Theoretical Probability vs Experimental Probability

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| --- | --- |
| Theoretical ProbabilityWhat is likely to happen based on mathP(event) = $\frac{Number of favorable outcomes}{Total number of possible outcomes}$Example:A coin is tossed.P(heads) = $\frac{1}{2}$P(tails) = $\frac{1}{2}$ | Experimental ProbabilityIs found by repeating experiments and documenting the outcomesP(event) = $\frac{Number of times event occured}{Total number of trials}$Example:A coin is tossed 10 times. A head is recorded 3 times and a tail is recorded 7.P(heads) = $\frac{3}{10}$P(tails) = $\frac{7}{10}$ |

We’re going to start with something easy to figure theoretical vs experimental!

Let’s figure out the theoretical probability of suits you could get!

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| $$\frac{}{52}$$ | $$\frac{}{52}$$ | $$\frac{}{52}$$ | $$\frac{}{52}$$ |

Now, everyone will come up one by one, pick a card, show the suit of the card, tally which suit is picked, and shuffle the deck again. We will be experimenting to see the outcome.

|  |  |  |  |
| --- | --- | --- | --- |
| Shape  Description automatically generated with medium confidence | Icon  Description automatically generated | Shape  Description automatically generated | A picture containing star, outdoor object, dark, night sky  Description automatically generated |
|  |  |  |  |

Let’s figure out the theoretical probability of colors you could get!

|  |  |
| --- | --- |
| **Red** | **Black** |
| $$\frac{}{52}$$ | $$\frac{}{52}$$ |

Now, everyone will come up one by one, pick a card, show the color, tally which color was picked, and shuffle the deck again. We will be experimenting to see the outcome.

|  |  |
| --- | --- |
| **Red** | **Black** |
|  |  |

Let’s try look at this another way! I will hand out 4 cards to 13 people. We will document the number of red vs black cards we all have on a number line. After doing this, we’ll make a bar graph to visualize these numbers.

**Red Cards**

**Black Cards**