3.8 Lesson 8 Relative frequency with Grim dice

Consider a game in which two players roll a single Grim dice each. The player with the highest score wins. Let us investigate the probabilities behind this game.

1. Pick a red and a blue die. Why are these dice different to normal?

   Which one would beat the other? Why?

   How would you find out which is better? (to repeat/frequency)

   How will you keep score? (to tally)

2. Battle one Red die and one Blue die 20 times and keep score. Which die do you think has a highest chance to win?

Red die wins	
Blue die wins	

   How can you be sure?

3. Write down a definition of *relative frequency of an event* (to occur / divided by / trials)

   Write down your relative frequencies for blue winning and for red winning

4. Roll both dice for 3 more minutes and record your results. (You can take into account the 20 previous rolls). Total trials =

Red die wins	
Blue die wins	

5. What is your group's relative frequency for blue winning? for red winning?

6. Share results with class and write down relative frequency for all trials done by class of blue winning and red winning

Let us add a new twist to the game :

Each players picks two dice of the same color. The one that rolls the highest total wins.

7. Roll 2 blue dice. What are the possible totals of the two dice?

8. Roll 2 red dice. What are the possible totals of the two dice?

9. Battle two red dice and two blue dice 20 times, then 3 minutes and keep score.

Double Red dice wins	
Double Blue dice wins	
Total trials	

10. Write down your group's relative frequencies of double blue dice winning and of double red dice winning

11. Share results with class and write down relative frequency for all trials done by class of double blue winning and double red winning :

12. For the remaining time, repeat trials (3 min for each case) with single then double Red vs Olive dice, as well as for single and double Blue vs Olive dice. What do you notice ?

Single Red die wins	
Single Olive die wins	
Total trials	

Single Blue die wins	
Single Olive die wins	
Total trials	

Double Red dice wins	
Double Olive dice wins	
Total trials	

Double Blue dice wins	
Double Olive dice wins	
Total trials	