INTRODUCTION TO PROBABILITY

What Is Probability?

Probability is the possibility that a certain event will occur.

- An event that is certain to occur has a probability of 1. An event that cannot occur has a probability of 0. Therefore, the probability of an event occurring is always between 0 and 1.
- The closer a probability is to 1, the more certain that an event will occur.
- Probability is the chance of an event occurring divided by the total number of possible outcomes.
- If the probability of an event is known, a prediction about the probabi

To figure c space lists all the

Another to e **diagram** s

The **Counting Principle** also is used to show different combinations. The Counting Principle is a faster method to use than a tree diagram, but only gives the total number outcomes, not what the outcomes are.

Experimental probability is the probability that a certain outcome will occur based on an experiment being performed multiple times

Theoretical probability is the probability that a certain outcome will occur based on all the possible outcomes.

How to use probability

The **probability** of one event occurring is equal to the chance of the event occurring divided by the total outcomes.

- For example, the probability of picking a seven out of a standard deck of cards is 4/52, or 1/13. Since the probability of picking a seven is 1/13, a prediction can be made if a card is picked 50 times.

Ex. Chance of a seven out of 50 times, 1/3 = x/50, 3x = 50, x = 16.7 ≈ 17

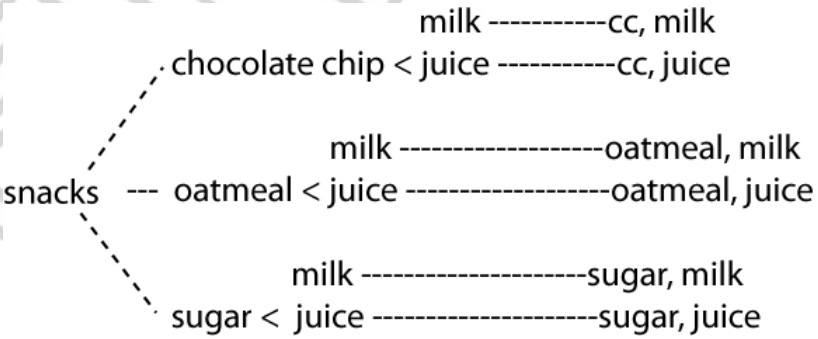
The number of times a seven is picked would be 17.

A way that outcomes are shown is called a sample space. A **sample space** shows all the possible outcomes for an event. If a spinner, with the letters A-D equally spaced, is spun and a die is rolled, the probability [illegible] sample space.

Sample s[illegible] B5, B6 }
D5, D6}

The [illegible] /24.

A tree diagram is also a visual that shows the combinations of certain events. For example, there are three types of cookies, chocolate chip, oatmeal and sugar, and two types of drinks, milk and juice, to choose from for a snack. How many different combinations are there? Use the **tree diagram** below:



This tree diagram shows that there are 6 different ways to have a snack.

This could also be figured out using the Counting Principle. With the **Counting Principle**, the number of different choices is multiplied to get the different combinations. For the above example, 3 cookies x 2 drinks = 6 combinations. The probability of picking sugar cookies and milk is 1/6.

Experimental probability is the probability that a certain outcome will occur based on an experiment being performed multiple times. For example, Jeanie's class is doing an experiment about picking the numbers 1 -10. Jeanie picks the number 3. Her teacher picks a number 10 times and the numbers are 2, 1, 6, 9, 7, 6, 3, 7, 3, and 6. The probability of Jeanie's number,3, being picked is 2/10 or 1/5.

Theoretical probability is the probability that a certain outcome will occur based on all the possible outcomes. For example, the probability of picking a 3 out of the numbers 1 - 10 is 1/10. Even if the numbers were picked 10 times, the probability would be 10/100 or 1/10.

Try This!

1. Is the **probability** that June is a summer month closer to 0 or 1?

2. What is the **probability** of picking a red card out of a deck of 52 cards?

3. If a die is rolled 60 times, how many times will it land on a 2?

4. What is the **sample space** for a coin being flipped and a number 1 - 5 being picked?

5. Make a bread, ham or

6. Using the **Counting Principle**, how many outcomes are there for a pizza with 2 types of sauces, 3 types of cheeses and 8 types of toppings?

7. Ruth's class did an experiment where a die was rolled 8 times. Ruth picked the number 4. The results were 2, 1, 6, 1, 6, 3, 5, and 2. What was the probability of Ruth getting a 4?