Mathematics
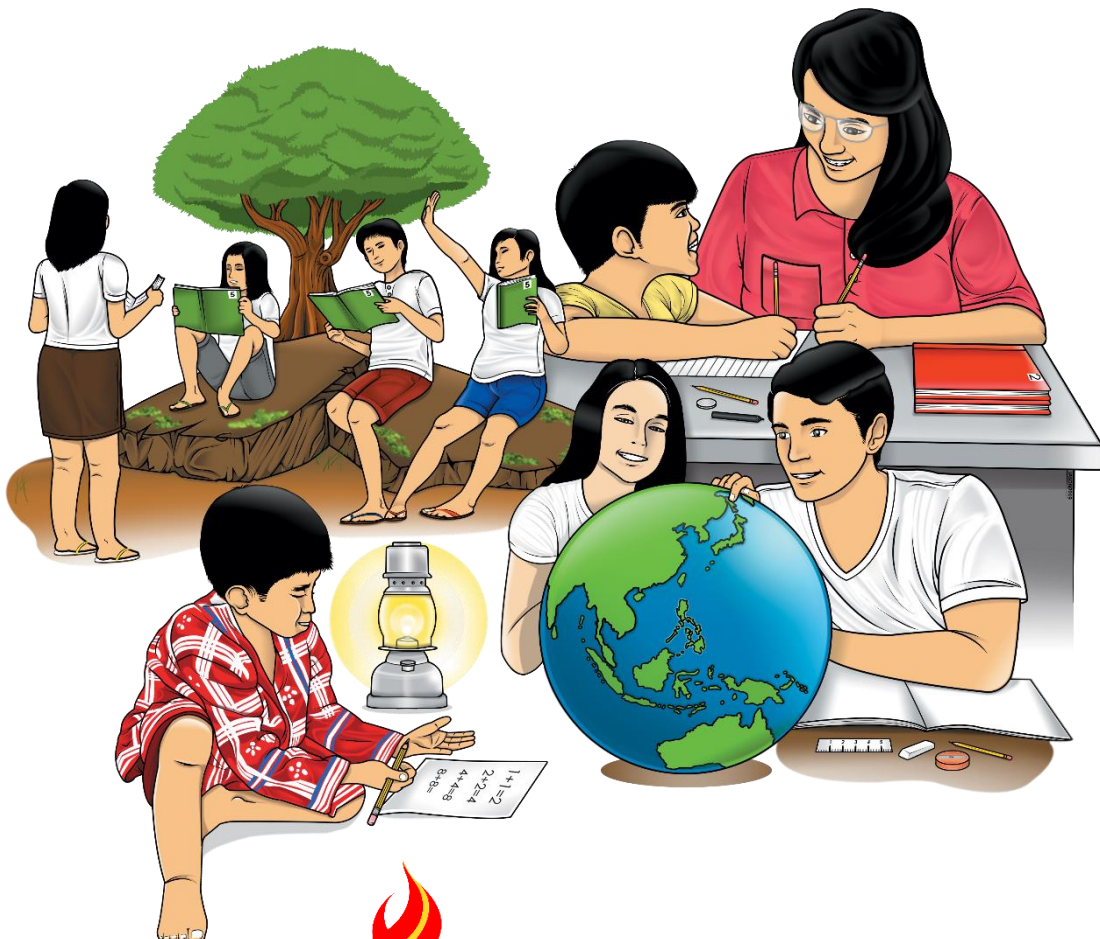
Quarter 4 – Module 6:
Illustrating an Experiment, Outcome, Sample Space and Event

ALTERNATIVE DELIVERY MODE

ADM

Mathematics – Grade 8
Alternative Delivery Mode
Quarter 4 – Module 6: Illustrating an Experiment, Outcome, Sample Space and Event
First Edition, 2020

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Mathematics

Quarter 4 – Module 6:
Illustrating an Experiment, Outcome, Sample Space and Event

DepED
DEPARTMENT OF EDUCATION

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 illustrating an experiment, outcome, sample space and event. 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 1- Illustrating an Experiment, Outcome, Sample Space and Event

After going through this module, you are expected to:

1. define an experiment, outcome, sample space and event;
2. illustrate an experiment, outcome, sample space and event; and
3. relate the importance of an experiment, outcome, sample space and event in real-life situation.
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What I Know

PRE-ASSESSMENT

Directions: Answer each of the following items. Encircle the letter of the correct answer.

