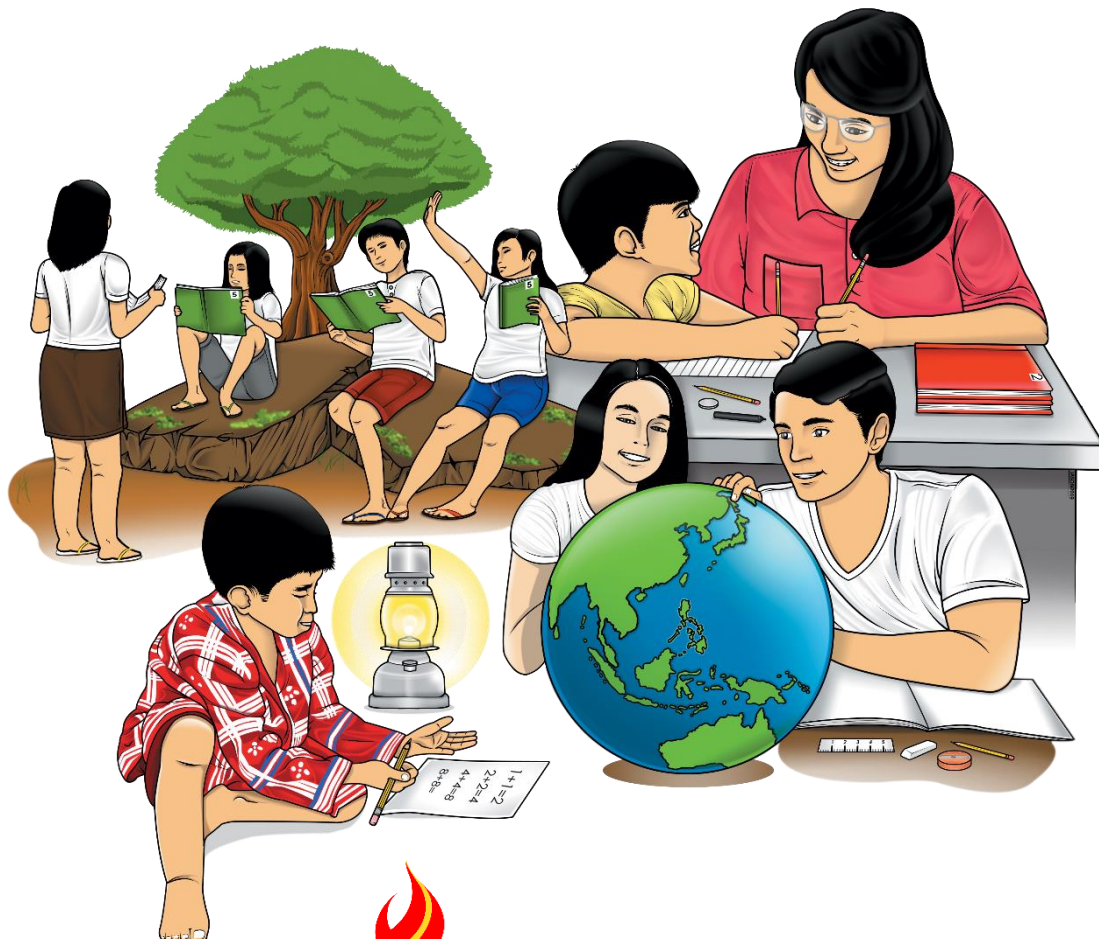


Mathematics

Quarter 4 – Module 16: Performing an Experimental Probability and Records Result by Listing



Mathematics – Grade 5

Alternative Delivery Mode

Quarter 4 – Module 16: Performing Experimental Probability and Records Results by Listing

First Edition, 2020

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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

Good day Mathletes! This module was designed and written to help you gain understanding and test your ability in Performing Experimental Probability and Records Results by Listing!

We knew that an experimental probability is the ratio between the number of times the event occurs and the total number of trials. It is determined by doing an experiment. When dealing with probabilities, it is important to be able to identify all the possible outcomes. In real life, whenever we do an experiment, two things can happen, either the one we expect or the one that we do not. When the result is what we expected, then it is the favorable outcome.

