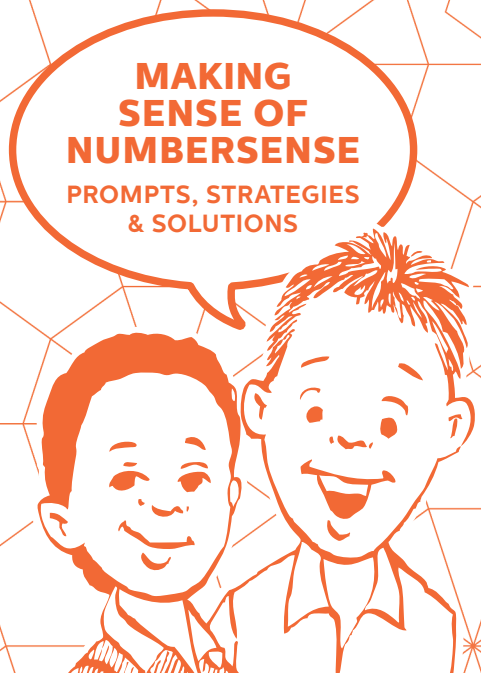
7 NumberSense

COMPREHENSIVE WORKBOOK

English

Teacher Guide



1. How many cents? 150 c

2. How many cents? 150 c

3. Complete.
   50 ; 100 ; 150

4. Complete the tables.

Cats	1	2	4	5	10	11	12	13	14	15
Legs	4	8	16	20	40	44	48	52	56	60

Cats	1	5	10	11	12	13	14	15
Legs	4	20	40	44	48	52	56	60

5. Make your own table.

Cats								
Legs								

6. Make the sides equal.

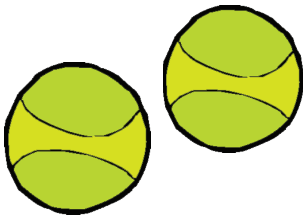
   $4 \times 4 = 16$ $\quad$ $4 \times 12 = 48$

   $4 \times 5 = 20$ $\quad$ $4 \times 15 = 60$

7. There are 4 players in a tennis team. How many teams can we make if there are:

   - 24 players?
     6 teams
   - 36 players?
     9 teams

I can use the table to help me.



Additional prompts and strategies

Activity 4: Tables

Encourage children to use relationships within the tables to determine the missing information.
Be curious about the strategies they are using.

- Do they use doubling?
- Do they look for ways to use what they have already done to help them?

Ask questions such as:

? Can you explain how you did it?

? Is there a faster way?

Each cat has 4 legs, so 5 cats will have 5 x 4 legs = 20 legs.

		double		double						
Cats	1	2	4	5	10	11	12	13	14	15
Legs	4	8	16	20	40	44	48	52	56	60
			double		double					

4 cats have double the number of legs as 2 cats.

I already know that:
10 cats ⟶ 40 legs and
2 cats ⟶ 8 legs, so
12 cats ⟶ 40 legs plus 8 legs ⟶ 48 legs.

I used Table 1 to help me with Table 2 and with making my own table.

Activity 6 and 7:

Notice how both these activities are linked to the tables.

Ask questions such as:

? Is there anything you have already done that can help you?

I can use the tables to help me. I have done all of them already in the tables.

The tables are counting in 4s. The tennis teams are also in 4s.
I know that 20 = 5 x 4 from the tables.
24 is just 4 more, which makes 6 teams.

I know that 40 = 10 x 4 from the tables.
36 is just 4 less, which makes 9 teams.

Although the 5c coin has been discontinued, it provides a context for counting and investigations. It is not intended as a 'money' activity. We suggest explaining the context to the children and focusing on the activity rather than the money.

1. How many cents? 150 c

2. How many cents? 150 c

3. Jan has these coins.

- How many cents? 150 c
- In how many different ways can he make up 70c?

Investigations

Counting in 20s is like counting in 2s with an extra zero.

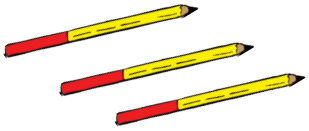
4. Complete the tables. *Can you see a pattern?*

20c coins	1	2	3	4	5	6	7	8
Cents	20	40	60	80	100	120	140	160

5c coins	1	2	3	4	5	6	7	8
Cents	5	10	15	20	25	30	35	40

5. 5 friends share 42 pencils equally. How many pencils will each friend get?

8 pencils (2 left over)



Things to think about

Activity 1, 2 and 3: Counting

The purpose of this activity is to encourage children to count in groups or mixed groups and to expose them to different ways of building a number. Working systematically is a useful skill which this activity supports.

Suggested activity:

During the teacher-led time, practise counting in mixed groups of 5, 10, 20, 25 and 50 (you could use coins or cut out paper balloons with price tags – see page 6). Reflect on the most efficient way of counting the groups together.

Ask questions such as:

? How did you count the coins?

I counted all the 20c coins, then all the 5c coins and added them together.

? What do you notice? What is the same/different?

Each group of coins makes 150c.

Activity 5: Multiplication- and division-type problems

Sharing problems develop an understanding of equal sharing (division) long before we use the word division or introduce the division symbol. Sometimes these problems have remainders which cannot be cut and shared (like this page and page 15). Later on (pp.18, 24, 38) the remainders can be cut into pieces,creating an awareness of fractions.

