 Modelling exponential decay using dice

Resource required:

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

Activity:

1. Start with all students to represent the initial population.
2. The student(s) which represent the population roll their die.
3. Each student who rolls an even (or other condition to represent decay) leave the population. Note: If you use a condition such that the rate if decay is 50% you can model half-lives.
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 the population has decayed.
2. Graph the population (dependant variable – y axis) verse time (independent variable – x axis)

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

Alternate individual activity:

1. The student starts with quantity of dice to represent the initial population. (for example – 40)
2. The student rolls the dice which represent the population.
3. If an even (or other condition to represent decay) is rolled on a die, that die is removed from the population.
4. Record the population into the table after each time period. (roll)

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

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

See sample data for the activity:

| Roll (time period) | Population |
| --- | --- |
| 0 | 40 |
| 1 | 26 |
| 2 | 18 |
| 3 | 11 |
| 4 | 7 |
| 5 | 4 |
| 6 | 3 |
| 7 | 3 |
| 8 | 2 |
| 9 | 1 |