15 NumberSense

COMPREHENSIVE WORKBOOK

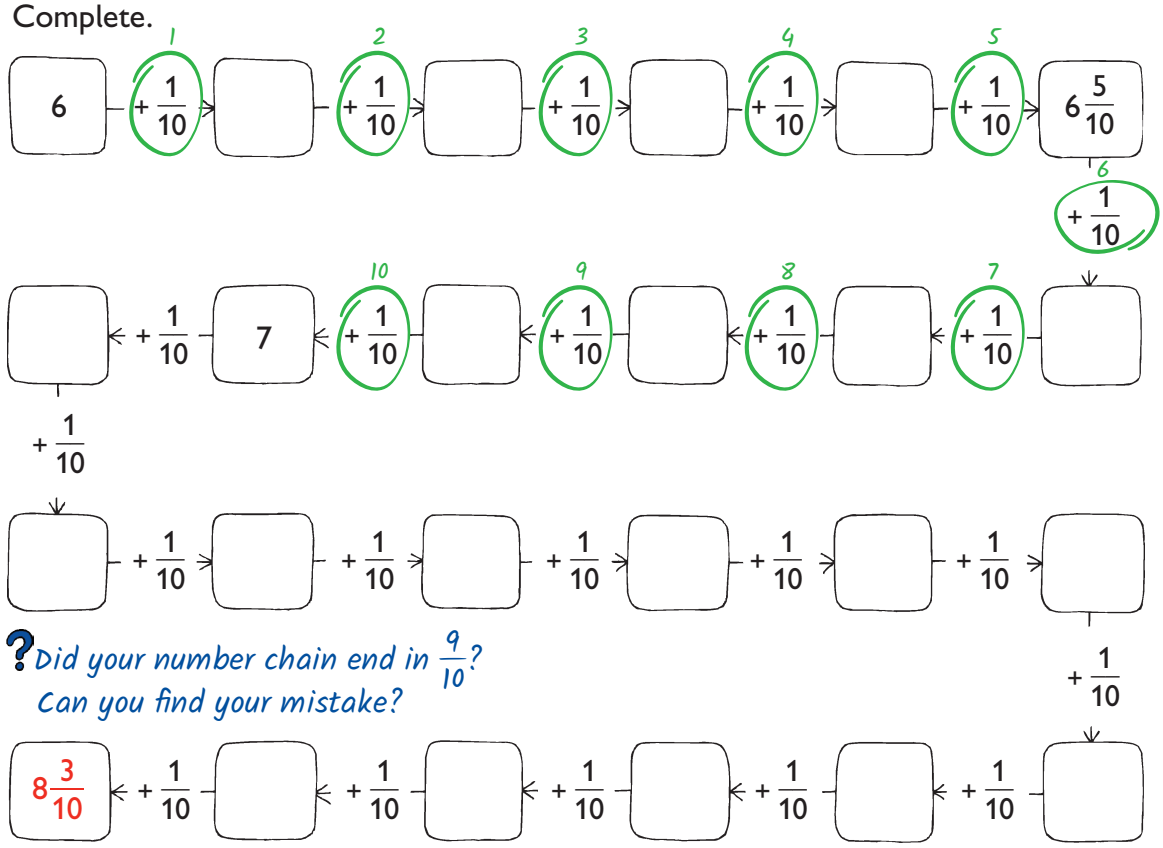
English

Teacher Guide

How many tenths are there in 1 whole?

I use the number chain to count. 10-tenths in 1 whole.

1. Complete.



Did your number chain end in $\frac{9}{10}$? Can you find your mistake?

a. How many tenths are there in 2? 20

b. How many tenths are there in $2\frac{1}{2}$? 20 + 5 = 25

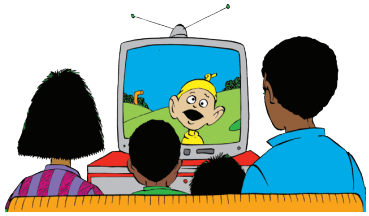
c. How many tenths are there in 5? 50

d. What is $\frac{1}{10} \times 5$? = $\frac{5}{10}$

e. How many fifths are there in 2?

20 tenths → 1 bed
10 fifths → 1 bed (OR) $\frac{5}{5}$ *in 1, so* $\frac{10}{5}$ *in 2*

How many tenths are there in $\frac{2}{4}$? Can you draw a picture?



2. It costs R48 to hire a certain DVD. The friends, who watch the DVD, agree to share the costs. As more friends watch, so each has to pay less.
Complete the table.

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No. of friends watching	2	3	4	6	8	12	16	24
Amount each pays (R)	24							

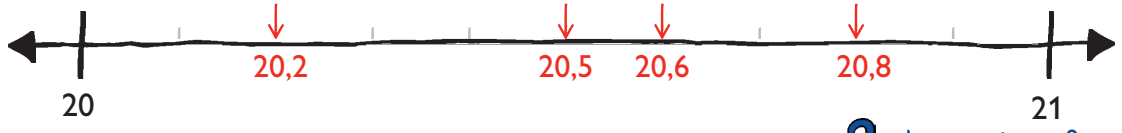
What happens to the amount that each one pays as the number of friends watching doubles (e.g. from 2 to 4 or from 3 to 6)?

