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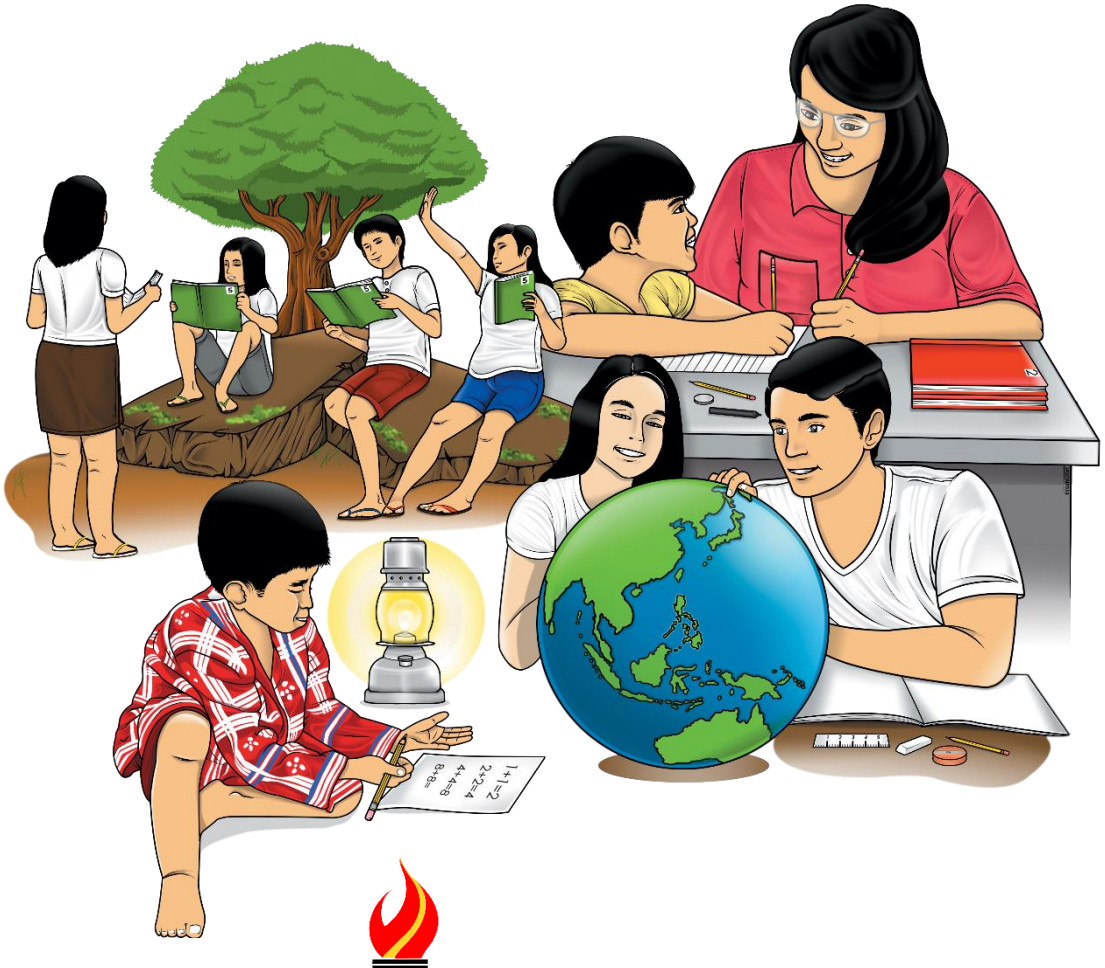
Mathematics

Quarter 4 – Module 7
Counting Methods and Techniques in an Experiment



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Mathematics

Quarter 4 – Module 7
Counting Methods and Techniques in an Experiment

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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.

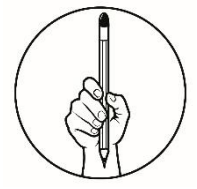
What I Need to Know

This module was designed and written with you in mind. It is here to help you master the skills on how to count the number of occurrences of an outcome in an experiment using different counting methods and techniques. You are provided with varied activities to process the knowledge and skills learned and to deepen and transfer your understanding of the lesson. The scope of this module enables you to use it in many different learning situations. The lesson is arranged to follow the standard sequence of the course. But the order in which you read them can be changed to correspond with the textbook you are now using.

This module contains lesson on how to count the number of occurrences of an outcome in an experiment using: (a) table; (b) tree diagram; (c) systematic listing; and (d) fundamental counting principle (M8GE-IVf-g-1).

After going through this module, you are expected to:

1. identify the different counting methods and techniques in an experiment,
2. organize the number of occurrences of an outcome in an experiment using (a) table, (b) tree diagram, (c) systematic listing, and (d) fundamental principle of counting, and
3. appreciate the importance of the different counting methods and techniques of an experiment in real-life settings.



What I Know

PRE-ASSESSMENT

Directions: Answer each of the following items and write the letter of the correct answer on a separate sheet of paper.

