What is ten more than 38? What is ten less than 70?* Each time ask a child to explain how they worked out the answer. This gives an insight into their thinking, an opportunity to clarify or suggest alternative strategies and an opportunity for the children to explain to their peers.

ACTIVITY 2: Using ten more and ten less to understand the patterns of bigger numbers

! **WATCH OUT:** Some questions on Worksheet 1 involve crossing the hundreds barrier. To support children with these questions, model using the next example.

- Ask: *Find the number that is ten more than 90.* (100) *Find the number that is ten more than 95.* (105) Use the apparatus for both examples to demonstrate that the numbers reach and exceed 100.
- Now ask: *Find a number that is ten more than 96.* Can they work it out in their heads? This checks if the children can apply the pattern of **ten more** or **ten less** to numbers that go through the 100 barrier.
- Hand out Worksheet 1. Explain that they are going to work out the missing numbers in the patterns. All the patterns are based on adding on ten more or subtracting ten.
- Finish by going through some of the questions. Ask: *How did you work out the missing numbers? Did you use the pattern or apparatus, or counting on and back?*

OBJECTIVE

- Find 10 or 100 more or less than a given number

Rising Stars Progression Framework: 3.1.a.1, 3.1.a.2

RESOURCES

- Activity 1: A 100 square for each child; large 100 square for the adult; Base 10 apparatus or similar for counting in tens
- Activity 2: Worksheet 1; Base 10 apparatus or similar; 100 squares

Worksheet 1

Name _____ **Date** _____

Finding 10 more and 10 less

Fill in the missing numbers by finding **10 more**.

1. 2, 12, ☐, 32, 42, ☐, ☐, 72, ☐, ☐

2. 10, ☐, ☐, 40, 50, ☐, ☐, 80, ☐, 100

3. 67, ☐, 87, 97, ☐, 117, 127, ☐, ☐, 157

4. 234, ☐, 254, 264, ☐, 284

Fill in the missing numbers by finding **10 less**.

5. 108, ☐, 88, ☐, 68, ☐, ☐, 38, 28, ☐

6. 125, ☐, 105, ☐, ☐, 75, 65, ☐, ☐

7. 157, ☐, 137, ☐, 117, ☐, 97, 87, ☐, 67

8. 843, ☐, 823, ☐, 803, ☐, 783, 773, ☐, ☐

Strand: Number

DAY 3

Sub-strand: Counting in steps and multiples

TEACH

ACTIVITY: Finding 100 more or less than a given number using Base 10

- Give each child a set of place-value (arrow) cards. Explain how they work – each card represents a digit in the number and shows you its value.
- Make a quantity with the Base 10 (e.g. 453). Work with the children to count the quantity. Remind them how much each piece of Base 10 is worth.
- The children now make this number with their place-value (arrow) cards (they will need the cards for 400, 50, 3).
- Ask: *How would you find **100 more** than this number? How could you add 100 on?* The children may respond with counting up, making the 400 into a 500, or adding some Base 10. Ask them to discuss which is the quickest and easiest method. Clearly counting on is an inefficient method.
- The children then make the number they think is 100 more than 453 using their place-value (arrow) cards and show you.

✓ **TIP:** Get the children to display their answer before you talk them through how to work it out, so you can check their understanding of place value.

- Model adding another 100 square to 453 and count the new total (553).
- Explain that you have added 100 on and therefore the number that is in the 100 column of the number goes up one (400 to 500). The tens and ones will stay the same.
- Ask them to write 553 in the place-value grid provided (cut out from Worksheet 2), by putting one digit in each column.
- Now ask: *What would happen if we wanted to find the number that is **100 less** than our original number of 453?* Encourage them to work out this number and display their answer using their place-value (arrow) cards.
- Show the children the change in quantity, using the Base 10 units to support them.
- The children then write this number in their place-value grid.
- Repeat the process with other numbers (e.g. ask the children to find 100 more and 100 less than 785, 324, 674, 846, etc.).

! **WATCH OUT:** The children may change the wrong numeral in the number. In this case you should refer to the work on place value from earlier years to support them in understanding the value of each digit.

OBJECTIVE

- Find 10 or 100 more or less than a given number

Rising Stars Progression Framework: 3.1.a.1, 3.1.a.2

RESOURCES

- Base 10 units, tens sticks and 100 squares, place-value (arrow) cards; a place-value grid, one per child (cut out from Worksheet 2)

Worksheet 2

Photocopy and cut up.

Place-value grids

Place value

Thousands 1,000	Hundreds 100	Tens 10	Ones 1

✂

Place value

Thousands 1,000	Hundreds 100	Tens 10	Ones 1

Strand: Number

DAY 4

Sub-strand: Counting in steps and multiples

ASSESS

ASSESSMENT ACTIVITY

- The purpose of the assessment is to check what each child can do independently, carefully noting down any difficulties and misconceptions. The adult will need to watch carefully what the children do, any strategies used and confidence levels.
- Give out Worksheet 3 and ask the children to fill in the missing numbers in the sequences.

WATCH OUT: The children may find the wrong answers in the sequences because they do not know which sequence they are using.

- Explain that both sets of questions require them to count **ten more or ten less** than 100 from a given number. Reassure them that it is what they have been learning during the week.
- Explain that the first questions are missing number questions. They will need to look at the numbers and see if they are getting larger or smaller. This will tell them whether they must count more or less. Next they should look where there are two or more numbers together. Are the numbers ten more or less or 100 more or less than each other? Once the children can see the pattern they can work out the missing numbers.
- The second set of questions are True or False questions. Explain that they need to look at the statement, e.g. 20 + 10 = 30. Is it true or false? They then write the answer in the True or False column.
- If there is time at the end, go through some of the questions with the children, discussing answers and strategies.

EVIDENCING SUCCESS

Meeting expectations:

- The child can work out ten less than 258 or 100 more than 852.
- The child can confidently move through the 100 barrier.

OBJECTIVE

- Find 10 or 100 more or less than a given number

Rising Stars Progression Framework: 3.1.a.1, 3.1.a.2

RESOURCES

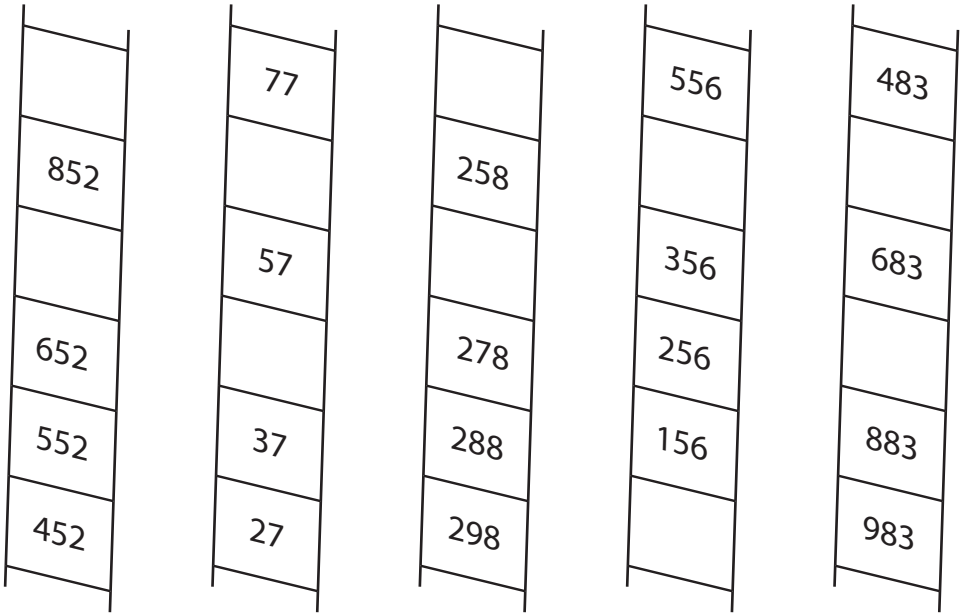
- Worksheet 3; a pencil each

Worksheet 3

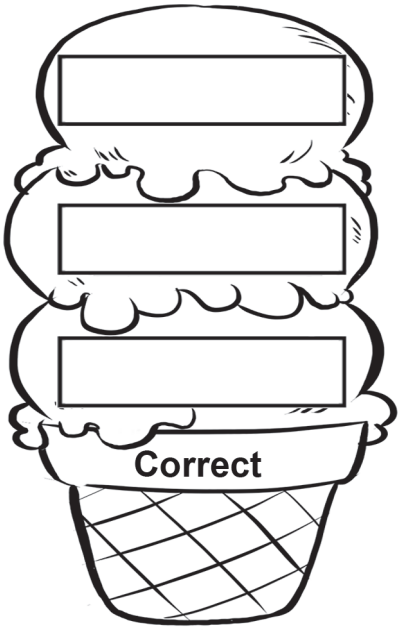
Name _____ **Date** _____

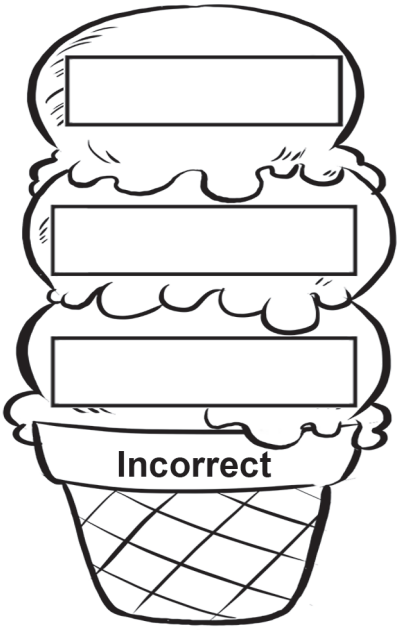
10 or 100 more or less

1. Find the missing numbers by going up and down the ladders.



2. Copy each calculation into one of the ice cream cones, to show whether it is correct or incorrect.





135 – 100 = 35

119 – 100 = 19

97 + 10 = 197

12 + 100 = 120

76 – 10 = 17

99 + 10 = 109

Strand: Number

DAY 1

Sub-strand: Counting in steps and multiples

TEACH

ACTIVITY 1: Counting in steps of 100

- Tell the children that, when they have a large quantity to count, it is more efficient to count in groups and multiples rather than one by one.
- Show them a Base 10 square. Explain that it represents 100: *There are 100 ones in this 100 square.*
- Say: *I would like to know how many ones I have in the hundreds I have here (in the pile of Base 10 squares). I could count each one individually but, as I know each square is a 100, I will just count in* ***hundreds****.*
- Model how to count the Base 10 ones in hundreds (e.g. 100, 200, 300, etc.) until you have counted all the squares.
- Give them different amounts of the 100 squares each and ask them to find out how many ones they have by counting in hundreds.
- The children should tell a partner how many ones they have.

ACTIVITY 2: Counting in steps of 50

- Recap the five multiplication table with the children by reciting from memory as a group. Ask them to describe the pattern to you. Say: *Remember the pattern counting in fives makes – every number ends in five or in zero.*
- Highlight that **counting in steps of 50** makes a similar pattern – the numbers either end in 50 or 00. Explain that this is because 50 is ten times larger than five, so there is an extra zero added to the end. Demonstrate this using Base 10 materials. Write the five and 50 multiplication tables on the board to clarify the pattern, e.g.:

  $1 \times 5 = 5$ $1 \times 50 = 50$

  $2 \times 5 = 10$ $2 \times 50 = 100$
- Work with the children to complete the multiplication table up to 12×5 and 12×50.
- Now shuffle the number cards and place them in a pile in the middle of the group.
- Ask the children to work together to put the number cards in order to make a number track in steps of 50.
- Once the cards are in order, the children take it in turns within their group to remove one card from the number track while the other children close their eyes. The rest of the group then work out which number is missing by counting up or down in 50s.

✓ **TIP:** Count as a group if you notice that the children are struggling to identify the missing number from the track.

OBJECTIVE

- Count from zero in multiples of four, eight, 50 and 100

Rising Stars Progression Framework: 3.1.a.1, 3.1.a.3

RESOURCES

- Activity 1: Base 10 (only the 100 pieces)
- Activity 2: Number cards with the numbers of the 50 multiplication table up to 600; Base 10 (hundreds and tens)

Strand: Number

DAY 2

Sub-strand: Counting in steps and multiples

TEACH

ACTIVITY 1: Counting multiples of four using a 100 square

- Start by asking the children what they know about the four multiplication table.

WATCH OUT: The children may not know the four multiplication table – the next part of the activity introduces them to this – but start by discovering their knowledge base.

- Give each child their four cubes or counters and explain that they will use them to help them count in **steps of four**.
- Starting from zero, model using the cubes to count in fours. As you count, colour in each number on the 100 square: *one, two, three,* ***four***.
- Ask the children to fill in their own 100 square by colouring in the numbers that they say when counting in fours up to 48. They should continue to use cubes to help them.
- Explain: *The numbers that you say when you count in fours are the numbers in the four multiplication table*.
- The children then read the four multiplication table by saying the coloured numbers out loud. Start by saying *4 × 1 is four*, then ask the child next to you to say the next: 4 × 2 is eight; the next child then says 4 × 3 is 12, and so on round the group until 4 × 12.

TIP: Keep the coloured 100 squares for the activity on multiples of eight later in the week.

ACTIVITY 2: The pattern behind the four multiplication table

- Ask: *Do you notice anything about the numbers in the four multiplication table? Are they odd or even numbers? Can you get an answer ending in three? Why?*

TIP: The pattern is important for children with working memory problems. Point out that all the numbers are even numbers and are double the two multiplication table.

- Hand out copies of the number strip for the four multiplication table, with spaces for the answers to be written in.
- Encourage the children to complete the number strip for the four multiplication table with as many answers as they can. Remind them that they can use their 100 square from Activity 1 if they need help or forget some of the numbers.
- Give each child a number strip with the correct answers so they can mark their answers.
- Ask them to give you their completed strip. They can keep the number strip with the correct answers to help them practise the four multiplication table at home.

OBJECTIVE

- Count from zero in multiples of four, eight, 50 and 100

Rising Stars Progression Framework: 3.1.a.1, 3.1.a.3

RESOURCES

- Activity 1: Each child needs: a 100 square; four cubes or counters; coloured crayon or highlighter
- Activity 2: A number strip with the multiples of four without the answers and also one with the answers supplied (see example below), one per child

4 × 1 = ☐
4 × 2 = ☐
4 × 3 = ☐
4 × 4 = ☐
4 × 5 = ☐
4 × 6 = ☐
4 × 7 = ☐
4 × 8 = ☐
4 × 9 = ☐
4 × 10 = ☐
4 × 11 = ☐
4 × 12 = ☐

Number strip for the four multiplication table

Strand: Number

DAY 3

Sub-strand: Counting in steps and multiples

TEACH

ACTIVITY 1: Number arc of the four multiplication table

- Ask the children to work in pairs to make a number arc of the **multiples of four**. Give a set of number cards to each pair.
- Ask the children to set their cards out in a number arc in the correct order from four to 48. Suggest that they say the multiples of four and touch each card as they do this.
- The children then take it in turns to remove a number from the number arc. Can their partner work out which number is missing? Ask: *Can you suggest ways to help your friend if they get stuck and can't remember the missing number?*

WATCH OUT: If the children struggle to identify the missing card, suggest that they try saying the four multiplication table to themselves. They could count on from the part of the table that they know and can remember.

- The children can continue to play the game, taking turns in each role.

ACTIVITY 2: Counting in multiples of eight using a 100 square

- Give each of the children eight cubes or counters, a crayon and a 100 square.
- Model putting the eight cubes in a line and, starting from zero, use them to find the **multiples of eight**. Each time you get to the last counter or cube, colour in the number you say on the (clean) 100 square. *zero, one, two, three, four, five, six, seven,* ***eight****,…16…24, etc.*
- Ask the children to fill in their own 100 square by colouring in the numbers that they say when counting in eights. They should continue to use cubes to help them.
- Explain: *The numbers you say when you count in eights are the numbers in the eight multiplication table*.
- Now ask the children to swap sheets with a partner and check that they have coloured in the correct numbers in their 100 square. Allow the children time to correct any mistakes. Then check their completed sheets so you are confident that all children have the correct numbers coloured.
- Once the children have coloured in the multiples of eight, hand out the 100 squares with the multiples of four coloured in, from Day 2. Ask the children if they notice anything about the sets of multiples. *Is there a matching pattern?*
- Write the numbers in the four and eight multiplication tables on the board with the help of the children, to make the pattern as clear as possible. Do the first few and then ask the children to tell you the rest of the numbers. Ask them to put their hand up when they can see a pattern.

OBJECTIVE

- Count from zero in multiples of four, eight, 50 and 100

Rising Stars Progression Framework: 3.1.a.1, 3.1.a.3

RESOURCES

- Activity 1: Each pair needs: number cards with multiples of four from 0 to 48
- Activity 2: Each child needs: eight cubes or counters; crayons and a 100 square; their coloured-in 100 square from Day 2

Strand: Number

DAY 4

Sub-strand: Counting in steps and multiples

TEACH

ACTIVITY 1: Counting in multiples of eight

- Give each child a copy of Worksheet 4 which shows ten starfish with eight legs each. Ask them: *If one starfish has eight legs, how can we work out the number of legs for two starfish?* The children may suggest counting the legs, or they might realise they can use doubling or their knowledge of the **multiples of eight**.

✓ **TIP:** There isn't a right or wrong strategy – just a strategy that works for the child. The purpose is to make them aware of the range of strategies available.

- Write on the board. *8 × 1 = 8, 8 × 2 = 16.* Refer the children to the pictures of the starfish on Worksheet 4 for visual support, if necessary.
- Now ask the children to work out the number of legs on three starfish. Again, you are looking for strategies, e.g. using the three or the eight multiplication table, or adding on eight.
- Check answers with the group; then ask the children to complete Worksheet 4. The images of the starfish serve as visual support initially, but they finish by writing the eight multiplication table out as a list, like the one started on the board.

! **WATCH OUT:** Notice the strategies the children use. If you see a child counting every leg, help them find a quicker method such as adding on in eights or using the other tables they know, e.g. 3 × 8 if they know the three multiplication table or 5 × 8.

ACTIVITY 2: The eight multiplication table

- Lay out the cards in an arc so that all the children can easily see the numbers the right way up.
- Ask the children to close their eyes and then remove a card from the arc, such as 40.
- Ask the children to work out which number is missing.
- Ask the children to explain to the group how they worked out which was the missing number. Discuss differences in the methods, including: *Is one way quicker? If counting on in ones is slow, what other method could we use? What ways do you use to remember the eight multiplication table?*
- Next, chant the eight multiplication table together as a group. The children can refer to the list they made earlier, from Worksheet 4, for support.
- Repeat the missing number exercise a few more times, asking different children to secretly remove a card. Check each time what strategy the children use to work out the missing number.

✓ **TIP:** Chant the eight multiplication table after each go, to aid the children in memorising the numbers.

OBJECTIVE

- Count from zero in multiples of four, eight, 50 and 100

Rising Stars Progression Framework: 3.1.a.1, 3.1.a.3

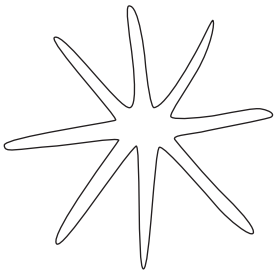
RESOURCES

- Activity 1: Worksheet 4
- Activity 2: One set of number cards with the numbers of the eight multiplication table up to 80; each child needs their coloured 100 square from Day 2

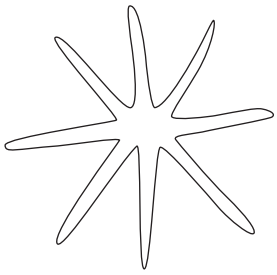
Worksheet 4

Name _____ **Date** _____

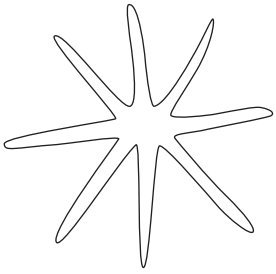
Counting in multiples of 8, using starfish



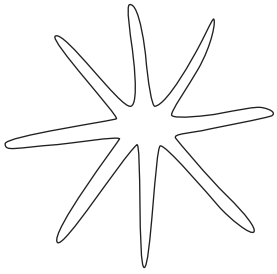
1 starfish has ☐ legs



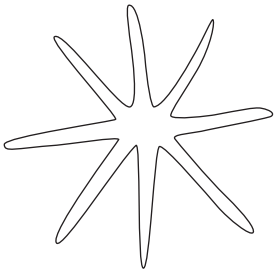
2 starfish have ☐ legs



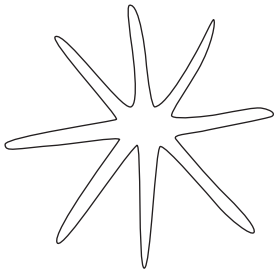
3 starfish have ☐ legs



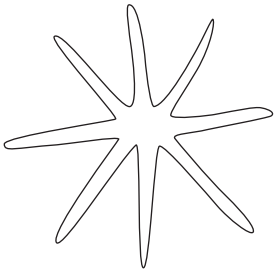
4 starfish have ☐ legs



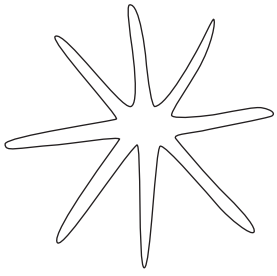
5 starfish have ☐ legs



6 starfish have ☐ legs



7 starfish have ☐ legs



8 starfish have ☐ legs

$8 \times 1 =$ ☐

$8 \times 2 =$ ☐

$8 \times 3 =$ ☐

$8 \times 4 =$ ☐

$8 \times 5 =$ ☐

$8 \times 6 =$ ☐

$8 \times 7 =$ ☐

$8 \times 8 =$ ☐

$8 \times 9 =$ ☐

$8 \times 10 =$ ☐

Strand: Number

DAY 5

Sub-strand: Counting in steps and multiples

ASSESS

ASSESSMENT ACTIVITY

- The purpose of the assessment is to check what each child can do independently, carefully noting down any difficulties and misconceptions. The adult will need to watch carefully what the children do, any strategies they use and their confidence levels.
- Give each child a copy of Worksheet 5.
- Explain that all the questions relate to the work they have been doing during the week on counting in steps or multiples.
- The first questions have a number track with missing numbers. They must first work out how much the numbers are increasing by and then use their knowledge of that multiplication table to help them to find the missing numbers.
- The second question requires them to use what they know about **multiples of 50, 100, four and eight** to solve the problems of a wizard making an invisibility spell.
- Explain that they can use their 100 squares and any other resources they feel would help them.

WATCH OUT: Watch the children when they are working to see who makes use of resources, who can count in multiples mentally and who uses their multiplication tables. Note which resources the children use, as this will help to evaluate their understanding and confidence.

- Use the remaining time of the assessment session to go through the questions and the answers with the group.

EVIDENCING SUCCESS

Meeting expectations:

- The child can confidently count in hundreds and also 50s. The child is able to use the pattern to continue the sequence and apply their understanding to solving problems.
- The child understands the four multiplication table and can recall it up to 4×12.
- The child understands and can recall most of the eight multiplication table, sometimes needing more time or support to be completely accurate.
- The child can apply their knowledge of the four and eight multiplication tables to problem-solving situations.

OBJECTIVE

- Count from zero in multiples of four, eight, 50 and 100

Rising Stars Progression Framework: 3.1.a.1, 3.1.a.3

RESOURCES

- Each child needs: Worksheet 5; a pencil and a 100 square; any other resources to support them in counting in multiples, e.g. Base 10

Worksheet 5

Name _____ **Date** _____

Counting in steps or multiples

1. Count in multiples to complete these sequences.

8,	16,	24,	☐,	40,	☐,	56,	☐,	☐,	80
4,	8,	☐,	16,	☐,	24,	28,	32,	☐,	☐
0,	50,	100,	☐,	☐,	250,	☐,	☐,	400,	☐
100,	200,	300,	400,	☐,	☐,	☐,	800,	☐,	1000

2. Florrie the absent-minded wizard is try to make an invisibility spell. Can you help her with her shopping list?

a) Beetles come in packets of 5. She needs 50 beetles. How many packets should Florrie buy?

.....

b) The Beetle packets cost 50p each. How much money will Florrie need to buy all the beetles she needs?

.....

c) Batswings come in packets of 8. Florrie needs 40 batswings. How many packets should she buy?

.....

d) Each packet of batswings costs £1. How much money will Florrie need to buy all the packets she needs?

.....

e) Eye of newt costs 4p each. Florrie needs 10 for her spell. How much will that cost her?

.....

Strand: Number

DAY 1

Sub-strand: Place value

TEACH

ACTIVITY 1: Identify and represent numbers up to 1000

- Introduce the activity: *Today we are going to learn to **partition** numbers. This means splitting them up into parts. The parts are **hundreds**, **tens and ones**.*
- Display the hundreds, tens and ones table. Say: *Look at the table. What would we need to make 246? We would need 200 (point to 200), 40 (point to 40) and six (point to 6).*

100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9

HTO table

- Ask the children: *How many hundreds, tens and ones in 246?* Model how to write it clearly, showing the hundreds, tens and ones on a place-value grid. Explain that each number has a position to show its value.
- Ask if anyone can use the place-value (arrow) cards to make 246.
- Show the children how to put the partitioned number back together by adding: 200 + 40 + 6 = 246.

✓ **TIP:** You may need to repeat with other three-digit numbers before the children have a go themselves.

- Once the children are secure in this method, ask pairs to write 328 in hundreds, tens and ones and then put it back together again.

ACTIVITY 2: Using place value

- Place the quiz cards, cut out from Worksheet 6, face down on the table.
- Each child takes a card, jots down the letter in their book and writes their answer. Remind them to read the question carefully.
- If a child is struggling with a card, ask them to read the card to you first, get the place-value grid and write the number on the grid. Ask them to tell you what each number means. Use this and the other resources to clarify the question and help the child arrive at the answer to the question.

✓ **TIP:** Discuss how the children have arrived at their answers. Ask them to explain their method to others and highlight good practice. Note any misconceptions, etc.

OBJECTIVES

- Recognise the place value of each digit in a three-digit number (hundreds, tens, ones)
- Compare and order numbers up to 1,000
- Identify, represent and estimate numbers using different representations

Rising Stars Progression Framework: 3.1.b.1, 3.1.b.3, 3.1.c.1

RESOURCES

- Activity 1: HTO table; exercise book; pencil; place-value grids (from Worksheet 2, page 5); place-value (arrow) cards
- Activity 2: Quiz cards cut out from Worksheet 6; each child needs: their exercise book; 100 square; place-value grids (from Worksheet 2, page 5); grid cards; place-value (arrow) cards

Worksheet 6

Photocopy and cut into cards.

Quiz cards

A Write this as a number: Four hundreds, five tens and two ones.	**B** A number is more than 100 but less than 200. It has 5 tens and 6 ones. What is it?
C How many tens are there in 462?	**D** How many tens are there in 806?
E One hundred, six tens and zero ones; write it in **numerals**.	**F** How many hundreds are there in 101?
G 200 + 40 + 8 What is this number?	**H** Partition 826.

Strand: Number

DAY 2

Sub-strand: Place value

TEACH

ACTIVITY 1: Recognise the place value of digits in a three-digit number

WATCH OUT: It is vital the children understand that the value of a number depends on its place in a number. So 153 has one hundred, five tens and three ones; if we use the same digits in different places we have a different number (e.g. 315).

- Explain that the children will be looking at **three-digit numbers**. Ask: *Can you remember what **digit** means?* Ensure they are clear that a digit is one of the key numbers one to nine. Explain that digits are used to make numerals, so the numeral 153 is made up from the digits one, five and three.
- Take one of the three-digit number cards from the box or bag, e.g. 124. Ask: *How many hundreds are in this number? How do you know? How many tens are there? How many ones are there? What is the number on the card?* Demonstrate by writing the number on the place-value grid. Ask one of the children to use the place-value (arrow) cards to show the same number.
- Repeat this exercise with another three-digit number.
- Now challenge the children to take a three-digit number card from the bag or box and say how many hundreds, tens and ones are in their chosen number.

WATCH OUT: Allow the children access to the place-value resources for support.

- Each time, ask the group to check the child's stated answer is correct.

ACTIVITY 2: Finding the smallest and largest numbers with three digits

- Draw three number cards and arrange them to make a three-digit number, read it out, e.g. 361, and write it onto a place-value grid.
- Ask the children to rearrange the three digits to make a larger number, and to explain how moving the digits to different columns can make the number larger.
- Next, ask them to find the smallest number they can make with the three digits and explain how they have done this.
- Draw three more cards and read out the numbers on them. Ask the children: *What is the largest number you can make from the three digits? What is the smallest number? What other numbers can you make with those digits?*
- Repeat this activity with more cards. Continue to use the place-value cards and grids for support and to help the children to share their ideas.
- When the children seem confident with the activity, introduce a trickier set of numbers, e.g. three, four and zero. Ask: *What different numbers can I make with these three numbers? Would you have 043? Why not?* Make sure the children understand what the zero means in different positions, such as 403 and 430.

OBJECTIVES

- Recognise the place value of each digit in a three-digit number (hundreds, tens, ones)
- Compare and order numbers up to 1,000
- Identify , represent and estimate numbers using different representations

Rising Stars Progression Framework: 3.1.b.1, 3.1.b.3, 3.1.c.1

RESOURCES

- Activity 1: Cards with three-digit numbers on them; a bag or box; place-value (arrow) cards; place-value grids (from Worksheet 2, page 5)
- Activity 2: Exercise books; pack of number cards

Strand: Number

DAY 3

Sub-strand: Place value

TEACH

ACTIVITY 1: Compare and order numbers up to 100

- Display the A4 cards, not in numerical order, so all the children can see them.

✓ **TIP:** Avoid using 'tricky' numbers such as 19 and 91 at this stage.

- Explain that the lesson is about learning to put numbers in **order** of size. Ask: *Are these numbers in size order? Can we put them in the right order?*
- Ask for suggestions as to how to order them according to size; e.g. find the smallest number first, and then the next smallest and so on.

✓ **TIP:** Have 100 squares on the table for the children to refer to if necessary.

- Now ask the children to work in pairs. One child in each pair deals six playing cards from the pack and puts them in order. Pairs then check the ordering together. Encourage them to think carefully about the order from smallest to largest.

! **WATCH OUT:** Ensure the children do not simply rely on their partner in this task.

- Ask how the children could check they have ordered the numbers correctly. What strategies are they using (saying numbers out loud, counting on, etc.)?

ACTIVITY 2: Compare and order numbers up to 1000

- Explain that you are going to order some 'tricky' numbers. Point out that tricky numbers look very similar, so they will have to look and check really carefully!
- Display the numbers 19 and 91 using the A4 cards and write each number on a place-value grid. Ask: *How many tens/ones does 19/91 have?*
- Display the following number cards: 16, 61, 15, 51, 14, 41. Discuss the strategy to put them in the **correct order** (see 'Tip').

✓ **TIP:** Say*: Look at the number. Say it out loud. Look at the tens and ones. Find the smallest number first, then the next smallest, etc.*

- Display six more two-digit numbers, including some tricky numbers, such as 84, 14, 21, 12, 38, 83. Again, model the strategy for putting them in order.
- Tell the children*: Now we are going to put some three-digit numbers in order. We will use the same strategies as with the two-digit numbers.*
- Move on to some examples. *Let's put these numbers in order from smallest to largest: 234, 112, 86, 944, 567.* Start by writing the numbers onto a place-value grid and then ask the children to identify the smallest number (86) by looking at the hundreds in each number, then the tens and ones.
- Finally, encourage the children to try ordering these numbers on their own: 205, 457, 129, 754, 84, 101.

! **WATCH OUT:** Keep an eye out for any children who are struggling. Encourage them to use the place-value resources for support.

OBJECTIVES

- Recognise the place value of each digit in a three-digit number (hundreds, tens, ones)
- Compare and order numbers up to 1,000
- Identify, represent and estimate numbers using different representations

Rising Stars Progression Framework: 3.1.b.1, 3.1.b.3, 3.1.c.1

RESOURCES

- Activity 1: A4 cards with selection of numbers up to 100; playing cards with numbers from 1 to 100; 100 squares if needed
- Activity 2: A4 cards as above; exercise books; place-value grids and cards

Strand: Number

DAY 4

Sub-strand: Place value

TEACH

ACTIVITY 1: Compare and order numbers up to 1000

- The children will each throw a welly and then measure the distance using a trundle wheel or metre sticks.

WATCH OUT: Think about any safety issues with this activity. It is best done outside where there is plenty of space. You can't rely on the throwing being accurate, so keep the children a sensible distance behind the thrower.

TIP: Before they start to throw, let the children practise with the trundle wheels, as it may be some time since they used one. They need to make sure they position the start point carefully and count each click of the wheel.

- Ask the children to work in pairs. Explain that one child will throw the welly and then they will both measure the distance; the other child will write the measurement on the chart. Distances should be measured to the nearest centimetre.

TIP: Remind the children that there are 100 cm in a metre so, if a welly is thrown 4 m 35 cm, that is 435 cm.

- Back in the classroom, collate all the distances. Ask each pair to work together to put them in **order** on a number track, starting with the largest distance.
- Once all pairs have finished, bring the group together to check whether everyone agrees on the order. Use a number track to present the correct order.

ACTIVITY 2: Using > and < to compare numbers

- Explain that there is a sign used in maths to mean 'more than'. It is >.
- Ask: *Can anyone think of other signs we use in maths and what they mean?* Here the children may suggest the equals (=) and addition (+) signs.
- Choose two numbers from Activity 1. Ask: *Which is the biggest number?* Show the children how to insert the > sign.
- Give other examples, asking the children to write the sign in.
- Now go on to explain that < means 'less than'. Choose two numbers from Activity 1. Ask: *Which is the smallest number?* Show the children how to insert the < sign.
- Give other examples asking the children to write the sign in.
- Write 254 > 100. Ask the children: *What does this tell you? Is it true?*
- Give other examples, e.g. 260 and 620, 19 and 91, 104 and 410, again asking the children to say whether they are true.

OBJECTIVES

- Recognise the place value of each digit in a three-digit number (hundreds, tens, ones)
- Compare and order numbers up to 1,000
- Identify, represent and estimate numbers using different representations

Rising Stars Progression Framework: 33.1.b.1, 3.1.b.3, 3.1.c.1

RESOURCES

- Activity 1: Wellington boot; trundle wheel or metre sticks; clipboard with chart; whiteboards
- Activity 2: Measurements from Activity 1; whiteboards

Strand: Number

DAY 5

Sub-strand: Place value

ASSESS

ASSESSMENT ACTIVITY

- The purpose of the assessment is to check what each child can do independently, carefully noting down any difficulties and misconceptions. The adult will need to watch carefully what the children do, any strategies used and confidence levels.
- Provide each child with a copy of Worksheet 7. Explain that there are three sections:
  - The first section is very short and involves reading and partitioning numbers.
  - The second section asks them to put numbers in order from the smallest to the largest.
  - The third section asks them to use what they know about > and < signs to say whether statements are true or false.

✓ **TIP:** You might choose at this point to put an example on the board, to check that the children understand the form of the questions, e.g. *802 > 206. Is this true or false?*

- Remind the children that they have used place-value grids and that these are available if required.

! **WATCH OUT:** While the children are working, note those that do and do not need the resources to achieve a correct answer.

EVIDENCING SUCCESS

Meeting expectations:

- The child can arrange three digit cards, e.g. three, four and seven, to make the largest possible number and can justify their choice of 743 using the language of hundreds, tens and ones.
- The child can partition 462 in several ways and draw an appropriate diagram to show each of them.
- The child can place the correct sign (=, < and >) in statements such as between 304 and 187 and between 425 and 394.