How many pieces would you divide the number line into?

I divided the numberline into 10 pieces.

1. Place these numbers on the number line as carefully as you can.

20,8 20,5 20,2 20,6



Why 10 pieces?

Because from 20 to 21 is 1 unit. The numbers I need to place are tenths, and there are 10-tenths in 1 unit.

2. Complete.

a. 2,3 + ____ = 3

b. 3,8 + ____ = 4

c. 3,1 + ____ = 4

d. 6,9 + ____ = 7,1

e. 14,5 + ____ = 15

f. 3,5 + ____ = 4

g. 50,4 + ____ = 51

h. 6,0 + ____ = 7,5

3. Trevor needs 3 pieces of canvas to repair his garden chairs. Each piece must be 1,5 m. How many metres of canvas must he buy?

1,5 + 1,5 + 1,5 = 3 + 1,5 = 4,5m OR *3 × 1,5 = 4,5m* OR $1\frac{1}{2} + 1\frac{1}{2} + 1\frac{1}{2} = 4\frac{1}{2}$m

4. a. Francis buys 2 packets of sausages. The one is 1,8 kg and the other is 1,3 kg.

What do they weigh together?

1,8 + 1,3 + 1,5 = 2 + 1,1 = 3,1 kg OR *1,8 + 1,2 + 0,1 = 3 + 0,1 = 3,1 kg*

b. How much sausage must he still buy to have 4 kg of sausage altogether?

3,1 + 0,9 = 4 kg OR *4 − 3,1 = 4 − 3 − 0,1 = 1 − 0,1 = 0,9 kg*

5. Complete.

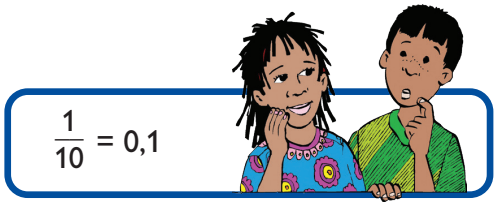
Encourage children to read decimals in this way and avoid saying "3 comma 4".

a. 3,4 = 3 and 4 tenths

b. 15,9 = 15 and 9 tenths

c. 21,1 = 21 and 1 tenth

d. 29,3 = 29 and 3 tenths



6. Write as decimal fractions.

a. $\frac{3}{10}$ = 0,3

b. $1\frac{7}{10}$ = 1,7

c. $4\frac{1}{2}$ = 4,5

d. $\frac{1}{5}$ = 0,2

e. $8\frac{4}{5}$ = 8,8

f. $\frac{1}{2} + \frac{1}{5}$ = 0,7

How did you do d?

If $\frac{1}{10}$ = 0,1, then $\frac{1}{5}$ will be double that $\frac{1}{5} = \frac{2}{10}$ = 0,2

How did you calculate f?

I used my answers from c and d. $\frac{1}{2}$ = 0,5 and $\frac{1}{5}$ = 0,2, so $\frac{1}{2} + \frac{1}{5}$ = 0,7

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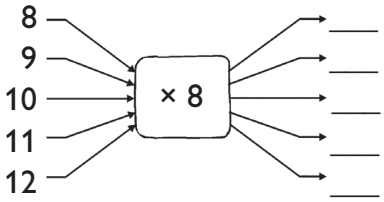
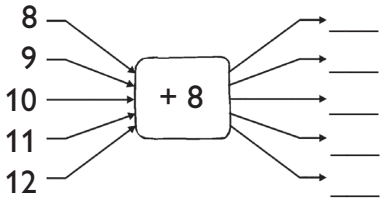
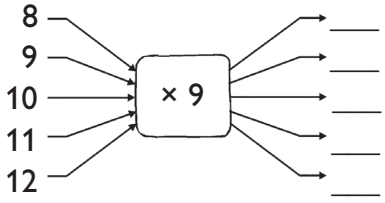
Number & Pattern

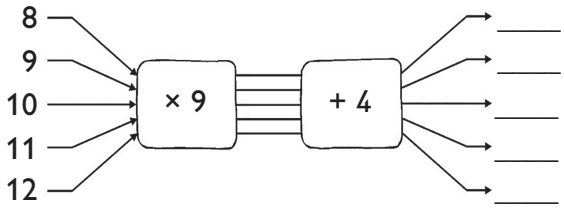
1. a. Complete and look for patterns.

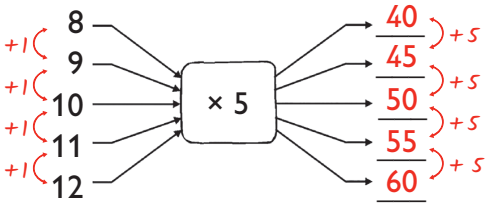
? What is the same and what is different?