1. Which of the following is the way of finding the total number of outcomes of an experiment without enumerating those outcomes?
   A. Tabular
   B. Tree diagram
   C. Systematic listing
   D. Fundamental Counting Principle

2. What do you call the method of determining the total number of outcomes of an experiment with at least two events where every possible outcome of the first event is paired with every possible outcome of each succeeding event using lines?

A. Tabular
B. Tree diagram
C. Systematic listing
D. Fundamental Counting Principle

3. The possible outcomes when a coin is tossed twice are HH, HT, TH, and TT. What method of determining the total number of outcomes of the experiment is used?
A. Tabular
B. Tree diagram
C. Systematic listing
D. Fundamental Counting Principle

4. A coin is tossed once and at the same time a die is rolled once. The outcomes are shown below. What method of determining the total number of outcomes of the experiment was used?

	1	2	3	4	5	6
H	H, 1	H, 2	H, 3	H, 4	H, 5	H, 6
T	T, 1	T, 2	T, 3	T, 4	T, 5	T, 6

A. Tabular
B. Tree diagram
C. Systematic listing
D. Fundamental Counting Principle

5. Which of the following does NOT belong to the group?
A. Tabular
B. Tree diagram
C. Sample space
D. Systematic listing

6. A female student's uniform includes a blouse and a skirt. A female student has four blouses and three skirts, how many possible ways can she wear her uniform?
A. 3 B. 6 C. 9 D. 12

7. A canteen sells three types of snack foods and two types of homemade juices. Grace can choose one snack food and one juice. How do you determine the total number of possible choices that Grace have for her snacks?
A. 2 x 2
B. 3 x 2
C. 3 x 3
D. 2^2 x 3^2

8. How many possible outcomes are there in rolling two dice once?
A. 6 B. 12 C. 24 D. 36

9. Which is the sample space if you flip two coins once?
A. $\{H, T\}$
B. $\{HH, TT\}$
C. $\{HH, HT, TH\}$
D. $\{HH, HT, TH, TT\}$

10. Aling Nena is an online food seller. She posted on her Facebook account the menu for the day which includes 1 rice, 1 main dish, 1 vegetable dish, and 1 drink. The choices for rice are plain and garlic; for the main dishes are pork adobo and fried chicken; for vegetable dishes are chop suey and broccoli salad with

creamy almond dressing. How many choices of drinks are there if the total number of possible menu choices is 24?

A. 2 B. 3 C. 4 D. 5

11. Trisha's get-up includes jeans, t-shirt, and pair of shoes. What are the possible numbers of pairs of jeans, t-shirts, and pairs of shoes that Trisha have if she has a total of 40 different possible outfits?

A. 2, 3, 5
B. 2, 4, 5
C. 3, 3, 5
D. 3, 4, 5

12. You decided to order pizza, but you must choose the type of crust and the toppings. If there are only 4 possible ways of ordering a pizza, from which of the following should you choose?

A. Crust: thin or deep dish; Toppings: cheese, or pineapple
B. Crust: thin or deep dish; Toppings: cheese, bacon, or pineapple
C. Crust: thin or deep dish; Toppings: cheese, bacon, sausage, or pineapple
D. Crust: thin or deep dish; Toppings: cheese, bacon, sausage, pineapple, or hotdog

13. Juanito got coins from his pocket which accidentally rolled on the floor. He learned from his lesson in probability that with this number of coins tossed once, the number of possible outcomes is 8. How many coins fell on the floor?

A. 8 B. 4 C. 3 D. 1

14. Healthcare workers treating patients infected with Coronavirus Disease 2019 (COVID-19) are at risk of infection, so they use personal protective equipment (PPE) to shield themselves from infection. PPE includes gown or overalls, face mask, pair of gloves, and goggles. A healthcare worker in Philippine General Hospital has eight overalls, ten face masks, six pairs of gloves, and five goggles. In this case, which of the following counting techniques is best to use in determining the total number of possible ways a healthcare worker can wear his PPE?

A. table
B. tree diagram
C. systematic listing
D. fundamental counting principle

15. John and Samson are given an assignment by their teacher to find the total number of possible outcomes of flipping a coin once and rolling a die once. Which of the following is/are true?

I. Rolling a die once has 6 possible outcomes.
II. Flipping a coin once has 3 possible outcomes.
III. Flipping a coin once and rolling a die once has 12 possible outcomes.

A. I only
B. I and II only
C. II and III only
D. I and III only

Lesson 1

Counting Methods and Techniques in an Experiment

Begin this module by assessing what you have learned on illustrating an experiment, outcome, sample space and event that will help you in counting the number of occurrences in an experiment.

What's In

Activity: Everything in My Space

Directions**:** Describe the sample space of each experiment. Write your answer on a separate sheet of paper.

	Experiment	**Sample Space**
1.	Rolling a die and tossing a coin once simultaneously	_____
2.	Tossing three coins	_____
3.	Drawing a prime number from the first 10 natural numbers	_____
4.	Getting an odd number in a single roll of die	_____
5.	Getting a sum of 5 when two dice are rolled once	_____

Questions

1. How did you find the sample space of each experiment?
2. Are there other ways of organizing all possible outcomes to describe a sample space? What are these?

