CAN YOU PREDICT WHAT YOU WILL GET?

Many games are played with a pair of six-sided dice. How likely is it to roll a double six? Are all the totals equally likely? Out of 100 rolls of the dice, how many times are you likely to get the total 2?

Can you predict accurately, from theoretical probabilities, what you will get when you roll a pair of dice? Compare experimental results with theory.

Requirements: The **widget** **Rolling dice** or a pair of dice for each group of students.

TASK 1 What is possible?

a List the possible totals from rolling two dice.

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b Are totals of two and twelve equally likely? Justify your answer.

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c Are totals of two and seven equally likely? Justify your answer.

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TASK 2 Calculate the probabilities

Complete the table to list all possible totals for rolling two dice.

	1	2	3	4	5	6
1	2	3				
2	3					
3						
4						
5			8			
6						

Using the table above, record the probability of getting each different total in the table below.

Totals	2	3	4								
Probability	$\frac{1}{36}$ $2.\dot{7}\%$	$\frac{2}{36}$ $5.\dot{5}\%$									

TASK 3 Conduct an experiment

Do the theoretical probabilities reflect what actually happens? Use the **widget** **Rolling dice** to conduct this experiment without the need to tally results. If you do not have access to the widget, use a pair of dice and tally the results.

a Roll two dice 50 times and record the results. After 50 throws, complete the **frequency** column.

Total	Tally	Frequency	Rel. freq. (%)
2			
3			
4			

b Use the frequencies to calculate the relative frequency for each total. For example, if you rolled a total of 4 **seven** times:

$$\text{Relative frequency (4)} = \frac{7}{50} = 14\%$$

c Compare the relative frequencies (experimental probabilities) with the theoretical probabilities (from task 2). Comment on your findings.

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TASK 4 Extend the experiment

Pool your results with your class. You could use an overhead projector transparency, the board or a spreadsheet. In the table, record the combined results from the whole class and calculate the relative frequency for each result.

Total	2	3	4								
Frequency											
Rel. freq.%											

Do the relative frequencies from the collected data agree with the theoretical probabilities more closely now? _____