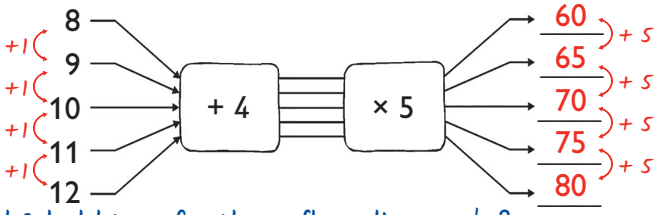










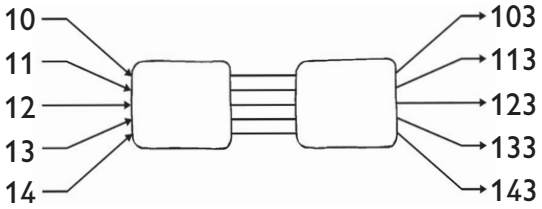


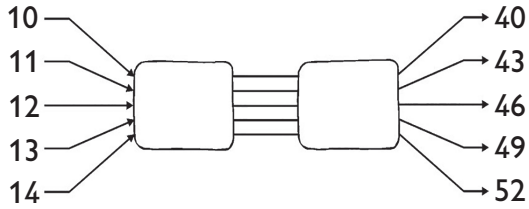
? Does Sindis observations on pages 6 and 9 hold true for these flow diagram's?

b. Describe in your own words any patterns that you noticed.

Mental Maths Icon TBC

c. Look carefully at the patterns in the input and output numbers. What do you think the operations should be? Test your thinking.





2. Fikile is a bricklayer. He is paid the following amounts for the work that he does:

R4 500; R2 500; R200; R2 800

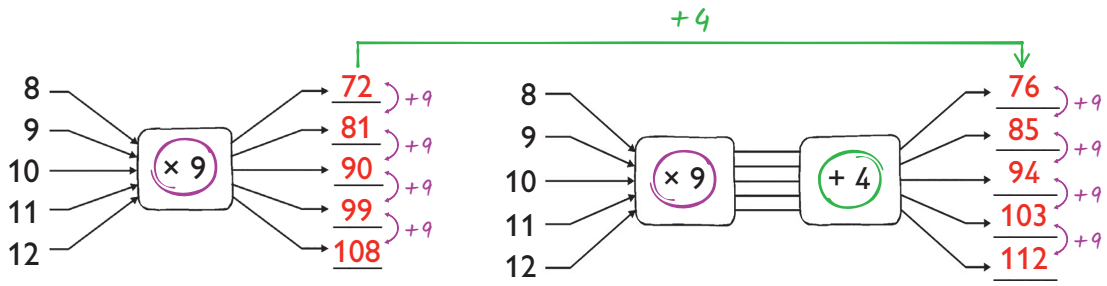
a. How much is that in total?

b. He gives his parents one half of the amount, and saves a quarter of the amount. How much money does he have left to spend?

Things to think about

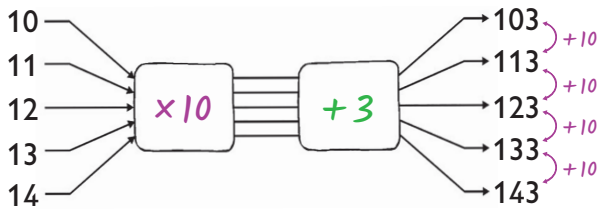
Question 1

The teacher's role here is to draw children's attention to the different patterns and relationships between the different flow diagrams. Let the children compare and share as many patterns as they can.
Through observing the patterns we want the children to notice that a flow diagram with multiplication as an operation increases in terms of groups.



Ideally, we want the children to use this observation to determine the rules in part (c).

For question (c) explain how you decided which operations and numbers worked for each flow diagram. Did you use what you noticed in parts (a) and (b)? Explain.



I noticed that the output numbers for this flow diagram increases by 10 every time the input increases by 1. Based on what I saw before, I thought that this flow diagram must have groups have 10... so the rule must be × 10 + 3.

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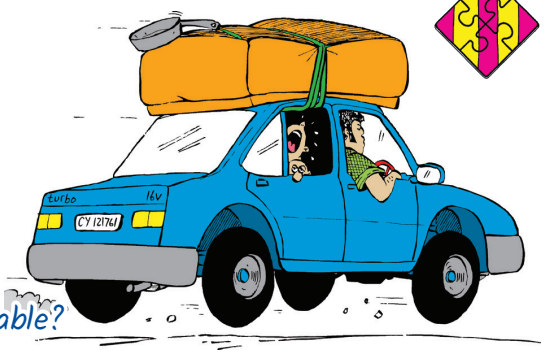


1. The Khumalo family is going camping for the holidays. Mrs Khumalo booked them into a camping site. They have to pay R50 to get into the site and then R75 per night that they stay there.

Where did you start completeing the table?

I started at R350 and R425. The difference between the costs is R75, so I know that these are nights 4 and 5.

Complete the following table.

Number of nights	1	2	3	4	5	6	7	8	9	10
Cost (R)	125	200	275	350	425	500	575	650	725	800

−75 −75 −75 + 75 + 75 + 75

What do you notice?

a. How much will it cost them to stay 4 nights?

I subtracted R75 from R350 and worked backwards.