Anticipated strategies might include:

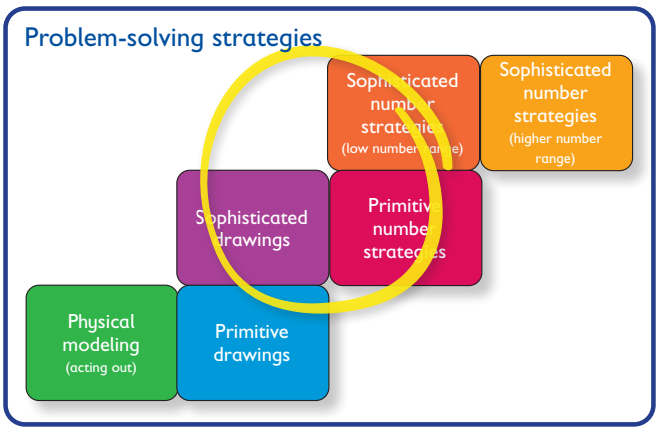
5	5	5	5	5	(25)
2	2	2	2	2	(10)
1	1	1	1	1	(5)
8	8	8	8	8	(40)

There are 2 left.

I know that 10 x 5 = 50
9 x 5 = 45
8 x 5 = 40
They each get 8 and there are 2 left.

I know that 8 x 5 = 40.
Each friend gets 8 pencils (2 left over).

By this stage, we anticipate a primitive number strategy. Some children may be using sophisticated drawings and some may use more sophisticated number strategies.

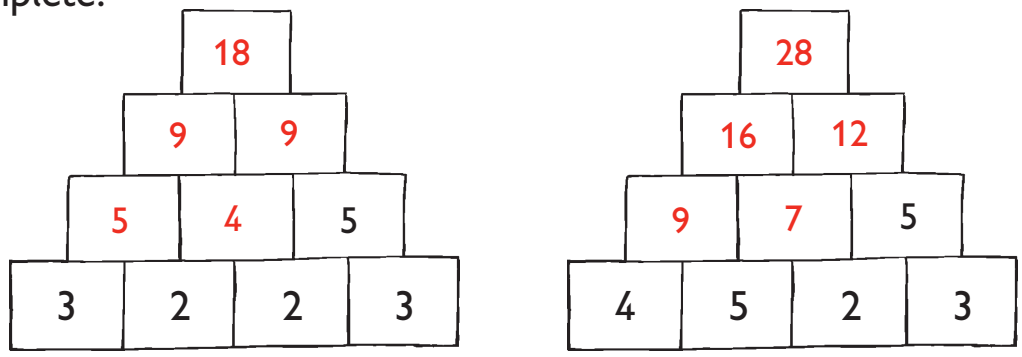


1. Complete.

20 ; 40 ; 60 ; 80 ; 100 ; 120 ; 140 ; 160 ; 180 ; 200

2. Complete.

p.4



3. Make the sides equal. ? *What do you notice?*

These numbers must all make 20.

10 + 10 = 20
11 + 9 = 20
12 + 8 = 20
13 + 7 = 20

10 + 30 = 40
11 + 29 = 40
12 + 28 = 40
13 + 27 = 40

These numbers are all 20 more than the missing numbers on the left.

p.1

4. Fundi's mother gave her a money box with R30 in it. Fundi saves R2 in the money box each month.
Complete the table.

Months	0	1	2	3	4	6	8	10
Money in box	30	32	34	36	38	42	46	50

5. Fundi wants to buy a soccer ball that costs R40. She has R13. How much more money does she need?

R27

p.8

Things to think about

Activity 4: Tables

The purpose of this activity is to introduce children to a table that does not have 1 as the first input value. Tables like this have two features:

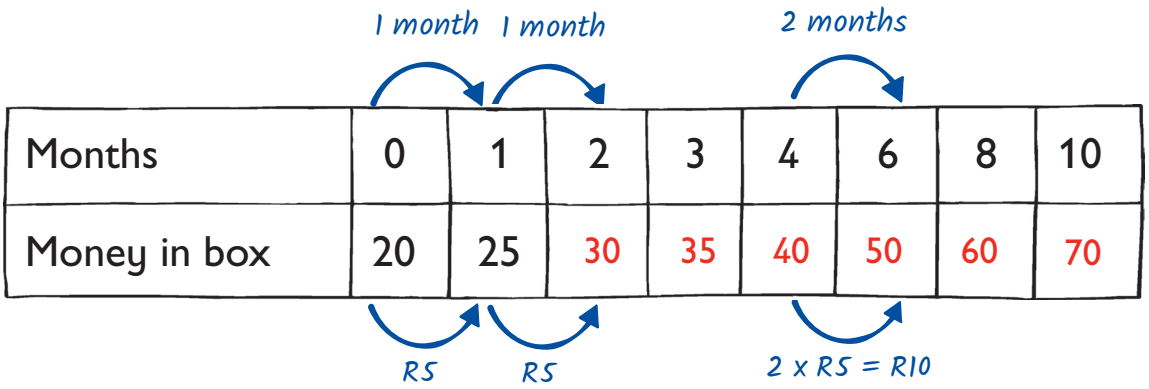
- There is a fixed step size from one term to the next (Fundi saves R2 each month).
- There is an initial value (a constant) that is not related to step size (there was already R30 in Fundi's money box).

Suggested activity:

Spend time during the teacher-led time modelling a similar situation. Ask the children to complete the table. Be curious as to how they did this.

