## 2.9 Lesson 9 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.

| | |
|---|---|
| Red Die | |
| Blue Die | |

   Why do you have different numbers of wins?

   .....

   Which do you think is a better die (highest chance to win)?

   .....

   How can we be sure?

   .....

3) The relative frequency of an event is the number of times that the event occurs during experimental trials (absolute frequency), divided by the total number of trials conducted. Write down your relative frequencies for blue winning .....and for red dice winning .....

4) Roll the dice for 3 more minutes and record your results.

| | |
|---|---|
| Red die wins | |
| Blue die wins | |

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

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

6) Repeat with Red and olive dice.

   a) Which do you think is better? (Before rolling) .....

   b) Experiment : repeat trials for 3 min : Red wins : ..... Olive wins : .....

   c) Find relative frequency for olive win and red win .....

   d) Share results with class and write down relative frequency for all trials doneby class of blue winning and red winning .....

7) Repeat with the Blue and Olive dice.

8) Conclusion

Let us investigate **relative frequencies** for a new twist to the game :

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

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

.....

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

.....

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

| | | |
|---|---|---|
| Wins total of double red dice | | (classmates) |
| Wins total of double blue dice | (classmates) | |

Write down your relative frequencies of double blue dice winning .....

and your relative frequency of double red dice winning .....

Share results with class and write down relative frequency for all trials of the events :

double blue dice winning ..... and double red dice winning .....

4) Repeat with two red duce abd two olive dice (20 rolls + 3 minutes):

| | | |
|---|---|---|
| Wins total of double red dice | | (classmates) |
| Wins total of double olive dice | | (classmates) |

Share results with class and write down relative frequency for all trials of the events :

double olive dice winning ..... and double red dice winning .....

5) Repeat with two blue duce abd two olive dice (20 rolls + 3 minutes):

| | | |
|---|---|---|
| Wins total of double olive dice | | (classmates) |
| Wins total of double blue dice | | (classmates) |

Share results with class and write down relative frequency for all trials of the events :

double olive dice winning ..... and double blue dice winning .....

6) Conclusion