Worksheet 3

Name _____ Date _____

Missing number calculations

Complete the missing numbers.

14 + ☐ = 19

8 + ☐ = 18

3 + ☐ = 15

12 + ☐ = 17

16 + ☐ = 24

19 − ☐ = 5

18 − ☐ = 10

15 − ☐ = 3

17 − ☐ = 5

24 − ☐ = 8

Worksheet 4

Name _____ Date _____

Number bonds

Complete the number bonds.

0	+	☐	=	10
☐	+	5	=	10
☐	+	7	=	10
4	+	☐	=	10
☐	+	2	=	10
17	+	☐	=	20
16	+	☐	=	20
10	+	☐	=	20
☐	+	8	=	20
☐	+	6	=	20

Strand: Addition and Subtraction

DAY 1

TEACH

Sub-strand: Mental calculation strategies

ACTIVITY 1: +, – and = bingo

- Give each child a bingo card on which you have written a combination of the symbols +, – and =.
- Give each child six counters.
- Explain to the children that you will tell them a word that describes one of the symbols and they need to put a counter on the symbol that they think matches that description.
- Use the following words: **add, more, subtract, fewer, equals, balance, the same as, total, sum, difference, less**.
- The first child with a bingo card full of counters shouts out 'Bingo!'

WATCH OUT: Make a note of any of the language the children do not respond to or understand. If there are many words that are unfamiliar to them, such as 'total' or 'sum', be sure to use these words in context throughout the rest of the activities during the week.

ACTIVITY 2: Recognising symbols in calculations

- Show the children an example of a written calculation: 8 + 7 = 15. Ask: *Which is the important part of the calculation? Which symbol says whether it is addition or subtraction?*
- Emphasise to the children that the addition symbol after the first number shows that you are going to **add** the two numbers together to find the **sum**. The sum comes after the **equals** symbol. This means that the quantity on one side of the equals is **the same** as the quantity on the other side.
- Continue to show the children a variety of types of calculation that use the **add** or **subtract** and **equals** signs.
- As you show the children the calculations, ask them to tell you whether you need to do an addition or subtraction to find the answer.

TIP: The point of this activity is not to find the answer to the calculation but to recognise whether it is an addition or subtraction calculation.

OBJECTIVES

- Mentally add and subtract one-digit and two-digit numbers to 20, including zero
- Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs

Rising Stars Progression Framework: 1.2.b.1, 1.2.e.1

RESOURCES

- Activity 1: Bingo cards (from Worksheet 1, Number, page 4); counters (six per child)
- Activity 2: Examples of written calculations

Strand: Addition and Subtraction

DAY 2

Sub-strand: Mental calculation strategies

TEACH

ACTIVITY 1: Counting on

- Show the children the calculation: 6 + 5 = ? Model working out the answer. Say to them: *I need to start at six and it is an **addition** calculation, so I am **counting up**. I should count up five, so I will put five on top of six on my fingers – 7, 8, 9, 10, 11. So the answer to 6 + 5 is 11.*
- Go through a second example. Then ask the children to find the answer to these calculations using the same method, i.e. fingers and counting on in their heads. 3 + 5 = ?; 9 + 3 = ?; 12 + 6 = ?; 8 + 4 = ?
- Observe the children as they find the answers to the calculations and then ask them what their answers are. Did they all get to the same answer? Did anyone get something different?

WATCH OUT: Note down if the children are using your strategy effectively. Do they understand the addition symbol as meaning they should count up?

ACTIVITY 2: Counting back

- Repeat Activity 1, but this time the focus is on subtraction calculations.
- Show the children the first calculation: 6 – 5 = ? Model working out the answer. Say to them: *I need to start at six and it is a **subtraction** calculation, so I am **counting back**. I should count back five so I will put five on my fingers and put one down for each number I say – 5, 4, 3, 2, 1. So the answer to 6 – 5 is 1.*
- Go through a second example then ask the children to find the answer to the next few calculations you show them using the same method: 8 – 3 = ?; 12 – 4 = ?; 16 – 5 = ?; 19 – 2 = ?

WATCH OUT: Note down if the children are using your strategy effectively. Do they understand the subtraction symbol as meaning they should count back?

OBJECTIVES

- Mentally add and subtract one-digit and two-digit numbers to 20, including zero
- Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs

Rising Stars Progression Framework: 1.2.b.1, 1.2.e.1

RESOURCES

- Activities 1 and 2: Written calculations displayed on the board

Strand: Addition and Subtraction

DAY 3

TEACH

Sub-strand: Mental calculation strategies

ACTIVITY 1: Using mathematical symbols

TIP: If the children do not understand the vocabulary you are using, do not focus on teaching the vocabulary at this stage. Rather, if a child is struggling with writing the calculations, try rephrasing the question using a different word for the concept.

- Read the children the calculations and allow them a little time to write down the number sentences. Suggested calculations are: 10 – 5 = ?; 15 – 3 = ?; 18 – 9 = ?; 20 + 4 = ?; 9 + 6 = ?; 5 + 7 = ?
- Discuss the use of **mathematical symbols** with the children. Ask: *How did you know to put an addition symbol here? Which word in the calculation let you know it was addition and not subtraction? Are there any other words we could have used instead of the addition/subtraction symbol? Can you phrase the calculation in another way?*

ACTIVITY 2: Making up calculations for numbers up to ten

- Show the children a number card between one and ten. Ask them to try writing down a calculation that totals that number. So, if you show them the number card '7', they can write 0 + 7, or 1 + 6, or 2 + 5, or 3 + 4, etc.
- Show the children another number. Allow them a minute or two to write down their calculation on their wipe clean boards.
- When they have finished, ask the children to share their answers as a group and check their calculations.
- Ask each child: *How did you do it? Did you use your fingers? Did you count on in your head? Did you know the number bonds to that number?*
- Now ask the children to try finding another calculation that results in the same number as the answer.

TIP: To stretch the children further, you could ask them to write an addition and subtraction calculation to represent the number card you have turned over.

OBJECTIVES

- Mentally add and subtract one-digit and two-digit numbers to 20, including zero
- Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs

Rising Stars Progression Framework: 1.2.b.1, 1.2.e.1

RESOURCES

- Activity 1: Wipe clean boards and pens
- Activity 2: Wipe clean boards and pens; number cards from 1 to 10

Strand: Addition and Subtraction

DAY 4

Sub-strand: Mental calculation strategies

TEACH

ACTIVITY 1: Adding and subtracting in context

- Give each child a wipe clean board and a pen.
- Tell the children that you will read them a calculation and they are to write down the calculation on their wipe clean board and try to solve it using the mental strategies taught earlier in the week. Some calculations to use are:
  - *13 people are on a bus and five more get on. How many are there altogether?*
  - *I have seven cakes and my son eats one. How many do I have left?*
  - *Jess has 19 dolls and she gets one more. How many does she now have?*
- After they have had a go at solving the problems, discuss strategies with the children. Ask: *How did you know which numbers you should use? How did you know whether it was addition or subtraction? How did you find the answer?*

WATCH OUT: Watch the children solve the calculations and listen to them during the discussion. This will tell you whether any incorrect answers come from misunderstanding the verbal calculation or getting the wrong answer.

ACTIVITY 2: Mental maths bingo

- Decide which calculations you will use. Write the answers on the bingo cards. Here are some suggestions: 2 + 3 = ?; 7 – 5 = ?; 13 – 4 = ?; 12 – 6 = ?; 11 – 3 = ?; 17 – 7 = ?; 8 – 4 = ?; 1 + 2 = ?; 11 – 10 = ?
- Give each child a blank bingo card with the answers written on and six counters.
- Explain how the game will work: *I will say a calculation and you will try to work out the answer. That will be the number you put a counter on.*
- As all of the children will have a different selection of numbers on their card, you will have to be sure to randomise the calculations to find a winner.
- The child with a full card of counters calls out 'Bingo!'

OBJECTIVES

- Mentally add and subtract one-digit and two-digit numbers to 20, including zero
- Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs

Rising Stars Progression Framework: 1.2.b.1, 1.2.e.1

RESOURCES

- Activity 1: Wipe clean boards and pens
- Activity 2: Bingo cards (from Worksheet 1, Number, page 4); counters (six per child)

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.
- This assessment challenges the children to calculate independently the answers to the questions on Worksheet 5. They can use a range of strategies for finding the answers.
- Give the children a pencil each. Ask them to try to find the answers to the questions using the various mental strategies you have taught them – counting on, number bonds, using fingers, etc.

TIP: During the session, make notes of the strategies each child uses to answer the questions. After the session, you can add these notes on to the worksheets.

WATCH OUT: The children may well use the same strategy to find the answer to all of the calculations. If this is the calculation strategy they are most comfortable with, then this is fine.

EVIDENCING SUCCESS

Meeting expectations:

- The child can find pairs of numbers below 20 with a difference of four or a sum of 18.
- The child can use manipulatives to demonstrate 8 + 6 = 14 and write the correct number sentence for: *'Eight counters add six counters gives 14 counters altogether.'*

OBJECTIVES

- Mentally add and subtract one-digit and two-digit numbers to 20, including zero
- Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs

Rising Stars Progression Framework: 1.2.b.1, 1.2.e.1

RESOURCES

- Worksheet 5; pencils

Worksheet 5

Name _____ Date _____

Addition and subtraction

Find the answers to the addition and subtraction calculations.

Addition	Subtraction
18 + 2 = ☐	26 – 10 = ☐
12 + 8 = ☐	19 – 4 = ☐
14 + 4 = ☐	17 – 9 = ☐
17 + 1 = ☐	14 – 6 = ☐
8 + 6 = ☐	14 – 9 = ☐
9 + 7 = ☐	13 – 7 = ☐
3 + 10 = ☐	6 – 2 = ☐
11 + 4 = ☐	8 – 3 = ☐
9 + 3 = ☐	15 – 6 = ☐
10 + 9 = ☐	17 – 5 = ☐

Strand: Addition and Subtraction

DAY 1

TEACH

Sub-strand: Mental calculation strategies

ACTIVITY 1: Using the language of addition, e.g. 'more'

- Read the following problem: *There are four birds on the wire and three* ***more*** *come. How many* ***altogether****?*
- Ask the children to decide which are the most important words in the problem ('more' and 'altogether'). Ask them: *What do the words mean we need to do?*
- Model finding the answer to the problem using the counters.

TIP: 'Think out loud', so the children understand why you are doing the things you are doing. E.g.: *There are four birds – so I need four counters, and three more come – so I need to add three more counters. How many altogether – so I will count all of them to get the answer. Oh, it is seven.* Encourage the children to think out loud as they solve the problems too.