For example:

Sihle's dad gives him a money box with R20 in it.
Sihle saves R5 in the money box each month. Complete the table.



Ask questions such as:

Where does the R20 at 0 months come from?

How did you do it?

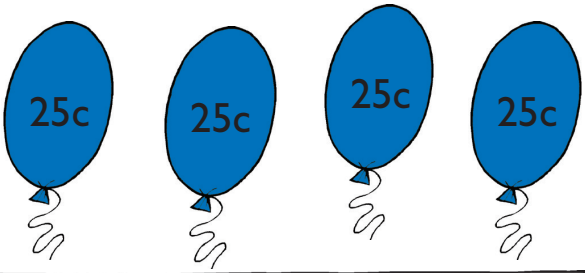
It is the money Sihle's dad gives him with the money box.

Sihle saves R5 every month. I just added R5 more for each month.

Do not expect all the children to be confident with this situation and the table since this is the first introduction to this type of relationship. It will be revisited frequently in future workbooks. The situation used here is revisited on page 12 as a problem but without a table. Children might notice that some of their usual strategies such as doubling, adding 2 and 6 months to get 8 months etc. do not work with this table. Try asking the children to explain why these strategies do not work.

p.2

1. How many cents? 100 c



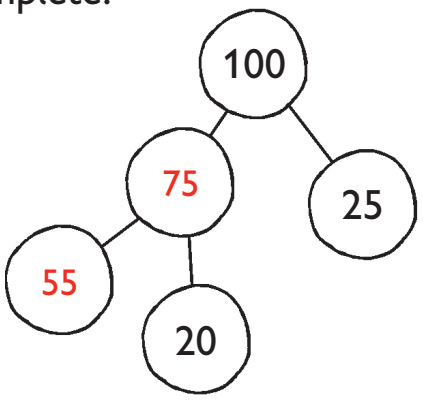
p.6

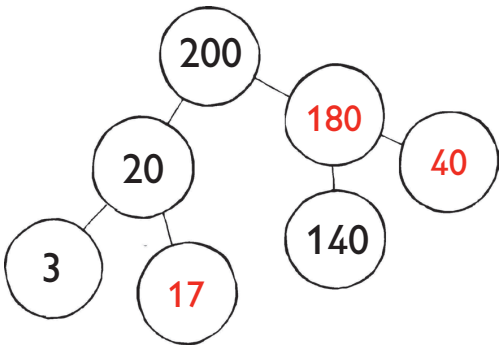
2. Complete the tables.

20c coins	1	2	3	4	5	6	7	8
Cents	20	40	60	80	100	120	140	160

20c coins	1	2	5	6	7	8	9	10
Cents	20	40	100	120	140	160	180	200

3. Complete.





4. • Fundi and Yusuf want to share 3 chocolate bars equally. Show them how to do it.

• Jan, Sara and Ben want to share 4 chocolate bars equally. Show them how to do it.

What did you do with the leftover chocolate?

I cut it into four pieces because there are four children.

• Yusuf, Ben, Jan and Fundi want to share 5 chocolate bars equally. Show them how to do it.

Things to think about

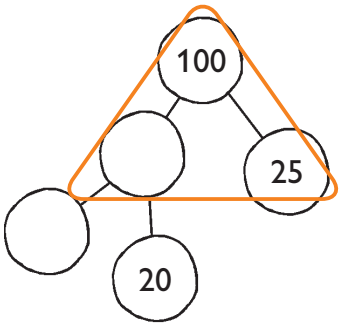
Activity 3: Bubbles

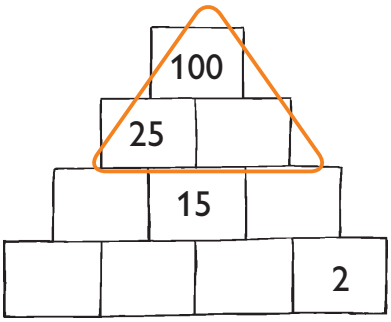
The purpose of this activity is to reinforce the concept of number combinations (number bonds) using a different representation for practice. It also allows children to explore breaking down and building up numbers. Make sure that children understand how the bubbles work: the top bubble is 'made up' by adding the bubbles directly below it (just like the pyramids).

Ask questions such as:

? Where can you start?

? How did you choose?



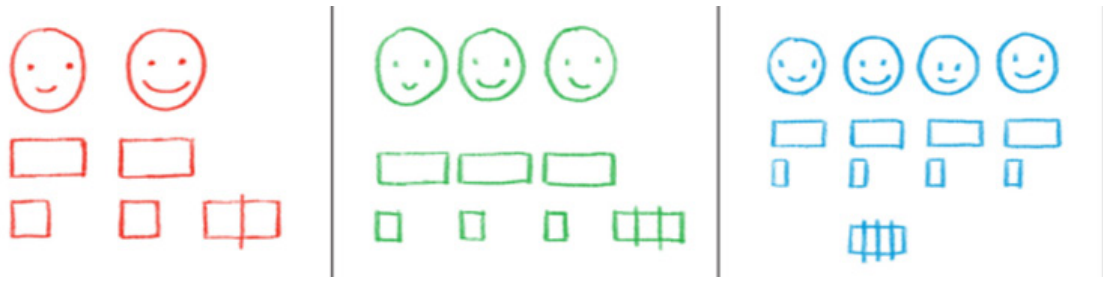


Activity 4: Problems which develop the fraction concept

This is the first introduction to fractions in the NumberSense Workbooks.