1. How many faces does a cube have?
   A. 3   B. 4   C. 5   D. 6

2. Which is referred to as an activity involving chance that can have different results?
   A. Event   B. Experiment   C. Sample Point   D. Sample Space

3. How many possible outcomes are there when you spin the spinner shown at the right?

   A. 1   B. 2   C. 3   D. 4

4. What do you call the set of all possible outcomes of an experiment?
   A. Event   B. Experiment   C. Sample Point   D. Sample Space

5. How many aces are there in a standard deck of 52 playing cards?
   A. 4   B. 6   C. 10   D. 13

6. Which is referred to as the results of an experiment?
   A. Events   B. Outcomes   C. Sample Points   D. Sample Spaces

7. In the word **EXPERIMENT,** how many vowel letter/s is/are there?
   A. 1   B. 2   C. 3   D. 4

8. Which is referred to as the set of some outcomes of an experiment?
   A. Event   B. Outcomes   C. Sample Point   D. Sample Space

9. Suppose you toss a coin once, how many possible outcomes are there?
   A. 1   B. 2   C. 3   D. 4

10. Ana flipped a coin once. Which set contains the possible outcomes?
   A. $S = \{H, T\}$ C. $S = \{(H,H), (H,T), (T,H)\}$
   B. $S = \{(H,H), (T,T)\}$ D. $S = \{(H,H), (H,T), (T,H), (T,T)\}$

11. Which of the following is **NOT** an experiment?
   A. rolling a die twice   C. a queen of hearts
   B. drawing a card from a deck of cards   D. flipping a coin thrice

12. Which is the sample space when you roll a die once?
   A. $S = \{4\}$ B. $S = \{2, 4, 6\}$ C. $S = \{1, 2, 3, 5, 6\}$ D. $S = \{1, 2, 3, 4, 5, 6\}$

13. If you roll two dice once, how many possible outcomes are there?
   A. 8   B. 16   C. 26   D. 36

14. Arlene got coins from her pocket which accidentally rolled on the floor. If there were 4 possible outcomes, how many coins fell on the floor?
   A. 1   B. 2   C. 3   D. 4

15.   Which of the following statements is true?
   A. Rolling a die once has 7 possible outcomes.
   B. Tossing two fair coins once has 6 possible outcomes.
   C. In a True or False test, there are four possible answers.
   D. In a standard deck of 52 playing cards, there is one Jack of spade.

Illustrating an Experiment, Outcome, Sample Space and Event

What's In

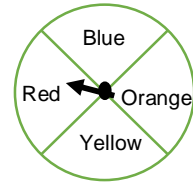Begin this module by answering some questions which may help you understand the lessons on illustrating an experiment, outcome, sample space and event.

Activity: Count On

Directions: Use Figure 1 below in completing the table. Write your answer on a separate sheet of paper.

Teacher Jose decided to buy a standard deck of (52) playing cards that he will use in discussing one of his topics in Mathematics. Help teacher Jose in identifying the number of the following cards by completing the table below.

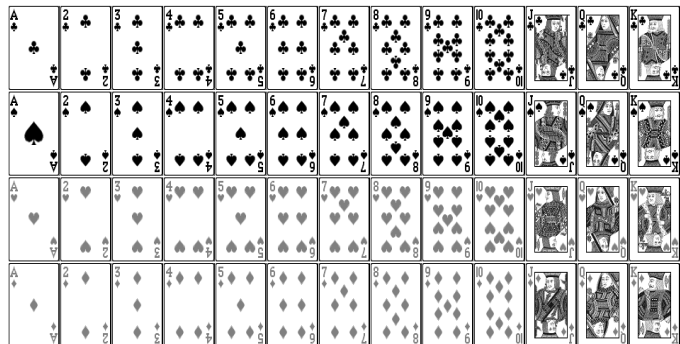| Card Name	Number of Cards
1. Jack	
2. Club	
3. Ace	
4. King of clubs	
5. 8 of spades	
6. 6 of diamonds	
7. Queen of hearts	
8. Spade	
9. 2 of hearts	
10. 3 of diamonds	

Figure 1.