- Now solve another problem with the children. Some examples are: *There are five cakes on a plate and Tahira makes one more. How many altogether? There are three children on the climbing frame and five more join them. How many altogether?*

ACTIVITY 2: Using the language of subtraction, e.g. 'less'/'away'/'left'

- Read the following problem to the children: *There are four birds on the wire and three fly* ***away****. How many are* ***left****?*
- Ask the children to decide which are the most important words in the problem ('away' and 'left'). Ask: *What do the words mean we need to do?*
- Model finding the answer to the problem using the counters, thinking out loud as you did in Activity 1.
- Then solve another problem or two with the children helping you. E.g.: *There are five cakes on a plate and Rupert eats two. How many are left? There are three children on the climbing frame and one falls off. How many are left?*

OBJECTIVE

- Solve one-step problems that involve addition and subtraction using concrete objects and pictorial representations and missing number problems

Rising Stars Progression Framework: 1.1.d.1, 1.2.c.1

RESOURCES

- Activities 1 and 2: Counters

Strand: Addition and Subtraction

DAY 2

Sub-strand: Mental calculation strategies

TEACH

ACTIVITY 1: How do I solve this number problem?

▶ Work through the problems. Read them out and ask the children to find the important part of the problem (shown in bold) and use the counters to find the answers.

- *There are three sweets in the jar and I buy three **more**. How many **altogether**?*
- *There are twenty chickens on the farm and three are **sold**. How many are **left**?*
- *There are eight children in the swimming pool and four **more** jump in. How many **altogether**?*
- *There are ten cakes on a plate and I **eat** three. How many are **left**?*

WATCH OUT: Watch out for the children using the wrong operation to find the answer (e.g. addition rather than subtraction).

ACTIVITY 2: Using a number track to solve number problems

▶ Draw a 0 to 20 number track in chalk.

▶ Repeat the activity from the previous session, but this time the children move up and down the drawn number track to find the answers.

▶ The questions to ask are:

- *There are fifteen children in the line for lunch. Five more join them. How many children are there altogether?*
- *Six babies are at nursery and a mummy picks up one of them. How many are left?*
- *There are nineteen monkeys swinging in a tree. Four fall off. How many are left?*
- *There are nine fish in a pond and four frogs. How many altogether?*

TIP: Encourage the children to face the way they will move on the number track before they start to answer the problem. This will allow you to intervene if necessary to correct them.

OBJECTIVE

- Solve one-step problems that involve addition and subtraction using concrete objects and pictorial representations and missing number problems

Rising Stars Progression Framework: 1.1.d.1, 1.2.c.1

RESOURCES

- Activity 1: Counters
- Activity 2: Chalk number track

Strand: Addition and Subtraction

DAY 3

Sub-strand: Mental calculation strategies

TEACH

ACTIVITY 1: Practising problem solving

- First give each child a plate or a bowl as you would at a picnic.
- Tell the children that the counters will represent food. If you have enough play food for this activity then this could be used instead.
- Give the children a problem: *At a picnic you are given eight sandwiches. You are very hungry and manage to eat five of them. How many are left over?*
- Model finding the answer using your own plate and counters. Physically move the counters one by one as you count back to find the answer.
- Ask the children to follow you, using their own counters.
- Give the children other simple problems and challenge them to solve them independently, using their counters (or food) and plates, e.g. *You are given 12 grapes. You ask for eight more. How many do you have altogether?; You take four mini-biscuits. You are given five more. How many do you have altogether?; You are given 20 jelly sweets but you only eat seven of them. How many do you have left?*

ACTIVITY 2: Problem-solving bingo

- Give each child a bingo card and six counters. Explain to the children that they will be looking for the answers to your problems on the bingo card.
- Decide which six number problems you will be asking the children to solve and write the answers on the bingo cards before you pass them to the children.
- Say your first number problem to the children, e.g.: *I have four fish and two swim away. How many are left?* Check to see that the children put a counter on the correct number on their bingo card; in this case '2'.
- Then introduce your second number problem, e.g.: *I had one dog and mum bought me another two dogs. How many do I have altogether?* Again, check to see that the children put a counter on the correct number on their bingo card; in this case '3'.
- Repeat with four more simple calculations.
- The child who covers all their numbers first shouts 'Bingo!'

OBJECTIVE

- Solve one-step problems that involve addition and subtraction using concrete objects and pictorial representations and missing number problems

Rising Stars Progression Framework: 1.1.d.1, 1.2.c.1

RESOURCES

- Activity 1: Counters; small pots or bowls (one per child)
- Activity 2: Bingo card (from Worksheet 1, Number, page 4); counters

Strand: Addition and Subtraction

DAY 4

Sub-strand: Mental calculation strategies

TEACH

ACTIVITY 1: Solving number problems using subtraction

- Show the children a missing number calculation on the board, e.g. 10 – ? = 4.
- Ask: *How could we find the answer to this problem?*
- Share ideas about how to find the missing number. Tell the children: *We need to start at the number ten and count backwards to four, because there is a* ***subtraction symbol****.*

TIP: The children should already be familiar with the word 'subtraction', but it is worth checking they are clear that it means 'taking away'. They may be less familiar with the word 'symbol'. Ask the children if they can tell you what it means (a symbol is a mark or thing that stands for something else).

- Put up ten fingers and put one down for each number you say as you count backwards from ten to find the answer.
- Now check the answer using counters: start with ten counters, take six away and find out how many you have left.
- Repeat with other problems using the counters, e.g.: 8 – ? = 5; 12 – ? = 4; 18 – ? = 6.

ACTIVITY 2: Solving number problems using addition

- Show the children a missing number calculation on the board, e.g.: 10 + ? = 14
- Ask: *How could we find the answer to this problem?*
- Share ideas about how to find the missing number. Tell the children: *We need to start at the number ten and count up four because there is an* ***addition symbol****.*
- Count up from ten putting a finger up for each number that you say (11, 12, 13, 14).
- Then check the answer using counters: start with ten counters, add four and find out how many you now have.
- Repeat with other problems using the counters, e.g.: 12 + ? = 20; 3 + ? = 7; 15 + ? = 18.

OBJECTIVE

- Solve one-step problems that involve addition and subtraction using concrete objects and pictorial representations and missing number problems

Rising Stars Progression Framework: 1.1.d.1, 1.2.c.1

RESOURCES

- Activities 1 and 2: Wipe clean board; dry wipe marker pens; counters

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 the children 20 counters each. Tell the children they will use the counters to solve the **addition and subtraction** problems you give them.

  The problems are:

  - *There are 12 fairies. Five fairies fly away. How many are left?*
  - *There are 18 flowers in my flowerbed. Three more grow. How many flowers do I have altogether?*
  - *There are five birds in a nest. One flies off. How many are left?*
  - *Farmer Green has seven chickens but four fly away! How many chickens does he have left?*

  The children should write their answers in their exercise books.

WATCH OUT: Each time the children share out the counters, watch them carefully. Consider: Are they counting out the correct number of counters to start with? Are the children sharing the counters one at a time? Can the children count how many in one group to find the answer?

- Now, give each child a copy of Worksheet 6 and ask them to find the missing number in each case and write the number in the box.
- Check the children's answers on the worksheet. Any incorrect answers should be addressed and corrected with the children on a one-to-one basis, to ensure they can see where the mistakes were made.

EVIDENCING SUCCESS

Meeting expectations:

- The child can solve problems such as: *'There are five birds in a nest. One flies off, how many are left?'*
- The child can use counters to work out the missing number in 8 + ? = 14.

OBJECTIVE

- Solve one-step problems that involve addition and subtraction using concrete objects and pictorial representations and missing number problems

Rising Stars Progression Framework: 1.1.d.1, 1.2.c.1

RESOURCES

- Activity 1: Counters (20 per child)
- Activity 2: Counters; Worksheet 6; pencils

Worksheet 6

Name _____ Date _____

Missing numbers

Solve the number problems by writing the missing numbers in the boxes.

8	+		=	14
10	−		=	7
12	+		=	17
17	−		=	10
20	−		=	10
15	+		=	20

Strand: Multiplication and Division

DAY 1

Sub-strand: Mental calculation strategies

TEACH

ACTIVITY 1: Doubling with a ladybird

- Give each child a copy of Worksheet 1 (the ladybird sheet) and 20 counters.
- Ask the children: *What does it mean to **double** a number?*
- The ladybird is drawn with a line down the middle, to help with mirroring while doubling. Tell the children that they are going to double numbers using the ladybirds.
- Ask the children to put a certain number of counters on each side of the ladybird.
- Count them altogether to find double of the original number. Say to the children: *We have three counters on the left wing, and so to double three we put three counters on the right wing. 3 + 3 = 6. So, double three is six.*
- Now give each child a number card. Ask the children to put the correct number of counters onto one side of their ladybird and then to double it.
- When they have done this, ask each child to feed back to the group on what they have done by saying, e.g.: *Double four is eight.*
- Allow the children to repeat the activity with other numbers from the pile of number cards, as time permits.

ACTIVITY 2: Sharing players for a football match

- Say to the children: *Today we are going to share out players for football teams.* Say: *We have four team captains (the number of children in the group) and 16 football players. How many children will there be on each team?*

TIP: The numbers given above are intended as examples. Count how many children are in the group and adjust your numbers for the calculations to be a multiple of the number of children you have.

- Model finding the answer to the calculation by sharing the players (counters) out one at a time. Then say: *Oh look! We now have four each. So our football match would be between teams of four players.*
- Repeat the process with a different number of players.