These problems involve objects that can easily be partitioned so that the remainder can be cut into pieces – parts of a whole. The problems deliberately have the same structure as the sharing with remainder problems so that children feel confident in making a start. The problems draw attention to the notion that a whole can be cut into any number of pieces (two pieces, three pieces, four and five pieces and so on). By asking 'Show them how to do it' rather than 'How much does each child get' the problem avoids the expectation of a numerical solution. This encourages children to make sense of the problem by, for example, drawing a picture, and focuses the children's attention on the existence of a part of a whole.

Anticipated strategies might include:



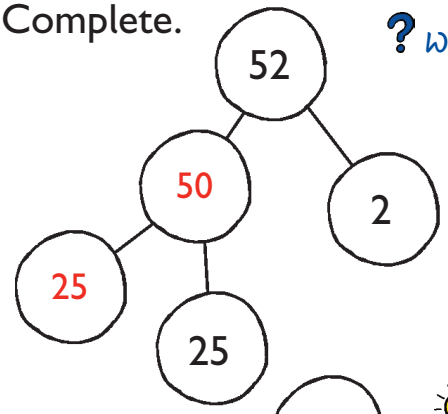
We delay the introduction of the word 'fraction', fraction names and fraction notation (Piaget's so-called social knowledge) until children have had more experience with this concept in context. In the meanwhile, we use phrases such as 'one of two equal parts', one of 3 equal parts', etc.

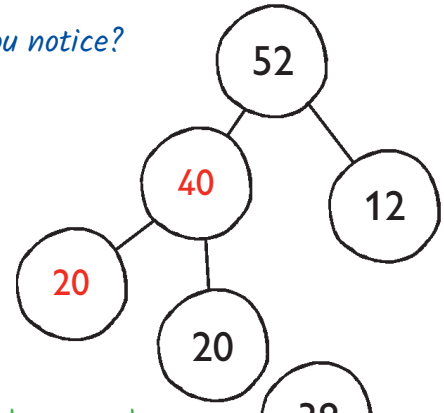
Where can you start?

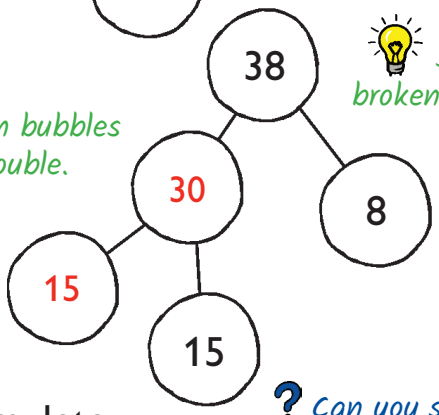
Can you explain how you did it?

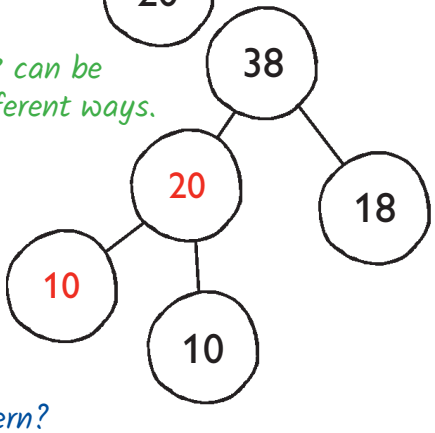
1. Complete.

What did you notice?









The bottom bubbles are all double.

52 and 38 can be broken up in different ways.

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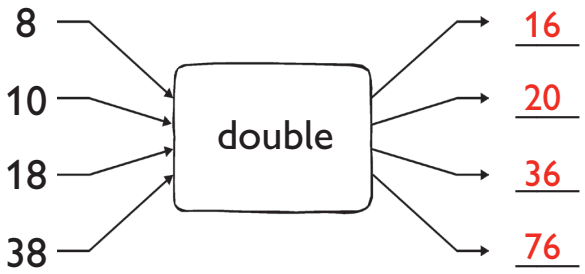
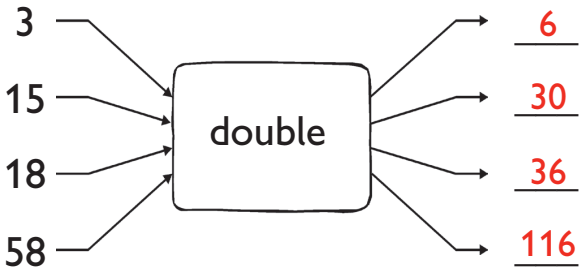
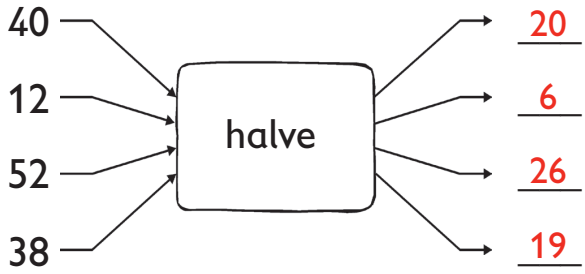
Can you see a pattern?

