Reasoning in the classroom

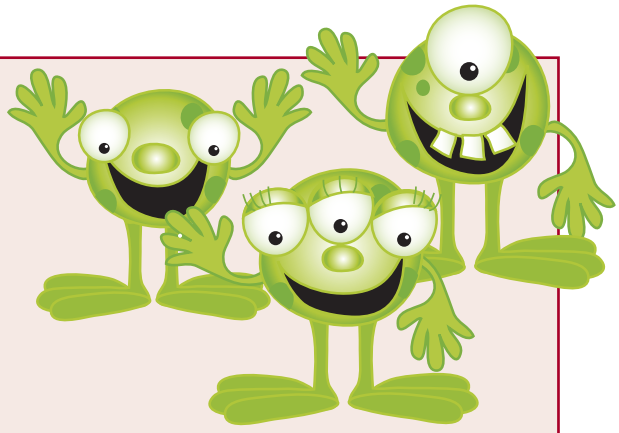
Zigs, Pobs and Wums

Support materials for teachers

Year 5

Llywodraeth Cymru
Welsh Government

Year 5 Reasoning in the classroom – Zigs, Pobs and Wums



These Year 5 activities start with an item that was included in the 2014 National Numeracy Tests (Reasoning). A further linked activity is also provided.

Activity 1

Zigs, Pobs and Wums
Learners use given information to solve a problem.

Includes:

- Zigs, Pobs and Wums question
- Markscheme

Activity 2

Keep it going!
They play a game that focuses on number relationships and multiples.

Includes:

- Explain and question – instructions for teachers
- Resource sheet – Keep it going!
- Teachers' sheet – Solutions

Reasoning skills required

Identify	Communicate	Review
Learners find their own methods.	They explain their reasoning, both verbally and in written form.	They check their work and support others.

Procedural skills

- **Division**
- **Multiplication**
- **Multiples**

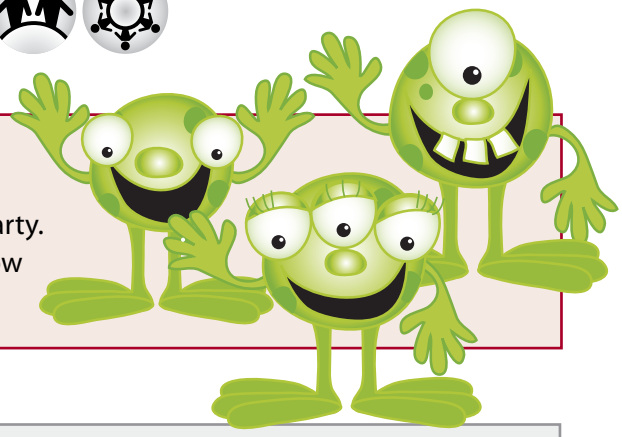
Numerical language

- **Altogether**
- **Digit**
- **Multiple**
- **Even/odd**

Activity 1

Zigs, Pobs and Wums

Activity 1 – Zigs, Pobs and Wums



Outline

This Year 5 activity is built on the fantasy context of aliens at a party. Learners combine different pieces of information to work out how many aliens are at the party.

You will need

Zigs, Pobs and Wums question
One page for each learner

Markscheme

Zigs, Pobs and Wums are aliens.

Zigs have **3** teeth and **1** eye.

Pobs have **0** teeth and **2** eyes.

Wums have **0** teeth and **3** eyes.

The aliens have a party.

Altogether, there are **24** teeth and **15** eyes.

How many Zigs, Pobs and Wums are at the party?

