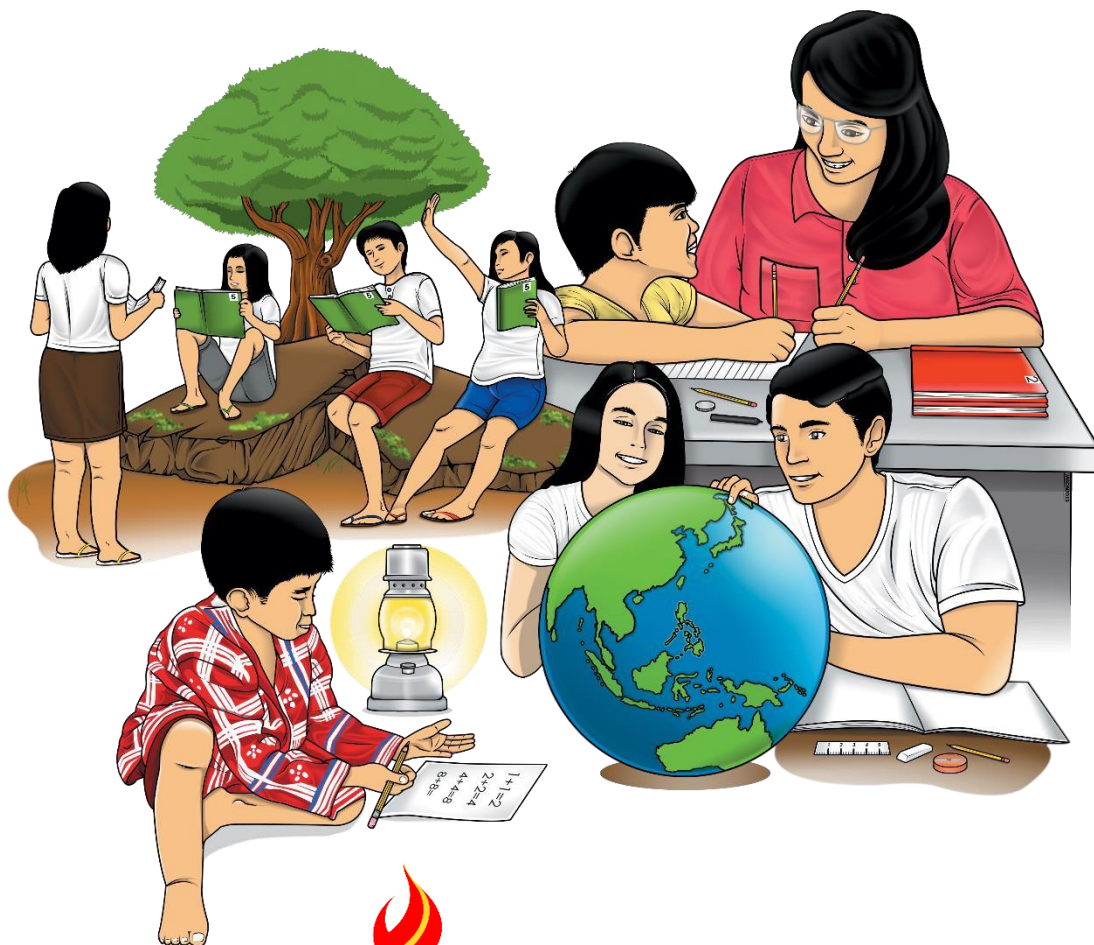


# Mathematics

## Quarter 4 – Module 8: Making Simple Predictions of Events Based on the Results of Experiments



**Mathematics – Grade 6**  
**Alternative Delivery Mode**  
**Quarter 4 – Module 8: Making Simple Predictions of Events Based on the Results of Experiments**  
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# Mathematics

**Quarter 4 – Module 8:**

**Making Simple Predictions of  
Events Based on the Results  
of Experiments**

# **Introductory Message**

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.



## ***What I Need to Know***

This module was designed and written with you in mind. It is here to help you master the skills in making simple predictions of events based on the results of experiments.