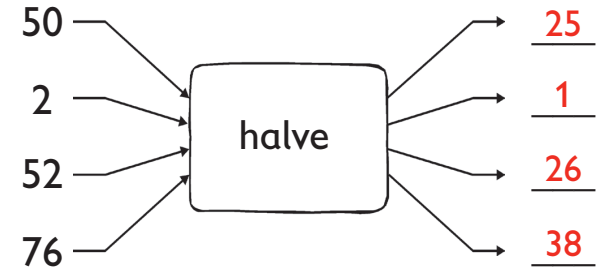
2. Complete.

p.12









3. Jan played rugby with his friends from 11 o'clock in the morning until 3 o'clock in the afternoon.
How many hours is that?

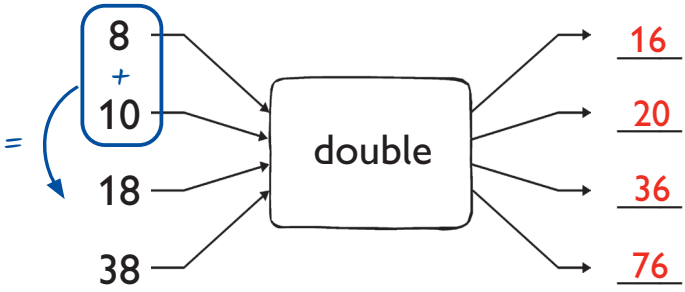
4 hours

p.17

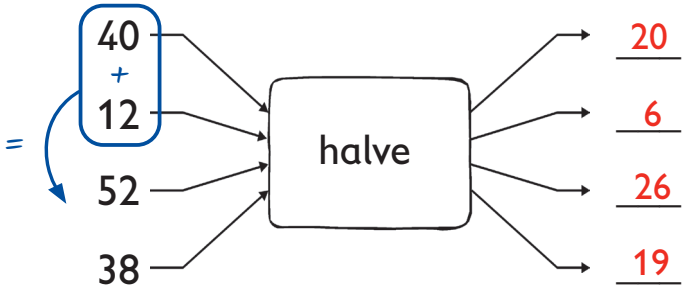
Additional prompts and strategies

Activity 2: Flow diagrams

I can use what I have already done to help me. 18 doubled is just 8 doubled, plus 10 doubled. 38 doubled is 18 doubled, plus 20 doubled.



It is difficult to halve 38,
but I can easily halve 10 and 18.
Half of 20 = 10
Half of 18 = 9
Half of 38 = 10 + 9 = 19



Resist the temptation to teach this. Rather ask questions such as:

- What is 8 doubled? What is 10 doubled? What is 18 doubled?
- Is there anything I have done already that can help me?
- Can you explain how you did it?
- Could you break the number up to make it easier?

Activity 3: Problems involving time

Like with other time activities, these types of problems should be a regular part of the daily classroom activities.

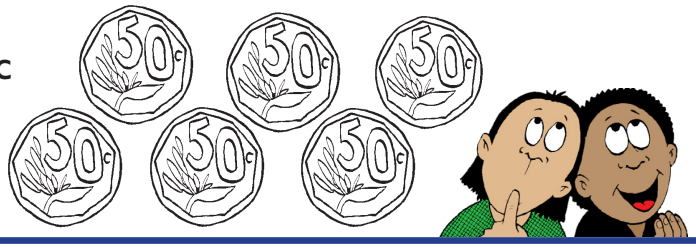
Use a clock with 'linked' hour and minute hands so that children see that the two move in relation to each other.

Discuss the features of analogue time:

- 60 minutes in an hour
- 24 hours in a day, split into two halves of 12 hours each.

Engage children in counting hours for time spans including those that 'bridge' 12:00 (midday and midnight).

1. How many cents? 300 c



These numbers are multiples of 3.

3 ; 6 ; 9 ; 12 ; 15 ; 18 ; 21 ; 24 ; 27 ; 30 ;

33 ; 36 ; 39 ; 42 ; 45

These numbers are multiples of 4.

4 ; 8 ; 12 ; 16 ; 20 ; 24 ; 28 ; 32 ; 36 ; 40 ;

44 ; 48 ; 52 ; 56 ; 60

2. Write down the multiples of 5 up to 60.

5 ; 10 ; 15 ; 20 ; 25 ; 30 ; 35 ; 40 ; 45 ; 50 ;

55 ; 60

3. Write down the flard cards that you will use to build the numbers:

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- four hundred and thirty-six

400	30	6

- six hundred and nineteen

600	10	9

- three hundred and twelve

300	10	2

4. Yusuf sleeps for 10 hours every night. How many hours does he sleep in:

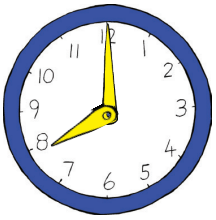
p.17

4 × 10 = 40 hours

- 4 nights? 40 hours

10 + 10 + 10 + 10 = 40 hours

1 night = 10 hours
2 nights = 20 hours
4 nights = 40 hours



- 1 week? 70 hours

3 more nights
40 + 30 = 70 hours

4 nights = 40 hours
8 nights = 80 hours
7 nights = 70 hours

7 × 10 = 70 hours

Ideas for teaching

Activity 2: Multiples

We can think about multiples as 'groups of' a certain number.

For example:

Multiples of 3 can be thought of as groups of 3.

? How many threes make 27?

- 27 is a multiple of 3 because you can make it with nine groups of 3, with nothing left over (9 x 3 = 27).
- 14 is not a multiple of 3 because you can make four groups of 3, but there are 2 left over. If there are any left over (remainders), then the number is not a multiple.

For children more confident:

Find all the numbers that are not multiples of 4.

