Y4 Lucky Seven

NEW September 2025

Year level: 4

Approximate number of lessons: 2

Learning goals

- Engage in chance-based investigations with equally likely outcomes by:
  - posing an investigative question
  - anticipate and then identify possible outcomes for the investigative question
  - generating all possible ways to get each outcome (a theoretical approach), or undertaking a probability experiment and recording the occurrences of each outcome
  - creating data visualisations for possible outcomes
  - describe what these data visualisations show
  - answering the investigative question
  - reflecting on anticipated outcomes
- Agree or disagree with others' conclusions about chance based investigations

Resources

- Year 4 Probability Glossary
- Two different coloured dice per group (e.g., blue, red)
- **Lucky Seven - Lesson 1 probability experiment** - table to record results of probability experiment
- Paper, markers or something for each group to draw and record with
- **Lucky Seven - sums of dice graph grids**
- **Lucky Seven chart - red & blue dice** or **Lucky Seven chart - colour according to your dice**
- **Lucky Seven - dice squares**
- Optional virtual **dice roller**
- Optional **CODAP**
- Optional **Lucky Seven At Home**

Activity | Lesson One

Introduction

This lesson explores a chance based experience where ākonga can be actively involved in the data collection. This active involvement helps ākonga to make sense of the statistical concept through analysis.

When introducing the lesson, tell ākonga that today you are going to use two dice and try to answer the investigative question. There will be opportunities for individual, peer to peer and whole class discussion based on the data they collect in the lesson.

? PROBLEM:

Today we are going to do a probability experiment where we roll two dice and find the sum of the two dice. Discuss in your pairs:

- What are possible sums we can get when we roll two dice and add the two numbers together?
- Do you think some sums are more likely than other sums?
- Which sum or sums do you think are more likely?

Gather ideas discussed from the class, and work the discussion towards an investigative question about the sum of two dice. Depending on the discussion the investigative question might fall out easily, or you may need to direct it a bit more.

Agree to explore the investigative question **“Are we more likely to roll a sum of seven than any other sum when tossing two dice?**

Elicit ideas from ākonga referring them back to their discussion about what they think they will find when they explore rolling two dice. Prompt them as needed to respond using the language of ‘ equally likely outcome’ or 'not an equally likely outcome’ when they are predicting the answer to the investigative question. Ask them to consider what they think the ‘probability’ of rolling a sum of seven on the two dice might be. Prompts could include

- Do they think it will always happen? Never happen? [ok so somewhere in between]
- Do they think it will happen more than half of the time? Or less than half of the time?
- Depending on the above,
    - do they think it will happen more than three times out of four (more than half the time)?
    - do they think it will happen less than one time out of four?, one time out of five?, one time out of six?

The kaiako records these thoughts or statements for the class to return to later in the lesson and discuss whether what they anticipated has proved to be correct. Ask them to share with their **Talk Partner** why they think the probability will be and justify their thinking in simple ways. For example they may say “I think that it is very likely we will roll a sum of seven most as I often roll a six and a one.” Or they may say ‘I most often get double three when I roll so I think it is unlikely.”

PLAN:

Find out what prior knowledge ākonga have about undertaking a probability experiment. Ideas such as deciding how many times they will do the experiment (how many trials), what a trial or one repeat looks like of the experiment, how will they record the results of each trial.

The kaiako now helps ākonga to draw on their previous knowledge of how they could organise the data they are going to collect in a way that helps them make sense of the data. The kaiako may need to prompt ākonga to access this prior knowledge, especially if they have not had regular experiences of this type. Year 4 ākonga should be familiar with recording and using simple surveys, tallies, tables, picture graphs, dot plots and bar graphs with their kaiako supporting them.

Consider whether they will record the sum of the two dice for each trial, and then summarise these findings, or if they will set up a table with the possible sums and then using tally marks record the outcome of each trial. Being methodical and organising the data is an important part of sense making.

E.g., write down the number on the red dice, the number on the blue dice and the sum for each trial.

Note in Lesson Two, this data can be used to introduce the theoretical outcomes. In that activity ākonga need to know what was on the first dice and what was on the second dice.

Trial	Red dice | First dice	Blue dice | Second dice	Sum of the two dice
1			
2			
3			
4			
5			
6			
...			