Number of Zigs	Number of Pobs	Number of Wums

4m

Activity 1 – Zigs, Pobs and Wums – Markscheme

<table>
<tr><th>Marks</th><th>Answer</th></tr>
<tr><td>4m</td><td>8 Zigs, 2 Pobs, 1 Wum</td></tr>
<tr><td>Or 3m</td><td>Answers 8 Zigs and shows 7</td></tr>
<tr><td>Or 2m</td><td>Answers 8 Zigs, even if the other aliens are incorrect or omitted

Or

Any one of the following answers:

<table>
<tr><th>Z</th><th>P</th><th>W</th></tr>
<tr><td>1</td><td>1</td><td>4</td></tr>
<tr><td>1</td><td>4</td><td>2</td></tr>
<tr><td>2</td><td>2</td><td>3</td></tr>
<tr><td>2</td><td>5</td><td>1</td></tr>
<tr><td>3</td><td>3</td><td>2</td></tr>
<tr><td>4</td><td>1</td><td>3</td></tr>
<tr><td>4</td><td>4</td><td>1</td></tr>
</table>
<table>
<tr><th>Z</th><th>P</th><th>W</th></tr>
<tr><td>5</td><td>2</td><td>2</td></tr>
<tr><td>6</td><td>3</td><td>1</td></tr>
<tr><td>7</td><td>1</td><td>2</td></tr>
<tr><td>10</td><td>1</td><td>1</td></tr>
</table>
</td></tr>
<tr><td>Or 1m</td><td>Shows 24 ÷ 3 or 3 × 8 = 24

Or

Any one of the following answers:

<table>
<tr><th>Z</th><th>P</th><th>W</th></tr>
<tr><td>0</td><td>3</td><td>3</td></tr>
<tr><td>0</td><td>6</td><td>1</td></tr>
<tr><td>1</td><td>7</td><td>0</td></tr>
<tr><td>3</td><td>0</td><td>4</td></tr>
<tr><td>3</td><td>6</td><td>0</td></tr>
<tr><td>5</td><td>5</td><td>0</td></tr>
<tr><td>6</td><td>0</td><td>3</td></tr>
</table>
<table>
<tr><th>Z</th><th>P</th><th>W</th></tr>
<tr><td>7</td><td>4</td><td>0</td></tr>
<tr><td>9</td><td>0</td><td>2</td></tr>
<tr><td>9</td><td>3</td><td>0</td></tr>
<tr><td>11</td><td>2</td><td>0</td></tr>
<tr><td>12</td><td>0</td><td>1</td></tr>
<tr><td>13</td><td>1</td><td>0</td></tr>
</table>
</td></tr>
</table>

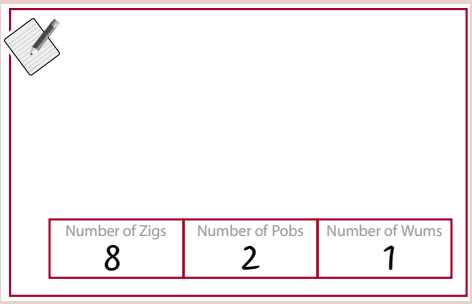
7 is the number of eyes still to be allocated

Three types of alien with a total of 15 eyes

Finding the number of Zigs

Two types of alien with a total of 15 eyes

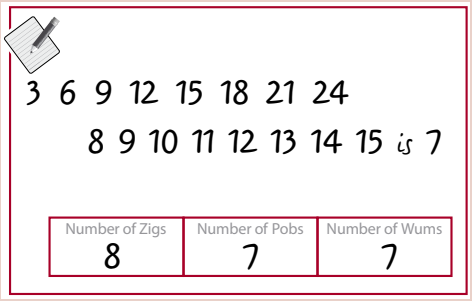
Activity 1 – Zigs, Pobs and Wums – Exemplars



Number of Zigs	Number of Pobs	Number of Wums
8	2	1

Correct; **4 marks**

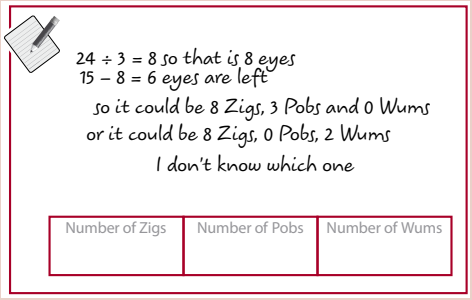
- Although there is no working, the answer is correct. The lack of communication is something that could usefully be discussed after the test.



