

	National Lottery	<i>Lesson Plan</i>
Activity		<i>Notes</i>
1	<p>Background T: You are probably all familiar with the National Lottery, but let's check that we all understand how it works. <i>(Ps respond with details)</i></p> <p>T: What is the main difference between spending money on the National Lottery and buying Premium Bonds? <i>(NL: You lose your money if you don't have a winning line PB: You keep your stake money)</i></p> <p>T: What about investing in</p> <ul style="list-style-type: none"> • shares • a house. <p>Are these safe ways of making money?</p> <p>T: Let's go back to the National Lottery and see if we agree with their stated odds for winning.</p>	<p>T: Teacher P: Pupil</p> <p>Discussion firstly on how the NL works; secondly, on whether it is worth playing (and on gambling in general!).</p> <p>Clarification about differences between gambling (where you can lose ALL your money, and investment, where some money is almost certainly guaranteed to be safe).</p> <p>Copies of OS 1.1 given out.</p>
2	<p>Jackpot T: The National Lottery state odds of about 1 to 14 million for winning the jackpot, but is this correct? We will find out.</p> <p>T: How many possible ways are there of obtaining the six winning numbers? $(49 \times 48 \times 47 \times 46 \times 45 \times 44)$</p> <p>T: In how many ways can you order 6 numbers? $(6 \times 5 \times 4 \times 3 \times 2 \times 1)$</p> <p>T: So how many different lines are there?</p> $\left(\frac{49 \times 48 \times 47 \times 46 \times 45 \times 44}{6 \times 5 \times 4 \times 3 \times 2 \times 1} \right)$ <p style="text-align: center;">= 13983876)</p> <p>T: Are the odds stated for the National Lottery correct? <i>(Yes)</i></p> <p>T: So, how much would it cost to buy every possible line? $(£13983876)$</p> <p>T: Would you be guaranteed to win if you did this? <i>(No, as you do not know how many copies of the winning line will be sold)</i></p> <p>T: When is a good time to try this approach? <i>(When there is a triple rollover!)</i></p> <p>T: There have been many successful attempts at a lottery coup by buying lines for all the possible number combinations. An Australian gambler, Peter Mandral, has (quite legally) used this method to win on more than one occasion. His major coup was in the Virginian lottery, where the jackpot (because of rollovers) had reached \$27 million. For this lottery, the total number of possible different lines is ${}^{44}C_6 \approx 7$ million.</p>	<p>Show odds on OS1.1. Discuss how to approach this; depends on Ps knowledge of "C_r" notation.</p> <p>Discussion on the ethics and practicalities of this approach.</p>

	<p>He actually spent about 10 million dollars in obtaining the lines (manpower and laser printers for the tickets), and in fact only obtained 90% of those possible, since a couple of workers did not buy their allocated share – but it was enough to win, and make a substantial profit.</p>	
3	<p>Bonus</p> <p>T: After the Jackpot, the next prize is for obtaining 5 out of the six winning numbers, plus the bonus ball. How can we check the stated odds? <i>(Find (a) the number of ways of matching 5 out of 6; (b) the number of ways of matching 1 out of 1; (c) the number of successful tickets (d) the odds)</i></p>	<p>Discussion of method of approach; try to get individual/pairs of Ps working on this.</p>
4	<p>Guaranteed £10</p> <p>T: The stated odds for 3 out of 6 matching is 1 in 57. Can you verify this?</p> <p>T: So how many times would you expect to win over a year if you buy one line each time? <i>(It depends if you buy a line for both the Wednesday and Saturday lotteries or for just one of them)</i></p> $\left(104 \times \frac{1}{57} \approx 2\right)$	<p>This should be an individual exercise, with T checking, monitoring progress, etc. Review with whole class; let P explain to class.</p>
5	<p>Homework</p> <p>Set extended project work (see Worksheet 2) or checking that the odds for 4 out of 6 are correct.</p>	