𝍸 DATA:

Now you are ready to have ākonga in pairs, roll their two dice 40 times, taking turns to roll the dice and to record the results of each trial in the table. As each pair rolls their dice they note their result onto their self created table. A photocopy master of a table to collect the results of 40 trials is included in the materials masters section | **Lucky seven - Lesson 1 Probability experiment**.

Trial	Red dice | First dice	Blue dice | Second dice	Sum of the two dice
1	1	1	2
2	5	4	9
3	6	6	12
4	5	4	9
5	2	5	7
6	1	1	2
...			

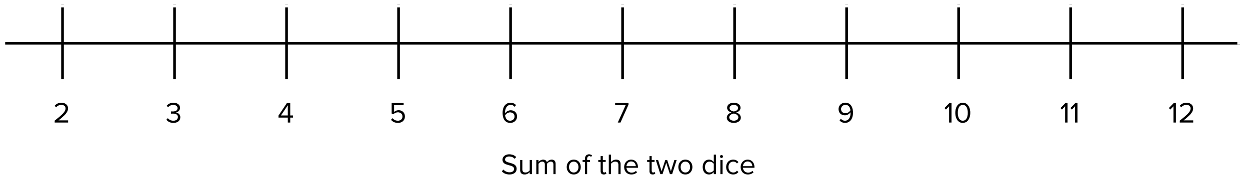
You could also put in a summary table (included in **Lucky seven - Lesson 1 Probability experiment**) for each sum to help ākonga see the number of times they tossed a sum more easily. They could summarise using tally marks and then write the frequency for each sum. Remember that each pair of ākonga will have 40 pieces of data.

Sum of the two dice	2	3	4	5	6	7	8	9	10	11	12
Tally											
Frequency											

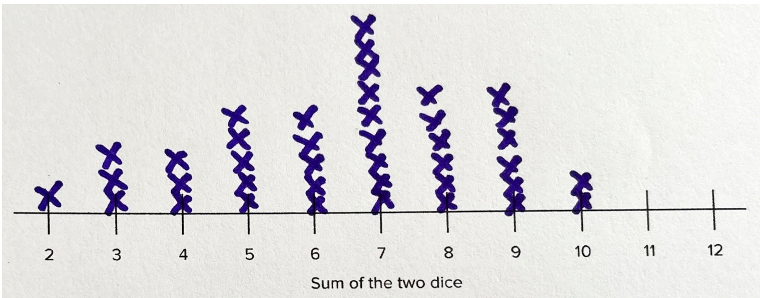
ANALYSIS:

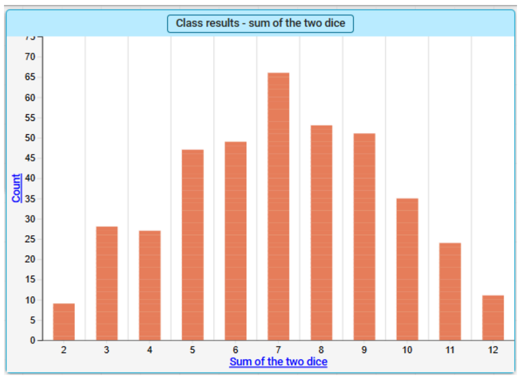
Now the kaiako supports ākonga to graph their sums using a **graph grid**. Once ākonga have done this they will compare and contrast their graph with the graph of another pair.

The graph grid: ākonga plot points or crosses above each sum to show the frequencies of the dice sums from their probability experiment.



Example of ākonga results from their 40 trials.





Collect together the class sums and graph these. Prompt ākonga to look at the pattern of the sum frequencies rather than focus on the actual frequencies, comparing and contrasting the pattern of their graph with the pattern of the class graph.

Kaiako are looking/listening to see if ākonga notice the triangular shape of the graphs, that the frequencies start low, increase to a peak at seven and then go down again.

Example from 10 pairs of students - 400 sums

Make a summary of sums table and support the class to put all the data together to create a table that has the number to times (frequency) that sum was rolled and also find the probability estimate as a fraction e.g., the sum of 7 was rolled 73 times in the class, the number of rolls for the class was 400 so the probability estimate for the sum 7 is $\frac{73}{400}$.