OBJECTIVES

- Recognise the place value of each digit in a three-digit number (hundreds, tens, ones)
- Compare and order numbers up to 1,000
- Identify, represent and estimate numbers using different representations

Rising Stars Progression Framework: 3.1.b.1, 3.1.b.3, 3.1.c.1

RESOURCES

- Worksheet 7; access to place-value grids

Worksheet 7

Name _____ **Date** _____

What is the number?

1. Write these numbers using digits.

a) 2 hundreds, 4 tens and 7 ones .....

b) 6 hundreds, 0 tens and 2 ones .....

Partition these numbers.

c) 548

d) 301

e) 462

Order! Order!

2. Put these numbers in order from the smallest to the largest.

a) 550 110 660 880 .....

b) 311 457 210 109 .....

c) 806 608 680 860 .....

True or false?

3. Are these true or false? Write your answer next to each.

a) 160 > 300 .....

b) 156 > 111 .....

c) 230 < 320 .....

d) 425 > 394 .....

e) 304 < 187 .....

f) 833 > 177 .....

Strand: Addition and Subtraction

DAY 1

Sub-strand: Mental calculation strategies

TEACH

ACTIVITY 1: Rounding and adjusting for addition

- Explain that **rounding and adjusting** is a useful mental calculation strategy for addition and subtraction.
- Write an addition calculation on the board: 234 + 147. Make the numbers with Base 10 apparatus.
- Ask the children: *How could we round these numbers up or down so that we can add them more easily?* Here you are looking for the children to suggest rounding to the nearest 10 to make 230 + 150 = 380.

✓ **TIP:** Model each step of the calculation with the Base 10 apparatus.

- Now ask: *What is the difference between our original number (234) and our rounded number (230)?* Elicit that 230 is four **less than** 234. *We must add the four ones to our answer: 380 + 4 = 384.*
- Next ask: *What is the difference between our original number (147) and our rounded number (150)?* Elicit that 150 is three **more than** 147. *We must subtract the three ones from our answer: 384 – 3 = 381.*
- Write the calculation 279 + 133 on the board. Make sure all the children can access the Base 10 materials. Ask the children to work in pairs and find the answer using rounding and adjusting.

✓ **TIP:** Encourage the children to model each step of the calculation with the Base 10 apparatus.

! **WATCH OUT:** Observe carefully to make sure that the children don't make an error when adjusting.

- Collect feedback from the group. *Did each pair reach the same answer? Did each pair round in the same way?*

ACTIVITY 2: Rounding and adjusting for subtraction

- Tell the children that they must now use **rounding and adjusting** to answer subtraction calculations mentally.
- Give each pair one of the following calculations: 302 – 118, 265 – 109, 308 – 143, 633 – 216.
- Ask the children to discuss which numbers they will round. Agree which numbers must be rounded and how they should be rounded.
- Tell the children to work in their pairs to complete the calculation. Remind them to adjust their answers.

✓ **TIP:** Watch the children carefully while they are working. Do they use Base 10 apparatus to help them? Are some children able to answer without the support of the apparatus?

OBJECTIVE

- Add and subtract numbers mentally, including: a three-digit number and ones, a three-digit number and tens, a three-digit number and hundreds

Rising Stars Progression Framework: 3.2.b.1

RESOURCES

- Activity 1: Base 10 apparatus
- Activity 2: Base 10 material; exercise books

Strand: Addition and Subtraction

DAY 2

Sub-strand: Mental calculation strategies

TEACH

ACTIVITY 1: Crossing the hundreds barriers

- Start by saying a three-digit number, such as 322.

✓ **TIP:** Jot the numbers down for yourself as you say them, so you have a record for the end of the session when you go through the answers with the children!

- Then say: *What is one more than 322? Write it in your book. What is ten more than 322? Jot that down too. Model using a number track.*
- Continue with other numbers, asking the children to write down one more/ten more and one less/ten less than that number in their books. Use numbers that do not cross ten or hundred barriers at this stage.
- Move on to use numbers that cross ten or hundred barriers. E.g. *What is ten less than 409? What is one more than 119? What is ten less than 199? What is ten more than 990? What is one less than 110?*
- Use the number track to show children how to bridge from 409 to 400, and then down one more to 399. Ask the children to use the number track to show you how they could solve the questions.
- Go through the answers with the group, making sure any mistakes are corrected and understood.

✓ **TIP:** Use place-value grids as a visual support when clarifying any misconceptions.

ACTIVITY 2: Adding and subtracting a three-digit number and hundreds

- Place the three-digit number cards face down on the table in the middle of the group. Pick up a card, such as 400. Tell the children that you are going to flip the coin. If it comes up heads, they will have to add 100 and, if it comes up tails, they will have to subtract 100.
- Remind children of the work they've done on finding 100 more and 100 less. Adding and subtracting 100 builds on this idea.

✓ **TIP:** Model the strategy for the children, e.g. *I am adding 100 to 300 which gives me 400,* to ensure they are clear they are adding or subtracting hundreds. Otherwise there is a danger the children will slip into saying they are adding on one.

- Now let the children take turns to take a card, flip the coin and tell the group the answer. When the children are confident with this, ask them to roll a die to decide how many hundreds to add on or subtract.

! **WATCH OUT:** The use of a die means you could find you are trying to take 600 from 400. Be prepared to discuss the fact that the answer will be less than zero: *It will be 200 less than zero and we call this negative 200.* However, try to keep the children focused on positive numbers at this stage, to avoid confusion.

OBJECTIVE

- Add and subtract numbers mentally, including: a three-digit number and ones, a three-digit number and tens, a three-digit number and hundreds

Rising Stars Progression Framework: 3.2.b.1

RESOURCES

- Activity 1: Exercise books and pencils; number track showing tens up to 200
- Activity 2: A selection of 20 cards with three-digit numbers written on them; whiteboards; coin; a die

Strand: Addition and Subtraction

DAY 3

Sub-strand: Mental calculation strategies

TEACH

ACTIVITY 1: Using compensation for addition

- Explain that using **compensation** is a useful mental calculation strategy for adding and subtracting a number that is close to a multiple of ten (ending in 1, 2, 8, 9).
- Write the following calculation on the board: 29 + 5. *How could you complete this calculation mentally?* The children may suggest counting on from 29, or bridging to 30 and adding on four more.
- Place 29 cubes in one pile and five cubes in a separate pile. *We can add one cube to the pile of 29. Now we have 30 cubes. We have too many cubes, so we take one from the pile of five. We are left with 30 cubes and four cubes: 34 cubes in total.*
- Give the children another example to try: 24 + 9. Ask the children to discuss in pairs how to use compensation to make the numbers easier to add. Elicit that it would be easier to calculate 25 + 10 mentally.
- Again, demonstrate the strategy with cubes.
- Give the children a few more examples to try with a partner, including questions involving three digits: 14 + 9, 126 + 9, 640 + 28.
- Share children's answers. Did all children use compensation in the same way?

ACTIVITY 2: Using compensation for subtraction

- Tell the children that they must now use **compensation** to answer subtraction calculations mentally.
- Write the following calculation on the board: 29 – 4.
- Place 29 cubes in one pile. Highlight that 29 is a near multiple of ten (30). Model adding one cube to the pile: *Now we have a pile of 30. We can subtract four cubes from the pile of 30 and are left with 26. If we now remove the extra cube we added, we are left with the total 25*.
- Give the children another example to try: 36 – 9. Ask the children to discuss in pairs how to use compensation to make the numbers easier to subtract. Elicit that it would be easier to calculate 36 – 10 mentally.
- Again, demonstrate the strategy with cubes.
- Give the children a few more examples to try with a partner, including questions involving three digits: 27 – 8, 118 – 7, 341 – 9.

WATCH OUT: Make sure the children remember to subtract the extra ones that were added at the beginning of the calculation.

- Share children's answers. Did all children use compensation in the same way?

OBJECTIVE

- Add and subtract numbers mentally, including: a three-digit number and ones, a three-digit number and tens, a three-digit number and hundreds

Rising Stars Progression Framework: 3.2.b.1

RESOURCES

- Activity 1: counters/ cubes
- Activity 2: counters/ cubes

Strand: Addition and Subtraction

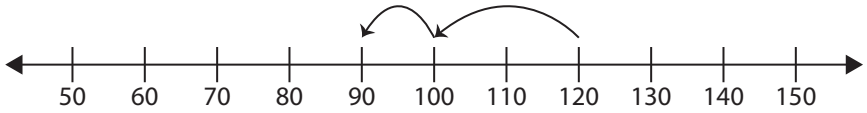
DAY 4

Sub-strand: Mental calculation strategies

TEACH

ACTIVITY 1: Using bridging for addition and subtraction

- Explain that **bridging** is a useful mental calculation strategy for addition and subtraction and we can use a number track as a support.
- Place a piece of tape on the number track at 120. *How can we subtract 30 from 120 on the number track*? The children may suggest counting backwards in tens. If so, ask: *Is there a quicker way?* Elicit that the children could count backwards to 100 in one step, and then count backwards ten.



- *This strategy is called bridging because we go to the 'bridge' of 100 and then continue subtracting*.
- Give the children another example: 70 + 40. *How much do we need to add on to reach 100 (the bridge)?* (30) *How many more do we need to add on*? (10). *What is the final answer?* (110) Give out Worksheet 1 and ask the children to complete question 1 with a partner. Ask each pair to explain their answer to the group. Did everyone come up with the same solution? Now ask the children to complete the remaining questions independently.

ACTIVITY 2: Adding on ones and tens with visual support

- Explain to the children that they will be adding and subtracting ones and tens from three-digit numbers in their heads. Draw three numbers from the bag to make a three-digit number, e.g. 342, and place the cards where all the children can see them. Ask one child to tell you what the number is. Ask another child to tell you how many hundreds, tens and ones are in the number.

✓ **TIP:** Check the children are clear about the place value of each column. This will support a clear visualisation of the number, which will help them when they are adding and subtracting larger numbers without the cards to support them.

- Now ask: *Add a one to this number. What is the answer? Can you add ten to this number? What is the answer?*

! **WATCH OUT:** If the children are insecure with place value, they might confuse adding a ten and adding a one. If so, ask them to count to ten out loud. Then draw their attention to the hundreds, tens and ones columns.

- Model another example, asking the children the questions such as: *Can you add three ones to this number?*
- The children take turns to draw three numbers from the bag. They roll a die to find out how many ones to add on. They do the addition and write down the new number on their whiteboards. Then ask them to write ten more, followed by a number of ones less (based on the roll of the die) and ten less.

OBJECTIVE

- Add and subtract numbers mentally, including: a three-digit number and ones, a three-digit number and tens, a three-digit number and hundreds

Rising Stars Progression Framework: 3.2.b.1

RESOURCES

- Activity 1: Number track for 0 to 200 marked every 10 for the teacher; tape; Worksheet 1
- Activity 2: Five sets of number cards from 0 to 9 mixed together in a bag; a board for the teacher; whiteboard for each child; die

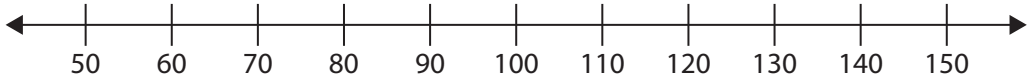
Worksheet 1

Name _____ **Date** _____

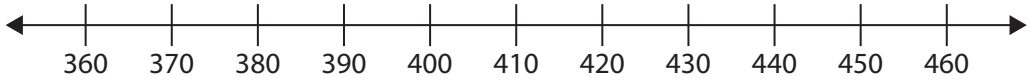
Bridging for addition and subtraction

Use bridging to find the answers to these calculations mentally.

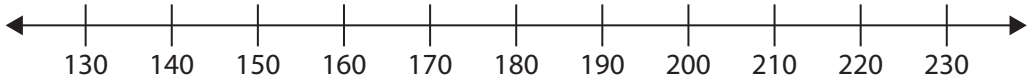
1. 60 + 50



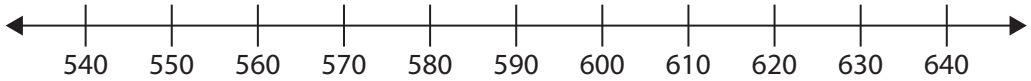
2. 440 – 70



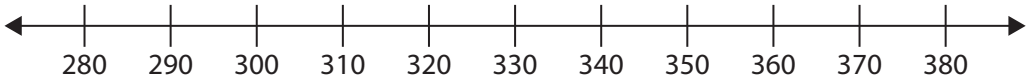
3. 140 + 70



4. 630 – 50



5. 280 + 40



Strand: Addition and Subtraction

DAY 5

Sub-strand: Mental calculation strategies

ASSESS

ASSESSMENT ACTIVITY

- The purpose of the assessment is to check what each child can do independently, carefully noting down any difficulties and misconceptions. The adult will need to watch carefully what the children do, any strategies used and confidence levels.
- Give each child a copy of Worksheet 2.
- Remind the children of the different strategies they have been learning about to help them add and subtract mentally: rounding and adjusting, compensation, bridging and using known facts.
- Explain that there is a suggested strategy for answering each question on the worksheet, but they can use a different strategy if they choose.

✓ **TIP:** Observe whether the children use the suggested strategy or a different strategy. If they use a different strategy ask: *Why did you choose that strategy? Is your chosen strategy more efficient?* The reasons that children give will indicate how secure they are in their understanding of the variety of mental calculation strategies and how confident they are in selecting an efficient method.

- Encourage the children to draw number tracks or make jottings to support their mental calculations. Remind the children that making jottings or sketches is not cheating - quite the opposite!

EVIDENCING SUCCESS

Meeting expectations:

- The child can add and subtract up to three digit numbers mentally, e.g. 227 + 147 or 317 –186.
- The child has more than one strategy that they can apply.

OBJECTIVE

- Add and subtract numbers mentally, including: a three-digit number and ones, a three-digit number and tens, a three-digit number and hundreds

Rising Stars Progression Framework: 3.2.b.1

RESOURCES

- Worksheet 2

Worksheet 2

Name _____ **Date** _____

1. Find the answer to these calculations.

HINT: You could use rounding and adjusting.

a) 227 + 147

b) 317 – 186

2. Find the answer to these calculations.

HINT: You could use known facts.

a) 247 + 1 **d)** 693 – 1

b) 247 + 10 **e)** 693 – 10

c) 247 + 100 **f)** 693 – 100

3. Find the answer to these calculations.

HINT: You could use bridging.

a) What is 120 + 70?

b) What is 210 – 60?

4. Find the answer to these calculations.

HINT: You could use compensation.

a) 149 + 5

b) 161 – 8

Strand: Addition and Subtraction

DAY 1

Sub-strand: Mental calculation strategies

TEACH

ACTIVITY 1: Using place value to solve number problems

- Working as a group, ask a child to choose three digits from the cards. Ask them to make a three-digit number with their chosen numbers by placing their digit cards in a **place-value grid**, e.g. three, nine and five could combine to make 395.
- Ask: *Can anyone make a larger number using those digits?* When you have an answer (e.g. 953) check how the children arrived at the answer or why it wasn't possible to make a larger number.

WATCH OUT: Using the example of 953, you are looking for the children to be able to explain that the nine is the largest number so it goes in the hundreds column, five is the next largest so it goes in the tens column, and the smallest number (three) is in the ones column.

- Ask: *Can anyone make a smaller number?* When you have an answer (e.g. 359) check how the children arrived at the answer or why it wasn't possible to make a smaller number.

ACTIVITY 2: Using number bonds to solve number problems

- Tell the children: *I know the* ***number bond*** *3 + 4 = 7.* Ask: *So what else do I know?*
- Demonstrate using a 100 square. Take your time to ensure the children clearly understand these statements.

3 + 4 = 7	30 + 40 = 70
4 + 3 = 7	40 + 30 = 70

- Make sure they can see how this related to the number bond 3 + 4 = 7.
- Show that 3 – 7 *does not* equal four. Ask: *Why not?* Work through another example and this time take it further.

2 + 7 = 9	20 + 70 = 90	200 + 700 = 900
7 + 2 = 9	70 + 20 = 90	700 + 200 = 900
9 – 7 = 2	90 – 70 = 20	900 – 700 = 200
9 – 2 = 7	90 – 20 = 70	900 – 200 = 700

- Remind the children about using number bonds, then ask them to try on their own using 3 + 5 = 8 all the way up to the hundreds.
- Tell the children: *Let's try it the other way around. I know that 600 + 200 = 800. So what do I know about 60 + 20 and 6 + 2?* Ask the children to write out a grid for these numbers. See example above.

OBJECTIVE

- Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

Rising Stars Progression Framework: 3.2.c.1, 3.2.c.2

RESOURCES

- Activity 1: Set of 12 playing cards or number cards from 1 to 12; place-value grids
- Activity 2: 100 square; whiteboard

Strand: Addition and Subtraction

DAY 2

Sub-strand: Mental calculation strategies

TEACH

ACTIVITY 1: Making a given number using known number facts

- Ask the children to work in pairs. One of them picks a number card from the bag, e.g. 120. The other child then counts out the correct number of manipulative resources to use. Pairs then work together to split the manipulatives into two groups and write this down. They should aim to write in *two* different ways to make that number, e.g. 60 + 60 = 120; 70 + 50 = 120. 6 + 6 = 12, 7 + 5 = 12.

✓ **TIP:** You may wish to model to the children how this is done first.

- When they have done this, ask: *How did you find the correct* ***total****? How did you choose the first number? How did you work out the second?* Discuss their strategies and which ones work well. Here, the children may say that 'I know 6 + 6 = 12 so I know 60 + 60 = 120'. They may have tried adding on from the first number.
- The second child in the pair then draws another number card from the bag and together the children write down two calculations to give that number total, again using the manipulative resources for support.
- Repeat the process but this time challenge the children to find the two calculations *without* using manipulative resources. Ask them: *Can you use a number fact about the total to make the number?* Model this first with the number 190: *180 is 10 less than 190 so we did 180 + 10 = 190. We also know that 190 is 10 less than 200 so we did 150 + 40 = 190 because 100 + 100 = 200.*
- Check the children are familiar with the process of using facts they know to make given totals before moving on to the next activity. You could ask them to complete the first two questions on Worksheet 3 to check understanding.

ACTIVITY 2: Making the total when we already know some of the numbers, but one is missing

- Start by looking at an example, such as: 130 + ? = 180. Ask: *How can we work out the missing number?* See what the children suggest. Then show them how to work it out using a number track.
- Have a go at another question together, but this time with three numbers to make a total where one is missing, e.g. 150 + 130 + ? = 300.
- As soon as you feel the children understand, ask them to work independently to complete the questions on Worksheet 3.

✓ **TIP:** Ensure the children have access to a number track and counters, in case they are needed.

- As an extension task, ask the children to write five more sums with missing numbers for their friends to have a go at.

OBJECTIVE

- Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

Rising Stars Progression Framework: 3.2.c.1, 3.2.c.2

RESOURCES

- Activity 1: 20 number cards from a selection of numbers between 100 and 500; bag for cards; manipulative resources (counters, cubes, buttons, etc.); Worksheet 3
- Activity 2: Worksheet 3; number balance/number track/counters

Worksheet 3

Name _____ **Date** _____

Missing numbers

1. Here is one way to make 100 using addition. Can you find 2 more ways?

30 + 70 = 100 ☐ ☐

2. Here is one way to make 100 using subtraction. Can you find 2 more ways?

300 – 200 = 100 ☐ ☐

3. Find the missing numbers.

a) 140 + ☐ = 200 **b)** 210 + ☐ = 300

c) ☐ + 150 = 600 **d)** 160 + ☐ = 260

e) 100 + ☐ = 340 **f)** ☐ + 130 = 500

g) 160 + ☐ = 250 **h)** ☐ + 140 = 220

Strand: Addition and Subtraction

DAY 3

Sub-strand: Mental calculation strategies

TEACH

ACTIVITY 1: Understanding the language of addition and subtraction

WATCH OUT: One reason why children may struggle with number problems is the vocabulary rather than the maths. This lesson focuses on what the question is asking for and understanding the vocabulary of problem solving.

- Look with the children at the vocabulary cards from Worksheet 4. Start by asking them to read the cards and then to work as a group to sort them into two piles. Say to them: *Which words mean that we should **add** the numbers together and which words mean that we should **subtract** one number from another?*
- As you work as a group to sort the cards, give an example of how each word might be used in a calculation, e.g. *What is the **difference** between 400 and 900? What is 160 **subtract** 20? What is 30 **more than** 300?*
- When the children have sorted the cards, hand out copies of Worksheet 5. Look at question 1. Ask: *Can anyone see which word tells you what to do?* (It is 'add'.) The children should highlight the word. Ask the children to explain what it means. Ask: *Can you think of another sentence using the word 'add'?*

TIP: Remind the children they are not answering the questions at this point.

- Go on to the subsequent questions on Worksheet 5, taking time to ensure the children can find and highlight the words that tell them what to do. Although the words themselves are not tricky, the children will need to think about their meaning in each specific context.

ACTIVITY 2: Applying the language of addition and subtraction

- Return to Worksheet 5 and now focus on answering the questions.
- Look at question 1. Ask: *Which word have we highlighted as the word that tells us whether to add or subtract? What does that mean we have to do to?*
- Work through the question together as a group to find the answer.
- Go on to the subsequent questions on Worksheet 5, taking time to ensure the children can find the words that tell them what to do and then complete that operation.

TIP: Question 7 asks: '*What is the difference?*' To help the children understand what this means, use a number track to physically show the **difference** in the context of subtraction: *Here is the number ten and here is the number six. The 'difference' is the space between them.*

OBJECTIVE

- Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

Rising Stars Progression Framework: 3.2.c.1, 3.2.c.2

RESOURCES

- Activity 1: Worksheet 4 cut into cards; highlighter pens; Worksheet 5
- Activity 2: Worksheet 5; highlighter pens of a different colour for the subtraction words; number track

Worksheet 4

Photocopy and cut into cards.

Addition and subtraction vocabulary cards

more	subtract
altogether	sum
total	take away
less	add
difference	left
and	make

Worksheet 5

Name _____ **Date** _____

Language of addition and subtraction

1. Add 6, 2 and 4.

2. What is the total of 7, 3 and 10?

3. What is the sum of 20 and 12?

4. What is the total of 4 + 4 + 4?

5. Altogether, how many are 40 + 40 + 40?

6. Take away 5 from 10.

7. Count back from 10 to 6. What is the difference?

8. If I have 12 sweets and eat 6, how many are left?

9. Subtract 40 from 60.

10. What is 6 subtracted from 20?

Strand: Addition and Subtraction

DAY 4

Sub-strand: Mental calculation strategies

TEACH

ACTIVITY 1: Solving simple word problems

- Give each child a copy of Worksheet 6 and ask the children to read through the first question. Ask: *What is the operative word in the question? Which word tells you what to do? Is it addition or subtraction? How do you know?*
- The children should work together to highlight the **operation** words in each of the calculations on Worksheet 6 and then write each of the problems and a calculation in the box provided.

WATCH OUT: Observe the children closely to make sure they are able to put the numbers into the calculations in the correct places and know the symbol to use.

- The children then solve the word problems from the calculations they have written down in the calculation box.

TIP: Allow the children to use whichever method they feel most comfortable with to find the answers (manipulative resources, number tracks, working out in their heads, etc.).

ACTIVITY 2: Creating simple word problems

- Model choosing a vocabulary card (from Worksheet 4, page 33) from the selection and devising a word problem around it. *I have chosen difference. I am 6 and my brother is 11. What is the difference between our ages?*
- Ask the children to now do the same thing. They then write down their word problem on a whiteboard.
- When all of the children have written their word problem down they are to swap boards and have a go at solving each other's word problems.
- Repeat the activity as time allows, so the children have the opportunity to create word problems using different vocabulary cards.

OBJECTIVE

- Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

Rising Stars Progression Framework: 3.2.c.1, 3.2.c.2

RESOURCES

- Activity 1: Worksheet 6; pencils; highlighter pens; number tracks; manipulative resources
- Activity 2: Vocabulary cards from Worksheet 4, page 33; whiteboards and pens

Worksheet 6

Name _____ **Date** _____

Solving problems

Word problem	Can you write the calculation?
Example: There are 80 birds in the oak tree and 40 birds in the elm tree. How many more birds are there in the oak tree than in the elm tree?	80 – 40 = 40
1. There are 6 frogs in my pond and 12 frogs in my friend's pond. What is the difference between them?	
2. I have brought 15 cupcakes for the bake sale and my friend has brought 20. How many cakes do we have altogether?	
3. Beth has 36 books. For her birthday she got 23 more. How many books does Beth have now?	
4. In my room I have 45 dolls. My sister has 65 dolls. How many more dolls does she have than me?	
5. My Grandma lives 125 miles away. We have driven 75 miles. How much further do we have to go?	
6. There are 94 sandwiches at the picnic. During lunch 53 of them are eaten. How many sandwiches are left?	

Strand: Addition and Subtraction

DAY 5

Sub-strand: Mental calculation strategies

ASSESS

ASSESSMENT ACTIVITY

- The purpose of the assessment is to check what each child can do independently, carefully noting down any difficulties and misconceptions. The adult will need to watch carefully what the children do, any strategies used and confidence levels.
- The children work independently to complete Worksheet 7 which provides them with practice of the methods of calculation taught on Days 1 to 4. They can use the 100 square, number tracks and counters if they want to. Ask the children to complete the questions in their exercise books to give them more space for jotting and recording.

WATCH OUT: Observe the children closely as they work to see how they approach the questions. Notice if they use the equipment or are making notes. Are they using their fingers? These observations will tell you if the children are able to calculate mentally and can use the methods they have been taught, such as partitioning for addition. The observations will also reveal whether the children can use resources such as a number track or a 100 square confidently, or whether they need additional support to use these resources effectively.

- When the children have finished, take them through the questions and encourage discussion where there are different answers. Also discuss how the apparatus helped.

EVIDENCING SUCCESS

Meeting expectations:

- The child understands the language of addition and subtraction in the context of number problems.
- The child can use their knowledge of place value to help them to solve number problems.
- The child can use their knowledge of number facts to help them to solve number problems.
- The child can solve simple missing number problems.

OBJECTIVE

- Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

Rising Stars Progression Framework: 3.2.c.1, 3.2.c.2

RESOURCES

- Worksheet 7; exercise books; number track; 100 square; counters

Worksheet 7

Name _____ **Date** _____

Using the language of addition and subtraction

Find the answers to these calculations.

1. What is the total of 46 and 32?

2. What is the sum of 27 and 14?

3. What is the answer to 36 take away 10?

4. How many are left if you subtract 21 from 42?

Find the missing numbers

5. 14 + _____ = 30

6. _____ + 121 = 140

7. 226 – 100 = _____

8. _____ – 64 = 36

Word problems

Read each word problem then write the calculation and the answer.

9. I am 174 cm tall and my mum is 156cm tall. How much taller am I?

10. My dog eats 56 bones a year and my friend's dog eats 97 bones a year. How many more bones does her dog eat?

What else do I know?

11. If I know that 6 + 4 = 10, what else do I know?

Find 4 facts.

Strand: Addition and Subtraction

DAY 1

Sub-strand: Written calculation

TEACH

ACTIVITY 1: Partitioning refresher

- Start by asking: *What does the word **partition** mean?*
- Show the children the different parts of numbers using the place-value (arrow) cards. E.g. *This number is one hundred, two tens and three ones. It is one hundred and twenty-three.*
- Starting with two-digit numbers and using place-value (arrow) cards, ask the children to partition 72. They should check answers with a partner. Then ask them to partition 87.
- Move on to three-digit numbers. Ask the children to partition 542 using place-value cards then check answers with a partner. Finally, ask the children to partition 423.
- Check answers. Ask the children to explain their method, i.e. starting with either ones or hundreds and working their way through the number identifying the place value of each part. Reinforce that in the number 542 the answer is 500 or five hundreds, 40 or four tens, and two or two ones.

✓ **TIP:** Include numbers with zero as a **place holder**, such as 403. Use a place-value grid to show that the zero represents no tens in the number.

! **WATCH OUT:** Children who say 'five' or 'four' without specifying the hundreds or tens might not be entirely clear what the numbers mean, in which case you may need to spend the rest of the session on simple partitioning.

ACTIVITY 2: Adding three-digit numbers using partitioning

- Start by giving them an example, e.g. 324 + 251. Partition each number using the place-value (arrow) cards and then put these numbers into a calculation. Point out that we can write the sum as: 300 + 20 + 4 + 200 + 50 + 1. Lay the place-value cards out above one another and ask the children to write the numbers down in their books: 300, 20, 4, 200, 50 and 1
- Ask: *How many ones?* (4 + 1 = 5) *How many tens?* (50 + 20 =70) *How many hundreds?* (300 + 200 = 500).
- The children can write these numbers underneath and combine them to make the answer: 500, 70, 5, or 575.
- To secure learning, guide the children through further examples, such as 346 + 142; 246 + 121; 523 + 423; 503 + 612; 300 + 234.

! **WATCH OUT:** Make sure the children write the numbers in the correct columns, to reinforce the positional value of each digit. If some children struggle to keep to the columns, provide paper with larger squares.

OBJECTIVE

- Add and subtract numbers with up to three digits, using the efficient written methods of columnar addition and subtraction

Rising Stars Progression Framework: 3.2.e.1

RESOURCES

- Activities 1 and 2: Exercise books/squared paper; place-value (arrow) cards

		H	T	O
First, partition each number	+	300 200	20 50	4 1
Then add the columns		500	70	5

Partitioning numbers to add

Strand: Addition and Subtraction

DAY 2

Sub-strand: Written calculation

TEACH

ACTIVITY: Columnar addition

- Ask: *What methods of addition do we already know?* Responses may include **partitioning**, using fingers, counting using a number track or using known facts such as number bonds.
- Tell the children: *We are going to add 523 and 436 together.* Remind them about adding numbers together using place-value (arrow) cards (Day 1): *First, we **partitioned** both numbers. Then we added the numbers together and put the partitioned answer back together to make one total.*
- Explain*: We are going to find the answer to addition calculations in a similar way but without partitioning the numbers.*
- Model this method for 523 + 436: *I write the digits in the correct **columns (hundreds, tens and ones)**. Then I add the ones together and write this number underneath, add the tens numbers together and write this number underneath, and then finally do the same with the hundreds numbers.* As you describe what you are doing, model writing the numbers on squared paper.
- Explain: *We write the calculation in columns so we call this method the **columnar method for addition***.

	H	T	O
	5	2	3
+	4	3	6
	9	5	9

WATCH OUT: Emphasise that the numbers represent the same quantity as when you wrote them as partitioned parts: this is just a short-hand way of writing it. Some children may think that the numbers represent ones, as they do not have the zero place holders in the numbers. If this is the case use the place-value cards to model to the children that the zeros are simply hidden behind the other numerals.

- The children can practise using the columnar method of addition using these numbers: 685 + 213; 107 + 392; 242 + 150; 301 + 298.

TIP: Be prepared to talk the children through another example or two on the board, to help secure understanding. As you do this you should use a range of addition vocabulary – such as **add**, **total**, **sum of** – to reinforce learning of the vocabulary of addition.

OBJECTIVE

- Add and subtract numbers with up to three digits, using the efficient written methods of columnar addition and subtraction

Rising Stars Progression Framework: 3.2.e.1

RESOURCES

- Exercise books/squared paper; place-value cards for support

Strand: Addition and Subtraction

DAY 3

Sub-strand: Written calculation

TEACH

ACTIVITY 1: Grid method of subtraction with two-digit numbers

- Tell the children: *We can use partitioning to **subtract** numbers. Can anyone think how we would start?* Encourage them to use what they know about **partitioning** numbers for **addition** to explain how to partition numbers for **subtraction**.

WATCH OUT: The children need to understand that the partitioning stage is exactly the same for subtraction as addition; the difference is that this time they will be subtracting one number from the other.

TIP: At this stage, ensure that you write the larger number first.

- Give the children the calculation 48 – 25. Model partitioning the numbers 48 and 25 using the place-value (arrow) cards and place them in a grid. (See diagram below.) 40, 8 and 20, 5
- Model the method: *We start by subtracting the ones (8 – 5 = 3). Write the three underneath the ones in the calculation. Now we will subtract the tens (40 – 20 = 20). Write the 20 underneath the ones in the calculation. Now combine the numbers to make the answer 23.*
- The children should then try these subtractions using place-value (arrow) cards and writing the numbers in their exercise books using the same method: 36 – 21; 96 – 42; 86 – 55; 33 – 10.

WATCH OUT: None of the examples involves exchanging. This is to ensure that the children can practise partitioning in the right order, writing the numbers in the correct column and doing the simple subtraction to achieve the correct answer.

ACTIVITY 2: Grid method of subtraction with three-digit numbers

- Using the place-value cards, model partitioning the numbers 423 and 112. Place the cards above one another in columns, as you did in Activity 1.
- Write out the grid as shown for the subtraction 423 – 112.
- Subtract the columns in turn. Write each number in the **correct column (hundreds, tens or ones)**. Combine the numbers to make the answer.
- The children can then try the subtraction questions using the place-value cards, writing the numbers in their exercise books using the same method: 641 – 230; 527 – 116; 307 – 201.

OBJECTIVE

- Add and subtract numbers with up to three digits, using the efficient written methods of columnar addition and subtraction

Rising Stars Progression Framework: 3.2.e.1

RESOURCES

- Activities 1 and 2: Whiteboard for adult; exercise books/squared paper; place-value cards

	T	O
	40	8
–	20	5
	20	3

Partitioning two-digit numbers to subtract

	H	T	O
	400	20	3
–	100	10	2
	300	10	1

Partitioning three-digit numbers to subtract

Strand: Addition and Subtraction

DAY 4

Sub-strand: Written calculation

TEACH

ACTIVITY: Columnar subtraction

- Tell the children: *Today we are going to learn a new **method** of doing subtraction with three-digit numbers. We are going to subtract 112 from 423.*
- Remind the children how they subtracted numbers using the place-value (arrow) cards on Day 3. *First, we partitioned the numbers and laid them out in columns before subtracting one number from another. We then put the partitioned answer back together to find the final answer.*
- Explain that they are now going to find the answer to subtraction calculations *without* partitioning the numbers.
- Model this to the children*: I write the digits in the **correct columns (hundreds, tens and ones)**. Then I subtract the ones numbers bottom from top and write this number underneath, the tens numbers bottom from top and write this number underneath, and finally the hundreds numbers bottom from top and write this underneath.* As you describe what you are doing, model writing the numbers on squared paper.

	H	T	O
	4	2	3
–	1	1	2
	3	1	1

- Explain: *We write the calculation in columns so we call this method the **columnar method for subtraction***.

✓ **TIP:** Emphasise that the numbers represent the same quantities as when you wrote them as partitioned parts: this is just a short-hand way of writing it.

! **WATCH OUT:** Some children may think that the numbers represent ones as they do not have the zero place holders in the numbers. In this case, use the place-value cards to model that the zeros are simply hidden behind the other numerals.

- The children can practise using the column method using these numbers: 534 – 231; 403 – 201; 567 – 345; 987 – 234.

✓ **TIP:** Be prepared to talk the children through another example or two on the board, to help secure understanding. As you do this be careful to use a range of subtraction vocabulary – such as **subtract**, **difference between** – to reinforce learning of the vocabulary of subtraction.

