8

DepED
DEPARTMENT OF EDUCATION

Lesson Exemplar for Mathematics

Quarter 4
Lesson
7

Lesson Exemplar for Mathematics Grade 8
Quarter 4: Lesson 7 (Week 7)
SY 2025-2026

Development Team

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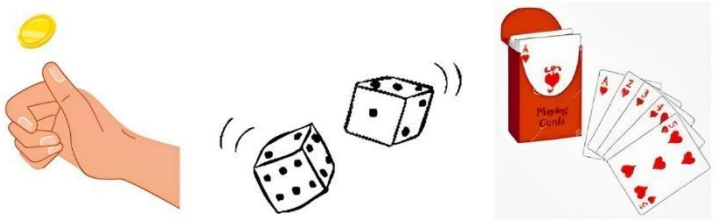
MATHEMATICS / QUARTER 4 / GRADE 8

I. CURRICULUM CONTENT, STANDARDS, AND LESSON COMPETENCIES	
A. Content Standards	The learners demonstrate knowledge and understanding of experimental and theoretical probability.
B. Performance Standards	By the end of the quarter, the learners are able to calculate the probability of a single event and the probability of simple combined events. (DP)
C. Learning Competencies and Objectives	***Learning Competency*** At the end of the lesson, the learners are able to: **1. calculate the theoretical probability of a single event by listing all possible outcomes.** **2. describe probability as a measure of the chance of an event occurring.** *Lesson Objective 1: Define theoretical probability.* *Lesson Objective 2: List all possible outcomes for probability of a single event.* *Lesson Objective 3: Measure the chances using theoretical probability of a single event.* *Lesson Objective 4: Solve problems in theoretical probability of a single event.*
D. Content	1. Define Theoretical Probability and Describing its Sample Space 2. Calculating Theoretical Probability of a Single Event 3. Solving Problems Involving Theoretical Probability
E. Integration	

II. LEARNING RESOURCES
169_186_CC_A_RSPC1_C12_662330.indd. (2018). *Worksheet 9-5 - Math 7.pdf*. https://www.dvsd.org/cms/lib/PA01001022/Centricity/Domain/385/Worksheet%209-5%20-%20Math%207.pdf 3.4 - solutions to practice packet 1 - 3 pages.pdf. (2016). *3.4 - Solutions to Practice Packet 1 - 3 pages.pdf*. https://pa01000176.schoolwires.net/cms/lib/PA01000176/Centricity/Domain/1020/3.4%20-%20solutions%20to%20practice%20packet%201%20-%203%20pages.pdf Burke, C. (2020, March 22). *Simple Probabilities*. Pinterest. https://ph.pinterest.com/pin/334392341084845677/ Campbell, J. (2012). MSCC3_Red_PE_10CO.indd. *g7_10.pdf*. https://static.bigideasmath.com/protected/content/pe/ca/g7_10.pdf *Football Time Cliparts #2834323 (License: Personal Use)*. (n.d.). https://clipart-library.com/clipart/740544.htm https://www.cazoommaths.com/maths-worksheet/playing-cards-and-probability-worksheet/ *Lesson Explainer: Theoretical probability*. (n.d.). https://www.nagwa.com/en/explainers/873142979130/

Libretexts. (2022, July 18). *8.1: Sample spaces and probability*. Mathematics LibreTexts. https://math.libretexts.org/Bookshelves/Applied_Mathematics/Applied_Finite_Mathematics_(Sekhon_and_Bloom)/08%3A_Probability/8.01%3A_Sample_Spaces_and_Probability
Nivera, G., PhD. (2018). *Grade 8 Mathematics Patterns and Practicalities*. Salesiana Book by Don Bosco Press Inc.
Oronce, O. A. (2007). *E-math IV' 2007 Ed.(advanced algebra and trigonometry)* (1st ed.). Rex Bookstore.
Sample Spaces and The Counting Principle.pdf. (2015). *Document1*. https://cdn.kutasoftware.com/Worksheets/Alg2/Sample%20Spaces%20and%20The%20Counting%20Principle.pdf
Vasta, S. (2022, June 27). *Statistics Worksheets*. Pinterest. https://ph.pinterest.com/pin/279082508149951803/
Vector Spin Wheel Game with numbers 1-10 Stock Vector. (n.d.). Adobe Stock. https://stock.adobe.com/images/vector-spin-wheel-game-with-numbers-1-10/102178929