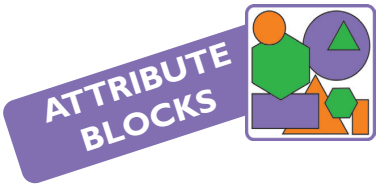
13 (4 × 3 + 1)

17 (4 × 4 + 1)

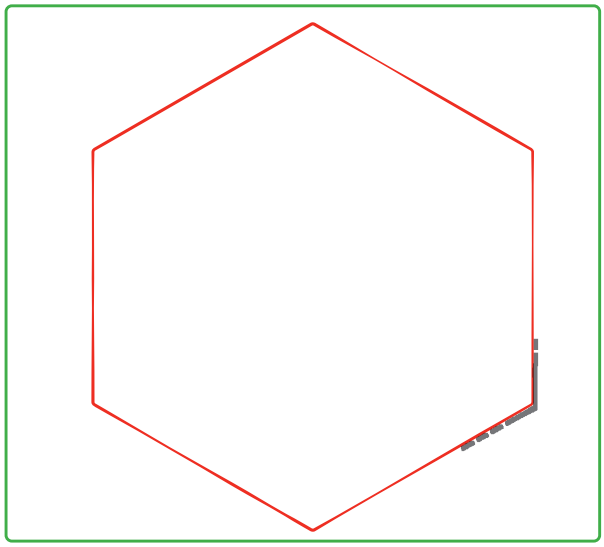
22 (4 × 5 + 2)

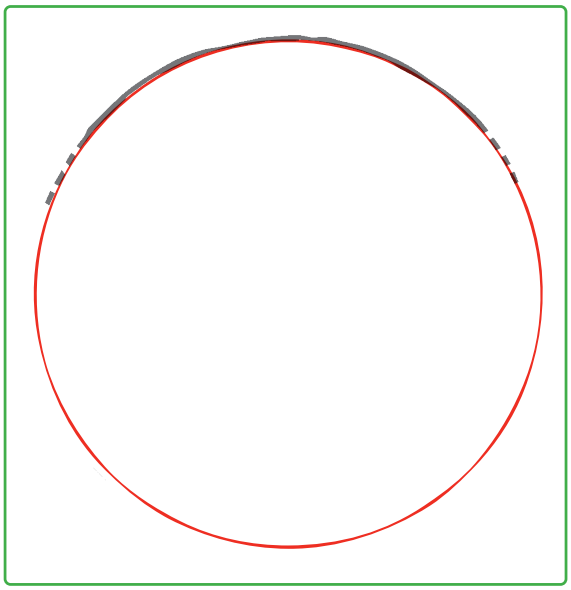
30 (4 × 7 + 2)

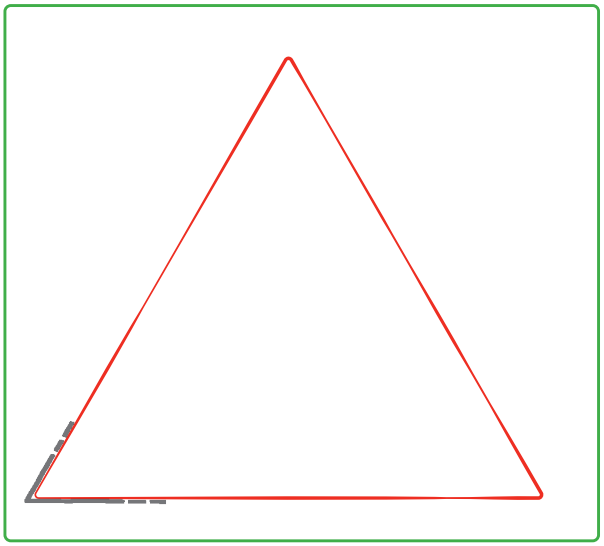
The **New Idea** icon alerts children to a new activity or concept. This icon should also alert you to allow for time to introduce and practise this new idea.

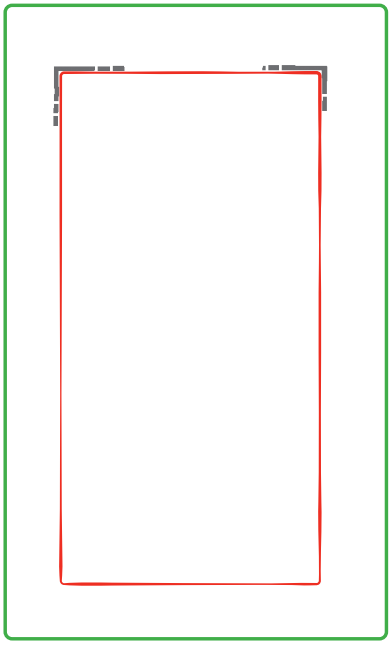


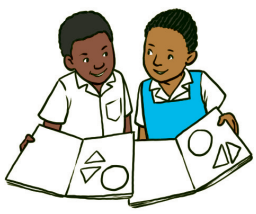
1. Place the Attribute Blocks that complete the drawings into the corners and trace around the pieces.











Compare your solutions with a friend.

Ideas for teaching

Approach to Space and Shape activities

The activities in the workbooks and the Activity Cards are designed to give children plenty of hands-on experience with 2D shapes and 3D objects. It is expected that they will have been doing this since Grade R. If there are children in your class for whom this is not the case or who need scaffolding, try giving them some of the earlier Activity Cards or workbook pages.

