Name: _____ Date: _____ Period: _____

Genetic Drift, Gene Flow & Natural Selection Activity

Part I Directions: Genetic Drift

1. Grab a bag of beads; this represents the original population (72) of the *Colored beadius* organism.

TABLE I **A** **B** **C** **D** **E**

Color of bead from original population	# of each color from original population	% of each color from original population	# of each color from genetic drift population	% of each color from genetic drift population
	Total # of beads in original population =	Your percentages should add up to 100%	Total # of beads in genetic drift population =	Your percentages should add up to 100%

2. Carefully empty the bag and record the necessary information for the original population in the first two columns (A & B) of Table I above. Calculate the percentage of each color (#of color/total # of beads) in column C.

3. Place the beads back in the bag. One person needs to close their eyes and randomly pick out 15 beads. DO NOT LOOK at them until after you remove them from the bag. This represents the genetic drift population. Record all the necessary information for the genetic drift population in columns D & E in Table I.

4. Define Genetic Drift.

5. Why were you asked to close your eyes when picking beads for genetic drift?

Part II Directions: Gene Flow

6. Put all your beads back in your bag. Fill in columns A, B & C in Table II. It should be the same information as in Table I. You will now demonstrate gene flow. Reach your hand in and grab a group of beads (about 20), make it random, don't pick the colors you want. (Record on a sheet of paper what colors they are so you can get them back later). Listening to your teacher's instructions pass your beads to another group. Fill in the chart below:

Table II **A** **B** **C** **D** **E**

Color of bead from original population (use same information in above chart)	# of each color from original population (same as above)	% of each color from original population (same as above)	# of each color after gene flow population	% of each color after gene flow population
	Total # of beads in original population =	Your percentages should add up to 100%	Total # of beads after gene flow population =	Your percentages should add up to 100%

7. Define Gene flow.

Take a minute to get your beads back from the other group and give the beads you got back to that group. Put your original population back in the bag.

Part III Directions: Natural Selection

8. Get a piece of fabric from your teacher and spread it out on your table. Take your bag of *Colored beadius* and dump your beads (carefully so they don't go everywhere) on your fabric. Spread them around. Fill in the chart below.

9. One person in the group needs to be the timer. Another person is the predator (Beadus collectorus). The timer will say "GO" and give the predator 10 seconds to "eat" as many prey as possible. The predator uses one hand to pick up one bead and set it in a designated spot on the table before going after another bead. When the timer says "STOP" the predator can't collect any more beads.

10. Carefully slide your remaining beads off the fabric. These are your survivors! Each survivor will have one offspring. So, count each bead twice and record the data in column D on Table III. After "reproducing" spread all of the beads on your piece of fabric again.

11. Repeat step # 9.

12. Slide the remaining beads off the fabric and repeat step #10. This is your final population after natural selection. Fill in column E on Table III below. Calculate the percentage of survivors using your final population.

Table III

A	B	C	D	E	F
Color of bead from original population (use same information in above chart)	# of each color from original population (same as above)	% of each color from original population (same as above)	# of each color after natural selection round 1	# of each color after natural selection round 2	% of each color after natural selection (use column F only)
	Total # of beads in original population =	Your percentages should add up to 100%		Total # of beads after natural selection population =	Your percentages should add up to 100%

13. Define Natural Selection:

14. Return your beads to the bag. Return your bag and fabric to your teacher.

Complete the Post Lab Questions.

Post lab questions:

Part I Genetic Drift:

1. Does the new genetic drift population accurately represent the original population? _____ Explain by citing your data.

2. What colors in the original population are NOT represented in the genetic drift population?

3. When you compare the percentages of each color, are they the same for the original population and the genetic drift population? _____ Explain.

4. Let's assume that the beads are praying mantises and that the new environment consists of lots of greenery and many bright red flowers. Which colors in the genetic drift population would have better fitness in this new environment? _____Why/how? How might that affect the alleles for those individuals?

5. Which praying mantises would have less fitness? _____ Why/how? What might happen to the alleles for those individuals that have less fitness?

6. If we only considered the effect of genetic drift on these praying mantises, would it matter what color the mantis was as to if it survived or not? _____ Explain.

Part II Gene Flow:

1. Does the new gene flow population accurately represent the original population? _____ Explain by citing your data.

2. What colors in the original population are NOT represented in the gene flow population?

3. When you compare the percentages of each color, are they the same for the original population and the gene flow population? _____ Explain.

4. Compare and contrast Genetic Drift and Gene Flow below:

Similarities	Differences

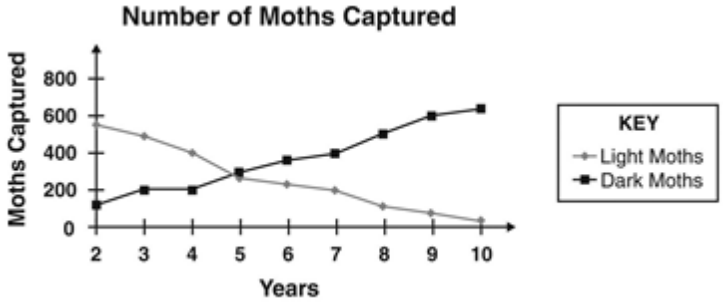
Part III Natural Selection:

1. Does the new population after natural selection accurately represent the original population? _____ Explain by citing your data.

2. What colors in the original population are NOT represented in the population after natural selection?

3. Why is Natural Selection NOT a random event?

4. Look at the graph below. Which moth is being naturally selected for? _____



4. What could have caused the population of moths (the allele frequency) to change so drastically? Your answer should be an explanation or scenario.

Critique:

1. Did you enjoy this lab? _____ Why or why not?

2. Do you have suggestions to improve it?

3. What do you feel are the three main points of this activity?