Questions:
1. Did you find difficulty in answering the activity above?
2. Were you able to help Teacher Jose identify the number of specified cards?
3. How did you find the answers?

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What's New

Activity: Classify!

Directions: Group the following terms that are inside the box as **Experimen**t or **Outcome**. Write your answer in a separate sheet of paper.

head	color red
flipping a coin	spinning a spinner
rolling a die	drawing a card from a deck of 52 cards
tail	a queen of hearts
a number 3	guessing the number of marbles in a jar

Experiment	Outcome

Questions:

1. Were you able to classify the given terms?
2. How did you classify them?

What is It

Your goal in this section is to learn and understand how to illustrate an experiment, outcome, sample space and event which would help you in your daily life in making decisions.

Definitions of Terms

Experiment is an activity involving chance that can have different results. It is a process that, when performed, results in exactly one of many observations. Activities such as **tossing or flipping a coin, rolling a die, or picking a card from a standard deck of cards** without looking which could be repeated over and over again and which have well-defined results.

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Outcomes are the results of experiments. If you are flipping a coin, head and tail are the possible outcomes.

In the previous activity, you classified the given term/s as experiment or outcome. For instance, spinning a spinner is an example of experiment where you can have a possible outcome that the spinner point lands on color red.
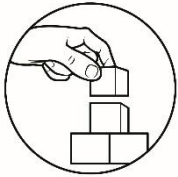
Sample Space is the set of all possible outcomes of an experiment and is denoted by S. If you are flipping a coin once, head and tail are the possible outcomes. The sample space is **S = {*Head , Tail*}**

Sample Point is an individual outcome in the sample space. It is one of the possible outcomes.

Event is a set of some elements or outcomes of an experiment. It is a subset of a sample space. It is not necessary to be the actual outcome of the experiment.

Here are some illustrative examples:

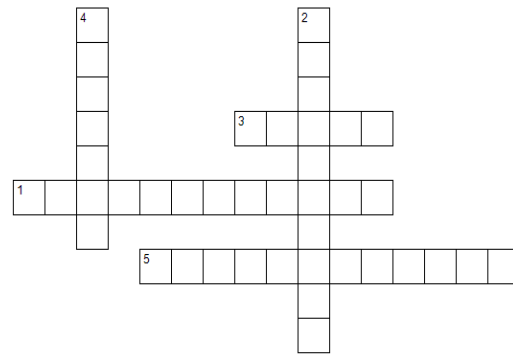| Situation	Experiment	Possible Outcomes	Sample Space (*S*)	Event (E)
1. You need to get a number 6 in rolling a die to win in the game of snake and ladder.	Rolling a die once	1, 2, 3, 4, 5, 6	$\{1, 2, 3, 4, 5, 6\}$	An even number {2, 4, 6}
2. Jen and Jan are playing cards. Jan needs to draw a card numbered 5 to win the game from a well-shuffled numbered 5, 8, 9, 2, 7 cards and placed face down on the table.	Drawing a card	5, 8, 9, 2, 7	$\{5, 8, 9, 2, 7\}$	A prime number {2, 5, 7}
3. Getting an odd number when you roll a fair die once.	Rolling a fair die once	1, 2, 3, 4, 5, 6	$\{1, 2, 3, 4, 5, 6\}$	An odd number
4. Spinning a spinner with colors red (r), blue (b), green (g) and yellow (y), Ana hopes that it lands on red.	Spinning a spinner	r, b, g, y	$\{r, b, g, y\}$	Lands on non-yellow
5. You wish to select a 23-year-old driver randomly from all drivers in the age category of 18-25.	Selecting a driver	18, 19, 20, 21, 22, 23, 24, 25	$\left\{\begin{matrix}18, 19, 20, 21,\\22, 23, 24, 25\end{matrix}\right\}$	Non-teenager driver

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What's More

Activity 1. Reveal Me!

