

September 13, 2012

good organization of  
your notebook

Title: Natural selection of "strawfish"

I - Introduction / Purpose:

The purpose of the lab is to explore the concept of "selected by nature" further. We will investigate how different natural selection factors in the environment can influence the colors of strawfish. We will also measure how these natural selection factors can affect the inheritance of the genes that code for the color of strawfish.

II - Method / Procedure:

Step 1: Make sure there are 40 straws in the bag. 20 blue and 20 yellow (These represent the collection of genes in our population of fish)

Step 2: In each round, we will randomly pull two straws (alleles) from the fishing bag for each fish in the population. We will record the color of the resulting "strawfish" in our data table until the bag is empty.

Step 3: The first round in all tests serves as a control and should be completed without any predation. In the next three generations, predators will prey on the fish but under different selection factors.

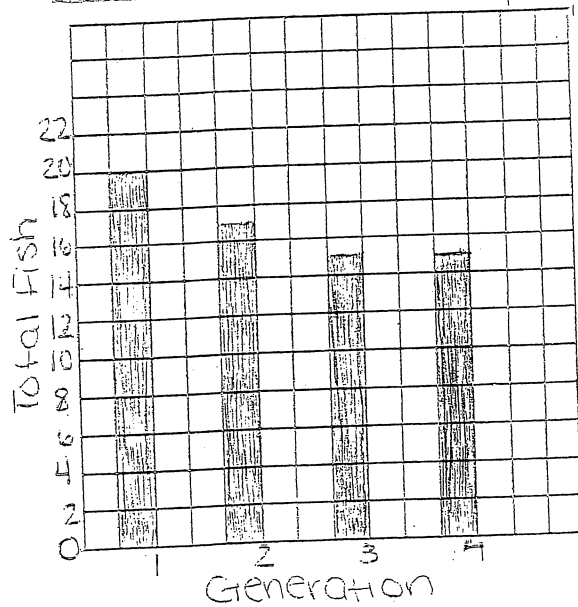
### III - Data and observations:

Just data page

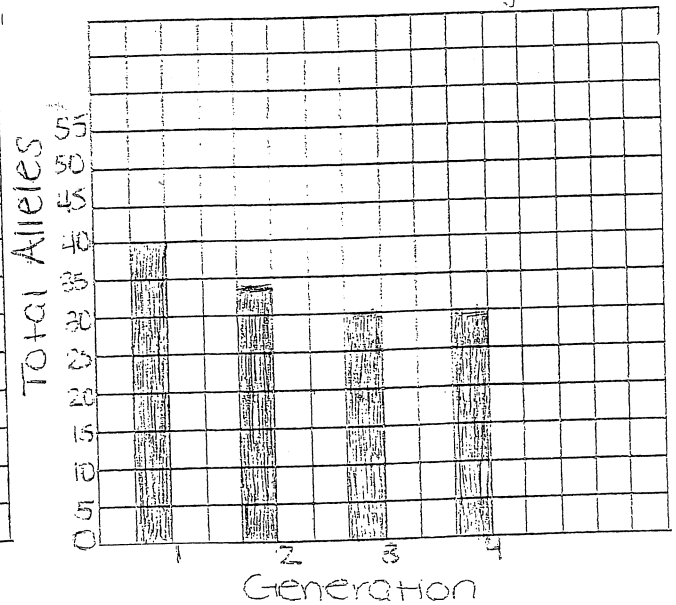
Test 1: Predators prefer blue fish

Generation #	Colors of surviving fish				Surviving alleles		
	Blue	Green	Yellow	Total fish	Blue	Yellow	Total alleles
1 control (No predation)				20	20	20	40
2				17	14	20	34
3				15	10	20	30
4				15	11	19	20