So, what are you waiting for? Stay focused and start-up.

At the end of this module, you are expected to:

- perform experimental probability and record results by listing
- appreciate the importance of performing experimental probability and records results by listing

Before going any further, let us check your understanding about performing experimental probability and records results by listing.



What I Know

Directions: Read carefully each statement below. Express the outcomes of your prediction in fraction. Choose the letter that corresponds to the best answer. Write the chosen letter on a separate sheet of paper.

1. What is the chance that you will get a passing score in your 10-item Math quiz?
(A) 3 (B) 4 (C) 5 (D) 2
2. What is the probability that a newly born puppy is a girl?
(A) 1 (B) $\frac{2}{2}$ (C) $\frac{1}{2}$ (D) $\frac{1}{4}$

3. There are 6 marbles in a bag. One is red; 2 - yellow; and 3 - green. What is the chance of picking yellow marble?
(A) $1/6$ (B) $3/6$ (C) $5/6$ (D) $2/6$
4. What is the chance of picking red? Please refer to question number 3.
(A) $2/6$ (B) $3/6$ (C) $5/2$ (D) $1/6$
5. What is the chance of picking green?
(A) $3/6$ (B) $2/6$ (C) 1 (D) $1/6$
6. Van has 5 white socks, 4 blue socks and 6 black socks in a drawer. If he pulls one out without looking, what is the probability that he will pull out of black socks?
(A) $6/15$ (B) $5/15$ (C) $4/15$ (D) 10
7. A die is marked with the first 6 letters of the alphabet rather than numbers. What are the chances that when the die is rolled a vowel will show up?
(A) $1/6$ (B) $3/6$ (C) $1/35$ (D) 4
8. What is the probability that a 5 or 6 will be showing on top after the number cube is tossed?
(A) $5/6$ (B) $1/6$ (C) $1/3$ (D) 6
9. A bag of candies contains 10 red, 12 blue, 8 green, 6 brown, and 14 yellow candies. If Robert removes one candy from the bag at random what is the probability that it will be blue?
(A) $10/50$ (B) $6/50$ (C) $8/50$ (D) $12/50$
10. A spinner numbered 1-8 is spun. What is the probability of spinning a factor of 18?
(A) 4 (B) 2 (C) 3 (D) 1

Lesson

1

Performing Experimental Probability and Records Results by Listing

In order to perform experimental probability and records results by listing, you need to master the skills on reducing fraction to lowest term, changing decimal to percent and vice versa and describe experimental probability. Because these will help you gain understanding the concept of the lesson. In this module, you will learn how to perform experimental probability and records results by listing. Are you ready?



What's In

In the previous lessons, you were able to learn the concept of describing experimental probability.

Also, you learned how to perform experimental probability. Note that, by doing a probability experiment, we can determine the number of times an event occur. We use a table and record the outcome of probability experiment. The probability can be approximated as the fraction of the number of times an event occurs by the number of times the experiment was performed.

Note that, a probability is the mathematics of chance. Probability is used to describe how likely or unlikely it is that something will happen. Probability may be given in fraction, decimal, or percent. The value of probability ranges from 0-1 (0 means the event is impossible to happen, while 1 means the event is certain to happen).

Let us refresh your memory and try to answer the following exercises:

Directions: Write **0** for impossible to happen, **$\frac{1}{2}$** for equally like to happen and **1** for certain to happen.

1. A frog will swim in the water.
2. You will finish reading this sentence.
3. The teacher teaches the pupils.
4. The probability of getting a number more than 6 in tossing a die is $\frac{1}{6}$.
5. The cat drives the car.



What's New

From the previous lesson, you were taught on how to describe experimental probability. In this lesson, we will deal with performing experimental probability and records results by listing.

Do you know that a probability can be expressed into fraction, decimal or percent form? You will understand this concept as you go along with this module.

Let us study this example:

There are 20 guests in the party, and each have an equal chance to win the prize. Alfred wins only if his card is drawn. What is his chance of winning the prize?



What Is It

Experimental probability is a probability determined from the results of an experiment and also experimental probability is what actually happens when we try it out.