Make sure the children know what to do and then ask them to attempt the activities on their own. It is in their struggle to do the tasks that they will start to notice patterns and relationships. During the activity, reflect with the children as you walk around the classroom or at the end.

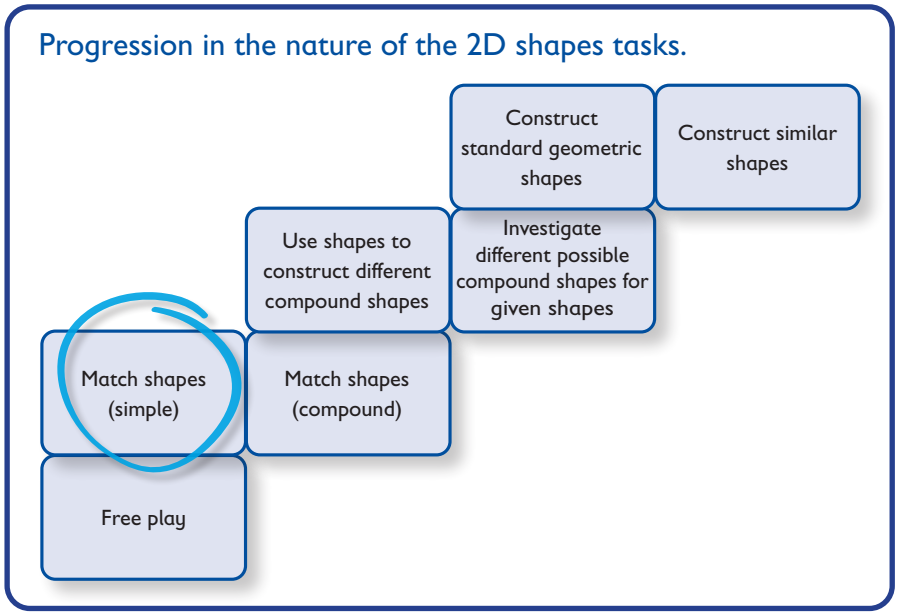
Ask questions such as:

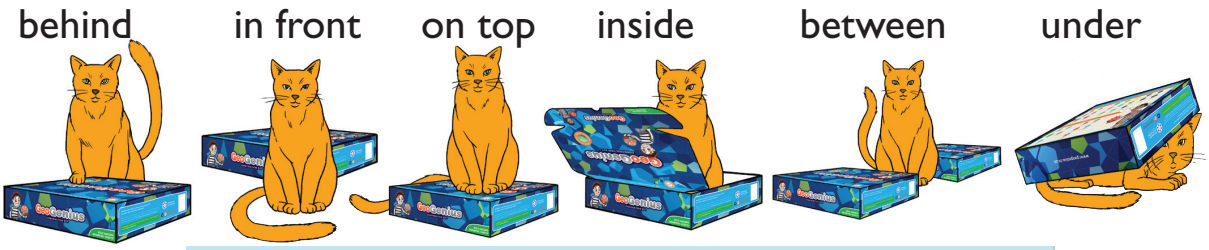
- What did you notice?
- What is the same?
- What is different?
- Can you explain how you did it?

It is very important to do the page yourself before the lesson so that you understand how the page develops geometric thinking and are prepared to guide the children.

The purpose of this activity is to develop an awareness of the properties of 2D shapes, with a focus on corners and an understanding of the concept of 'fit'.

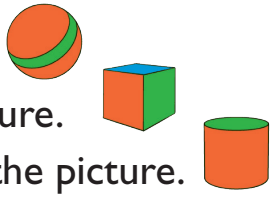
This is a matching activity. Activity cards 1 to 6 have similar matching activities for scaffolding or consolidation.





1. Complete.
   Who is inside the pipe? Sesethu
   Who is on top of the pipe? Matthew
   Who is behind the tree? Nkosi
   Who is under the table? Amy
   Who is in front of the table? Fatima
   Who is between the pipe and the tree? Gokul

2. Circle all the ball-like objects in the picture.
3. Cross out all the box-like objects in the picture.
4. Put a ✓ through all the tube-like objects in the picture.



This is the development of an early awareness of 3D objects.

Additional prompts and strategies

Spatial reasoning

To support these activities, go out into the playground and get the children to position themselves behind, in front, on top, inside of, etc. various apparatus. Physically performing the positions will prepare them for the page's activities.

Tasks used to lay the foundations for spatial reasoning typically involve illustrations of daily scenes: playgrounds, shops, classrooms, sports matches etc. In each case, the child is asked to do two things. First the child is asked to describe the relative positions of objects using the vocabulary of position, and then to identify all of the objects in the scene that meet some given criteria, e.g. all of the box-like objects (rectangular prisms) and ball-like objects (spheres).

It is important to note that the activities on this page are not intended as the main focus of the lesson, but rather as consolidation of practical activities facilitated by the teacher.

Activity 1: Positional language

Ask questions to build an understanding of position having two equivalent position descriptions. Get the children to compare them.

How do you know that the cat is behind the box?

There is a part of the cat that we can't see.

Where is the box?

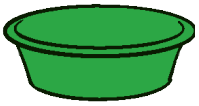
The box is in front of the cat.

Ask questions around the activity on the page with the equivalent position descriptions in mind. For example:

- Matthew is on top of the pipe. The pipe is under Matthew.
- Amy is under the table. The table is above Amy. (Discuss why it isn't 'on top of' Amy.)
- Gokul is between the pipe and the tree. The pipe and tree is on either side of Gokul.