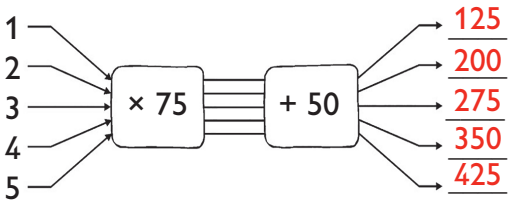
b. How much will it cost them to stay 10 nights?

c. Vusi calculates the cost for 14 nights by doubling the cost of 7 nights. Is he correct? Test Vusi's plan by using the values in the table or extending your table.

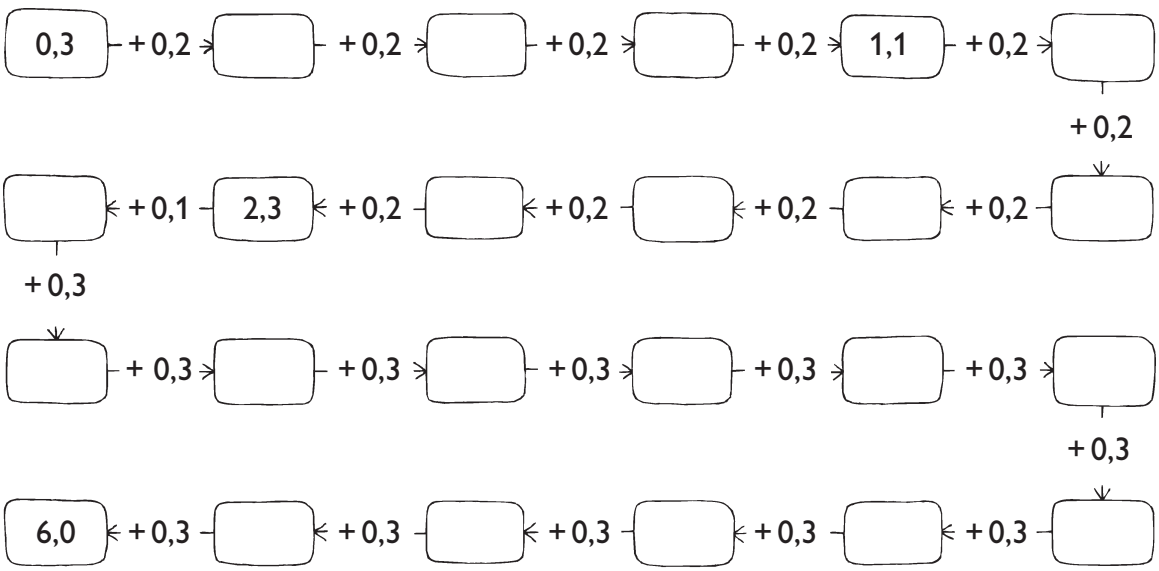
No. R800 + (75 x 4)
= R 800 + R 300 = R1 100

Vusi will not get the correct amount.
I notice that R1150 − R1100 = R50.
The same amount as the entrance fee.

d. Complete.



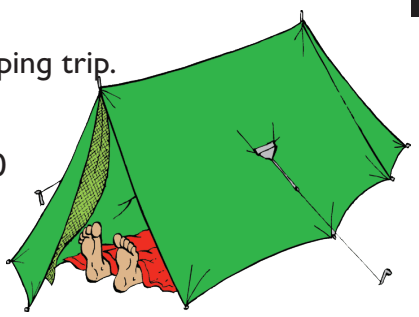
2. Complete.



Notes

Workbook 15 p.22

On page 22, we calculated the cost of the Khumalo's camping trip.



1. The Faro family is also going camping. Mrs Faro has booked them into a camping site where they pay R90 per night.
   Complete the table for the cost for a certain number of nights. *How did you complete the table?*

Number of nights	1	2	3	4	5	6	7	8	9	10
Cost (R)	90	180	270	360	450	540	630	720	810	900

−90 +90 +90

What do you notice?

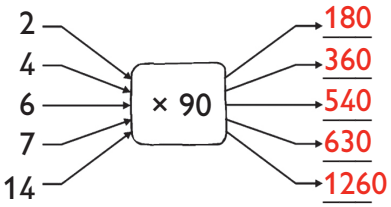
   a. How much will it cost them to stay 4 nights?

   b. Who pays more for accommodation – the Khumalos or the Faros?

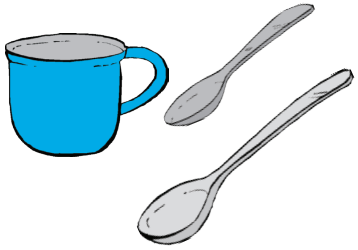
   c. How much will it cost them each to stay for 14 nights?

   d. Johnny Faro calculates the cost for 14 nights by doubling the cost for 7 nights. Is it correct? Test Johnny's plan by using the values in the table or extending the table. *Yes, doubling works.*
   7 nights ⟶ R630 x 2 = R1260
   and 4 nights ⟶ R360 x 2 = R720
   and 3 nights ⟶ R270 x 2 = R540

   e. Complete.



2. One cup is the same as 250 mℓ
   One teaspoon is the same as 5 mℓ.
   One tablespoon is the same as 15 mℓ.



Write all the quantities in this recipe in millilitres.