In real life, whenever we do an experiment, two things can happen, either the one that we expect or the one that we do not. When the result is what we expected, then it is a favorable outcome.

An experimental probability is the ratio between the number of times the event occurs and the total number of trials.

$$P = \frac{\text{favorable outcomes}}{\text{total possible outcomes}}$$

So, the answer to the presented problem above is:

$$\frac{\text{Number of favorable outcomes}}{\text{Number of possible outcomes}} = \frac{1}{20} = 0.05 = 5\%$$

Therefore, Alfred has $\frac{1}{20}$ or 5% chance to win the prize.

When dealing with probabilities, it is important to identify all the possible outcomes. The following are some of the methods that we can use:

When a cube with letters S, E, N, S, E, and S on its faces is tossed once, there are 6 total outcomes and the possible outcomes of tossing an S, E, and N. We could also say that the probability of tossing each letter is

$$\text{Probability of tossing an } S = \frac{3 \rightarrow \text{favorable outcomes } \{S,S,S\}}{6 \rightarrow \text{total possible outcomes } \{S,E,N,S,E,S\}}$$

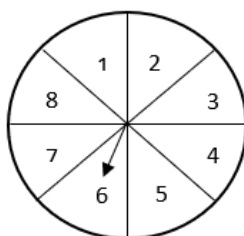
$$\text{Probability of tossing an } E = \frac{2 \rightarrow \text{favorable outcomes } \{E,E\}}{6 \rightarrow \text{total possible outcomes } \{S,E,N,S,E,S\}}$$

$$\text{Probability of tossing an } N = \frac{1 \rightarrow \text{favorable outcome } \{N\}}{6 \rightarrow \text{total possible outcomes } \{S,E,N,S,E,S\}}$$

Listing and Tree Diagrams

To calculate probability, we need to know all the different things that can happen. A sample space is a list of all the possible outcomes of an activity or experiments.

Example 1: Suppose you spin the spinner. Make a sample space for the spin.



Solution:

The spinner can land on 8 different regions. To make the sample space, list all the possible outcomes of the spin.

Answer: The sample space is: 3, 4, 5, 6, 7, 8, 1, 2

Example 2: Look at the menu below. How many ways can you order snacks?

HAMBUGERS
Regular Burger
Cheeseburger
Pizza burger
BEVERAGES
Juice
Tea

There is more than one way to solve this problem.

Solutions:

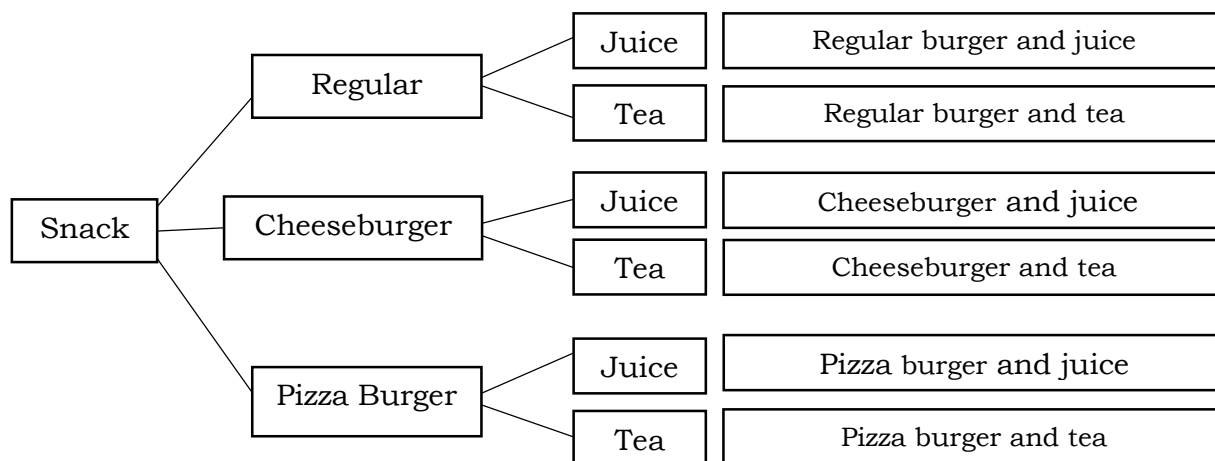
LISTING: Use R for regular, C for cheese, P for pizza, J for juice and T for tea.