Discuss the difference between 'in' and 'on' and 'in' and 'inside'.

Jessica, Kayla and Naledi want to determine how many cups of water are needed to fill a basin.



Jessica

I will fill cups of water. Then I will pour the cups into an empty basin and count how many cups I need to fill the basin.

Kayla

I will fill the basin with water. Then I will use a cup to empty the basin and count how many cups I use to empty the basin.

Naledi

I will fill cups of water. I will determine how many cups of water fill the small bucket. Then I will determine how many small buckets fill the basin and calculate how many cups of water fill the basin.

1. Whose method works the best? Explain why. Naledi's

   Naledi's. It is the fastest because the bucket is bigger than the cups.

2. 2 cups of water fill a bottle. 12 bottles of water fill a bucket. 8 buckets of water fill a bath.

   - How many cups of water would be needed to fill a bucket?
     24 cups
   - How many cups of water would be needed to fill a bath?
     192 cups

Additional prompts and strategies

Measurement: Capacity – non-standard units

The purpose of this activity is to draw the children's attention to the fact that the unit selected impacts accuracy and efficiency. It makes more sense to fill the basin with a small bucket and then calculate the number of cups (Naledi's way). This is developed further on pages 57 and 58.

Activity 2: Comparing units

Anticipated strategies might include:

I made a list.

1 bottle ⟶ 2 cups
12 bottles ⟶ 24 cups (12 x 2)

1 bucket = 12 bottles
So, 1 bucket = 24 cups

1 bucket ⟶ 24 cups
2 buckets ⟶ 48 cups
4 buckets ⟶ 96 cups
8 buckets ⟶ 192 cups

1 bath ⟶ 8 buckets
So, 1 bath ⟶ 192 cups

I used a table to compare.

Cups	2	4	6	8	10	12	24	48	96	192
Bottles	1	2	3	4	5	6	12	24	48	96
Buckets							1	2	4	8
Bath										1

Note that the activity is not the page but rather the practical experience that the page describes. Please ensure that the practical experience is given to the children before completing the page. The learning is in the experience and not in the completing the page; the page provides a summary and consolidation.

Practise this activity in your class before moving on to page 60.

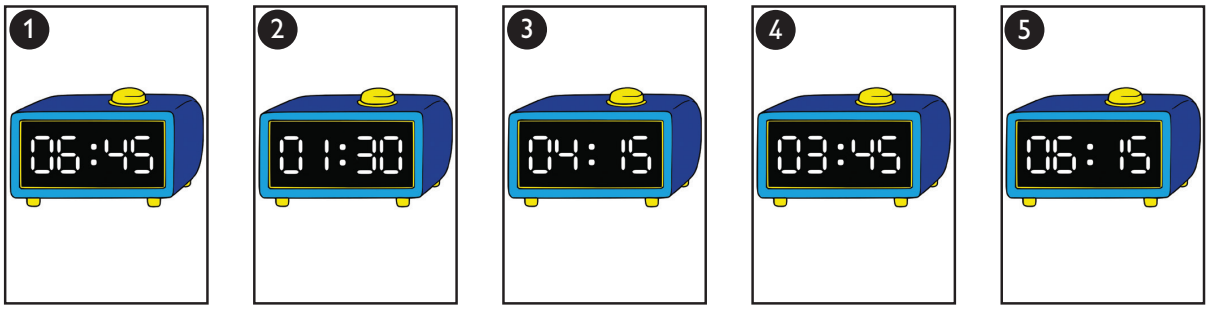
half past

Place the blue Time (clock) cards face up next to each other in sequence from earliest to latest. Place the blue Time (word) cards upside down. Take turns to turn a Time (word) card over and place it next to the clock with that time on it.

quarter to and past

Repeat the activity with the green Time (clock) and Time (word) cards.

1. Match each clock with the correct written time. Write the correct clock number under each Time (word) card.



quarter past four	quarter to seven	quarter to four	quarter past six	half past one
3	1	4	5	2

Compare your solutions with a friend.
Discuss what activities you usually do at these times.

Things to think about

Measurement: Time

The focus of the time activities in Workbook 7 is 'telling time'. By this stage children should be comfortable with 'o'clock' and 'half past' on both analogue and digital clocks. It is expected that these will have been practised as part of the daily classroom routine since the beginning of the year (and in Grade 1).

Pages 59-62 introduce 'quarter past' and 'quarter to' and give some suggestions for activities to practise these. These should form part of the daily classroom routine. Doing each activity once on the workbook page will not suffice. It is important to practise each activity for a while before moving to the next one.

The language of time
- Yesterday, I went to the shops with my mom.
- We are going home later.
- I brush my teeth after breakfast.

Sequencing
- I wake up, then I get dressed, then I eat breakfast.

Time of day correlation
- I do homework in the afternoon.

Duration
- It takes me longer to walk to school than to brush my hair.

YOU ARE HERE

Telling time
- Analogue and digital
- Hours, minutes, half hours, quarter past and quarter to

Elapsed time
- There are 45 minutes between the start of mathematics and the start of break.

Solving problems with time
- If Jabu takes 15 minutes to walk to school and 15 minutes to walk home each day, how many minutes does he spend walking to and from school each week?

Pay attention to how the children's mother tongue may influence the telling of time. Telling time is slightly different in the various South African languages. Discuss these as you practise talking about time.