III. TEACHING AND LEARNING PROCEDURE		NOTES TO TEACHERS
A. Activating Prior Knowledge	**DAY 1** **1. Short Review** **Activity 1:** Use fundamental counting principle to find the total number of outcomes in each situation. 1. A men's department store sells 4 different suit jackets, 5 different shirts, 6 different ties, and 5 different pairs of pants. How many different suits consisting of a jacket, shirt, tie, and pants are possible? 2. Alexa loves to eat salad. How many different salad varieties can she have if she chose one from three types of lettuce, one from five choices of additional vegetable ingredient, and one from six types of dressing? 3. A restaurant offers three sizes of pizza, two types of crust, and nine toppings. How many possible combinations of pizza can the restaurant offer? 4. How many different outcomes are there when a coin is tossed 4 times? 5. A car dealer has 7 car models, 6 exterior paints and 3 interior colors. How many choices can the car dealer have? **2. Feedback (Optional)**	**Short Review Answers:** 1. 600 different suits 2. 90 salad varieties 3. 54 pizza combinations 4. 16 different outcomes 5. 126 cars
B. Establishing Lesson Purpose	**1. Lesson Purpose** Observe the following pictures.	



Questions:

1. What can you say about the given pictures?
2. Have you experienced playing these kinds of games?
3. What is the chance that you will win in each game?
4. If you will not perform any of the given activity, can you still determine the chance of an event to happen?

All the given pictures illustrate probability. **Probability** is a mathematical way of describing how likely an outcome or event is to occur.

2. Unlocking Content Vocabulary

PROBABILITY in a sample space of equally likely outcomes, is denoted by

$$P(E) = \frac{n(E)}{n(S)}$$

where: P(E) = probability of an event
n(E) = number of favorable outcomes
n(S) = number of possible outcomes

PROBABILITY is a value between zero and one inclusive. It can be expressed in fraction, decimal, percent or even ratio.

- When an event is impossible to happen, its probability is zero.
- When an event is certain to happen, its probability is one.
- The closer a probability is to 1, the more likely an event is to happen.

EXPERIMENT – an activity with observable results
OUTCOME – the result of an experiment
SAMPLE SPACE – the set of all possible outcomes

	EVENT – subset of a sample space of an experiment.	
C. Developing and Deepening Understanding	**SUB-TOPIC 1: Define Theoretical Probability and Describing its Sample Space** **1. Explicitation** What can you about the following statements: a) An unbiased coin is tossed. b) A fair die is rolled. c) one card is drawn from a well-shuffled deck of cards Without performing the 3 experiments, you can still identify all the possible outcomes and you can still find the probability of a certain event. When the probability is calculated without any experiment being performed, it is known as **theoretical probability**. Theoretical probability describes the behavior you expect to happen in theory. This is different from experimental probability, which is obtained through carrying out the same experiment multiple times and analyzing the resulting data. **2. Worked Example** Without performing each experiment, answer the given questions. **Example 1:** An unbiased coin is tossed. a) List all the possible outcomes. b) How many possible outcomes are there? **Example 2:** A fair die is rolled. a) List all the possible outcomes. b) How many possible outcomes are there? **Example 3:** Two coins are tossed. a) List all the possible outcomes. b) How many possible outcomes are there? **Example 4:** The chess club must decide when to meet for a practice. The possible days are Tuesday, Wednesday, or Thursday. The possible times are 3, 4, or 5 p.m. a) List all the possible outcomes. b) How many possible outcomes are there?	**Example 1 Answers:** a) S = {head, tail} b) n(S) = 2 **Example 2 Answers:** a) S = {1,2,3,4,5,6} b) n(S) = 6 **Example 3 Answers:** a) S = {HH, HT, TH,TT} b) n(S) = 4 **Example 4 Answers:** a) S = { (T3, W3, Th3, T4, W4, Th4, T5, W5, Th5) } b) n(S) = 9