SPICY BISCUITS

4	cups flour	_____	$\frac{2}{5}$	teaspoon salt	_____
1	cup sugar	_____	$\frac{1}{4}$	tablespoon cream of tartar	_____
$\frac{1}{4}$	cup butter	_____	$\frac{1}{2}$	teaspoon ground cloves	_____
$\frac{1}{4}$	cup soft fat	_____	1	teaspoon ground cinnamon	_____
1	egg		$\frac{2}{5}$	cup water	_____

Notes

Things to think about

Question 1b

Who pays more for accommodation – the Kumalos or the Faros?

This is a great opportunity for the children to make sense of the situation. Allow space for them to discuss and justify their responses and be prepared to accept all responses that are valid.

Initially the Khumalos pay more for accommodation. However, at some point the Faros start paying more. At first, most children will accept that the Khumalos pay more and leave it at that. The teacher might have to coax them into investigating the patterns further. Once they become aware of the shift, then they must be encouraged to determine at what point the change occurs.

? Who pays more for accommodation 2 nights? And 3 nights? What about 10 nights?

? Can you determine when this change occurs? Can you use the tables on pages 22 and 27 to help you?

Workbook 13
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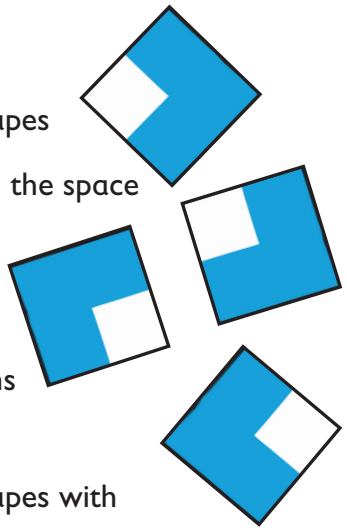
Cut out the tiles at the back of the book.

1. Select four tiles like these.

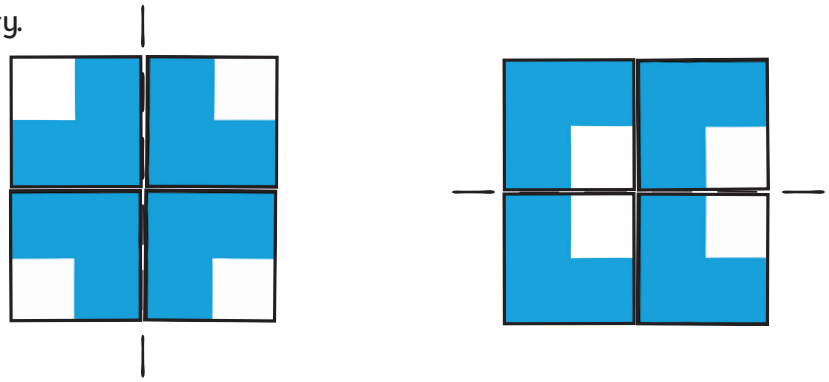


   a. Use the tiles to make at least two different square shapes with only one line of symmetry. Stick your solutions in the space below and mark the line of symmetry.

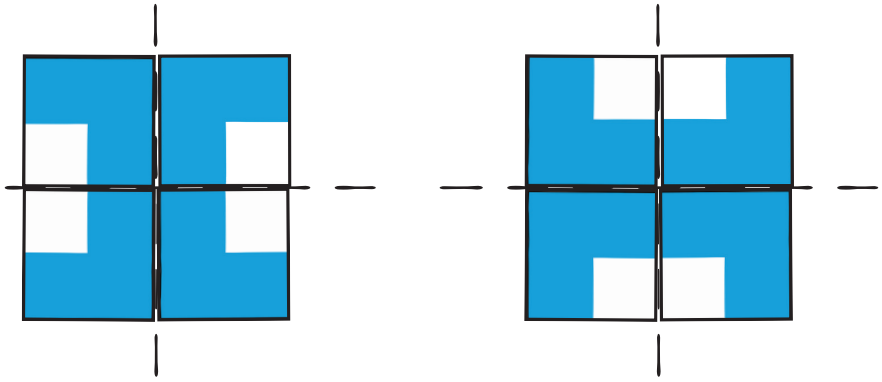
   b. Use the tiles to make at least two different square shapes with two lines of symmetry. Stick your solutions in the space below and mark the lines of symmetry.

   c. Use the tiles to make at least two different square shapes with four lines of symmetry. Stick your solutions in the space below and mark the lines of symmetry.

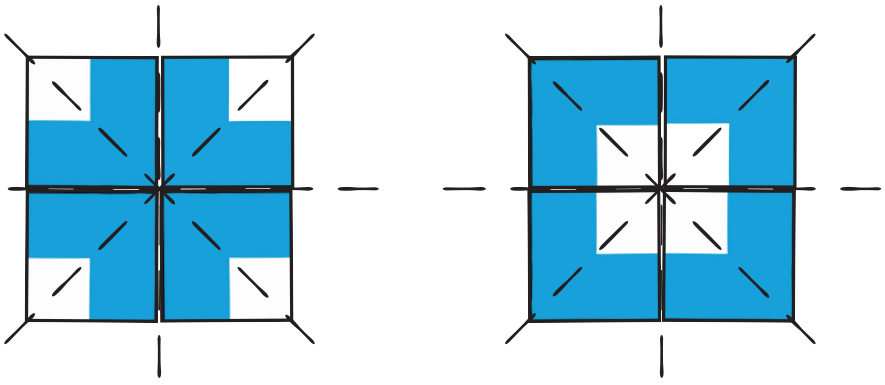
(a) *One line of symmetry.*



(b) *Two lines of symmetry.*



(c) *Four lines of symmetry.*



Compare your solutions with the person sitting next to you. Discuss any similarties and differences.