Sum of the two dice	2	3	4	5	6	7	8	9	10	11	12
Frequency						73					
Probability estimate						$\frac{73}{400}$					

Describing the graphs

Look at the frequencies for the different sums, which is highest, lowest, therefore has the same chance of happening or does not have the same chance of happening etc.

Lead ākonga to use the language probability, for example, they could say - from our probability experiment there were 73 sums of seven out of 400, so the probability estimate for getting a sum of seven is $\frac{73}{400}$. Have ākonga go on to work out the fraction for the remaining frequencies of the sums.

CONCLUSION:

Now it is time to answer the investigative question **"Are we more likely to roll a sum of seven than any other sum when tossing two dice?"** using the class data.

This is where the lesson comes to a clear end and it is the choice of the kaiako whether they go onto lesson two or not. Lesson Two explores the theoretical approach in a way that draws on Lesson One.

Remember to keep the results from ākonga trials for Lesson Two if doing.

Activity | Lesson Two

Introduction:

In this lesson ākonga explore summarising their data from Lesson One in a way that leads to the theoretical probabilities for each sum.

? PROBLEM:

In this lesson we are exploring the investigative question from Lesson One, **“Are we more likely to roll a sum of seven than any other sum when tossing two dice?”** and an additional investigative question **“What are the theoretical probabilities for each of the sums when we toss two dice?”**

PLAN & DATA | Probability experiment results from Lesson One

Using the data collected in Lesson One the kaiako supports ākonga to have a discussion, using visuals to support the discussion, about all the possible outcomes when two dice are rolled.

Using their own chart or **one of the ones provided**, ākonga record their results from their trials in Lesson One in the chart. Do a couple of examples to support them to get started, checking that they understand that the tally mark goes in the box that represents the dice by the order the dice were thrown/recorded.

Kaiako could model using their own chart and the following data.

Trial	Red dice I First dice	Blue dice I Second dice	Sum of the two dice
1	4	2	6
2	3	4	7
3	2	1	3
4	1	6	7
5	2	4	6
6	3	5	8
7	5	2	7
8	6	2	8
9	3	3	6
10	3	4	7

Red will be die 1 and rolled first every time. Blue will be die 2 and rolled second every time. If I rolled (Trial 1) a 4 (red I die 1) and a 2 (blue I die 2) I would record it in the chart, in the box as shown to the right.

<table>
<tr><th>Die 1 red
Die 2 blue</th><th>⚀</th><th>⚁</th><th>⚂</th><th>⚃</th><th>⚄</th><th>⚅</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>
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<tr><td>⚅</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

Working with ākonga, using the provided ten trial results, capture through strategic questioning where each tally mark will go in the chart for the ten trials.

Die 1 red Die 2 blue	⚀	⚁	⚂	⚃	⚄	⚅
⚀		|				
⚁				|	|	|
⚂			|			
⚃		|	| |			
⚄			|			
⚅	|					

Note with care when you hit trial 5. The sum, six, is generated with the same two numbers as trial 1, BUT the numbers are on the opposite dice. In trial 1 it is 4 on the red, 2 on the blue. In trial 5 it is 2 on the red, 4 on the blue. Check that ākonga see the difference, identifying the two different boxes that the tally marks went into.

Ākonga now work to fill in their own chart, using their results from Lesson One. If the results from Lesson One are not available, ākonga could do another 40 trials, recording the outcomes directly onto the chart.

Once ākonga have recorded their 40 dice rolls onto the chart they can add in the sum of the two dice rolled in the box (as shown to the right). The number written here is the total number of dots on the dice, not the number of tally marks in the box.

Die 1 red Die 1 blue	⚀	⚁	⚂	⚃	⚄	⚅
⚀	2	3 |	4	5	6	7
⚁	3	4	5	6 |	7 |	8 |
⚂	4	5	6 |	7	8	9
⚃	5	6 |	7 | |	8	9	10
⚄	6	7	8 |	9	10	11
⚅	7 |	8	9	10	11	12

Ākonga could start just by putting the sums for the boxes they filled in for their 40 trials, and then complete the chart for pairs of dice not yet rolled. **Note**, that for this example ten pieces of data have been recorded, each pair of ākonga would have 40 pieces of data in their charts.

Ākonga can check, by counting the tallies in each of the sums, how many of each sum they have, and confirm against their summary table from Lesson One.