	Example 5: A spinner can land on either red or blue. You spin and then roll a six-sided die. a) List all the possible outcomes. b) How many possible outcomes are there? **Questions:** 1. If the experiment is rolling 2 dice or 3 dice, what is an easier way to identify the number of possible outcomes? 2. Is the number of outcomes in theoretical probability the same with the number of outcomes in an experimental probability? **3. Lesson Activity** **Activity 2:** A. True or False. 1. A probability that is calculated without performing any experiment is a theoretical probability. 2. The statement "A company makes light bulbs, when it tests a sample of 100 bulbs, it finds that, on average, 4 are faulty." represents theoretical probability. 3. Theoretical probability allows equal chances in an experiment. 4. The number of possible outcomes in experimental probability is the same with the number of possible outcomes in a theoretical probability. 5. A theoretical probability's value can be greater than 1. B. List all the possible outcomes without performing an experiment. Identify the number of possible outcomes for each experiment. 1. Tossing three coins. 2. A jar contains three marbles numbered 1,2 and 3. Two marbles are drawn without replacement. 3. A jar contains three marbles numbered 1,2 and 3. Two marbles are drawn with replacement. 4. When a button is pressed, a computer program outputs a random odd number greater than 1 and less than 9. You press the button twice. 5. There are two boys and a girl on a trivia team. Two questions remain. One team member is randomly picked to answer the first question and a different member is picked to answer the second question.	**Example 5 Answers:** a) S = {R1, R2, R3, R4, R5, R6, B1, B2, B3, B4, B5, B6} b) n(S) = 12 **Answers:** 1. Use fundamental counting principle. 2. No. the number of outcomes in experimental probability is based on the trials performed while the number of outcomes in theoretical probability is based on all possible outcomes. **Activity 2 Answers:** A. 1. True 2. False 3. True 4. False 5. False B. 1. S = {HHH, HHT,HTH, HTT, THH, THT, TTH, TTT} n(S) = 8 2.{(1,2),(1,3),(2,1),(2,3),(3,1),(3,2)} n(S) = 6 3. {(1,1),(1,2),(1,3),(2,1),(2,2), (2,3),(3,1),(3,2), (3,3)} n(S) = 9 4.{(3,3),(3,5),(3,7),(5,3),(5,5),(5,7), (7,3),(7,5),(7,7)} n(S) = 9 5. {(B_1,B_2),(B_1,G_1),(B_2,B_1),

$(B_2,G_1),(G_1,B_1),(G_1,B_2)\}$
n(S) = 6

DAY 2

SUB-TOPIC 2: Calculating Theoretical Probability of a Single Event

1. Explicitation

The First Kickoff

Miguel and his classmates are going to play soccer. The referee tosses a coin to determine who is going to have the first kickoff. What do you think is the chance that Miguel will have the first kickoff?

Search image of football player. Sample figure:
https://clipart-library.com/clipart/dc4oz44qi.htm

2. Worked Example

To solve for the probability of a simple event, the formula is: $\boldsymbol{P(E) = \frac{n(E)}{n(S)}}$

where: P(E) = probability of an event
n(E) = number of favorable outcomes
n(S) = number of possible outcomes

Since you already learned how to find all possible outcomes in Day 1's lesson, you will apply this to solve the probability of a simple event.

Example 1: An unbiased coin is tossed. What is the probability that:
a) a head will come out?
b) a tail will come out?

Solution:

a) n(S) = 2
In a coin, there is one head so n(E) = 1

$$P(E) = \frac{n(E)}{n(S)}$$
$$P(E) = \frac{1}{2}$$

Therefore, the probability that a head will come out from tossing an unbiased coin is $\frac{1}{2}$ or 50% or 0.5.

b) n(S) = 2
In a coin, there is one tail so n(E)= 1

$$P(E) = \frac{n(E)}{n(S)}$$

$$P(E) = \frac{1}{2}$$

Therefore, the probability that a tail will come out from tossing an unbiased coin is $\frac{1}{2}$ or 50% or 0.5.

Answer:
50%

Question:
What do you think is the chance that Miguel will have the first kickoff?

Example 2: A fair die is rolled. What is the probability that:

a) a 4 comes out?
b) an even number comes out?
c) a number less than 6 comes out?
d) a number greater than 6 comes out?
e) a number less than 7 comes out?

Solutions:

a) n(S) = 6

In a die, there is only one 4 so n(E) = 1

$$P(E) = \frac{n(E)}{n(S)}$$

$$P(E) = \frac{1}{6}$$

Therefore, the probability that a 4 comes out from rolling a fair die is $\frac{1}{6}$ or approximately 16.7% or 0.167.

b) n(S) = 6

In a die, the numbers that are even are 2, 4 and 6 so n(E) = 3

$$P(E) = \frac{n(E)}{n(S)}$$

$$P(E) = \frac{3}{6} \textbf{ or } \frac{1}{2}$$

Therefore, the probability that an even number comes out from rolling a fair die is $\frac{1}{2}$ or 50% or 0.5.