Number of Zigs	Number of Pobs	Number of Wums
8	7	7

8 Zigs and 7 seen; **3 marks**

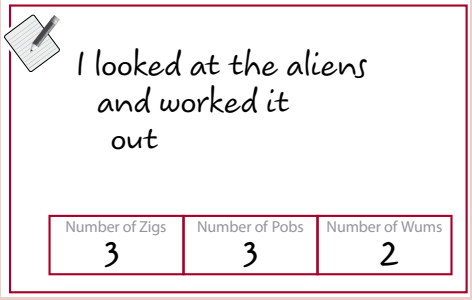
- This learner uses counting on which may indicate a lack of confidence with division and subtraction.



Number of Zigs	Number of Pobs	Number of Wums

8 Zigs; **2 marks**

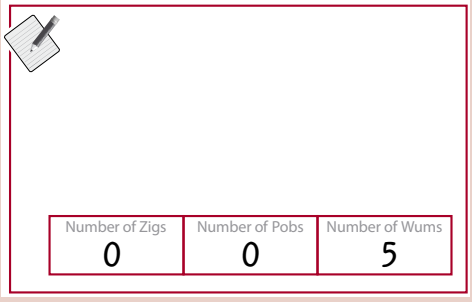
- This learner shows good understanding but the slip in calculating 15 – 8 has reduced the number of marks available. This shows the importance of checking work.



Number of Zigs	Number of Pobs	Number of Wums
3	3	2

3, 3, 2; **2 marks**

- $3 \times 1 + 3 \times 2 + 2 \times 3 = 15$ eyes so this learner has ignored the information about 24 teeth. The accompanying text shows a lack of understanding of what it means to show working.



Number of Zigs	Number of Pobs	Number of Wums
0	0	5

Incorrect; **0 marks**

Common error

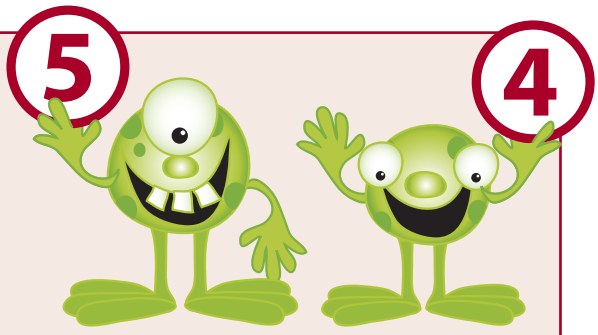
Although 5 Wums have 15 eyes, only one type of alien has been used so no marks can be given. This is a common error.

Activity 2

Keep it going!

Activity 2 – Keep it going!

Outline



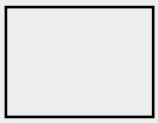
This fun Year 5 activity reintroduces the characters from **Activity 1 – Zigs, Pobs and Wums** by using their names in a number game.

The activity is designed to be run initially as a whole-class exercise. However, it can easily be adapted to be run in smaller groups if this is more appropriate for the ability levels of the learners within the class.

You will need

Resource sheet – Keep it going!

Teachers' sheet – Solutions



A large space for learners to stand or sit in a circle (if being run as a whole-class activity – see above)

Activity 2 – Keep it going!

Explain

Teachers may remember the well-known game of Buzz/fizz where you say 'buzz' or 'fizz' rather than predetermined numbers or multiples. In this version, these are replaced by 'zig' and 'pob' and *(for the adventurous)* 'wum'.

Learners stand or sit in a circle. Start by going round the circle, with the first learner saying '1', the next '2' and so on. Stop quite quickly and tell them that the game is too boring, so any number that contains the digit 5 must be read as 'zig' – so 5 becomes 'zig' as do 15 and 53, and so on. *(Ask for other examples.)* Play the game – 1, 2, 3, 4, zig, 6, 7 – and so on, stopping at 21.