Directions: Complete the crossword puzzle. Words/terms can be written vertically or horizontally.

ACROSS
1 – an individual outcome in a sample space
3 – it is a set of some outcomes of an experiment
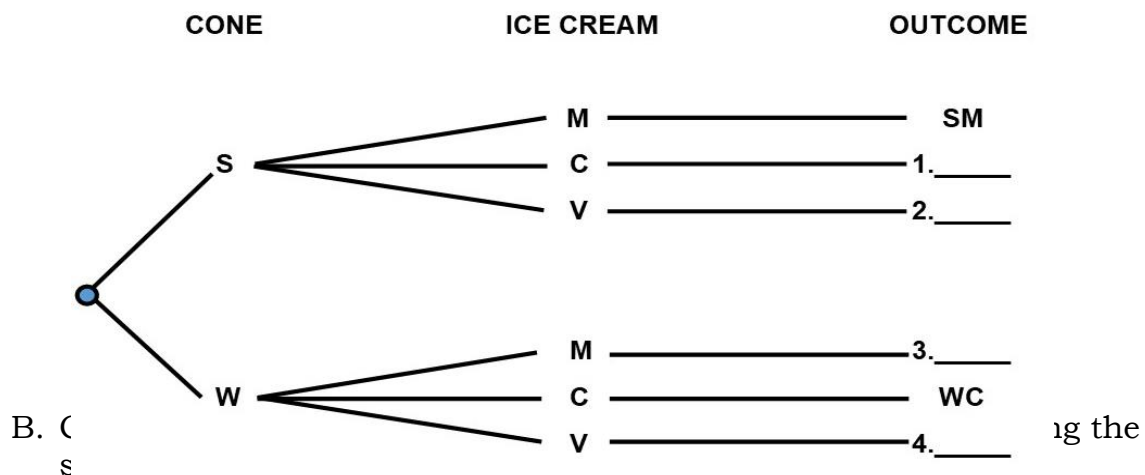5 – it is the set of all possible outcomes of an experiment

DOWN
2 – activity involving chance that can have different result
4 – the result of an experiment

Activity 2. It's Ice Cream Time!

Your parents bought ice cream with mango (M), chocolate (C), or vanilla (V) flavors and choices of a sugar cone (S) or a waffle cone (W). Everyone is free to choose to fill a cone with a particular ice cream flavor. But being the eldest among the children in the family, you volunteered to serve your siblings and your parents. As you served them, you have this question in mind "how may combinations of ice cream flavors and cones are possible?" Do the following activities and answer the questions that follow?

A. Fill in the blanks to know the possible outcomes for ice cream cones.

CONE	ICE CREAM	OUTCOME
S	M	SM
	C	1._____
	V	2._____
W	M	3._____
	C	WC
	V	4._____

B. (... ig the s ...

Experiment	Outcomes	Sample Space	Event
5.	6.	7.	8.

Questions:

1. In choosing a cone of ice cream, how many choices are there?
2. What are those choices?
3. How did you find the answer?

Activity 3. In or Out?

Philippines is facing a pandemic which leads us to stay at home. Because of this problem, your parents decided to have your family picnic on Sunday afternoon just outside your house or in your lawn area to avoid physical contact with other people in your community. But for the past few days, you've noticed that the weather condition is not good because it often rained and on the evening news, the weather forecaster reported that there is a 65% chance that it will rain on Sunday.

The following were your observations from Monday to Saturday.

Days	Weather Condition
Monday	rainy
Tuesday	sunny
Wednesday	sunny
Thursday	rainy
Friday	rainy
Saturday	rainy

Questions:

1. What were the weather conditions from Monday to Saturday?
2. What is the more frequent weather condition?
3. What would be the possible weather condition on Sunday based on your observations and the weather forecast?
4. What will you tell your parents about your plan for a family picnic?
5. Will you continue your family picnic outside the house or not? Explain.
6. How important an outcome of an event is in decision making?

