

Investigation Guide A: Highest Number 1

This Investigation Guide assumes that you have first worked on the Task Card.

Now use the materials to help you investigate these questions:

1. Play 5 games. Keep your score for each game and then add these 5 scores to obtain a 'grand total'. Try to get the highest grand total.

2. Analysing the Game

Write down your answers to each of the following questions:

i) What is the highest possible score in a single game - and what are the main ways this might happen?

ii) What is the highest possible grand total after 5 games.

iii) What is the lowest possible score in a single game - and how might this happen? How often do you think it might happen?

iv) In each of these games a first move has been played and the dice roll for the second move is shown. What move would you make and why?

a) $\underline{\quad} \underline{3} \underline{\quad}$ Second roll is a 4

b) $\underline{\quad} \underline{\quad} \underline{2}$ Second roll is a 4

c) $\underline{\quad} \underline{\quad} \underline{4}$ Second roll is a 3

d) $\underline{\quad} \underline{5} \underline{\quad}$ Second roll is a 3

e) $\underline{\quad} \underline{2} \underline{\quad}$ Second roll is a 5

3. Testing Theories

i) Play each of the situations in 2 (iv) above 10 times and find a total score. Then play them 10 times with a different strategy. Do the results support your choices of each move?

ii) Work out what might happen in each case and what average scores you can expect. Eg: In game (a), if you place the 4 in the ones column, then the scores you could get are 134, 234, 534 or 634. What could you expect on average? The alternative would be to place the 4 in the hundreds column. Then the results could be 431, 432, 435 or 436. What score do these produce 'on average'?

4. Computer Simulation

If a computer simulation is available:

i) use it to play several games

ii) analyse the moves the computer is making and say if you agree with all of these

iii) explore various strategies and find evidence of which strategies seem to be the best.