SAMPLE LESSON: MATHEMATICS

Class: Form 2

Title of Module: Elementary Statistics and Probability	**Title of Chapter:** Probability
Title of Lesson: Probability of an event	**Duration of Lesson:** *55 minutes*

SCHOOL: **TTP COP**; **TERM**: **2nd** ; **DATE** ----------

Class: Form 2; **Number on Roll**: _____; **Girl**s: _____; **Boys**: _____

Module: Elementary Statistics and Probability

Topic: Probability

Lesson 3: Probability of an event

Duration: 55mins

Objectives:

Be able to:

- Calculate Simple Probability of an event happening using equally likely events or experiment;

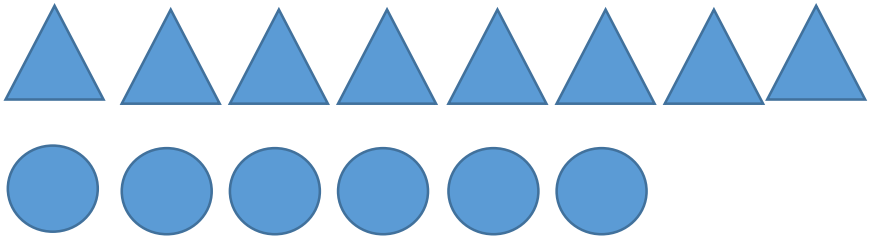
Pre-requisite knowledge:

- Master some vocabularies (Probability, events, impossible events, Certain, Likely, Unlikely, fair, bias, Outcome, sample space, equally likely).
- Can list all possible outcomes (sample space) for a given event;
- Can say whether events have equal chances or not.
- Can place events on the probability scale

Preparation for the 3 lessons on probability for this class:

1. Games prepared (If you intend to use a game)
2. Gather Materials such as:

Coins of 50frs and 100frs As many as you can provide. (If your students are not to be trusted, tell them the day before that they will need coins during the next lesson. They will therefore bring)	 
Dice Bring dice according to number of groups	  
Buttons of different colours. Buy buttons of different colours. Make small bags and put them in before coming to class. These can be used for different activities over the years	

Cut shapes such as these	
Create spinners from manilla papers and colour the sectors or number them	 
Photocopy Worksheets according to intended number of groups	

3. Read through lesson plan and print out if necessary
4. Type and print out problem situation OR write out on cardboard paper (large characters) that will be pested on the wall for all to see.

References:

1. https://www.bing.com/search?q=spinner+for+games&form=EDNTHT&mkt=en-us&httpsmsn=1&refig=e7060f073dc1451dbcbaa690e12e2ec2&sp=2&qs=HS&pq=sp&sk=HS1&sc=8-2&cvid=e7060f073dc1451dbcbaa690e12e2ec2&cc=US&setlang=en-US
2. https://www.onlinemathlearning.com/probability-of-an-event.html
3. https://www.mathsisfun.com/probability_line.html
4. Modular Mathematics for GCSE, *Brain Gaulter and Leslye Buchanan,* (1994) Oxford University Press
5. Mathematics 7, Nelson Thornes (2003)
6. Ordinary Level Mathematics, Piankeh Albert, (2011), Mbosso Publishers Bamenda

Stages / Duration	Teaching / Learning Activities		Learning Points	Observations
	Teacher's Activities	**Learners' activities**		
Introduction 10 mins	***Today we are going to continue with our lesson on probability. We will start by revising some few concepts of the last lesson. Read out to them.*** **Revision of Pre-requisite:** 1) List the sample space for the event of rolling a dice. 2) A bag contains 8 blue and 3 white buttons all identical. Which of the statements is true? a) It is impossible to pick at random a red button form the bag. b)It is more likely to pick out a white button	Get to order for the lesson Read the questions, discuss and respond to questions by show of hand	Revise notions taught in the first lesson. 1.Sample Space {1,2,3,4,5,6} 2. a)True. It is impossible because there is no red button in the bag b)False because there are fewer white buttons in the bag so, it is rather less likely to pick out a white button.	Pay attention to students' spoken language and correct them immediately
	Problem Situation Mbi has a dice and says that if she rolls the dice there is a 1 in 2 chance that it will give an even number. Is Mbi right? 1. What fraction is 1 in 2? 2. What is the Sample space when a dice is rolled? 3. How many elements are in the Sample space? 4. How many of these elements are even numbers?	A student volunteers to read out the problem situation to others.	Mbi has a dice and says that if she rolls the dice there is a 1 in 2 chance it will give an even number. Is Mbi right? 1.1 in 2 as a fraction is $\mathbf{\frac{1}{2}}$ **2.**The sample space is {1,2, 3, 4, 5, 6} 3. There are 6 elements in the sample space. 4. The even numbers in the sample space are 2, 4 and 6. There are 3 elements in the sample space. 5. the fraction is $\frac{3}{6} = \frac{1}{2}$	