OBJECTIVE

- Add and subtract numbers with up to three digits, using the efficient written methods of columnar addition and subtraction

Rising Stars Progression Framework: 3.2.e.1

RESOURCES

- Whiteboard for adult; exercise books/squared paper; place-value cards for support

Strand: Addition and Subtraction

DAY 5

Sub-strand: Written calculation

ASSESS

ASSESSMENT ACTIVITY

- The purpose of the assessment is to check what each child can do independently, carefully noting down any difficulties and misconceptions. The adult will need to watch carefully what the children do, any strategies used and confidence levels.
- Hand out copies of Worksheet 8 and ask the children to complete it independently.
  - In question 1, the children must partition three-digit numbers.
  - In question 2, the children must add three-digit numbers using the written method of their choice.
  - In question 3, the children must subtract three-digit numbers using the written method of their choice.

  None of the questions involve carrying or borrowing. Observe closely to see which children are confident in using the columnar method of addition and subtraction.

✓ **TIP:** Before they start the assessment, ask the children for their top tips for answering the questions correctly, such as:

- writing the numbers in the correct column;
- remembering what each number means in hundreds, tens and ones.

- After they have finished the worksheet, go through the answers with the children.

! **WATCH OUT:** If the children have the wrong answer, this may be because the numbers were not written in neat, clear columns. Also be aware that, when partitioning 655, for example, it is 600 rather than 6, and 50 rather than 5.

EVIDENCING SUCCESS

Meeting expectations:

- The child can add and subtract 613 and 285 using a formal method of columnar addition or subtraction.

OBJECTIVE

- Add and subtract numbers with up to three digits, using the efficient written methods of columnar addition and subtraction

Rising Stars Progression Framework: 3.2.e.1

RESOURCES

- Worksheet 8

Worksheet 8

Name _____ **Date** _____

1. Partition these numbers.

a) 237

H	T	O

b) 478

H	T	O

c) 613

H	T	O

2. Add these numbers using the written method of your choice.

a) 613 + 285

b) 558 + 411

c) 854 + 431

3. Subtract these numbers using the written method of your choice.

a) 643 – 221

b) 836 – 632

c) 977 – 431

Strand: Multiplication and Division

DAY 1

Sub-strand: Mental calculation strategies

TEACH

ACTIVITY 1: Refresher of the two multiplication table and the inverse

- Place the cubes in the middle of the table for easy access.
- Explain the purpose of the session, then write 2 × 1 on the board. Ask what 2 × 1 means (one set of two).
- Ask a child to use the cubes to show the group 2 × 1.
- Lay the cubes on a large piece of paper and write 2 × 1 = 2 next to them.
- Write 2 × 2 on the board and ask a child to make 2 × 2 in cubes. Lay the cubes on the paper and write 2 × 2 = 4 next to them. They should lay them out in the format shown below.
- Continue with the children adding the cubes to the paper to display the **two multiplication table** up to 12 × 2.

✓ **TIP:** Ensure that all the children are involved in making bars of cubes.

- Ask the children how many twos there are in ten. Ask a child to prove it using the cubes. Here you want the child to take the bar of ten cubes and physically split it into five pairs of cubes.
- Explain to the children: *You can see there are five twos in ten by dividing the ten cubes into five equal pairs. Who can prove there are six twos in 12?*
- Make explicit that, because we know that 2 × 3 = 6, we also know that 6 ÷ 2 = 3. Ask: *Can anyone use the cubes to show me what else we know?* You want the children to demonstrate that 2 × 3 = 6, 6 ÷ 2 = 3 and also 6 ÷ 3 = 2.

ACTIVITY 2: Linking the two and four multiplication tables

- Write on the board: 2 × 1 = 2, 2 × 2 = 4, 4 × 1 = 4. Ask the children to tell you what this means (one set of two, two sets of two, one set of four).
- Ask the children to make 2 × 2 using the cubes and to also make 4 × 1. Draw their attention to the fact that they both use four cubes.
- Now write on the board: 2 × 3 = 6, 2 × 4 = 8, 4 × 2 = 8.
- Again, ask the children to use cubes to make 4 × 2 and 2 × 4.
- Ask: *What comes next in the pattern? How do you know and what pattern can you see?* Point out that all the numbers are even. Have they noticed that four is double two and eight is double four?
- Ask: *Can anyone use the cubes to prove that 2 × 6 = 12 and 4 × 3 = 12? Can anyone prove how many fours are in 12 using the cubes?*
- Continue using the cubes to go through the **four multiplication table** until you get to 40.
- Now ask the children to complete Worksheet 1. They will stick it in their exercise books to refer to later if needed.

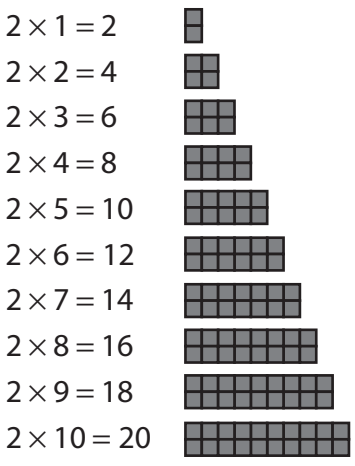
OBJECTIVES

- Recall and use multiplication and division facts for the three, four and eight multiplication tables
- Solve problems, including missing number problems, involving multiplication and division

Rising Stars Progression Framework: 3.2.b.3, 3.2.c.3

RESOURCES

- Activity 1: Cubes; board for teacher; large sheet of paper to display the cubes
- Activity 2: Cubes; board for teacher; Worksheet 1; exercise books; glue sticks



Two multiplication table using cubes

Worksheet 1

Name _____ **Date** _____

The 2 and 4 multiplication tables

Complete the 2 and 4 multiplication tables.

$2 \times 1 =$ ☐	$4 \times 1 =$ ☐
$2 \times 2 =$ ☐	$4 \times 2 =$ ☐
$2 \times 3 =$ ☐	$4 \times 3 =$ ☐
$2 \times 4 =$ ☐	$4 \times 4 =$ ☐
$2 \times 5 =$ ☐	$4 \times 5 =$ ☐
$2 \times 6 =$ ☐	$4 \times 6 =$ ☐
$2 \times 7 =$ ☐	$4 \times 7 =$ ☐
$2 \times 8 =$ ☐	$4 \times 8 =$ ☐
$2 \times 9 =$ ☐	$4 \times 9 =$ ☐
$2 \times 10 =$ ☐	$4 \times 10 =$ ☐
$2 \times 11 =$ ☐	$4 \times 11 =$ ☐
$2 \times 12 =$ ☐	$4 \times 12 =$ ☐

Strand: Multiplication and Division

DAY 2

Sub-strand: Mental calculation strategies

TEACH

ACTIVITY 1: Introducing the eight multiplication table

- Place two cubes, four cubes and eight cubes on the table in front of the children. Remind them that they know the **four multiplication table** is **double** the **two multiplication table**. Ask them: *How do you think the **eight multiplication table** will compare with the four and two multiplication tables?* Encourage them to explain their ideas.

✓ **TIP:** Use the cubes to demonstrate that four is double two, and eight is double four or four multiplied by two.

- Write the tables out as before but now add in the eight multiplication table. Ask the children to predict what comes next at each stage. Write on the board:

  $2 \times 1 = 2$

  $2 \times 2 = 4$ $\quad 4 \times 1 = 4$

  $2 \times 3 = 6$

  $2 \times 4 = 8$ $\quad 4 \times 2 = 8$ $\quad 8 \times 1 = 8$, etc.

- As in Day 1, ask the children to make the numbers with cubes.
- Continue making the pattern up to 2×12, 4×12 and 8×12.
- As the children work, ask if they can use their knowledge of the two and four multiplication tables to predict what will come next.
- Now ask the children to write out the two, four and eight multiplication tables on Worksheet 2.

ACTIVITY 2: Multiplication and division facts – patterns and the inverse relationship

- Ask the children to work in pairs. Each pair needs 24 cubes arranged in sticks of 8. Ask: *How can this be written down?*

✓ **TIP:** The children's answer here may be $8 \times 3 = 24$. Draw their attention to alternatives, such as $24 \div 8 = 3$. Can they come up with other suggestions?

- Ask the children to write the **multiplication and division facts** for 24 in their books with a diagram next to it.
- Ask: *How else can we split our 24 cubes?* Encourage the children to think about what they know about the two, four and eight multiplication tables. Ask them to write their solutions in their books, using both multiplication and division facts, and with quick and simple diagrams.
- Encourage the children to share their solutions with the group.
- If time allows, ask pairs of children to take 40 cubes and see how many different ways they can find to make 40 using the two, four and eight multiplication tables.

OBJECTIVES

- Recall and use multiplication and division facts for the three, four and eight multiplication tables
- Solve problems, including missing number problems, involving multiplication and division

Rising Stars Progression Framework: 3.2.b.3, 3.2.c.3

RESOURCES

- Activity 1: Multi-link cubes; Worksheet 2
- Activity 2: Exercise books; multi-link cubes

Worksheet 2

Name _____ **Date** _____

The 2, 4 and 8 multiplication tables

Complete the 2, 4 and 8 multiplication tables.

$2 \times 1 =$	$4 \times 1 =$	$8 \times 1 =$
$2 \times 2 =$	$4 \times 2 =$	$8 \times 2 =$
$2 \times 3 =$	$4 \times 3 =$	$8 \times 3 =$
$2 \times 4 =$	$4 \times 4 =$	$8 \times 4 =$
$2 \times 5 =$	$4 \times 5 =$	$8 \times 5 =$
$2 \times 6 =$	$4 \times 6 =$	$8 \times 6 =$
$2 \times 7 =$	$4 \times 7 =$	$8 \times 7 =$
$2 \times 8 =$	$4 \times 8 =$	$8 \times 8 =$
$2 \times 9 =$	$4 \times 9 =$	$8 \times 9 =$
$2 \times 10 =$	$4 \times 10 =$	$8 \times 10 =$
$2 \times 11 =$	$4 \times 11 =$	$8 \times 11 =$
$2 \times 12 =$	$4 \times 12 =$	$8 \times 12 =$

Strand: Multiplication and Division

DAY 3

Sub-strand: Mental calculation strategies

TEACH

ACTIVITY 1: Introducing the three multiplication table

- Start by asking the children what facts they already know about the **three multiplication table**. As the suggestions are made, e.g. $5 \times 3 = 15$, write them on the board, leaving spaces for the missing parts of the table.

✓ **TIP:** As you do this, make explicit links between the suggestions given and the tables the children already know. E.g. *Yes, $3 \times 2 = 6$, and we already know that $2 \times 3 = 6$ from the two multiplication table.*

- Now complete the missing parts of the table using sets of three cubes. Ask the children to make 3×7 with the cubes and put their hand up when they have the answer.
- Check that all the children have the correct answer and continue to write out the three multiplication table on the board.
- When the full three multiplication table is written on the board, ask the children to copy it into their exercise books for future reference.

✓ **TIP:** Remember to check that they have written it correctly in their books.

ACTIVITY 2: Multiplication and division facts using the three multiplication table

- Ask the children (or pairs of children) to take 30 cubes and prove that $3 \times 10 = 30$. Encourage them to share their outcomes and explanation.

✓ **TIP:** Point out that the children *divided* 30 to prove that $3 \times 10 = 30$.

- Ask them to take 21 cubes and see if they can prove that $21 \div 3 = 7$. Again, ask them to share their findings.
- Now ask: *If $3 \times 11 = 33$, what is $33 \div 11$?*

✓ **TIP:** Get the children to work with the cubes, but note which children are able to answer without the cubes, i.e. because they understand the **pattern**.

- Finish by asking them to take 24 cubes and see how many ways they can make 24 using their knowledge of the two, three, four and eight multiplication tables. You are looking for answers such as: 3×8, 4×6, $24 \div 2$, etc.

OBJECTIVES

- Recall and use multiplication and division facts for the three, four and eight multiplication tables
- Solve problems, including missing number problems, involving multiplication and division

Rising Stars Progression Framework: 3.2.b.3, 3.2.c.3

RESOURCES

- Activities 1 and 2: Multi-link cubes; exercise books; whiteboard

Strand: Multiplication and Division

DAY 4

Sub-strand: Mental calculation strategies

TEACH

ACTIVITY: Solving problems using the two, three, four and eight multiplication tables

- Give each child a copy of Worksheet 3 and place a tray of cubes on the table. Explain that they will be using their knowledge of the two, three, four and eight multiplication tables to solve the problems.
- Read out question 1: *Andrea has 24 eggs. Each egg box holds 6 eggs. How many egg boxes will she need to store them?* Ask the children to work with a partner to discuss the question and how to solve it. Suggest that they use the cubes to represent the eggs.

✓ **TIP:** Remind the children to read the question carefully and highlight or underline the parts that give key information (i.e. that there are *24 eggs* and that *each egg box holds 6 eggs*).

- Ask them to report back on their discussions, focusing on key information and ways to solve the problem. Use cubes to illustrate the solution the children suggest.
- Establish with the children that for the first question they are sharing 24 eggs between the egg boxes, so the calculation could be 24 ÷ 6. So, they can solve the problem by asking how many sixes are in 24.
- Take the children through question 2: *Tariq has 4 boxes of apples. Each box has 4 apples. How many apples does he have?* Ask them to identify the key information and decide whether to multiply or divide to find the answer. Remind them that they can use the cubes. Ask them: *What would the cubes represent?* (apples)
- Here the key information is: *each box has 4 apples and he has 4 boxes*. Help the children to see that the solution lies in multiplying 4 × 4.

✓ **TIP:** Use the cubes to support any child struggling to understand. E.g. lay the cubes out in sets of four to represent a box of apples.

- Ask the children to try the remaining questions. Ask them to answer the questions in their exercise books to give them more space for jotting and recording. Reinforce the importance of reading the questions carefully. Remind them to use the multi-link cubes for support, if needed. Observe the children as they work.
- Call the group together after the children have completed question 5 on the worksheet, to check how they are getting on. Compare answers and methods as a group. The children then complete the worksheet.

✓ **WATCH OUT:** If a child struggles to identify the calculation, ask them to show you how they understand the question using the cubes. This should enable you to determine whether they have identified the key facts and how they relate to each other.

OBJECTIVES

- Recall and use multiplication and division facts for the three, four and eight multiplication tables
- Solve problems, including missing number problems, involving multiplication and division

Rising Stars Progression Framework: 3.2.b.3, 3.2.c.3

RESOURCES

- Multi-link cubes; Worksheet 3; exercise books

Worksheet 3

Name _____ **Date** _____

Solving problems using the 2, 3, 4 and 8 multiplication tables

Solve these problems using your knowledge of the 2, 3, 4 and 8 multiplication tables.

1. Andrea has 24 eggs. Each egg box holds 6 eggs. How many egg boxes will she need to store them?

.....

2. Tariq has 4 boxes of apples. Each box has 4 apples. How many apples does he have?

.....

3. There are 12 pairs of shoes on the shelf. How many left-foot shoes are there?

.....

4. Steve has 20p in 2p coins. How many coins does he have?

.....

5. Amelie has 80 candles. Each box holds 10 candles. How many boxes of candles does she have?

.....

6. How many legs do 6 cows have altogether?

.....

7. There are 16 chairs. I want to make 4 rows of chairs. How many chairs will be in each row?

.....

8. Abram has 50p in 5p coins. How many coins does he have?

.....

9. I need 3 marshmallows for each of my 4 friends. How many do I need altogether?

.....

10. A spider has 8 legs. How many legs do 8 spiders have altogether?

.....

Strand: Multiplication and Division

DAY 5

Sub-strand: Mental calculation strategies

ASSESS

ASSESSMENT ACTIVITY

- The purpose of the assessment is to check what each child can do independently, carefully noting down any difficulties and misconceptions. The adult will need to watch carefully what the children do, any strategies used and confidence levels.
- Give each child a copy of Worksheet 4.
- Explain that all of the questions relate to work that they have been doing during the week.
- The first set of questions are simple questions on multiplication and division facts, such as 3×4 or $12 \div 3$.
- The second set of questions involving filling in missing numbers and are about the two, three and four multiplication tables.
- The final set of questions present problems similar to those covered on Day 4. Remind the children to read the questions carefully.

✓ **TIP:** Encourage the children to solve the problems independently without resources, if possible. However, resources should be easily accessible if a child wants them.

! **WATCH OUT:** Observe the children carefully as they carry out the assessment. The use of resources as a support should be noted for assessment purposes.

EVIDENCING SUCCESS

Meeting expectations:

- The child can recall and use the two, three and four multiplication tables and can recall and use the eight multiplication tables with access to occasional support.
- The child can use their knowledge of these tables to solve problems.

OBJECTIVES

- Recall and use multiplication and division facts for the three, four and eight multiplication tables
- Solve problems, including missing number problems, involving multiplication and division

Rising Stars Progression Framework: 3.2.b.3, 3.2.c.3

RESOURCES

- Worksheet 4; multi-link cubes should be available, if needed

Worksheet 4

Name _____ **Date** _____

Multiplication tables

1. Multiplication and division facts

a) $2 \times 4 =$ ☐ **b)** $5 \times 8 =$ ☐ **c)** $3 \times 6 =$ ☐ **d)** $4 \times 10 =$ ☐

e) $15 \div 3 =$ ☐ **f)** $20 \div 4 =$ ☐ **g)** $24 \div 8 =$ ☐ **h)** $48 \div 4 =$ ☐

2. Find the missing numbers.

a) 2, ☐, 6, ☐, 10, ☐, ☐, 16, 18, 20, ☐, ☐

b) 3, 6, ☐, 12, 15, ☐, ☐, 24, 27, 30, ☐, 36

c) 4, ☐, 12, ☐, ☐, 24, ☐, 32, ☐, ☐

3. Solve these problems.

a) Ms Riley has 8 cars. She needs new tyres for all the wheels on her cars. How many new tyres will she need to buy?

b) A box of chocolates has 3 layers, with 8 chocolates on each layer. How many chocolates are in the box?

c) There are 3 cakes in a packet. Miss Broom has 30 children in her class. How many packets should she buy so every child gets a cake?

Strand: Multiplication and Division

DAY 1

Sub-strand: Written calculation

TEACH

ACTIVITY 1: Multiplication as repeated addition

- Start by saying: *Let's think about 5 × 3. It is three lots of five. Or we could say 5 + 5 + 5. Another way of saying it is three groups of five.*

✓ **TIP:** You can use multi-link cubes to physically show three sets of five cubes. You may prefer the children to use the cubes instead of drawing on paper at this stage.

- Ask the children: *Can you draw 5 × 3 on your squared paper using dots?* Write the calculation (5 × 3) and draw the answer next to it.
- Ask the children to work through another example with less structuring, e.g. to find the answer to 5 × 6. Give them access to the multi-link cubes to lay out the calculation. Then draw the calculation and write the answer, as in the example above.

ACTIVITY 2: Introducing short multiplication through arrays

- Point out that **arrays** are very important for *understanding* multiplication and for seeing the **commutative law** – e.g. that 5 × 6 = 6 × 5.
- Make the cubes accessible and give each child a copy of Worksheet 5. Challenge them to find out if the law remains true with different numbers of cubes.
- Say: *Let's look at 5 × 6. This time we are going to make it as an **array**.*
- Ask: *How many rows of five do we need to make 5 × 6?* (six)
- Arrange six rows of five cubes in the form of an array.
- Say: *Here we can see six rows of five showing the answer to our calculation. Can you now find the answer to the calculation by counting?* (30)

! **WATCH OUT:** The children may choose to count each row as a block of five or may count each cube individually. If the children choose to count the cubes individually, encourage them to count in fives for the following examples. Record this as 5 × 6.

- Ask the children how many rows would be needed if there were six cubes in a row (five). Ask a pair of children to confirm the answer by making rows of six cubes to make a total of 30. Record this as 6 × 5.
- Now ask the children to find the answers to the following calculations in the same way – making the array with cubes, counting the cubes and verbally confirming the answer in each case: 9 × 5; 4 × 5; 5 × 5; 7 × 5.

OBJECTIVE

- Write and calculate mathematical statements for multiplication using the multiplication tables that they know, including for two-digit numbers multiplied by one-digit numbers, using mental and progressing to formal written methods

Rising Stars Progression Framework: 3.2.e.2

RESOURCES

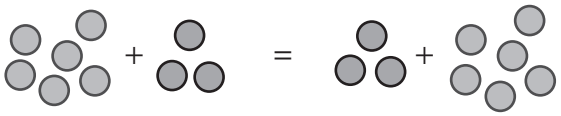
- Activity 1: Squared paper or board display with squares; graph paper with 1 cm squares for the children; multi-link cubes
- Activity 2: Worksheet 5; multi-link cubes

Worksheet 5

Name _____ **Date** _____

The commutative law

The commutative law states that it doesn't matter which order you multiply or add in, the answer is always the same.

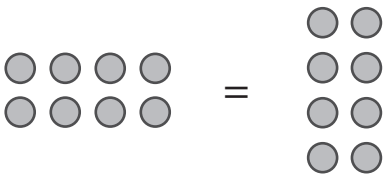


$6 + 3$ $3 + 6$

1. Take 12 cubes and make the sum 10 + 2 = 12.

If you swap them around, do you get the same answer?

Try with another number of cubes. Is the commutative law always true for addition?



4×2 2×4

2. Is the commutative law true for multiplication?

Take 3 sets of 4 cubes. Is it the same as 4 sets of 3 cubes?

Try with a multiplication calculation for another number of cubes. Is the commutative law always true for multiplication?

Strand: Multiplication and Division

DAY 2

Sub-strand: Written calculation

TEACH

ACTIVITY 1: Multiplication of one-digit numbers using partitioning and arrays

- Start by saying: *Now we are going to draw (or make) an **array** for 8 × 8.*

✓ **TIP:** The array could be made using cubes, as the children are familiar with them from Day 1, or drawn on paper.

- Explain **partitioning** to the children as splitting a number up to make it more manageable. We can split, or **partition**, ten into five and five, or into four and six, etc.
- Then ask: *How can we partition the **array** for 8 × 8 to carry out the multiplication? Which numbers can we split eight up into?* Give each child eight cubes and invite them to come up with suggestions. The children could suggest three and five or they may suggest four and four.
- Next, say to the children: *We have split the array into 3 × 8 and 5 × 8.* Do each of these calculations and add them together to get the answer.

$$\begin{array}{l} 3 \times 8 = 24 \\ +\ 5 \times 8 = 40 \\ \hline 8 \times 8 = 64 \end{array}$$

- Repeat the process, with the children making arrays for 8 × 5, 4 × 6, 8 × 6 and 9 × 5, finding different ways of partitioning the numbers in the calculations.

✓ **TIP:** The children need to see how to partition the numbers in the calculations to be able to find the answers. They do not need to write anything down.

ACTIVITY 2: Multiplication of one- and two-digit numbers using partitioning and arrays

- Tell the children they will try a calculation with a two-digit number: 5 × 14.
- Make the array for 5 × 14 using cubes: *We need to make 14 rows of five cubes.*
- Ask: *How can we partition the array to make it easier to calculate?*

! **WATCH OUT:** The children may make many suggestions, but we want to partition into tens and ones – ten and four. This will build their understanding as they move towards formal written methods.

- Show the children how to partition the calculation into ten and four by moving the cubes. *We have 5 × 4 = 20 and 5 × 10 = 50. Now we can add 20 + 50 to make 70, so we know that 5 × 14 = 70.*
- Now ask the children to try 5 × 12 and then 5 × 15 on their own. They can use cubes or drawings for support as needed.
- Go through their answers as a group. Ask: *How did you partition the numbers? Did you partition the 12 or the five? Why did you choose to partition that number? Which two numbers did you then add together to make the total?*

OBJECTIVE

- Write and calculate mathematical statements for multiplication using the multiplication tables that they know, including for two-digit numbers multiplied by one-digit numbers, using mental and progressing to formal written methods

Rising Stars Progression Framework: 3.2.e.2

RESOURCES

- Activities 1 and 2: Whiteboard; squared paper; pencils; multi-link cubes

Strand: Multiplication and Division

DAY 3

Sub-strand: Written calculation

TEACH

ACTIVITY: Moving to formal written methods of multiplication with arrays

- Say: *We are going to multiply 24 × 5.* Explain that it would take a lot of little dots to draw a full array of five rows of 24, so we will just do the outline, like this:

- Explain that we can partition 24 into tens and ones to make it easier to multiply it by five.
- Say to the children: *Let's start by drawing a grid to show the calculation* (see diagram above) *and multiply each part. Then we can add it together,* e.g.:

5 × 4 = 20
5 × 10 = 50
5 × 10 = 50
5 × 24 = 120

- Point out that this example took three steps to solve. Ask: *Can anyone think of how it could be reduced to two steps?* Here you are looking to see if they can suggest 5 × 20 instead of 5 × 10 twice.
- Now write 5 × 28 on the board. Ask the children: *How can we partition this to make it easier to multiply?*

WATCH OUT: The children may make many suggestions, but we want to partition into tens and ones – 20 and eight.

- Use the same method as before, but this time point out that instead of writing 5 × 10 twice, we can put 5 × 20 instead.

5 × 8 = 40
5 × 20 = 100
5 × 28 = 140

Draw the children's attention to the fact that this was solved in two steps.

- Ask the children to work in pairs to try these calculations: 4 × 32; 2 × 27; 5 × 58. They should aim to keep the number of steps as small as possible.
- When the children have finished, compare answers as a group.

OBJECTIVE

- Write and calculate mathematical statements for multiplication using the multiplication tables that they know, including for two-digit numbers multiplied by one-digit numbers, using mental and progressing to formal written methods

Rising Stars Progression Framework: 3.2.e.2

RESOURCES

- Squared paper; pencils

Strand: Multiplication and Division

DAY 4

Sub-strand: Written calculation

TEACH

ACTIVITY 1: Using different methods for different multiplication calculations

- Write a calculation on the board, e.g. $3 \times 5 = ?$
- Ask: *How could we find the answer to this calculation? Do we need to write the calculation down? Do we need to partition any numbers? Do we need to use cubes to help? Can we find the answer mentally?*
- Remind the children that they know the five multiplication table, so they can find the answer to this calculation mentally. They then write the calculation on their board with the answer.
- Write another calculation on the board, e.g. $9 \times 6 = ?$
- Ask: *How could we find the answer to this calculation? Do we need to write the calculation down? Do we need to partition any numbers? Do we need to use cubes to help? Can we find the answer mentally?* In this case encourage the children to partition using an array to find the answer.
- They then write the calculation on their board with the answer.
- Repeat this process with the following calculations (methods given in brackets): $13 \times 6 = ?$ (partitioning); $18 \times 3 = ?$ (partitioning); $45 \times 8 = ?$ and $8 \times 45 = ?$ (commutativity)

WATCH OUT: Each time, allow the children to discuss their reasoning. This will allow you to see if they fully understand how to choose the method. If they are unsure, remind them of the examples they have just looked at.

ACTIVITY 2: Choosing the most efficient method

- Give each child a copy of Worksheet 6. Explain that this time the calculations are in the form of problems.
- Work through question 1 as a group. Ask the children to identify the calculation (17×4) and write it down.
- The children then solve the calculation using their chosen method and then explain their working to the group.

TIP: If the children have found the correct answer but have done so using an inefficient method, model the most efficient method for them.

- Ask the children to complete the remaining problems on Worksheet 6 using the methods discussed before going through their answers as a group.

OBJECTIVE

- Write and calculate mathematical statements for multiplication using the multiplication tables that they know, including for two-digit numbers multiplied by one-digit numbers, using mental and progressing to formal written methods

Rising Stars Progression Framework: 3.2.e.2

RESOURCES

- Activities 1 and 2: Whiteboard and pen per child; large number of cubes; paper and pencils for jottings
- Activity 2: Each child needs a copy of Worksheet 6

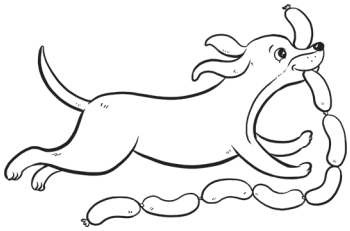
Worksheet 6

Name _____ **Date** _____

Multiplication problems

1. 4 princes each have 17 gold coins. How many coins do they have altogether?

2. 3 dogs stole 8 sausages each from the butcher. How many sausages did they have altogether?



3. 6 children have 4 cakes each. How many cakes do they have altogether?

4. May, June and July each had 14 hot, sunny days. How many hot, sunny days were there altogether?

Strand: Multiplication and Division

DAY 5

Sub-strand: Written calculation

ASSESS

ASSESSMENT ACTIVITY

- The purpose of the assessment is to check what each child can do independently, carefully noting down any difficulties and misconceptions. The adult will need to watch carefully what the children do, any strategies used and confidence levels.

✓ **TIP:** The children need to work independently. Remind them to make any notes and to draw grids or other jottings to work out the calculations.

- Give each child a copy of Worksheets 7 and 8.
- Explain that the questions are all examples of the work they have been doing during the preceding lessons. Each question has a grid of squared paper for the children to write on. This is to help them write their calculation in neat columns and to ensure there is designated space for making jottings.
- The questions start with a simple calculation to multiply one digit by one digit, such as 5×4. The children can answer this question mentally if they wish.
- They then move on to questions involving one digit multiplied by two digits, such as 5×14. Remind the children that they have been taught to multiply using partitioning. Advise them to use this method.

✓ **WATCH OUT:** If a child seems to be struggling to remember their tables, suggest that they write them out as a jotting on the page.

EVIDENCING SUCCESS

Meeting expectations:

- The child can calculate one-digit by two-digit numbers such as 3×27 using a formal written method.

OBJECTIVE

- Write and calculate mathematical statements for multiplication using the multiplication tables that they know, including for two-digit numbers multiplied by one-digit numbers, using mental and progressing to formal written methods

Rising Stars Progression Framework: 3.2.e.2

RESOURCES

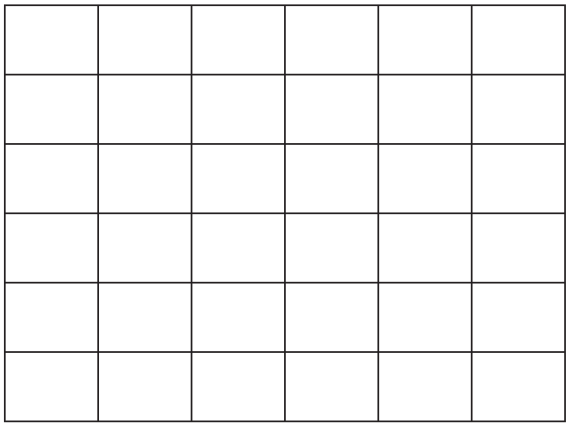
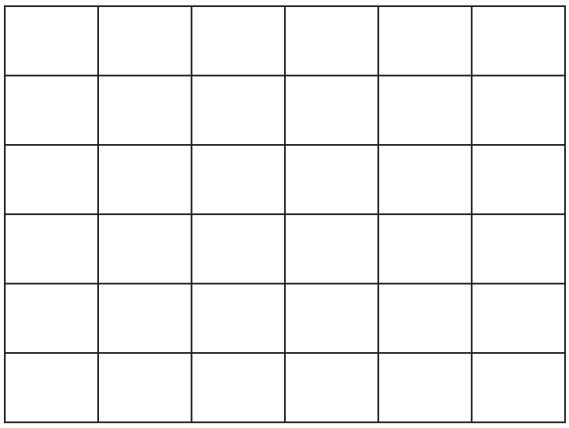
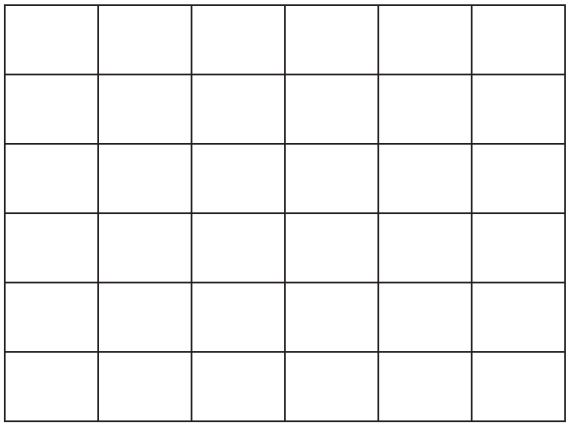
- Worksheet 7; Worksheet 6; pencils

Worksheet 7

Name _____ **Date** _____

Choosing a method for multiplication

Choose a method and answer these questions. Use jottings to help you and show how you worked out the answer.

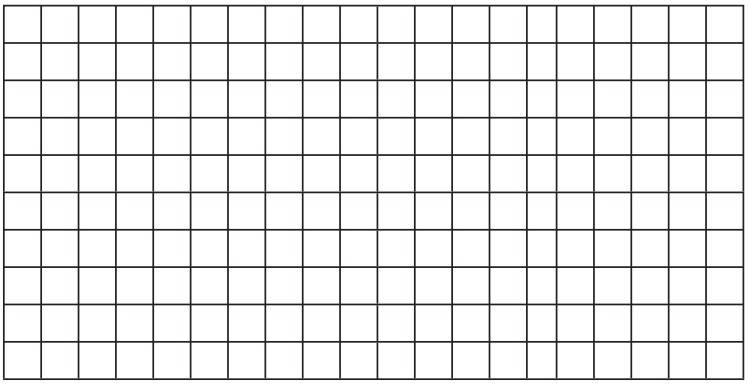
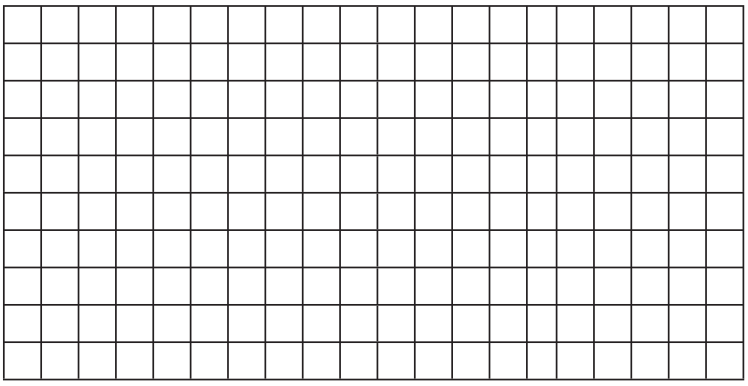
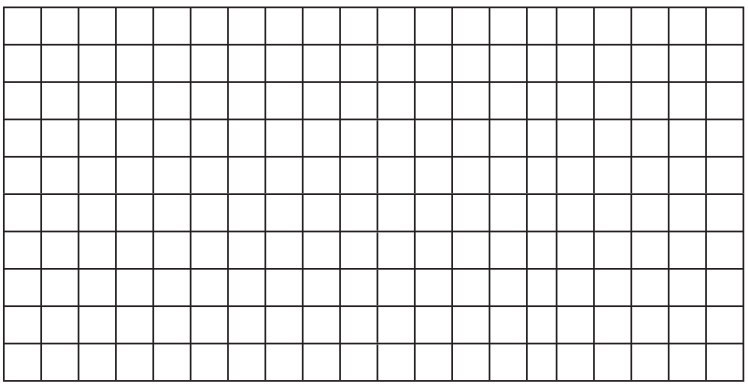
4×5	
8×12	
5×14	

Worksheet 8

Name _____ **Date** _____

Calculation and written methods

Choose a method and answer these questions. Use jottings to help you and show how you worked out the answer.

3×27	
2×42	
3×64	

Strand: Multiplication and Division

DAY 1

Sub-strand: Calculation and calculation methods

TEACH

ACTIVITY 1: Recapping sharing

- Spread out 16 counters and the four paper plates in front of the children. Tell them: *Let's **share** the counters between the four paper plates equally. How can we do that?* Ask: *What does sharing mean?*
- One child then shares the counters between the four plates **equally**. Watch how the children do this: they may choose to move one counter at a time or they may know how many to put onto each plate by calculating mentally.