What's New

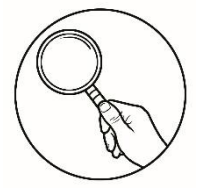
Activity: How many are we?

Directions: A pair of dice is rolled once. Observe how the possible outcomes are presented and answer the questions below.

Faces of a Die	1	2	3	4	5	6
1	(1,1)	(1,2)	(1,3)	(1,4)	(1,5)	(1,6)
2	(2,1)	(2,2)	(2,3)	(2,4)	(2,5)	(2,6)
3	(3,1)	(3,2)	(3,3)	(3,4)	(3,5)	(3,6)
4	(4,1)	(4,2)	(4,3)	(4,4)	(4,5)	(4,6)
5	(5,1)	(5,2)	(5,3)	(5,4)	(5,5)	(5,6)
6	(6,1)	(6,2)	(6,3)	(6,4)	(6,5)	(6,6)

Questions:

1. What experiment is illustrated in the activity?
2. What are the outcomes of the activity?
3. How many outcomes are there?
4. What do we call the set containing all possile outcomes of the experiment?
5. Is it important to count all the possible outcomes in an experiment? Why?



What is It

In this lesson, we will study on how to count all possible outcomes of an experiment.

Let us consider first the two equally important concepts, the counting methods, and the counting techniques. Counting methods are particular ways of doing something like making decisions and predicting outcomes while counting techniques are the ability to apply a particular task skillfully.

When a set of objects is small, it is easy to list all the objects and count them one by one. When the set is too large, and when the objects can be arranged systematically, there are some useful techniques for counting the objects without

actually listing them. Let us examine the examples below and see how the different methods or counting techniques are used in different situations.

A. Tabular Method

This method uses columns and rows where to enter all possible outcomes of an experiment.

Example 1:

In a debate contest, the participants are divided into two groups so that members of Group 1 will be paired with members of Group 2. The members of Group 1 are Elena, Estela, Felisa, and Mae while the members of Group 2 are Mark, Red, and Sam. The number of possible pairings is shown in the table below.

	Elena	Estela	Felisa	Mae
Mark	(Mark, Elena)	(Mark, Estela)	(Mark, Felisa)	(Mark, Mae)
Red	(Red, Elena)	(Red, Estela)	(Red, Felisa)	(Red, Mae)
Sam	(Sam, Elena)	(Sam, Estela)	(Sam, Felisa)	(Sam, Mae)

Example 2.

Maria always brings with her a handkerchief and a face mask whenever she goes out for an errand. If she has five handkerchiefs (1, 2, 3, 4, 5) and four face masks (blue, green, yellow, red), in how many ways can she pair her handkerchiefs to her face masks? Observe how it is done using a table.

	1	2	3	4	5
Blue	(Blue,1)	(Blue,2)	(Blue,3)	(Blue,4)	(Blue,5)
Green	(Green,1)	(Green,2)	(Green,3)	(Green,4)	(Green,5)
Yellow	(Yellow,1)	(Yellow,2)	(Yellow,3)	(Yellow,4)	(Yellow,5)
Red	(Red,1)	(Red,2)	(Red,3)	(Red,4)	(Red,5)

Example 3.

Euri has 5 pairs of socks (A, B, C, D, E) and 2 pairs of shoes (1, 2) which he uses when he goes to church. How many ways can he use his pairs of socks and shoes? This is how it is done using a table.

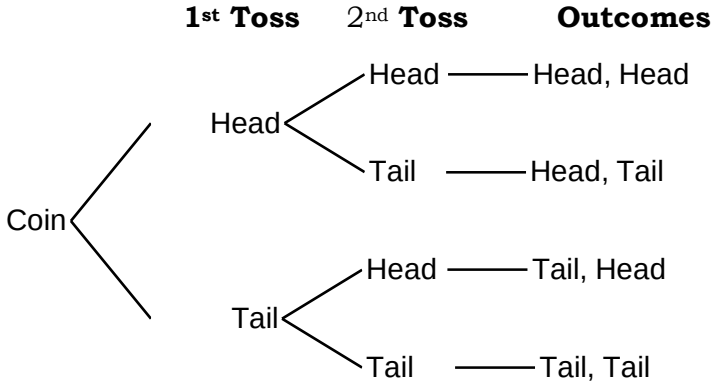
Shoes\Socks	A	B	C	D	E
1	(1,A)	(1,B)	(1,C)	(1,D)	(1,E)
2	(2,A)	(2,B)	(2,C)	(2,D)	(2,E)

B. Tree Diagram

It is a diagram used to show all the possible outcomes in a probability experiment. It consists of line segments coming from a starting point to the outcome point. All possible outcomes are visually represented by the branches.

