***Using Dice to Model the Spread of a Disease***

You have been invited to a party with 39 other people. OH NO – it is discovered after the party one of the guest has an infectious disease. Were you infected?

**Procedure**: We will assign each of the 39 other guest a number (1-39). You will be number 40.

We first need to determine which other guest came to the party with the disease. To do this we will use a random number generator. Use <https://www.random.org/> to find a random number between 1 and 39. Record this number on your record sheet. This will be the guest with the disease.

Next, we use a dice to simulate the variability of the number of infected people. The number of newly infected people caused by each infected people at each step is determined by the value of tossing a fair dice, so the infection rate is not fixed.

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| --- | --- |
| Number on die | Number of newly infected people |
| 1 | 0 |
| 2 | 0 |
| 3 | 1 |
| 4 | 1 |
| 5 | 2 |
| 6 | 2 |

**Stage One**

Use the random number generator, <https://www.random.org/integer-sets/>, to generate a list of numbers.

Generate 1 set with 40 unique random integers in it. Each integer should have a value between 1 and

40 and NOT in ascending order. (We now use 40 numbers, since you are included in this spread of the disease.) Record these numbers on your list. On your list cross off the number of the initially infected person you found in stage one. This list is the order in which people will become newly infected.

Roll a fair die. If you do not have die you can roll a virtual die here <https://www.random.org/dice/>. If the die shows 1 or 2, you have no newly infected people. Leave the stage one newly infected people blank on your record sheet and move to stage two.

If the die shows 3 or 4, you have 1 newly infected person. Write down the first non-crossed off number on your list of the 40 random people under stage one newly infected people on your record sheet . Cross this number off your list and move on to stage two.

If the die shows 5 or 6, you have 2 newly infected people. Write down the first two non-crossed off numbers on your list of 40 random people under stage one newly infected people. Cross these numbers off your list and move on to stage two.

**Stage Two**

Roll a fair die for each infected person in the previous stages and the initially infected person. Now the disease is spreading from each infected person. Use the same procedure from stage one for each dice roll. Make sure you record the ID number for each newly infected person under the stage two on your record sheet.

**Stage Three**

Once you have finished crossing off the newly infected people from stage two, you now roll the die again for each of these infected people. For example if you are starting stage 3 and you had 2 newly infected people in stage 1 and 3 newly infected people in stage 2, you would need to roll the die 6 times (initial person, 2 from stage 1, and 3 from stage 3). Use the same procedure from stage one for each dice roll. Make sure you record the ID number for each newly infected person under the appropriate stage on your record sheet.

**Stages Four - Six**

Continue rolling the die for each infected person from the previous stage. Record the newly infected people.

**Reflection**

Answer the reflection questions on the record sheet and turn in your record sheet on Canvas.