Title: Total of Surviving Fish



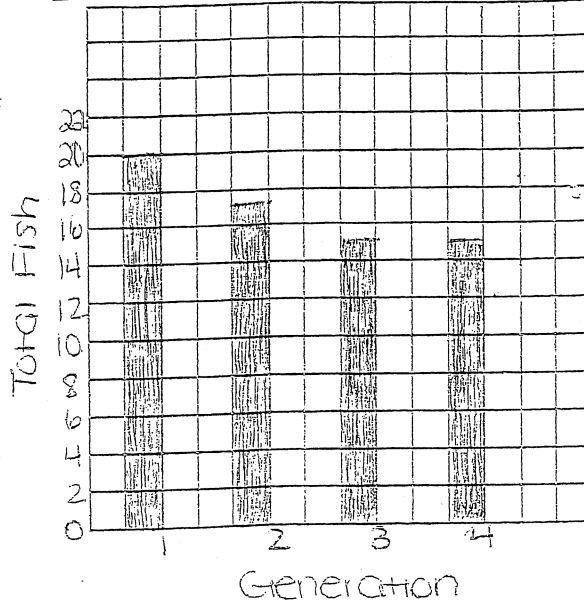
Title: Total of Surviving Alleles



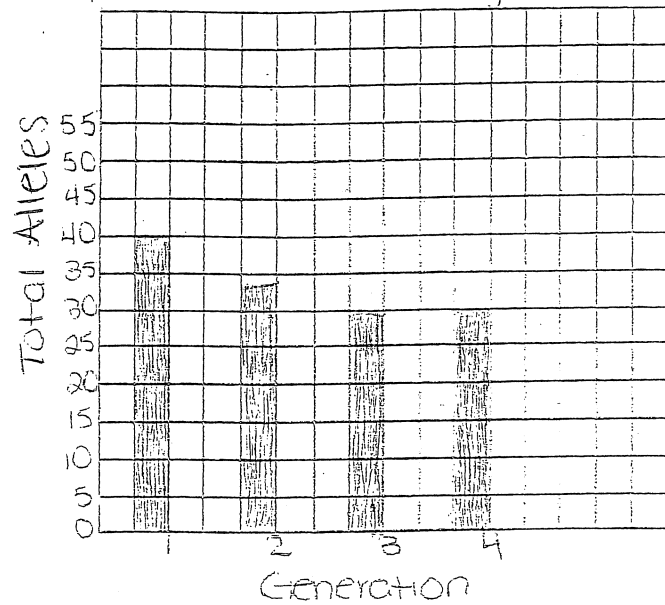
Test 2: Predators prefer Yellow fish

Generation #	Colors of surviving fish				Surviving alleles		
	Blue	Green	Yellow	Total Fish	Blue	Yellow	Total Alleles
1 Control (No predation)				20	20	20	40
2				17	20	14	34
3				15	20	10	30
4				15	20	10	30

