SUBJECT and GRADE	MATHEMATICAL LITERACY GRADE 12	
TERM 3	*Week 3*	
TOPIC	PROBABILITY	
AIMS OF LESSON	UNDERSTANDING: Probability and specifically any interpretations and calculations involving scenarios involving probability. You should be able to see how probability applies in data tables, graphs and any possible way where it could be applied. You need to be able to do the following: Explore probability in scenarios that involve: • Games with coins & dice • Weather predictions Work with expressions of probability in that you: • Understand the difference between the terms: outcome and event. • Recognise that probability can be expressed using a scale. Understand that probability can be expressed in one of three ways: • Fraction • Decimal • Percentage Understand the difference between: • Theoretical Probability • Relative frequency (Experimental probability) Representing possible outcomes of events by using: • Tree diagrams • Two-way tables	    
RESOURCES	***Paper based resources***	***Digital resources***
	In your textbook look for the topic PROBABILITY. This should provide you with examples of the types of scenarios, the expression of probability, the important terms used in probability as well as how to represent and interpret situations with probability.	https://www.youtube.com/watch?v=mkDzmI7YOx0 https://www.youtube.com/watch?v=KzfWUEJjG18 https://www.youtube.com/watch?v=7uOPSxrvguo

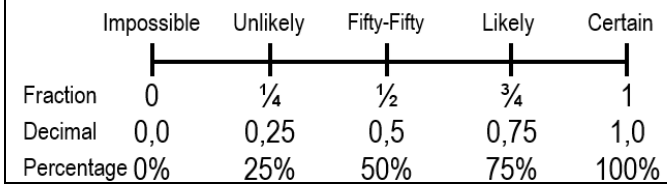
INTRODUCTION	Calculations involving probability are often confined to **mathematical calculations** primarily in the context of dice, coins and games. Although we may encounter situations involving probability and chance on a regular basis in daily life, it is very seldom that mathematical calculations are needed in order to make sense of those situations. E.g. **you don't need to be able to calculate the probability of winning a lottery to know that even though there is a chance of winning, that chance is very small.** What is more important, is understanding the concept of probability, together with a sense of whether an event is more- or less likely to take place.
CONCEPTS AND SKILLS	For probability you need to have the following skills: • Simplifying fractions • Basic percentage calculations • Conversions between fractions, percentages and decimal numbers. • Interpreting data tables
ACTIVITIES/ ASSESSMENT	• The material consists of the lesson plan, with Notes and examples to work through. • Study the examples to guide you to do the activities. • Break up the activities to be done over the week.
CONSOLIDATION	• Supplement activities with activities in your textbook. • It is important to study previous papers to see questions that relates to the topic done now. By doing this, you will get a feeling of how questions could be posed in the end-of-year-examination. • Thank you for showing your first step of independent working. Please consult with your class friends and continue to motivate each other.
VALUES	Use your knowledge of probability to explain to others how to determine the likelihood of an event occurring and how probability influences our daily lives, especially when it comes to any financial decisions that an adult sometimes have to make.
HOW TO DEAL WITH THIS TOPIC:	Please try to do all activities without looking at the answers. Answers are supplied to check your workings.
RESOURCES	*Mind the Gap; Via Africa Study Guide; MATHEMATICAL LITERACY REVISION BOOKLET DBE; NSC Papers*
TERMINOLOGY	○ Certain – It will definitely happen ○ Very likely – It has a much greater chance of happening ○ Frequency - The number of times that something happens ○ Random - When something happens without being made to happen on purpose. ○ Trial - A test. Throwing a dice and tossing a coin are examples of a trial. ○ Fair - Treated equally, without having an advantage or disadvantage. ○ Theoretical probability - The calculated probability, not the actual result.

EXAMPLES AND EXERCISES	1.

The Probability Scale:

Probability can be expressed in 3 ways:

- Common Fraction
- Decimal
- Percentage



Fraction	0	¼	½	¾	1
Decimal	0,0	0,25	0,5	0,75	1,0
Percentage	0%	25%	50%	75%	100%

Decide where on the probability scale the following experiments would fall:

1.1 Flipping a coin.

1.2 Oranges growing on a banana tree.

1.3 The sun sets in the evening.

1.4 Choosing a red ball in a bag with 2 white balls and 6 red balls.

2.

The Probability formula:

$$\textbf{Probability} = \frac{\textbf{Number of favourable outcomes}}{\textbf{Total number of possible outcomes}}$$

A private game reserve records the following number of animals: 236 springboks, 14 elephants, 2 rhinos and 37 zebras. Calculate the probability using the formula to determine the first animal to be spotted is…

2.1 a rhino

2.2 a zebra

2.3 a giraffe

2.4 not a springbok

3.