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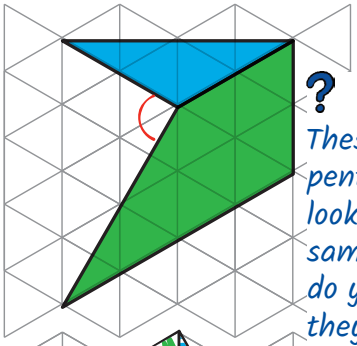
? How is this activity the same and different to the one completed on page 40?

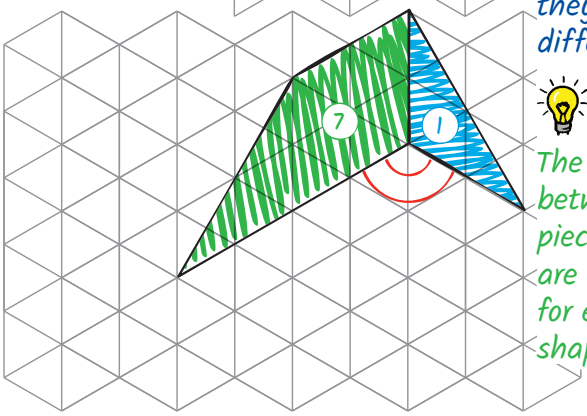
MOSAIC PUZZLE

1. Samuel joins piece 1 and piece 7 to make a shape with 5 edges like this.

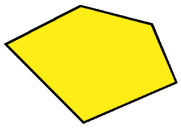
   Join piece 1 and piece 7 to make a different shape with 5 edges. Record your shape on the grid.



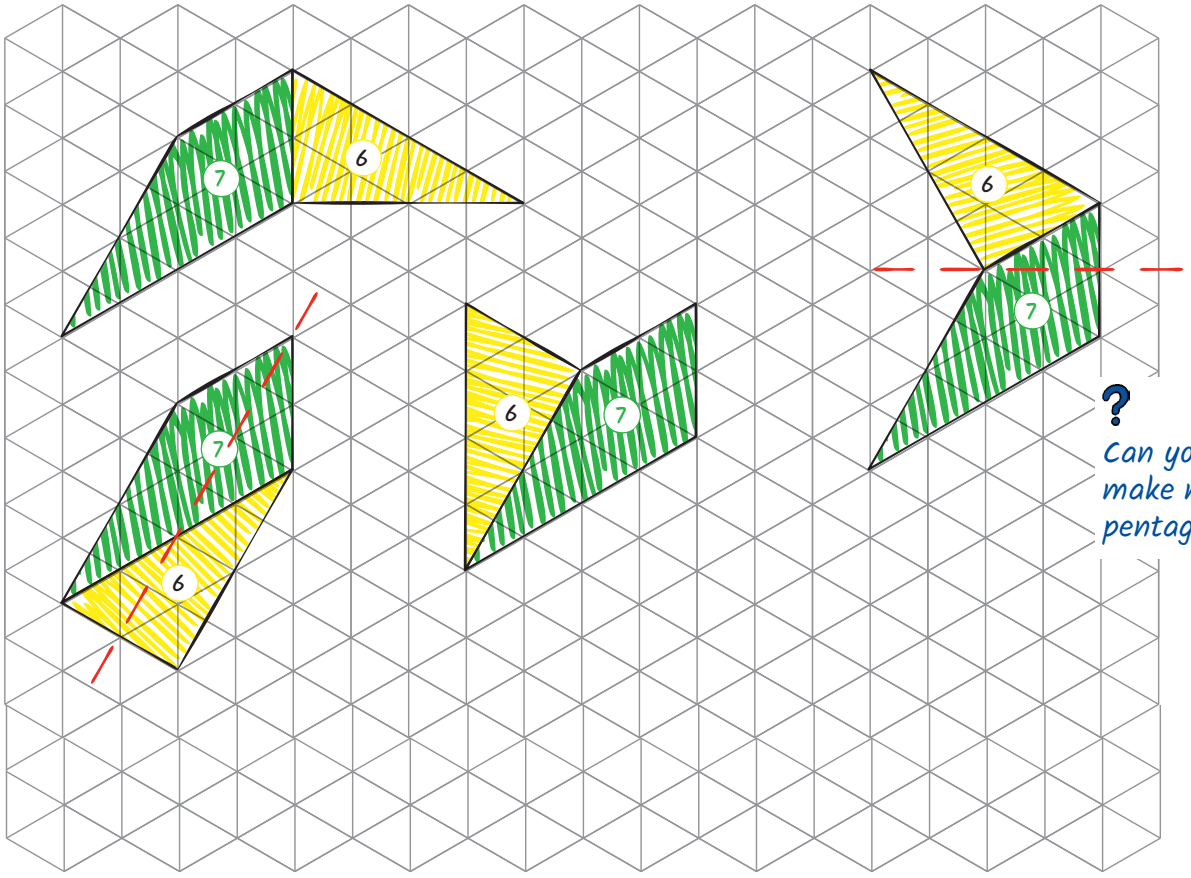
? These two pentagonsw look the same. How do you know they are different?



