Simulating Multiple Rolls of a Die

**Data Management**

**Unit 1 Line Master 8a**

Let’s alter our code from **Master 7** to include a loop, or a repeat, which will simulate rolling a die hundreds, thousands, and even millions of times!

A *loop* is a repetition of instructions used in code. In Scratch, a repeat is used to make code blocks loop through multiple times.

What do you think will happen to the relative frequency
of rolling a 3 with so many rolls?

Relative frequency provides a better estimate of the likelihood
of an event with larger amounts of data.

1. We will start by adding a repeat block so that the die rolls
10 times at once.
* Click the link to access the completed code from **Master 7**:

<https://scratch.mit.edu/projects/878489604/editor>

* From the ***Control*** tab, select the ***Repeat 10*** block and place it around all the code under the green flag block.
* Since we are rolling the die 10 times and are keeping track of the number of times a 3 is rolled in the ***num3Rolled*** variable,
we can remove the ***say 3!*** block.
* Click on the green flag multiple times to see what happens! Don’t forget that if you’d like to reset the variables to 0,
you can click on the ***space*** bar.

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Here is a screenshot of the completed code.



1. Let’s loop the code even more times!
* Try changing the repeat number to 100 and then 1000.
* What do you notice about the relative frequency
of rolling a 3?
* Does it get closer to the expected likelihood of or about 0.17?

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1. When you changed the repeat to 1000, you might have noticed that you had to wait a while for the 1000 rolls to happen.
We can use **Turbo Mode** in Scratch to make this happen faster!
* To turn on ***Turbo Mode***, select ***Edit*** and ***Turn on Turbo Mode****.*



* Try clicking the green flag with 1000 in the repeat
to see what happens.
* Change the repeat to 10 000 and even 1 000 000 or more!
* What do you notice about the relative frequency when you roll the die so many times?