ANALYSIS | Moving to theoretical probabilities

Discuss with ākonga how many possible outcomes there are when two dice are summed. Guide them to understand that the sums in the boxes in the chart are all the possible outcomes when two dice are summed, and there are 36 of them. *Some ākonga might get the idea of six numbers on the red die, combined with six numbers on the blue die (6x6) gives 36.*

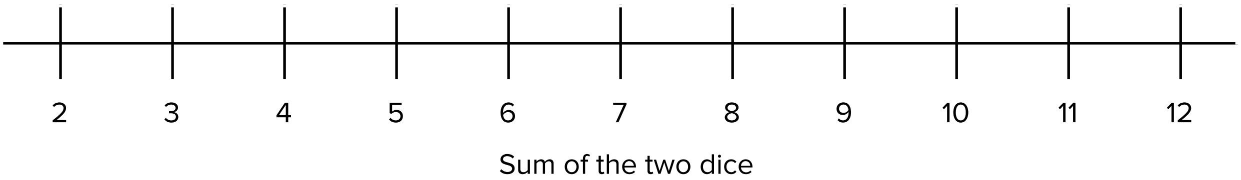
Die 1 red Die 2 blue	⚀	⚁	⚂	⚃	⚄	⚅
⚀	2	3 |	4	5	6	7
⚁	3	4	5	6 |	7 |	8 |
⚂	4	5	6 |	7	8	9
⚃	5	6 |	7 | |	8	9	10
⚄	6	7	8 |	9	10	11
⚅	7 |	8	9	10	11	12

Using colour pencils, highlighters or similar, support ākonga to shade in all the boxes that have the same sum. Ask them how many of the boxes have a sum of seven, two, eight. Is a sum of seven the most common? How do they know?

Support ākonga to summarise the number of boxes for the different sums from the chart, in a table, to support what they say. Note: they are not summarising their tally marks, they are counting how many boxes for each sum.

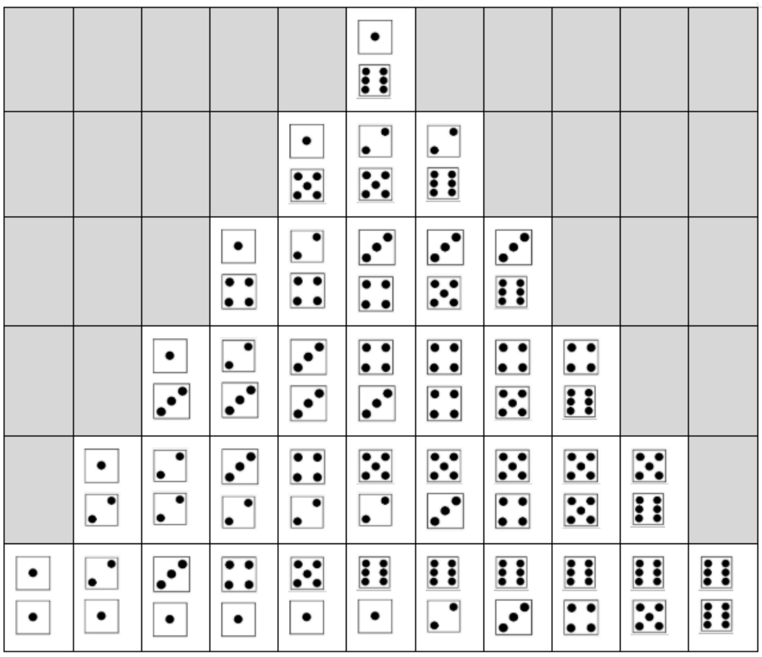
Sum	2	3	4	5	6	7	8	9	10	11	12
Count for each sum	1	2	3	4	5	6	5	4	3	2	1

At this point ākonga could make a graph to show the count for the sums, using the **graph grid** from Lesson One. They plot points or crosses above each sum to show the count of the dice sums.



Prompt ākonga to compare and contrast the pattern of the counts graph with the pattern of their probability experiment results from Lesson One. What do they notice? Possible prompts:

- What do you notice about your chart and which sum has the most entries?
- What do you notice about where the sum for the dice roll is seven?
- How does the graph of counts of dice sums look similar or different to the graph from the probability experiment?
- What does this make you think?
- What was your anticipated answer to the investigative question? Do you still think this will be correct?
- Why would you like to revise your prediction? Or, why would you like to stick with your prediction?