OBJECTIVES

- Double numbers and quantities and find simple fractions of objects, numbers and quantities
- Solve one-step problems involving multiplication and division by calculating the answer using concrete objects and pictorial representations

Rising Stars Progression Framework: 1.2.b.2, 1.2.a.2, 1.2.c.2

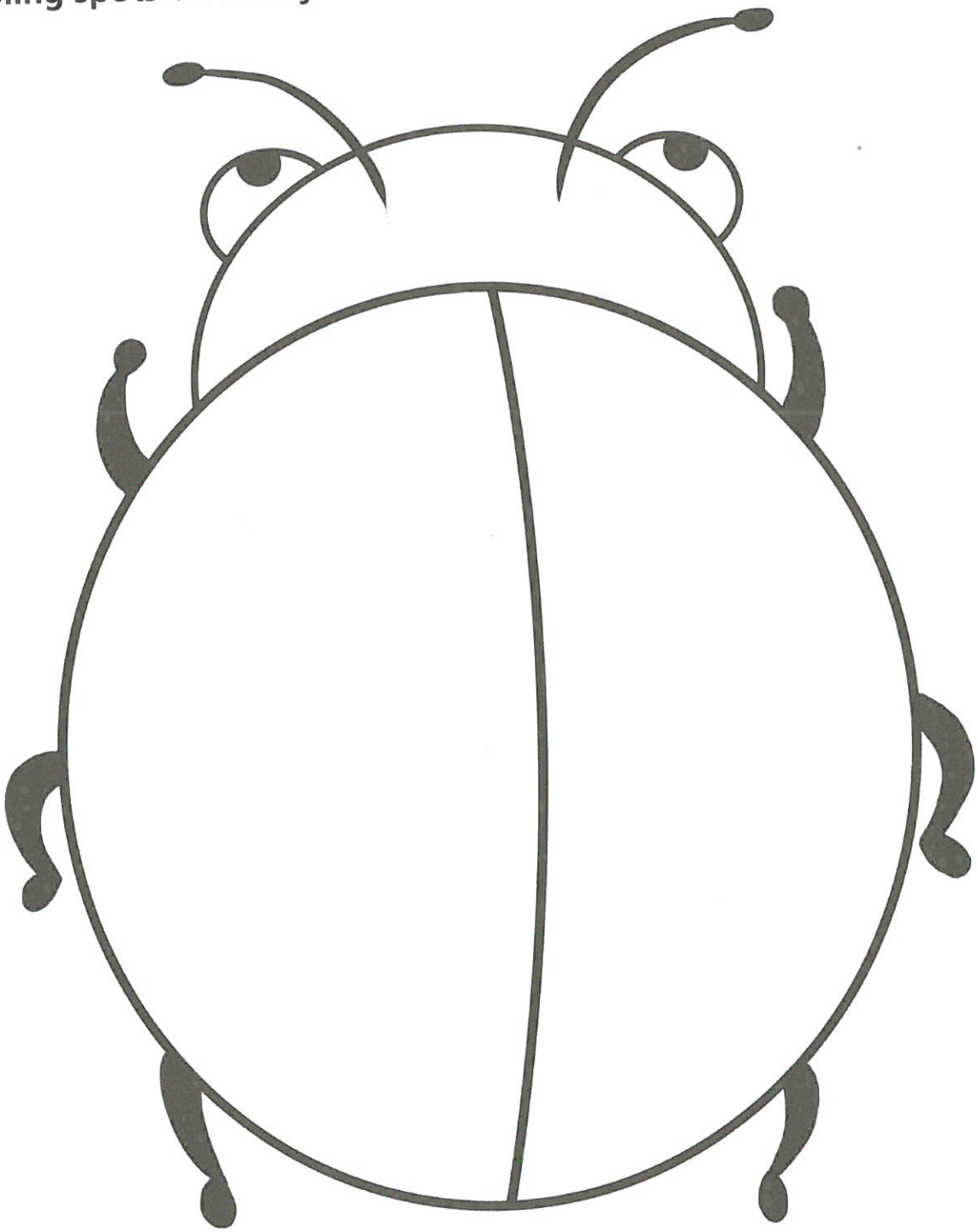
RESOURCES

- Activity 1: Each child needs: Worksheet 1, 20 counters, a set of number cards from 1 to 10
- Activity 2: Counters

Worksheet 1

Name _____ Date _____

Doubling spots on a ladybird



Strand: Multiplication and Division

DAY 2

TEACH

Sub-strand: Mental calculation strategies

ACTIVITY 1: Doubling using fingers

- Remind the children of the work done in the previous lesson on **doubling**. Say to them: *We had to have the same on both sides to double the number.*
- Now tell the children a number that is less than five and ask them to try doubling it on their hands – they need to put the correct number of fingers up and match it on the other side and then count them altogether.

WATCH OUT: Watch the children carefully as they double the number. If they are getting the answers wrong they could be counting the wrong total on the two hands or putting the wrong number of fingers up in the first place.

TIP: You could allow the children to take it in turns to 'be the teacher' for this activity. They call out the answer and then check the other children's answers.

ACTIVITY 2: Doubling using mirrors

- Give each child a wipe clean board and a pen.
- Tell them that any number that is the result of doubling will have **two halves** that are exactly the same.
- Give the children a number, e.g. seven, and ask them to draw that many dots on one side of the board.

TIP: Try to use numbers that are ten or less for the children to double.

- Using their mirror the children then double the number by positioning the mirror in the centre of the wipe clean board, to reflect the drawn quantity of dots.
- Ask the children to count the number of dots on the board and in the mirror altogether to find the answer.

WATCH OUT: Make sure the children count the correct number as they are drawing the dots, to ensure they get the correct total.

- Repeat the activity with other numbers under ten, as time allows.

OBJECTIVES

- Double numbers and quantities and find simple fractions of objects, numbers and quantities
- Solve one-step problems involving multiplication and division by calculating the answer using concrete objects and pictorial representations

Rising Stars Progression Framework: 1.2.b.2, 1.2.a.2, 1.2.c.2

RESOURCES

- Activity 2: Mirrors, wipe clean boards and pens for each child

Strand: Multiplication and Division

DAY 3

Sub-strand: Mental calculation strategies

TEACH

ACTIVITY 1: Counting in fives using counters

- Pull a card from the deck and model making that many **groups of five** on the table from counters.
- Then count the total number of counters and say, e.g. *Five lots of five is 25.*
- Repeat with other numbers, this time asking the children to help you find the answers.
- Encourage the children to say the sentence when they find the answer.

WATCH OUT: Watch the children as they count out the counters. Are the groups all even? Have they counted out the correct number of groups? Are they counting the total accurately?

ACTIVITY 2: Grouping and sharing in fives

- Give each child Worksheet 2. Set the scene: *The zoo has flooded and the animals need to share pens until the water can be removed.*
- Give each child 10 counters. These are their animals.
- Explain that you can only have five animals in each pen for health and safety reasons.
- Model sharing and grouping your five counters: *I can have one animal in each pen, or I can have one pen containing five animals.*
- Ask: *How many ways of grouping and sharing 10 animals can you find?* Children should write their answers on the worksheet. They may choose to group them into two pens of five or fill five pens with two animals in each.
- Repeat with different numbers of animals (15, 20 etc.).

OBJECTIVES

- Double numbers and quantities and find simple fractions of objects, numbers and quantities
- Solve one-step problems involving multiplication and division by calculating the answer using concrete objects and pictorial representations

Rising Stars Progression Framework: 1.2.b.2, 1.2.a.2, 1.2.c.2

RESOURCES

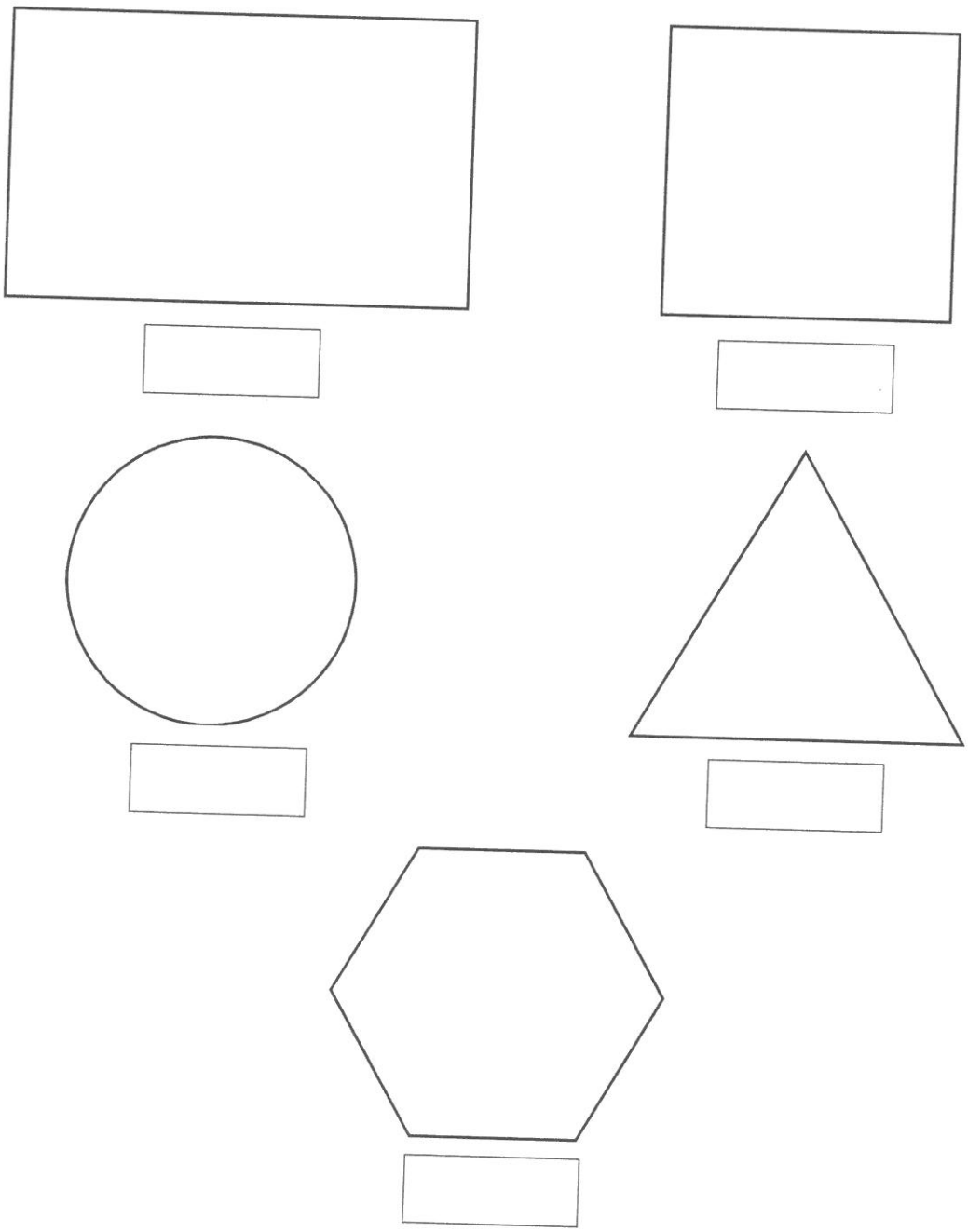
- Activity 1: Counters; number cards from 1 to 10
- Activity 2: Worksheet 2; counters (ten per child)

Worksheet 2

Name _____ Date _____

Grouping and sharing 5s

How many ways of grouping and sharing your animals can you find?