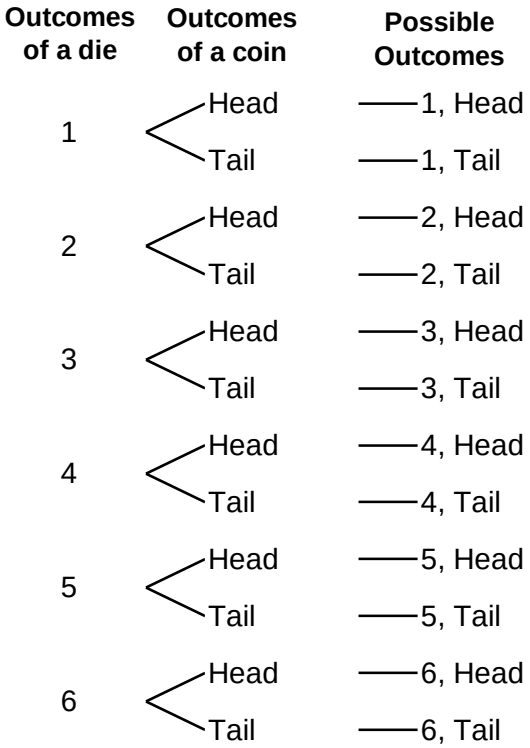
Example 4. In tossing a coin twice, how many possible outcomes are there?

The tree diagram below shows the possible outcomes when a coin is tossed two times.



Example 5. In rolling a die once and tossing a coin once, how many possible outcomes are there in all?

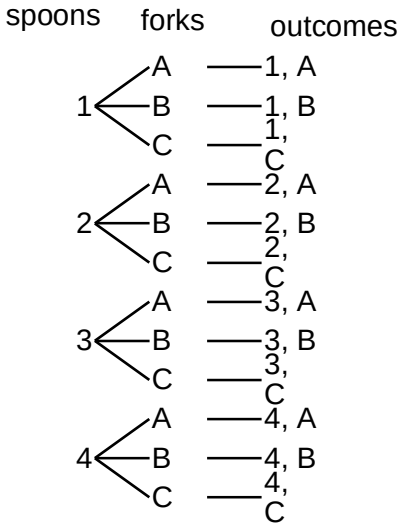
When a die is rolled once and a coin is tossed once, the number of outcomes can be counted using a tree diagram.



The tree diagram shows that there are 12 possible outcomes when a die is rolled once, and a coin is tossed once. With tree diagram, counting of all possible outcomes is easy. But this tree diagram is not practical to use if there are more events involved and there is a higher number of outcomes in every event in the experiment.

Example 6.

Erwin is a lifestyle and food vlogger. Whenever he goes for work to create content for his channel, he will always bring with him a pair of spoon and fork. Erwin has 4 spoons (1, 2, 3, 4) and 3 forks (A, B, C). The number of possible ways Erwin will bring his pair of spoon and fork whenever he works can be shown in a tree diagram.



C. Systematic Listing

It is a method of determining the number of outcomes of an experiment by enumerating or making a list of all possible outcomes. This method, if not carefully and systematically done, there is a possibility that some possible outcomes are missed or left out.

Example 7.

In tossing a coin three times, how many possible outcomes are there?

The number of outcomes can be determined by systematic listing such as HHH, HHT, HTH, HTT, THH, THT, TTH, TTT. This gives us 8 possible outcomes in tossing a coin three times.

Example 8.

Four students Elsa, Vicky, Easther, and Juliem went to attend a Holy Mass. When they reached the church, there were only three seats available. In how many ways can the four students be seated? using systematic listing? Observe how it is done.

S = { (Elsa, Vicky, Easther), (Elsa, Vicky, Juliem), (Elsa, Easther, Vicky), (Elsa, Easther, Juliem), (Elsa, Juliem, Vicky), (Elsa, Juliem, Easther), (Vicky, Easther Juliem), (Vicky, Easther, Elsa), (Vicky, Elsa, Easther), (Vicky, Elsa, Juliem), (Vicky, Juliem, Elsa), (Vicky, Juliem, Easther), (Easther, Elsa, Vicky), (Easther, Elsa, Juliem), (Easther, Vicky, Elsa), (Easther, Vicky, Juliem), (Easther, Juliem, Elsa), (Easther, Juliem, Vicky), (Juliem, Elsa, Vicky), (Juliem, Elsa, Easther), (Juliem, Vicky, Elsa), (Juliem, Vicky, Easther), (Juliem, Easther, Elsa), (Juliem, Easther, Vicky) }

There are 24 ways for the four students to be seated three at a time.

Example 9.

In how many ways will a 5-item true or false test be answered?

Solution:

The number of ways of answering the 5-item true or false test can be determined by systematic listing. Observe the pattern in listing the possible answers to the 5 items. Let T represent true a true item and F represent a false item.

