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.

Different types of events will have their probabilities figured out differently. The probability of 1 single event occurring is figured out differently than the probability of 2 events occurring. Probability is also based on whether events are dependent or independent of each other.

To figure c space lists all the ol used in probability e different combinatic s used to show diffe

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.

- If the probability of picking two events needs to be calculated, the probability would be equal to the probability of the one event **plus** the probability of the second event. For example, the probability of picking a seven **or** a jack out of a standard deck of cards would be 4/52 + 4/52 = 8/52, or 2/13. These are called 'or' **probability**.

- If the events overlap, it is called 'and' probability. This occurs when asked to find the probability of picking a seven **and** a heart from a standard deck of cards. The probability of picking a seven is 4/52, the probability of picking a heart is 13/52, but since there is a seven of hearts 1/52 must be subtracted.

Example: 4/52 + 13/52 - 1/52 = 16/52 or **4/13**

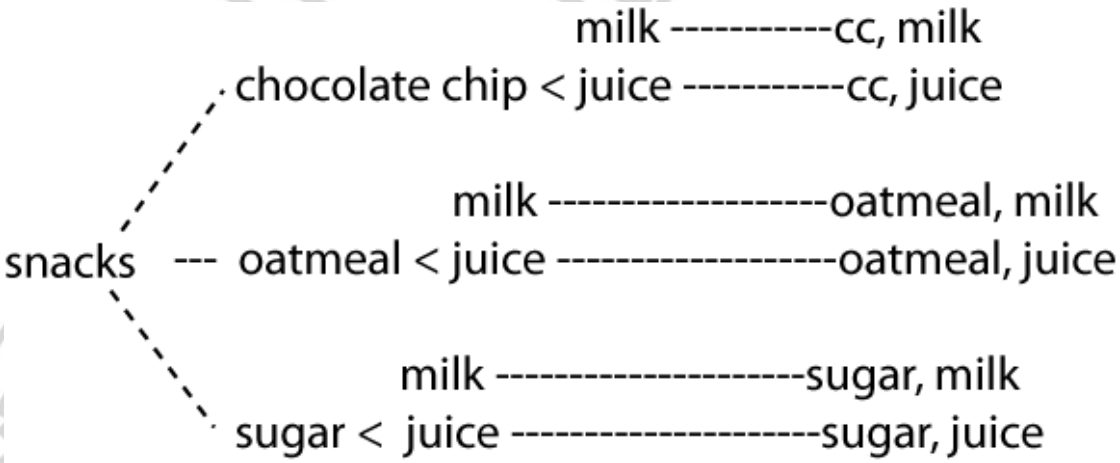
- This could also be shown using a **sample space**. A sample space shows all the possible outcomes for an event. If a spinner, with the letters A-D equally spaced, is spun and a die is rolled, the probability of getting a 2 and a B could be found by using a sample space.

Sample space { A1, A2, A3, A4, A5, A6, B1, B2, B3, B4, B5, B6 }
{ C1, C2, C3, C4, C5, C6, D1, D2, D3, D4, D5, D6 }

The probability of getting a 2 and a B would be 1/24.

- A **tr**ations of
certa cookies
(cho lrinks
(milk y different
coml

Use



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**.

- **Probabilities** can also be found of events that are **independent** or **dependent** of each other.

Example:

If there are 10 marbles in a bag with 4 blue and 6 red, the probability of picking 2 red marbles with replacement is 6/10 · 6/10 = 36/100 or **9 / 25**.

This proba first time does not a

Example:

The probal is 6/10 ·5/9

This probability is **dependent** because the events are related to each other.

Try this!

1. Find the following probabilities:

Picking a red card

Picking an Ace

Picking an Ace **or** a red card

Picking a spade **or** 6

2. Write a sample space for flipping a coin and rolling a die.

3. Draw **and 2 pants (bl**

4. Use th **ks and 3 desserts**

5. In a bag there are 7 yellow marbles and 8 blue marbles.

a. Find the probability of picking 1 yellow marble and 1 blue marble with replacement.

b. Find the probability of picking 1 yellow marble and 1 blue marble without replacement.