Title: Total of Surviving Fish



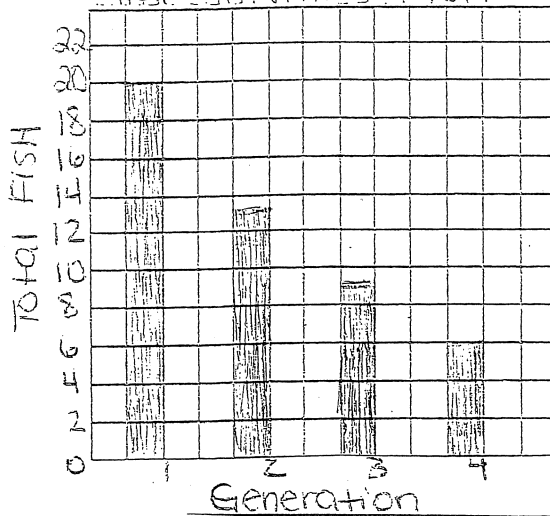
Title: Total of Surviving Alleles



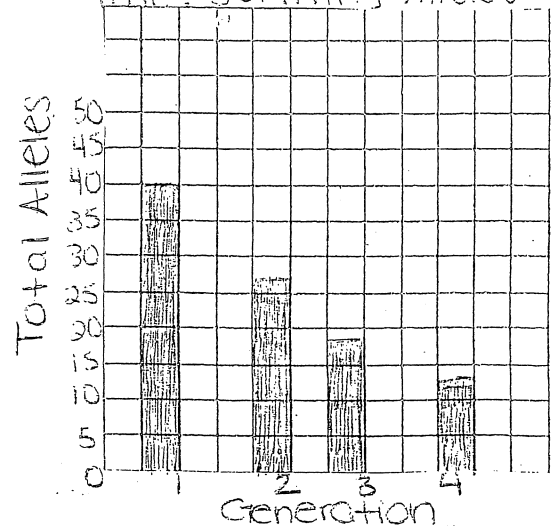
Test 3: Predators prefer Green Fish

Generation #	Colors of surviving fish			Total Fish	Surviving alleles		
	Blue	Green	Yellow		Blue	Yellow	Total Alleles
1 Control (No predation)				20	20	20	40
2				13	13	13	26
3				9	9	9	18
4				6	6	6	12

Title: Surviving Fish



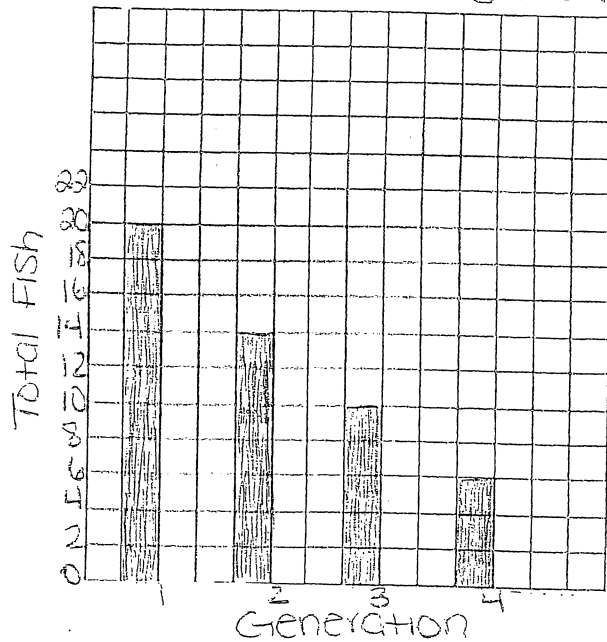
Title: Surviving Alleles



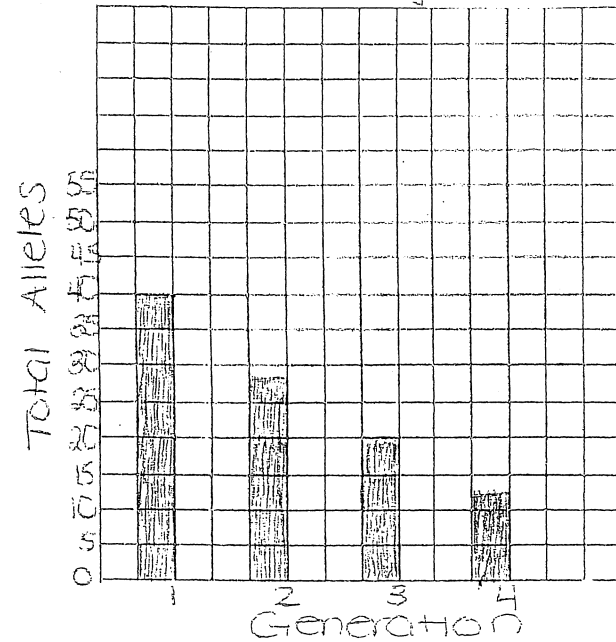
# Test 4: Green Fish are camouflaged)

