

7-9: REMOTE MATHS

EDITION 2

CHANCE - LIKELIHOOD OF EVENTS

Mathematical language: Outcome, equally likely, chance, event, frequency, probability.

TASK 1: EXPERIMENTAL PROBABILITY

For this task you will be conducting a series of experiments. Before commencing the experiments you will need to collect the following materials.

Materials needed: Paper cup, matchbox, ruler, bottle top

Your task: For each of the experiments you will need to complete the following steps.

- Before the experiment, record a prediction of the outcome after 30 trials.
- Perform each task 30 times, observe and record your results.
- Calculate the probability for each task (paper cups example below)

$$\Pr(\text{cup lands up}) = \frac{\text{frequency of cup up}}{\text{total number of outcomes}} = \frac{\text{frequency of cup up}}{30}$$

Experiment 1 is detailed below, for the full list of experiments download the accompanying [Experimental Probability worksheet](#).

Experiment 1 – Paper Cups

Possible outcomes are pictured. Complete your prediction and record your observations in the table below.



	Prediction	Observation		
Outcome	Frequency	Tally	Frequency	Probability
Landing up				
Landing down				
Landing on side				

EDITION 2: LIKELIHOOD OF EVENTS (CONT.)

TASK 2: REPRESENTING PROBABILITIES DIAGRAMMATICALLY

During isolation your school has informed you that you will still be attending classes online 5 days a week and your timetable will continue as per schedule. However, you won't be expected to wear school uniform YAY! You have decided on comfortable casual outfits. You have 2 trackie pants (one black and one blue) to choose from and 5 tops to choose from. As the weather is starting to cool you have chosen 3 T-shirts (one red, one white and one blue) and 2 windcheaters (one green and one orange)

- Draw a tree diagram to show all possible combinations of outfits. Start with the pants on the first set of branches.
- How many possible different outfits do you have? List all the possible outfits.
- Assign a probability (as a fraction) over each branch of your tree diagram
- Work out the probability of each outfit. What is the probability that you chose to wear the black tracksuit pants with the red T- shirt?

TASK 3: DICE DIFFERENCES

This task is a game where you will play against one other opponent. You can choose to play against someone at home or virtually with another student in your class.

Materials needed: two dice per pair. One 6 sided die per player.

Game: Player A and Player B both roll a die at the same time.

Player A wins if the difference between the two numbers rolled is 0, 1 or 2.

Player B wins if the difference between the two numbers is 3, 4, or 5.

Play this game 10 times using 2 dice and record your results in the table.

Reflections:

- What if you were to play the game 20 times? Does this change your results?
- Is this game fair?
- Give detailed reasons to back up your answer.

To explore this further download the accompanying [Dice Differences worksheet](#).

Player	Tally of wins	Total wins
Player A. (Difference between the numbers rolled 0, 1, or 2)		
Player B. (Difference between the numbers rolled 3, 4 or 5)		

ADDITION

Mathematical language: Sum, lowest common multiple, greatest common divisor, integer, multiple, factor, numerator, denominator, product.

TASK 1: YOU ARE A FRACTION ADDING MACHINE *Task adapted from Nrich.*

- Can you find the sum of these fractions *without* using a calculator?

$$\frac{1}{7} + \frac{1}{8} + \frac{1}{9} + \frac{1}{10} + \frac{1}{12} + \frac{1}{14} + \frac{1}{15} + \frac{1}{18} + \frac{1}{22} + \frac{1}{24} + \frac{1}{28} + \frac{1}{33}$$

TASK 2: EXCEL-LENT EXCEL

MS Excel is such a powerful tool! In this task we will play around with it and create a file that will help you with your maths homework forever! Excel has two useful functions for work with fractions: LCM & GCD.

- =LCM(number1, number2, ...) gives the Lowest Common Multiple of a set of integers, that is the smallest positive integer that is a multiple of all integer arguments number1, number2, and so on.
- =GCD(number1, number2, ...) gives the Greatest Common Divisor, that is the largest integer that is a factor of all the listed numbers.
- Create a file that adds any two fractions you enter and then simplifies the result. Hint: Use one cell for the numerator and another for the denominator.
- For example, you want your Excel file to be able to do the following steps for any two fractions you begin with:

$$\frac{1}{3} + \frac{2}{4} = \frac{4+6}{12} = \frac{10}{12} = \frac{5}{6}$$

Enabling prompt: The LCM gives the new denominator for adding or subtracting fractions with different denominators. GCD finds the common factor required to reduce a fraction to its simplest form.

$\frac{6}{9}$ becomes $\frac{2}{3}$ because 6 and 9 both contain a factor of 3.

TASK 3: ABABABA

- If a is a positive integer, and b is a negative integer, which of the following is the greatest:

$a + b$

$a - b$

$b + a$

$b - a$

$-a - b$

$-b - a$

EDITION 2: ADDITION (CONT.)

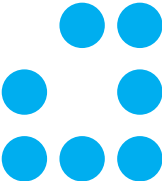
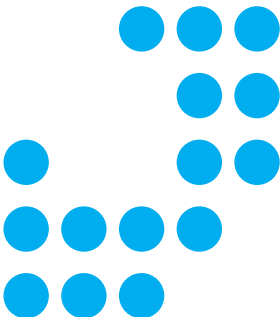
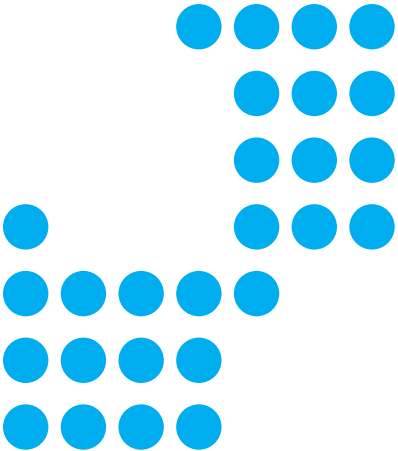
TASK 4: THE PRODUCT GAME *Source: National Council of Teachers of Mathematics*

The Product Game is a two-player game that can be played against a computer or another person.

- Go online to play: www.nctm.org/Classroom-Resources/Illuminations/Interactives/Product-Game/
- **Extending prompt:** Create your own board game version of this. Can you add more factors to the bottom list? How would that affect your numbers in the playing board illustrated on the website or the one you created?

TASK 5: NIGHT EYES *Source: When Math Happens*

- Go to <https://whenmathhappens.com/2017/03/14/night-eyes/> and follow the steps and questions in order. Do not skip ahead.
- **Extending prompt:** How many circles would the 4th term have? What about the n th?

1	2	3	4	n
				

Look out for more tasks next week!