 Modelling modified exponential growth using dice

Resources required:

* 1 to 2 classes of students
* 1 die per student
* Grid paper for graphing

Activity

1. Start with 6 student to represent the initial population, 5 of which do not have a die.
   * The students without a die represent the fixed quantity, P, in the modified growth model.
   * The students with a die represent the arbitrary constant, A, in the modified growth model.
2. The students with a die, roll their die.
3. Each student who rolls an even (or other condition to represent growth) invite another student to join the population with a die.
4. Record the population into the table after each time period (each roll of the dice)

| Roll (time period) | Population |
| --- | --- |
| 0 | (starting population) |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| And so on |  |

1. Repeat steps 2 to 4 until it is no longer practical to continue
2. Graph the population (dependant variable – y axis) verse time (independent variable – x axis)

The activity can be repeated for various conditions to represent growth.

Sample data for the activity

This was conducted with a total of 40 students and an even being the condition for population growth. The population started with 6 students, only 1 of which has a die. (So each roll of the dice, 5 students did not have a die)

| Roll (time period) | Population |
| --- | --- |
| 0 | 6 |
| 1 | 7 |
| 2 | 8 |
| 3 | 10 |
| 4 | 12 |
| 5 | 14 |
| 6 | 17 |
| 7 | 23 |
| 8 | 33 |

Compare the modified growth model to the simple growth model

It may be beneficial to compare the results with that obtained for the simple growth model, Resource: modelling-exponential-growth-using-dice.DOCX. The sample data for this is shown below:

This was conducted with a total of 40 students and an even being the condition for population growth.

| Roll (time period) | Population |
| --- | --- |
| 0 | 1 |
| 1 | 1 |
| 2 | 2 |
| 3 | 3 |
| 4 | 5 |
| 5 | 8 |
| 6 | 12 |
| 7 | 17 |
| 8 | 24 |
| 9 | 36 |