c) n(S) = 6

In a die, the numbers less than 6 are 1,2,3,4, and 5 so n(E) = 5

$$P(E) = \frac{n(E)}{n(S)}$$

$$P(E) = \frac{5}{6}$$

Therefore, the probability that a number less than 6 comes out from rolling a fair die is $\frac{5}{6}$ or approximately 83% or 0.83.

d) n(S) = 6
In a die, there is no number greater than 6 so n(E) = 0

$$P(E) = \frac{n(E)}{n(S)}$$
$$P(E) = \frac{0}{6}$$
P(E) = 0

Therefore, the probability that a number greater than 6 comes out from rolling a fair die is 0.

e) n(S) = 6
In a die, the numbers less than 7 are 1,2,3,4,5 and so n(E) = 6

$$P(E) = \frac{n(E)}{n(S)}$$
$$P(E) = \frac{6}{6}$$
P(E) = 1

Therefore, the probability that a number less than 7 comes out from rolling a fair die is 1 or 100%.

3. Lesson Activity

Activity 3: Spin the Wheel

1) A spinner is shown at the right. Find the probability that the pointer stops at:

a) 1.
b) an odd number.
c) a number less than 10.
d) a prime number.
e) a number greater than 10.
f) a square number.
g) a negative number.

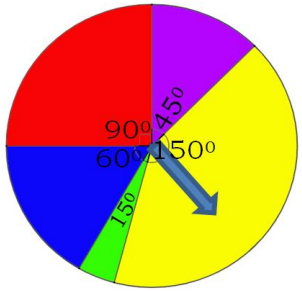
Activity 3 Answers:

1.
a) P(E)=$\frac{1}{10}$ or 10% or 0.1
b) P(E)=$\frac{5}{10}$ or $\frac{1}{2}$ or 50% or 0.5
c) P(E)=$\frac{10}{10}$ or 1 or 100%
d) P(E)=$\frac{4}{10}$ or $\frac{2}{5}$ or 40% or 0.4
e) P(E)=0
f) P(E)=$\frac{3}{10}$ or 30% or 0.3
g) P(E)=0

2.
a) P(E)=$\frac{90}{360}$ or $\frac{1}{4}$ or 25% or 0.25
b) P(E)=$\frac{45}{360}$ or $\frac{1}{8}$ or 12.5% or 0.125
c) P(E)=$\frac{15}{360}$ or $\frac{4}{10}$ or $\frac{2}{5}$ or 40% or 0.4
d) P(E)=$\frac{60}{360}$ or $\frac{1}{6}$ or 16.7% or 0.167
e) P(E)=$\frac{150}{360}$ or $\frac{5}{12}$ or 41.7% or

2) A spinner is constructed as shown to the right. When the pointer is spun, find the probability that it will stop at:

a) red.
b) violet.
c) green.
d) blue.
e) yellow.
f) orange.



0.417

f) P(E)=0

DAY 3

SUB-TOPIC 3: Solving Problems Involving Theoretical Probability

1. Explicitation

Read the short comic strip.

Search image of short comic strip related to probability of rolling a die.
Sample figure: https://ph.pinterest.com/pin/334392341084845677/

- What do you think is incorrect in the comic strip you read?
- What should be the correct answer? Why?

2. Worked Example

In solving for the theoretical probability of a simple event, the formula is:

$$P(E) = \frac{n(E)}{n(S)}$$

where: P(E) = probability of an event
n(E) = number of favorable outcomes
n(S) = number of possible outcomes

Example 1: A fair die is rolled. What is the probability that a two comes out?
Solution:

n(S) = 6
n(E) = 1, since there is only one 2 in a die.

$$P(E) = \frac{n(E)}{n(S)}$$

$$P(E) = \frac{1}{6}$$

Therefore, the probability that a two comes out from rolling a fair die is $\frac{1}{6}$ or 16.7% or 0.167.

Example 2: A bag contains 6 blue and 10 yellow marbles. If you pick a marble from the bag, what is the probability that the marble will be yellow?

Solution:

n(S) = 16
n(E) = 10, since there are 10 yellow marbles in a bag

$$P(E) = \frac{n(E)}{n(S)}$$

$$P(E) = \frac{10}{16} or \frac{5}{8}$$

Therefore, the probability that a two comes out from rolling a fair die is $\frac{5}{8}$ or 62.5% or 0.625.

Example 3: Two coins are tossed. What is the probability that it will land on a both tails?