What I Have Learned

A. Directions: Determine whether each of the following underlined phrases illustrates an **Experiment, Outcome, Sample Space or** an **Event.** Write your answers on the space provided.

1. Two teams decided to <u>flip a coin</u> once to determine who plays first. _____

2. You rolled a die once and <u>the number 2</u> turned up. _____

3. You were asked to <u>select a girl at random</u> in your class. _____

4. Lorna selects an outfit from these choices:
   {*green shirts and black jeans, green shirt and gray jeans,*
   blue shirts and black jeans, blue shirts and gray jeans} _____

5. There are red, green, and yellow candies inside the box of teacher Anne as a reward to her students. Jay as one of the students hopes <u>to get a yellow candy.</u> _____

B. Directions: Read and analyze the situation carefully. Write the experiment being done, the outcome, and the sample space.

6. You roll a die once, and you get a 5.
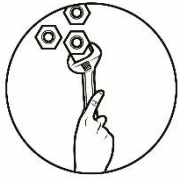   Experiment:
   Outcome:
   Sample Space:

7. Suppose you flip a coin twice, and you get a head (H) on the first toss and a tail (T) on the second toss.
   Experiment:
   Outcome:
   Sample Space:

What I Can Do

Directions: Use the situation below to answer the questions that follow.

Situation:

You are going to observe the weather condition from Monday to Sunday if it is sunny day, rainy day, or cloudy day. After that, you are going to write your observations in a separate sheet of paper.

Questions:

1. Illustrate the experiment, outcome, sample space and event.
2. What are the weather conditions from Monday to Sunday?
3. What is/are the day/s that is/are rainy day? sunny day? Cloudy day?
4. In your observation, what is the most frequent weather condition?
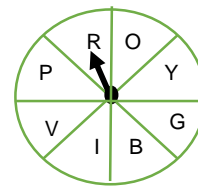5. How did you arrive at your answers?
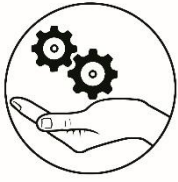
Assessment

POST-ASSESSMENT

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

1. In how many ways can a prime number turn up in rolling a die once?
   A. 1   B. 2   C. 3   D. 4

2. When you roll a die thrice, how many possible outcomes are there?
   A. 100   B. 156   C. 200   D. 216

3. How many possible outcomes are there in tossing three coins simultaneously?
   A. 4   B. 8   C. 12   D. 16

4. In playing a snake and ladder game, you hope to get a number 5 in rolling a die once to win a game. Which of the following describes the phrase "get a number 5"?
   A. Event   B. Experiment   C. Sample Point   D. Sample Space

5. In a bag, there are 3 white balls, 2 brown balls and 4 gray balls. How many possible outcomes when one ball is chosen randomly from the bag?
   A. 3   B. 5   C. 7   D. 9

6. The set of possible outcomes of getting composite number from the counting numbers 5 to 10 is S = {6, 8, 9, 10}. Which of the following terms describes this set of outcomes?
   A. Event   B. Experiment   C. Sample Point   D. Sample Space

7. How many possible outcomes are there for the experiment choosing a rock, or a paper, or a pair of scissors at random?
   A. 3   B. 4   C. 5   D. 6

8. When a card is drawn from the standard deck of 52 playing cards, how many possible outcomes of getting a numbered card?
   A. 9   B. 18   C. 27   D. 36

9. From the counting numbers 1 to 30, in how many ways can you choose a number which is a multiple of three?
   A. 5   B. 10   C. 12   D. 15