Strand: Multiplication and Division

DAY 4

Sub-strand: Mental calculation strategies

TEACH

ACTIVITY 1: Matching numbers with their doubles

- Place the number cards face up on the table.
- Explain the activity to the children: they need to match each number with its **double** to make a pair. So, e.g. 2 and 4 are a pair.
- The children then take it in turns to make a pair.
- As the children make their pair of cards, ask the children to tell the group what pair they have made. E.g. *I have two and four. Double two is four, so they are a pair.*
- When the children have had a few goes and seem confident with the task, repeat the activity but this time with the cards face down on the table.

WATCH OUT: If the children struggle to find the doubles of the numbers in their heads, ask the children to try using counters to find the answers, as in previous sessions.

ACTIVITY 2: Multiplication using dots

- Tell the children that today they will be drawing dots in groups to find the answers to **multiplication problems**.
- Start by modelling to the children how to find three lots of five by drawing three lines of five dots. Count them altogether to find the answer.
- Repeat with other numbers, using the number cards to choose the numbers if you wish. Pose the questions in various ways to embed the vocabulary of multiplication: **lots of**, **multiplied by**.

TIP: It is worth mentioning to the children that this way of calculation is called drawing an **array**.

OBJECTIVES

- Double numbers and quantities and find simple fractions of objects, numbers and quantities
- Solve one-step problems involving multiplication and division by calculating the answer using concrete objects and pictorial representations

Rising Stars Progression Framework: 1.2.b.2, 1.2.a.2, 1.2.c.2

RESOURCES

- Activity 1: Number cards 1 to 20; 20 counters if necessary
- Activity 2: Paper; pencils; number cards

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.
- This assessment tests the children's independent understanding of doubling and multiplication using practical resources.
- Give each child a copy of Worksheet 3 and Worksheet 4.
- First they need to find the answer to the **doubles** questions in Worksheet 3.
- The children then move on to the **grouping and sharing** exercise on Worksheet 4.
- Tell the children that they can answer the questions using either counters, their fingers or by drawing dots.

TIP: While it is important to give the children the opportunity to use the different apparatus, do encourage them to try finding the answers to the questions mentally (and using fingers) or by using jottings, such as dots for multiplication.

WATCH OUT: Observe the children during the assessment. Note down which methods each child uses to find the answers to the questions. You can then record these on the worksheets after the assessment is complete.

EVIDENCING SUCCESS

Meeting expectations:

- The child can answer six when asked to double three.
- The child can arrange a set of 12 counters into two groups of six each.

OBJECTIVES

- Double numbers and quantities and find simple fractions of objects, numbers and quantities
- Solve one-step problems involving multiplication and division by calculating the answer using concrete objects and pictorial representations

Rising Stars Progression Framework: 1.2.b.2, 1.2.a.2, 1.2.c.2

RESOURCES

- Worksheet 3; Worksheet 4; counters; pencils

Worksheet 3

Name _____ Date _____

Doubling

Double each number and set of objects.

Single	Double
10	
5	
7	
3	
8 puppies	
4 pennies	
6 crayons	

Worksheet 4

Name _____ Date _____

Multiplying and dividing

Answer these multiplication and division questions. Use the 'Working' column to draw dots to help you.

Question	Working	Answer
5 lots of 4		
3 lots of 2		
4 lots of 1		
9 lots of 2		
8 shared by 4		
12 shared by 2		
9 shared by 3		
6 shared by 2		

Strand: Multiplication and Division

DAY 1

Sub-strand: Mental calculation strategies

TEACH

ACTIVITY 1: Using arrays to group and multiply objects

- Hand out copies of Worksheet 5 and look at the pictures of the **arrays** with the children.
- Ask the children to describe to the group the arrays of objects they can see. Ask: *What makes the arrays special?*
- Emphasise to the children that the arrays are ways of organising objects, usually in **rows** (lines across) and **columns** (lines down). Say: *In an egg box of six eggs, the eggs are grouped into two groups of three, or three rows of two, depending on how you look at it.*
- We could also say: two add two add two or three add three. *We call this* ***repeated addition***.
- Ask the children to try to describe the arrays again, this time using the numbers. Ask them: *How many along one side? How many along the other?*

TIP: The children may struggle to explain the array in numbers. If so, work with the children to find out by counting one side and then the other.

ACTIVITY 2: Linking arrays and calculations

- Before starting the activity, each child should have a copy of Worksheet 5 and one set of calculation cards from Worksheet 6 to refer to. (There are two sets of calculation cards on the worksheet.)
- Together with the children, look at the calculation card for $2 \times 3 = 6$. Say to the children: *We know that the calculation two multiplied by three is six. We could say three groups of two is six altogether. Can anyone find the array picture that shows this calculation on Worksheet 5?*
- Allow the children to point to a picture from Worksheet 5 and explain to you why they think it shows that calculation.
- Repeat with the other calculation cards.

TIP: If the children find it difficult to turn their knowledge of the calculation into an array, start by asking the children what the first number in the calculation is. Can they find a picture on Worksheet 5 with this many items down one side? They should then see whether the number on the other side of the array matches the second number in the calculation.

OBJECTIVE

- Solve one-step problems involving multiplication and division by calculating the answer using arrays

Rising Stars Progression Framework: 1.2.c.2, 1.2.e.2

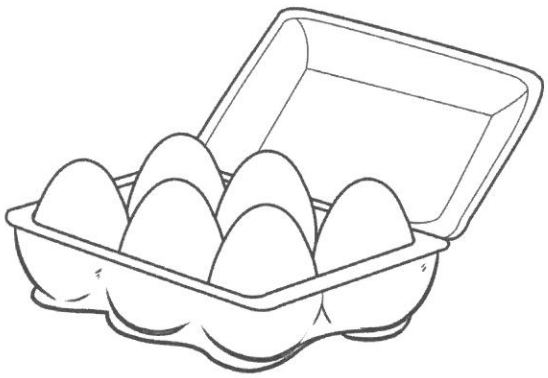
RESOURCES

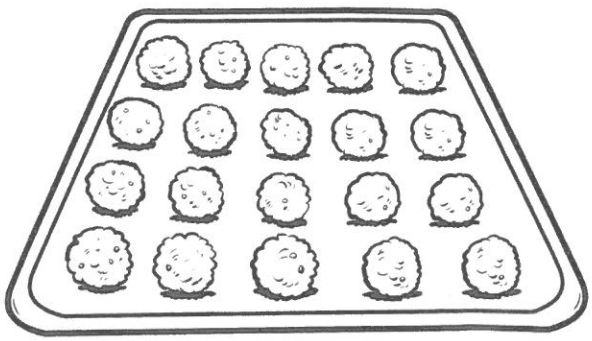
- Activity 1: Worksheet 5
- Activity 2: Worksheet 5 and Worksheet 6 (with the calculation cards cut out)

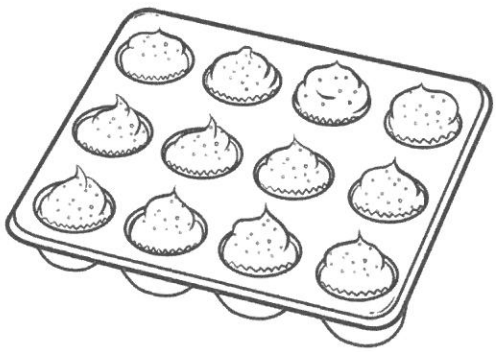
Worksheet 5

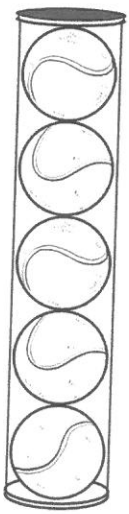
Name _____ Date _____

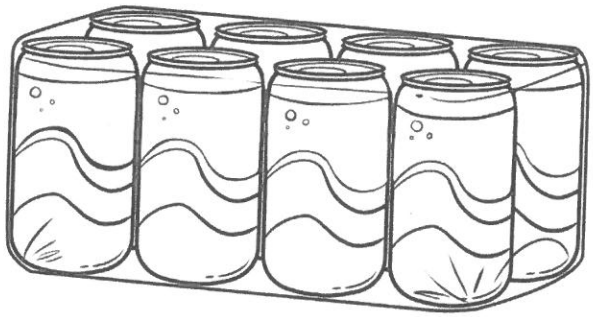
Arrays all around us!











Worksheet 6

Photocopy and cut out the calculation cards so that each child has one set of six calculations.

Calculation cards

2 × 3	5 × 3
5 × 4	4 × 3
5 × 1	4 × 2

2 × 3	5 × 3
5 × 4	4 × 3
5 × 1	4 × 2

Strand: Multiplication and Division

DAY 2

Sub-strand: Mental calculation strategies

TEACH

ACTIVITY 1: Making arrays from calculations

- Recall with the children how they counted the items within the array and then matched them to the numbers in the calculation.
- Now show the children a written calculation, e.g. 2 × 4. Ask the children: *How could we make an array to show this calculation?*
- Model drawing four rows of two spots on the wipe clean board.
- Explain to the children why this **array** shows the calculation. Say: *It is four lots of two.*
- Show the children another calculation, e.g. 2 × 3. Ask them to draw the array to go with the calculation on their wipe clean board.
- After they have attempted to draw the array, read the calculation (so in this case, *two multiplied by three*) to the children so they can check their answer.
- Repeat with other basic calculations, as time allows.

ACTIVITY 2: Making calculations from arrays

- Show the children an **array**, e.g. the array for 5 × 2, by drawing it using dots. Ask them: *How could we make a calculation to show this array?*
- Say to the children: *So this array is two lots of five dots.* Write 5 × 2 on the wipe clean board. Explain to the children why this shows the array: *It is two lots of five.*
- Now draw a second array for the children, e.g. 3 × 2, and ask them to write the calculation to go with the array.
- After they have attempted to write the calculation, read the array: *There are two lots of three. We can read this as three multiplied by two.* Ask the children to check their answer.

TIP: Reading the array to the children in this way allows them to see if they have the correct numbers in the calculation.

- Repeat with other arrays.
- If the children feel confident with this activity, ask them to think up a calculation and draw an array for it. They then pass the array to another child, who tries to work out which calculation their partner started with.

