

Get Lucky Primary Masterclass

Thanks for helping with this Masterclass session! Your support is much appreciated.

The session leader should be able to tell you more about the content of the session, and exactly how they'd like you to help, but this sheet should give you some basic information you may find useful. If any of this seems obvious to you, that's great!

In general, for Masterclass sessions:

- While the session leader is talking to the group, don't interrupt them or distract the students unless something is wrong that needs fixing urgently. You should also watch and pay attention to what they're saying, to set a good example.
- If things need handing out to the students, wait for the session leader to signal you to do this, as it can distract the students if you start to hand things out before they're ready.
- If the students are given a task to work on, you should circulate the room to talk to the students. Wait until they've had a chance to tackle the problem before you interrupt them, and encourage anyone who looks like they haven't started yet.
- Try not to give away the answers to the students, especially if they're working on the problem and about to discover it for themselves - if they are really struggling, you can give them a hint or suggest where they might start looking.

In this session:

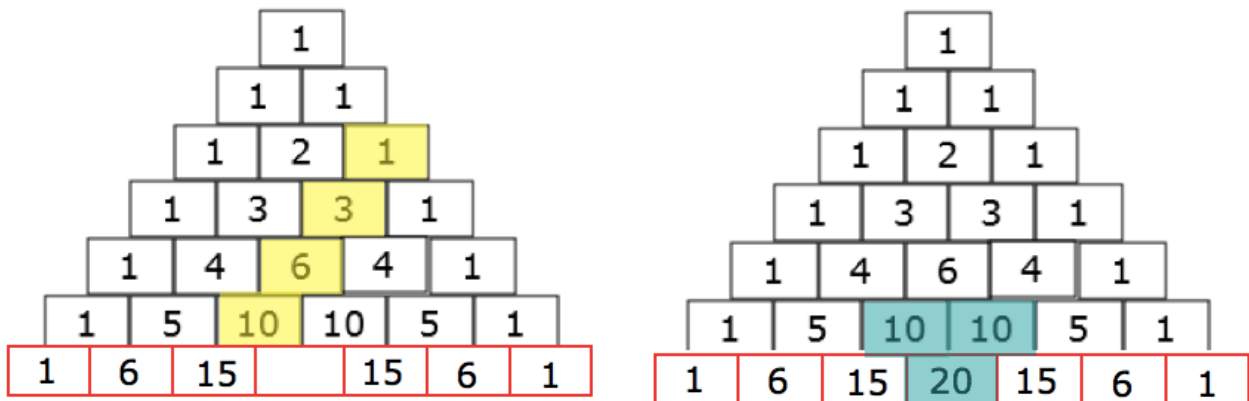
In this Masterclass students answer the question 'Is it worth playing the Lottery' by exploring combinations, Pascal's Triangle, probability and randomness.

The main activities are listed below, with directions to helpers in italics:

1. Students choose lottery numbers.
6 whole numbers from 1 - 59, and they can't choose the same number twice.
2. Students play a probability game and discuss basic probability.
Encourage the students to be systematic when listing coin flip options - how will know they have got them all? The order matters in the coin flip sequences.
3. Students discuss what we need to think about to answer the question 'Is it worth playing the lottery'.
Remind students we are not asking for the answer to 'Is it worth playing the lottery', we are asking them to tell us what things we will need to consider in the course of the Masterclass, in order to answer that question. Let them suggest things - don't tell them if their suggestion is 'right' or 'wrong'.
4. Students find combinations by hand for 'mini lottery' situations.
Again, in this section remind students to be systematic. The order doesn't matter here (so 1,2 is the same thing as 2,1), and numbers can't be repeated within a pair/group (eg 1,1 is not a pair). Encourage the students to write out all the options for the more difficult combinations questions in the grid. See the answers on the right:

		How many lottery numbers you choose.					
		CHOOSE					
		0	1	2	3	4	5
How many numbers to choose from.	FROM	0	1				
	1	1	1				
	2	1	2	1			
	3	1	3	3	1		
	4	1	4	6	4	1	
	5	1	5	10	10	5	1

5. Students spot patterns when these results are written in Pascal's Triangle format. *Students will likely have spotted that the end cells are 1, and 6 is in the cells just inside of those so that the run of consecutive numbers continues. The yellow cells are all triangular numbers which is why 15 follows this. The green shading is to draw students' attention to this arrangement of three cells. They are connected because the two cells above add together to give the cell below – this works for every set of 3 cells arranged like this in Pascal's Triangle.*



6. Use Pascal's Triangle to find the answer to different combination questions – starting with a mini lottery situation, then for the real lottery (perhaps using an interactive online Pascal's Triangle).
To use Pascal's Triangle to find answers to combinations questions: we always count from 0, so the first row is row 0 and the first cell in a row is cell 0. To find how many ways of choosing 2 numbers from 5, we go to the 5th row and go to cell 2 of that row. To find how many ways of choosing 2 numbers from 7 in the mini lottery, go to row 7 and then go along to cell 2 (it should say 21).
7. Think about what the probability of winning the jackpot means in 'real life' terms.
Students will need to use a calculator and will need to make some assumptions about how long people live for. And if anyone asks – the legal minimum age to play the lottery is 16!
8. Additional material: play a game to understand expectation, and show students what the expected value of a lottery ticket is.
9. Students choose their favourite of the 4 groups of lottery numbers and a discussion follows.

Thanks again for your help with this session! If you have any other questions, please ask the session leader.