The scope of this module allows you to use it in many different learning situations. The language used recognizes your diverse vocabulary level. The lessons are arranged to follow the standard sequence of your course. But the order in which you read them can be changed to match with the textbook you are now using.

After going through this module, you are expected to make simple predictions of events based on the results of experiments. M6SP-IVi-23



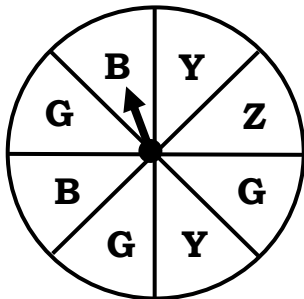
## What I Know

Read each item carefully. Choose the letter of the correct answer. Write the chosen letter on a separate sheet of paper.

1. A bag has 2 green marbles, 6 black marbles, and 9 purple marbles. If you pick a marble 17 different times, how many times can you probably pick a green marble?  
A. 1                      B. 2                      C. 3                      D. 6
2. A spinner is divided into 10 equal parts. Half is red,  $\frac{3}{10}$  is white, and  $\frac{1}{5}$  is purple. If you will spin it 10 times, what is the best prediction possible for the number of times that it will land on white?  
A. 2                      B. 3                      C. 4                      D. 5
3. If you flip a coin 20 times, what is the best prediction for the possible number of times that it will land on heads?  
A. 2                      B. 5                      C. 8                      D. 10

For items 4 – 5

The spinner shown below was spun 40 times. The table shows the results.



Letters	Number of Spins
B	14
G	12
Y	6
Z	8

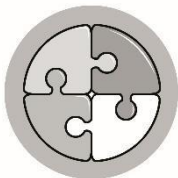
4. What is the probability of the spinner landing on letter Z?  
A.  $\frac{1}{10}$                       B.  $\frac{1}{5}$                       C.  $\frac{1}{4}$                       D.  $\frac{1}{2}$
5. What is the probability of the spinner landing on letter G?  
A.  $\frac{7}{20}$                       B.  $\frac{3}{10}$                       C.  $\frac{2}{5}$                       D.  $\frac{1}{7}$

## Lesson

# 1

# Making Simple Predictions of Events Based on the Results of Experiments

In the previous lessons, you have learned how to write sample space/s through listing outcomes, tree diagrams and grid or table. This time, we will focus on how to make simple predictions of events based on theoretical and experimental probability.



## *What's In*

Read and answer the following problems. Write your answer in your answer sheet.

1. What are the possible outcomes for choosing a prime number less than 20?
2. If Ana has 5 shirts and 3 pants, how many possible combinations of outfit she can choose from?
3. A businessman has 6 shirts and 9 ties. How many different shirt and tie outfits can he create?



## *What's New*

Read and understand the given problem.

A shoe store received a delivery of products from their supplier. They found out that 30 out of 2,500 pairs of shoes were defective. Next month, a delivery of 6,000 pairs of shoes is expected. Predict the number of defective shoes.

How will you solve this?



## What is It

In any action we take every day, we are actually predicting and expecting outcomes. In Mathematics, we can make predictions of the possible outcomes through theoretical and experimental probability.

Theoretical Probability (TP) of an event is the number of ways that an event can occur divided by the total number of outcomes. The theoretical probability of an event is what we expect to happen.

$$\text{Theoretical Probability}_{(\text{event})} = \frac{\text{number of favorable outcomes}}{\text{number of possible outcomes}}$$

Experimental Probability (EP) of an event on the other hand, is the ratio of the number of times an event occurs to the total number of trials the activity is performed. It is the probability determined from the result of the experiment. It is what actually happens instead of what we were expecting to happen.