OBJECTIVE

- Solve one-step problems involving multiplication and division by calculating the answer using arrays

Rising Stars Progression Framework: 1.2.c.2, 1.2.e.2

RESOURCES

- Activities 1 and 2: Wipe clean boards and pens/ paper and pencil for each child

Strand: Multiplication and Division

DAY 3

Sub-strand: Mental calculation strategies

TEACH

ACTIVITY 1: Bingo! Arrays

- Before you start the lesson, cut out copies of the array bingo card from Worksheet 7, so that each child has one copy.
- Give the children an array bingo card and six counters each.
- Tell the children that in this game of bingo you will tell them a calculation and if they have an array that matches it they need to put a counter on the array.
- See below for the calculations to use.
- Run through the different calculations with the children, paying close attention to how they count the dots on either edge of the array to find the calculation hidden within it.
- Then play bingo! The first child to get six counters on their card shouts 'Bingo!' Check their answers carefully.

TIP: It would be worthwhile using a variety of multiplication vocabulary (**multiply**, **lots of**) to describe the calculation to the children, to reinforce this to them.

ACTIVITY 2: Division by making arrays with counters

- Put the **even number cards** from 2 to 20 on the table, face down and ask the children to pick a card each.
- Explain to the children that the number they choose from the pile will be divided by two using an array. So, if they pick 12, they will count out 12 counters and place them into rows of two to make an array.
- After they have done this, ask: *How many rows of two have you made from the counters?*

WATCH OUT: Check the children's arrays as you go along, to make sure they are carefully counting the counters.

- The children should then write down the calculation for the array they have created. So, using the above example, they would write: 2 × 6 = 12.
- Repeat the activity as time allows.

OBJECTIVE

- Solve one-step problems involving multiplication and division by calculating the answer using arrays

Rising Stars Progression Framework: 1.2.c.2, 1.2.e.2

RESOURCES

- Activity 1: Worksheet 7; counters (six per child)
- Activity 2: Even number cards up to 20; counters (20 per child); paper and pencils

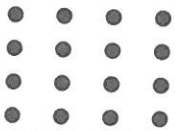
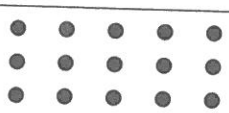
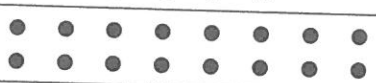
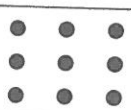
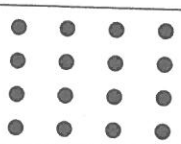
arrays for bingo

3 × 2
2 × 5
6 × 3
7 × 2
3 × 3
4 × 4
2 × 3
5 × 3
4 × 3
8 × 2
3 × 3
4 × 4

Worksheet 7

Photocopy and cut out the array bingo cards, one per child.

Array bingo boards

	3 × 2
	2 × 5
	6 × 3
	7 × 2
	3 × 3
	4 × 4
	2 × 3
	5 × 3
	4 × 3
	8 × 2
	3 × 3
	4 × 4

Strand: Multiplication and Division

DAY 4

Sub-strand: Mental calculation strategies

TEACH

ACTIVITY 1: Finding missing numbers using arrays

- Show the children a missing number calculation. e.g., write on the board: $5 \times ? = 20$.
- Ask the children: *How do you think you could you find the missing number using an array?*
- Discuss the children's responses. Explain to the children that they will need to make an array of 20 dots in rows of five.
- Ask the children to now draw rows of five dots until they have drawn 20 dots. Ask them: *How many rows did you draw?* Tell them: *That is the missing number.* Now complete the calculation on the board: $5 \times 4 = 20$.
- Give each child their own missing number calculation to solve. Ask them to try finding the missing number by drawing the array. You could use the following calculations: $2 \times ? = 18$; $5 \times ? = 35$; $5 \times ? = 15$; $10 \times ? = 30$.

WATCH OUT: The children may struggle with jumping from a missing number calculation to drawing an array. In this case it would be worthwhile to help the children turn the missing number calculation into a division calculation and then into an array.

ACTIVITY 2: Making arrays to solve calculations

- Set the scene: *Katharine and her four friends are going on a picnic. We need to help her to make sure there is enough food.*
- Give each child a copy of Worksheet 8. Ask the children: *How could we find the answers to the question? How could we use an array to help us?*
- Help the children to identify the key words in each question that tell them the operation needed and the numbers that will be in the array.
- Remind the children to make the correct number of rows of counters and then count them altogether to find the answer for multiplication, or make lines of the small number until they have used all of the counters for division calculations.

OBJECTIVE

- Solve one-step problems involving multiplication and division by calculating the answer using arrays

Rising Stars Progression Framework: 1.2.c.2, 1.2.e.2

RESOURCES

- Activity 1: Wipe clean boards and pens
- Activity 2: Each child needs: Worksheet 8, pencil, 20 counters

Worksheet 8

Name _____ Date _____

Using arrays

Katharine and her four friends are going on a picnic. Solve these problems to make sure there is enough food. Draw arrays to help you.

Question	Array	Answer
1. Each person will have 2 sandwiches. How many sandwiches will they need altogether?		
2. Each person will have 5 apple slices. How many apple slices will they need altogether?		
3. Katharine brings 15 cakes. How many cakes can each person have?		
4 There are 10 bags of crisps. How many can each person have?		

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.
- This assessment is designed to challenge the children by finding the answers to a number of calculations using **arrays**.
- Give each child a copy of Worksheet 9.
- Ask them to draw the array for each calculation and write in the answer to the calculation. Some children may write the answer to the calculation and then draw the array.
- Give each child a copy of Worksheet 10.
- Ask the children to match the array to the correct calculation by drawing a line to link them.

WATCH OUT: Are the children confident in recognising the calculations in the arrays or are they counting all of the dots to find the answers? Make a note of the children's approach to these activities on the worksheets once they are complete.

OBJECTIVE

- Solve one-step problems involving multiplication and division by calculating the answer using arrays

Rising Stars Progression Framework: 1.2.c.2, 1.2.e.2

RESOURCES

- Worksheet 9; Worksheet 10; ; pencils

EVIDENCING SUCCESS

Meeting expectations:

- The child can draw an array from a given calculation.
- The child can match arrays and calculations.

Worksheet 9

Name _____ Date _____

Drawing arrays

Draw the array to match each calculation. Find the answer to the calculation.

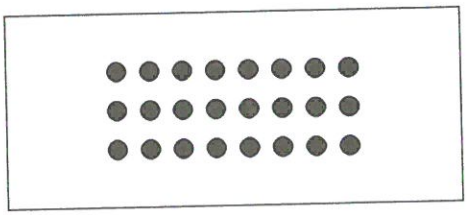
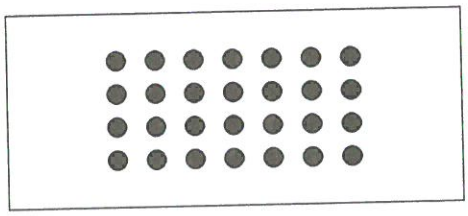
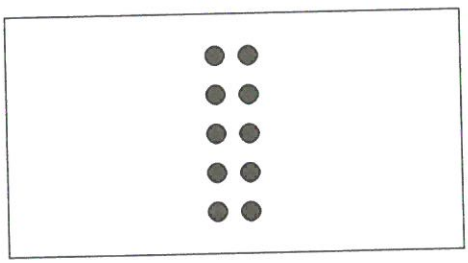
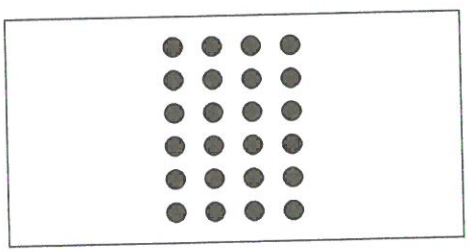
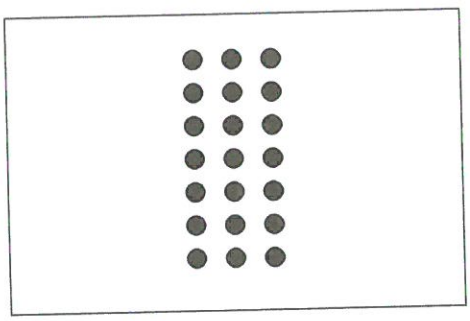
Calculation	Array	Answer
6 × 2 =		
2 × 5 =		
10 × 2 =		
4 × 5 =		

Worksheet 10

Name _____ Date _____

Matching arrays

Match each array to the correct calculation.

2 × 5	
4 × 6	
3 × 7	
8 × 3	
7 × 4	

Strand: Fractions

DAY 1

TEACH

Sub-strand: Recognise, order, compare, equivalence

ACTIVITY 1: Halving shapes

- Give each of the children a square cut out of paper; a template for this is found on Worksheet 1.
- Ask the children to fold the shape in two making sure that the edges of the shape line up so the two pieces are **equal**.

TIP: Highlight that the two pieces of the shape need to be equal (or the same) to be considered halves of the shape.

- Ask: *Are any of the shapes folded in a different way? Has anyone folded the shape along the **diagonal**?*
- Emphasise to the children that, as long as the two parts of the shape are equal, they are **halves** of the shape.
- Demonstrate to the children folding a shape incorrectly. Ask them: *Why is this not a half of the shape?* They should be able to explain this to you in terms of the two halves of the shape not being the same/not being **equal**.
- Move on to give the children other shapes – rectangles, triangles and circles. Can the children fold these shapes in half?

ACTIVITY 2: Halving counters

- Ask the children to return to their folded square and look closely at the fold down the middle of the shape. Say to them: *Each side of the shape is a half. We can use it to find half of a number too.*
- Give the children an even number of counters each. Ask the children to count how many they have altogether.
- Model sharing the counters out onto the shape – with an equal number on the left and right sides of the fold – to find half of the original number.
- Say to them: *It is important to **share** the counters out **equally** to make sure that you find a **half** of the number.*
- Then give each of the children an even number of counters and ask them to use one of their shapes from Activity 1 to find half the number of counters.
- Repeat with other even numbers of counters.

TIP: Only use even numbers.