✓ **TIP: Sharing** is an important aspect of understanding division and the link with multiplication, so give the children opportunities to physically share counters.

- Tell the children: *There were 16 counters and we **shared** them between four of us. We each got four counters.*
- Now ask: *How can we write what we have done? We divided 16 counters between four plates.* Write on the board: 16 ÷ 4 = 4.
- Ask the children how many lots of four they had (four lots of four) and write on the board: 4 × 4 = 16, to make the link between division and multiplication.
- Work in the same way to share 24 counters and 32 counters between four plates. Each time, show the children how to write it as a division sum and also as multiplication, e.g. 24 ÷ 4 = 6 and 6 × 4 = 24.

ACTIVITY 2: Moving towards chunking

- Say: *What if I had 60 counters to divide by four?* Write on the board: 60 ÷ 4.
- Start the activity using the four plates and a pile of counters. Begin carrying out the division but then say: *This is taking a long time. Let's try another way.*
- Now write 60 on the board and keep taking away four, writing down each time how many fours you have taken away (see right).
- After a few goes, say: *This is still taking a long time. What do we know about the four multiplication table that could help us?* If the children are unsure, take the lead by suggesting: *We know that 4 × 5 = 20.*
- Now model on the board taking four away from 60 by stages.
- Explain: 4 × 15 = 60, so 60 ÷ 4 = 15.
- Next work through another example with the children. Write 75 ÷ 5 = ? on the board. Ask the children to think how they can reduce the number of steps by using what they know. Ask: *How can you make a chunk of 50?* (5 × 10). Show the children how to divide 75 by five and use as large chunks as the children can suggest to get to the answer 15. To reinforce learning, let the children try another example in pairs, e.g. 85 ÷ 5.

OBJECTIVES

- Write and calculate mathematical statements for division using the multiplication tables that they know using mental and progressing to efficient written methods
- Solve problems, including missing number problems, involving division

Rising Stars Progression Framework: 3.2.c.3, 3.2.e.2

RESOURCES

- Activities 1 and 2: Counters; four paper plates; number track

60
− 4 (4 × 1)
56
− 4 (4 × 1)
etc.

60
− 20 (4 × 5)
40
− 20 (4 × 5)
20
− 20 (4 × 5)
0 (4 × 15)

Moving towards chunking

Strand: Multiplication and Division

DAY 2

Sub-strand: Calculation and calculation methods

TEACH

ACTIVITY: Practising the chunking method of division

- Start by explaining that the children will be using the **chunking method** of division, which is a way of dividing larger numbers. Remind the children that yesterday they were dividing numbers by subtracting in chunks.
- The questions in this activity use multiplication tables the children should be secure with, such as two, three, four and five. However, if the children are struggling with some of those tables, alter the questions to use tables they are secure with.

✓ **TIP:** The learning here is about the method, not the multiplication tables. The key focus is for the children to understand how to partition and take away 'groups of' numbers, and to develop the confidence to use their knowledge of multiplication tables.

- Say: *You know how to partition numbers into hundreds, tens and ones for adding and subtracting. Now we are going to learn to use partitioning to help us to* ***divide****.*
- Demonstrate using this example. Write 72 ÷ 4 on the board. Ask the children*: What did we learn yesterday? How are we going to work this out?* Talk them through the early stages of the division, as shown:

$$\begin{array}{r} 72 \\ -\ 4 \quad (4\times 1) \\ \hline 68 \\ -\ 4 \quad (4\times 1) \\ \hline 64 \\ -\ 4 \quad (4\times 1) \\ \hline \end{array}$$

- Once you get to this point, say: *This is taking a long time. Can anyone think of a larger number that divides by four?* Take children's answers then settle on: *We know 5 × 4 = 20, so 20 ÷ 4 = 5.*
- Now start the division of 72 again, but this time as shown on the right.
- Finish by saying: *There are 18 fours in 72. 72 ÷ 4 = 18.*
- Once the children are clear about how to use the method, encourage them to have a go at these examples in their exercise books: 65 ÷ 5; 48 ÷ 3; 84 ÷ 2.

! **WATCH OUT:** You may notice that a child is struggling because they cannot remember the relevant tables easily. Draw their attention to the tables grid for support. Remind them to use what they know, such as 10 × 5 = 50 or 10 × 3 = 30, and to use the tables grid for confirmation.

OBJECTIVES

- Write and calculate mathematical statements for division using the multiplication tables that they know using mental and progressing to efficient written methods
- Solve problems, including missing number problems, involving division

Rising Stars Progression Framework: 3.2.c.3, 3.2.e.2

RESOURCES

- Whiteboard for teacher; exercise books; tables grid

$$\begin{array}{r} 72 \\ -\ 20\ (4\times 5) \\ \hline 52 \\ -\ 20\ (4\times 5) \\ \hline 32 \\ -\ 20\ (4\times 5) \\ \hline 12 \\ -\ 12\ (4\times 3) \\ \hline 12\ (4\times 18) \end{array}$$

Strand: Multiplication and Division

DAY 3

Sub-strand: Calculation and calculation methods

TEACH

ACTIVITY 1: Dividing with remainders using the chunking method

- Start by saying: *We are going to use the same method of division today – can you remember what it is called?* Remind them that it is the **chunking method**, if necessary, and that it requires them to use what they know about tables.
- Explain: *Today when we use the **chunking method**, the division will include a **remainder**.* Check they know a remainder is a leftover number. Use an example to reinforce understanding, e.g. *If we share five cakes between two people, each person has two cakes and there will be one cake left over.*

✓ **TIP:** The questions in this lesson use the four and five multiplication tables. If the children struggle to remember the tables, write the tables out for them to refer to.

- Now talk the children through the calculation (75 ÷ 4). Ask pairs to make 75 from the Base 10 materials and then identify a chunk to be subtracted from 75 and hold it up. Here you may have a child holding 40 up in the form of four lots of ten sticks. See which pair has identified the largest chunk and ask them to explain it to the group – e.g., we know that 4 × 10 = 40.
- Write the subtraction on the board and continue until there is only a remainder left. The remainder is less than four – so less than a 'chunk'. Show the children how to show the remainder at the end. You could write the calculation shown below on the board.

✓ **TIP:** Explain the importance of keeping the numbers in neat columns.

- To consolidate learning, talk the children through a few more divisions with remainders on the board, e.g.: 76 ÷ 5; 23 ÷ 4; 61 ÷ 5.

ACTIVITY 2: Practising dividing with remainders

- Split the children into pairs. Identify one child as A and the other as B. Ask the group A children to sit together and discuss how they can explain to the Bs how to do this calculation: 91 ÷ 5. Ask the Bs to discuss how to explain 55 ÷ 4 to the As. Suggest that they make notes in their exercise books. The children then explain to their partners how they did the division using the chunking method. Help them to use the language, e.g. **partition, tables, groups** and **remainder**, to explain what they have done.
- Finally ask the children to solve these calculations in their exercise books:
  56 ÷ 8; 42 ÷ 4; 42 ÷ 7; 37 ÷ 4; 30 ÷ 6; 36 ÷ 5; 43 ÷ 2.

OBJECTIVES

- Write and calculate mathematical statements for division using the multiplication tables that they know using mental and progressing to efficient written methods
- Solve problems, including missing number problems, involving division

Rising Stars Progression Framework: 3.2.c.3, 3.2.e.2

RESOURCES

- Activity 1: Board for teacher; Base 10 materials
- Activity 2: Exercise book

$$
\begin{array}{l}
\ 75 \\
-\ 40\ (4 \times 10) \\
\hline
\ 35 \\
-\ 20\ (4 \times 5) \\
\hline
\ 15 \\
-\ 12\ (4 \times 3) \\
\hline
\ 3\ (4 \times 18\ \text{r}3) = 83\ \text{r}3
\end{array}
$$

Chunking with remainders

Strand: Multiplication and Division

DAY 4

Sub-strand: Calculation and calculation methods

TEACH

ACTIVITY 1: Identifying possible 'chunks' to divide numbers using knowledge of tables

- Place the sets of numbers face down on the table and invite a child to take a card from the top of each pile. Place these cards face up, so the children can see a two-digit number, such as 36.
- Ask the children to think which tables would help them to divide these numbers using the **chunking method**. E.g., for 36 they know that they could use the two, three, four and six multiplication tables.
- Invite another child to select two cards to make a two-digit number. Ask the group: *What tables could help to divide this number by chunking?*
- Continue until each child has selected two cards to make a two-digit number.

ACTIVITY 2: Problem solving by applying the skill of chunking

- Give each child a copy of Worksheet 9 and share the first problem with the group. *Alex and Shane have 59 marbles. They want to share them with their friend Anya. How many marbles will each friend get? Will there be any marbles left over?*
- Ask the children what the calculation will be to solve this problem. (59 ÷ 3) Remind them that they are looking for the largest chunk of three that they can subtract from 59. Ask them to find the answer and write it in their exercise books.
- When they have had sufficient time to do the first question, go through their answers as a group. Ask: *Who found the largest chunks?* Ask the children to explain to the group how they found the answer.
- Now ask the children to try the remaining problems on Worksheet 9. They should work directly into their exercise books to give them more space for jotting and calculating.

✓ **TIP:** Remind them to read the questions on the worksheet carefully.

- Finish by going through the answers to all the questions on the worksheet as a group.

OBJECTIVES

- Write and calculate mathematical statements for division using the multiplication tables that they know using mental and progressing to efficient written methods
- Solve problems, including missing number problems, involving division

Rising Stars Progression Framework: 3.2.c.3, 3.2.e.2

RESOURCES

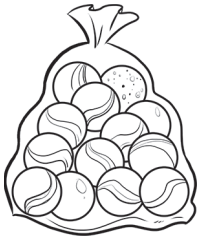
- Activity 1: Two sets of digit cards 0 to 9
- Activity 2: Each child needs a copy of Worksheet 9, their exercise book, a pencil

Worksheet 9

Name _____ **Date** _____

Problem solving using the chunking method

1. Alex and Shane have 59 marbles. They want to share them with their friend Anya. How many marbles will each friend get? Will there be any marbles left over?



.....

2. The caretaker is putting out chairs for the end-of-term assembly. He has 84 chairs and he wants to put them in rows of 10. How many rows will he make? Will there be any remainders?

.....

3. The zookeeper has 74 fish to share between 4 penguins. How many fish can each penguin have? Will there be any remainders?

.....

4. The robbers have stolen 93 gold coins. There are 5 robbers in the gang. How many coins will each robber get? Will there be any remainders?

.....

Strand: Multiplication and Division

DAY 5

Sub-strand: Calculation and calculation methods

ASSESS

ASSESSMENT ACTIVITY

- The purpose of the assessment is to check what each child can do independently, carefully noting down any difficulties and misconceptions. The adult will need to watch carefully what the children do, any strategies used and confidence levels.

✓ **TIP:** Make note of children who use the tables grids to help them, as this may indicate that they need more support and encouragement to learn the tables and be able to work independently.

- Hand out copies of Worksheet 10. Explain that the questions are based on the work they have been doing on the chunking method of multiplication and division during the week. Questions 2 to 4 involve remainders.
- The first two questions are straightforward division calculations. The children can use the chunking method that they have been learning about throughout the week.
- The second pair of questions require the children to apply their understanding of multiplication and division to contextualised problems. As the children complete these questions, remind them of the importance of reading the question carefully and picking out the key information.

! **WATCH OUT:** Keep an eye out in case a child is struggling to find chunks to subtract or is losing track of how many chunks they have subtracted. Remind them of the importance of noting this each time they subtract a chunk.

- When everyone has finished, go through the questions together.

EVIDENCING SUCCESS

Meeting expectations:

- The child can calculate 81 ÷ 3 using a formal written method such as chunking.
- The child can use their knowledge of these methods to solve problems.

OBJECTIVES

- Write and calculate mathematical statements for division using the multiplication tables that they know using mental and progressing to efficient written methods
- Solve problems, including missing number problems, involving division

Rising Stars Progression Framework: 3.2.c.3, 3.2.e.2

RESOURCES

- Worksheet 10; tables grid or similar

Worksheet 10

Name _____ **Date** _____

Division using the chunking method

Use the chunking method to answer these questions.

1. 81 ÷ 3

2. 57 ÷ 5

3. Sammy Squirrel had 62 nuts to share between his 6 baby squirrels. How many did each baby squirrel get? Were there any left over for Sammy?

4. The Rose Queen had 46 roses to share with her three flower girls. How many roses did each girl get? Were there any roses left over for the Rose Queen?

Strand: Fractions

DAY 1

Sub-strand: Recognise, order, compare and equivalence

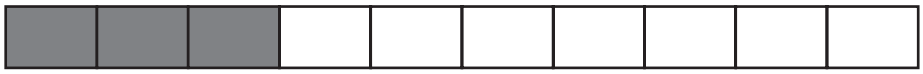
TEACH

ACTIVITY 1: Introducing tenths to prepare for decimals

▶ Draw a rectangle on the board, divided into ten equal parts. Ask the children: *How many squares are there?* (Ten) *What will we call each* ***fraction****?* (One-tenth) *How many one-tenths in a whole?* (Ten) *If I colour three-tenths red, how many will be white?* (Seven-tenths)

✓ **TIP:** Ensure that you phrase your questions so you use the term **tenths**. E.g., you will need the answer to be seven-tenths rather than seven.

▶ Draw this bar model on the board:



▶ Write the sum on the board: $\frac{3}{10} + \frac{7}{10} = \frac{10}{10} = 1$

✓ **TIP:** You are introducing the **addition** and **subtraction** of **tenths** straight away so that children become familiar with the concept from the start.

▶ Give each child a copy of Worksheet 1. Ask the children to see if they can answer the questions on the worksheet on their own.

! **WATCH OUT:** Make sure the children understand they should first shade a number of tenths then write the calculation in numbers, e.g. $\frac{2}{10} + \frac{8}{10} = 1$.

ACTIVITY 2: Dividing numbers and quantities by ten

▶ Give each pair of children a set of 20 objects. Explain that they are going to divide the set of objects into tenths. Ask them to discuss how they could do this.

✓ **TIP:** Here you are looking for the children to suggest counting the number of objects first and then dividing that number by ten. If a child suggests counting the objects one by one into ten groups, ask if they can use what they know about the ten multiplication table to divide the number of objects by ten.

▶ Ask the children to divide the objects and then share their method and answer with another pair. They should all find that a tenth is two objects.

▶ Now add an additional ten objects to each pair's collection and ask them to divide the collection into tenths. They should all find that a tenth is three objects. Ask the children how many objects would make a tenth if there were 40 objects.

▶ Explain that you have 50p and want to give an equal amount to ten children. Ask: *How much would each child get? What fraction of 50p would each child get?* Again, give the children time to reflect before working with a partner to solve the problem. Encourage them to use what they know to solve it.

OBJECTIVES

- Count up and down in tenths; recognise that tenths arise from dividing an object into ten equal parts and in dividing one-digit numbers or quantities by ten
- Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators
- Recognise and use fractions as numbers: unit fractions and non-unit fractions with small number denominators
- Recognise and show equivalent fractions with small denominators
- Compare and order unit fractions, and fractions with the same denominator

Rising Stars Progression Framework: 3.3.a.1, 3.3.a.2, 3.3.a.3, 3.3.b.1, 3.3.c.1, 3.3.c.3

RESOURCES

- Activity 1: Whiteboard for teacher; Worksheet 1
- Activity 2: Each pair of children needs: sets of 20 objects such as beads, cubes, pencils; sets of a further ten objects

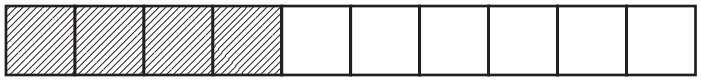
Worksheet 1

Name _____ **Date** _____

Adding and subtracting

1. Add and subtract tenths.
Use the diagrams to help you.

The first one has been done for you.

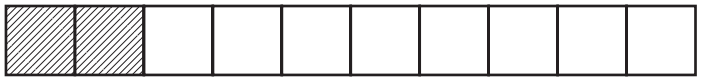
a)  $\frac{4}{10}$

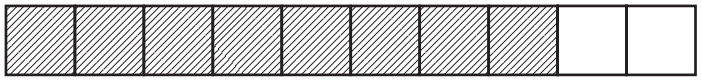
$\frac{4}{10} + \frac{6}{10} = 1$

$1 - \frac{4}{10} = \frac{6}{10}$

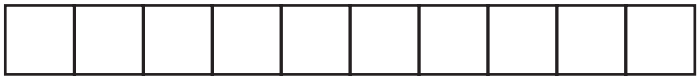
$\frac{6}{10} + \frac{4}{10} = 1$

$1 - \frac{6}{10} = \frac{4}{10}$

b)  $\frac{1}{5}$

c)  $\frac{4}{5}$

2. Can you make up your own addition and subtraction using tenths?



Strand: Fractions

DAY 2

Sub-strand: Recognise, order, compare and equivalence

TEACH

ACTIVITY 1: Paper plate fractions – making, finding and writing equivalent fractions

- Ahead of starting this activity, or for homework, give each child a paper plate to colour in.
- Take a plain paper plate and place it in front of you. Then take one of the decorated plates and **divide** it into **halves**. Say to the children: *I have cut this plate into **two equal parts**. What is each part called?* (Half) Write $\frac{1}{2}$ on each **half** and place one-half on the plain plate.

✓ **TIP:** Allow the children to divide and cut the plates where possible, unless time constraints and the need for accuracy mean it is best done by an adult.

- Now take another plain plate and a decorated plate. Say to the children: *I want to divide this plate into **quarters**. How many equal parts do I need?* (Four) When the children have identified four, cut the plate into four, write $\frac{1}{4}$ on each **quarter** and put one-quarter on the plain plate.
- Continue with this method until you have **halves**, **quarters**, **eighths**, **thirds** and **sixths** all laid on plates in front of the children.

✓ **TIP:** You could count the ridges around the edge of the plate to help you to make the fractions more accurate. You could use folding to help divide the plates accurately.

ACTIVITY 2: Equivalent fractions

- Now take a plain white plate and ask if anyone can cover half of it with the fraction plates. E.g., two-quarters or four-eighths.

! **WATCH OUT:** The children will not be able to make half with thirds – be prepared to spend a bit of time exploring why not.

- Now take the 'halves' off the plate and place them on the table, so the children can see them laid out. Say to them: *One-half equals two-quarters, equals three-sixths, equals four-eighths*. Write the fractions on the board: $\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8}$
- Explain that these are all ways of making half. Ask: *Can you see a pattern? What fraction would come next?* ($\frac{5}{10}$) *How do you know?*
- If there is time, start using the fraction pieces to make plates with $\frac{1}{4}$ and equivalents or $\frac{3}{4}$ and equivalents.

✓ **TIP:** Keep the plates of fractions for tomorrow's lesson.

OBJECTIVES

- Count up and down in tenths; recognise that tenths arise from dividing an object into ten equal parts and in dividing one-digit numbers or quantities by ten
- Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators
- Recognise and use fractions as numbers: unit fractions and non-unit fractions with small number denominators
- Recognise and show equivalent fractions with small denominators
- Compare and order unit fractions, and fractions with the same denominator

Rising Stars Progression Framework: 3.3.a.1, 3.3.a.2, 3.3.a.3, 3.3.b.1, 3.3.c.1, 3.3.c.3

RESOURCES

- Activities 1 and 2: Plain paper plates; decorated paper plates and scissors

Strand: Fractions

DAY 3

Sub-strand: Recognise, order, compare and equivalence

TEACH

ACTIVITY 1: Compare and order unit fractions

▶ Write $\frac{1}{2}$ and $\frac{1}{4}$ on the board and ask: *Which **fraction** is larger?* Ask the children to prove it by holding up a half and a quarter of the paper plate.

✓ **TIP:** Draw attention to the fact that the smaller the number on the bottom, the larger the fraction. Begin to model the term '**denominator**'.

▶ Next write $\frac{1}{6}$ and $\frac{1}{8}$ on the board. Ask: *Which fraction is larger?* See if the children can explain their answer. Then hold up a one-sixth and one-eighth of the paper plate fractions so the children can see for themselves. Explain that to make **eighths**, something is split into eight pieces, and to make **sixths** it is split into only six pieces, so the sixths are larger than the eighths.

▶ Now write $\frac{1}{3}$ and $\frac{1}{6}$ and ask: *Which is the larger of these two?* Use the paper plate pieces to demonstrate the difference if necessary.

▶ Then write $\frac{1}{4}$ and $\frac{1}{8}$ on the board. Ask: *Which fraction is larger?* Again, use the paper plate pieces to show the difference. Check: can the children explain why $\frac{1}{8}$ is smaller than $\frac{1}{4}$?

✓ **TIP:** Throughout this activity, use the paper plate pieces to show practically the differences in size.

▶ As you compare the fractions, write them on the board with the fractions you decide are larger on the right and the smaller ones on the left. You can then make a number track as a group, starting with the smallest fraction on the left and moving to the largest fraction on the right.

ACTIVITY 2: Comparing and ordering fractions with the same denominator

▶ Provide children with cut out fraction cards from Worksheet 2.

▶ Ask the children to look at their fractions cards and sort them based on the bottom number. Tell them the number on the bottom of the fraction is a **denominator** and write the word on the board as you say it.

! **WATCH OUT:** While the children work independently, check if they recognise which part of the fraction is the denominator.

▶ Once the children have sorted the fractions, they order them into a number track from smallest to largest (one number track for each denominator set). The number tracks can be stuck into their exercise books for future reference.

✓ **TIP:** The children do not need to be focused on whether $\frac{1}{6}$ or $\frac{1}{8}$ is larger but whether $\frac{2}{6}$ or $\frac{4}{6}$ is larger. Show the children using the plates cut up in earlier sessions if they need a visual representation.

OBJECTIVES

- Count up and down in tenths; recognise that tenths arise from dividing an object into ten equal parts and in dividing one-digit numbers or quantities by ten
- Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators
- Recognise and use fractions as numbers: unit fractions and non-unit fractions with small number denominators
- Recognise and show equivalent fractions with small denominators
- Compare and order unit fractions, and fractions with the same denominator

Rising Stars Progression Framework: 3.3.a.1, 3.3.a.2, 3.3.a.3, 3.3.b.1, 3.3.c.1, 3.3.c.3

RESOURCES

- Activity 1: Whiteboard for teacher; paper plates and fractions from Day 2
- Activity 2: Fractions cards (one set per child) cut out from Worksheet 2; exercise books; glue sticks

Worksheet 2

Photocopy and cut out to make one set of cards per child.

Fractions cards

$\frac{1}{6}$	$\frac{2}{6}$	$\frac{3}{6}$	$\frac{4}{6}$	$\frac{5}{6}$
$\frac{1}{10}$	$\frac{2}{10}$	$\frac{3}{10}$	$\frac{4}{10}$	$\frac{5}{10}$
$\frac{1}{5}$	$\frac{2}{5}$	$\frac{3}{5}$	$\frac{4}{5}$	$\frac{5}{5}$
$\frac{1}{3}$	$\frac{2}{3}$	$\frac{3}{3}$	$\frac{1}{2}$	$\frac{2}{2}$
$\frac{1}{4}$	$\frac{2}{4}$	$\frac{3}{4}$	$\frac{4}{4}$	$\frac{6}{6}$

Strand: Fractions

DAY 4

Sub-strand: Recognise, order, compare and equivalence

TEACH

ACTIVITY 1: Recognise and use fractions as numbers

✓ **TIP:** Remember: Recognising fractions as numbers means the child can look at a diagram and see it is showing one-third. One-third $\left(\frac{1}{3}\right)$ is a unit fraction because the numerator is one.

- Hold up the first fraction card from Worksheet 3, showing a circle with a third shaded. Ask: *What fraction is shaded in?* (One-third) *How do you know that a third has been shaded?*
- Ask a child to write $\frac{1}{3}$ in numbers on the board.
- Explain that the children will be working in pairs and that each pair will have a set of cards (cut out from Worksheet 3). Explain that they must lay all the cards out on the table and match each picture fraction with a word or number fraction. If there is time, the children could be asked to stick the pairs in their exercise books.

! **WATCH OUT:** If a pair is struggling, check that they are remembering to count how many sections the whole has been divided into. Remind them that the number on the bottom is the number of sections that make up the whole.

ACTIVITY 2: Recognise and use fractions as shapes and numbers

- Give each child a copy of Worksheet 4. Explain that they will be making some fraction cards for another child to match. Their first task is to draw a fraction in the first circle. Ask them for suggestions of a fraction they might draw.

✓ **TIP:** Ensure that children have the right number of sections. E.g. if the fraction is $\frac{5}{8}$ there must be eight sections with five shaded.

- After the children have drawn their first fraction, they write the fraction as a number in the box below it. Take feedback and check responses.
- The children then continue to complete all fraction cards on Worksheet 4.
- Now cut the cards out and jumble them up. Each child should swap their fraction cards with another child and try to match them.
- Finish the session by checking that all children have matched their partner's cards correctly.

OBJECTIVES

- Count up and down in tenths; recognise that tenths arise from dividing an object into ten equal parts and in dividing one-digit numbers or quantities by ten
- Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators
- Recognise and use fractions as numbers: unit fractions and non-unit fractions with small number denominators
- Recognise and show equivalent fractions with small denominators
- Compare and order unit fractions, and fractions with the same denominator

Rising Stars Progression Framework: 3.3.a.1, 3.3.a.2, 3.3.a.3, 3.3.b.1, 3.3.c.1, 3.3.c.3

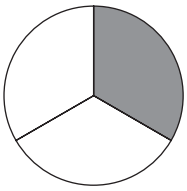
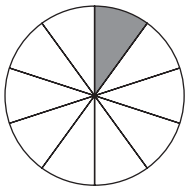
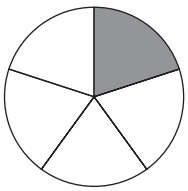
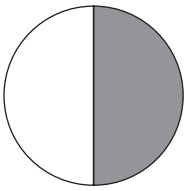
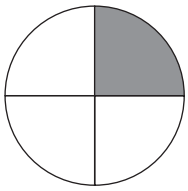
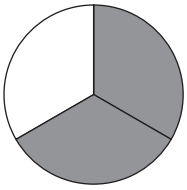
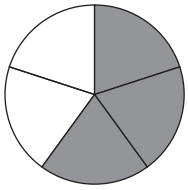
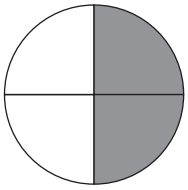
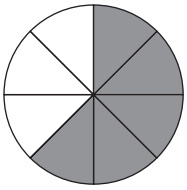
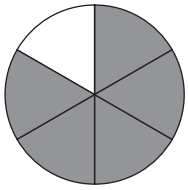
RESOURCES

- Activity 1: Each pair needs a set of fraction matching cards from Worksheet 3; exercise book
- Activity 2: Each child needs a copy of Worksheet 4 and a pair of scissors

Worksheet 3

Photocopy and cut up, one set for each pair.

Fractions cards

				
				
$\frac{1}{3}$	one-tenth	a fifth	a half	$\frac{1}{4}$
$\frac{2}{3}$	three-fifths	two-quarters	$\frac{5}{8}$	$\frac{5}{6}$

Worksheet 4

Name _____ **Date** _____

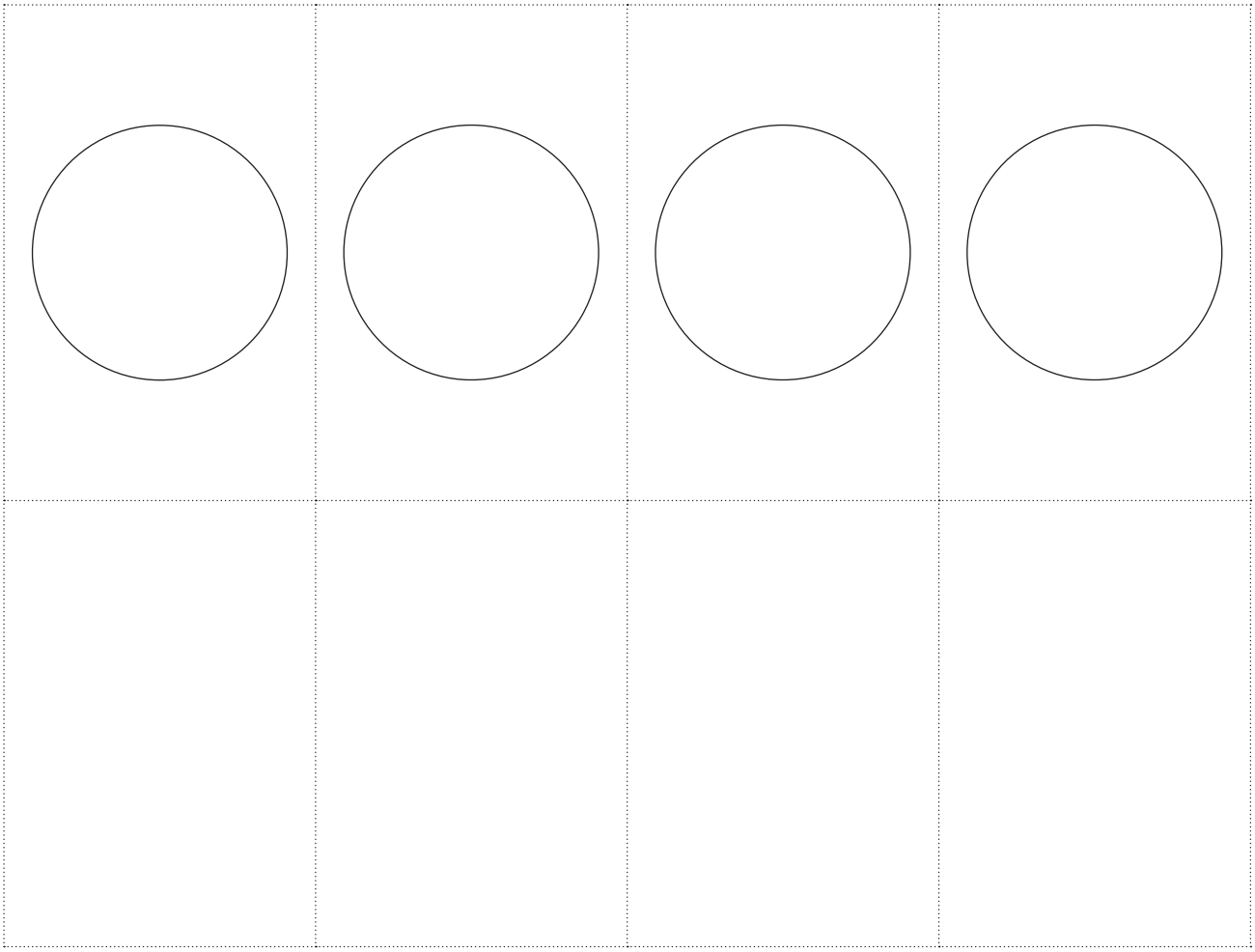
Make your own fractions cards

1. Divide each circle into parts (such as 5 parts, or fifths). Then colour in some of the parts (e.g. you could colour in 2 of 5 parts, or two-fifths).

2. Write the fraction using numbers or words in the box underneath, e.g. you could write two-fifths or $\frac{2}{5}$.

3. When you have finished, cut out the cards and jumble them up.

4. Can your partner match them?



Strand: Fractions

DAY 5

Sub-strand: Recognise, order, compare and equivalence

ASSESS

ASSESSMENT ACTIVITY

- The purpose of the assessment is to check what each child can do independently, carefully noting down any difficulties and misconceptions. The adult will need to watch carefully what the children do, any strategies used and confidence levels.
- Give each child a copy of Worksheets 5 and 6. Explain that the first questions on Worksheet 5, show shapes with different fractions shaded; the task is to label the shape with the correct fraction.
- The second question on Worksheet 5, asks the children to match equivalent fractions by drawing a line between them.

✓ **TIP:** Give the children an example of the type of question by asking them which is the same as a half: two-quarters or three-quarters? Ask one of the children who knows the correct answer to remind the group how they worked it out.

! **WATCH OUT:** The children may not be able to visualise these fractions. Remind them of the activity they did with the paper plates and suggest that they can use jottings or multi-link cubes to help them.

- The first question on Worksheet 6 asks the children to put fractions in order of size, and the second question involves addition and subtraction of tenths.

EVIDENCING SUCCESS

Meeting expectations:

- The child can understand tenths and can add and subtract tenths.
- The child can recognise fractions of an object or group of objects.
- The child can compare and order simple fractions and can find simple equivalents.
- The child can recognise fractions in pictorial, numerical and written form.

OBJECTIVES

- Count up and down in tenths; recognise that tenths arise from dividing an object into ten equal parts and in dividing one-digit numbers or quantities by ten
- Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators
- Recognise and use fractions as numbers: unit fractions and non-unit fractions with small number denominators
- Recognise and show equivalent fractions with small denominators
- Compare and order unit fractions, and fractions with the same denominator

Rising Stars Progression Framework: 3.3.a.1, 3.3.a.2, 3.3.a.3, 3.3.b.1, 3.3.c.1, 3.3.c.3

RESOURCES

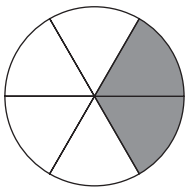
- Worksheet 5; Worksheet 6; a pencil; access to multi-link cubes

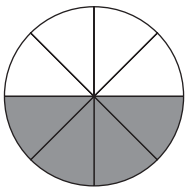
Worksheet 5

Name _____ **Date** _____

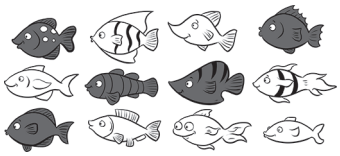
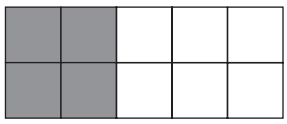
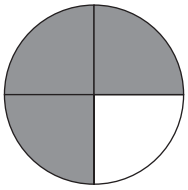
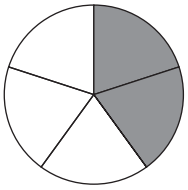
Finding fractions

1. Write the fraction of each shape that is **shaded**. The first example has been done for you.






$\frac{2}{6}$			

2. Draw a line between the equivalent fractions.

$\frac{1}{2}$	$\frac{2}{6}$
$\frac{1}{3}$	$\frac{6}{8}$
$\frac{1}{4}$	$\frac{5}{10}$
$\frac{3}{4}$	$\frac{2}{8}$

Worksheet 6

Name _____ **Date** _____

Comparing and counting in fractions

1. Put these fractions in order of size from the smallest to the largest.

$\frac{1}{10}$ $\frac{1}{5}$ $\frac{1}{12}$ $\frac{1}{4}$ $\frac{1}{2}$ $\frac{1}{8}$

2. Complete these additions and subtractions.

a) $\frac{2}{10} + \frac{3}{10} =$ ☐

b) $\frac{3}{10} + \frac{5}{10} =$ ☐

c) $\frac{1}{10} + \frac{1}{10} + \frac{1}{10} =$ ☐

d) $\frac{8}{10} - \frac{2}{10} =$ ☐

e) $\frac{5}{10} - \frac{1}{10} =$ ☐

Strand: Fractions

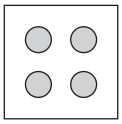
DAY 1

Sub-strand: Addition and subtraction

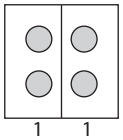
TEACH

ACTIVITY 1: Recapping halves and quarters

▶ Tell the children: *Let's start by reminding ourselves about what we know about **fractions**.* Talk the children through the illustrated example below.