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	5. What is the fraction of the number of even numbers to the total number of elements in the sample space? 6. So is Mbi correct? 7.What will be the chance of getting a 3 8. What will be the chance of getting a number greater than 4? 9. What will be the chance of getting a number between 0 and 7? 10. What will be the chance of getting 8? ***Wrap - Up*** The values 1 in 2, ; 1 in 6; 2 in 6 etc, are the possibility of each of those event happening and gives the probability of that event. **Probability of an event** ***Do at least 2 examples with them and move to 4 depending on how they easily grasp the concept*** **Examples** 1.The event of tossing a coin. a. What is the sample space for tossing a coin? b. How many possible outcomes are in the sample space for tossing a coin?	Learners move up to the board and write out their answers and verbally justify. Learners do exercises in their books	6. Yes Mbi is right. 7. What will be the chance of getting a 3? **1 in 6**. 8. What will be the chance of getting a number greater than 4? **2 in 6** 9. The chance of getting a number between 0 and 7? **1** 10. What will be the chance of getting 8? **0** ***Wrap - Up*** The values 1 in 2, ; 1 in 6; 2 in 6 etc, are the possibility of each of those event happening and gives the probability of that event. **Probability of a simple event** a. Sample space for tossing s coin: {Head; Tail} b. There are 2 possible outcomes. c. 1 possibility show a head. d. 1 possibility shows a tail e. The probability of having a head is "1 out of 2 possibilities" written ½ f. Equally the probability of having a tail is "1 out of 2 possibilities" written $\frac{1}{2}$ or 50% or 0.5 We can therefore write: P(Head) = $\frac{1}{2}$; P(Tail) = $\frac{1}{2}$	Encourage learners to speak mathematically. Teacher listens to students discussing and corrects their

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	c. How many possibilities show a head? d. How many possibilities show a tail? e. What is the probability of having a head at a toss of a fair coin? f. What is the probability of having a tail at a toss of a fair coin? From the problem situation Mbi says if she rolls the dice there is a 1 in 2 chance that it will give an even number. 1 in 2 chance is the probability of getting an even umber when a dice is rolled and is written as a fraction as $\frac{1}{2}$. As will be seen in activity 2. **2. Rolling a fair dice**. a) List all the possible outcomes of this event. b) Give the sample space of this event and say how many elements are in the sample space.	Learners are allowed to discuss their answers to the exercises with their peers. Learners volunteer to share their thoughts and reasoning with peers	Which is read as: the probability of having a head is $\frac{1}{2}$. **2. Rolling a fair dice.** A **fair** die is an unbiased die where each of the six numbers is **equally likely** to turn up. a) The possible outcomes of rolling a dice are 1, 2, 3, 4, 5, 6. b) The Sample Space S = {1, 2, 3, 4, 5, 6}. There are 6 elements in the sample space. c) The even numbers are 2, 4, 6. So there are 3. d) The probability of having an even number is: $\frac{3}{6} = \frac{1}{2}$	spoken language while encouraging then to use appropriate terminologies.

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	c) How many of these elements of the sample space are even numbers. d) Calculate the probability of having an even number. e) Calculate the probability of having a number greater than 4. f) Calculate the probability of having the number 5. g) Find the probability of having a number greater than 6. h) Find the probability of having a number less than 7		e) The numbers greater than 4 are 5 and 6 so there are 2. Probability of having a number greater than 2 is: $\frac{2}{6} = \frac{1}{3}$ f) Let *A* = event of getting the number 5 = {5} Let n(*A*) = number of outcomes in event *A* = 1 n(*S*) = number of outcomes in *S* = 6 P(5) = $\frac{1}{6}$. g) Let *C* = event of getting a number greater than 6. There is no number greater than 6 in the sample space *S*. *C* ={} $P(C) = \frac{0}{6} = 0$ A probability of **0** means the event will **never** occur. h) Let *D* = event of getting a number less than 7 Numbers less than 7 = {1, 2, 3, 4, 5, 6} $P(D) = \frac{6}{6} = 1$ A probability of **1** means the event will **always** occur.	Give learners some time to think.

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	3) Ruth spun the spinner  a)The list of all the possible outcomes will be? b) How many elements are in the sample space c)Find the probability that the arrow will stop on yellow. 4) Jack is to spin the spinner below:  a)List all the possible outcomes (numbers) on where the arrow will land.		3) a)The possible outcomes are: blue, red, orange, yellow, green, white b)There are 12 elements in the Sample space c)The probability that the arrow will stop on yellow is: $\frac{2}{12} = \frac{1}{6}$ 4) a)Possible outcomes are: 0, 1, 2, 3, 4, 5,6, 7, 8, 9. There are 10 possibilities. b)The probability that the arrow will point on a multiple of 3. There are 3 multiples of 3 namely: 3, 6 , 9 The probability will be: $\frac{3}{10}$ c)The odd numbers are 1, 3, 5, 7, 9 The probability will be: $\frac{5}{10} = \frac{1}{2}$ **Wrap-UP** Probability is expressed as a number somewhere between 0 (not going to happen or impossible) and 1 (definitely going to happen or certain), with ratios closer to 1 being most likely and ratios close to zero being less likely to happen.	Help Students to determine probability from experiments and real life situations

