

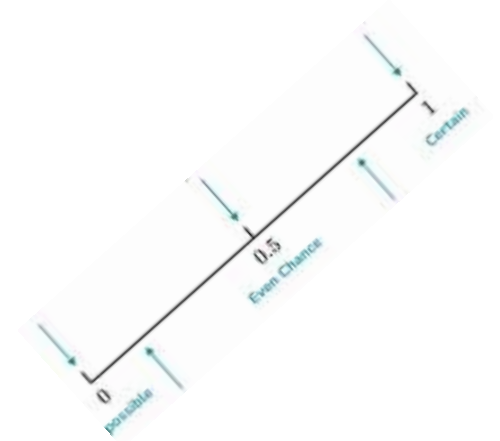
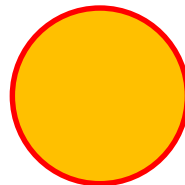


# THEME: DATA AND PROBABILITY



## TOPIC: PROBABILITY

KAZIBA STEPHEN



14th January 2025

# LEARNING OUTCOMES



- The learner should be able to determine probabilities from experiments and real-life data
- differentiate between theoretical and experimental probabilities

# Experiment Probability

- **Experimental probability** is the probability of an event happening based on an experiment or observation.

# Activity

Solange tossed a cylinder 24 times and recorded whether it landed on one of its bases or on its side. Based on Solange's experiment, which way is the cylinder more likely to land?

Outcome	On a base	On its side
Frequency		

# Activity

Solomon spun the spinner several times and recorded the results in the table

Color	Red	Black	Yellow	Green	Orange
Frequency	5	3	2	3	7

## Task

1. Find the experimental probability that the spinner will land on black
2. Find the probability that the spinner will land on red
3. Based on the experiment ,on which color will the spinner most likely land?

# Activity

A spinner has four sections lettered A, B, C, and D. The table shows the results of several spins. Find the experimental probability of spinning each letter as a fraction in simplest form, a decimal, and a percent

Letter	A	B	C	D
Frequency	14	7	11	8

# Activity

The names of the students in Mr. Justus' math class are written on the board. Mr. Justus writes each name on an index card and shuffles the cards. Each day he randomly draws a card, and the chosen student explains a math problem at the board. What is the probability that Ryan is chosen today? What is the probability that Ryan is not chosen today?



Anna	Alisha	Kenna	Bridget
Meghan	Cody	Parker	Grace
Michael	Gabe	Taylor	Joel
Kate	Kaylee	Shaw	Tessa
Jon	Ryan	Morgan	Leo

# Activity

A dentist has 400 male and female patients that range in ages from 10 years old to 50 years old and up as shown in the table. What is the experimental probability that the next patient will be female and in the age range 22–39?

	Range: 10–21	Range: 22–39	Range: 40–50	Range: 50+
Male	44	66	32	53
Female	36	50	45	74



# Activity

Nike conducted a test on 500 pairs of their sneakers. They found nothing wrong with 490 pairs. What is the probability that a pair of sneakers selected have nothing wrong?

# Activity

- Thirty students are asked to choose their favourite subject out of Maths, English and Art. The results are shown in the table below:



# ASSIGNMENT

# Activity: Bottle Top Toss Experiment: Which Side Lands More Often?

## **Materials:**

- 1 bottle top (e.g., from a soda or water bottle)
- A flat surface
- Pen and paper to record results

# Procedures

1. Toss the bottle top 20 times onto a flat surface.
2. Record the outcome for each toss:
  - o If the bottle top lands on its open side (up), record it under "Open Side".
  - o If the bottle top lands on its closed side (down), record it under "Closed Side".
3. Count and record the frequency of each outcome.

Data Table:

Outcome	Open Side (Up)	Closed Side (Down)
Frequency		

# Tasks

- Calculate the experimental probability for each outcome
- Compare the probabilities to determine which side the bottle top is more likely to land on.
- Draw conclusions based on the calculated probabilities and discuss any factors (e.g., shape, weight distribution) that might influence the outcomes.

## Experimental Probability vs. Theoretical Probability

**Experimental Probability** is found by repeating an experiment and observing the outcomes.

$$P(\text{event}) = \frac{\text{number of times event occurs}}{\text{total number of trials}}$$

**Example:**

A coin is tossed 10 times:  
A head is recorded 7 times  
and a tail 3 times.

$$P(\text{head}) = \frac{7}{10}$$

$$P(\text{tail}) = \frac{3}{10}$$

**Theoretical Probability** is what is expected to happen based on mathematics

$$P(\text{event}) = \frac{\text{number of favorable outcomes}}{\text{total number of possible outcomes}}$$

**Example:**

A coin is tossed.

$$P(\text{head}) = \frac{1}{2}$$

$$P(\text{tail}) = \frac{1}{2}$$



# THEORETICAL PROBABILITIES



# Activity

A bag contains 10 red marbles, 8 blue marbles and 2 yellow marbles. Find the theoretical probability of getting a blue marble.

# Activity

Of the first 100 positive integers ----- are prime ,-----are factors of 100 ,and -----  
---- are neither prime nor a factor of 100. Enter this information into a Venn diagram

What is the probability that a number is

- a) Not prime
- b) Both prime and a factor of 100
- c) A factor of 100 but not prime

## Activity

Three fair coins are tossed simultaneously.

- (a) Write down its sample space
- (b) Find the probability of obtaining:
  - (i) exactly two heads
  - (ii) at least two heads

# Activity

A two digit number is formed using the digits 4, 6 and 7 without repeating any digit in the number formed.

(a) Write down the possibility space for the numbers formed

(b) Find the probability that the number formed is:

(i) even

(ii) more than 65



# Exercise

1. . A letter is chosen from the word “**MISCELLANEOUS**”. Find the probability that it will be:
  - (i) an **S**
  - (ii) a vowel
  - (iii) a consonant
  
2. Two fair dice are thrown together. Find the probability that the product of the scores is
  - (i) twelve
  - (ii) four