Here are four counters. If we split this into two, we get two halves.



We write it like this

$\frac{1}{2}$ $\frac{1}{2}$

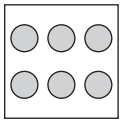
one on each side of the dividing line: $\frac{1}{2}$

▶ Ask: *How many **quarters** in each half?* $\left[\frac{(2)}{4}\right]$

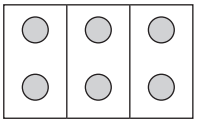
✓ **TIP:** Use counters to support the children's discussion. This will help them understand denominators other than two and four involving halves and quarters.

▶ Now say: *We know that:* $\frac{2}{4}+\frac{2}{4}=\frac{4}{4}=1$ *whole.*

▶ Introduce another example visually, this time using six counters, as follows:



Each counter is $\frac{1}{6}$



Each third has $\frac{2}{6}$

▶ Tell the children: *So we know:* $\frac{2}{6}+\frac{2}{6}+\frac{2}{6}=\frac{6}{6}=1$ *whole.*

▶ Repeat the process with the children having their own set of eight counters. Ask the children to lay them out in two rows of four as an oblong.

▶ Now ask the children to split the counters into quarters. Ask them: *How many eighths are in* $\frac{1}{4}$*? How do you know?* Elicit that there are two counters in each $\frac{1}{4}$ and therefore $\frac{2}{8}$ in each $\frac{1}{4}$.

▶ Model writing on the board: $\frac{2}{8}+\frac{2}{8}+\frac{2}{8}+\frac{2}{8}=1$ whole.

ACTIVITY 2: Written calculations for fractions

▶ Hand out copies of Worksheet 7 and go through the first question together. Ask: *Can anyone suggest what the first sum using fractions might be?* Check answers using counters then talk them through it: *Count how many spots there are and then count how many spots are in each section. You write it like this:* $\frac{2}{4}+\frac{2}{4}=1$.

▶ Encourage the children to try the rest of the questions working on their own.

! **WATCH OUT:** Observe the children while they are working. If they are struggling, ask them to explain what they are doing. Use their explanation to help you work out any areas of confusion. They may be forgetting to count all the spots first or they may become confused as they move from the spots to writing the fractions, in which case you may want to suggest they use counters to help them.

OBJECTIVES

- Add and subtract fractions with the same denominator within one whole
- Solve problems that involve the Year 3 National Curriculum for fractions

Rising Stars Progression Framework: 3.3.c.2, 3.3.d.1

RESOURCES

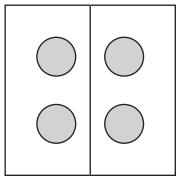
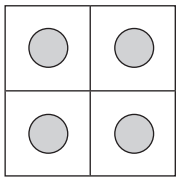
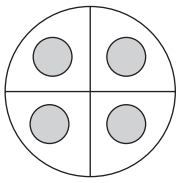
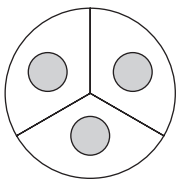
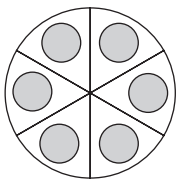
- Activity 1: Board for the teacher; each child needs a set of eight counters
- Activity 2: Worksheet 7; counters

Worksheet 7

Name _____ **Date** _____

Written calculations for fractions

For each shape, write the sum using fractions to show how the parts add up to the whole. The first question has been done for you.

	Shape	Written calculations
1.		$\frac{2}{4}+\frac{2}{4}=1$
2.		
3.		
4.		
5.		

Strand: Fractions

DAY 2

Sub-strand: Addition and subtraction

TEACH

ACTIVITY 1: Introducing eighths

- Fold a paper plate and then draw on it to divide it into eighths. Tell the children: *Here is a birthday cake. Eight children are coming to my party so I have **divided** it into eight pieces. What is each piece called?*
- Make sure that all the children are familiar with the term 'eighth' then say: *Let's all take a turn at writing $\frac{1}{8}$ on a piece of our cake.*
- Model the sum using **fractions**:
  $\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}=1$ whole.

✓ **TIP:** Explain to the children that the number at the bottom (the **denominator**) shows us *how many parts there are to the whole*. The number at the top (the **numerator**) tells us *how many parts we are looking at*.

  - Now cut your paper plate 'cake' into half. Ask: *How many eighths are there in half a cake?* Establish with the children that there are four-eighths. Explain that you can write it like this: $\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}=\frac{4}{8}$.
  - Point out to the children that we now know that $\frac{4}{8}=\frac{1}{2}$.
- Now cut one-half of the plate into half again, to make a quarter 'cake'. Establish that you now have two-eighths, or one-quarter, of the cake. Explain that you can write it like this: $\frac{1}{8}+\frac{1}{8}=\frac{2}{8}$.
- Point out to the children that you now know that $\frac{2}{8}=\frac{1}{4}$.
- Use questioning to draw out equivalence, as follows:
  - *How many eighths are in the whole cake?* ($\frac{8}{8}=1$ whole)
  - *How many eighths are in $\frac{1}{2}$?* ($\frac{1}{2}=\frac{4}{8}$)
  - *How many eighths are in $\frac{1}{4}$ of the cake?* ($\frac{1}{4}=\frac{2}{8}$)

ACTIVITY 2: Adding eighths

! **WATCH OUT:** If you have a child for whom accurate cutting is a problem, be prepared to do the cutting with/for them. It is more important that they write $\frac{1}{8}$ on each piece than cut each piece themselves. You could draw on the cutting lines.

- First, children divide their 'cake' into eighths and write $\frac{1}{8}$ on each segment ('piece of cake'). They then add the eighths to make a whole.
- Next they cut their 'cake' in two and add the eighths to make a half, again writing down the sum using fractions.
- The children then cut their half-cakes again, to make quarter-cakes, and write the sum for two-eighths making a quarter.
- End the lesson by testing the children's knowledge of equivalence, e.g. by asking: *How many eighths make a half? How many eighths make a quarter?*

OBJECTIVES

- Add and subtract fractions with the same denominator within one whole
- Solve problems that involve the Year 3 National Curriculum for fractions

Rising Stars Progression Framework: 3.3.c.2, 3.3.d.1

RESOURCES

- Activity 1: Paper plate; scissors; felt tip pen
- Activity 2: Paper plates; scissors; pens; exercise book

Strand: Fractions

DAY 3

Sub-strand: Addition and subtraction

TEACH

ACTIVITY 1: Investigating subtraction of fractions with the same denominator

- Hold up the A4 piece of paper to show the children. Say: *This is the whole.*
- Now fold the paper in half and then in half again, and in half again. Explain what you have done: *I have folded my paper to show eighths.*
- Cut the paper along the folded lines to make eight pieces and write $\frac{1}{8}$ onto each piece. Explain that: *Each piece is one of the eight pieces of the paper.*
- Ask the children do the same to their piece of paper.

✓ **TIP:** It might be worth giving each child a different coloured piece of paper, or at least different to the people sitting next to them, to prevent mix ups.

- Display a subtraction calculation and ask the children to read it: $\frac{5}{8} - \frac{2}{8} = ?$
- Now say: *You need to start off with $\frac{5}{8}$. You could show this with five pieces of your paper. Now you need to subtract $\frac{2}{8}$. You could just remove two of the pieces of paper. How many do you have left?* ($\frac{3}{8}$) *So:* $\frac{5}{8} - \frac{2}{8} = \frac{3}{8}$.
- Write another calculation: $\frac{7}{8} - \frac{2}{8}$, and ask a child to read the question to the group. Place seven of the pieces on the table in front of you and say: *I have $\frac{7}{8}$ here. How many eighths do I need to subtract?* Remove $\frac{2}{8}$ and ask a child to tell you have many eighths are left. Then ask a child to write the answer on the board to complete the calculation.
- Now give the children other simple fraction subtractions to solve using their pieces of paper, such as: $\frac{4}{8} - \frac{2}{8}$, $\frac{8}{8} - \frac{5}{8}$, $\frac{6}{8} - \frac{1}{8}$, $\frac{7}{8} - \frac{4}{8}$.

! **WATCH OUT:** If the children struggle to read the calculations, read the calculations to them so they can then find the answer.

ACTIVITY 2: Problem solving involving subtraction of fractions

- Read out the problems and ask the children to listen carefully. They should try to solve them using their paper pieces to help them.
  - *There are eight pieces of cake and three of them get eaten. How many are left?*
  - *There are eight stickers on the sheet. Sally gets one and so does Joe. How many stickers are left on the sheet?*
  - *There are eight puppies in the pet shop. Jane buys two and Ahmed buys three. How many puppies are left?*

✓ **TIP:** Remind the children that each part of the whole is a fraction. You have eight parts and therefore each part is $\frac{1}{8}$.

- Repeat the problems asking the children to give their answers as a fraction.

OBJECTIVES

- Add and subtract fractions with the same denominator within one whole
- Solve problems that involve the Year 3 National Curriculum for fractions

Rising Stars Progression Framework: 3.3.c.2, 3.3.d.1

RESOURCES

- Activity 1: Each child needs: a sheet of A4 paper (ideally different colours), scissors
- Activity 2: Each child needs their eight pieces of paper from Day 2 Activity 2

Strand: Fractions

DAY 4

Sub-strand: Addition and subtraction

TEACH

ACTIVITY 1: Consolidating subtraction

- Hand out copies of Worksheet 8, which shows four cats (two black and two white) and six dogs (two black, two white, and two Dalmatians).
- Use Worksheet 8 to review the children's understanding of fraction equivalences. Read the questions together. Challenge the children to complete the questions in pairs.

✓ **TIP:** If the children seem unsure, remind them to start by counting the total number of the cats/dogs and then to count the number asked for by the question.

- The last two questions focus on subtraction of fractions. In each case the children need to use their information from the previous questions to find the answer.

! **WATCH OUT:** The children may easily see how many dogs or cats will be left, but they will need to recognise this and write it as a fraction. E.g. $\frac{2}{6}$ of the dogs are spotty. One spotty dog is therefore $\frac{1}{6}$ of the total group. There will be $\frac{1}{6}$ of the dogs missing so only $\frac{5}{6}$ left.

- Finish the session by inviting the children to make up their own subtraction problem. First they must solve their own problem and then swap it with another child to try. Finally, the children can feedback on the problem they have been given, talking about how they solved it and what answer they got.

ACTIVITY 2: Fraction bingo

- Cut out the six bingo cards on Worksheet 9 and give one card to each child. The children will need a pen or pencil to cross off the fractions as they hear them.
- The statements/questions to be read out for the bingo game are given on Worksheet 10.

! **WATCH OUT:** Remember to read the questions slowly and repeat them to help the children who struggle with memory.

- The 'winner' is the first child to cross off all the fractions on their card and shout 'Bingo!' Check the winner's card carefully against your list of answers, to ensure that no mistakes have crept in.

OBJECTIVES

- Add and subtract fractions with the same denominator within one whole
- Solve problems that involve the Year 3 National Curriculum for fractions

Rising Stars Progression Framework: 3.3.c.2, 3.3.d.1

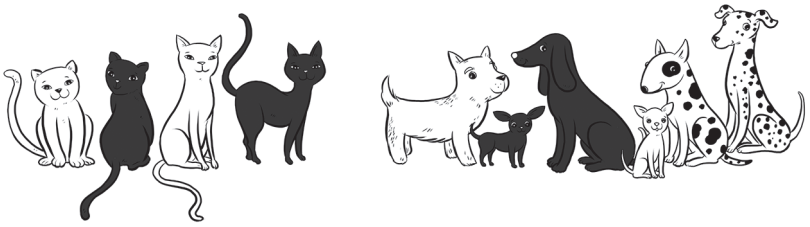
RESOURCES

- Activity 1: Worksheet 8
- Activity 2: Worksheet 9 cut into cards (bingo boards); pencils; Worksheet 10

Worksheet 8

Name _____ **Date** _____

Cats and dogs



1. We have 4 cats; 2 are black and 2 are white. What fraction of the cats is white? What fraction is black?

.....

2. Now look at the dogs.

a) What fraction is black?

.....

b) What fraction is spotty?

.....

c) What fraction is spotty and plain white?

.....

3. If 1 spotty dog runs away, how many dogs will be left? Write this problem as a fraction and answer it.

4. If 1 of the white cats runs away, how many cats will be left? Write this problem as a fraction and answer it.

Worksheet 9

Photocopy and cut up the cards, one per child.

Bingo cards

$\frac{1}{2}$	$\frac{1}{3}$	$\frac{2}{4}$
$\frac{3}{8}$	$\frac{2}{8}$	$\frac{2}{3}$

$\frac{2}{3}$	$\frac{3}{8}$	$\frac{2}{4}$
$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{6}$

$\frac{4}{6}$	$\frac{3}{8}$	$\frac{2}{4}$
$\frac{1}{2}$	$\frac{1}{6}$	$\frac{2}{8}$

$\frac{2}{8}$	$\frac{1}{6}$	$\frac{3}{8}$
$\frac{3}{4}$	$\frac{2}{4}$	$\frac{1}{2}$

$\frac{1}{6}$	$\frac{1}{2}$	$\frac{2}{3}$
$\frac{3}{8}$	$\frac{2}{4}$	$\frac{4}{6}$

$\frac{2}{4}$	$\frac{2}{8}$	$\frac{1}{2}$
$\frac{2}{3}$	$\frac{3}{8}$	$\frac{1}{6}$

Worksheet 10

Read the questions to the children.

Bingo questions

1. Who has $\frac{1}{2}$?

2. Who has a fraction that is equivalent to $\frac{1}{2}$?

3. Who has a fraction that is equivalent to $\frac{1}{4}$?

4. Who has a fraction equal to $\frac{1}{3} + \frac{1}{3}$?

5. There are 8 apples left on the apple tree. 5 are rotten.
What fraction can be eaten?

6. 4 people share a cake. 2 people eat their pieces.
What fraction is left?

7. There are 6 bottles of juice. 5 children drink a bottle each.
What fraction is left?

8. 3 people go to a cafe. 2 order tea.
What fraction of the group doesn't order tea?

9. 4 people go to a cafe. 3 order cake.
What fraction order cake?

10. 1 cake is cut into 6 pieces. 2 pieces are eaten.
What fraction is left?

Strand: Fractions

DAY 5

Sub-strand: Addition and subtraction

ASSESS

ASSESSMENT ACTIVITY

- The purpose of the assessment is to check what each child can do independently, carefully noting down any difficulties and misconceptions. The adult will need to watch carefully what the children do, any strategies used and confidence levels.
- Give each child a copy of Worksheet 11.
- Explain that the first couple of questions involve identifying a fraction, such as finding half. Remind them that they did this at the beginning of the week.
- The next questions involve adding and subtracting fractions, as they have been shown during the week.
- The final questions involve solving fraction problems.

✓ **TIP:** Remind the children to read the questions carefully. When the question involves solving a problem, remind them to pay attention to the information part of the question and the part that says what to do.

EVIDENCING SUCCESS

Meeting expectations

- The child can calculate $\frac{2}{9}+\frac{8}{9}=\frac{10}{9}$, $\frac{12}{16}+\frac{2}{16}=\frac{14}{16}$ and $\frac{10}{9}-\frac{8}{9}=\frac{2}{9}$.
- The child can solve problems such as: '*I have 12 counters. One-quarter of them are blue, one-third are yellow and the rest are green. How many are green?*'

OBJECTIVES

- Add and subtract fractions with the same denominator within one whole
- Solve problems that involve the Year 3 National Curriculum for fractions

Rising Stars Progression Framework: 3.3.c.2, 3.3.d.1

RESOURCES

- Worksheet 11

Worksheet 11

Name _____ **Date** _____

Solving simple problems with fractions

1. a) Draw a ring around a third of the leaves.

b) How many leaves make a third?

.....

2. a) $\frac{4}{10} + \frac{2}{10} =$ .....

b) $\frac{6}{7} - \frac{2}{7} =$ .....

c) $\frac{1}{8} + \frac{2}{8} =$ .....

d) $\frac{12}{16} - \frac{8}{16} =$ .....

e) $\frac{4}{5} - \frac{2}{5} =$ .....

f) $\frac{12}{16} + \frac{2}{16} =$ .....

3. There is a group of 16 children.

a) Half of the children have blond hair. How many have blond hair?

.....

b) 2 children wear glasses. What fraction of the children wear glasses?

.....

c) 4 of the children are boys. What fraction of the group is girls?

.....

Strand: Measurement

DAY 1

Sub-strand: Time

TEACH

ACTIVITY 1: Time refresher

- Ask: *What do we mean by **clock face**? How many **minutes** are there in an **hour**? What do the five, ten, 15 and 20 on the clock mean? What do the one, two, three and four on the clock mean?*

WATCH OUT: Areas for confusion include minutes and muddling the hour and minute hands, so take your time. Ask the children to explain to the group how they worked out their answer.

- Using the clock face, set the clock to various times and ask the children to say what the time is, e.g. two o'clock, half past four, quarter past five, quarter to four. Start with easy times such as o'clock, half past, quarter *to* and quarter *past*. Then go on to times using five minutes, such as 4:20, 3:35, etc. Each time get a child to explain how they know what the time is.

WATCH OUT: The children could think that they are reading 3:45 as 'nine past three'. Make sure they are secure in the understanding that the gap between the numbers represents five minutes and so we count on in fives as we go round.

- If the children are secure in this, find the time to the nearest minute using times such as 8:31. In this example show the children that it is 8:30 but then one more segment past the 6 and therefore you add on an extra minute to make it 8:31. Repeat with times such as 9:47, 3:22, 5:23.
- Introduce Worksheet 1, on practising telling the time. Check that the children know how to complete it. It can be finished for homework.

ACTIVITY 2: Time durations

- Tell the children: *We have been learning about time. Let's see what we know. How many **hours** are there in a **day**? How many days in a **week**?*
- Now ask: *How many **minutes** in an hour?* Tell the children to look at the clock face and check. Lead them in counting as a class in fives all the way up to 60. You could use a clock face, such as the one shown below, to support the count.
- Now ask: *How many **seconds** are in a minute?* Tell the children that you're going to count the seconds in a minute using the stopwatch.
- Now say: *Let's do it again but this time clap for each second. How many times will we clap in a minute?* Use the stopwatch while the children clap.
- Challenge the children to see if they can stand on one leg for a minute. Discuss why a minute seems a lot longer when you are standing on one leg!

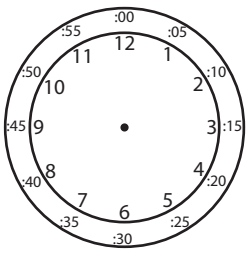
OBJECTIVES

- Tell and write the time from an analogue clock and 12-hour and 24-hour clocks
- Estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight
- Know the number of seconds in a minute

Rising Stars Progression Framework: 3.1.1, 3.1.2, 3.2.1

RESOURCES

- Activity 1: A4-sized analogue clock face, geared, or cardboard with movable hands that shows hours and five minutes; Worksheet 1
- Activity 2: Large analogue clock face; stopwatch



Clock face

Worksheet 1

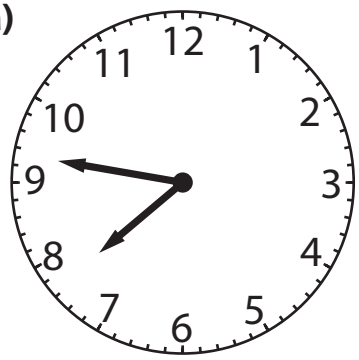
Name _____ **Date** _____

Telling the time

Write the time below each clock in words. Use the words in the box to help you.

half	quarter past	quarter to	minute	hour	one	two	three	
four	five	six	seven	eight	nine	ten	eleven	twelve

a)



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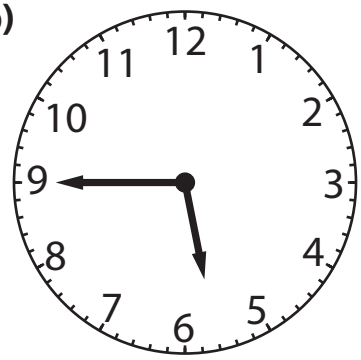

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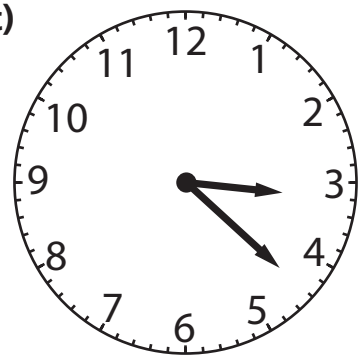

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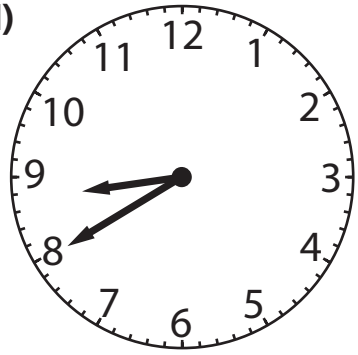

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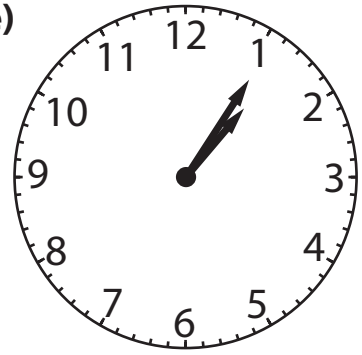

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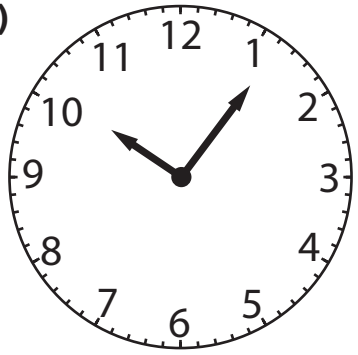


Strand: Measurement

DAY 2

Sub-strand: Time

TEACH

ACTIVITY 1: Introducing digital clocks using the 12-hour clock only

- Hold the large clock face up showing three o'clock analogue. Ask: *What time does it say? Does anyone know what this type of clock is called? It is an* ***analogue*** *clock – this means the clock has hands that move around the face rather than numbers that change.*
- Now show the children the digital clock face. Tell them: *It is a* ***digital*** *clock – this means that the numbers (digits) change to show the time.* Show the time at midnight and point out that there are four zeros. Ask: *What are they for?* Establish that two of them are for the hour and two are for the minutes.
- Now set the time to 03:00 and ask: *What time does this clock say?*
- Tell the children that the digital clock now says the same time as the analogue clock. They both say three o'clock. The three shows the hour is three and the two zeros at the end of the number show that there are no minutes past the hour.
- Continue to introduce more times. Show the analogue clock face first, then show the same time in digital form.
- Here are some suggestions for times you could show in analogue and digital: 4:05; 2:25; 6:15; 12:45; 10:40; 11:12; 06:47; 03:38.

WATCH OUT: The children may struggle to make the link between the number 45 and the term 'quarter to'. If so, remind them to count around the clock face in fives to find the digital time.

ACTIVITY 2: What's the time in digital?

- Hand out Worksheet 2 and ask the children to work on their own to fill in the digital times on the sheet.
- Model the first question if needed: *I can see that the minute hand is pointing to the 17 so it is 17 minutes past the hour. The hour hand is past the six so it is 17 minutes past six*.

TIP: If a child is making errors, try to understand their thinking. Don't start by explaining how to get it right; start by asking what they did and why.

- Explain to the children that all of the times are times of the **morning** and are therefore **a.m.** times.

OBJECTIVES

- Tell and write the time from an analogue clock and 12-hour and 24-hour clocks
- Estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight
- Know the number of seconds in a minute

Rising Stars Progression Framework: 3.1.1, 3.1.2, 3.2.1

RESOURCES

- Activity 1: Large analogue clock face; digital clock face
- Activity 2: Worksheet 2

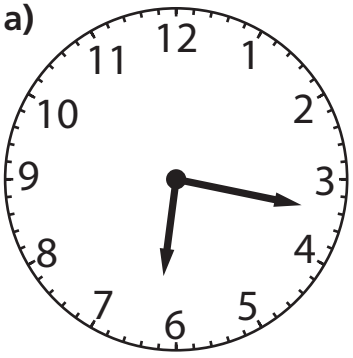
Worksheet 2

Name _____ **Date** _____

Digital time

Write the time in digital format under each clock face.

a)



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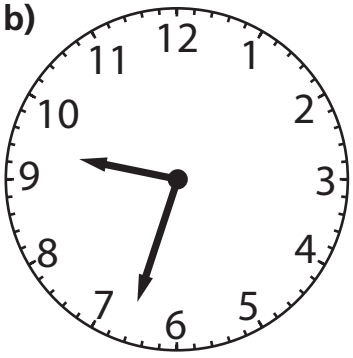

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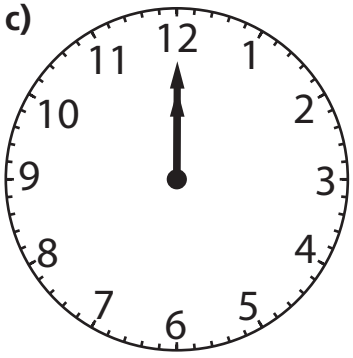

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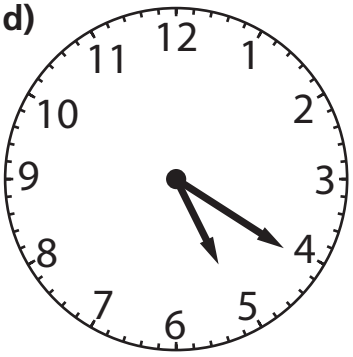

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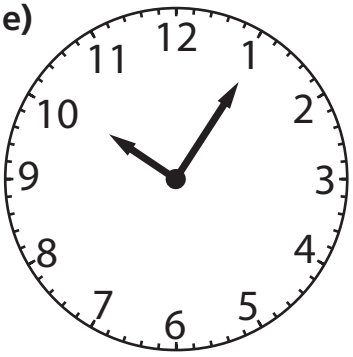

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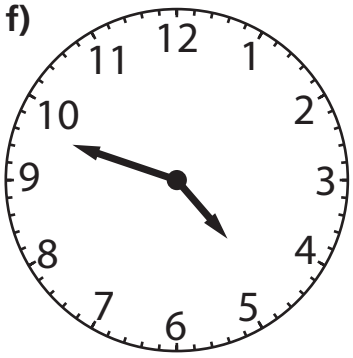


Strand: Measurement

DAY 3

Sub-strand: Time

TEACH

ACTIVITY 1: Is the time a.m. or p.m.?

- Set the **analogue** clock to three o'clock. Ask: *What time is this? What does it look like on the **digital** clock?* Establish with the children that they know that both clocks say three o'clock – but do they know whether it is **morning** or **afternoon**?
- Ask: *How we can write three o'clock to show whether it is morning or afternoon on an analogue clock?* Explain that we use **a.m.** to describe times from midnight through to midday, and that we use **p.m.** to describe the time from midday to midnight.

TIP: You could choose to develop the explanation by adding that **a.m.** comes from the Latin *ante meridium*, meaning 'before noon', and **p.m.** is from the Latin *post meridium,* meaning 'after noon.'

- Now move on to writing the time using a.m. and p.m. Start by giving an example. *It is four in the afternoon. It is written 4:00 p.m. It is four in the morning. It is written 4:00 a.m.* Go through some more examples verbally as a group.
- Once the children are secure in their understanding, get them to write down whether these times are a.m. or p.m. on their own or in pairs: *My hockey match starts at ten in the morning; Dad comes home from work at five in the afternoon; The train will leave the station at seven in the evening; The flight departed from Greece at one in the morning.* Conclude the activity by checking what everyone has written and asking how the children decided whether the time was a.m. or p.m.

ACTIVITY 2: Introducing the 24-hour clock

- Start by asking the children how many hours there are in a day. Then show them the **24-hour** analogue clock face. Explain that every hour has its own name on a 24-hour analogue clock, so we don't need to use a.m. and p.m. to tell whether it is morning, afternoon or evening.
- Read the times out starting at one a.m. until you get to midnight.

TIP: The children may notice the number 13 for one p.m. and make the connection between this being the number after 12 and one being the number after 12 on an analogue clock. If they do not make this connection point it out to them.

- Now discuss with the children that we tend to use the **12-hour clock** and a.m. or p.m. on an analogue clock and the 24-hour clock on a digital clock.
- Ask the children to complete the table on Worksheet 3. The table has digital times and analogue times. Ask the children to fill in the missing times on the worksheet using what they have learned about time so far.

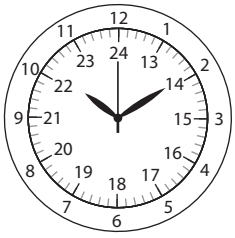
OBJECTIVES

- Tell and write the time from an analogue clock and 12-hour and 24-hour clocks
- Estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight
- Know the number of seconds in a minute

Rising Stars Progression Framework: 3.1.1, 3.1.2, 3.2.1

RESOURCES

- Activity 1: Analogue clock face and a digital clock face; whiteboards and pens
- Activity 2: 24-hour clock face; each child needs a copy of Worksheet 3



24-hour analogue clock face

Worksheet 3

Name _____ **Date** _____

The 24-hour clock

Complete the table to show each time in both analogue and digital.

Analogue time 	**Digital time** 06:00
1 o'clock a.m.	
	02:00
3 o'clock a.m.	
4 o'clock a.m.	
	05:00
	06:00
7 o'clock a.m.	
8 o'clock a.m.	
	09:00
10 o'clock a.m.	
11 o'clock a.m.	
12 o'clock p.m.	
	13:00
2 o'clock p.m.	
	15:00
4 o'clock p.m.	
	17:00
	18:00
7 o'clock p.m.	
8 o'clock p.m.	
	21:00
10 o'clock p.m.	
	23:00
12 o'clock a.m.	

Strand: Measurement

DAY 4

Sub-strand: Time

TEACH

ACTIVITY 1: 24-hour clock bingo

- Explain to the children that they are going to play bingo, and that they will be using their knowledge of the **24-hour clock**.

✓ **TIP:** You can use the 24-hour clock face, for support if needed. The children can also refer to their completed Worksheet 3 from Day 3.

- Hand out the bingo cards, cut out from Worksheet 4. Explain that you will be calling out times. The children have to see if they have the time on their card and if they do they can put a counter on it. Remind the children that some of the times may be in 24-hour clock on their cards.
- Ask: *Look on your card, do you have this time?* Call out the following times: two in the afternoon, one in the morning, ten in the morning, eight-thirty in the morning, four in the morning, three in the afternoon, five in the afternoon, seven in the evening, six in the morning, nine in the evening, 11 in the evening.
- If a child has the time, they can cover it with a counter. The winner is the first person to cover all the times on their card.

ACTIVITY 2: 24-hour clock in context

- Give each child a copy of Worksheet 5, which includes six drawings showing different parts of the day: getting up, going to school, lunch time, watching TV, getting undressed, and being asleep in bed. The children write the time when they do these activities each day **using the 24-hour clock**.
- Model an example to start the children off: *I get up at six thirty in the morning, so I would write 06:30.*
- Go through the children's work as a group, if time allows.

! **WATCH OUT:** The children may have slightly different ideas about the times that the different activities take place. If this is the case, discuss with them their reasons for choosing the times they did. You may need to suggest appropriate times for the children to use.

- The children should cut out the drawings and put them in the correct order.

OBJECTIVES

- Tell and write the time from an analogue clock and 12-hour and 24-hour clocks
- Estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight
- Know the number of seconds in a minute

Rising Stars Progression Framework: 3.1.1, 3.1.2, 3.2.1

RESOURCES

- Activity 1: Each child needs: a bingo card cut out from Worksheet 4, counters; provide for support: 24-hour clock face, Worksheet 3 from Day 3, page 96
- Activity 2: Each child needs a copy of Worksheet 5, scissors; provide for support: 24-hour clock face, Worksheet 3 from Day 3, page 96

Worksheet 4

Photocopy and cut out the cards, one per child.

Time bingo using the 24-hour clock: Bingo cards

01:00	17:00	06:00
10:00	19:00	08:30

14:00	15:00	21:00
04:00	06:00	23:00

10:00	19:00	08:30
14:00	15:00	21:00

01:00	10:00	14:00
04:00	08:30	06:00

10:00	15:00	19:00
23:00	04:00	06:00

Worksheet 5

Name _____ **Date** _____

24-hour clock in context

Look at the images.

Write the times when you do these activities each day using the 24-hour clock.

Next cut the pictures out and put them in the correct order.

Strand: Measurement

DAY 5

Sub-strand: Time

ASSESS

ASSESSMENT ACTIVITY

- The purpose of the assessment is to check what each child can do independently, carefully noting down any difficulties and misconceptions. The adult will need to watch carefully what the children do, any strategies used and confidence levels.
- Hand out copies of Worksheet 6 and ask the children to work independently to answer the questions on the sheet.
- In question 1 the children are using their knowledge of analogue and digital time to convert between the two. If they struggle with this, encourage them to use their completed Worksheet 3 from Day 3, page 96. Also make a note to do more work on this with these children.
- The second question asks the children knowledge questions about time. Allow them to use an analogue clock as a support, if necessary.
- In the final two questions the children will be problem solving. The children may find this the trickiest. If so, work through the questions as a group to model how to find the answers.
- Go through the questions with the children. You may not have time to go through them all, but it is an opportunity to check what they clearly know and where they may need more practice.

EVIDENCING SUCCESS

Meeting expectations:

- The child can write any analogue time in a digital format.
- The child can identify when it is 27 minutes past seven p.m. and know that it is then three minutes to bedtime.
- The child can interpret the time on an analogue clock and write it down in 12-hour and 24-hour clock times.
- The child can solve problems such as: '*In a race, Jane takes two minutes. Tariq takes one minute 35 seconds. Bea takes one minute 20 seconds. Who took the shortest time?*'

OBJECTIVES

- Tell and write the time from an analogue clock and 12 -hour and 24-hour clocks
- Estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight
- Know the number of seconds in a minute

Rising Stars Progression Framework: 3.1.1, 3.1.2, 3.2.1

RESOURCES

- Worksheet 6; analogue clock to support if needed

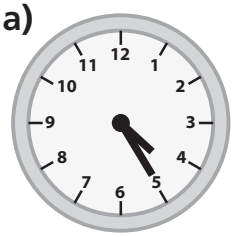
Worksheet 6

Name _____ **Date** _____

Time

1. Write the time in analogue and digital.

a)



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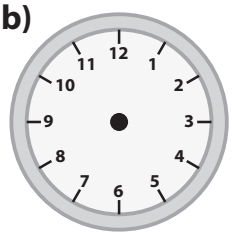

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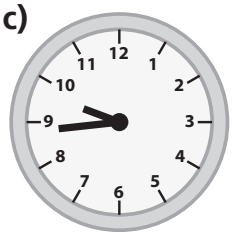

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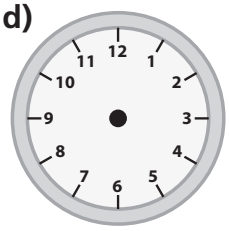


2. a) How many hours in a day?

.....

b) How many minutes in an hour?

.....

c) How many seconds in a minute?

.....

d) How many minutes in half an hour?

.....

e) How many seconds in half a minute?

.....

3. In a race, Jane takes 2 minutes. Tariq takes 1 minute 35 seconds.

Ben takes 1 minute 20 seconds. Who took the shortest time?

.....

4. Henry usually goes to bed at 7:30 p.m. It is 7:23 p.m.

How many minutes is it until Henry's bedtime?