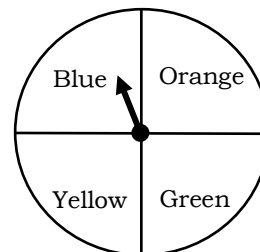
$$\text{Experimental Probability}_{(\text{event})} = \frac{\text{number of times favorable outcomes occur}}{\text{number of trials in the experiment}}$$

### Theoretical Probability VS. Experimental Probability

Examples:

Theoretical Probability

1. A spinner on the right has four equal-sized sections that are blue, orange, green and yellow. What is the theoretical probability of the spinner landing on each color?



$$\text{Theoretical Probability}_{(\text{event})} = \frac{\text{number of favorable outcomes}}{\text{number of possible outcomes}}$$

$$TP_{(\text{orange})} = \frac{1}{4}$$

$$TP_{(\text{blue})} = \frac{1}{4}$$

$$TP_{(\text{green})} = \frac{1}{4}$$

$$TP_{(\text{yellow})} = \frac{1}{4}$$

If the spinner spins 40 times, what is the theoretical probability of landing on orange?

Solution:

*Total number of times it will result to orange =  $TP_{(\text{orange})} \times \text{total number of spins}$*

$$= \frac{1}{4} (40)$$

$$= 10$$



So, if the spinner spins 40 times, it will land 10 times in each color by theoretical probability.

### Experimental Probability

A shoe store received a delivery of products from their supplier. They found out that 30 out of 2,500 pairs of shoes were defective. Next month, a delivery of 6,000 pairs of shoes is expected. Predict the number of defective shoes.

Solution:

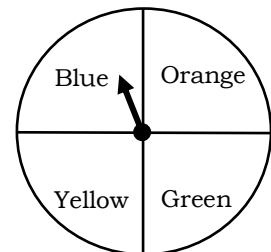
Since the number of defective shoes are being counted and recorded, we will solve its experimental probability.

$$\begin{aligned} \text{Experimental Probability}_{(\text{defective shoes})} &= \frac{\text{number of times favorable outcomes occur}}{\text{number of trials in the experiment}} \\ &= \frac{30}{2,500} = \frac{3}{250} \end{aligned}$$

$$\begin{aligned} \text{Total number of defective shoes} &= \text{EP}_{(\text{defective shoes})} \times \text{total number of shoes} \\ &= \frac{3}{250} \times 6,000 \\ &= 72 \text{ probable pairs of defective shoes} \end{aligned}$$

Let's try another example.

A spinner at the right has four equal-sized sections that are blue, orange, green and yellow. What is the experimental probability of the spinner landing on each color if it spins 40 times?



What to do:

Spin the spinner 40 times and record the result.

Color	Number Of Spins
Blue	14
Orange	8
Green	12
Yellow	6

$$\text{Experimental Probability}_{(\text{event})} = \frac{\text{number of times favorable outcomes occur}}{\text{number of trials in the experiment}}$$

$$\text{EP}_{(\text{blue})} = \frac{14}{40} = \frac{7}{20}$$

$$EP_{(\text{orange})} = \frac{8}{40} = \frac{1}{5}$$

$$EP_{(\text{green})} = \frac{12}{40} = \frac{3}{10}$$

$$EP_{(\text{yellow})} = \frac{6}{40} = \frac{3}{20}$$

So, if the spinner is spun 100 times, the probability that it will land on the following colors are the following:

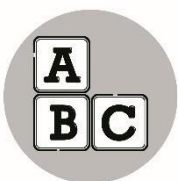
Total number of times it will land on specific colors =  $EP_{(\text{color})} \times$  total number of spins

$$EP_{(\text{blue})} = \frac{7}{20} \times 100 = 35 \text{ times}$$

$$EP_{(\text{orange})} = \frac{1}{5} \times 100 = 20 \text{ times}$$

$$EP_{(\text{green})} = \frac{3}{10} \times 100 = 30 \text{ times}$$

$$EP_{(\text{yellow})} = \frac{3}{20} \times 100 = 15 \text{ times}$$



## ***What's More***

Read and answer the problem below. Write your answer in your answer sheet.

Two hundred fifty random learners were surveyed about their favorite snacks during recess time. Here was the result of the survey:

Snacks	Number of Students
Banana Cue	84
Puto	68
Suman	46
Cassava Cake	52

If there were 2,000 students enrolled, about how many of each kind would the canteen manager prepare?



## What I Have Learned

Probability of outcomes can be predicted through the following:

1. Theoretical probability of an event is the number of ways that an event can occur divided by the total number of possible outcomes. The theoretical probability of an event is what we expect to happen.

$$\text{Theoretical Probability (event)} = \frac{\text{number of favorable outcomes}}{\text{number of possible outcomes}}$$

2. Experimental Probability of an event is the ratio of the number of times an event occurs to the total number of trials the activity is performed.