Two-way(Contingency) tables

John rolls two six-sided dice simultaneously. He draws the two-way table to show the possible outcomes. Study the table and answer the questions that follow:

		Score on first dice					
		6	5	4	3	2	1
Score on 2nd dice	6	6:6	5:6	4:6	3:6	2:6	1:6
	5	6:5	5:5	4:5	3:5	2:5	1:5
	4	6:4	5:4	4:4	3:4	2:4	1:4
	3	6:3	5:3	4:3	3:3	2:3	1:3
	2	6:2	5:2	4:2	3:2	2:2	1:2
	1	6:1	5:1	4:1	3:1	2:1	1:1

What is the possibility of John getting:

3.1 the same score on both dice?

3.2 a score of 2 on either of the 2 dice?

3.3 scores that add up to 6?

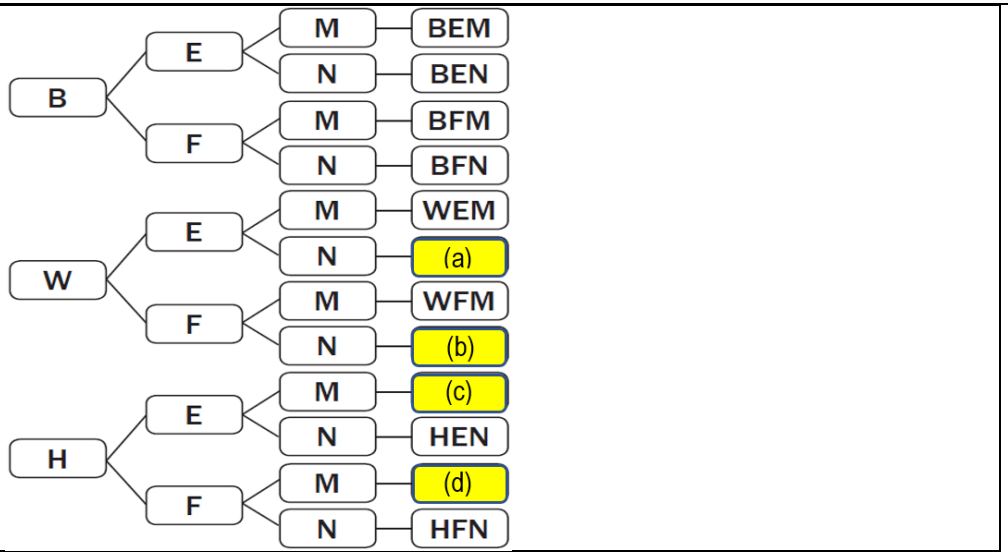
3.4 scores that adds up to an even number

4.

Tree diagrams:

The sandwiches are made from an equal number of white (W), brown (B) and whole-wheat (H) loaves of bread. The fillings used for the sandwiches are egg (E) or fish (F), with (M) or without (N) mayonnaise.

An incomplete tree diagram is given below.



4.1 Explain what the outcome BEM represents on the tree diagram.

4.2 Complete the tree diagram[(a)-(d)]

4.3 Use the tree diagram to write down the probability in simplified form that a sandwich **W** selected at random would:

4.3.1 be a whole-wheat fish sandwich without mayonnaise.

4.3.2 not be a white bread sandwich.

ANSWERS:

1.1 Fifty-Fifty/Even

1.2 Impossible

1.3 Certain

1.4 Likely

2.1 . $\frac{2}{289}$

2.2 $\frac{37}{289}$

2.3 $\frac{0}{289}$

2.4 $\frac{53}{289}$

3.1 $\frac{6}{36}$

3.2 $\frac{11}{36}$

3.3 $\frac{5}{36}$

3.4 $\frac{18}{36}$

4.1 BEM means brown bread with egg and mayonnaise.

4.2 The following should be found on the tree diagram:

(a) WEN 3 (b) WFN 3 (c) HEM 3 (d) HFM

4.3.1 WFN = $\frac{1}{12}$ OR 0,08 OR 8,33%

4.3.2 $\frac{8}{12}$ OR 0,67 OR 66,67%

Activities:

1. Write down the chances of getting the outcomes in the following situations. Write your answers as decimals, percentages and common fractions. You must give all three.

