Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

UNIT 7 LESSON 3

**AIM**: SWBAT calculate theoretical probabilities

**THINK ABOUT IT!**

Step A: Without flipping the coin, what do you think the probability of the coin landing on heads would be?

Step B: Conduct the chance experiment of flipping a coin 10 times and recording the results in the table below.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Trial**  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| **Outcome (heads or tails)** |  |  |  |  |  |  |  |  |  |  |

Step C: Determine the observed relative frequency of flipping a coin and it landing on heads showing your work.

Key Point:

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**Interaction with New Material**

Ex.1) Barry, Michelle, and Sasha are all conducting different chance experiments as outlined below. Order the names from greatest to least for the person’s probability will be most likely to least likely.

Barry – Rolls a six-sided dice and tries to land on a number greater than 3.

Michelle – Picks a random marble out of a bag that has 15 red, 20 blue, and 15 yellow marbles and tries to pick out a blue marble



Sasha – Spins the spinner and tries to land on a composite number

**PARTNER PRACTICE**

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| *Bachelor Level* |

For problems 1-4, calculate the theoretical probability of each of the following events:

1. You spin a spinner with 3 equal sections labeled blue, red, and purple, and it lands on purple.
2. You spin the same spinner and it lands on yellow.
3. Your teacher places 30 names in a hat and pulls one out randomly, and yours is selected.
4. There are 60 marbles in a bag (20 red, 20 striped, and 20 multi-colored), and you randomly pull out a red one.

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| *Master Level* |

1. Kiera writes all of the letters of her name on index cards and places each of one face down on the table. She’s going to conduct an experiment to see how many times she picks the letter “A” when randomly selecting the cards. Read each statement below and determine whether it is “true” or “false.”

|  |  |  |
| --- | --- | --- |
| Statement | True | False |
| The sample space for this experiment is 5 |  |  |
| The theoretical probability of picking the letter “A” is 20% |  |  |
| The theoretical probability of picking a vowel is 0.5 |  |  |
| This is an example of non-uniform probability  |  |  |
| The theoretical probability of picking the letter “T” is 1 |  |  |

**INDEPENDENT PRACTICE**

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| *Bachelor Level* |

For Questions 1-4, calculate the theoretical probability given the situation:

1. You roll a dice and it lands on a number greater than 4.
2. Your teacher places 90 names in a hat and pulls one out randomly, and yours is selected.
3. You write the letters of the word PROBABILITY on individual slips of paper, place them face down and mix them up, and randomly select the letter O.
4. You write the letters of the word PROBABILITY on individual slips of paper, place them face down and mix them up, and randomly select the letter B.
5. Explain why questions 1-4 represent theoretical probability. How is this different from observed relative frequency?

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| *Master Level* |

1. In Shazana’s box, she has 3 green scarves, 3 blue scarves, 3 purple scarves, and 3 multi-colored scarves. Each morning, she closes her eyes and randomly selects one from the drawer to wear.

Step A: Is this an example of uniform, or non-uniform probability? Explain.

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Step B: How could you alter the design of the experiment to make it non-uniform? Explain

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Step C: What is the probability that Shazana will pick a multi-colored scarf? Express your answer as a fraction, decimal, and a percent.

Step D: What is the probability that Shazana will not pick a multi-colored scarf? Express your answer in two different ways.

1. Which of the following scenarios is more likely to occur? Justify your answer with mathematical work.
	* Kayla rolls a dice and it lands on a number that is less than 3.
	* Jamie spins the spinner and it lands on purple.

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1. Tiffany has a 40% chance of winning a game. Tiyana has a ½ chance of winning the same game. Suzy Scholar says that that Tiffany is more likely to win because 40 is greater than ½. Do you agree or disagree with Suzy’s reasoning? Explain.

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| *PhD Level* |

1. Mr. Friedline assigns homework almost every night of the week. The table below shows the probability of how many pages of homework he assigns as a decimal.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Pages of Homework | 0 | 1 | 2 | 3 | 4 |
| Probability of assigning | 0.1 | 0.25 | 0.35 | 0.2 | 0.1 |

Step A: Does this describe uniform or non-uniform probability? How do you know?

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Step B: How would you describe the probability of Mr. Friedline assigning 3 or more pages of homework? Explain your reasoning.

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Step C: What is the probability of Mr. Friedline assigning at least 1 page of homework per night? Explain how you determined your answer.

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**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**EXIT TICKET**

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| --- | --- | --- | --- |
| Self-assessment | I mastered the learning objective today. | I am almost there.  | Need more practice and feedback. |
| Teacher feedback | You mastered the learning objective today. | You are almost there.  | You need more practice and feedback. |

1. An experiment consists of randomly picking a square section from the board below:



* 1. Find the probability for picking a triangle
	2. Find the probability for picking a star
	3. Find the probability for picking a circle
	4. Find the probability for picking a triangle, star, or blank space.
1. Describe why your answers for question 1 are theoretical probabilities

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