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	b) Find the probability that the arrow will point on a multiple of 3. c) Find the probability that the arrow will point on an odd number. **Wrap - Up** Probability is expressed as a number somewhere between 0 (not going to happen or impossible) and 1 (definitely going to happen or certain), with ratios closer to 1 being most likely and ratios close to zero being less likely to happen. The probability of an event that is Certain is 1. The probability of an event that is Impossible is 0. The probability of all other events are between 0 and 1 **Examples:** 1. The next time you roll a die you will have a 9. 2. The triangle John will draw will have 3 sides. 3. My friend Mary who is pregnant will have a baby boy.		Probability is the ratio of the times an event is likely to occur divided by the total number of possible events. **Probability**: the likelihood of an event occurring P(an Event) = $\frac{number\ of\ desired\ outcome}{number\ of\ possible\ outcomes}$ The probability of an event that is Certain is 1. The probability of an event that is Impossible is 0. The probability of all other events are between 0 and 1 Example: 1.Impossible you cannot roll a die and have a 9, so the probability is 0. 2.This is Certain because all triangles have 3 sides and if what John draws is a triangle, it has 3 sides. So the probability is 1. 3.Having a boy or a girl is a 50/50 chance so the probability is ½ Probability can also be expressed as percentage or a decimal.	

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			If the probability of an event is $\frac{1}{2}$ then it could also be said that the probability is 0.5 or 50%.	
Probability in real life. **Some real life applications of probability**	***Start here by asking learners to give some real life situations where probability is used and say how. Then go ahead and give them the exercise.*** Probability in real life. Answer the questions that follow: 1. Let's say you are playing a coin-tossing game with a friend. You toss the same coin 50 times, and 40 times it comes up heads. Would this be normal? What could explain it? 2. Someone hands you a standard deck of 52 cards. There are four queens. What is the likelihood that you will draw a queen from the deck the first try? 3. In the first week of school in September, the Maths teacher was late on 1 Monday out of 4. What is the probability that he will be early this Monday? **Wrap-UP** ***Say this and allow them copy the learning points in their books.***		1. No, it would not be normal. Most likely, either a trick is being played or there is something wrong with the coin. 2. 4/52 3. The Maths teacher was late 1 out of 4 Mondays and early 3 out of 4 Mondays. The probability of being early this Monday is $\frac{3}{4}$ **Wrap-Up** The term **probability** is frequently **used** in **everyday life** such as **probability** of rain, **probability** of passing the entrance examination,	Be attentive to learners spoken and written language and correct them throughout the lesson

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	In addition to being used for predicting potential outcomes for things like weather forecast and political elections, probability is used in several different professional fields. Public health workers can use probability to warn a high-risk population about the danger of contracting an illness such as ebola, cancer etc. Other fields can use probability in different ways to communicate risk or benefit to clients or the general public, and probability can also be used to help people in non-public –facing professions such as farming and ranching. The insurance company uses probability based on demographic information such as age and gender to set premiums for their customers.		**probability** of winning lottery, probability of winning PMUC. Probability is used in surveying, including political and presidential polling or elections. Sometimes we use probability knowingly or unknowingly. -**Weather forecasting:** The meteorological department makes use of the concept of probability for their work. -**Sports:** be it basketball or football or cricket a coin is tossed for captains to see which side starts. More so, both teams have 50/50 chances of winning the match. Athletes and coaches use probability to determine the best sports strategies for games and competitions. **-Health**: Public health workers use probability to warn high-risk population about the danger of contracting an illness or a condition such as cancer, HIV, Ebola, cholera etc. **Farmer**: Farmers use probability to decide on when to plant, what type of seed or seedling to use, what type of fertilizers etc to use. Buy and Selling: A small business person uses probability to decide on what to buy and sell and where to buy and where to sell.	

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Home work	**Copy the home work** 1. Manyui puts 5 purple beads and 1 yellow beads in a bag. Manyui takes a bead without looking. a) Calculate the probability of getting a purple bead. b) Find the probability of getting a yellow bead. 2. The blood groups of 200 people is distributed as follows: 50 have type **A** blood, 65 have **B** blood type, 70 have **O** blood type and 15 have type **AB** blood. A person from this group is selected at random. Find the probability that the person has blood group type A. 3. A card is drawn at random from a deck of cards. Find a) the probability of getting a queen. B) the probability of having a 4 of diamond		a) Probability of getting a purple bead. Total number of beads 5+1 = 6 Number of purple beads 5 Probability (Purple) = $\frac{5}{6}$ b) Probability of yellow bead. Total number of beads 6 Number of yellow beads 1 Probability (Yellow) = $\frac{1}{6}$ 2.Probability of blood group A. n(S) = 200 N(A) = 50 P(a) = $\frac{n(A)}{n(S)} = \frac{50}{200} = \frac{1}{4} = 25\% = 0.25$ 3.a)n(S0 = 52, n(Queen) = 4 P(Queen) = $\frac{4}{52} = \frac{1}{13}$ b) Let E be the event "4 of Diamond". Therefore n(E) = 1. The probability of getting a 4 of diamond is 1 out of 52.	