It may be helpful for some ākonga to see the possible events for rolling two dice as a visual without numbers as in the table. This could be drawn or created as you go through the discussion with ākonga or you could have a prepared chart (as provided here and in the **resource links**) to show and discuss.

Kaiako could have printed copies of '**dice squares**' available for ākonga to physically cut and paste what the dice showed into a table using the data from Lesson One. Ākonga would then have a visual representation of their data to compare to the chart.

By looking at their own shaded charts and the visual above ākonga can clearly see that there are six chances of rolling a sum of seven when using two dice. This means that out of 36 possible outcomes, six of them will add together to make seven.

Use the information from the analysis about counts of the dice sums, and their probability experiments from Lesson One, to make data driven statements and answer the investigative question **"Are we more likely to roll a sum of seven than any other sum when tossing two dice?"**

CONCLUSION:

"Are we more likely to roll a sum of seven than any other sum when tossing two dice?

Remind ākonga of their prediction and anticipated outcomes. Have them respond using the language of 'same chance of happening' or 'does not have the same chance of happening' when they are talking about their answer to the investigative question. What was the likelihood of the sum of the two dice being a seven? (Theoretically it is six out of 36 which is a $\frac{1}{6}$ chance). Point this out on the chart that shows the pictorial dice results. You could literally count that there are 36 possibilities and then shade the ones where the sum is seven and count them.

Ask ākonga to anticipate whether they think their results would be the same if they rolled the pair of dice 50 times or 100 times. Some ākonga may be keen to test their thinking by actually doing this.

"What are the theoretical probabilities for each of the sums when we toss two dice?"

Up until now we have been focusing on the likelihood of getting a sum of seven. For this investigative question we need to formalise all the probabilities for the different sums.

Support ākonga to complete the summary table with counts and probabilities.

Sum	2	3	4	5	6	7	8	9	10	11	12
Counts of dice sums	1	2	3	4	5	6	5	4	3	2	1
Theoretical probability	$\frac{1}{36}$	$\frac{2}{36}$	$\frac{3}{36}$	$\frac{4}{36}$	$\frac{5}{36}$	$\frac{6}{36}$	$\frac{5}{36}$	$\frac{4}{36}$	$\frac{3}{36}$	$\frac{2}{36}$	$\frac{1}{36}$

Notes for teachers

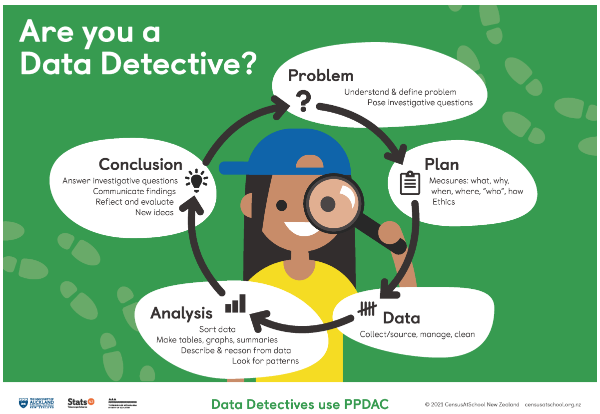
A common idea that is found across many cultures is the idea of a favourite or lucky number. To be clear, for the purposes of this lesson there is **NO** actual cultural knowledge being favoured around the number seven, it is merely a number selected to be able to have an interactive, material based experience of probability. Dice have been selected as these are materials that are readily available across the country and will be present in classrooms.

When eliciting ākonga’s prior knowledge of ways to record and organise data it is helpful to have some visual supports. Think about things that you may have in your classroom, that they are familiar with, that are about recording and organising data. For example you may have a checklist for who has had a turn on something or a tally chart for how many of something.

Lucky Seven is a perfect home learning activity that requires interactive, discussion based learning with others in their home. Teach this lesson before sending the home learning prompt so that ākonga have a chance to take the lead at home and consolidate their probability learning.

Year 4 Probability Glossary

The purpose of this glossary is to support kaiako to understand the probability vocabulary that they will be using throughout their teaching. It can act as a discussion tool for staff hui prior to probability being taught.