Solution:

n(S) = 4 since S={HH,HT,TH,TT}
n(E) = 1, since there is only one outcome that it will land on both tails (TT)

$$P(E) = \frac{n(E)}{n(S)}$$

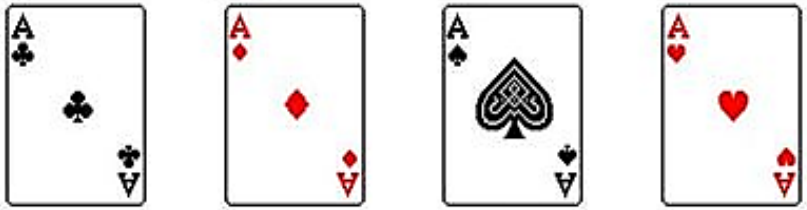
$$P(E) = \frac{1}{4}$$

Therefore, the probability that a two comes out from rolling a fair die is $\frac{1}{4}$ or 25% or 0.25.

3. Lesson Activity

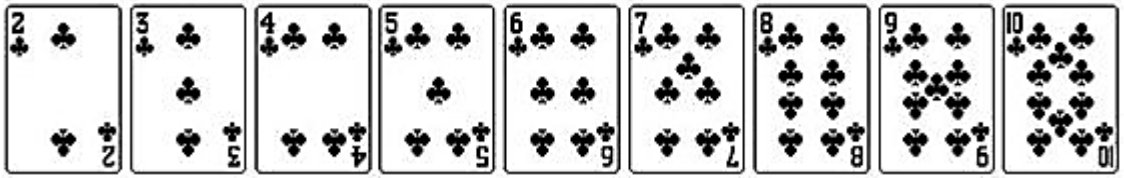
Activity 4: Let's Play Cards!

A pack of 52 playing cards is made up of 4 suits.

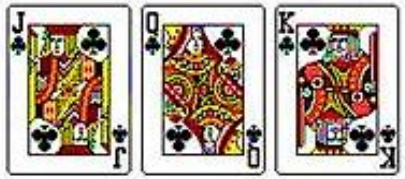


Clubs (Black) | Diamonds (Red) | Spades (Black) | Hearts (Red)

Each suit contains number cards.



Each suit also contains royal cards.



The final card in each suit is the ace.

One card is selected at random from a well-shuffled deck of cards.

Find the probability of getting:	**Answer:**
a) black card	
b) hearts	
c) a number card	
d) a face card	
e) an ace	
f) a prime number card	
g) a red card	
h) an even number red card	
i) a jack	

Activity 4 Answers:

a) $\frac{26}{52}$ or $\frac{1}{2}$ or 50% or 0.5
b) $\frac{13}{52}$ or $\frac{1}{4}$ or 25% or 0.25
c) $\frac{36}{52}$ or $\frac{9}{13}$ or 69.2% or 0.692
d) $\frac{12}{52}$ or $\frac{3}{13}$ or 23.1% or 0.231
e) $\frac{4}{52}$ or $\frac{1}{13}$ or 7.7% or 0.077
f) $\frac{16}{52}$ or $\frac{4}{13}$ or 30.8% or 0.308
g) $\frac{26}{52}$ or $\frac{1}{2}$ or 50% or 0.5
h) $\frac{20}{52}$ or $\frac{5}{13}$ or 38.5% or 0.385
i) $\frac{4}{52}$ or $\frac{1}{13}$ or 7.7% or 0.077
j) $\frac{2}{52}$ or $\frac{1}{26}$ or 3.8% or 0.038
k) $\frac{8}{52}$ or $\frac{2}{13}$ or 15.4% or 0.154
l) $\frac{6}{52}$ or $\frac{3}{26}$ or 11.5% or 0.115
m) $\frac{12}{52}$ or $\frac{3}{13}$ or 23.1% or 0.231
n) $\frac{1}{52}$ or 1.9% or 0.019
o) $\frac{18}{52}$ or $\frac{9}{26}$ or 34.6% or 0.346

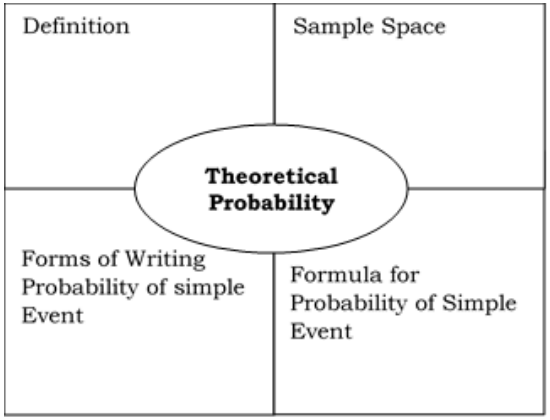
	j) a six black card	
	k) an odd number red card	
	l) a black face card	
	m) a royal card	
	n) a king of hearts	
	o) a black three	

D. Making Generalizations

DAY 4

Learners' Takeaways and Reflection on Learning

Use the Frayer Diagram to show what you learned.



