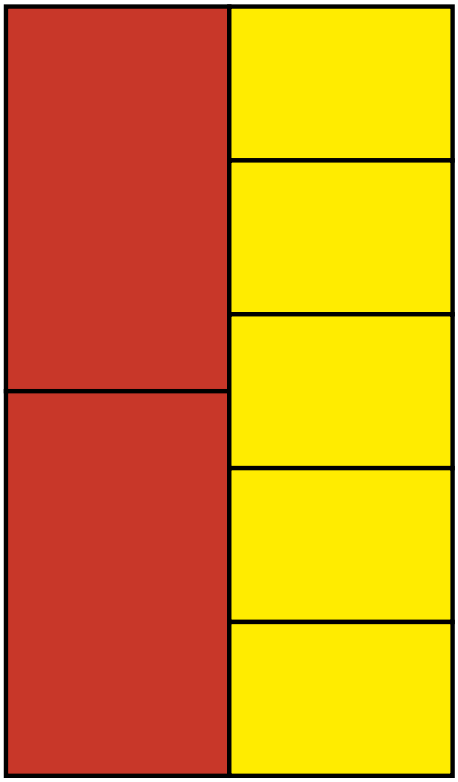
Reasoning in the classroom

Blocks



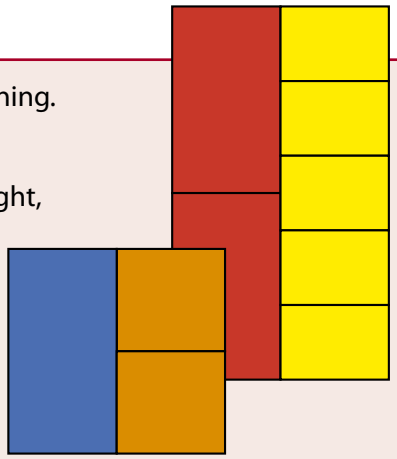
Support materials for teachers

Year 5

Llywodraeth Cymru
Welsh Government

Year 5 Reasoning in the classroom – Blocks

These Year 5 activities encourage learners to use simple proportional reasoning.



Activity 1

Blocks

Learners consider images of blocks that are the same height, and solve problems relating to those heights.

Includes:

- Blocks questions
- Markscheme

Activity 2

More blocks

They use the resource sheet to create questions of their own, which they give to other groups to solve.

Includes:

- Explain and question – instructions for teachers
- Resource sheet – More blocks

Reasoning skills required

Identify	Communicate	Review
Learners choose their own methods when solving problems.	They write their own questions.	They review work from other groups and give feedback.

Procedural skills

- **Doubling and halving**
- **Using simple fractions**
- **Multiplication and division, addition and subtraction**

Numerical language

- **Double (doubling)**
- **Half (halving)**

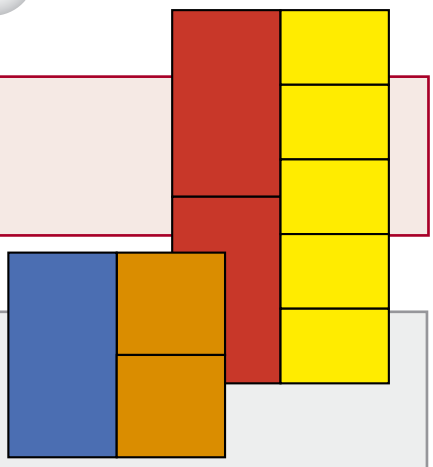
Activity 1

Blocks

Activity 1 – Blocks

Outline

Learners use simple proportional reasoning to solve problems.

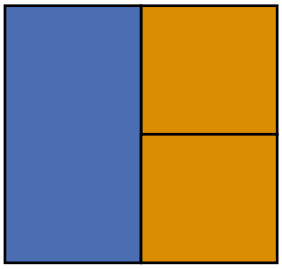


You will need

Blocks questions
One page for each learner

Markscheme

The **blue** block is **8cm** high.

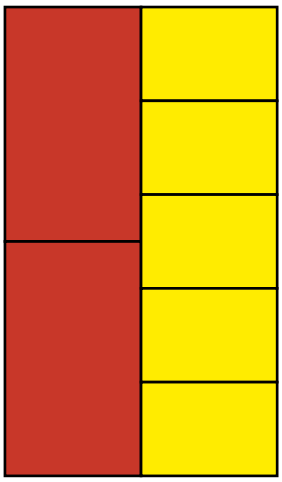


How high is each **orange** block?

cm

1m

Each red block is $7\frac{1}{2}$ **cm** high.



