

Can I list all the different outcomes that may result from repeating an experiment?

Teaching guidance

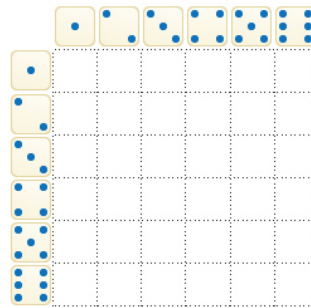
Key vocabulary

possible, impossible, possibility, outcome, combination, list, table, tree diagram, systematic

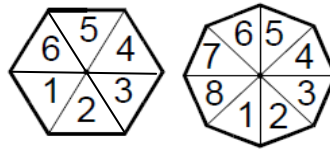
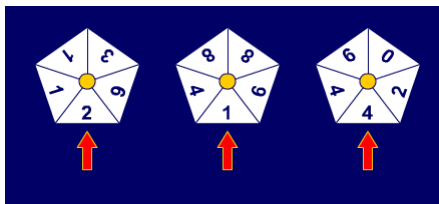
Models, images and resources

Systematic tabulation of possible outcomes

	b	c	d
b	bb	bc	bd
c	cb	cc	cd
d	db	dc	dd



Spinners or Number spinners ITP, dice and cards



Bags of assorted counters or Probability spreadsheet



There are 12 cubes in the bag.
Decide whether you want each cube to be red, blue or green.
Click on them to change their colour.

Hide cubes

Show cubes

Click on this button to select a random cube.
The colour of the selected cube will be added to the chart below.

red

green

blue

Reset Graph

Teaching tips

- Provide examples for children to try to identify all the possible outcomes for two events. Encourage systematic recording so that children are confident that they have identified all the outcomes.
- For example, in a game of Snap using three different images on cards, that is, cat, dog and bird.
 - What are the possible outcomes for each pair you draw?
 - How can you be sure that you have found them all?
 - How can you list them systematically?

- Encourage pupils to use a systematic method of recording the outcomes, such as:

bb bc bd

cb cc cd

db dc dd

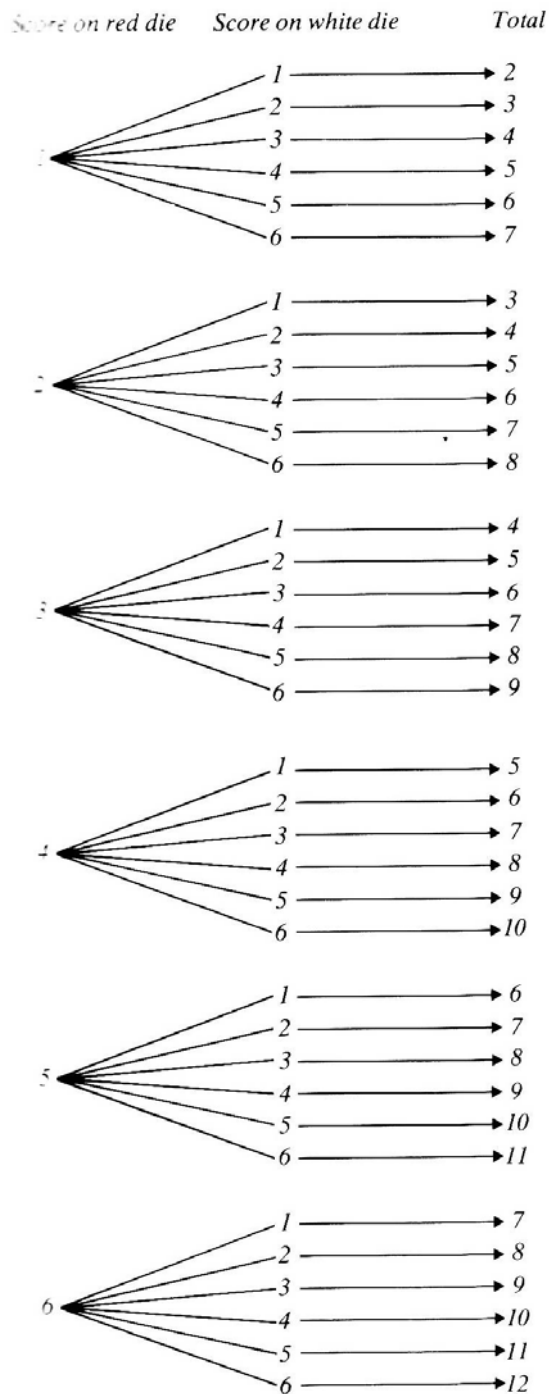
or

	b	c	d
b	bb	bc	bd
c	cb	cc	cd
d	db	dc	dd

- Ask children to articulate how they can be sure that they have recorded all the possibilities. Can they think of another way of recording so that they can still be sure that they have all the possibilities? Ask them to evaluate their recordings for efficiency, reliability and accuracy.
- Throwing one dice and then two dice makes an interesting context for learning more about identifying all possible outcomes. Ask children to do this for one throw of a dice and then try listing all possible outcomes from throwing two dice. It helps to say that one dice is red and the other white, so that, for example, a 2 on the red dice and a 3 on the white dice is a different outcome from 2 on the white dice and 3 on the red dice.
- Model for children how to systematically build up a representation of the possible outcomes of an experiment. For example, record the possibilities for tossing a coin once, then discuss and model how a second toss of a coin could be represented on the same diagram. Encourage children to use the representations to look for patterns in the number of possible outcomes, and use this to predict the number of outcomes when the experiment is repeated. In this case a third coin toss would lead to the number of possible series of outcomes being doubled again.

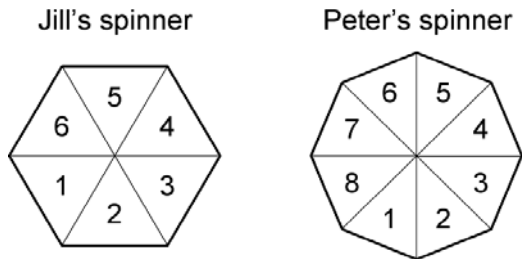
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- A tree diagram is a helpful way of seeing all possibilities. Introducing this representation provides children with an extra technique for enumerating all the possible outcomes.



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Overcoming barriers level 4–5

- Spinners are also a useful way for children to explore finding all possible outcomes. For example, Jill and Peter each have a spinner with numbers as shown below. They each give their own spinner a single spin. Ask children to record all the possible combinations of outcomes systematically:



- Ask children to reflect on the range of outcomes they have identified in order to answer questions such as 'Jill thinks she is more likely to get a higher score than Peter. Is she likely to be correct?'

Question and image based on KS2 1996 Paper A level 5 © QCA