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10. Suppose you spin the spinner shown at the right. Which of the following is the sample space?
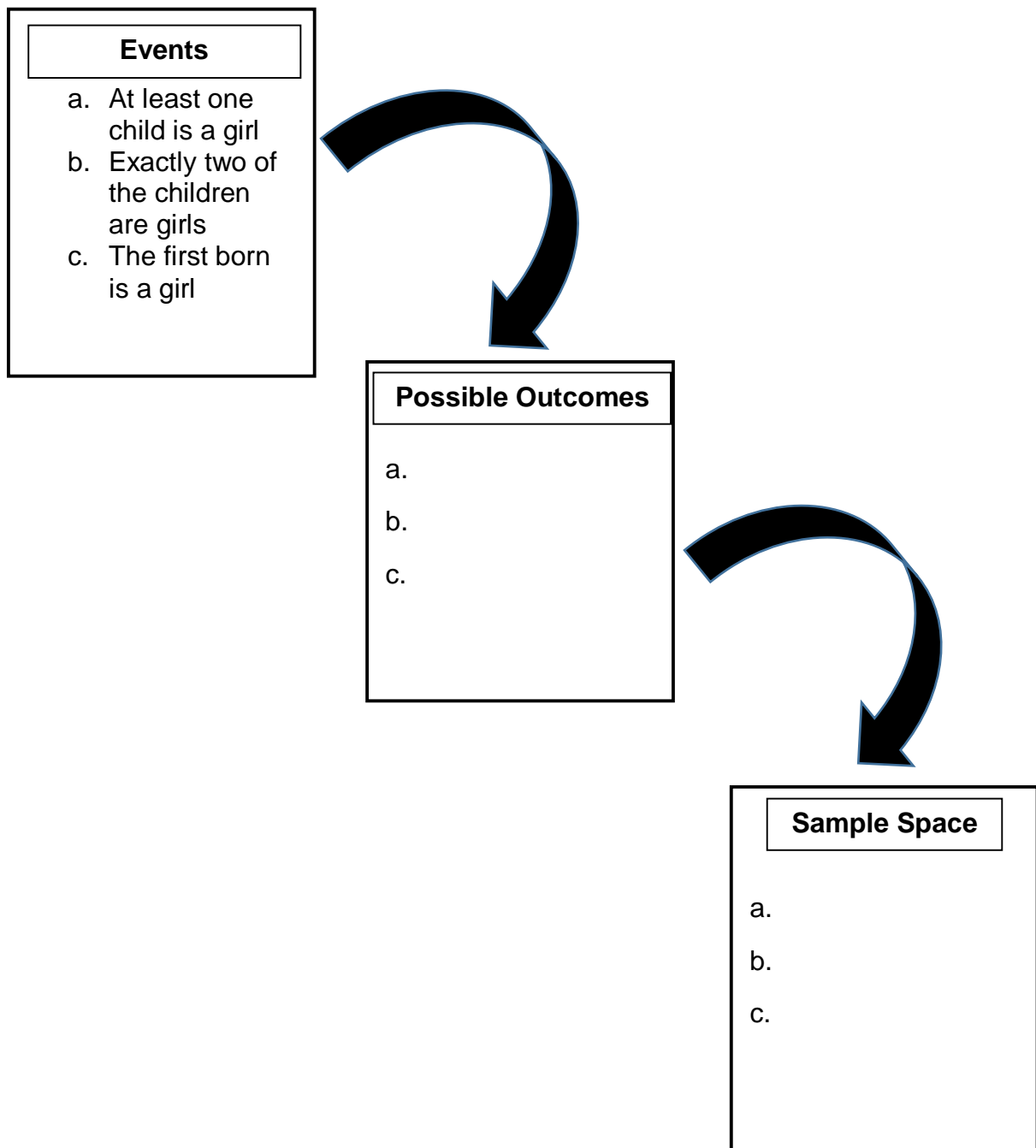
   A. $S = \{R, O, Y, G\}$ C. $S = \{R, O, Y, G, B, I\}$
   B. $S = \{R, O, Y, G, B\}$ D. $S = \{R, O, Y, G, B, I, V, P\}$