Outcomes:

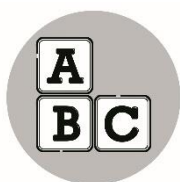
- | | |
|------------|-----------------|
| a. R, J | b. R, T c. C, J |
| b. d. C, T | e. P, J f. P, T |

The list shows there are 6 ways to order snacks.

TREE DIAGRAM



In the diagram, we can see that for each of the three kinds of hamburgers, there are two beverage choices. Thus, $3 \times 2 = 6$, there are six ways to order snacks.



What's More

Activity 1

PICK A COLOR

Materials: a box, 6 marbles, (3 green, 2 blue, 1 red)

Procedure:

- Put the marbles in the box. Without looking, draw one marble from the box and record the color in the table below.
- Put the marble back in the box. Do more 19 trials. Replace the marble each time after recording the color.
- How many times out of 20 did you draw a blue marble? Green marble? And red marble?

color	tally	number
Green		
Blue		
Red		

Answer the following questions:

- Did you enjoy performing the activity?
- Did you follow the procedure in performing the probability experiment?
- How did you express the outcomes of your probability experiment?
- What did you notice from the results of your probability experiment?

Activity 2

Directions: Express the outcomes of your prediction. Write your answer in your notebook.

- Consider the days of the week. What is the chance that you choose a day which begins with letter T? What is the chance that the day you choose has less than 15 letters?
- Toss a coin. What is the probability that neither the head nor the tail shows up?
- A bag contains 10 marbles - 8 yellow marbles, and 2 black marbles. Rona took a marble and returned it. After 10 trials, a yellow marble was picked 6 times. Find the experimental probability of getting red marble.
- If you roll a die, what is the probability that you will get even numbers?

Activity 3

The table shows the results of a card experiment. Each time a card was picked, it was returned to the bag.

Card Experiment	
Outcome	Number
blue	27
green	15
red	8

1. How many trials of picking a card were made?
2. How many times was the blue card picked?
3. What is the experimental probability of picking a red card?
4. If 10 blue cards were in the bag, how many green cards would you predict?



What I Have Learned

By doing probability experiment, we can determine the number of times an event occur. We use a table and record the outcome of the probability experiment.

A. Fill in the blanks.

(1) _____ is a probability determined from the results of an experiment and also experimental probability is what actually happens when we try it out. When we do something and we are expecting a result by (2) _____ or we are not certain of what the result will be, in probability, we call it an (3) _____. The uncertain result is called an (4) _____.

In real life, whenever we do an experiment, two things can happen, either the one that we expect or the one that we do not. When the result is what we expected, then it is the favorable outcome.

An *experimental probability* is the (5) _____ between the number of times the event occurs and the total number of trials.



What I Can Do

In real life, whenever we do an experiment, two things can happen, either the one that we expect or the one that we do not. When the result is what we expected, then it is *the favorable outcome*.

An *experimental probability* is the ratio between the number of times the event occurs and the total number of trials.

Directions: Read the given situation and describe the experimental probability. The first one is done for you.

Example: A coin is tossed 60 times. A head appeared twenty-seven times. Find the experimental probability of getting heads.

Solution:
$$\frac{\text{number of times the event occurs (heads appeared)}}{\text{total number of trials}} = \frac{27}{60} = \frac{9}{20}$$

Therefore, the experimental probability of getting heads is $\frac{9}{20}$

Directions: Read the given situation and record the probability.

Lorraine puts cards with letters of her name into a box. What is the probability that the card she pulls out is /are_____?

--	--	--	--	--	--	--	--

- | | |
|-------|-------|
| a. L? | _____ |
| b. O? | _____ |
| c. R? | _____ |
| d. A? | _____ |
| e. I? | _____ |
| f. N? | _____ |
| g. E? | _____ |



Assessment

Directions: Read carefully each statement below. Choose the letter that corresponds to the best answer. Write the chosen letter on a separate sheet of paper.