The angles between piece 7 and 1 are different for each shape.

> A shape with 5 straight edges is called a pentagon.
>
> 

2. Investigate how many different pentagons you can make by joining piece 6 and piece 7. Record your pentagons on the grid.



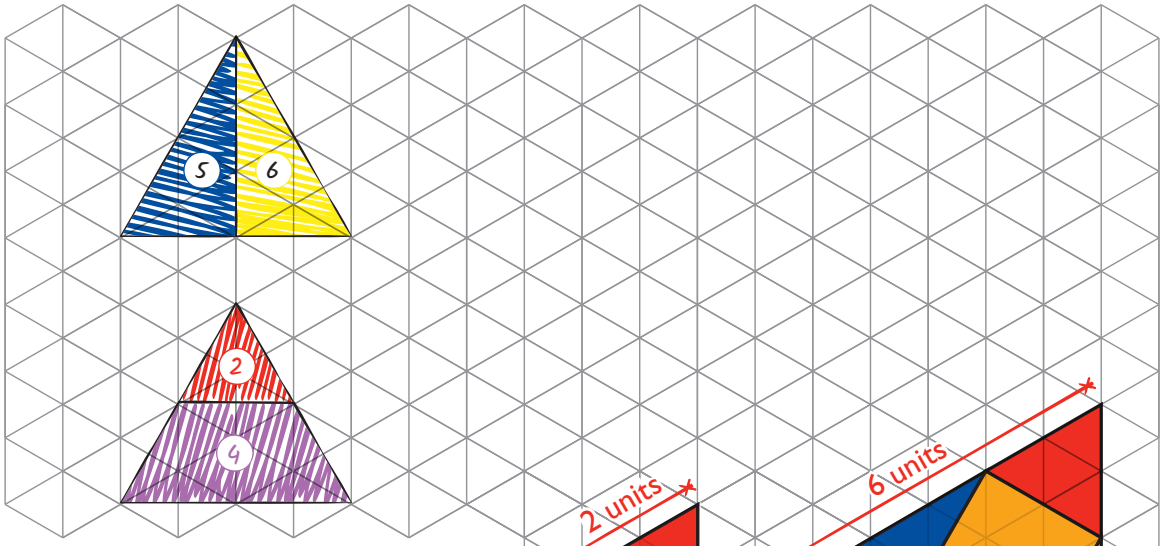
? Can you make more pentagons?

3. For each pentagon that has lines of symmetry add the lines of symmetry to your drawing.

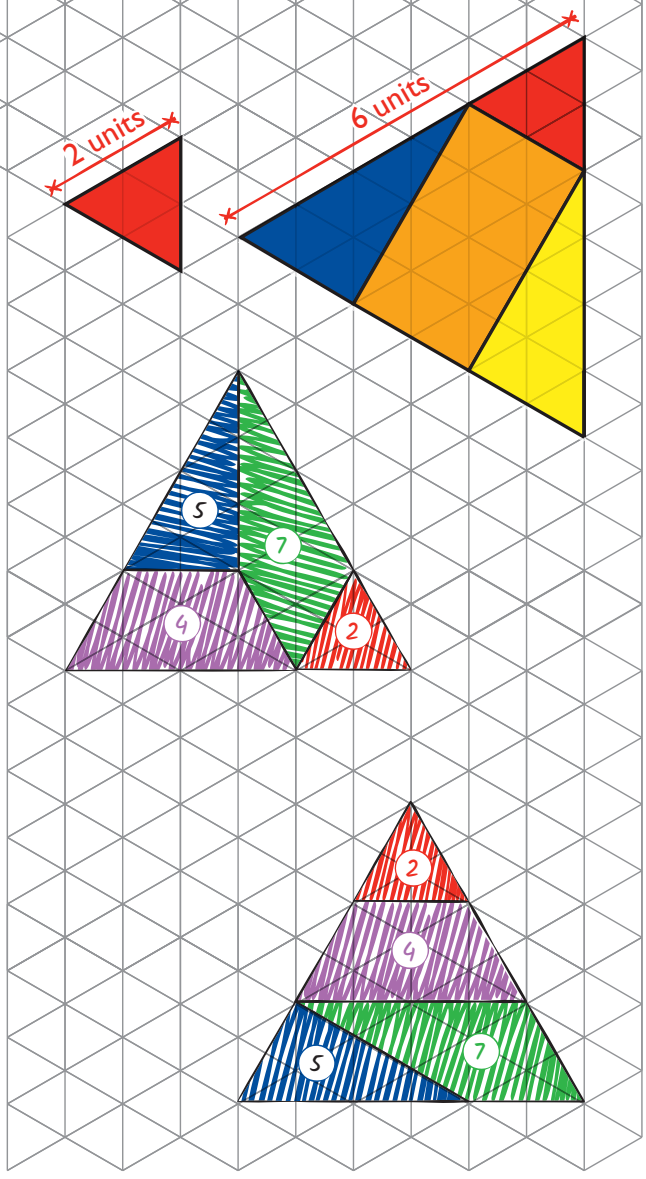
MOSAIC PUZZLE

Do you remember what a regular shape is?