.....

Strand: Measurement

DAY 1

Sub-strand: Money

TEACH

ACTIVITY 1: Quick and accurate counting of coins

- Say to the children: *People who work in banks are very good at counting money **quickly** and **accurately**. We know what quickly means but what does **accurately** mean? Which do you think is most important – **speed** or **accuracy**?*

✓ **TIP:** What we want to be able to do is to be able to count and get it right without taking too long. You might think of other examples, such as a customer in a shop.

- Say: *You are going to try to count money and see how well you do.*
- Give each child a bag or container of coins containing £3 in various coins, including 50p, 10p, 5p, 2p and 1p. Encourage them to try to count them. Tell them the challenge is to see who can count **quickly** and **accurately**.

✓ **TIP:** Watch closely while the children are counting to determine whether they have a strategy for counting or count randomly.

- Ask the first child to finish to explain how he or she counted so quickly. Invite other children to share their strategies. Discuss the quickest way to count.
- After discussing effective strategies, ask the children to try again.
- Afterwards, share experiences among the group. Was the children's second time at counting quicker? Which strategy did they use?

ACTIVITY 2: Finding equivalent amounts with different coins

- Pose this question: Can you make 20p with three coins or fewer? Ask: *Are there any coins that we cannot use? Using what you know about ways to make 20, which coins could you use to make 20p?* Give the children a minute or two to try to find a solution.
- Ask: *Has anyone made 20p with exactly three coins? Can you show us how you did it?*
- Challenge the children to try this question in pairs: *Can you make 50p using only one 20p coin?* Encourage them to use the coins as a support. Give them a minute and then ask for feedback on strategies and answers. Did they discard the coins over 50p? Did they work out the difference between 20p and 50p, and then find the coins to match? Did they count on from 20p to make 50p?
- Cut out the cards on Worksheet 7 and place them face down on the table, in easy reach of the children. Explain to the children that they will take turns to pick a card and answer the question on the card. When they have listened to the question they will use the coins in front of them to make the amount.
- Check the children's answers as a group and then ask another child to select a card to read out.

OBJECTIVE

- Add and subtract amounts of money to give change, using both in £ and p in practical contexts

Rising Stars Progression Framework: 3.1.3, 3.3.2, 3.3.3

RESOURCES

- Activity 1: Selection of coins; small bags, pots or other containers for coins up to amounts of £3
- Activity 2: A selection of coins; Worksheet 7 cut into cards

Worksheet 7

Photocopy and cut out the cards.

Equivalent amount cards

Can you make 20p with 3 coins or fewer?	Can you make 50p using only one 20p?
What is the smallest number of coins you can use to make 33p?	What is the smallest number of coins you can use to make £1.52?
How many 2p coins in 10p?	How many 5p coins in 50p?
How many ways can you find to make 62p?	Can you find 5 ways to make £1?
How many 20p coins do you need to make £1?	How many 50p coins do you need to make £5?
Which coins do you need to make 47p?	How many 2p coins do you need to make 20p?
Which multiplication table will help you to work out the number of 5p coins in 35p?	Which coins do you need to make £1.89?

Strand: Measurement

DAY 2

Sub-strand: Money

TEACH

ACTIVITY 1: Adding money using partitioning

- Start by writing £2.45 on the board. Ask: *How many pounds are there and how many pence?*
- Explain that you can **partition** this amount to make £2.00 + 40p + 5p.
- Ask the children to make this amount using the coins in their bag and to place their coins on their partitioning grid.

WATCH OUT: If children use a large number of coins, e.g. eight × 5p to make 40p, ask them to find a way of making the same amount with fewer coins.

- Write £2.45 + £1.30 on the board. Ask the children to partition £1.30 using the coins on their grids. They should then ask a partner to check they have the correct coins.

	£	10 p	p
£2.45			
+ £1.30			

- Ask the children to **add** the pence and write the amount at the bottom of the pence column and to then add the pounds. Check the answer with the group – has everyone got £3.75?

ACTIVITY 2: Adding money in context

- Give each child Worksheet 8. Explain that they will be working out the cost of buying the book and the train.
- Write £4.50 + £1.45 on a board. Ask the children to help you to **partition** the amounts.
- Model **adding** the pence as a tens and ones and then the pounds. This should give them £5 + 95p, which the children can easily add together to make £5.95.
- Now ask the children to choose two toys from the list and work out how much it would cost to buy the two items.
- Check answers with each child as they finish their calculations.

OBJECTIVE

- Add and subtract amounts of money to give change, using both in £ and p in practical contexts

Rising Stars Progression Framework: 3.1.3, 3.3.2, 3.3.3

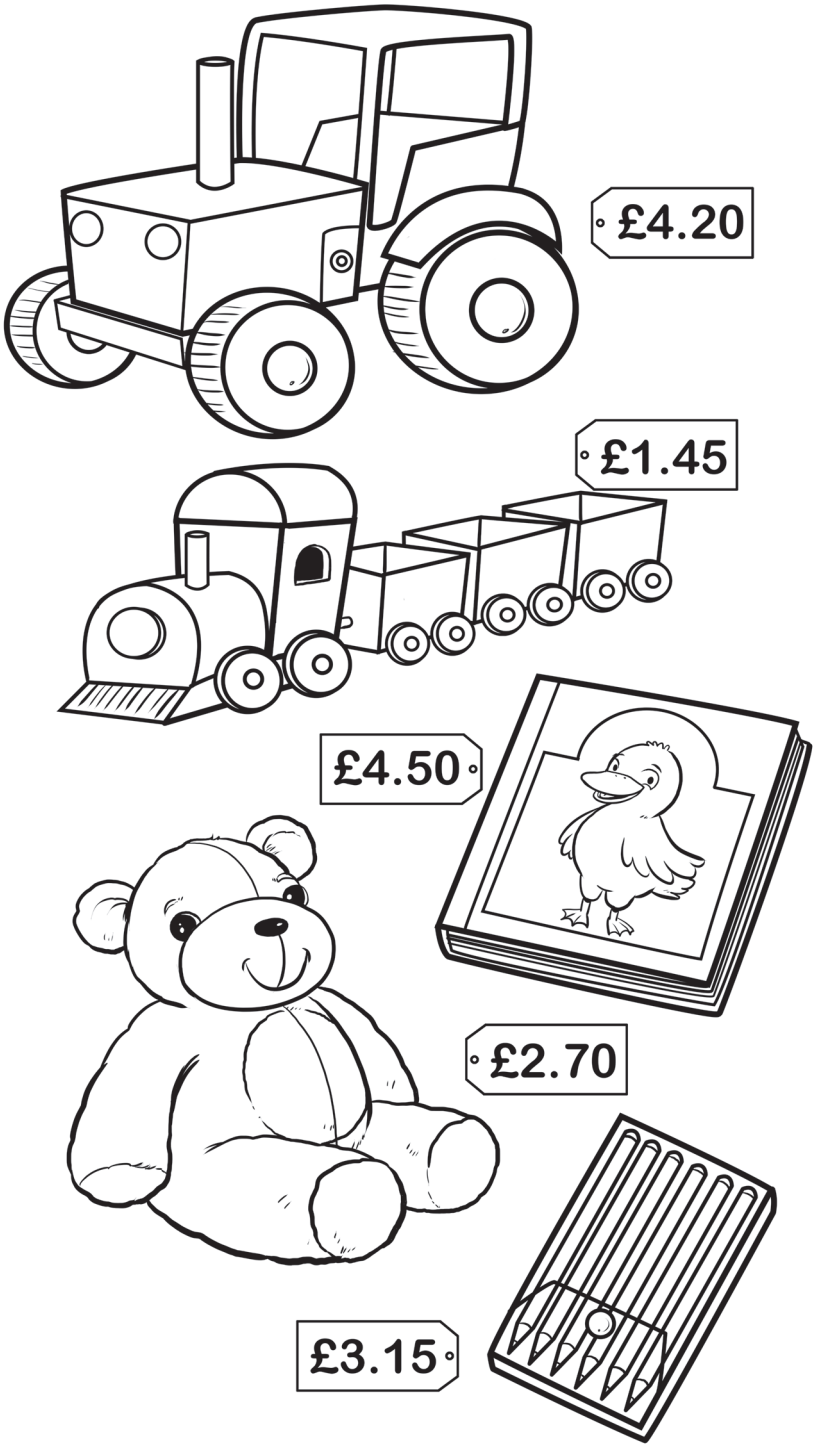
RESOURCES

- Activity 1: Each child needs: a selection of coins in a bag (to include a few of each type of coin), a partitioning grid
- Activity 2: Each child needs: a copy of Worksheet 8, an exercise book

Worksheet 8

Name _____ **Date** _____

Buying toys in a toyshop



Strand: Measurement

DAY 3

Sub-strand: Money

TEACH

ACTIVITY 1: Subtracting using partitioning

✓ **TIP:** Each child will need a partitioning grid for this activity; if not available they can be easily drawn on a piece of paper or whiteboard.

- Start by reminding the children that they were **adding** amounts of money using **partitioning** the day before.
- Write £2.45 – £1.30 on the board. Ask the children to **partition** both amounts using coins on their partitioning grids. They should ask the child next to them to check they have the correct coins.

✓ **TIP:** Each time encourage the children to use the smallest number of coins that they can.

- Ask the children to **subtract** the pence and write the amount at the bottom of the pence column and then subtract the pounds. Check answers with the group – has everyone got £1.15?
- Talk the children through another example, such as £5.99 – £2.50.

! **WATCH OUT:** Make sure the children place their coins in neat columns or it could lead to errors when finding the answer.

ACTIVITY 2: Calculating change using adding on

- Give each child a copy of Worksheet 8, page 105, showing the toys and price list.
- Explain that each child has a £5 note. Ask the children to choose an item. Tell the children that each item costs less than £5.

✓ **TIP:** Explain that when we pay with £5 we expect the shopkeeper to give us back the difference between the cost of the toy and £5, and that we call this 'change'.

- Ask: *How can you work out the **change** you will get from a £5 note?* The children will probably suggest using the same method practised in Activity 1 (subtracting the cost of the toy from £5 using partitioning and a grid). Explain that they can also work out the change from a £5 note by adding on. As an example, note that the book costs £4.50. Ask the children to count on to £5; they can use coins or the number track to help them.
- Now ask the children work in pairs: one child is the shopkeeper and the other is the customer. The customer has £5, and the shopkeeper has the coins. The customer can choose a toy, ask the shopkeeper for it and pay with the £5 note. The shopkeeper must give the correct change.
- After the first transaction, the children swap roles.

! **WATCH OUT:** Some children may struggle when crossing the 'pound boundary' and will need to count carefully, such as when adding on from £2.70 to £5. Help them by physically pointing as the children move along the number track.

OBJECTIVE

- Add and subtract amounts of money to give change, using both in £ and p in practical contexts

Rising Stars Progression Framework: 3.1.3, 3.3.2, 3.3.3

RESOURCES

- Activity 1: Each child needs: a selection of coins in a bag, to include a few of each type of coin, partitioning grid
- Activity 2: Each child needs: a copy of Worksheet 8, page 105; each pair of children needs: coins and a £5 note, a money number track

Strand: Measurement

DAY 4

Sub-strand: Money

TEACH

ACTIVITY: Solving money problems

TIP: Advise the children to read each question carefully – reading out loud helps. Tell them that they need to identify the words giving information and the words that ask the question.

- Introduce the first question on Worksheet 9 by saying*: Here we have different party foods with their prices. Let's have a look at the first question. 'Can I buy two cakes with a 50p coin?' How can I work that out?*
- Place the coins where they are easily accessible to all of the children and remind the children that they are there to help them.
- Ask the children to talk to a partner for a minute, then see what ideas they have.
- Remind the children to read the questions carefully and to find the parts that give information (e.g. '*buy two cakes' and 'how much will it cost?*') and the parts that tell us about the calculation (e.g. *'Can I buy two cakes with a 50p coin?'*).
- Discuss possible strategies for finding the solution: *We could add 20p + 20p, which gives us 40p. This shows that the cakes cost less than 50p. Alternatively, we could double 20p to find that the two cakes cost less than 50p.*
- Look at the second question with the group. *How might you go about tackling it?* Take children's suggestions. The children might suggest adding four 10p coins to find the total, or they might suggest multiplying 10p by four.
- Allow them to try each question on Worksheet 9 working independently.
- When all children finish the worksheet, go through the answers with the group.

WATCH OUT: Any errors are likely to either be caused by misunderstanding the question or calculating inaccurately. In the case of the former, help the children to read more carefully and identify key information. In the case of the latter, offer the use of coins for support.

OBJECTIVE

- Add and subtract amounts of money to give change, using both in £ and p in practical contexts

Rising Stars Progression Framework: 3.1.3, 3.3.2, 3.3.3

RESOURCES

- Worksheet 9; coins if required

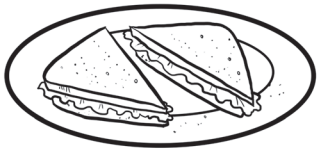
Worksheet 9

Name _____ **Date** _____

Party food problems

Here are the prices of party food. Solve the problems using these prices.

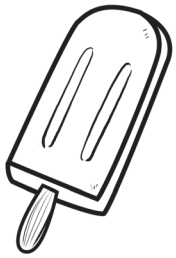
20p
Cake



25p
Sandwich

10p
Crisps

15p
Orange Juice



15p
Ice Lolly

1. Can I buy 2 cakes with a 50p coin?

2. If I buy 4 bags of crisps, how much will it cost?

3. How much will it cost to buy 1 of each type of food?

4. How much change from £1 will I get if I buy 2 ice lollies?

Strand: Measurement

DAY 5

Sub-strand: Money

ASSESS

ASSESSMENT ACTIVITY

- The purpose of the assessment is to check what each child can do independently, carefully noting down any difficulties and misconceptions. The adult will need to watch carefully what the children do, any strategies used and confidence levels.
- Have a selection of coins, of all coin values, available to the children to make up £1.50.
- It is important that the children work independently so you can accurately assess their understanding.
- First, give each child a selection of coins. Ask them to count the money. Then ask then to make the same amount using as few coins as possible.
- Give each child a copy of Worksheet 10. The first questions here involve adding and subtracting amounts of money using partitioning. Remind the children of the work they did on this during Day 2 and Day 3.

WATCH OUT: Remind the children to keep the amounts of money in neat columns to avoid confusing pounds, tens and pence.

- The final set of questions involves adding and subtracting amounts of money for various food items and giving change.

TIP: Remind the children to read these final questions carefully, underlining important information if necessary.

EVIDENCING SUCCESS

Meeting expectations:

- The child can count up a pile of coins and record the total using £ and p.
- The child can solve problems such as: *'What is the smallest number of coins you could use to make £1.20?'*
- The child can solve problems such as: '*I buy a sandwich and a drink for 75p. How much change do I get from £5?*'

OBJECTIVE

- Add and subtract amounts of money to give change, using both in £ and p in practical contexts

Rising Stars Progression Framework: 3.1.3, 3.3.2, 3.3.3

RESOURCES

- Worksheet 10; a selection of coins; partitioning grids, if needed

Worksheet 10

Name _____ **Date** _____

Calculating with money

1. Use partitioning to answer these questions.

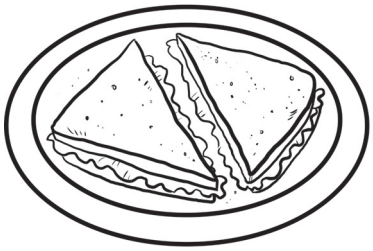
a) £2.30 + £1.25 = ☐

b) £5.15 + £2.40 = ☐

c) £3.60 – £1.40 = ☐

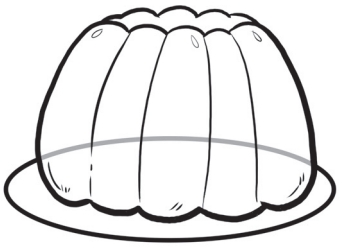
d) £6.95 – £2.50 = ☐

2. Answer the questions below about this party food.

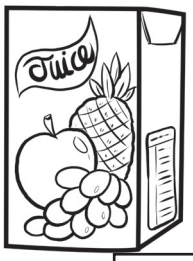


Sandwich 45p

Cake 25p



Jelly 62p



Fruit Squash £1·25

a) How much does a cake, a sandwich and a jelly cost?

b) I buy a sandwich and a drink. How much change would I get from £5?

c) I buy a fruit squash and a cake. How much change would I get from £2?

Strand: Measurement

DAY 1

Sub-strand: Length

TEACH

ACTIVITY 1: Measuring lines accurately with a ruler

WATCH OUT: This activity may seem simple, but measuring accurately with a ruler is where many children slip up.

- As a group, have a look at the different kinds of rulers available. Identify the start point for measuring on each. Explain the importance of finding the right place to start measuring from to ensure accuracy.
- The children can measure the lines on Worksheet 11 in pairs using different rulers, so they develop familiarity with the different types available.
- Bring the group back together and check whether all the children got the same measurements. If not, why was this? Check where errors in measuring crept in, e.g. was the tape measure stretched, did everyone start at zero?

TIP: Remember, it is important that the children learn to reflect and consider the cause of an error they have made, so that they can learn to self-correct.

ACTIVITY 2: Recapping basic facts of length

- Look at the rulers and other measures available. Ask: *How many centimetres in a metre? How many millimetres in a centimetre?*
- Discuss strategies that children can use to convert between units. Ask: *We know there are 100 cm in a metre. How many centimetres are in half a metre?* Encourage the children to apply their understanding of fractions (half of 100 is 50) or number bonds (5 + 5 = 10 and 50 + 50 = 100).
  Ask: *How many centimetres are there in two metres?* Encourage the children to use doubling or multiplication to find the answer: 100 × 2 = 200.
  - Tell the children a giant had a shoe measuring 4 m 20 cm. We want to know how big his shoe was in just centimetres so we can compare it to a human shoe. How could we do this?
  - Remind the children that we need to multiply four by 100 as there are 100 centimetres in a metre and we have four metres. So his shoe is 420 cm long.
  - Now ask the children to find out the answer to the following questions:
  - A fairy shoe measures 320 mm. How long is that in centimetres? How would we find out? (Divide by ten as there are ten millimetres in a centimetre.)
- Working in pairs, ask the children to each measure their shoe in centimetres and millimetres. Write their measurements on the board.

TIP: Keep the shoe measurements for the lesson at the start of Day 2.

OBJECTIVES

- Measure, compare, add and subtract lengths (m/cm/mm)
- Measure the perimeter of simple 2-D shapes

Rising Stars Progression Framework: 3.1.4, 3.2.3, 3.2.4, 3.3.4

RESOURCES

- Activity 1: Selection of rulers with different start points for measuring (one of the rulers should start at the edge and another slightly in from the edge); tape measures; metre rule; each child needs a copy of Worksheet 11
- Activity 2: Selection of rulers with different start points for measuring (as above); tape measures; whiteboard

Worksheet 11

Name _____ **Date** _____

Measuring lines

Measure each of the lines below. Write down how many centimetres (cm) and millimetres (mm) it is.

1. _____ ☐ mm ☐ cm

2. _____ ☐ mm ☐ cm

3. _____ ☐ mm ☐ cm

4. _____ ☐ mm ☐ cm

5. _____ ☐ mm ☐ cm

Strand: Measurement

DAY 2

Sub-strand: Length

TEACH

ACTIVITY 1: Ordering and calculating using lengths

- Ask: *Can we put the shoe measurements in order to find who has the longest and the shortest shoe*? Place the shoes in order and write the names and shoe measurements from Day 1 on a number track.
- Then say: *Now let's see if we can ask a question of the **data**? Who can tell me what **data** is?* Confirm with the children that the data is the information – in this case, the shoe measurements.
- Now work with the children to establish, e.g.: *Whose shoe is the second longest? Who has the third shortest shoe? Who has a longer shoe than (name of child)? What is the total length of the two shortest shoes? What is the length of child x's shoe and child y's shoe added together? What is the difference in length between the longest and the shortest shoe? How many shoes do we have to add together to make a metre?*
- Ensure that each child answers at least one question on the data and check answers among the group.

ACTIVITY 2: Measuring and calculating with lengths

- Show the children the range of measuring equipment, e.g. trundle wheel, metre stick, tape measure. Check they know what each is and how to use it.

✓ **TIP:** Metre wheels can have various start positions, so make sure the children know where it is.

- List on the board the 12 items you want the children to measure (make sure you include the height of the child, the height of a chair, the length of a table and the length of a rubber). Assign each child two or three items to measure.
- Explain that they must measure their items and then record the measurement and the measuring tool they used on Worksheet 12. They also add the measurement to the list on the board.

! **WATCH OUT:** If a child selects an inappropriate or less effective tool for measuring, e.g. a metre stick instead of a measuring tape, allow them to continue and then ask them how easy they found it. Did they have any difficulties? Could they have chosen a better measuring tool for the task?

- When each child has measured two things or all the items have been measured, ask them to answer the questions at the bottom of Worksheet 12, which require them to use addition and subtraction.
- Compare answers after each question and discuss any differences.

OBJECTIVES

- Measure, compare, add and subtract lengths (m/cm/mm)
- Measure the perimeter of simple 2-D shapes

Rising Stars Progression Framework: 3.1.4, 3.2.3, 3.2.4, 3.3.4

RESOURCES

- Activity 1: Shoe measurements from Day 1, displayed on the board
- Activity 2: Each child needs a copy of Worksheet 12; selection of small items to measure (story book or magazine, rubber, pencils of different lengths); a selection of things to measure with, e.g. metre wheel, metre stick, rulers, measuring tape

Worksheet 12

Name _____ **Date** _____

Measuring and calculating with lengths

Measure your items. What will you use to measure each item?

Write down the name of the item, its measurement and what you used to measure it.

Item	Measurement	Measuring tool

1. What is the difference between the length of a table and the height of your chair?

2. What is the length of 3 rubbers?

3. What is the length of the table in metres and centimetres, and also in centimetres?

4. a) What is the difference between the height of the chair and the height of the child?

b) What is the difference in metres and centimetres?

Strand: Measurement

DAY 3

Sub-strand: Length

TEACH

ACTIVITY: Measuring perimeter

- Say: *You are going to learn to measure **perimeter**. Does anyone know what **perimeter** means?*
- Show the children a square, either drawn on the board or a physical 2-D shape. Explain that we measure perimeter by measuring the **outside edge**.
- Measure the square and write down the perimeter on the board, e.g.: 4 + 4 + 4 + 4 = 16 cm. The perimeter is 16 cm.
- Follow this up by asking the children: *What do we know about a **square**?* Establish with them that the sides are equal. Then ask: *Can anyone think of a quicker way to work out the perimeter of a square?*

✓ **TIP:** The aim of this questioning is to enable the children to make the link between **properties of shapes** and **multiplication** as a way of calculating perimeter.

- Once the children understand this link, draw another square for the children and ask them to calculate the perimeter.

! **WATCH OUT:** Notice – do the children use the quick way of working out the perimeter or do they measure all four sides of the square?

- Take feedback and discuss the methods the children used to find the perimeter. Reinforce the link between a square having four equal sides and the perimeter being found by measuring one side then multiplying by four.
- Now show the children a rectangle and ask what they know about rectangles that could help with measuring perimeter. Establish that a rectangle has two pairs of equal sides. Write the length of each of the sides along the sides: e.g. 4 cm, 4 cm, 6 cm, 6 cm.
- Establish with the children that we can see that the perimeter is 4 + 4 + 6 + 6 = 20 cm. Now ask: *Can you see a more efficient way to find the perimeter than adding all the numbers together?* Establish that you arrive at the same answer (20 cm) if you **add** the length of one short and one long side together (4 + 6) and double it (10 + 10 = 20).
- Then show the children another rectangle with sides of 3 cm and 6 cm. Ask: *Can you find the perimeter using the more efficient way?*
- Now ask the children to attempt Worksheet 13, which is based around the scenario of a zookeeper planning zoo houses. Remind them to look carefully at the ruler to check where to start measuring. There are no right or wrong answers when it comes to deciding in which zoo houses to place the different animals!

! **WATCH OUT:** Some children may prefer to calculate the perimeter by using repeated addition rather than multiplication. This may mean more work is needed on the link between repeated addition and multiplication.

- Go through the children's answers to Worksheet 13 as a group.

OBJECTIVES

- Measure, compare, add and subtract lengths (m/cm/mm)
- Measure the perimeter of simple 2-D shapes

Rising Stars Progression Framework: 3.1.4, 3.2.3, 3.2.4, 3.3.4

RESOURCES

- Each child needs: a copy of Worksheet 13, a ruler; teacher needs: a 2-D shape, ruler, board

Worksheet 13

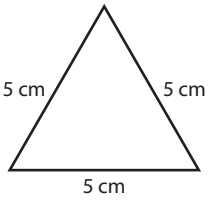
Name _____ **Date** _____

Perimeter at the zoo

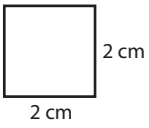
Zena Zorro the zookeeper is creating a model of some new animal houses to be built at the zoo.

Zena needs you to find out the perimeter of each of these animal houses.

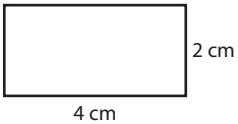
1. Calculate the perimeter of this triangle.



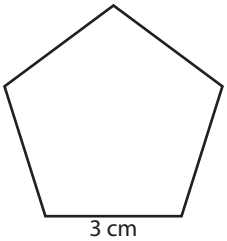
2. Calculate the perimeter of this square.



3. Calculate the perimeter of this rectangle.



4. Calculate the perimeter of this regular pentagon (5-sided shape, with all sides equal length).



Strand: Measurement

DAY 4

Sub-strand: Length

TEACH

ACTIVITY: Solving problems involving length and distance

- Give each child a copy of Worksheet 14. Explain that the questions 1 and 2 relate to the distance travelled in a snail race. Question 3 relates to the distance some children manage to throw their wellies in a competition. They must identify whether to use **addition** or **subtraction** to answer the questions.
- Explain to the children that a **distance** is just the length between the start and end point of an object. So if it is the distance a snail goes it is the length of their movement. If it is the distance a welly flies it is the length along the ground between the start and end point.

✓ **TIP:** Place number tracks and counters on the table, to support the children when answering the questions on the worksheet.

- Read out question 1 from the worksheet. Ask: *How will you know which snail came first, second and third?* (The snail that slid the furthest won.)
- Now ask: *How can you work out the difference in distance travelled between the winner, Bertha, and the loser, Binky?* Here you are looking for the children to recognise that they must either **subtract** 17 from 32 or **add** on from 17 to get to 32. Ensure that children include **units** in their answer.
- Direct the children's attention to the table showing the results of the welly-throwing competition. *Who won the competition and how do you know?*
- Ask: *How can we work out the difference between the distances that Wally and Nelly threw?* Here you are looking for the children to suggest **counting up** from 2 m 50 cm to 3 m 50 cm, or **subtracting from** 3 m 50 cm. Ask the children to think about what they could use to support them in working this out. Suggestions could include drawing a number track, using metre sticks as a number track, or converting to centimetres and calculating using the grid method.
- Now ask the children to complete the remaining questions on the worksheet. Remind them that there are number tracks and cubes to help them, if needed.

✓ **TIP:** The children can work with a partner or individually to complete the rest of the questions on Worksheet 14.

! **WATCH OUT:** The calculations are quite straightforward, but the children may need support to understand which operation to use. Remind them to read the questions carefully and underline key information words such as '**difference**'.

- Finish the session by going through the questions as a group.

OBJECTIVES

- Measure, compare, add and subtract lengths (m/cm/mm)
- Measure the perimeter of simple 2-D shapes

Rising Stars Progression Framework: 3.1.4, 3.2.3, 3.2.4, 3.3.4

RESOURCES

- Each child needs: a copy of Worksheet 14, access to number tracks and counters/cubes for support

Worksheet 14

Name _____ **Date** _____

1. In a snail race, Billy slithers 28 mm.
Bertha slides 32 mm and Binky slips 17 mm.

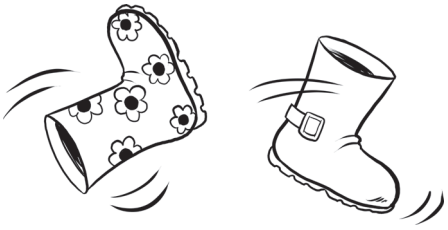
2. a) Write the order of winning:

1st: | 2nd: | 3rd:

b) How much further did the winning snail slide than the slowest snail?

3. Here are the results of a welly throwing competition:

Welly thrower	Distance thrown
Wally	3 m 50 cm
Sally	3 m 65 cm
Nelly	2 m 50 cm
Penny	1 m 25 cm



a) Put the throws in order of length, starting with the furthest throw.

1	2	3	4

b) How much further did Sally throw her welly than Wally?

Strand: Measurement

DAY 5

Sub-strand: Length

ASSESS

ASSESSMENT ACTIVITY

- The purpose of the assessment is to check what each child can do independently, carefully noting down any difficulties and misconceptions. The adult will need to watch carefully what the children do, any strategies used and confidence levels.
- Give each child Worksheet 15. Explain that the first set of questions involves measuring lines accurately with a ruler. Remind the children to check that they start measuring from the correct place.
- The second set of questions asks the children to think about what they would use to measure specific items. As an example to get them thinking, ask: *Would you use a ruler to measure the distance to the end of the playground?* (No!) *What would you use?*

✓ **TIP:** To help the children with spelling, ask them to tell you the names of different measuring tools and write the names on the board.

- The rest of the questions on the worksheet involve remembering basic measuring facts, perimeter and on problem solving.
- Finish the assessment session by going through the answers as a group.

EVIDENCING SUCCESS

Meeting expectations:

- The child can measure accurately and record using a mixture of metres and centimetres and millimetres.
- The child can choose between a ruler, tape measure and trundle wheel when measuring length.
- The child can measure the perimeter of a square or rectangle.
- The child can solve problems such as: '*How much longer is my pencil than Toby's pencil?*'

OBJECTIVES

- Measure, compare, add and subtract lengths (m/cm/mm)
- Measure the perimeter of simple 2-D shapes

Rising Stars Progression Framework: 3.1.4, 3.2.3, 3.2.4, 3.3.4

RESOURCES

- Worksheet 15; a ruler

Worksheet 15

Name _____ **Date** _____

Length

1. Measure the lengths of these lines.

a) ——————

b) ————————————

2. What would you use to make these measurements?

a) The length of a lollipop stick

b) The distance around your head

3. How many centimetres in a metre?

4. How many centimetres in half a metre?

5. What is 1m 23 cm – 24 cm?

6. Measure to find the perimeter of this shape.

7. a) Mr Beardy's beard is 15 cm long in January. By February it has grown to 17 cm long. How much did Mr Beardy's beard grow in a month?

b) By June, Mr Beardy's beard is 25 cm long. How much did his beard grow from January to June?

Strand: Measurement

DAY 1

Sub-strand: Mass

TEACH

ACTIVITY 1: Ordering mass

- Show the children a selection of packets. Read the masses from the packets and write them on a board.

✓ **TIP:** You could make a table for recording the masses. If you do this, remind the children that this way of recording **data** is called a **table**. (Tables are covered in detail in the *Statistics* section).

- Check the children's understanding of the information given on the packets by asking questions such as: *What does it mean when it says 'g'? What does 'kg' mean? How many grams in a kilogram?*
- Finally, challenge the children to put the packets in **order of mass** from the lightest to the heaviest.

✓ **TIP:** The children have looked at the mass written on the packets and so will be able to use this information to physically order the packets in a row. They could do this by placing the packets along a number track.

ACTIVITY 2: Practising ordering mass

- On the board write down the **mass** *1 kg 200 g* and read it to the children. Then write down *1 kg 500 g* and read it to the children. Ask: *Which one is heavier? Which one is lighter? How do you know?*
- Hand out copies of Worksheet 16, which asks the children to order mass and to identify which is lightest and which heaviest, etc. Remind them to read the questions carefully.
- Explain that on the worksheet there are pictures of items and their masses. Explain that the questions might ask for the **heaviest** first or they might ask for the **lightest** first. (The first question requires the children to organise items starting with the lightest; the second question requires children to organise items starting with the heaviest.)

! **WATCH OUT:** If the children misread the units, encourage them to re-read the mass and units and re-order them. Other children may forget the number of grams in a kilogram, in which case remind them that there are 1,000 g in a kilogram and 500 g is half a kilogram.

OBJECTIVE

- Measure, compare, add and subtract mass (kg/g)

Rising Stars Progression Framework: 3.1.4, 3.2.3, 3.3.4

RESOURCES

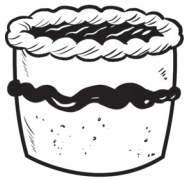
- Activity 1: Selection of packets, e.g. cereal boxes, bags of sugar, packets of biscuits, boxes of tea bags (ensure that the largest packet is not the heaviest)
- Activity 2: Worksheet 16

Worksheet 16

Name _____ **Date** _____

Comparing and ordering mass

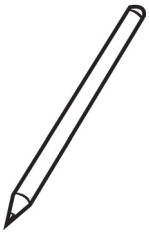
1. Put these items in order of mass starting with the **lightest**.



800 g

1 kg 250 g

1 kg 200 g



25 g

2. Put these items in order of mass starting with the **heaviest**.

1 kg 250 g

4 kg 250 g

200 g

250 g

3. Which is the lightest? Circle the answer.

200 g 2 g 2 kg 20 g

4. Which is the heaviest? Circle the answer.

40 g 400 g 40 kg 14 kg

Strand: Measurement

DAY 2

Sub-strand: Mass

TEACH

ACTIVITY 1: The right tool for weighing and reading scales

- To introduce the activity, say: *Let's have a look at each of these scales. How does each one work?*

✓ **TIP:** Remind the children that, when using rulers, they had to look carefully to be sure to measure accurately. The same rule applies to the scales when reading mass from a scale.

- Ask the children: *Which scales do you think would be best for finding the **mass** of heavy things? Which scales would be best for light things?*
- Ask the children to work in pairs to find the mass of each packet using the different scales.

! **WATCH OUT:** Notice how the children are using the scales. If they are struggling to read the mass, intervene. Don't rush to tell them how to do it. Ask questions such as: *Where should you look to find the mass?* Then point them to the mass on the packet and ask: *What can you see?* It is far better that you guide them to the answer so they learn to be independent.

- Finish with a group feedback session. Ask the children: *What did you notice when using the different scales? Did the mass on the packet match the mass on the scale?*

ACTIVITY 2: Converting and equivalence between mass and units

- Remind the children of how many grams there are in a kilogram (1,000). Then say: *If you had 2,000 g you would have two kilograms. If you had 2,003 g you would have two kilograms and three grams.*
- Write 1,250 g on the board. Using the weights on the table, show the children how to convert this to kilograms and grams. *There are 1,000 g in a kilogram so I have 1 kg* (show the kilogram weight). *I have a further 250 g* (show 250 g using the weights). 1,250 g is equal to 1 kg 250 g. Now write 1,700 g on the board. *What is this in kilograms and grams? Can you show me using the weights?*
- Show the children the cards cut out from Worksheet 17 and ask them to read the mass shown on them to the group.
- Then shuffle the cards and put all of the cards face down on the table.
- The children take it in turns to turn over two cards. If they have a pair of equivalent masses in grams and kilograms (e.g. 1,200 g and 1 kg 200 g) they can keep the cards turned face up, but if they are not a pair they turn the cards back over.

✓ **TIP:** If the children can find the matching pairs quickly you could add a timer for the children to race against.