(T,T,T,T,T), (T,T,T,T,F), (T,T,T,F,T), (T,T,F,T,T), (T,F,T,T,T), (F,T,T,T,T), (T,T,T,F,F), (T,T,F,T,F), (T,F,T,T,F), (F,T,T,T,F), (T,T,F,F,T), (T,F,F,T,T), (F,F,T,T,T), (F,T,T,F,T), (F,T,F,T,T), (T,F,T,F,T), (T,T,F,F,F), (T,F,T,F,F), (T,F,F,T,F), (T,F,F,F,T), (F,F,T,T,F), (F,F,T,F,T), (F,T,T,F,F), (F,T,F,T,F), (F,T,F,F,T), (F,F,F,T,T), (T,F,F,F,F), (F,T,F,F,F), (F,F,T,F,F), (F,F,F,T,F), (F,F,F,F,T), (F,F,F,F,F)

D. Fundamental Counting Technique

The fundamental counting principle is a technique of finding the number of possible outcomes of an experiment without listing. We can find the total number of ways that two or more separate tasks can happen by multiplying the numbers of ways each task can happen separately.

Fundamental Counting Principle (Product Rule)

If one event can occur in **m** ways, a second event can occur in **n** ways, and a third event can occur in **p** ways, and so on, then the sequence of events can occur in m x n x p x … ways. This is known as the ***product rule*** or ***rule of product***.

Example 10

How many possible outcomes are there if a die is rolled once and a coin is tossed once?

The event rolling a die once has six possible outcomes while the event tossing a coin once has two possible outcomes. Applying the product rule, the total number of outcomes when a die is rolled once, and a coin is tossed once is

6 x 2 = 12.

There are 12 possible outcomes when a die is rolled once, and a coin is tossed once.

Example 11.

Using the digits from 1 to 9, how many 3-digit numbers can be formed if repetition of digits is

a. allowed? b. not allowed?

Solution: Since we will form 3-digit numbers, so we reserve space for each digit.

__1st__ __2nd__ __3rd__

a). repetition of digits is allowed.

In the 1st space, anyone of the 9 digits can be placed; in the 2nd space, anyone of the 9 digits can be placed, and in the 3rd space, anyone of the 9 digits can be placed also. Therefore, the number of 3-digit numbers that can be formed if repetition of digits is allowed is 9 x 9 x 9 = 729.

b). repetition of digits is not allowed.

In the 1st space, anyone of the 9 digits can be placed; in the 2nd space, anyone of the 8 remaining digits can be placed since one digit is already assigned in the first space, and in the 3rd space, anyone of the 7 remaining digits can be placed since two digits are already assigned in the first two spaces. Using the product rule, the number of 3-digit numbers that can be formed if repetition of digits is not allowed is 9 x 8 x 7 = 504.

So, the number of 3-digit numbers that can be formed if repetition is not allowed is 504.

What's More

Activity 1: What's My Outfit?

Clarisse wanted to go the Shopping Mall. She was confused on what to wear. In her wardrobe she found a gray (G) and a black (B) jeans and a red (R), a yellow (Y) and a white (W) shirts. Help Clarisse choose her outfit matching her available jeans and t-shirts using the following methods.

a. Tabular B. Tree Diagram C. Systematic Listing

Questions:

1. How many choices of pants are there?
2. How many choices of shirts are there?
3. How many different possible choices of outfits does Clarisse have?

Activity 2: It's Your Turn!

From the digits 1, 2, 4, 5, 7, 8, how many four-digit numbers can be formed if repetition of digits is allowed?

Questions:

1. How many digits are given?
2. How many digits are required in each number to be formed?
3. How many options are there for the first digit? second digit? third digit? fourth digit?
4. Is the product rule applicable to answer the problem?
5. How many four-digit numbers are formed?
6. What is the greatest 4-digit number formed in this activity?

Activity 3. It's Lunch Time!

A school canteen offers a student meal. It is composed of cup of rice, a vegetable viand, a meat viand, and a regular drink. If there are 3 vegetable viands (pinakbet, chop suey, or mixed vegetables), 3 meat viands (afritada, adobong baboy, or beef steak), and 2 drinks (lemon juice, or kalamansi juice) organize the possible choices a student can have using tree diagram.