Data Detective Poster - CensusAtSchool New Zealand

Lucky Seven student materials

Resource list with preparation

Resource	Preparation required	Approx numbers
Lucky Seven - Lesson 1 Probability experiment	Print two pages backed	Need one per pair of ākonga
Lucky Seven - sums of dice graph grids	Print and cut up, can be used in Lesson One and Lesson Two	Three per sheet, print enough for each pair, for Lesson One, and another set for Lesson Two
Lucky Seven chart - red & blue dice	Print and cut up. This page uses red and blue dice.	
Lucky Seven chart - colour according to your dice	Alternatively use this page, colour according to your dice. Ākonga can colour the chart using coloured pencils or pens.	
Lucky Seven - dice squares	Page contains two sets of 72 dice squares. One set is needed to make the full sum of two dice graph.	Two per page, print enough for each graph to be made.
Lucky Seven At Home	Print in colour, backed.	Print one per ākonga to take home

Lucky Seven - Lesson 1 probability experiment

Names: ____

Trial	Red die | First die	Blue die | Second die	Sum of the two dice
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			

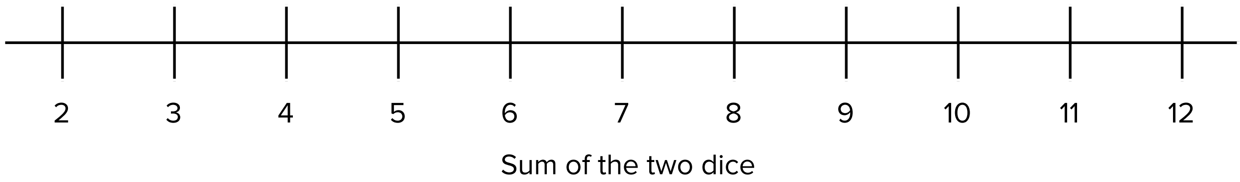
Lesson 1 Probability experiment page 2

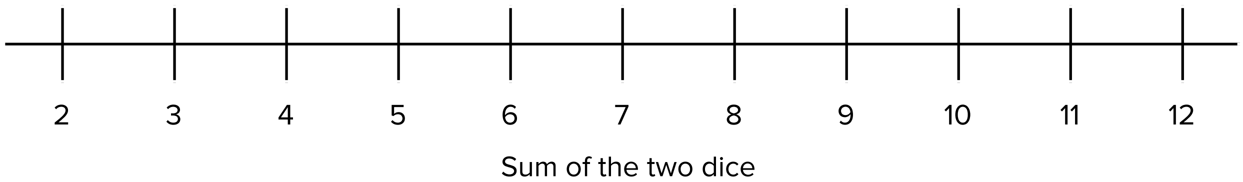
Trial	Red die | First die	Blue die | Second die	Sum of the two dice
26			
27			
28			
29			
30			
31			
32			
33			
34			
35			
36			
37			
38			
39			
40			

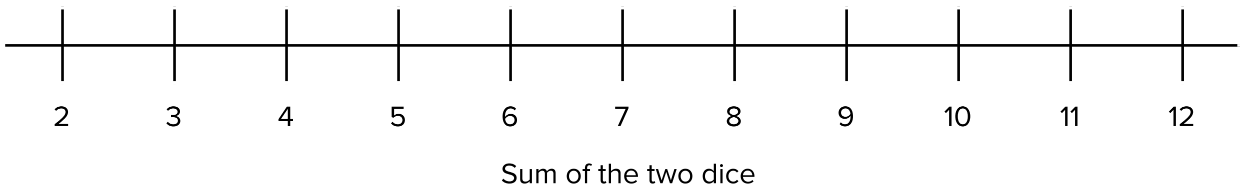
Summary table

Sum of the two dice	2	3	4	5	6	7	8	9	10	11	12
Tally											
Frequency											

Lucky Seven - sums of dice graph grids





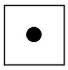
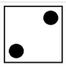
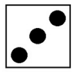
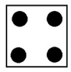
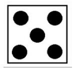
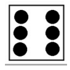
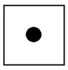
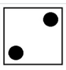
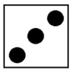
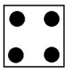
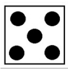
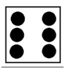