OBJECTIVE

- Measure, compare, add and subtract mass (kg/g)

Rising Stars Progression Framework: 3.1.4, 3.2.3, 3.3.4

RESOURCES

- Selection of packets from Day 1 Activity 1 (*with the mass written on them*); selection of scales
- Activity 2: Matching pairs cards cut out from Worksheet 17; selection of weights

Worksheet 17

Photocopy and cut out to make a set of cards.

Converting and equivalence between units for mass – matching cards

1,200 g	1 kg 200 g
3,540 g	3 kg 540 g
9,638 g	9 kg 638 g
2,746 g	2 kg 746 g
1,092 g	1 kg 92 g
2,034 g	2 kg 34 g
2,134 g	2 kg 134 g
1,492 g	1 kg 492 g

Strand: Measurement

DAY 3

Sub-strand: Mass

TEACH

ACTIVITY 1: Adding masses

- Give each child a copy of Worksheet 18, with pictures of the animals and their masses. Say: *In a field live a duck, a chick, a rabbit and a hedgehog. They want to cross the rickety bridge but it will break if there is more than 3 kg of mass on it.*
- Start by asking the children questions to establish which is the heaviest animal, the lightest animal, etc.
- Tell them we need to help the animals to cross the bridge as quickly as possible, to save them from the fox. Can they all cross at the same time? (No)
- Ask the children what the mass of the duck and the chick are together. They should be able to calculate this mentally.
- Now get the children to check if they are correct by writing the sum in a grid format with kg and g columns. The children should **add** the grams together (500 + 200 = 700 g), and then add the kilograms to make 1 kg 700 g (see grids below).
- Now ask the children to work out if the rabbit and the hedgehog can cross together. Share answers as a group.
- The children now work in pairs to decide how to get the animals across the bridge. Finish by discussing the various solutions and highlight the solution with the fewest journeys across the bridge.

ACTIVITY 2: Adding and comparing masses

- Write 8 kg > 4 kg on the board and ask the children what it means. *Is it true?* Now write 2 kg + 3 kg > 2 kg 500 g. *Is this true?* Ask the children how they worked it out.
- Remind the children that they have used the **inequality signs** (>,<) to order and compare numbers. They can use the signs in the same way when working with measures.
- Now ask the children to answer the questions on Worksheet 19. They are first asked to **add** two masses, as they did in Activity 1. The second section asks the children to compare the answers to addition calculations in the context of mass; this is the section the children should spend most time on.

WATCH OUT: Check the children have the correct answer to the addition calculations before checking the **comparative symbols**. If they find the incorrect answer, start by checking the answer to their addition calculation.

OBJECTIVE

- Measure, compare, add and subtract mass (kg/g)

Rising Stars Progression Framework: 3.1.4, 3.2.3, 3.3.4

RESOURCES

- Activity 1: Worksheet 18; range of supporting equipment such as number tracks, grids, scales
- Activity 2: Worksheet 19; a range of supporting equipment (as above)

kg	g	
1	500	
+	200	
1	700	1 kg 700 g

kg	g	
2	750	
1	200	
3	950	3 kg 950 g

Worksheet 18

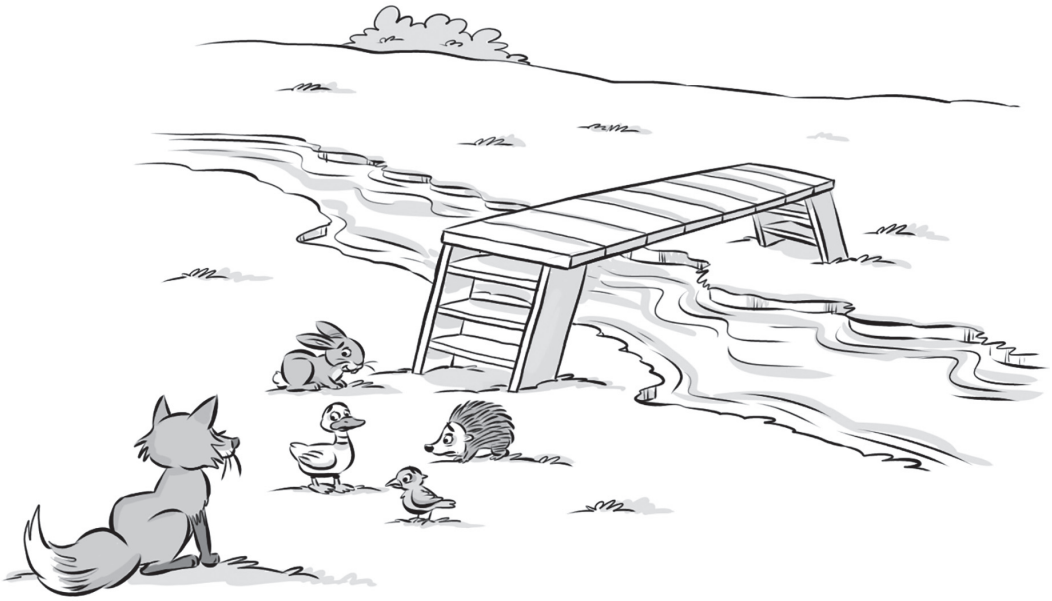
Name _____ **Date** _____

Adding animals' masses

Can you help the animals escape the fox by crossing the bridge?

The bridge can only hold 3 kg.

- The duck weighs 1 kg 500 g.
- The chick weighs 200 g.
- The rabbit weighs 2 kg 750 g.
- The hedgehog weighs 1 kg 200 g.



1. Which animals can cross the bridge together?

.....

.....

2. How can the animals cross the bridge the quickest?

.....

.....

Worksheet 19

Name _____ **Date** _____

Adding and comparing masses

Add these masses.

1. 12 kg + 8 kg = ☐

2. 22 kg + 25 kg = ☐

3. 530 g + 437 g = ☐

4. 3 kg 350 g + 5 kg 230 g = ☐

True or false?

5. 1 kg > 1,100 g

☐

6. 500 g + 250 g > 800 g

☐

7. Put the correct sign (<, >) between the following mass calculations.

643 g + 110 g ☐ 245 g + 400 g

102 g + 92 g ☐ 690 g – 400 g

Strand: Measurement

DAY 4

Sub-strand: Mass

TEACH

ACTIVITY 1: Subtracting masses

- Hand each child a copy of Worksheet 20. Start by introducing this problem to the children: *Eva is going away on holiday. She has an 18 kg baggage allowance. She has found that her case has a mass of 22 kg. How much more than the mass allowance is her case?*
- Explain to the children that Eva cannot take her case on the plane if the mass is too much. So they must decide which items to remove from the case to reduce the mass by 4 kg to 18 kg.
- Ask the children how they could work out the mass of the case if the blowup mattress (with a mass of 1 kg 100 g) was removed. Discuss suggestions such as: using the grid method to subtract 1 kg 100 g from 22 kg; subtracting 1 kg 100 g from the 4 kg of additional weight; or adding on from 1 kg 100 g to 4 kg or to 22 kg.
- Model one or two of the suggested strategies.

✓ **TIP:** If modelling adding on, use a number track as a support.

- Now ask the children to look again at the worksheet and work out which items they would remove to lose 4 kg and make the case the right mass. Before the children start, ask whether it matters if they take out more than 4 kg? *Does it matter what they take out of the case?*
- Discuss and model possible strategies: adding a number of objects together to make 4 kg; or subtracting the weight of individual objects from 4 kg (or 22 kg) until the total is sufficiently reduced.

! **WATCH OUT:** Ensure that the children are confident when using the mixed units. You may need to remind them that there are 1,000 g in a kg, so 4,000 g in 4 kg.

- Once the children have identified the items to remove, they tell the rest of the group which items they are and what the mass of the case is now.
- The group should then decide together which items they would recommend Eva should take from her bag.

ACTIVITY 2: Subtracting more masses

- Give each child a copy of Worksheet 21. Explain that the first set of questions asks them to **subtract** amounts of mass. Ask what methods they can use.

✓ **TIP:** Here you are looking for the children to suggest counting on, as in the previous activity, or using a grid as for the work on addition on Day 3. They may also suggest working it out in their heads.

- Explain that for the second set of questions the children need to work out the calculation and see if the answer provided is true or false.
- Finish the session by going through the answers as a group.

OBJECTIVE

- Measure, compare, add and subtract mass (kg/g)

Rising Stars Progression Framework: 3.1.4, 3.2.3, 3.3.4

RESOURCES

- Activity 1: Worksheet 20; number tracks marked in 100 g from 0 to 3 kg, for support if needed; whiteboards
- Activity 2: Worksheet 21; exercise books

Worksheet 20

Name _____ **Date** _____

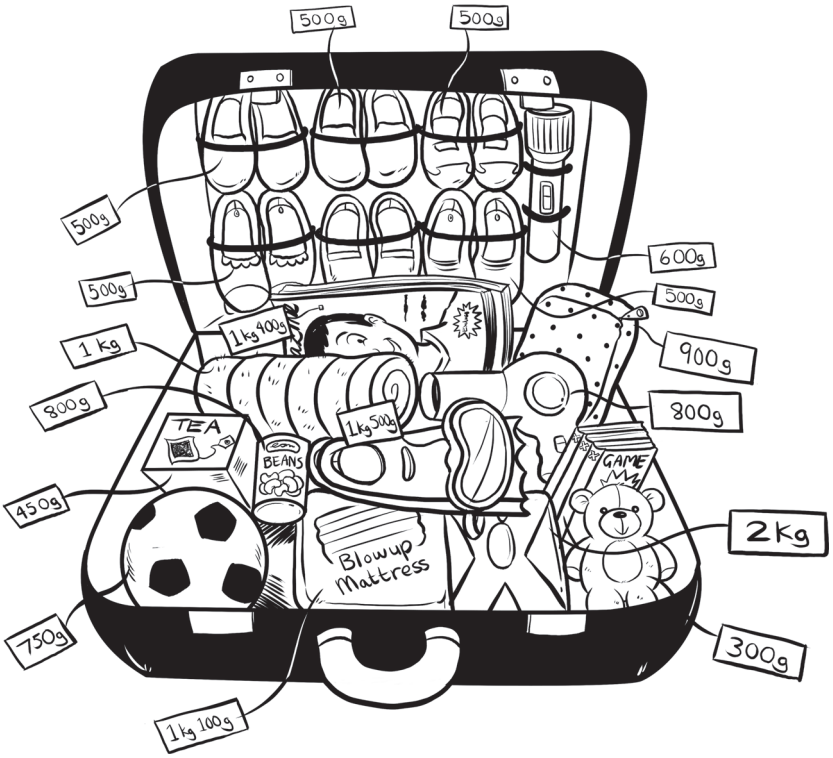
Eva's mass problem

Eva is going away on holiday. She has an 18 kg baggage allowance. The mass of her case is 22 kg.

1. How much heavier is Eva's case than her allowance?

2. Decide which items Eva could take out of her case to make it light enough to go on the plane.

Also think about which items Eva would actually need on holiday. Colour the labels of the items she could do without.



Worksheet 21

Name _____ **Date** _____

Subtracting masses

1. 15 kg – 7 kg = ☐

2. 27 kg – 17 kg = ☐

3. 825 g – 203 g = ☐

4. Amelia needs 325 g of sugar for her cake. She only has 210 g. How much more sugar does she need?

☐

5. George is carrying a box with 2 presents in. The box has a mass of 5 kg 485 g. After removing 1 present, the box has a mass of 2 kg 378 g. What was the mass of the first present?

☐

True or False?

6. 1,300 g > 1 kg 400 g

☐

7. 2 kg – 1 kg 200 g = 800 g

☐

Strand: Measurement

DAY 5

Sub-strand: Mass

ASSESS

ASSESSMENT ACTIVITY

- The purpose of the assessment is to check what each child can do independently, carefully noting down any difficulties and misconceptions. The adult will need to watch carefully what the children do, any strategies used and confidence levels.
- Give out Worksheet 22.
- The first question checks the children's understanding of converting between kilograms and grams.
- The second question asks the children to order masses from heaviest to lightest.
- Question 3 asks the children to identify the best tool for measuring mass.
- Question 4 involves addition and subtraction of masses.
- The final questions require the children to apply their understanding of calculating with masses to contextualised problems.

WATCH OUT: As always, watch the children carefully when they are working. If they seem to be struggling, consider whether this is to do with reading or understanding the question, or knowing the maths. Noticing these differences will help you to decide what the next steps for a particular child might be.

TIP: If the children are struggling to complete the final two questions (problem solving), ask them whether they need to subtract or add the masses and then write the calculation for the children to solve.

- When the children have completed the questions, take the time to go through their answers as a group.

EVIDENCING SUCCESS

Meeting expectations:

- The child can compare and order measures of mass.
- The child can add and subtract using simple measures of mass.
- The child can solve problems involving measure of mass.

OBJECTIVE

- Measure, compare, add and subtract mass (kg/g)

Rising Stars Progression Framework: 3.1.4, 3.2.3, 3.3.4

RESOURCES

- Worksheet 22, pencils

Worksheet 22

Name _____ **Date** _____

Mass

1. a) How many grams in a kilogram? ☐

b) How many grams in half a kilogram? ☐

2. Put these masses in order from heaviest to lightest.

1 kg 570 g 1 kg 507 g 702 g 2 kg 250 g 2,500 g

☐

3. What weighing instrument would you use to measure these masses?

a) Your mass: ☐

b) 200 g of sugar to make a cake: ☐

4. a) 250 g + 620 g = ☐

b) 820 g – 410 g = ☐

c) 1 kg 600 g + 300 g = ☐

d) 4 kg – 2 kg 500 g = ☐

5. Charlotte's mass is 37 kg 500 g. What will her mass be if she carries a case with a mass of 9 kg?

6. Rajmund buys 1,100 g of apples but he drops some into the mud. He has 750 g of apples left. How much did he drop?

Strand: Measurement

DAY 1

Sub-strand: Volume and capacity

TEACH

ACTIVITY: Understanding capacity and how to measure it in litres and millilitres

- To introduce the lesson, show the children the various containers. Ask*: Which of the containers will hold the most and has the **greatest capacity**? Which will hold the least and has the **least capacity**?* Ask the children to explain their answers.

✓ **TIP:** Be sure to keep using the word **capacity** and make sure the children use it when answering. This is a very effective indirect way of teaching the correct use and understanding of vocabulary.

! **WATCH OUT:** The children may be at the stage of still thinking that the tallest container has the greatest capacity. If so, ask them about the wide containers: *Does anyone think their capacity might be greater?* Then ask: *How can we find out what is the correct answer?*

- Introduce the measuring jug. Pass it round the group for the children to see the scale. Check the children understand that the **scale** is in **ml** and **l** and make sure they know what each stands for. Write **litre** and **millilitre** on the board. Ask the children if they know how many millilitres are in a litre. Write 1000 ml = 1 l on the board.
- Explain to the children that you are now going to measure the **capacity** of each container and put them in order from the **greatest capacity** to the **smallest capacity**. Explain that they need to watch carefully as they will be doing it themselves tomorrow.
- Fill the various containers with water and then pour the water into the measuring jug. Write the capacity in ml or l and ml on the board next to a drawing of the container.
- Finally, order the containers from the greatest capacity to the smallest. Now ask the children to compare the order with their previous estimates. Discuss why they may have thought particular containers held more or less than they did. Bear in mind the impact of the shape or height of a container on the children's estimates.

✓ **TIP:** Be aware of the potential for spills and wet floors, so select your teaching space carefully. Consider having cloths or a mop available and possibly a wet floor sign.

OBJECTIVE

- Measure, compare, add and subtract volume/capacity (l/ml)

Rising Stars Progression Framework: 3.1.4, 3.2.3, 3.3.4

RESOURCES

- Variety of containers, e.g. cup, mug, jug, tall thin vase or other container, wide bowl, egg cup;measuring jug (It might be wise to have a mop and bucket available as well as some cloths, just in case!)

Strand: Measurement

DAY 2

Sub-strand: Volume and capacity

TEACH

ACTIVITY: Estimating capacity and reading scales to measure the capacity of different containers

✓ **TIP:** As this activity involves pouring water, you may want to consider where is the best place to work, how spills will be mopped up and whether a wet floor sign should be at hand for safety purposes.

- Start by reminding the children about what they learned previously about the words **capacity**, **litre** and **millilitre**.
- Give each pair of children a set of three different containers. Ask them to **estimate** the capacity of each container.

! **WATCH OUT:** Check the children know what an **estimate** is.

- Children should make a note of their estimated order of capacity in their exercise books by making a quick drawing of the containers and writing their estimates next to them.
- Then give each pair a measuring jug and access to water. You might like to colour the water.
- The children should then write the **actual capacity** of each container in their exercise book.
- Discuss the estimates against the actual measurements and the possible reasons for any errors. This is an opportunity to help the children to learn to self-correct.

OBJECTIVE

- Measure, compare, add and subtract volume/capacity (l/ml)

Rising Stars Progression Framework: 3.1.4, 3.2.3, 3.3.4

RESOURCES

- Selection of different sized containers (different to those used on Day 1); measuring jugs; access to water; colouring for water (if available); exercise books

Strand: Measurement

DAY 3

Sub-strand: Volume and capacity

TEACH

ACTIVITY 1: Adding capacities

- Introduce this scenario to the children: *In the story of 'The Three Bears', Mama Bear is making porridge. She needs oats and milk to make the porridge. She has plenty of oats but not much milk. Has she got enough? She needs 200 ml for Baby Bear, 350 ml for Mama Bear and 450 ml for Papa Bear. How much milk does she need?*
- Write 200 + 350 + 450 on the board and ask the children how they could **add** the amounts.

✓ **TIP:** The children could use **partitioning** to add the numbers together or could use the **number track**. Remind them that they have had lots of practice of adding numbers using partitioning, and they can use this method with numbers involving **measures**.

- Give each child a copy of Worksheet 23 and let the children add the amounts together.
- When they have answered question 1 on the worksheet, ask the children what method they chose to add the amounts of milk. Start with partitioning: *Who used partitioning? Can you explain what you did?* They can show their working on the board. The total comes to 1,000 ml. Did the children remember that there are 1,000 ml in a litre? *Who used a number track? Can you explain what you did?*
- Next tell the children that Baby Bear has invited two friends over so Mama Bear will need another 200 ml of milk for each extra bear. Ask the children to work out how much milk she will now need. Encourage them to use partitioning.
- Finally, ask the children to convert the answer into litres and millilitres if they have not already done so. The amount of milk is 1,400 ml. Ask: *Is this more or less than a litre? How many litres is 1,400 ml? How many millilitres are left over? Is this more or less than a litre? How many millilitres in a litre? How many 1,000 in 1,400? There is one so there is one litre and how many millilitres are left over?* 400 ml are left over so 1,400 ml is 1 l 400 ml.

ACTIVITY 2: Adding more capacities

- Give each child a copy of Worksheet 24. Explain that the first two questions involve adding two amounts together. Remind the children that they can use partitioning to do this.
- Point out that the last question on the worksheet shows a table with statements that use > and < signs. The children must work out the calculation and then decide whether each statement is true or false. Check that the children can remember that > means **more than** and < means **less than**. Use an example to make sure the children are clear, such as 500 ml > 100 ml or 100 ml < 1 l.

OBJECTIVE

- Measure, compare, add and subtract volume/capacity (l/ml)

Rising Stars Progression Framework: 3.1.4, 3.2.3, 3.3.4

RESOURCES

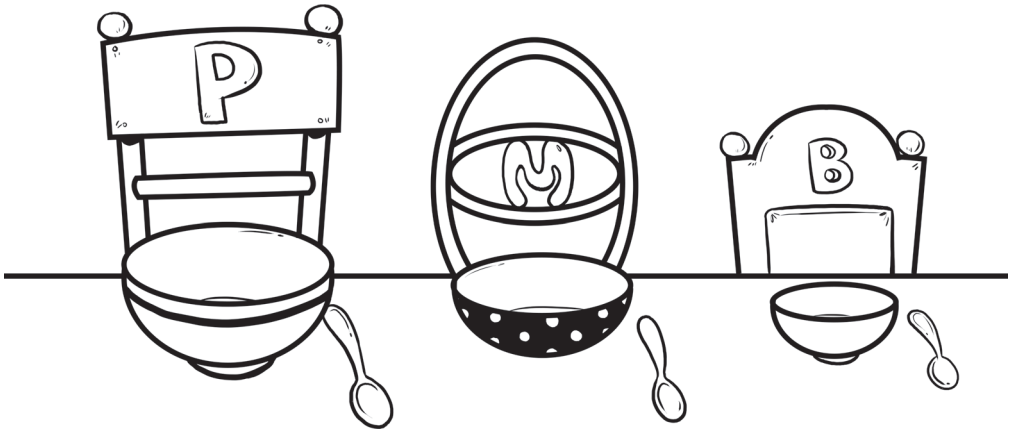
- Activity 1: Number tracks with ml up to two litres; exercise books; Worksheet 23
- Activity 2: Worksheet 24

Worksheet 23

Name _____ **Date** _____

Making porridge for the Three Bears

Mama Bear is making porridge. She needs oats and milk to make the porridge. She has plenty of oats but not much milk. Has she got enough?



1. Mama Bear needs 200 ml for Baby Bear, 350 ml for Mama Bear and 450 ml for Papa Bear. How much milk does she need?

2. Baby Bear has invited 2 friends over to eat. Mama Bear will need another 200 ml of milk for each of the extra bears. How much milk will she need altogether?

Worksheet 24

Name _____ **Date** _____

Adding capacities

1. Andre is making pancakes. He needs 250 ml of water and 354 ml of milk. How much liquid does he need altogether?

2. The Water Company has switched off the water supply for repairs. Mrs Hubbard has 2 jugs of water – 1 jug holds 1 l 500 ml. The other jug holds 2 l 250 ml. How much water do Mrs Hubbard's jugs hold altogether?

True or false?

3. Look at these statements. Are they true or false? Tick the correct box.

	True	False
2,000 ml > 2 l		
1,000 ml + 400 ml = 1 l 400 ml		
1,200 ml > 1 l 100 ml		
576 ml + 24 ml = 650 ml		

Strand: Measurement

DAY 4

Sub-strand: Volume and capacity

TEACH

ACTIVITY 1: Subtracting capacities

- Give each child a copy of Worksheet 25. Introduce the following scenario: *Henry has a bucket that holds 800 ml. He goes to the tap in the garden to fill his bucket. When he pours the water into the tank at home, he finds he only has 320 ml in his bucket. Oh no! He has a hole in his bucket.*
- Give the children a minute to talk to a partner about how to work out how much water disappeared through the hole in the bucket. What is the calculation to use?
- Working as a group, take feedback and write the calculation out: 800 ml – 320 ml =. Ask the children how they could work out the answer.

✓ **TIP:** Here the children could suggest partitioning. They might suggest using the number track or counting with the Base 10 materials.

- Now focus the children on the second part of the story and ask them to work out how much water Henry brought back the second time. Invite the children to choose how to work out the answer.
- Finish the session by discussing which methods the children chose to use and the answers they found.

ACTIVITY 2: Subtracting more capacities

- Give each child a copy Worksheet 26. Ask a child to read the first question out loud to the group. Ask: *Can anyone explain what the calculation will be?*
- Write the calculation on the board: 500 ml – 200 ml. Ask the children to find the answer.
- The children will be aware of a number of possible ways to do the calculation. Some will want the security of using a number track or Base 10 resources. Others will have the confidence to try partitioning or even doing a mental calculation using what they know about the numbers.
- Once the children are secure about how to do subtraction using ml and l, get them to have a go at the other questions on the worksheet.

! **WATCH OUT:** Remind the children of the importance of reading the question carefully and writing numbers neatly.

- Finish the session by sharing the answers and model using partitioning to find the answers.

OBJECTIVE

- Measure, compare, add and subtract volume/capacity (l/ml)

Rising Stars Progression Framework: 3.1.4, 3.2.3, 3.3.4

RESOURCES

- Activity 1: Worksheet 25; access to Base 10 materials; number tracks
- Activity 2: Worksheet 26; access to Base 10 materials; number tracks

Worksheet 25

Name _____ **Date** _____

There's a hole in my bucket

Henry has a bucket that holds 800 ml. He goes to the tap in the garden to fill his bucket. When he pours the water into the tank at home, he finds he only has 320 ml in his bucket. Oh no! He has a hole in his bucket.

1. How much water has Henry lost through the hole in his bucket?

2. Next time Henry goes to the tap to get water, he puts tape over the hole. He fills the bucket again and when he gets home finds he has 400 ml left. How much water did he lose this time?

Worksheet 26

Name _____ **Date** _____

Subtracting capacities

Answer these questions. Show your working each time.

1. Howard has 500 ml in a drinks bottle and spills 200 ml. How much is left in the bottle?

2. Manjeet has a tin of red paint with 2 l in it. He uses I l and 750 ml to paint the living room. How much paint is left in the tin?

3. Jeremy walks home with a goldfish in a bag. It has half a litre of water in it. When he gets home, there is only 200 ml left. How much water leaked out of the bag?

4. Sara has a jug with 1 l of water. She pours half of it away. How much water is left in the jug?

5. 1400 ml – 800 ml =

6. 2 l 350 ml – 1 l 250 ml =

Strand: Measurement

DAY 5

Sub-strand: Volume and capacity

ASSESS

ASSESSMENT ACTIVITY

- The purpose of the assessment is to check what each child can do independently, carefully noting down any difficulties and misconceptions. The adult will need to watch carefully what the children do, any strategies used and confidence levels.
- Give each child a copy of Worksheet 27.
- The first question shows containers with amounts of liquid in them. The children need to look at the scale and see how much is in each. There is a space to write the amount in ml.
- Point out that the scale is different on each container, e.g. the second container holds a total of 10 ml and is divided into 1 ml sections with even smaller measures in between. The third container has a scale from 0 to 50 and is divided into sections of 5 ml.

✓ **TIP:** Remind the children that they will need to look at the scales carefully to see how much is in each container.

- Question 2 gives four amounts and the children must decide which is the largest amount.

! **WATCH OUT:** The children will need to remember how many millilitres are in a litre to solve some of these questions.

- The final questions are short calculation problems involving adding or subtracting amounts of millilitres.

EVIDENCING SUCCESS

Meeting expectations:

- The child can add and subtract litres and millilitres.
- The child can compare different amounts of litres and millilitres.
- The child can read scaled jugs with varying scales.

OBJECTIVE

- Measure, compare, add and subtract volume/capacity (l/ml)

Rising Stars Progression Framework: 3.1.4, 3.2.3, 3.3.4

RESOURCES

- Worksheet 27; pencils

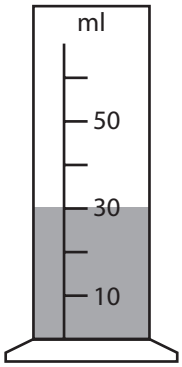
Worksheet 27

Name _____ **Date** _____

Volume and capacity

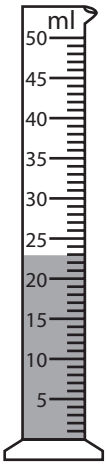
1. How many millilitres are in each measuring cylinder?

a)



b)

c)



2. Which jug has the greatest capacity? Circle it.

2 l 250 ml

2 l 520 ml

1,500 ml

2,750 ml

3. 1 cup of tea is 130 ml. How much tea will be in 2 cups?

4. My can of drink holds 350 ml. There is 150 ml left. How much did I drink?

5. A lamb drinks 400 ml of milk. How much do 2 lambs drink?

Strand: Geometry

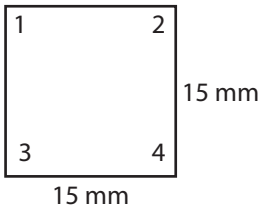
DAY 1

Sub-strand: Properties of shapes

TEACH

ACTIVITY: Introducing right angles

- Draw a square on the board. Ask the children: *What can you tell me about this shape? What is its name? How many sides does it have? How many corners?* Confirm with the children that the shape is a **square**, it has four sides that are the same length, and it has four corners.
- Now ask: *What do we call the turn between the two straight lines, where they meet at a point (the corner)?* Clarify with the children that it is an **angle**.
- Write a number in each corner of the square, as follows:



- Using a 2-D plastic square, match the corners to demonstrate to the children that they are all the same size. Explain to the children that square corners like this are called **right angles**.
- Now ask the children to work in pairs with a selection of 2-D and 3-D shapes. Explain that they are going to be 'Right Angle Detectives'. Tell the children that they have two minutes to find as many right angles as they can in the shapes they have been given.
- Finish by asking each pair to show a couple of the right angles they have found.
- Explain to the children that, as Right Angle Detectives, their next assignment is to search in the classroom for right angles. The children may suggest right angles they find in the corner of a window, a book, the door, etc.
- Show them a plastic square and demonstrate how to use it to check for right angles. (You could use a book for demonstration purposes.)
- Give each child a plastic square to check three of the right angles they have spotted to see if they are right angles.
- Ask the children to share their three findings with a partner. Ask: *What do you notice about the kinds of shapes that have right angles and what kinds of shapes do not have right angles?* Here the children may suggest things such as a clock, a pencil, a plant, items of clothing, a hand or another part of a body, a pattern on a school bag or on a display in class.

OBJECTIVES

- Recognise angles as a property of shape or a description of a turn
- Identify right angles; recognise that two right angles make a half turn, three make three-quarters of a turn and four make a complete turn; identify whether angles are greater than or less than a right angle

Rising Stars Progression Framework: 3.3.1, 3.3.2, 3.3.3

RESOURCES

- 2-D plastic squares, two for each child; class whiteboard; selection of up to six 2-D and 3-D shapes for each pair of children

Strand: Geometry

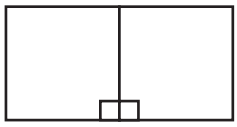
DAY 2

Sub-strand: Properties of shapes

TEACH

ACTIVITY 1: Right angles on a straight line

- Start by recapping on learning from Day 1 on right angles. Ask: *What do we call the angle in the corner of a square?*
- Now position the two 2-D plastic squares side-by-side, as shown. Mark or point to the two right angles in the centre.



- Ask the children to stay seated and look round the room. Ask them: *Can anyone see a straight line?*
- When a child finds a straight line, e.g. a table top, a window ledge, the front cover of a book, etc., give him or her the two 2-D plastic squares. The child should place them on the observed line and check whether is made of two right angles.
- Continue by letting the children each find a line and then check that it has two right angles.

✓ **TIP:** Make sure that the children hold the squares steady, so that they form a straight line and the two right angles are lined up against each other.

ACTIVITY 2: Quarter and half turns

- For this activity, position a cardboard 'arrow' in the middle of a paper plate, e.g. using a round-head paper fastener.
- Mark the start with the black pen. Ask: *How far do I need to turn the arrow to make a **right angle**?* Take the children's responses by letting them point to where they think the arrow would rest. Turn the arrow, mark the spot and ask the children: *How many turns have we made?* (One)
- Turn the arrow through another right angle and mark the spot. Ask: *How many turns have we made now?* (Two)
- Continue by making a third turn and then turning the arrow again.
- Ask: *How many turns did it take to move the arrow around the plate?* (Four)
- Explain to the children that, as it takes four turns to go round the full circle, we could call each turn a **quarter turn**.
- Now ask the children to show you how far the arrow moves during two quarter turns. Ask what we could call this and establish that this is a **half turn**.
- Ask the children: *How many half turns in a whole turn?* (Two) Demonstrate to show the correct answer.

OBJECTIVES

- Recognise angles as a property of shape or a description of a turn
- Identify right angles; recognise that two right angles make a half turn, three make three-quarters of a turn and four make a complete turn; identify whether angles are greater than or less than a right angle

Rising Stars Progression Framework: 3.3.1, 3.3.2, 3.3.3

RESOURCES

- Activity 1: 2-D plastic squares
- Activity 2: Paper plate; arrow and paper fastener; black pen

Strand: Geometry

DAY 3

Sub-strand: Properties of shapes

TEACH

ACTIVITY 1: Angles less than a right angle

- Hand out copies of Worksheet 1. Explain that, for the first question, they need to draw a red circle around all the letters with a **right angle**. Allow the children some time to do this and then go through their answers.
- Now ask the children to look at the letter A. Point out the **acute angle**, introducing the term to the children and writing it on the board.
- Ask whether the acute angle is bigger or smaller than a right angle. Explain to them that any angle that is smaller than a right angle is called an acute angle.
- Let the children go through the sheet marking the acute angles by drawing a circle around them using their green pencil.
- Finish the session by checking through the alphabet with the children.

✓ **TIP:** If there are disagreements, let the children explain why they think there is or is not an **acute angle** in a particular letter. Ask if the children can see how they could use their plastic right angle from Day 1 to help them.

ACTIVITY 2: Angles greater than a right angle

- Set the clock to 3:00. Ask the children what angle the hands are making. Check that they are all able to identify that this is a right angle.
- Now set the clock to 9:00 (**right angle**) and 2:00 (**acute angle**), making sure that all children are clear about which angle is which and can name them.
- Ask the children: *What other times will give us an acute angle?* Work with them to identify the following times: 1:00, 11:00, 10:00.
- Now say to the children: *Let's look at the angle the big hands and little hands of the clock make when the time is 5:00. The angle is bigger than a right angle. It is called an* ***obtuse angle****.*

✓ **TIP:** A key way for the children to learn new vocabulary is for you to model its use in context, so always use correct mathematical vocabulary and encourage the children to do the same. Notice when they do and praise them for this.

- To reinforce understanding, ask the children what other times have an **obtuse angle**. Work with them to identify the following times: 7:00, 8:00, 4:00.

OBJECTIVES

- Recognise angles as a property of shape or a description of a turn
- Identify right angles; recognise that two right angles make a half turn, three make three-quarters of a turn and four make a complete turn; identify whether angles are greater than or less than a right angle

Rising Stars Progression Framework: 3.3.1, 3.3.2, 3.3.3

RESOURCES

- Activity 1: Worksheet 1; coloured pencils
- Activity 2: Clock face with moveable hands

Worksheet 1

Name _____ **Date** _____

Alphabet sheet

Look at the alphabet.

- Put a **red** circle round all the letters with a **right angle**.
- Put a **green** circle round all the letters with an **acute angle**.

A B C D E F

G H I J K L

M N O P Q R

S T U V W X

Y Z

Strand: Geometry

DAY 4

Sub-strand: Properties of shapes

TEACH

ACTIVITY 1: Identifying different types of angle

- Remind the children that they have now learned about three types of angles. Ask who can remember the names. Write the names on the board for the children (**right angles**, **acute angles**, **obtuse angles**). Ask if one of the children would like to draw the angle next to the word. After they have drawn it on the board, ask if they had a particular way of remembering what the angle was like.
- Give out Worksheet 2, which shows different objects. The first picture is a pair of scissors. Ask: *Can you see some angles in the scissors?* When the children spot the angles created by the handles and the blades, draw an arc to mark the angle and ask what type of angle it is. Write the correct word next to the marked angle – **acute**, **obtuse** or **right angle**.

WATCH OUT: Some of the pictures on Worksheet 2 have many angles, such as the Union Jack and the house. Support the children by suggesting that they can find just three angles for each initially and then come back to find more if there is time.

ACTIVITY 2: Making turns

- Say to the children: *We are going to use what we know about turns to play 'Simon Says'.* Make sure everyone is clear about the rules of the game.

WATCH OUT: Make sure there is enough space, so that the children can make turns safely without bumping into each other or any furniture.

- Start by demonstrating a turn. Choose a direction and ask all the children to face that direction. Now tell the children that you are going to make a quarter turn to the right. Ask them: *What will I be facing when I have made my turn?* Now model making a **quarter turn**.
- Have a practice go with the adult giving the instructions, e.g. *Simon Says make a quarter turn.*
- After a few goes you can introduce turns to the left or the right.