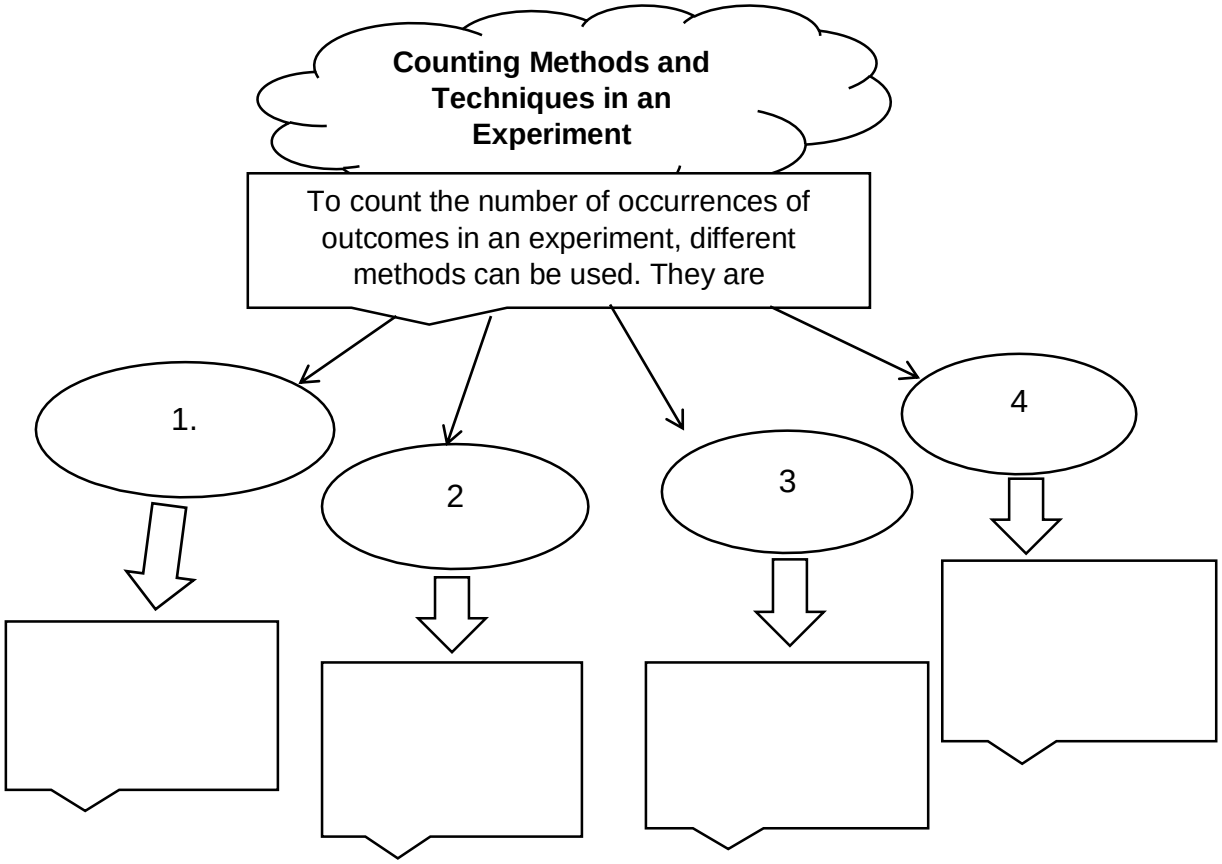
Questions:

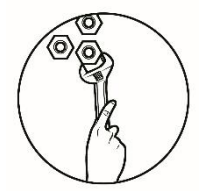
1. How many possible choices of meal does a student have?
2. What are the possible choices of meal that a student can choose from?
3. How important are the counting techniques in our real-life setting or experiments?

What I Have Learned

Who am I?

Directions: Fill in the information in the four ovals below. Describe each of the information using keywords in the boxes below the ovals.





What I Can Do

Travel Hassles

At last, Marlita is permitted to work abroad. She carries a new luggage locked with 3-digit number combinations. Excitement and anxiety filled her heart and mind while on travel. When she reached her destination, she wanted to freshen up, so she got her luggage and opened it. But she forgot the number combination. She can only remember that it started with 8, no "0", and that digits are not repeated. With this in mind, she made several attempts to open her luggage by making different number combinations but still failed to open it.

Help Marlita open her luggage by listing down all the possible combinations. You will be rated based on this rubric:

Score	Description
10	If you have listed all the 91 - 100% of all possible number combinations.
9	If you have listed 81 - 90% of all possible number combinations only.
8	If you have listed 71 - 80% of all possible number combinations only.
7	If you have listed 61 – 70% of all possible number combinations only.
6	If you have listed 51 – 60% of all possible number combinations only.
5	If you have listed 41 – 50% of all possible number combinations only.
4	If you have listed 31 – 40% of all possible number combinations only.
3	If you have listed 21 – 30% of all possible number combinations only.
2	If you have listed 11 – 20% of all possible number combinations only.
1	If you have listed 1 – 10% of all possible number combinations only.
0	If you have not listed any possible number combinations.

Assessment

POST- ASSESSMENT

Directions: Read the questions carefully and encircle the letter of the correct answer.

1. A newlywed couple plans to have 3 children of their own. Here is the list of possible genders of their children: {BBB, BBG, BGB, BGG, GBB, GBG, GGB, GGG}. How do we call this method of counting the number of occurrences of the genders of their would-be children?
   A. Fundamental Counting Principle
   B. Systematic listing
   C. Tabular
   D. Tree diagram

2. What technique of counting possible outcomes is illustrated below?

	1	2	3
A	(A,1)	(A,2)	(A,3)
B	(B,1)	(B,2)	(B,3)

   A. Fundamental Counting Principle
   B. Systematic listing
   C. Tabular
   D. Tree diagram

3. Carmina has 4 different blouses and 3 different skirts to be worn by a mannequin. In how many ways can she dress the mannequin?
   A. 3 B. 6 C. 9 D. 12