1.1 Getting any odd number when throwing a dice once.

1.2 Getting a 3 when throwing a dice with 8 faces.

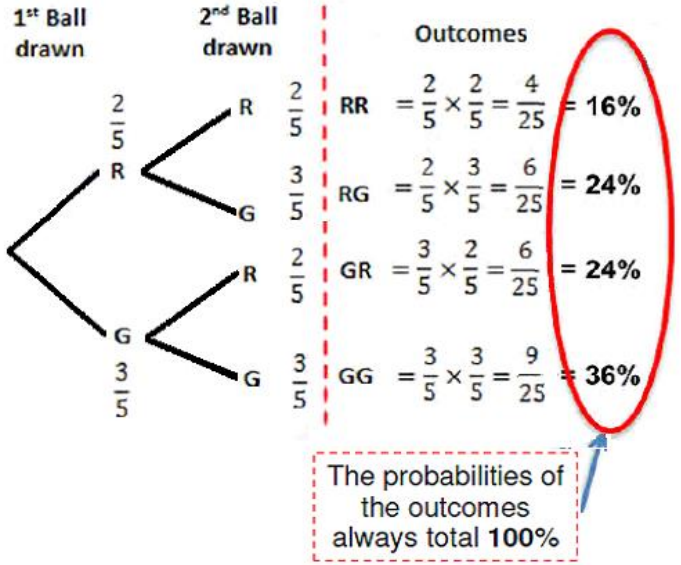
1.3 Selecting a Jack from a deck of cards.

1.4 You take out a T-shirt (without looking!) from a pile which has 1 blue, 3 green and 2 purple T-shirts in it. What are the chances of taking out a purple T-shirt?

2. A simple prediction game involves a bag that contains two red balls and three green balls. The probability of a sequence of two balls being selected (first one ball and then a second ball) can be shown in the following tree diagram (Red ball = R, Green ball = G):

Situation 1

With each ball being drawn and replaced in the bag immediately:



2.1 What is the probability that the first ball drawn is a red ball?

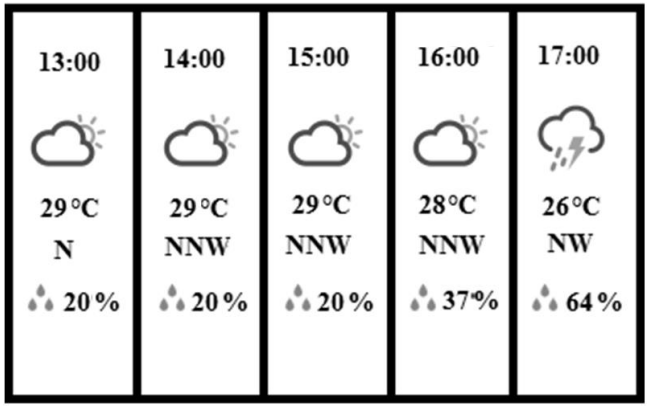
2.2 What is the probability that the second ball drawn is a red ball if the first ball was a red ball?

2.3 What is the probability that both balls are red?

2.4 What is the probability that at least one of the balls drawn is a green ball?

3. Celeste, a resident of Kimberley, studied the weather forecast below relating to the following day to determine whether it was necessary to take an umbrella to work.

HOURLY WEATHER FORECAST FOR KIMBERLEY – 12/03/2019



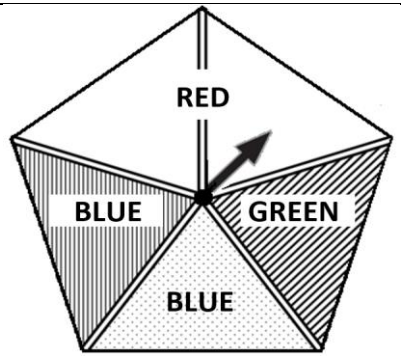
3.1 Determine the probability that it will rain when Celeste leaves work at 2:30 p.m.

3.2 Determine the probability that the temperature increased from 13:00 to 17:00. Express your answer as a decimal number.

3.3 Determine the probability that the temperature remained the same from 13:00 to 15:00. Express your answer as a percentage.

3.4 Determine the probability that the wind blew in any westerly direction from 13:00 to 16:00. Express your answer as a fraction.

4. The following spinner has two ways to look at it: 1- the patterns; 2- the colours written on the spinner. If a person spins the spinner, what are the chances to:



4.1 get the diagonal line pattern. Express your answer as a fraction.

4.2 get the white solid colour. Express your answer as a percentage.

4.3 get the colour blue that was written. Express your answer as a decimal fraction.

4.4 not get the dotted pattern. Express your answer as a percentage.

5. On the roulette wheel there are 18 red and 18 are black numbers. But there is an additional 0 that is green in colour.

5.1 What is the probability that the first ball lands on a red number? Express your answer as a decimal. Round your answer to 2 decimal places.