How high is each **yellow** block?

cm

2m

Activity 1 – Blocks – Markscheme

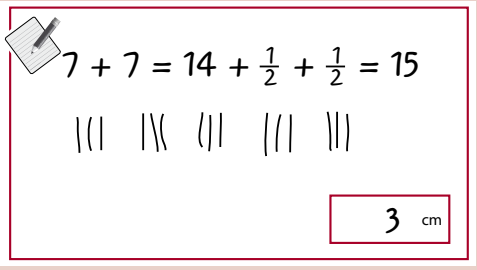
Q	Marks	Answer
i	1m	**4**cm
ii	2m	**3**cm
	Or 1m	Shows **15** Or Shows **$1\frac{1}{2}$** Or Shows a method that would lead to 3cm if calculated correctly, e.g. • $7\frac{1}{2} + 7\frac{1}{2} = 18$ (error), then ÷ 5

◀ **Total height, in cm, of the red blocks**

◀ **Works with only one red block not two, i.e. finds $7\frac{1}{2} \div 5$**

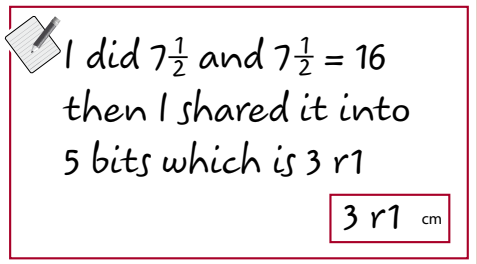
Activity 1 – Blocks – Exemplars

Part ii



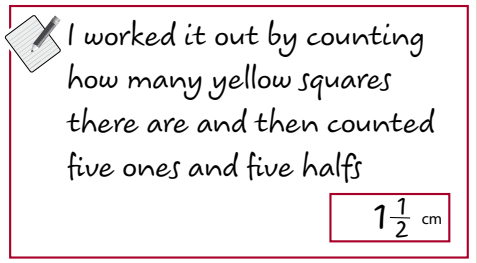
Correct; **2 marks**

- Although this learner appears to lack confidence with division, the answer is correct.



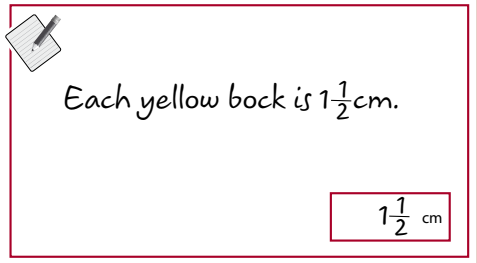
Correct method; **1 mark**

- The error in doubling $7\frac{1}{2}$ has made the subsequent calculation more difficult, but the method described would lead to a correct solution if there were no numerical errors.



$1\frac{1}{2}$ shown; **1 mark**

- This learner shows understanding of fractions, but has forgotten that there are two red blocks, not one.



$1\frac{1}{2}$ shown; **1 mark**

- In contrast to the previous exemplar, no evidence is given. This learner needs support to understand how to improve their numerical communication.

Incorrect; **0 marks**

- This learner has given an answer that makes no sense given the height of the red blocks. They need support to review work and also to understand the importance of numerical communication.

Incorrect; **0 marks**

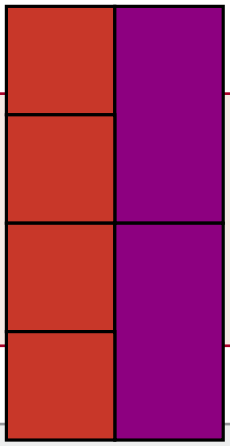
Common error

This learner has almost certainly measured (badly). Understanding that diagrams are not usually drawn full size is important.

Activity 2

More blocks

Activity 2 – More blocks



Outline

More blocks is designed to carry on from **Activity 1 – Blocks**.

Learners use different colour blocks to make towers of identical heights, and write questions for other groups to solve.

You will need

Resource sheet – More blocks
Printed in colour, preferably on card

Scissors

Glue (optional)

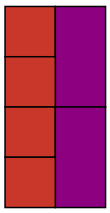
Activity 2 – More blocks

Explain

Give each group/pair a copy of the resource sheet **More blocks** and ask them to choose two different colour blocks, e.g. red and purple. They should cut out their blocks (carefully) and use them to make towers of the same height.

Then ask learners to choose what height they would like one of their blocks to be. For example, each purple block could be 10cm high. *(Remind learners that we are 'pretending' that they are that height, i.e. we are not measuring.)*

The learners then stick their towers on paper or card and write a question alongside, e.g.



Each purple block is 10cm high.

How high is each red block?

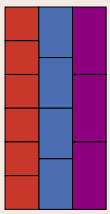
After groups have swapped question(s) the group that wrote the question can 'mark' it and give feedback.

Or

Cut their blocks for them, or use Cuisenaire rods, or similar.

Question

- Why are red with purple, or blue with yellow, the easiest pairs to work with? *(The height of a purple (or yellow) block is double the height of a red (or blue) block.)*
- Which do you find easier, doubling or halving? Why?
- How could you make your question easier/more demanding? *(For example, by using a fraction or decimal for the height of a block.)*
- What questions could you write if you use towers of more than two colours?



Extension

- Suppose you had a tower made with 12 red blocks. How many blue, purple or yellow blocks would make towers of the same heights? *(8, 6 and 4 respectively)* Instead of 12, what else could you choose for the number of red blocks so that you can make towers of the same heights with all four colours? *(Any multiple of 12)*