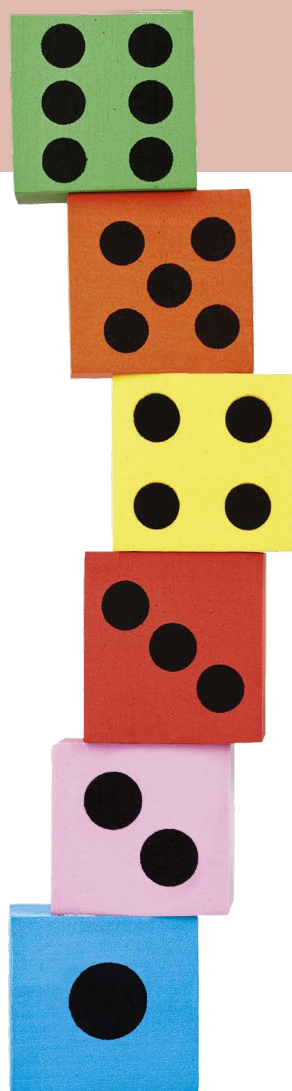


How many dice?



Support materials for teachers

Year 4



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Welsh Government

Year 4 Reasoning in the classroom – How many dice?



These Year 4 activities start with an item that was included in the 2014 National Numeracy Tests (Reasoning). A further linked activity is also provided.

Activity 1

How many dice?

Learners use their reasoning skills to work out combinations of numbers on dice.

Includes:

- How many dice? questions
- Markscheme

Activity 2

Less than, greater than

They play a game that requires them to predict whether the next throw will produce a total that is less than or greater than the first throw.

Includes:

- Explain and question – instructions for teachers
- Teachers' sheet – Less than/greater than cards, symbols
- Teachers' sheet – Less than/greater than cards, words

Reasoning skills required

Identify

Learners identify their own strategies.

Communicate

They explain their reasoning to their peers.

Review

They review their decisions and make amendments accordingly.

Procedural skills

- Addition
- Multiplication (or repeated addition)
- Less than/greater than

Numerical language

- Total
- Less than/greater than
- $<$ and $>$ (optional)

Activity 1

How many dice?

Activity 1 – How many dice?



Outline

Learners work out numbers on a group of six dice to achieve given totals.

You will need



How many dice? questions

One page for each learner



Markscheme

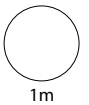
Aled has six dice.

Each dice has the numbers 1, 2, 3, 4, 5 and 6 on it.

He makes this tower.

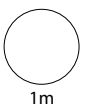


What is the **total** of the numbers you can see on this tower?

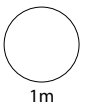


Aled uses all six dice to make a **new** tower.

The **smallest** possible total is



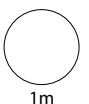
The **largest** possible total is



He uses **some** of the dice to make a new tower.

The largest possible total is **24**

How many dice does he use?



Activity 1 – How many dice? – Markscheme

Q	Marks	Answer
i	1m	21
ii	1m	6
iii	1m	36
iv	1m	4

Note: as these questions are straightforward to mark, no exemplars are given.

Activity 2

Less than, greater than

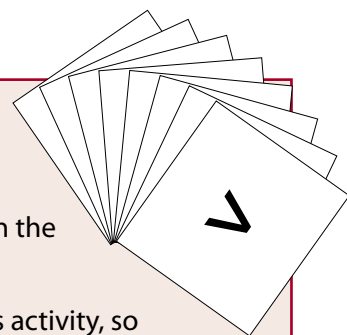
Activity 2 – Less than, greater than



Outline

This Year 4 activity continues the theme of dice with a simple game. Learners predict whether the next throw of a dice will result in a number that is less than or greater than the first throw.

Identifying why their selection should be 'less than' or 'greater than' is at the core of this activity, so learners should be appropriately challenged to explore and explain their choices.



You will need



Or



Teachers' sheet – Less than/greater than cards, symbols

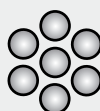
Each pair needs one of each type of card

Teachers' sheet – Less than/greater than cards, words

Each pair needs one of each type of card



Four dice for each group of three or four pairs



Counters

Activity 2 – Less than, greater than



Explain

Ask three or four pairs to work together – number them so each pair knows their identifying number (*choose the pair that is most numerate as 'Pair 1'*). Give each pair one 'less than card' and one 'greater than' card from either version of the teachers' sheet **Less than/greater than cards**.

Pair 1 throws one dice. Each pair, including Pair 1, has to decide whether the next throw will result in a number than is less than or greater than this throw. They place their card on the table to indicate their choice. Pair 1 leaves the first dice on the table, then throws a second dice and each pair that chose the correct card takes a counter. If the number thrown results in a double, the pair throwing the dice wins a counter – no one else. The two dice then pass to Pair 2, and so on.

After two or three rounds, stop the game. Ask Pair 1 to explain to the rest of their group why they chose the card they have in front of them (*or the last one if they are in between throws*). Allow time for them to discuss (*at this stage it is not about their having a complete understanding – rather it is that you want them to begin to articulate their reasoning*) then move the game on. During the rest of the game, make sure to stop the game so each pair has the opportunity to explain their reasoning to the others.

After several rounds, stop the game and ask them to see which pair in their group has the most counters and therefore wins. Discuss as a large group, using the questions below as a guide. Then restart the game, this time using two dice for each throw.



Question

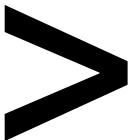

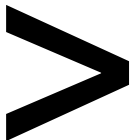



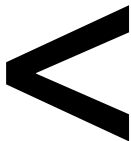
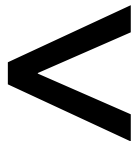
When each throw is of one dice

- How are you choosing which card to use?
- If the first dice is a six, which card would you choose? Why? Could the second throw result in anything other than a number that is less than six? (*Yes, it could be another six.*)
- What if it's a one? Which card would you choose then? Why?
- Which numbers are you most confident about? Why?
- Which numbers are you least confident about? Why? (*3 or 4*)

When each throw is of two dice

- Is making a decision now you have two dice as easy as when you had one? Why/why not?
- What is the highest total of the two dice you can get? (*12*) And the lowest? (*2*) So what is the middle score you can get? (*7 – show them on a number line if appropriate.*) Does that help you decide whether to go 'greater than' or 'less than'? How?

Each pair requires one of each card. Laminating makes them easier to use and allows them to be used for purposes other than this game.

The dice game 	The dice game 	The dice game 	The dice game 
The dice game 	The dice game 	The dice game 	The dice game 

Each pair requires one of each card. Laminating makes them easier to use and allows them to be used for purposes other than this game.

less than	less than	less than	less than
greater than	greater than	greater than	greater than