OBJECTIVES

- Recognise, find and name a half as one of two equal parts of an object, shape or quantity
- Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity

Rising Stars Progression Framework: 1.3.a.1, 1.3.a.2

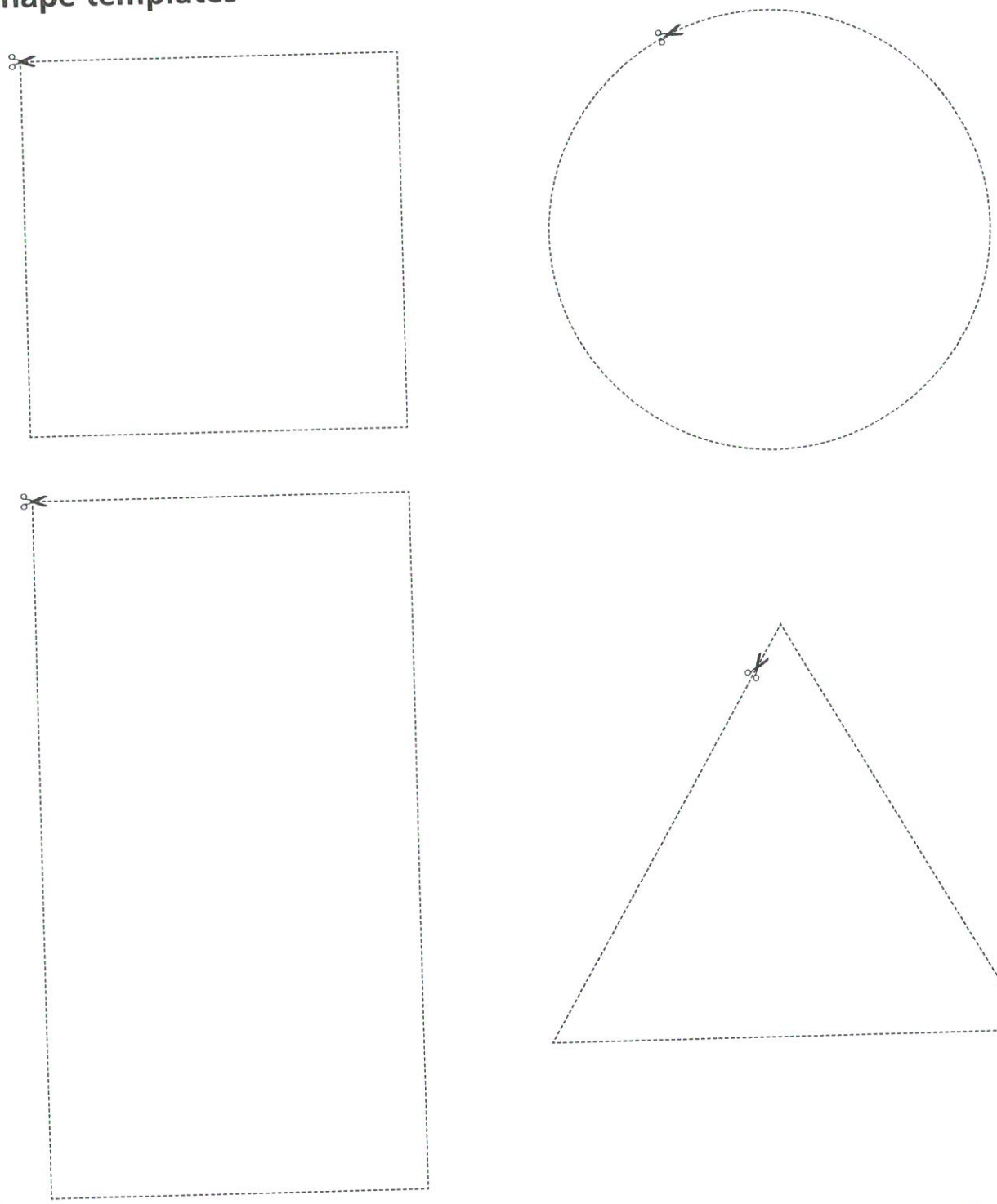
RESOURCES

- Activity 1: Cut out paper shapes from Worksheet 1 (a square, a rectangle, a triangle and a circle); one of each shape per child
- Activity 2: Ten counters per child; pre-cut shapes from Activity 1

Worksheet 1

Photocopy the shapes, enlarging them if you wish, and then cut them out so that each child has a set.

Shape templates



Strand: Fractions

DAY 2

Sub-strand: Recognise, order, compare, equivalence

TEACH

ACTIVITY 1: Halving numbers

- Give each child a piece of paper and ask the children to fold a line down the middle.
- Ask the children: *What can you tell me about the two sides of the page?* Emphasise to the children that the two sides are the same and therefore are **halves** of the page.
- Next, give out the counters (ten per child) and ask one child to pick an even number card (these should be for the numbers 2, 4, 6, 8 and 10).
- Now challenge the children to find half of the number using their counters and the page with the line down the middle.

WATCH OUT: Note how the children approach this task. Do they put one counter on each side of the line? Do the children put two at a time on each side of the line? Can they explain what they are doing?

ACTIVITY 2: Halving objects

- Recall the previous activity and discuss how we can find half of a shape or half of a number. Now ask: *Can we find half of an object too?*

TIP: At this stage you could model finding half of an object – e.g. by folding a symmetrical picture in half, or by cutting an apple in half/peeling an orange and halving the segments.

- Give each child a symmetrical picture (see Worksheet 2) and ask them to find half by folding a line along it and then using the scissors to cut it in half.
- Note: Worksheet 2 provides images to support this task, but if you prefer to use different images, make sure the two sides of the picture are the same.

TIP: Be sure to reiterate to the children that for two parts to be a half they have to be the same. This means that the picture will need to be the same on both sides too.

OBJECTIVES

- Recognise, find and name a half as one of two equal parts of an object, shape or quantity
- Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity

Rising Stars Progression Framework: 1.3.a.1, 1.3.a.2

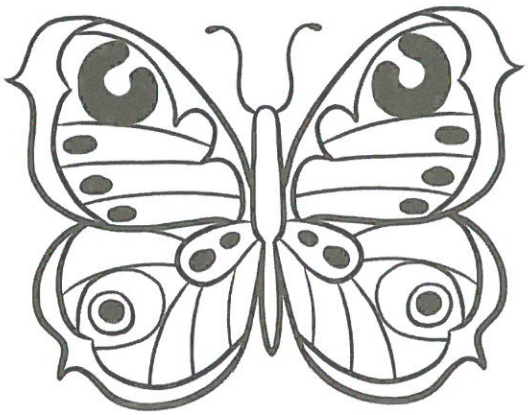
RESOURCES

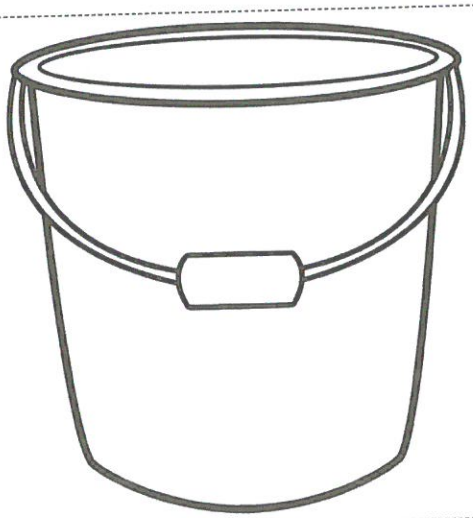
- Activity 1: Each child needs: a piece of paper, ten counters, number cards for 2, 4, 6, 8 and 10
- Activity 2: Each child needs: a copy of a symmetrical picture (examples of these are found on Worksheet 2); scissors

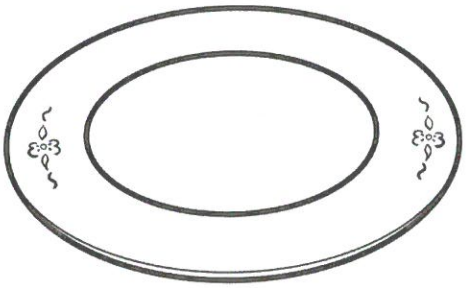
Worksheet 2

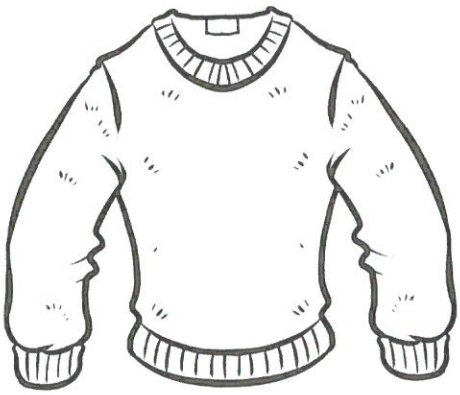
Photocopy and cut out the pictures so that each child has a set.

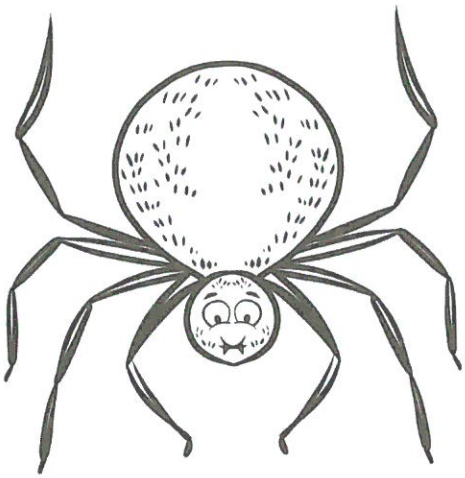
Find a half











Strand: Fractions

DAY 3

TEACH

Sub-strand: Recognise, order, compare, equivalence

ACTIVITY 1: Finding a quarter of a shape

- Give each of the children a square cut out of paper; a template for this is found in Worksheet 1, page 80.
- Ask the children to fold the shape in four, making sure that the edges of the shape line up so the **four quarters** are **equal**.

TIP: Highlight that the four pieces of the shape need to be equal to be considered quarters of the shape.

- Now ask the children to open their folded squares out again. Ask: *Are any of the shapes folded in a different way? Has anyone folded the shape along the diagonal?* Emphasise to the children that, as long as the four parts of the shape are equal, they are quarters of the shape.
- Demonstrate to the children folding a square into quarters incorrectly. Ask them: *Why is this not a quarter of the shape?* They should be able to explain this to you in terms of the four quarters of the shape not being the same/not being **equal**.
- Give each of the children the other shapes from Worksheet 1. Can the children fold these shapes in quarters too?

ACTIVITY 2: Finding a quarter of counters

- Ask the children to return to their folded square. Say to them: *Each part of the shape is a **quarter**. We can use it to find a quarter of a number too.*
- Give each child a number of counters divisible by four (e.g. 8, 12, 16). Ask the children to count how many counters they have altogether.
- Model sharing the counters out onto the shape with an equal number of counters in each quarter.
- As you are doing this, say to them: *It is important to **share** the counters out **equally** to make sure that you find a **quarter** of the number.*
- Repeat with other numbers of counters divisible by four.