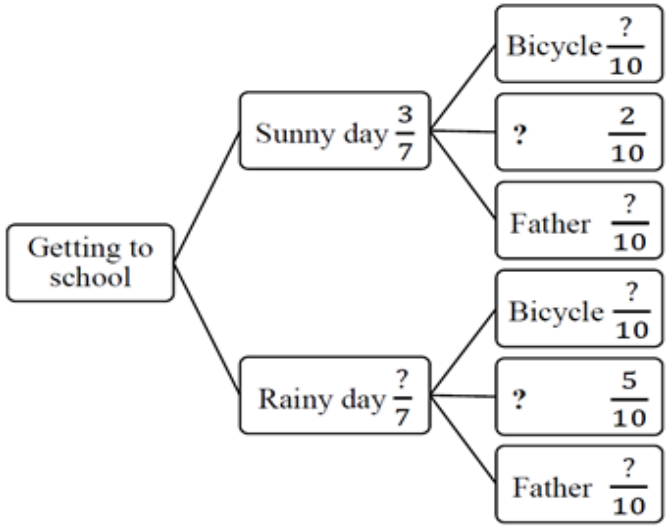
5.2 What is the probability that the first ball lands on a red number 19? Express your answer a fraction.

5.3 What is the probability that the second ball lands on a red number if the first ball landed on a red number? Express your answer as a decimal.

6. Luca has three options of getting to school. She can ride her bicycle, catch a taxi or wake up extra early to get a lift with her father. The weather plays a big role in her decision of how to get to school.
The probability of it being a sunny day is $\frac{3}{7}$ and the probability of it being a rainy day is $\frac{4}{7}$.

If it is a sunny day, the probability of Luca riding her bicycle to school is 60%, while the probability of her catching a taxi is 0%.

If it is a rainy day, the probability of Luca catching a taxi is 0,5, and the probability of her getting up early to get a lift with her father is 0,4.



6.1 Complete the missing information by copying the tree diagram in your workbook.

6.2 Calculate the probability, as a fraction, that it will be a sunny day and that Luca will get up early to catch a lift with her father.

ANSWERS:

1.1 The odd numbers on a dice are 1; 3; 5. So there are 3 numbers. There are six numbers in total, so the chances are 3/6 = ½ = 0,5 = 50%.

1.2 The 3 is only one number out of a total of 8 possible numbers. So the probability is 1/8 = 0,375 = 37,5%.

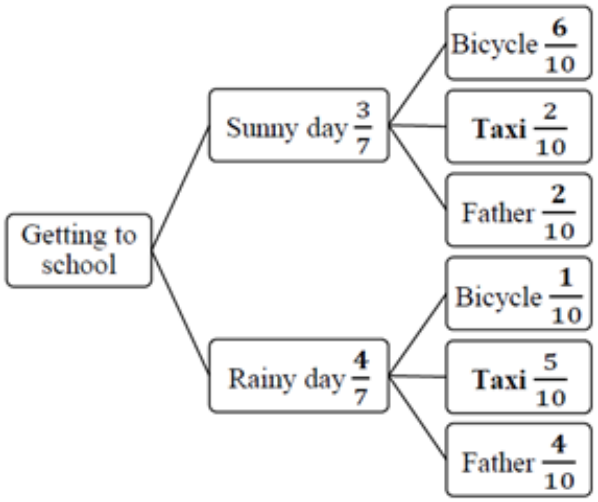
1.3 There are 52 cards, of which 4 are Jacks. So the probability is 4/52 = 0,077 = 7,7%.

1.4 There are 2 purple T-shirts. There are 6 T-shirts in total. This means the probability of taking out a purple one is 2/6 = 1/3 = 0,33…. = 33%

2.1 2 out of 5 balls are red, therefore 2/5 or 0,4 or 40%

	2.2 The first ball was replaced, so there are still 5 balls in the bag and 2 of them are red. Therefore 2/5 or 0,4 or 40% 2.3 Two events have to occur for this outcome to hap-pen. The first ball must be red and then the second ball must also be red. This is a sequence of events and so we multiply the probabilities: RR = 2/5×2/5=4/25 2.4 Looking at the outcomes there are three that involve at least one green ball (RG, GR, GG). All three are valid and so we add the probabilities. First convert to percentage before adding: Total probability = RG + GR + GG = 24%+24%+36%= 84% 3.1 20% 3.2 0,0 3.3 100% 3.4 $\frac{3}{4}$ 4.1 $\frac{1}{5}$ 4.2 $\frac{2}{5} \times \frac{100}{1}$ = 40% 4.3 $\frac{2}{5}$ = 0,4 4.4 $\frac{3}{5} \times \frac{100}{1}$ = 60% 5.1 $\frac{18}{37}$ = 0,49 5.2 $\frac{1}{37}$ 5.3 0,4 × 0,49 = 0,2401

6.1



6.2 $\frac{3}{7} \times \frac{2}{10} = \frac{6}{70}\ of\ \frac{3}{35}$ OF 0,09 /0,0857