1. Investigate in how many different ways you can make a regular triangle using any two Mosaic Puzzle pieces. Record your regular triangles on the grid.



2. Zoliswa made a regular triangle using four pieces of the Mosaic Puzzle. She drew it and piece 2 on the grid. What is the relationship between the lengths of the sides of the two triangles?
   The large triangle's sides are 3 times the length of the small triangle's sides.



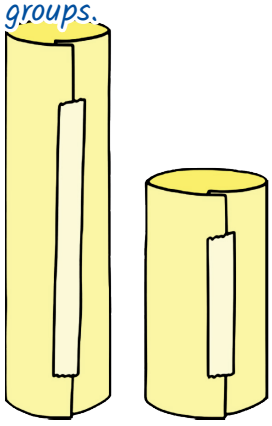
3. Use four Mosaic Puzzle pieces to make a regular triangle in a different way. Record your triangle on the grid.

   How many triangles did you make?

4. Investigate making regular triangles using Mosaic Puzzle pieces 6 & 7. Record your triangles on the grid.
   You cannot make a triangle with only pieces 6 and 7. You need to add other pieces to make triangles.

Notes

Practical activity. Prepare your resources.
It is recommended that children complete this page in small groups.



1. Make two cylinders as follows:
   - Fold and cut an A4 piece of card into two A5 pieces of card.
   - Use one of the pieces of card to make a cylinder by taping the long edges together.
   - Use the other piece of card to make a cylinder by taping the short sides together. Make sure that the overlap at the join is the same for both cylinders.
2. Which cylinder do you think will hold more when placed upright: the long one or the short one?

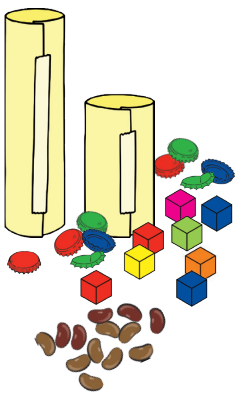
The measure of how much space is contained within, or occupied by a 3-dimensional object, is called the volume.

3. Use beans to determine which cylinder has the greater volume.
   a. Explain how you did it.
   I filled one cylinder... then poured those beans into the other cyclinder. The beans did not fill that cylinder, so it must have a greater volume than the first.
   b. Does your approach tell you how much more this one holds than the other or only which one holds more? Discuss. *No. To know that one must count the beans. This tells us which holds more, but not by how much.*

4. Now, determine how many beans, bottle tops and cubes fill each cylinder. Complete the table.

	Number of beans	Number of bottle tops	Number of cubes
Long cylinder			
Short cylinder			

5. Based on the values in the table, determine how much greater the volume of the larger cylinder is compared to the other. Express your finding using fractions.



6. Which objects: beans, bottle tops or cubes, worked best to determine the volume of the cylinders? Explain.

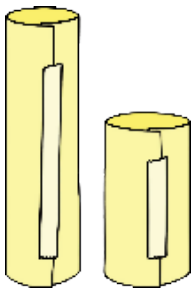
Things to think about

Measuring with non-standard units

Learning to measure with non-standard units helps children understand what measurement means. They learn to choose an appropriate unit and determine how many units are needed to describe an attribute. These experiences highlight the importance of selecting units that suit the quantity being measured and reveal the limitations of non-standard units. Differences in measurement results encourage children to recognise the need for common units, paving the way for understanding unit conversion and the use of standardised units and measuring tools.

Ideas for teaching

Question 1



- Ensure that the "overlaps" are consistent when children construct their cylinders. This will reduce the margin of error when comparing the volumes.
- Cardboard is suggested, but paper could be used. Teachers who prefer to use paper should know that the cylinder might be too flimsy to measure the beans, bottle tops and cubes. Teachers should keep this in mind and prepare accordingly.

Question 2

- Have the children share their predictions before they measure. Many might conclude that the cylinders hold the same amount as the pieces of paper they used was the same size. Some might decide that the short one hold more because it is "fatter", and similarly some might argue that the other one holds more because it is "taller".

Question 4, 5 and 6

- Due to the nature of non-standard units, the quantities for each group will vary.
- The teacher could populate a larger table recording each group's measurements. This will demonstrate the inaccuracy of using non-standard units. Teacher could then generate discussion around which resource (beans , bottle tops, cubes) are most and least accurate, and most and least efficient.
- Expressing the ratio/fraction (question 5) of how much cylinder A holds to how much cylinder B holds, will strengthen the argument for beans being more accurate then the other two resources.
- Ultimately, the general conclusion is that using the beans is the most accurate, but also the most frustrating to work with. The cubes would have been the easiest to count, but does not provide enough accuracy. The tension between efficiency and accuracy raises the need for formal (standardised) units.