TIP: Only use even numbers divisible by four.

OBJECTIVES

- Recognise, find and name a half as one of two equal parts of an object, shape or quantity
- Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity

Rising Stars Progression Framework: 1.3.a.1, 1.3.a.2

RESOURCES

- Activity 1: Cut-out paper shapes from Worksheet 1, page 80; one of each shape per child
- Activity 2: Counters; pre-cut shapes from Activity 1

Strand: Fractions

DAY 4

Sub-strand: Recognise, order, compare, equivalence

TEACH

ACTIVITY 1: Finding a quarter of a number

- Give each child a piece of paper. Ask the children to fold it into four equal parts, so it has lines down the middle splitting it into four.
- Ask the children: *What can you tell me about the four parts of the page?* Emphasise to the children that the four parts are **equal** and therefore are **quarters** of the page.
- Next, give out the counters (20 per child) and ask one child to pick a number card (these should be for the numbers 4, 8, 12, 16, 20).
- Now challenge the children to find quarter of that number using their counters and the page with the lines down the middle.
- Repeat the task asking different children to pick a number card.

WATCH OUT: Note how the children approach this task. How do they place the counters? Can they explain what they are doing?

ACTIVITY 2: Finding a quarter of an object

- Recall the previous activity and discuss with the children how we can find quarter of a shape or quarter of a number. Now ask: *Can we find quarter of an object too?*

TIP: At this stage you could model finding quarter of an object – e.g. by cutting a small cake or quiche, etc., into quarters.

- Give the children a symmetrical picture each (see Worksheet 3) and ask them to find a quarter by folding vertical and horizontal lines and then using the scissors to cut it into four.
- Be sure to reiterate to the children that for four parts to be **quarters** they have to be **equal**. This means that the picture will need to be the same in all four parts too.

WATCH OUT: Worksheet 3 provides images to support this task. If you prefer to use different images, make sure the pictures you use have both vertical and horizontal lines of symmetry.

- Check the children's quarters and then give them the other pictures with vertical and horizontal lines of symmetry (such as those on Worksheet 3) to fold and then cut into quarters.

OBJECTIVES

- Recognise, find and name a half as one of two equal parts of an object, shape or quantity
- Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity

Rising Stars Progression Framework: 1.3.a.1, 1.3.a.2

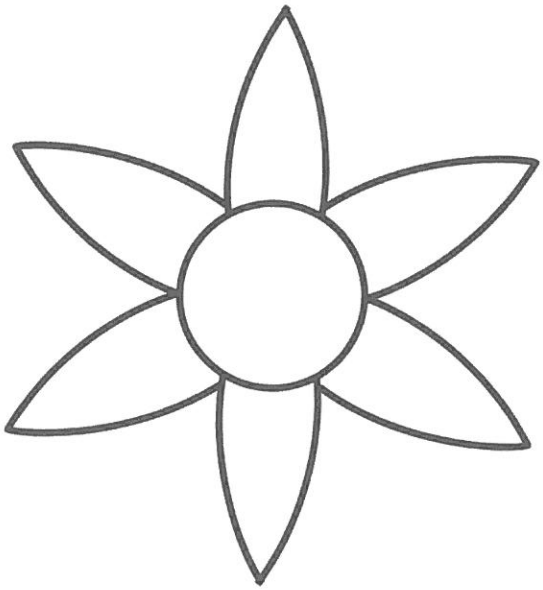
RESOURCES

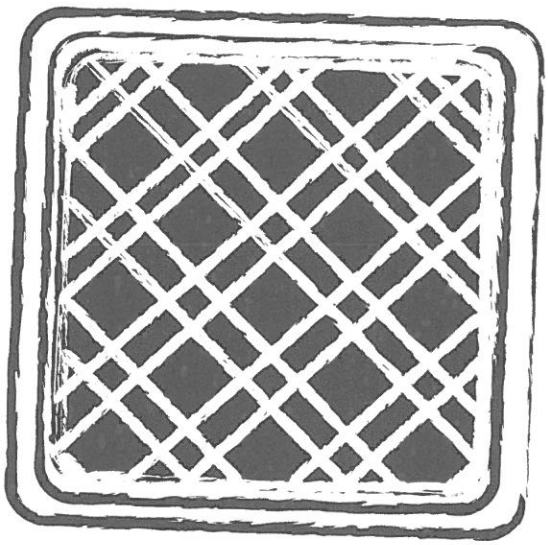
- Activity 1: Each child needs: a piece of paper, 20 counters, number cards for 4, 8, 12, 16 and 20
- Activity 2: each child needs: a copy of a symmetrical picture with both vertical and horizontal lines of symmetry (examples of these are found on Worksheet 3); scissors

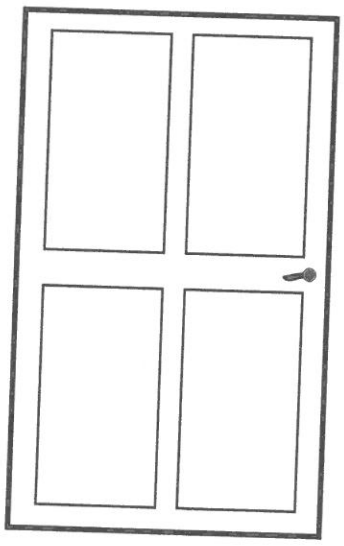
Worksheet 3

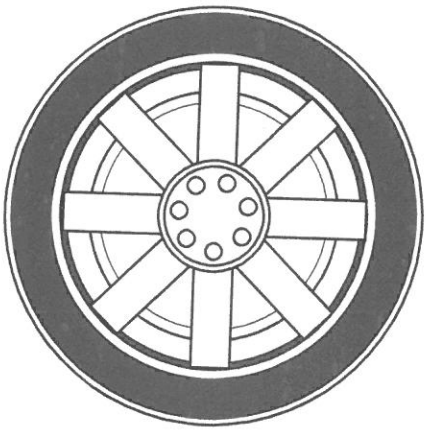
Photocopy and cut out the pictures so that each child has a set.

Find a quarter









Strand: Fractions

DAY 5

Sub-strand: Recognise, order, compare, equivalence

ASSESS

ASSESSMENT ACTIVITY

- The purpose of this assessment is to determine what each child can do independently, carefully noting 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 piece of paper, a pencil and 20 counters.
- Ask the children to follow your instructions to find **half of the numbers** you are going to say. When they find half of the number, they write the answer down on their page as evidence.
- Ask the children to find half of: 8, 10, 16, 4, 20, 18.
- Now give each of the children a copy of Worksheet 4, which has shapes with vertical and horizontal lines of symmetry.
- Remind the children how to find a quarter. Ask: *How many equal parts should you find?*
- The children now work to find **one quarter of each shape** and colour it in.

WATCH OUT: Note down during the assessment whether the children are able to find half of the numbers and how they do this: e.g. Do they use the counters? Do they use their own jottings? Also note down if the children are able to find a quarter and to recognise that to divide into quarters is to split into four equal parts.

OBJECTIVE

- Recognise, find and name a half as one of two equal parts of an object, shape or quantity
- Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity

Rising Stars Progression Framework: 1.3.a.1, 1.3.a.2

RESOURCES

- Each child needs: 20 counters, paper, pencils, Worksheet 4

EVIDENCING SUCCESS

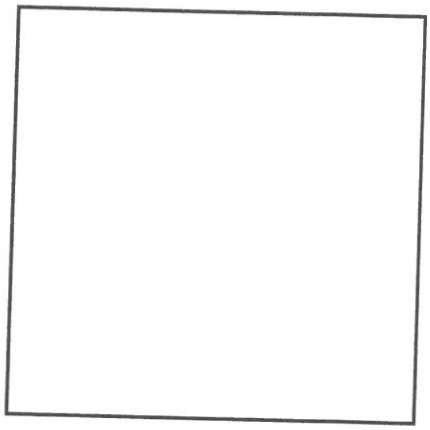
Meeting expectations:

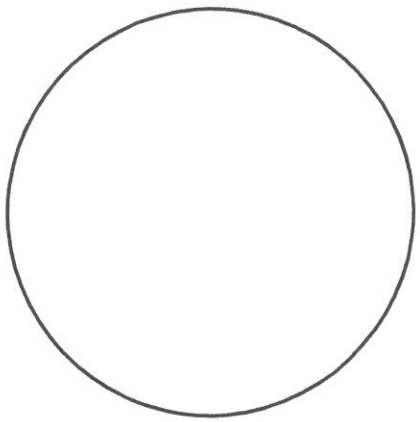
- The child can identify when a shape, such as a rectangle, is divided into two equal pieces and so each is a half, and when two pieces are unequal and so each is not a half.
- The child can identify four equal parts of a rectangle and choose one of them as a quarter.
- The child can identify half or quarter of even numbers up to 20.

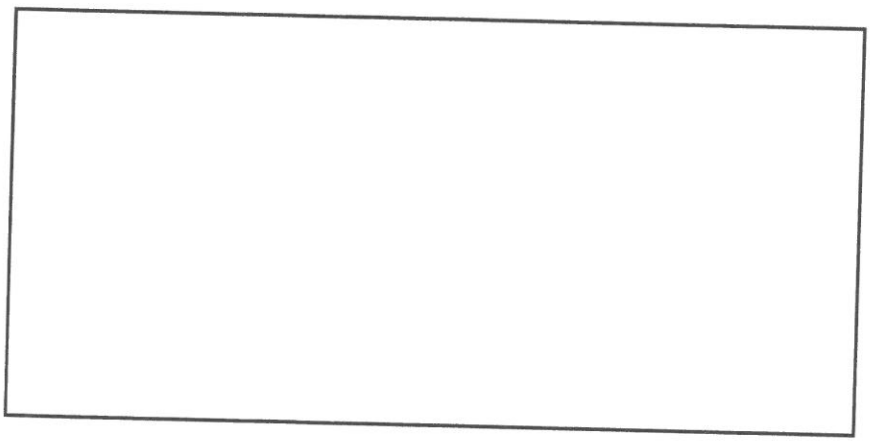
Worksheet 4

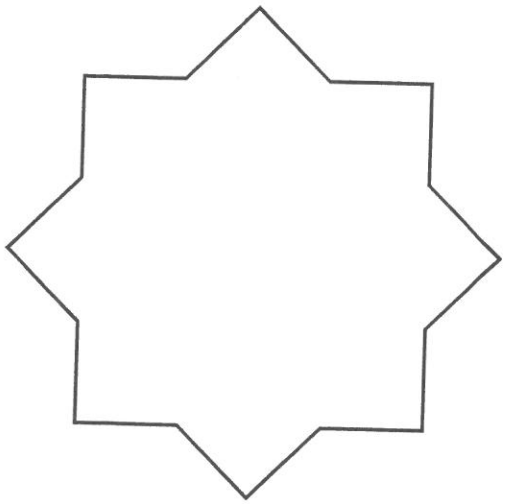
Name _____ Date _____

Finding a quarter of shapes









Strand: Measurement

DAY 1

Sub-strand: Length, mass, capacity

TEACH

ACTIVITY 1: Heavier than and lighter than

- Show the children the balance scales and ask them: *How could we use these scales to find the **mass** of different objects?*
- Model putting one item each on both sides of the balance scale. Before you do so, ask: *How will we know which is **heavier**? How will we know which is **lighter**?* Discuss with the children that the heavier item will pull the scale down and the lighter item will cause the scale to rise up.
- Place the items on the scales then ask: *Which is lighter? Which is heavier?*
- Now give the children the various classroom items and get them to work together to investigate their masses. Ask them to record which is heavier and which is lighter each time.

