Workbook exercise 3.1

Necklace patterns

1 For each of the following necklaces:
   a) Describe in words any patterns you can see in the necklace.
   b) Use Scarlett’s shorthand to record your patterns (see question 1b on page 25 of the Student’s Book).
   c) Mark on the picture where you can see each pattern.
You cannot see the entire necklace in the picture shown below, but try
to predict the following:

a) If the necklace contains 12 purple beads altogether, how many bright
blue and how many dark green beads do you think it will have?

b) If the necklace contains 46 bright blue beads altogether, how many
purple and how many dark green beads do you think it will have?
Workbook exercise 3.2

Designing necklaces

1. **a)** Show where you can see the 3 : 2 ratio of white to black beads in Design 1 below.

   **b)** Show where you can see the 3 : 2 ratio of white to black beads in Design 2.

   **c)** Draw a third design based on a white to black ratio of 3 : 2. Compare your design with designs 1 and 2. What do you notice?

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Ratio 3 : 2 Design 1

Ratio 3 : 2 Design 2

Ratio 3 : 2 Design 3
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continues
In the table below you will see some other design ratios.

For each design ratio, draw three possible arrangements of white and black beads. Check to see if each design is different from the previous ones.

<table>
<thead>
<tr>
<th>Ratio 3 : 3</th>
<th>Design 1</th>
<th>Ratio 3 : 3</th>
<th>Design 2</th>
<th>Ratio 3 : 3</th>
<th>Design 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ratio 4 : 2</td>
<td>Design 1</td>
<td>Ratio 4 : 2</td>
<td>Design 2</td>
<td>Ratio 4 : 2</td>
<td>Design 3</td>
</tr>
<tr>
<td>Ratio 5 : 2</td>
<td>Design 1</td>
<td>Ratio 5 : 2</td>
<td>Design 2</td>
<td>Ratio 5 : 2</td>
<td>Design 3</td>
</tr>
</tbody>
</table>
Workbook exercise 3.3

How many beads are needed?

For each of the bead designs shown below:

a) Describe the pattern of the bead arrangement.

b) Mark on the necklace to show the repeating pattern.

c) Work out roughly how many of each type of bead will be needed to make the necklace.

**Design B** – long, around 150 beads

Rectangle : oval : links

\[
1 : 1 : 4
\]

![Design B Image]

**Design C** – long, around 150 beads

![Design C Image]

**Design D** – short, around 80 beads

![Design D Image]
**Design E** – short, around 80 beads

**Design F** – short, around 80 beads

**Design G** – short, around 80 beads

**Design H** – long, around 150 beads
Workbook exercise 3.4

Unthreaded necklaces

Sometimes Carol’s necklaces arrive unthreaded. She has the task of figuring out a possible repeating pattern for the beads. Then she can re-thread the necklace.

The necklace below was made of 12 orange beads and 30 green beads.

a) Use counters to help you come up with a possible repeating pattern for this necklace.

b) Draw a possible arrangement of the beads in this necklace.
2 The other bags of unthreaded necklaces are described below. Find a possible repeating pattern for each one.

a) Bag A contains 10 pink beads and 20 silver beads.

b) Bag B contains 15 brown beads and 25 gold beads.

c) Bag C contains 12 white beads, 24 green beads and 20 blue beads.
d) Bag D contains 24 silver beads and 84 black beads.

e) Bag E contains 18 silver beads, 27 black beads and 45 gold beads.
Workbook exercise 3.5

Made for sharing

Three friends, Kate, Pam and Lesley, regularly meet up for lunch at Pablo’s pizza parlour. They always choose a rectangular pizza from the ‘Made for sharing’ menu and share this out between them.

They have a system for sharing out the bill according to how much each of them has eaten.

Below is a record of what they have eaten in the last few weeks.

<table>
<thead>
<tr>
<th>Date</th>
<th>Item</th>
<th>Kate</th>
<th>Pam</th>
<th>Lesley</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>6th Jan</td>
<td>Ham &amp; Pineapple</td>
<td>6</td>
<td>2</td>
<td></td>
<td>£7.60</td>
</tr>
<tr>
<td>18th Jan</td>
<td>Ham &amp; Pineapple</td>
<td>2</td>
<td></td>
<td></td>
<td>£7.20</td>
</tr>
<tr>
<td>5th Feb</td>
<td>Seafood</td>
<td>4</td>
<td>6</td>
<td></td>
<td>£10.50</td>
</tr>
<tr>
<td>13th Feb</td>
<td>Ham &amp; Pineapple</td>
<td>1</td>
<td>3</td>
<td></td>
<td>£7.60</td>
</tr>
<tr>
<td>1st Mar</td>
<td>Veg</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>£10.20</td>
</tr>
<tr>
<td>16th Mar</td>
<td>Ham &amp; Pineapple</td>
<td>3</td>
<td>3</td>
<td></td>
<td>£7.20</td>
</tr>
<tr>
<td>3rd Apr</td>
<td>Meat</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>£10.80</td>
</tr>
</tbody>
</table>

Pablo’s Pizzaria
Made for sharing

Rectangular Pizzas

- Cheese & Tomato: £7.20
- Ham & Pineapple: £7.60
- Pepperoni: £9.50
- Vegetarian: £10.20
- Seafood: £10.50
- Meat Feast: £10.80

continues
a) For each meeting date shown in the photograph, draw a sketch to show how the pizza might have been shared out.

b) Work out how much each person needed to pay towards the cost of each pizza.
Workbook exercise 3.6

Using the bar model for ratio problems

Below you will see how a student used the bar model to answer the question:

Share £180 in the ratio 5 : 4

Answer the following questions by drawing a rectangular bar and using a similar method.

1 Share £120 in the ratio 1 : 5.

2 Share £7000 in the ratio 5 : 3 : 2.

continues
3 £840 was raised by a group of parents, teachers and pupils in the ratio 2 : 3 : 7. How much money did the pupils raise?

4 A necklace is made from black and white beads. 35% of the beads are black.
   a) What percentage of the beads are white?

   b) What is the ratio of black beads to white beads? Give your answer in its simplest form.

   c) There are 28 black beads on the necklace. How many are white?

5 A recipe for blackcurrant lemonade says: ‘Mix one part blackcurrant juice with six parts lemonade.’
If you wanted to make 3500 ml of blackcurrant lemonade, how much blackcurrant juice and how much lemonade would you need?
6 A hair dressing salon has a policy of splitting their tips between the stylist and the trainee in the ratio 4 : 1.
   a) Do you think this is a fair policy?

   b) If a customer left a £4 tip, how much would the stylist get and how much would the trainee get?

   c) What about if the customer left a £6 tip?

7 Andrea is trying to decide which holiday company to use for letting out her holiday cottage.
   - Woolacombe Cottages take one fifth of the rent for their service.
   - Devonshire Cottages split the rent with the owners in the ratio 1 : 5.
   - The rental price for a week in the summer is £600.

Which holiday company should Andrea choose to use?