

Name - _____

Partner - _____

Effect of Mutation on Evolution

Hypothesis

Procedure

1. Start with a population of 20 *bacteria*, 18 *typical* and 2 *mutated*. Record the starting *bacteria* population for both *typical* and *mutated bacteria* in *Table 1* in the column labeled "At start of generation"
2. The entire population of *bacteria* will be exposed to an antibiotic. You will simulate this event by rolling the die for each individual *bacterium* (paper clip) to see if the *bacterium* survives antibiotic treatment
 - a. For *typical bacteria*, which have a 1-in-6 chance of surviving exposure to an antibiotic, survival and reproduction happen only when a 1 is rolled. Any other roll will lead to death.
 - b. For *mutated bacteria*, which have a 5-in-6 chance of surviving exposure to an antibiotic, survival and reproduction occurs in rolls of 1-5. Death only occurs when a 6 is rolled.
3. For each individual *bacterium*, roll the die
 - a. Determine if the *bacterium* survives or dies
 - b. When a *bacterium* dies, remove it from the population by setting it aside
 - c. Record the number of *bacteria* that died after antibiotic treatment in the "Dead" column in *Table 1*.
 - d. Record the number of *bacteria* that survived, after the antibiotic treatment, in the "Survivors" column in *Table 1*.
4. The surviving *bacteria* reproduce. *Bacteria* divide in half when they reproduce. Each surviving *bacterium* becomes two *bacteria*. In *Table 1*, use the number of survivors from generation 1 to calculate and record the total number of *bacteria* after each surviving *bacterium* reproduces in the "Reproduction" column in *Table 1*.
5. Write the number of *bacteria* in your "Reproduction" column at the end of generation 1 in the column "At start of generation" for generation 2.
6. Repeat steps 2-4, filling in *Table 1* for another 4 generations.
7. Once you have your final numbers record them with the class data.
8. Graph your results (scatter plot) for both *typical* and *mutated bacteria* (two lines) in *Figure 1*. Use the numbers in the "At start of generation" column.