Maths Week/ Wiki Pāngarau 2025

Survivor Series/Kia Mōrehurehu

Day 5 Set E

For students

What to do for students

1 **You can work with one or two others. Teams can be different each day.**

2 **Do the tasks and write any working you did, along with your answers, in your maths book.**

3 **Your teacher will tell you how you can get the answers to the questions and/or have your work checked.**

4 **When you have finished each day, your teacher will give you a word or words from a proverb. You could ask your teacher to explain what a proverb is.**

5 **At the end of the week, put the words together in the right order and you will be able to find the complete proverb! Your teacher may ask you to explain what the proverb means.**

6 **Good luck.**

THINKING STRATEGICALLY

Work in a group of 2 - 4 players. Each group needs three six-sided dice.

Task 1

You will play a game three times. You may use an online dice roller if necessary (search 'dice roller' online).

Instructions:

- To play the game, roll the three dice, and find the sum of all three dice (your **score**).
- If the sum of your dice is 13, your score is 0 for that round (unlucky for some!).
- Record each player's scores using the table below (or your teacher may print one for you).
- Play one game of 10 rounds and find the total score for the 10 rounds for each player.
- The player with the highest total score wins.

Play 10 rounds and record the winning sum each time in the following table.

Player	Score (each round)										Total Score
	1	2	3	4	5	6	7	8	9	10	

Question 1

(a) How many times in your group was the score 0?

(b) If you were to play the game again, how often do you think would there be a score of 0?

(c) Based on your results, what sum(s) for the three dice do you think come up most often?

Task 2

The rules are changed so that a sum that is likely to occur most frequently gives a score of 0 (and a sum of 13 gives a score of 13).

Question 1

(a) What sum would you suggest be made to give the score 0?
(b) Why do you suggest that?

Note your new sum for a score of 0 on the top of another new result sheet.

Play the game again for 10 rounds, using your new sum to score 0, and record the results on the new game result sheet.

Play 10 rounds and record the winning sum each time in the following table.

Player	**Score (each round)**										**Total Score**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	

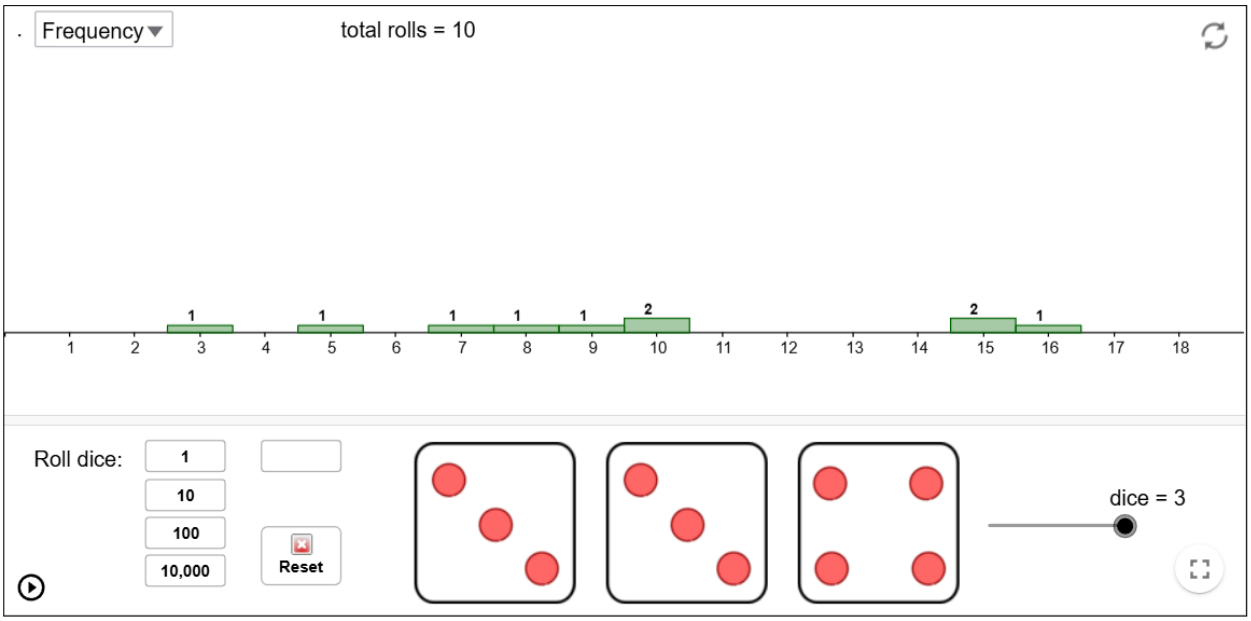
Question 2

(a) Did the score 0 happen most frequently in the game?
(b) If you had to choose the sum that results in a score of 0 now, would you keep the one you chose before you played the game or would you change it?
(c) Explain your reasoning for your answer to (b)
(d) Which sum(s) occurred most often? Is this the same as your answer about which sum occurred most often in the game in Task 1?

Task 3

You could continue playing the game to generate many sums, but that would take a while. One way to do many trials (repeated rolls of three dice) is to use a software tool to simulate throwing the dice many times. We are going to explore the game using Geogebra to do a large number of trials.

Open the Geogebra page found at https://www.geogebra.org/m/UsoH4eNl



Click on the dice slider in the sampler (bottom right-hand corner) and drag it to the right so it says 'dice=3'.

Press the play icon (bottom left-hand corner) and watch as the simulator slowly builds up your frequency distribution.

Press 'Pause' when it gets close to 100 rolls. You can roll the dice a single time using the 'Roll dice' button marked 1 (left hand side).

Question 1

(a) After 100 rolls, which sum is the most common?

(b) Is this the sum you expected? Why do you think this is?

Task Four

You can use the 100 button and press this repeatedly to quickly get to 1000 rolls. Notice how the distribution has become more evenly spread around the most common sum(s).

By now you should be able to see which sum is the most likely to occur. **Make a note of this sum.**

You can quickly add another 10 000 rolls by using the 10 000 button. After each addition of 10 000 rolls check to see if the most likely sum has stayed the same or changed.

Stop after 100 000 rolls and answer the final questions below.

Question 1

(a) After 1 000 rolls what was the most likely sum?

(b) What did you notice happening to the most common sum after adding another 10 000 rolls?

(c) Why do you think this happened?