TIP: Some children will be unsure of left and right. One solution could be to give them something to hold in their right hand, such as a pencil or other object, to remind them which direction is right.

- Then allow the children to take turns being 'Simon'.

OBJECTIVES

- Recognise angles as a property of shape or a description of a turn
- Identify right angles; recognise that two right angles make a half turn, three make three-quarters of a turn and four make a complete turn; identify whether angles are greater than or less than a right angle

Rising Stars Progression Framework: 3.3.1, 3.3.2, 3.3.3

RESOURCES

- Activity 1: Worksheet 2
- Activity 2: Ensure the children have adequate space to turn around in

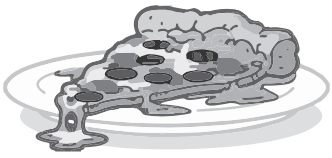
Worksheet 2

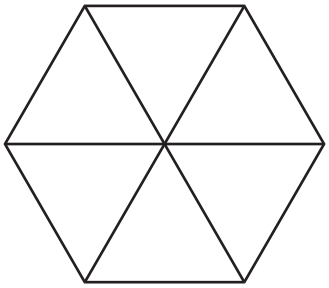
Name _____ **Date** _____

Spot the angle

Label and identify the angles you can see.

acute angle	obtuse angle	right angle





Strand: Geometry

DAY 5

Sub-strand: Properties of shapes

ASSESS

ASSESSMENT ACTIVITY

- The purpose of the assessment is to check what each child can do independently, carefully noting down any difficulties and misconceptions. The adult will need to watch carefully what the children do, any strategies used and confidence levels.
- Give each child Worksheet 3. The first question asks the children to look at a number of **angles** and identify which type they are. The second question asks the children to compare two angles and say whether the statement about them is true or false.

TIP: You may want to remind the children that **>** means **more than** and **<** means **less than**.

- The final question involves the children in helping Scruffy the Dog to find his bone. They are asked to first find a path through the maze and secondly to count the number of right-angled turns needed to get the bone.
- Finish the session by going through the questions as a group.

EVIDENCING SUCCESS

Meeting expectations:

- The child can identify a path through a maze and the number of **right-angled** turns.
- The child can sort a set of angles according to whether they are greater than or less than a right angle.
- The child can identify **right**, **acute** and **obtuse** angles.

OBJECTIVES

- Recognise angles as a property of shape or a description of a turn
- Identify right angles; recognise that two right angles make a half turn, three make three-quarters of a turn and four make a complete turn; identify whether angles are greater than or less than a right angle

Rising Stars Progression Framework: 3.3.1, 3.3.2, 3.3.3

RESOURCES

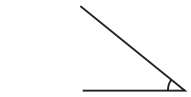
- Worksheet 3; pencils

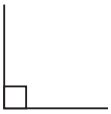
Worksheet 3

Name _____ **Date** _____

Angles

1. Match each angle to its name by drawing a line to link them.



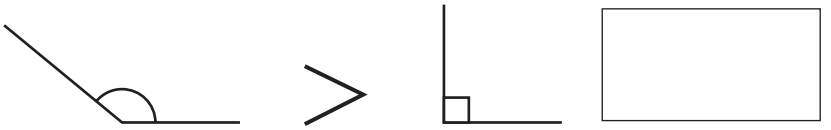


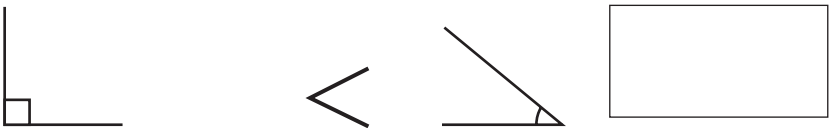
right angle

obtuse angle

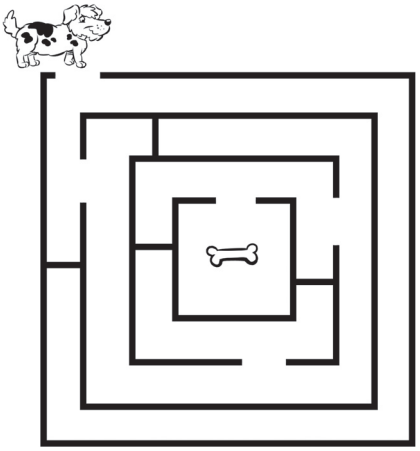
acute angle

2. True or false?

a) 

b) 

3. Draw a path to help Scruffy the Dog find his bone. Draw the path to the middle. How many right-angled turns does Scruffy the Dog need to make to get to the middle of the maze?



Strand: Geometry

DAY 1

Sub-strand: Properties of shapes

TEACH

ACTIVITY 1: Refresher of 2-D shapes

- Display the selection of **2-D shapes** and ask the children: *What do you know about these shapes?* Questions to ask include: *What is the name of each shape? What do you know about the lengths of the sides? Are they the same or different? How many **angles** does each shape have? What kind of angles do the shapes have? How many right-angled turns are there in a circle?*

✓ **TIP:** Encourage the children to share what they know; this is intended to be confidence building. E.g., are the children confident in talking about angles and the type of angle? Are they using the correct vocabulary confidently?

- Go over some key aspects of the shapes and then point out: *We are talking about the **properties** of the shapes.*

! **WATCH OUT:** As always, make sure you use the correct mathematical vocabulary as a model for the children, such as **angles** rather than corners, **faces** rather than sides.

ACTIVITY 2: Vertical, horizontal, perpendicular and parallel lines

- Remind the children about **vertical** and **horizontal lines**. Ask a child to draw a vertical line on the board. Ask the group where you might find vertical lines in the environment. Examples could include street lamps, telephone poles, flag poles.
- Next ask a child to draw a horizontal line and again ask for examples. These could include roads, a path.
- Show the children a pair of **parallel lines**. Explain that they are lines that stay the same distance from each other and never meet.
- Can the children suggest where they could find parallel lines? Examples include railway tracks, the edges of a window or door, the sides of a table. Help the children to notice that shapes such as rectangles and squares have sides that are parallel.
- Finally explain that **perpendicular lines** meet at a right angle. Look around and find some examples, such as the skirting boards, on an exercise book, etc.
- Now ask the children to write their names in large capital letters. Ask them to see what different types of lines they can find in their name. When they have done this, get them to swap with a partner to check each other's names.

OBJECTIVES

- Recognise 3-D shapes in different orientations and describe them
- Identify horizontal and vertical lines and pairs of perpendicular and parallel lines

Rising Stars Progression Framework: 3.2.1, 3.2.2, 3.2.3

RESOURCES

- Activity 1: Selection of 2-D shapes including square, rectangle, pentagon, circle, isosceles triangle, right-angled triangle, scalene triangle
- Activity 2: paper and pencils

Strand: Geometry

DAY 2

Sub-strand: Properties of shapes

TEACH

ACTIVITY: Exploring 3-D shapes through nets

- Ask the children: *Do you know the names of any of these **3-D shapes**?* Write the names on the board – **cylinder**, **cuboid**, **prism**, **cube** – drawing the children's attention to the spelling patterns.
- Now ask: *Why are these shapes called 3-D shapes?* Help the children to refer to the three dimensions of length and width and depth, and draw out the comparison with 2-D shapes that only have length and width.
- Now ask: *What do we already know about these shapes?* The children may identify some of the 2-D shapes they can see in the 3-D shapes. Encourage them to turn the shape around and consider the different **faces** of the shapes.
- Starting with a cuboid (e.g. this could be a cereal box), open it up to show all the 2-D shapes. Explain that when a 3-D shape is opened up like this, it is called a **net**.

✓ **TIP:** The children will already know the word **net** in other contexts, e.g. fishing *net*, inter*net*. Ask about their understanding of the word **net** and explain that in maths it has this special meaning to describe a pattern you can cut and fold to make a solid shape.

- Show each part of the net and ask the children to name the shapes within it.
- Ask them: *What else do you know about the shapes in the net?* Here you are looking for answers related to: the number of corners, the types of angles they can see, the number of faces, the lengths of the sides (i.e. two the same), the types of lines (i.e. whether they are parallel).
- Fold the net back into its 3-D shape again. Tell the children that this type of 3-D shape is called a **cuboid.**
- Now give each child a copy of Worksheet 4, with the table to be completed. Show the children the column labelled 'cuboid' and work as a group to complete the information boxes in the first column.
- Then look at the other shapes. Give each pair a shape to explore – **prism**, **cube** or **cylinder**. Ask the pairs to find out as much as they can about their shape and record it in the table on Worksheet 4. Finally, the children feedback to the group.

! **WATCH OUT:** Ensure that the children are looking at the shapes in different orientations. It is important that they can think flexibly about properties of shapes and don't become reliant on identifying shapes through orientation.

- Point out the differences between the shapes, such as those with no right angles, and the similarities between them, such as those with only right angles.

✓ **TIP:** Remember to always keep the focus on what the children already know by asking them to predict what shapes will make up the net.

OBJECTIVES

- Recognise 3-D shapes in different orientations and describe them
- Identify horizontal and vertical lines and pairs of perpendicular and parallel lines

Rising Stars Progression Framework: 3.2.1, 3.2.2, 3.2.3

RESOURCES

- Different-shaped 3-D packets, including a cylinder, a cuboid, a prism and a cube; board to write on; Worksheet 4

Worksheet 4

Name _____ **Date** _____

3-D shapes through nets

Complete this table with the information you have found out about 3-D shapes.

	Cuboid	**Cube**	**Prism**	**Cylinder**
Number of squares				
Number of rectangles				
Number of triangles				
Number of circles				
Number of right angles				
Number of parallel lines				

Strand: Geometry

DAY 3

Sub-strand: Properties of shapes

TEACH

ACTIVITY: Identify 3-D shapes from properties

- Tell the children that they will be playing the game 'Ten questions'. Explain: *I will put my hand in the bag and pick out one of the **shapes**. You can ask me a total of ten questions to help you identify what the shape is.*
- Before you start the game, show the children the 3-D shapes you have in the bag and quickly review the names of each shape. Show the shapes in different orientations. You could write the names on the board.

TIP: Spend a few minutes considering the types of questions the children could ask. If the children struggle to make suggestions, you could prompt them by asking what they know about shapes, e.g. they know about *faces*, so you could ask them: *What could you ask about faces?* (They could ask how many faces.) Write the questions on the board to support the children when they are making up their own questions.

- Continue to steer the children to thinking about the other properties of shapes that they know about, such as the shapes of **faces** and **angles**.

WATCH OUT: Be aware that there might be a child who struggles to ask useful questions. E.g., a child might ask: *What colour is the shape?* If this happens, let them be the person who has their hand in the bag and who answers the questions.

- After the first round of the game, you can either continue to select a shape for the children to identify or you could let the children have a turn each at being the 'shape chooser'. If you let a child be the chooser, make sure you have a secret conversation with them to make sure they know the name of the shape they are holding!

OBJECTIVES

- Recognise 3-D shapes in different orientations and describe them
- Identify horizontal and vertical lines and pairs of perpendicular and parallel lines

Rising Stars Progression Framework: 3.2.1, 3.2.2, 3.2.3

RESOURCES

- Feely bag containing a variety of 3-D shapes

Strand: Geometry

DAY 4

Sub-strand: Properties of shapes

TEACH

ACTIVITY 1: Consolidating the vocabulary of shape

✓ **TIP:** If you have children in the group who you think may struggle due to reading or memory difficulties, put them in pairs to support each other.

- Give each child a copy of Worksheet 5. Explain that they will be thinking about the names of different **shapes** and the **properties** of shapes that they have been learning about.
- Ask: *Who can remember what the property of a shape means?* You are looking for answers linked to the features or qualities of a shape, such as the number of **sides**, the types of **angles**, etc.
- Tell the children to complete Worksheet 5 by drawing lines to match the words and the pictures.

! **WATCH OUT:** If a child does not know what a particular property or shape is, suggest they leave it until the group go through the answers together.

- Finish the session by going through the answers. Ask children who successfully linked a picture to a word to explain it to the rest of the group.

ACTIVITY 2: Defining mathematical words

- Hand out Worksheet 6 to the children and draw their attention to the two types of questions.
- The first question asks you to circle the correct picture. *How do we **define** a **net** in maths? All of these pictures are nets but what do we mean when we use the word in maths?*
- Allow the children to circle the correct picture and then discuss how they came to their answers.
- For questions 2 and 3, ask the children to circle the picture they think represents the mathematical definition of each word.
- After they have circled the answer the children should explain to a friend how they came to their decision. *How did you know? Could you give me an example of the word in context?*
- For questions 4 and 5, the children need to write a simple definition of the term.
- If the children are struggling to give you a definition, ask them to draw a picture of it or describe where they might find it.

OBJECTIVES

- Recognise 3-D shapes in different orientations and describe them
- Identify horizontal and vertical lines and pairs of perpendicular and parallel lines

Rising Stars Progression Framework: 3.2.1, 3.2.2, 3.2.3

RESOURCES

- Activity 1: Worksheet 5; a pencil
- Activity 2: Worksheet 6; a pencil

Worksheet 5

Name _____ **Date** _____

Shape vocabulary

Can you match the words to the pictures? Draw lines to link them.

acute angle

cube

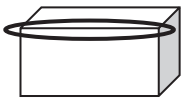
edge

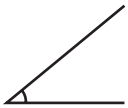
obtuse angle

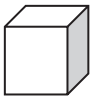
face

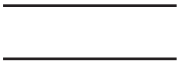
parallel lines

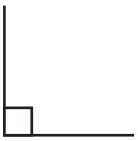
right angle

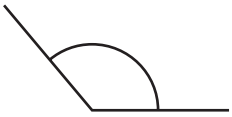












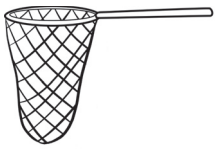
Worksheet 6

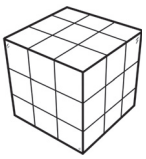
Name _____ **Date** _____

Defining mathematical words

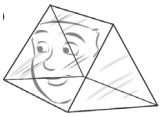
Which is the correct meaning in maths? Draw a circle around the correct one.

1. Net

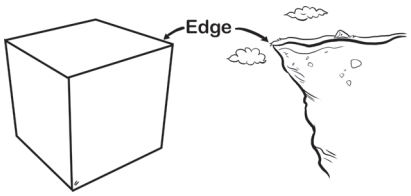




2. Face



3. Edge



4. What is a square?

.....

.....

.....

5. What is a vertex?

.....

.....

.....

Strand: Geometry

DAY 5

Sub-strand: Properties of shapes

ASSESS

ASSESSMENT ACTIVITY

- The purpose of the assessment is to check what each child can do independently, carefully noting down any difficulties and misconceptions. The adult will need to watch carefully what the children do, any strategies used and confidence levels.
- Give out Worksheet 7.
- The first four questions are in the form of a puzzle. They give some clues and ask the children to identify the **shape**.
- The next two questions ask the children to identify the types of lines in a drawing.

✓ **TIP:** If a child seems to be struggling, offer them the support of some 3-D shapes. Make a note of this support.

- When all the children have finished, go through the questions and the children can mark their own work.

EVIDENCING SUCCESS

Meeting expectations:

- The child can identify vertical lines and horizontal lines, noticing that they are perpendicular.
- The child can identify instances of parallel lines in the environment and in shapes.
- The child can identify basic 3-D shapes such as cube, cuboid, prism, cylinder and can describe some of their properties.

OBJECTIVES

- Recognise 3-D shapes in different orientations and describe them
- Identify horizontal and vertical lines and pairs of perpendicular and parallel lines

Rising Stars Progression Framework: 3.2.1, 3.2.2, 3.2.3

RESOURCES

- Worksheet 7 3-D shapes

Worksheet 7

Name _____ **Date** _____

Properties of shape

1. I have 4 equal sides. I have 4 right angles. What am I?

.....

2. I have 4 sides. I have 4 right angles. 2 of my sides are the same and the other 2 sides are equal. What am I?

.....

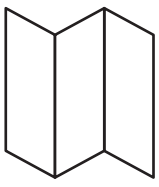
3. I have 6 faces. Each face is a square. What am I?

.....

4. I have 3 sides. I have no right angles. What am I?

.....

5. How many vertical lines can you see here?



.....

6. Which lines are parallel in each shape? Mark a cross (X) on the pairs of parallel lines.

Strand: Statistics

DAY 1

TEACH

Sub-strand: Present, interpret and solve data problems

ACTIVITY 1: Introducing pictograms

- Show the sweets to the children. Tell the children: *The sweet-maker wants to check the number of different coloured sweets in each packet. How could this be done?* The children's answers should involve counting the sweets.
- Sort some of the sweets into colours and then tell the children that you are going to show how many of each coloured sweet there is using a **pictogram**.

✓ **TIP:** The children need to be clear that pictograms – and later charts, graphs and tables – are all ways of sharing information. Over time, they will learn to select the best way to present data.

- Show the children how to put the information about the different coloured sweets (**data**) into a **pictogram** using actual sweets and the squared paper.
- Say to the children: *This is a **pictogram**. Why do you think it is called a pictogram?* The children will probably understand that it involves pictures or objects. They may think it has to be actual objects as in the example, so explain it is usually pictures.
- Ask questions to help the children to read the information, such as *How many red sweets are there? How many fewer blue sweets are there than orange sweets?*

ACTIVITY 2: Introducing bar charts

- First draw the **axes** and tell the children that they are called the **vertical axis** and the **horizontal axis**.

! **WATCH OUT:** If the children are unsure about which direction is vertical and which is horizontal, reinforce this using a very simple game of 'Simon Says': *Make your arm vertical*, *Make your arm horizontal*, etc.

- Then label the axes. Write the colours of the sweets from Activity 1 along the **horizontal axis** and the numbers up the **vertical axis**.

✓ **TIP:** Remember to use the correct mathematical language, so the children can learn the new words and how they are used. Don't fall into the trap of calling them 'along the bottom' and 'up the side'.

- Ask: *How many sweets are there of each colour?* Ask them to point to where the bar will go to for each colour. Explain that this is a **bar chart**.
- Complete the bar chart, talking the children through each step as you do it. E.g. *the first colour on the horizontal axis is green. There are three green sweets. I look up the vertical axis until I find the number 3. Now I use a ruler to draw a bar up to 3 in the green column.*

OBJECTIVES

- Interpret and present data using bar charts, pictograms and tables
- Solve one-step and two-step questions using information presented in scaled bar charts and pictograms and tables

Rising Stars Progression Framework: 3.1.1, 3.2.1, 3.3.1, 3.3.2

RESOURCES

- Activity 1: 350 g of wrapped sweets with different colour wrappers; squared paper
- Activity 2: A3 squared paper or a whiteboard to draw on

Strand: Statistics

DAY 2

Sub-strand: Present, interpret and solve data problems

TEACH

ACTIVITY 1: Reading a bar chart

- Recap the problem from Day 1: *The sweet-maker wants to check the number of different coloured sweets in each packet. How could this be done?*
- Tell the children that you will use the **bar chart** to find the answer to some questions. Display the bar chart from Day 1 Activity 2 and ask:
  - *Which colour is there most of? How did you work that out?*
  - *Which colour is there least of?*
  - *How many (of a certain colour) sweets are there? How do you know?*
  - *What can you tell me about the sweets from looking at the bar chart?*

✓ **TIP:** Some questions are '***one-step problems***' requiring a simple response, such as the child looks at the bar chart and tells you how many sweets of a particular colour there are. A '***two-step problem***' requires finding one piece of information and then a second, e.g. there is more of one colour than another. A more complex two-step question would be to ask how many more red sweets there are than green sweets.

ACTIVITY 2: Introducing tables

- Hand out copies of Worksheet 1 to the children. Explain that they will create a **table** for the **data** they collected on sweets in the previous lesson.

✓ **TIP:** Be prepared to spend a bit of time explaining the concept of tables. Show examples of different kinds of tables. Multiplication tables and the four-legged types will come up! Try to steer them to bus timetables, train timetables, tables of ingredients, etc.

- Look at the blank table on Worksheet 1. Point out that the table has two columns: the left column is labelled 'Colour of sweets' while the right column is labelled 'Number of sweets'. Ask: *What do you think should go in the left/right column? Where will we find the numbers of each colour sweet so we can complete the table?*

! **WATCH OUT:** Point out the column headings, so the children can see that they are essential.

- The children complete the bar chart on Worksheet 1 and then use the information from the bar chart to fill in the table.

OBJECTIVES

- Interpret and present data using bar charts, pictograms and tables
- Solve one-step and two-step questions using information presented in scaled bar charts and pictograms and tables

Rising Stars Progression Framework: 3.1.1, 3.2.1, 3.3.1, 3.3.2

RESOURCES

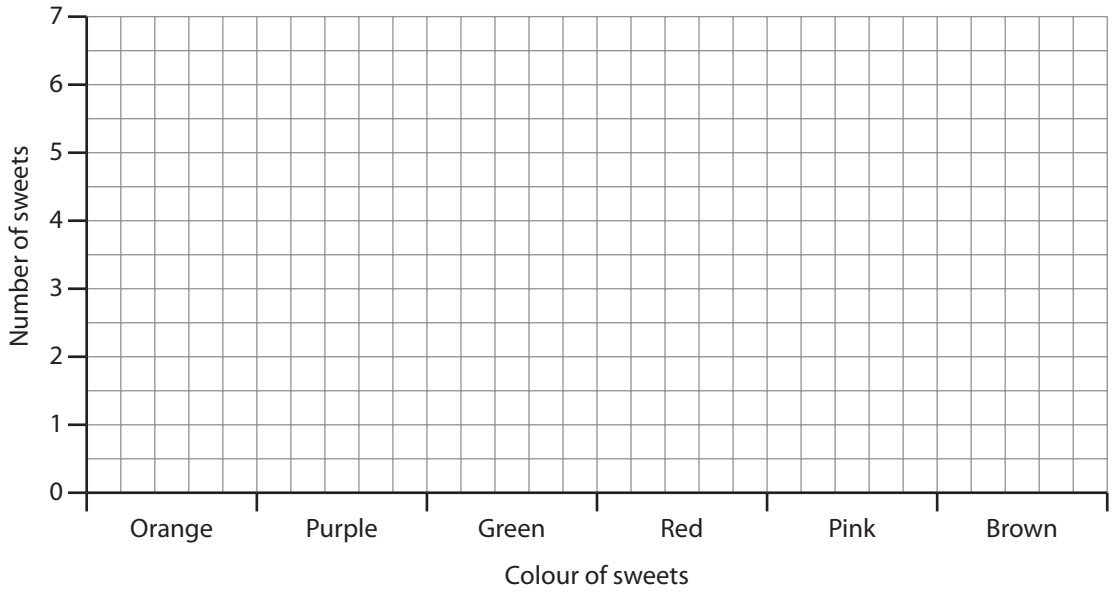
- Activity 1: Bar chart of sweets from Day 1 Activity 2
- Activity 2: Worksheet 1; copy of examples of tables, e.g. a bus timetable, the ingredient panel from a food packet

Worksheet 1

Name _____ **Date** _____

Bar chart and table

1. Complete the blank bar chart to show the numbers of each of the different coloured sweets.



2. Now add the data (information) from your bar chart to the table.

Colour of sweets	Number of sweets

Strand: Statistics

DAY 3

Sub-strand: Present, interpret and solve data problems

TEACH

ACTIVITY 1: Reading and understanding a scaled bar chart

- Before the lesson starts, create a bar chart showing the different colours of all the sweets from the box (rather than the small selection of sweets used previously). Ensure that your vertical scale goes up in twos, with one square representing two each time.
- Display the bar chart and say: *This **bar chart** is similar to the one we looked at previously, but it is also different. Can you spot a difference?*
- Confirm with the children that the numbers on the **vertical axis** go up in twos rather than going up by one, as before.
- Use questioning to get the children to explain to you what the numbering on the vertical axis means. Ask them: *What is each square worth? Why do you think the graph has been drawn this way?*

✓ **TIP:** You are helping the children to see that because the numbers are big, each square has to be worth more than one so the vertical axis can fit on the page.

- Check the children's understanding of the bar chart by asking them questions such as: *How many red sweets are in the tin? How many green sweets? Which colour is there most of? How many more pink sweets than brown sweets are there?*
- If time allows, encourage one of the children to ask a question based on the displayed bar chart, for the rest of the group to answer.

ACTIVITY 2: Completing a table from a scaled bar chart

- Hand out copies of Worksheet 2, which shows a blank chart and table. The children should complete these using the information from the class bar chart displayed on the board. Before they begin, point out the **markings** on the vertical axis, which increase by two, and the headings on the table.
- Ask the children to complete the bar chart on Worksheet 2 using the data from the class board, and to then complete the table using the information from the bar chart.
- When they have finished, bring the children together to compare answers and check for any errors.

! **WATCH OUT:** Errors are most likely to be caused by reading the bar chart inaccurately when looking across from the top of a column to the numbers on the vertical axis.

OBJECTIVES

- Interpret and present data using bar charts, pictograms and tables
- Solve one-step and two-step questions using information presented in scaled bar charts and pictograms and tables

Rising Stars Progression Framework: 3.1.1, 3.2.1, 3.3.1, 3.3.2

RESOURCES

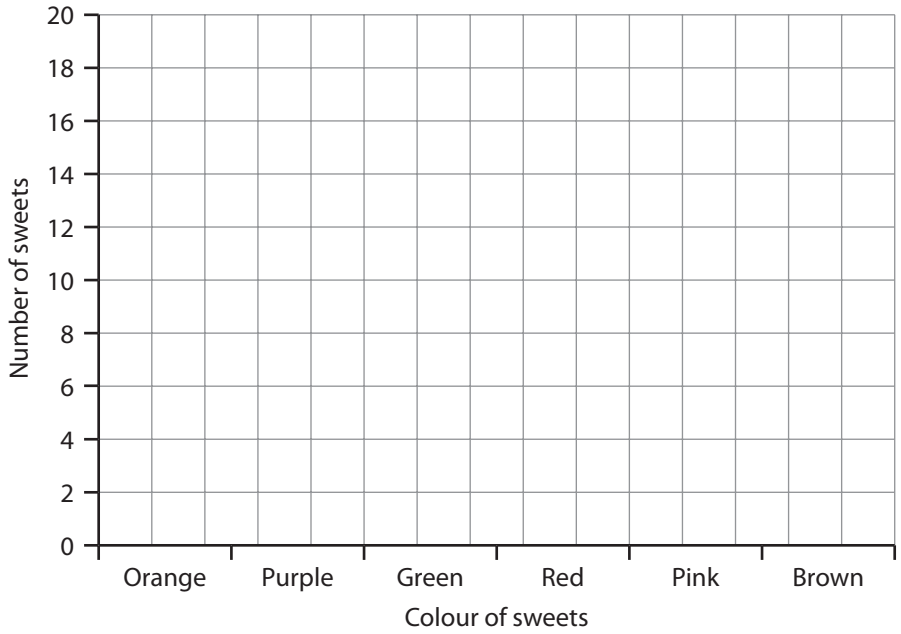
- Activity 1: Bar chart of the sweets from a whole box, either drawn on the class whiteboard or on a large piece of paper
- Activity 2: Worksheet 2

Worksheet 2

Name _____ **Date** _____

Completing a table from a scaled bar chart

1. Complete the blank bar chart to show the numbers of each of the different coloured sweets.



2. Now add the data (information) from your bar chart to the table.

Colour of sweets	Number of sweets

Strand: Statistics

DAY 4

TEACH

Sub-strand: Present, interpret and solve data problems

ACTIVITY 1: One-step problems based on a scaled bar chart

- Give each child a copy of Worksheet 3.
- Start by asking a couple of simple questions to ensure the children can read the chart accurately. E.g.
  - *How many people prefer the brown sweets?*
  - *How many people prefer the purple sweets?*
  - *Which was the least popular type of sweet?*

✓ **TIP:** Ask the children how they know they have the right answer. This provides an opportunity to check that they understand the scaling on the chart.

- Now ask the children to answer the questions on Worksheet 3 independently.
- Finish by going through the answers as a group.

ACTIVITY 2: Two-step problems based on a scaled bar chart

- Start by referring children to the chart on Worksheet 3 and asking: *How many more people preferred purple sweets than silver sweets?* Get them to talk to a partner for a minute and discuss how they could solve the problem.

✓ **TIP:** Here the children need to find out how many chose purple sweets and how many chose silver. They then need to find the **difference** between the two numbers. Check that they are clear about this two-step process.

- When the minute is up, ask one pair to explain how they think the problem can be solved. Let the rest of the group comment and discuss the best approach. Now ask the children to find the answer.
- Ask the children another question: *How many more people preferred purple sweets than yellow sweets?* Again, let the children discuss the solution in pairs, share with the group and then find the answer.
- Now give the children this problem to solve: *Eight men preferred gold sweets. How many women preferred gold sweets?*

✓ **TIP:** In this question the children must use inference as the chart does not explicitly divide the data into men and women.

- Continue to ask questions until the end of the session, e.g. *How many more people prefer gold sweets to red sweets? If a box of sweets contained no red sweets, how many people would be unhappy?*
- The number of questions the children answer in the time available will depend on their confidence in interpreting the questions and finding the solution.

OBJECTIVES

- Interpret and present data using bar charts, pictograms and tables
- Solve one-step and two-step questions using information presented in scaled bar charts and pictograms and tables

Rising Stars Progression Framework: 3.1.1, 3.2.1, 3.3.1, 3.3.2

RESOURCES

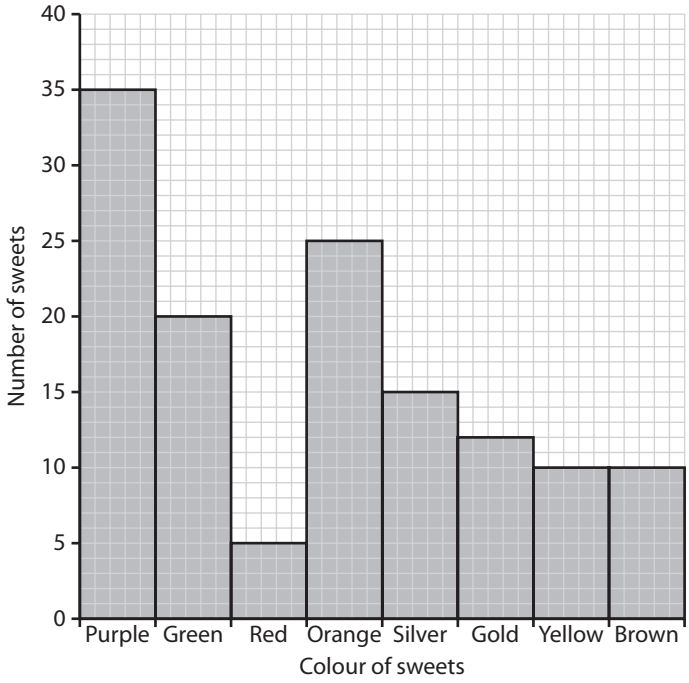
- Activity 1: Worksheet 3; pencils
- Activity 2: Completed Worksheet 3 from Activity 1

Worksheet 3

Name _____ **Date** _____

Sweet factory survey

The sweet factory carried out a survey of the workers, to find out their favourite sweet. The results are given in the scaled bar chart below.



1. How many people preferred silver sweets?

2. Which was the most popular type of sweet?

3. How many more people preferred purple than green sweets?

4. 25 people preferred orange sweets. Was this more or less than the number of people who preferred silver and gold sweets?

Strand: Statistics

DAY 5

ASSESS

Sub-strand: Present, interpret and solve data problems

ASSESSMENT ACTIVITY

- The purpose of the assessment is to check what each child can do independently, carefully noting down any difficulties and misconceptions. The adult will need to watch carefully what the children do, any strategies used and confidence levels.
- Hand out Worksheet 4 for the children to complete independently. This will enable you to assess clearly what the child can do and understand, and if there are still gaps.
- Explain that the questions all relate to the work they have been doing in the previous four days. The first question shows a pictogram and asks the children to read it and answer questions. The second question asks the children to construct a table and a bar chart in their exercise books to show the data from the pictogram.

WATCH OUT: Tell the children that they can ask if there are any words they are struggling to read. Sometimes there are children whose mathematics is better than their literacy, so some words may confuse them.

TIP: If you have children who can read the instructions but aren't sure what they mean, note this as something needing more work and help them to understand the meaning of the question.

EVIDENCING SUCCESS

Meeting expectations:

- The child can construct tables to collect information and then represent it using a bar chart.
- The child can solve simple one- and two-step problems independently.
- The child can solve problems such as: '*How many more members of staff come by car than by bus?*' by interpreting an appropriate diagram.
- The child can solve problems such as: '*Order the categories by the number of objects they contain*'.

OBJECTIVES

- Interpret and present data using bar charts, pictograms and tables
- Solve one-step and two-step questions using information presented in scaled bar charts and pictograms and tables

Rising Stars Progression Framework: 3.1.1, 3.2.1, 3.3.1, 3.3.2

RESOURCES

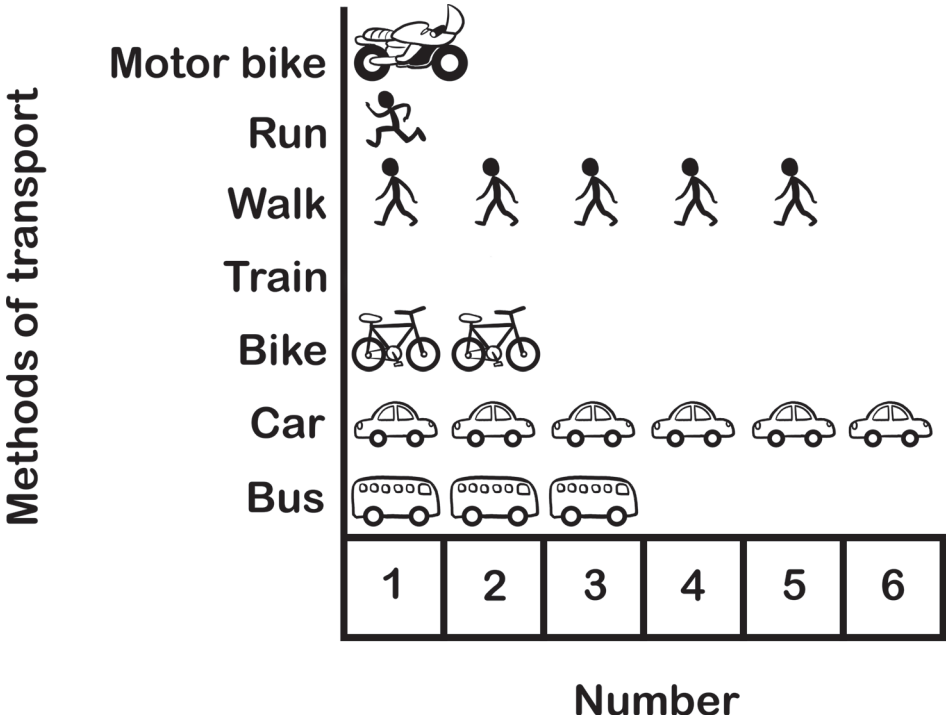
- Worksheet 4; pencils; rulers; exercise books

Worksheet 4

Name _____ **Date** _____

Displaying data

1. This pictogram shows how staff get to school.



a) How many members of staff walk to school?

b) How many members of staff travel by train?

c) Which is the most popular method of transport?

d) How many more members of staff come by car than by bus?

2. Make a table and a bar chart to show the data from the pictogram. Do this in your exercise book. Don't forget to draw neatly and to use a ruler. Label your drawings correctly.