TIP: Give the children the freedom to record the masses in their own way. You may wish to suggest a table or writing sentences.

- Now ask the children to help you order the items from heaviest to lightest.
- When you have ordered the items, ask the children to describe them to a friend using the words: **heavier, lighter, heaviest, lightest**.

WATCH OUT: The children should be able to use the vocabulary in context.

ACTIVITY 2: Weighing small world animals

- Place the balance scales in the middle of the group. Show the children how the scales appear when they are empty. Say: *Look, the two sides of the scales are both off the ground. The bar across the top is flat so the scales are **balanced**. This means that the mass on both sides of the scales is the same.*
- Now put a small world animal on one side of the scales and add the cubes to the other side.
- Count the cubes into the scale until it balances and record the mass.
- Repeat with other animals, allowing the children to weigh them using the cubes.

OBJECTIVES

- Measure and begin to record mass/weight, capacity and volume
- Compare, describe and solve practical problems for mass/weight (e.g. heavy/light, heavier than, lighter than), capacity and volume (e.g. full/empty, more than, less than, half, half full, quarter)

Rising Stars Progression Framework: 1.1.4, 1.2.3, 1.3.3

RESOURCES

- Activity 1: Balance scales; various classroom items, e.g. a ruler, a marker pen, a book, etc.; paper and pencils
- Activity 2: Balance scales; selection of small world animals; multi-link cubes

Strand: Measurement

DAY 2

Sub-strand: Length, mass, capacity

TEACH

ACTIVITY 1: Weighing classroom objects using gram weights

- Allow the children to choose an item from the selection of classroom objects.
- Explain to them that you will be using the **gram weights** to **weigh** objects. Say to them: *These weights all have a mass of one gram, and because we know that we can measure a mass more accurately.*
- Demonstrate how to weigh an item using the gram weights.
- Ask: *How will you know when to stop adding the gram weights to the pan balance?* (When the scales are balanced.)
- Observe the children while they try weighing their item.

TIP: Ensure the children are putting one weight into the pan at a time and counting carefully as they add them.

- Ask the children to write down the masses on paper and then swap items with another child. Remind the children that all they have to do is write the number of weights they added to the pan followed by the word **grams**, or **g**.
- Tell the children to check the mass of their partner's item using the gram weights and then compare their answer with the one their partner wrote down.

ACTIVITY 2: Problem solving using weights

- Before the session you will need to weigh different items (enough for one item per child). You will use these masses in the problem-solving questions during the activity.
- Ask the questions phrased below. Substitute the children's names and fill in the mass in multi-link cubes.
- Introduce the problem to the children by saying: *[Child A] has an item that has a mass of [X] cubes and [Child B] has an item that has a mass of [X] cubes. [Child C] has the heaviest item and [Child D]'s item is the lightest of them all.*
- Encourage the children to find their items from the group on the table by weighing them against the cubes and working out how much their item weighs and whether it is the lightest or heaviest.

TIP: Work together to weigh all of the items first and then write their masses down in grams. Then repeat the problem to the children and allow them to select their item from the group.

OBJECTIVES

- Measure and begin to record mass/weight, capacity and volume
- Compare, describe and solve practical problems for mass/weight (e.g. heavy/light, heavier than, lighter than), capacity and volume (e.g. full/empty, more than, less than, half, half full, quarter)

Rising Stars Progression Framework: 1.1.4, 1.2.3, 1.3.3

RESOURCES

- Activity 1: Balance scales; gram weights; variety of classroom objects; paper and pencils
- Activity 2: Balance scales; pre-weighed items; multi-link cubes

Strand: Measurement

DAY 3

Sub-strand: Length, mass, capacity

TEACH

ACTIVITY 1: Full and empty, more and less than

- Show the children the containers.
- Ask the children: *What do we need to do to find out which container holds the most?*
- Model filling a container to the top with sand. Make sure the sand fills it to the brim then discuss with the children how we know it is full (no more fits in).
- Choose another container. Pour the sand from the original container into the new one. Discuss with whether all of the sand managed to fit into the new container or if some was left over/there wasn't enough sand to fill it.
- Highlight to the children what this means about the container's capacity – the one that held more sand must have a larger **capacity** than the one that couldn't hold all the sand.
- Allow the children to investigate the capacity of the other containers.
- Facilitate their discussion and encourage them to use the vocabulary of **full, half full, more, less, capacity**.

TIP: Repeating their sentences back to them using the focus vocabulary above will encourage them to use it independently.

WATCH OUT: The children may enjoy the freedom to investigate the capacity of the containers and play with the sand but focus their discussion on how much the containers hold.

ACTIVITY 2: Measuring capacity with sand

- Introduce the task to the children by saying: *Using the same containers, you are now going to find out how much each one of them will hold.*
- Give each child a container and a cup and ask them to carefully pour one full cup of sand from the sand tray into their container. When they have done this, ask whether they can fit in another full cup. Ask: *Is your container full now?*
- Encourage the children to use mathematical vocabulary such as **half full, nearly empty**, etc.
- Support the children to find the capacity of their container using cups of sand. They can feedback saying: *The capacity of my container is X cups of sand.*
- When all the children have done this, ask them to work together to order the containers based on capacity.

OBJECTIVES

- Measure and begin to record mass/weight, capacity and volume
- Compare, describe and solve practical problems for mass/weight (e.g. heavy/light, heavier than, lighter than), capacity and volume (e.g. full/empty, more than, less than, half, half full, quarter)

Rising Stars Progression Framework: 1.1.4, 1.2.3, 1.3.3

RESOURCES

- Activity 1: Four containers of various sizes; sand tray
- Activity 2: Each child should have: one standard size cup, a container (various sizes from Activity 1), sand tray

Strand: Measurement

DAY 4

TEACH

Sub-strand: Length, mass, capacity

ACTIVITY 1: Measuring capacity in millilitres (ml)

- Show the children a measuring cylinder and look at the lines on the side of it as a group. Discuss the scale and the numbers. Ask the children: *What are these numbers for? How could we use them to find out the capacity of a container?* Children should realise that they will need to pour the full container into the **measuring cylinder**.
- Fill a container with water and pour that water into the measuring cylinder.
- Use the **scale** to find out how much water was in the container in millilitres or ml.
- Repeat with other containers. Encourage the children to take more of a lead role in the activity as they become more familiar with the use of the scale.

TIP: As the children are waiting for their turn to measure capacity, talk about the process with them. Ask: *Would you do this differently? Do you agree with that measurement? Do you think this container will hold more or less?*

ACTIVITY 2: Comparing capacity

- Give each child one container and one measuring cylinder.
- Ask the children to find the **capacity** of their container.
- As the children are measuring the capacity of their container, discuss with them how they are finding the answer, the units they are measuring in, and whether they think their container will hold **more** or **less** than their friend's container.
- The children then record the number of millilitres from the scale onto a sticky note and stick this onto their container.
- Now work as a group to order the containers from the largest to smallest capacity using the sticky note numbers.
- Discuss the children's findings with them. Ask: *Were any of the containers surprisingly small or large in capacity?*

OBJECTIVES

- Measure and begin to record mass/weight, capacity and volume
- Compare, describe and solve practical problems for mass/weight (e.g. heavy/light, heavier than, lighter than), capacity and volume (e.g. full/empty, more than, less than, half, half full, quarter)

Rising Stars Progression Framework: 1.1.4, 1.2.3, 1.3.3

RESOURCES

- Activity 1: Measuring cylinder (in ml); water tray; containers of different capacity
- Activity 2: A container and measuring cylinder per child; sticky notes; pencils

Strand: Measurement

DAY 5

Sub-strand: Length, mass, 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.
- Remind the children that they used the scales to weigh objects using cubes in the previous lesson.
- Give children the four objects to weigh and ask them to fill in the table of results (writing the name of the object in one column and the **mass** in the next column) on Worksheet 1. Allow the children to choose whether to weigh the objects with cubes or with gram weights. Ask them to put the units they have used to weigh the object next to their number for the result.
- The children then label the **heaviest and lightest** objects on their table, using the measurements to help them.
- Now give each child four containers and ask them to try finding the **capacity** of each.
- Once the children have made their measurements, ask them to fill in the table of results with their findings and then label the two containers that hold the most and the least/have the **largest and smallest capacity**.

EVIDENCING SUCCESS

Meeting expectations:

- The child can solve problems such as: '*Using a balance, compare four boxes to find out which is heaviest.*'
- The child can measure mass by balancing an object with a number of plastic cubes, for example.
- The child can find the capacity of an object by filling it and measuring the contents.

OBJECTIVES

- Measure and begin to record mass/weight, capacity and volume
- Compare, describe and solve practical problems for mass/weight (e.g. heavy/light, heavier than, lighter than), capacity and volume (e.g. full/empty, more than, less than, half, half full, quarter)

Rising Stars Progression Framework: 1.1.4, 1.2.3, 1.3.3

RESOURCES

- *Weighing task:* Balance scale; four objects (of known masses) per child; non-standard unit (e.g. multi-link cubes); gram weights; Worksheet 1
- *Capacity task:* Four containers of various capacity and one cup per child; sand tray; water; measuring cylinder; Worksheet 1