4. Which method is best to use in counting the number of 5-digit numbers that can be formed using the digits 1, 2, 3, 4, 5, 6, 7, 8, and 9?
   A. Fundamental Counting Principle
   B. Systematic Listing
   C. Table
   D. Tree Diagram

5. How many outfits are possible with 5 pairs of jeans, 8 t-shirts and 2 pairs of shoes?
   A. 15 B. 40 C. 80 D. 100

6. A coin is tossed once, and a die is rolled once. Which of the following could **not** be an outcome?
   A. (H, 6) B. (T, 5) C. (T, T) D. (T, 1)

7. If a coin is tossed thrice, there are 8 possible outcomes. How many possible outcomes are there if a coin is tossed four times?
   A. 8 B. 12 C. 16 D. 20

8. A canteen sells four different snack foods and two types of fruit juices. Grace can choose one snack food and one fruit juice. How many possible ways can she choose her snacks?
   A. 2 B. 3 C. 6 D. 8

9. A luggage is locked with a 3-digit even number selected from 1 – 9 digits and repetition of digits is **not** allowed. How many possible ways the luggage can be locked?
   A.150 B. 224 C. 260 D. 380

10. Six different books are to be arranged on a shelf. Unfortunately, the space available is only good for three books. Applying the product rule, which one gives the number of ways of arranging the books on the shelf?
   A. 3 x 2 x 1 B. 3 x 5 x 6 C. 6 x 5 x 4 D. 6 x 6 x 6

11. Which expression gives the number of ways a leader, a secretary, and a reporter be selected from a group of 5 members?
   A. 5 x 5 x 5 B. 5 x 4 x 3 C. 5 x 3 x 2 D. 5 x 3 x 1

12. In a 5-item true or false test, which of the following will give us the number of ways of answering the whole test?
   A. 2 x 2 x 2 x 2 x 2 C. 3 x 3 x 3 x 3 x 3
   B. 2 x 3 x 3 x 3 x 3 D. 5 x 5 x 5 x 5 x 5

13. John rolled a die once and tossed some coins once. If the number of possible outcomes is 24, how many coins were tossed?
   A. 1 B. 2 C. 3 D. 4

14. Which of the following situations will give 120 possible outcomes?

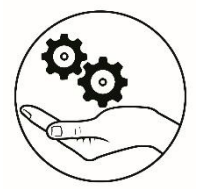
   I. The number of ways a family of 5 members can arrange themselves in a row for a picture taking.
   II. The number of ways lunch can be selected from 2 kinds of rice, 4 kinds of meat and vegetable viands, 3 different desserts, and 5 different fruit juices.
   III. The number of ways a protective gear can be worn from 5 different overalls, 3 different face masks, 3 pairs of gloves and 2 pairs of goggles.

   A. I only B. II only C. I and II only D. I, II, III

15. Which of the following shows the importance of the counting techniques in determining the number of outcomes of an experiment in real life settings?

   I. The listing of possible menu combinations in a restaurant will enable the customers to select easily.
   II. Enable everyone to list down possible choices accurately.
   III. Can make us rich.

   A. I and II only C. I and III only
   B. II and III only D. I, II, and III



Additional Activities

Unveil Me!

Cardano is an Italian physician, mathematician, and astrologer. He gave the first clinical description of typhus fever. What is Cardano's first name? To know the first name of Cardano, match each question with the possible answers listed in the box. Write the letter that corresponds to the best answer. If you got all answers right, then you will know Cardano's first name.

1	2	3	4	5	6	7	8

Questions:

1. What are the possible outcomes when a coin is tossed three times?
2. How do you call the set of all possible outcomes of an experiment?
3. If each of the four different skirts will be paired with each of the eight different blouses, how many pairs are possible?
4. How do you call the counting technique that involves writing all the possible outcomes in an experiment?
5. It is a technique of finding the number of possible outcomes in an experiment without listing.
6. From the digits 2, 3, 4, 5, 6, 8, how many three-digit odd numbers can be formed if repetition of digits is not allowed?
7. What do we call the counting technique that uses columns and rows?
8. The possible outcomes when a coin is tossed three times are HHH, HHT, HTH, HTT, THH, THT, TTH, TTT. What counting technique is used here?

Possible Answers:

A. 40
B. Statistics
C. Event
D. Certain
E. Sample space
F. Probability
G. {HHH, HHT, HTH, HTT, THH, THT, TTH, TTT}
H. {HHH, HHT, HTH, HTT, THH, HTH, TTH, TTT}
I. Tree diagram
J. Possible outcomes
K. 20
L. Fundamental principle of counting
M. Tabular
N. Experiment
O. Systematic listing
P. 27
Q. 28
R. 32