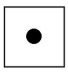
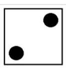
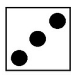
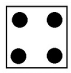
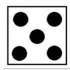
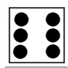
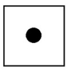
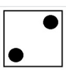
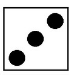
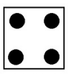
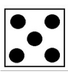
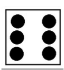
Lucky Seven chart - red & blue dice

Die 1 red Die 2 blue	⚀	⚁	⚂	⚃	⚄	⚅
⚀						
⚁						
⚂						
⚃						
⚄						
⚅						

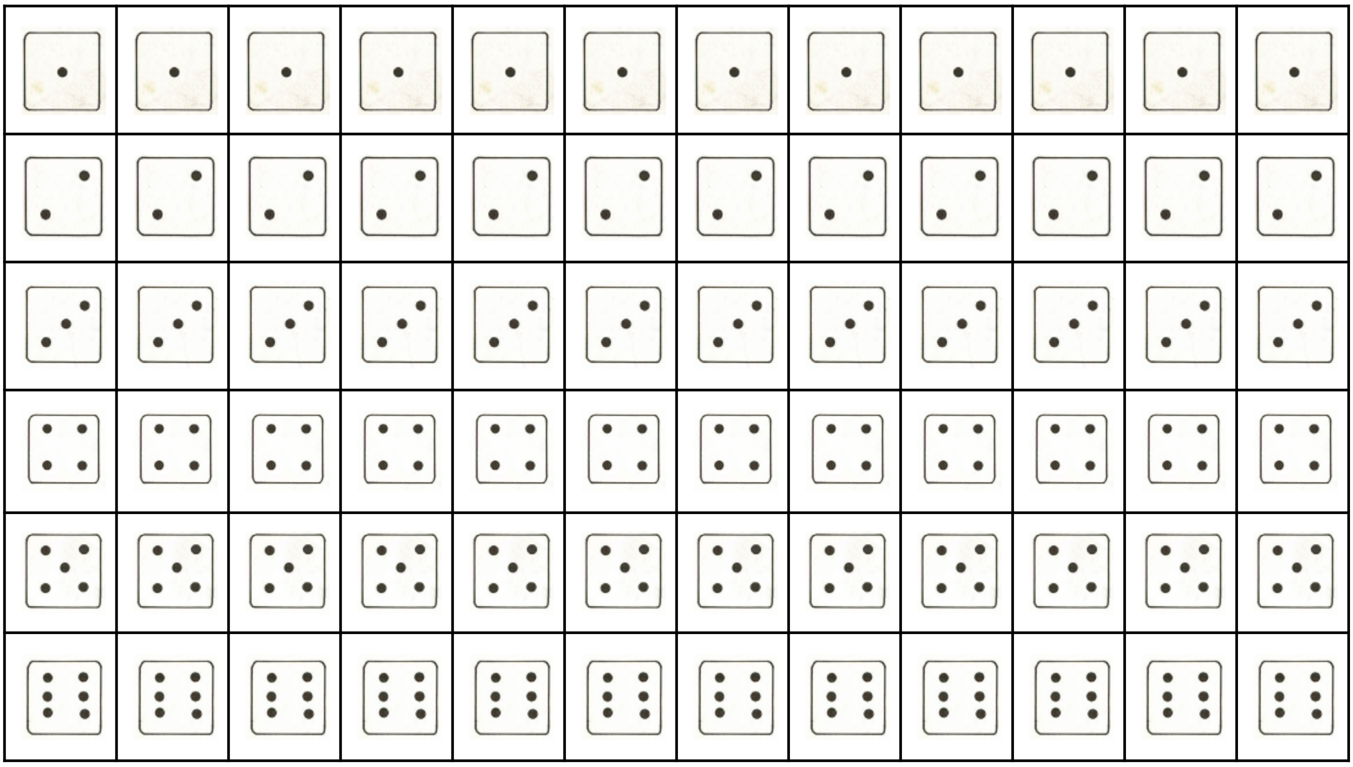
Die 1 red Die 2 blue	⚀	⚁	⚂	⚃	⚄	⚅
⚀						
⚁						
⚂						
⚃						
⚄						
⚅						