IV. EVALUATING LEARNING: FORMATIVE ASSESSMENT AND TEACHER'S REFLECTION		NOTES TO TEACHERS
A. Evaluating Learning	**1. Formative Assessment** A. Choose the letter of the correct answer. 1. An unbiased coin is tossed three times, what is the probability that it will land heads three times? A. $\frac{1}{8}$ B. $\frac{1}{4}$ C. $\frac{1}{3}$ D. $\frac{1}{2}$ 2. A bag has 3 red marbles, 4 green marbles and 8 yellow marbles. What is the probability of pulling a red marble? A. $\frac{4}{15}$ B. $\frac{1}{5}$ C. $\frac{8}{15}$ D. 0	**Answers:** A. 1. A 2. B 3. D 4. B 5. A 6. D 7. C

3. What is the likelihood of getting a black heart from a standard deck of cards?
   A. $\frac{1}{13}$ B. $\frac{4}{13}$ C. $\frac{1}{52}$ D. 0

4. A fair die is rolled, what is the probability that an odd number comes out?
   A. $\frac{1}{6}$ B. $\frac{1}{2}$ C. $\frac{1}{3}$ D. 0
5. From a pack of 52 playing cards, what is the probability of drawing a spade?
   A. $\frac{1}{4}$ B. $\frac{6}{13}$ C. $\frac{9}{13}$ D. 0

6. The probability of winning a certain game is 60%. If the game is played twenty times, how many times would someone be expected to lose?
   A. 0 B. 12 C. 6 D. 8

7. A coin is tossed twice. Find the probability of getting at least one head.
   A. $\frac{1}{4}$ B. $\frac{1}{2}$ C. $\frac{3}{4}$ D. 0

8. What is the probability of getting a number greater than 1 when a fair die is rolled?
   A. $\frac{1}{2}$ B. $\frac{2}{3}$ C. $\frac{5}{6}$ D. 0

9. In scrabble, 2 of the 100 tiles are blank. Find the probability of drawing a blank tile from the entire set of scrabble tiles.
   A. 2% B. 4% C. 20% D. 0

10. What is the probability of drawing a king from a standard deck of cards?
   A. 0 B. $\frac{1}{2}$ C. $\frac{4}{13}$ D. $\frac{1}{13}$

B. A pair of dice is rolled. Find the probability in fraction form.
1. a double 1 comes out.
2. 5 comes out on the first die.
3. factor of 6 comes out.

8. C
9. A
10. D

Answers:
B.
1. $\frac{1}{36}$
2. $\frac{6}{36} or \frac{1}{6}$

<table>
<tr>
<td></td>
<td colspan="3">4. the same number comes out
5. the sum of the numbers is odd.

2. Homework (Optional)</td>
<td>3. $\frac{4}{36} or \frac{1}{9}$
4. $\frac{6}{36} or \frac{1}{6}$
5. $\frac{18}{36} or \frac{1}{2}$</td>
</tr>
<tr>
<td rowspan="5">B. Teacher's Remarks</td>
<td>Note observations on any of the following areas:</td>
<td>Effective Practices</td>
<td>Problems Encountered</td>
<td rowspan="5">The teacher may take note of some observations related to the effective practices and problems encountered after utilizing the different strategies, materials used, learner engagement, and other related stuff.

Teachers may also suggest ways to improve the different activities explored/lesson exemplar.</td>
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<tr>
<td>strategies explored</td>
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<td>materials used</td>
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<td>learner engagement/ interaction</td>
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<td>others</td>
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<td>C. Teacher's Reflection</td>
<td colspan="3">Reflection guide or prompt can be on:
• <u>principles behind the teaching</u>
What principles and beliefs informed my lesson?
Why did I teach the lesson the way I did?

• <u>students</u>
What roles did my students play in my lesson?
What did my students learn? How did they learn?

• <u>ways forward</u>
What could I have done differently?
What can I explore in the next lesson?</td>
<td>Teacher's reflection in every lesson conducted/facilitated is essential and necessary to improve practice. You may also consider this as an input for the LAC/Collab sessions.</td>
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