Reasoning in the classroom

Hats

Support materials for teachers

Year 5

Llywodraeth Cymru
Welsh Government

Year 5 Reasoning in the classroom – Hats

These Year 5 activities encourage learners to use logical reasoning to solve simple problems. They are fairly demanding for the year group so learners may need more support than usual, or you may wish to use them as extension activities.

Activity 1

Hats

Learners work out on which days of the week a specific hat can be worn.

Includes:

- Hats question
- Markscheme

Activity 2

Tassel time

They consider the number of ways in which a tassel, using two different colour wools, can be made.

Includes:

- Explain and question – instructions for teachers
- Whiteboard – Anna's hats

Reasoning skills required

Identify	Communicate	Review
Learners choose their own methods to solve problems.	They explain their methods.	They review their work and reflect on their findings.

Procedural skills

- **Patterns and simple permutations**

Activity 1

Hats

Activity 1 – Hats

Outline

Learners use information about hats to solve a problem.

You will need

Hats question
One page for each learner

Markscheme

Anna has six hats.

She wears a different one each day.

She wears them in turn:

1, then 2, 3, 4, 5, 6 then 1 again, and so on.

1 **2** **3** **4** **5** **6**

How many **weeks** until she wears the same hat again on a Monday?

Show how you work it out.

weeks

3m

Activity 1 – Hats – Markscheme

<table>
<tr><th>Marks</th><th>Answer</th></tr>
<tr><td>3m</td><td>Answer of 6 weeks, with a correct justification, e.g.
• <table><tr><th>M</th><th>T</th><th>W</th><th>T</th><th>F</th><th>S</th><th>S</th></tr><tr><td>✓</td><td></td><td></td><td></td><td></td><td></td><td>✓</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td>✓</td><td></td></tr><tr><td></td><td></td><td></td><td></td><td>✓</td><td></td><td></td></tr><tr><td></td><td></td><td></td><td>✓</td><td></td><td></td><td></td></tr><tr><td></td><td></td><td>✓</td><td></td><td></td><td></td><td></td></tr><tr><td></td><td>✓</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>✓</td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>
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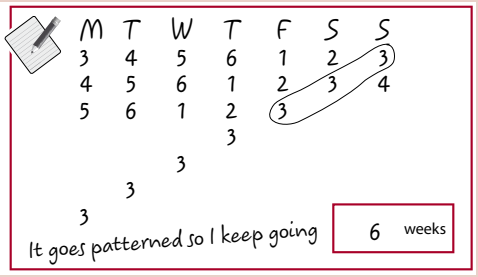
• Same week Sun, 1 is Sat, 2 is Fri, 3 is Thurs, 4 is Wed, 5 is Tues, so week 6 is Monday again
• Each week she wears it one day earlier so 6 altogether</td></tr>
<tr><td>Or 2m</td><td>Shows correct reasoning, i.e. that she wears the hat one day earlier each week</td></tr>
<tr><td>Or 1m</td><td>Gives an answer of 6 weeks but without sufficient reasoning to show their understanding

Or

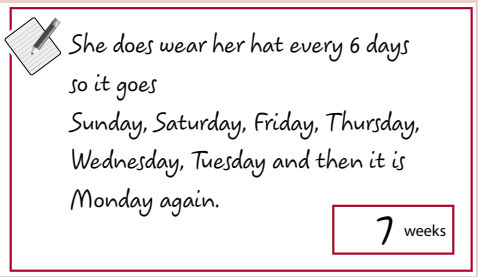
Shows or implies that the next time that she wears the hat is a Sunday</td></tr>
</table>

Activity 1 – Hats – Exemplars



Correct; **3 marks**

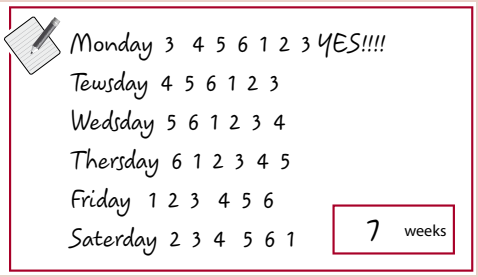
- This response shows good insight into what is a fairly demanding question for this year group.



Correct reasoning; **2 marks**

Common error

This learner works efficiently, listing the days on which hat number 1 is worn, but has not realised that two of these days are in the same week.



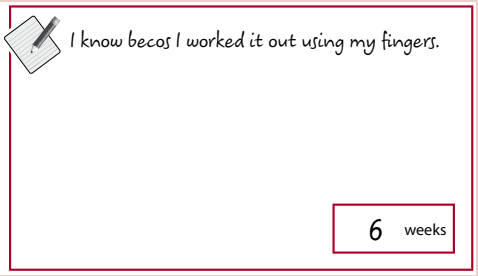
Correct reasoning; **2 marks**

Common error

The method is correct, but this learner has made the common error of including the first value when counting the number of weeks.

Next time Sunday; **1 mark**

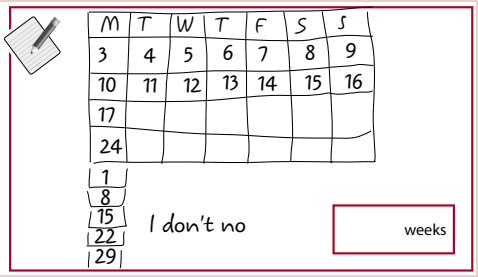
- This learner shows understanding but the method goes wrong when they continue numbers greater than 6.



Answer 6 weeks; **1 mark**

Common error

No evidence is shown. Understanding what constitutes working is an important skill for learners to acquire.



Incorrect; **0 marks**

- This learner has confused hats and dates and appears to be trying to find the next date on which Monday falls on the third of a month.

Activity 2

Tassel time

Activity 2 – Tassel time

Outline

This activity follows on from **Activity 1 – Hats**.

Learners find the number of different ways Anna can use colour to create tassels. Then they consider the number pattern obtained.

Learners may enjoy making their own tassels. There are many sites with detailed instructions on the web.

You will need

WB **Whiteboard – Anna's hats**

Activity 2 – Tassel time

Explain

Show **Anna's hats** on the whiteboard and ask who knows what the decorative pieces at the end of the two ties are – the tassels. Tell learners that these tassels are made of wool, and point out that two of the hats have tassels made with wool of two different colours.

Anna has decided that she will make tassels using two different colours of wool. Write red and blue on the whiteboard, and say that these are the colours of Anna's wool. Because red and blue is the same as blue and red, there is only one way that she can make her tassel. Write 1 way alongside red and blue.

Now write red, blue and yellow. Remind learners that she is going to use two colours to make her tassel. How many different tassels could she make? *(3, because she could have RB, RY, BY.)* Write 3 ways alongside.

What if she has four different colours? Or five? Or six? Ask learners to investigate. Can they see a pattern in the number of different tassels she can make?

(Solution
4 colours → 6 ways,
5 colours → 10 ways,
6 colours → 15 ways, and so on.
The increase in the number of ways is one more each time.)

Question

- How are you writing down the colours? Is there a quicker way than writing the word for each colour every time?
- Are you confident that you have found all the different ways? How? What is your system?
- How can you show all your results together? (*A table of results will help show patterns.)*
- What number patterns have you found?
- Can you predict the next number? How? Have you checked it?

WB