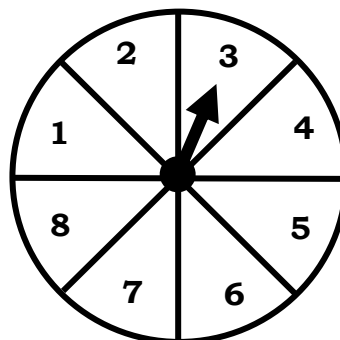
$$\text{Experimental Probability (event)} = \frac{\text{number of times favorable outcomes occur}}{\text{number of trials in the experiment}}$$



## What I Can Do

Read and solve the following problems. Write your answer in your answer sheet.

1. A coin is tossed 60 times. The coin lands on heads 24 times. If the coin is tossed 80 times, find the probability of landing on tails.
2. A die is rolled 24 times. If number 3 lands face up 16 times, what is the probability that number 3 will land face up if a die is rolled 36 times?
3. Look at the spinner below. Predict the probability of the following numbers stopping on the arrow if spun 40 times.
  - a. 2
  - b. Odd number
  - c. Even number
  - d. Prime number
  - e. Composite number



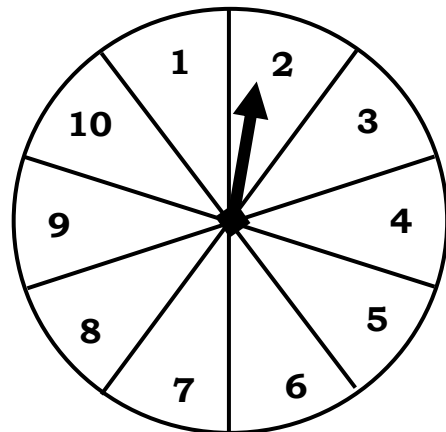


## Assessment

Read each item carefully. Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper.

1. A coin is tossed 12 times. Head appears 8 times. What is the probability of landing on tails if the coin is tossed 36 times?  
A. 10                      B. 12                      C. 14                      D. 16
2. If a die is rolled 10 times, the number 4 turns up 3 times. What is the probability of getting a number 4 after rolling a die 50 times?  
A. 5                        B. 10                      C. 15                      D. 20

For items 3 – 5. Refer to the spinner on the right if spun 20 times.



3. What is your prediction that a spinner will land on an even number?  
A. 10                      C. 30  
B. 20                      D. 40
4. What is your prediction that a spinner will land on a prime number?  
A. 2                        C. 6  
B. 4                        D. 8
5. Predict that the spinner will stop on a multiple of 5. What number would it be?  
A. 4                        C. 8  
B. 6                        D. 10



## ***Additional Activities***

Read and solve the problem. Write your answer in your answer sheet.

Ana surveyed 50 of her classmates to determine their favorite cafeteria food. The results of her survey are shown in the table.

Favorite Food	Number of Learners
Hamburger	22
Siomai	8
Tacos	6
Pizza	10
Puto	4

If there are 150 learners in the cafeteria, compute the number of learners who probably like to eat each food.



## Answer Key

<b>Additional Activities</b>	
Hamburger Siomai Tacos Pizza Puto	66 24 18 30 12
<b>What's More?</b>	<b>Assessment</b>
Banana Cue - 672 Puto - 544 Suman - 368 Cassava Cake - 416	1. B 2. C 3. A 4. D 5. A
<b>What's In</b>	<b>What I Can Do?</b>
1. {2,3,5,7,11,13, 17,19} 2. 15 3. 54	1. 48 2. 24 3. a. 5 b. 20 c. 20 d. 20 e. 15
<b>What I Know:</b>	
1. B 2. B 3. D 4. B 5. B	

## ***References:***

Most Essential Learning Competencies (MELC) in Mathematics 6

Burgos, J. et al. (2016) 21<sup>st</sup> Century Mathletes. Philippines: Book Media Press Inc.

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