1. Toss a die, what is the probability that you will get 4 on top?
(A) $1/6$ (B) $1/8$ (C) $2/6$ (D) $3/6$
2. What is the probability that you can choose a rose from a flower shop selling sunflower, tulips, dahlia?
(A) $1/2$ (B) 0 (C) 1 (D) 2
3. Toss a coin. What is the probability that neither the head nor the tail shows up?
(A) $2/1$ (B) $1/3$ (C) $1/2$ (D) $2/2$
4. What if there are 3 white ribbons, 4 pink ribbons and 5 red ribbons in your box. What is the chance of choosing a red ribbon?
(A) $5/12$ (B) $3/12$ (C) $4/12$ (D) $1/12$
5. What is the chance of choosing a ribbon that is not red?
(A) $12/12$ (B) $5/12$ (C) $3/12$ (D) $7/12$
6. If you choose a day at random, what is the probability of choosing Monday?
(A) $2/7$ (B) $1/7$ (C) $3/7$ (D) $7/7$
7. What is the probability of choosing a day with only 3 letters?
(A) $1/7$ (B) $2/7$ (C) $3/7$ (D) $0/7$
8. In tossing a coin there are two possible outcomes.
(A) yes (B) no (C) maybe (D) yes/no
9. When the result is what we expected, then it is the favorable outcome.
(A) no (B) maybe (C) yes (D) yes/no
10. Combination of outcomes can be shown on a tree diagram.
(A) no (B) yes (C) maybe (D) yes/no

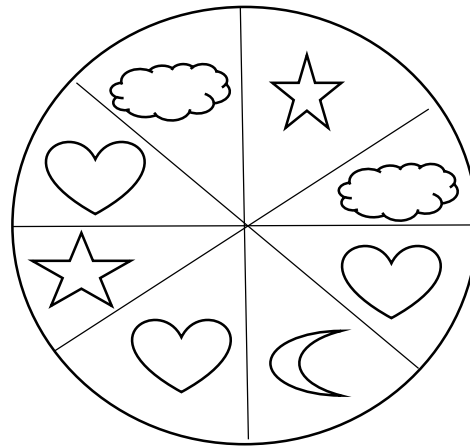


Additional Activities

You made it! Finally, you're on the last activity. Answer it all correctly so you could climb at the top and get your trophy.

Directions: What is the probability that this spinner will land on ____? Write in fraction form.

1. 
2. 
3. 
4. 
5. 





Answer Key

<p>What I Know</p> <p>1. A 2. C 3. D 4. D 5. A</p> <p>6. A 7. C 8. C 9. D 10. D</p>	<p>What's In</p> <p>1. 1 2. 1 3. 1 4. 0 5. 0</p>	<p>What I Have Learned</p> <p>1. Experimental probability 2. chance 3. experiment 4. outcome 5. ratio</p>	<p>What I can do</p> <p>1. L (1/8) 2. O (1/8) 3. R (2/8) 4. A (1/8) 5. I (1/8) 6. N (1/8) 7. E (1/8)</p>	<p>Assessment</p> <p>1. A 2. B 3. C 4. A 5. D</p> <p>6. B 7. D 8. A 9. C 10. B</p>	<p>Additional Activities</p> <p>1. 2/8 or 1/4 2. 3/8 3. 1/8 4. 2/8 or 1/4 5. 0/8</p>	<p>What's More</p> <p>Activity 1: 1-5. Answer may vary</p> <p>Activity 2: 1. 2/7, 1 2. 1/2 3. 0 4. 3/6 or 1/2</p> <p>Activity 3: 1. 50 2. 27 times 3. 4/25 4. Answer may vary</p>
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References

Borromeo, Melody G. 2016. Teacher's Manual 5. *21st Century MATHletes*. Vibal Group, Inc.

Lumbre, Angelina P., and Alvin C. Ursua. 2016. *21st Century MATHletes 5 Textbook*. Quezon City: Vibal Group, Inc.

Perez, Marjoseph H., and Donnel P. Placer, Jaime R. Burgos, 2016. *21st Century MATHletes 6 Textbook*. Quezon City: Vibal Group, Inc.

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