11. Which of the following is the sample space when you flip a coin and roll a die once simultaneously?

   A. $S = \{H1, H2, H3, H4\}$
   B. $S = \{H, T, 1, 2, 3, 4, 5, 6\}$
   C. $S = \{H1, H2, H3, T1, T2, T3\}$
   D. $S = \{H1, H2, H3, H4, H5, H6, T1, T2, T3, T4, T5, T6\}$

12. Which of the following is an event in rolling a die once?

   A. $E_1 = \{1, 4, 7\}$.   C. $E_3 = \{0, 2, 4, 6\}$
   B. $E_2 = \{2, 3, 5\}$.   D. $E_4 = \{1, 4, 9, 16\}$

13. A box contains 2 red and 3 blue marbles. Which of the following is the sample space when you randomly draw a marble?

   A. $S = \{r, b\}$ B. $S = \{r_1, r_2\}$ C. $S = \{b_1, b_2, b_3\}$ D. $S = \{r_1, r_2, b_1, b_2, b_3\}$

14. Which of the following statement is **FALSE** about the sample space of the specified experiment?

   A. Rolling a die once: S = $\{1, 2, 3, 4, 5, 6\}$
   B. Answering a True or False item: S = $\{True, False\}$
   C. Tossing two fair coins once: S = $\{HH,\ HT,\ TH,\ TT\}$
   D. Drawing a Jack from a standard deck of playing cards:
      S= $\{Jack\ of\ spades, Jack\ of\ clubs, Jack\ of\ hearts, Jack\ of\ diamonds\}$

15. Your cousin wanted to buy a lottery ticket worth one thousand pesos because he wants to try his luck and according to his horoscope that he is so lucky that day. But for you, it is very expensive. Will you support your cousin in buying a lottery ticket?

   A. No, because I do not like it.
   B. Yes, because that is what he wants.
   C. Yes, because according to his horoscope he is so lucky that day.
   D. No, because the chance of winning is very low, and he will be wasting his money and time.
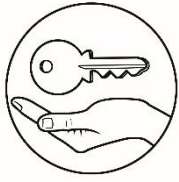
Additional Activities

The following activity will help you more in enriching your knowledge about illustrating an experiment, outcome, sample space and event.

Directions: Identify the outcomes that comprise each of the following events in the experiment of selecting a **three-child** family at random.

Events
a. At least one child is a girl
b. Exactly two of the children are girls
c. The first born is a girl

Possible Outcomes
a.
b.
c.

Sample Space
a.
b.
c.

Answer Key

What's New

Experiment	Outcome
Flipping a coin	Head
Rolling a die	Tail
Spinning a spinner	A number 3
Drawing a card from a deck of 52 cards	Color red
Guessing the no. of marbles in a jar	A queen of hearts

What's In

1. 4
2. 13
3. 4
4. 1
5. 1
6. 1
7. 1
8. 13
9. 1
10. 1

What I Know

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

What's More

Activity 1

1. Sample point
2. Experiment
3. Event
4. Outcome
5. Sample space

Activity 2

CONE   ICE CREAM   OUTCOME

S — M — SM
S — C — 1. SC
S — V — 2. SV
W — M — 3. WM
W — C — WC
W — V — 4. WV

5. Experiment: Choosing an ice cream cone
6. Outcome: SM, SC, SV, WM, WC, WV
7. Sample space:
   $S = \{SM, SC, SV, WM, WC, WV\}$
8. Event: sugar cone with mango ice cream

Questions:
1. 6
2. SM, SC, SV, WM, WC, WV
3. Students may have varied answers

Activity 3

1. rainy, sunny, rainy, rainy, rainy
2. rainy
3. rainy
4. students may have varied answers
5. No. students may have varied explanation
6. Students may have varied answers

What I Have Learned

1. Experiment
2. Outcome
3. Experiment
4. Sample Space
5. Event
6. Experiment: rolling a die once
   Outcome: 5
   Sample Space: $S = \{1,2,3,4,5,6\}$
7. Experiment: flipping a coin twice
   Outcome: H , T
   Sample Space:
   $S = \{(T,T),(H,T),(T,H),(H,H)\}$

Assessment

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

13

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