Probability and Uncertainty

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(Let's pretend) I am playing a board game, and I need a bag of dice.

I found two dice in my drawer, they look a bit unusual - I'm suspicious that they are not actually fair (i.e., weighted dice, some numbers occur more frequently than others).

We can run a statistical test on the dice to check if they're fair.

Null hypothesis (the situation in which no effect exists):

Activity 1:

Let's take a die, roll it many times, and tally the results, until you think an answer can be concluded.

	Die 1								
	1	2	3	4	5	6			
Total									

Activity 2:

Let's take another die, roll it and tally the results. But this time, try to focus on: *at which point you can confidently conclude that the die is fair/ unfair?*

	Die 2							
	1	2	3	4	5	6		
Total								

What's next:

Our tallied numbers (**the observation**) always deviate from the perfect results we should get from a fair die (**the expectation**) because the real world always has a level of uncertainty.

In mathematics, we use probability to deal with this uncertainty.

In the following lecture, we'll introduce methods to examine probability in various situations...