Answer Key

What I Know

1. D
2. B
3. C
4. A
5. C
6. D
7. B
8. D
9. D
10. B
11. B
12. A
13. C
14. D
15. D

What's In

1. {1H, 1T, 2H, 2T, 3H, 3T, 4H, 4T, 5H, 5T, 6H, 6T}
2. {HHH, HHT, HTH, HTT, THH, THT, TTH, TTT}
3. {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}
4. {1, 2, 3, 4, 5, 6}
5. {(1,1), (1,2), (1,3), (1,4), (1,5), (1,6), (2,1), (2,2), (2,3), (2,4), (2,5), (2,6), (3,1), (3,2), (3,3), (3,4), (3,5), (3,6), (4,1), (4,2), (4,3), (4,4), (4,5), (4,6), (5,1), (5,2), (5,3), (5,4), (5,5), (5,6), (6,1), (6,2), (6,3), (6,4), (6,5), (6,6)}

What's New

1. Rolling a pair of dice once
2. {(1,1), (1,2), (1,3), (1,4), (1,5), (1,6), (2,1), (2,2), (2,3), (2,4), (2,5), (2,6), (3,1), (3,2. (3,3), (3,4), (3,5), (3,6), (4,1), (4,2), (4,3), (4,4), (4,5), (4,6), (5,1), (5,2), (5,3), (5,4), (5,5), (5,6), (6,1), (6,2), (6,3), (6,4), (6,5), (6,6)}
3. 36
4. Sample space
5. Yes. It is used in finding the probability of an event.

What I Have Learned

1. Table
2. Tree diagram
3. Systematic listing
4. Fundamental principle of counting

Assessment

1. B
2. C
3. D
4. A
5. C
6. C
7. C
8. D
9. B
10. C
11. B
12. A
13. B
14. C
15. A

What's More

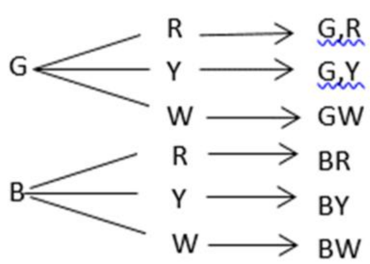
Activity 1. What's my outfit?

a. table

Shirts/ Jeans	R	Y	W
G	(G,R)	(G,Y)	(G,W)
B	(B,R)	((B,Y)	(B,W)

b. tree diagram

Jeans Shirts Outcomes



c. systematic listing

S = { (G,R), (G,Y), (G,W), (B,R), (B,Y), (B,W) }

Activity 2: It's your turn

1. 6
2. 4
3. 6, 6, 6, 6
4. Yes
5. 1,296
6. 8,888

Activity 3. It's Lunch Time

1. 18
2. { (pinakbet, afritada,, lemon juice),
(pinakbet, afritada, kalamansi juice),
(pinakbet, adobong baboy, lemon juice),
(pinakbet, adobong baboy, kalamansi juice),
(pinakbet, beef steak, lemon juice),
(pinakbet, beef steak, kalamansi juice),
(chopsuey, afritada, lemon juice),
(chopsuey, afritada, kalamansi juice),
(chopsuey, adobong baboy, lemon juice),
(chopsuey, adobong baboy, kalamansi juice),
(chopsuey, beef steak, lemon juice),
(chopsuey, beef steak, kalamansi juice),
(mixed vegetables, afritada, lemon juice),
(mixed vegetables, afritada, kalamansi juice),
(mixed vegetables, adobong baboy, lemon juice),
(mixed vegetables, adobong baboy, kalamansi juice),
(mixed vegetables, beef steak, lemon juice),
(mixed vegetables, beef steak, kalamansi juice)}
3. It will help us count all the possible outcomes.

Additional Activities

G	E	R	O	L	A	M	O
1	2	3	4	5	6	7	8

References

Abuzo, E. P., Bryant, M. L., Cabrella, J. B., Caldez, B. P., Callanta, M. M., Castro, A. I.,
Halabaso, A. R., Javier, S. P., Nocom, R. T., & Ternida, C. S. (2013). Grade 8 Mathematics Learner's Module. Philippines: Book Media Press, Inc. and Printwell, Inc.

Bennett, Jennie M, et.al, *Mathematics Course 1*, (Holt, Rinehart and Winston, 2007), 668 – 681

Oronce, O. A., & Mendoza, M. O. (2015). *E- MATH Worktext in Mathematics.* Philippines: Rex Bookstore, Inc.

Links

https://www.cochrane.org/CD011621/protective-clothes-and-equipment-healthcare-workers- prevent-them-catching-coronavirus-and-other [Accessed 29 July 2020]

https://www.walmart.ca/en/ip/Delsey-Aero-25-in-Hardside-Expandable-Spinner-Trolley-Red/PRD67TPVM1Z4P6X [Accessed 30 July 2020]

https://courses.lumenlearning.com/sanjacinto-finitemath1/chapter/reading-counting/ [Accessed 31 July 2020]

https://faculty.atu.edu/mfinan/2043/section34.pdf. [Accessed 31 July 2020]

https://www.quia.com/jg/2251762list.html#:~:text=A%20specific%20outcome%20or%20type%20of%20outcome.&text=The%20ratio%20of%20the%20number, outcomes%20in%20a%20probability%20experiment. [Accessed 31 July 2020]

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