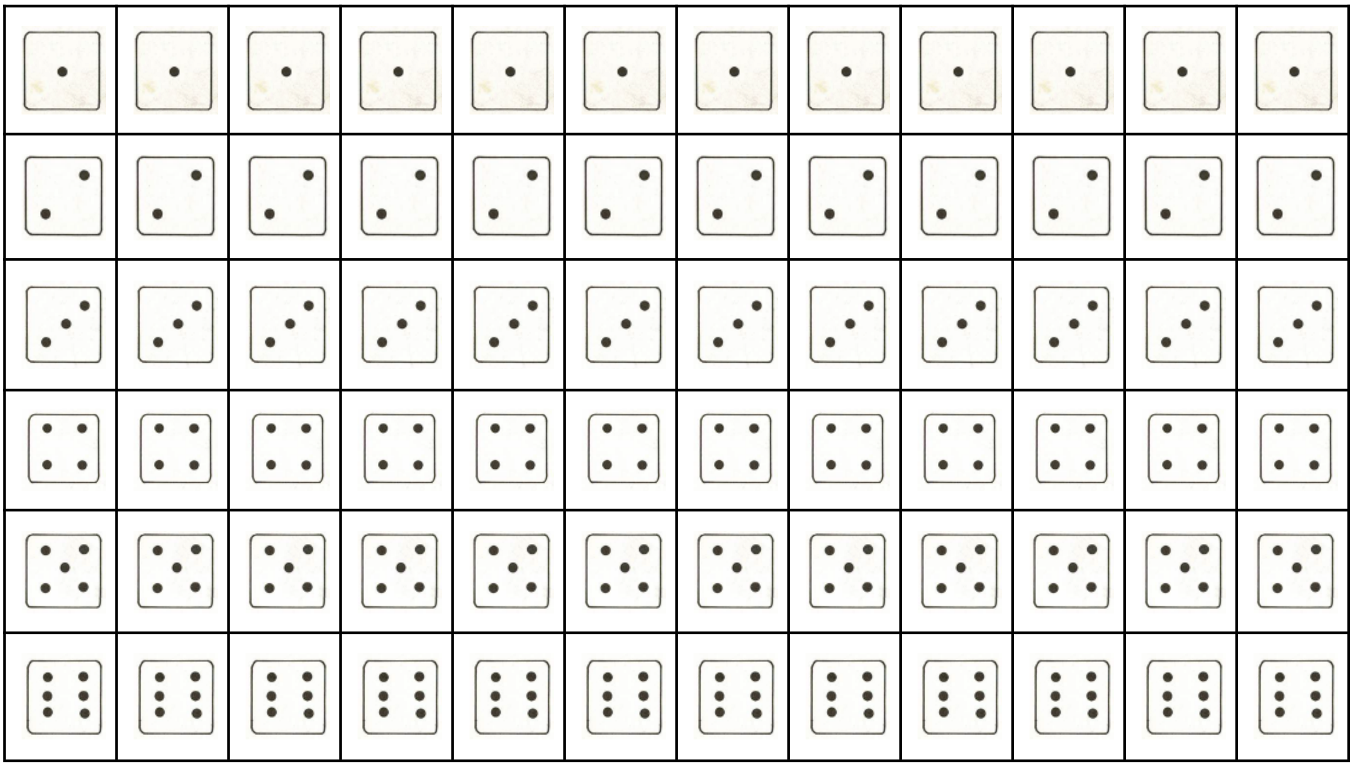
Lucky Seven chart - colour according to your dice

Die 1 _____ Die 2 _____						
						
						
						
						
						
						

Die 1 _____ Die 2 _____						
						
						
						
						
						
						

Lucky Seven - dice squares





Lucky Seven At Home

You will need two different coloured six-sided dice. The chart uses green and yellow, but other colour combinations are fine.

Use this table to record the results when you roll two dice a total of 50 times.

Before beginning, have the person doing this home learning activity with you anticipate which number (sum of the two dice) you are most likely to roll. Ask them why they think that.

What do we anticipate?

Die A green Die B yellow	⚀	⚁	⚂	⚃	⚄	⚅
⚀						
⚁						
⚂						
⚃						
⚄						
⚅						

After you have entered your data onto the table, talk about whether your predictions were correct.

Talk to the person you are playing this with using this chart to support your probability discussion and explanation.