Then introduce the next rule where 'zig' is also used for any multiple of 5, i.e. 10, 15, 20, etc. *(Again, ask for examples.)*

Let them practise this and see what number they can collectively reach before someone misses a 'zig'. If necessary *(and it is quite probable!)* tell them that when it is their turn, they can ask for help from the people on either side of them. *(Don't allow too long, though, before widening it out to the broader group, as this is far better as a relatively fast-paced game.)*

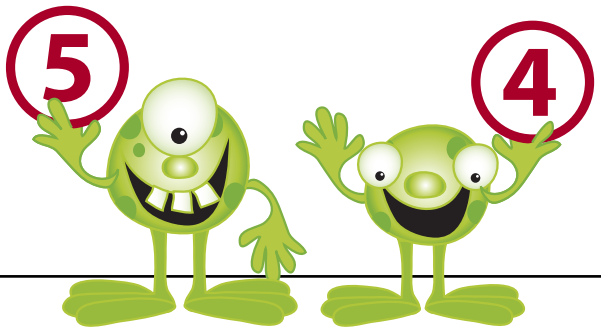
Once they are reasonably confident, tell them the poor Pobs from Activity 1 are feeling missed out, so you are bringing them into the game, too. The same rules apply, but with 'pob' representing 4.

The number line will then become: 1, 2, 3, pob, zig, 6, 7, pob, 9, zig, 11, pob, 13, pob, zig, pob, etc. When you reach the first number that meets the conditions of both zigs and pobs – 20 – make sure that learners understand that 20 therefore becomes zig-pob and why. *(If appropriate, 'wum' can also be added, replacing the number 7 – but this is very demanding!)*

Continue as long as is appropriate, then split learners into smaller groups. Give them a copy of the resource sheet **Keep it going!** and ask them to complete the challenges. Support using the questions below. If appropriate, end the activity with a rerun, seeing how high the group can go before it all goes wrong!

Question

- What does 'multiple' mean? *(In the times table of . . .)* Is 15 a multiple of 5? Why? Is 5 a multiple of 15? Why not?
- When we do our times tables, we stop at 10 times *(or 12 times)*. Do multiples keep going beyond that? *(Yes)*
- How do you know very quickly whether a number is a multiple of 5? *(Ends in 5 or 0)*
- What about whether a number is a multiple of 4? How can you check? *(Divide by two, then divide by two again – if the result is a whole number, it is a multiple of 4.)*
- Can an odd number be a multiple of 4? *(No – 4 is even and when you multiply an even number by a whole number the answer is always even.)*
- How can you tell if a number is a zig-pob? *(It needs to be a multiple of both 4 and 5.)* What is the smallest number that is a zig-pob? *(20)*



Just zigs

If you were just using zig and you reached 49, what would the next number be that was not a zig?

Just pobs

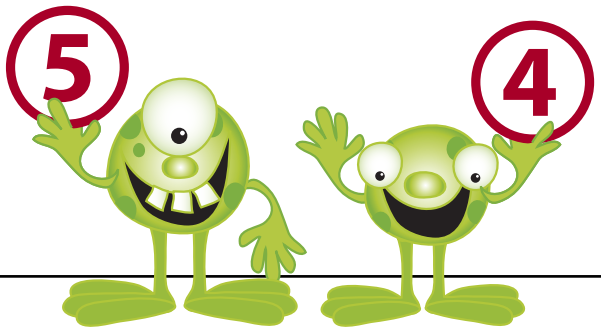
Can you work out how many times you would say 'pob' if the game went from 1 to 100 – but without checking every number?

Pob or zig?

If the game went from 0 to 100 which would be said more, zig or pob? How do you know?

How many zig-pobs?

If the game went from 1 to 100, how many zig-pob numbers would there be?



Just zigs

If you were just using zig and you reached 49, what would the next number be that was not a zig?

(61 because 50 to 59 contain the digit 5, and 60 is a multiple of 5.)

Just pobs

Can you work out how many times you would say 'pob' if the game went from 1 to 100 – but without checking every number?

(There would be 37 occasions because there are 25 multiples of 4 within 1 to 100, but the numbers 41 to 49 – excluding 44 and 48, which are already included as multiples – as well as 14, 34, 54, 74, 94, are also represented by pobs.)

Pob or zig?

If the game went from 0 to 100 which would be said more, zig or pob? How do you know?

(Pob would be more popular, as there are more multiples of 4 from 1 to 100 than there are multiples of 5.)

How many zig-pobs?

If the game went from 1 to 100, how many zig-pob numbers would there be?

(There are 5 multiples of 20 – 20, 40, 60, 80, 100 – plus 45 and 54, so there are 7 zig-pobs in total.)