Generation #	Colors of surviving fish				Surviving alleles		
	Blue	Green	Yellow	Total Fish	Blue	Yellow	Total Alleles
1 Control (No predation)				20	20	20	40
2				14	14	14	28
3				10	10	10	20
4				6	6	6	12

Title: Total Surviving Fish



Title: Total Surviving Alleles



## IV - Analysis of Results :

Test 1: Predators Prefer blue fish

Trial #	Frequency of colors of surviving fish			Frequency of surviving alleles	
	Blue	Green	Yellow	Blue	Yellow
1 Control (before predation)	.25	.5	.25	.5	.5
4	0	.73	.26	.36	.63

1. The frequency of the color fishes changed dramatically because of the process of random picking. The amount of fish being random pick vary throughout the test causing the fish to decrease.
2. The allele frequency changed overtime because the differences in the fish having the same desire of the predators preference of fish.
3. The genotypes within each fish begins to vary once the predator chooses to take a fish.
4. Eventually the frequency of each allele will decrease and less more fish could adult without the blue allele.
5. This stimulation represent a disruptive selection trend.

#### Test 2: Predators Prefer Yellow Fish

Trial #	Frequency of colors of surviving fish			Frequency of surviving alleles	
	Blue	Green	Yellow	Blue	Yellow
1 Control (before predation)	.2	.6	.2	.5	.5
4	.3	.6	0	.6	.3

1. Yellow over the generation depleted because of the predation. The fish would soon begin to decrease over the generation even when random.
2. The yellow alleles changed over time because of the predation and it preferring yellow more than blue.

3. The alleles with the yellow fish are being chosen by the predator; is why the fish is decreasing.
4. The frequency would soon begin to decrease over time with the predator wanting to eat more fish with the yellow allele.
5. This stimulation represent a disruptive selection trend.

### Test 3: Predators Prefer Green Fish

Trial #	Frequency of colors of surviving fish			Frequency of surviving alleles	
	Blue	Green	Yellow	Blue	Yellow
1 Control (before predation)	.3	.4	.3	.5	.5
4	.3	.3	.3	.5	.5

1. The change of the surviving fish was no significant change much in the test because of the lack of green fish being randomly selected.
2. The allele frequency did not change, it stayed the same throughout generation.
3. The allele types going on between the fish. Their would be only the same amount with both color fishes.
4. I believe that the fish wouldn't change much over time and stabilize within couple more generations.
5. This stimulation represent a stabilizing trend.

# Test 4: Green Fish are Camouflaged)

Trial #	Frequency of colors of surviving fish			Frequency of surviving alleles	
	Blue	Green	Yellow	Blue	Yellow
1 Control (before predation)	.15	.7	.15	.5	.5
4	.16	.6	.16	.5	.5

1. The frequency of each color didn't change dramatically through generation. Blue and Yellow fish stayed constant.
2. The allele frequency didn't change at all over the 4 generations. They decreased but constant.
3. The change in allele frequency is because the green fish is now camouflaged, which makes the blue and yellow fish easier to find.
4. Eventually the frequency of each allele will not make it to the next generation because if they are blue or yellow fish they won't camouflage.
5. This stimulation represents a stabilizing trend.

## V - Conclusion:

- The two straws (blue and yellow) represent the color gene of the fish; either dominant or recessive.

- (a) Test 1: (Predators prefer blue fish)

The phenotypic frequency in test 1 showed most of the green fish survived and was

able to continue its color genes in generation.

(b) Test 2: (Predators Prefer Yellow fish)

In test 2, yellow fish was decreasing, but Green fish was still able to survive.

(c) Test 3: (Predators Prefer Green Fish)

In test 3 both blue and yellow were accurate to each other, but surviving alleles through generation decreased dramatically.

(d) Test 4: Heterozygote Advantage (Green Camouflaged)

In test 4, Green fish was able to survive because it camouflaged. As for blue and yellow they started to decrease.

- It was necessary for the first round to have no predation to see how it changes by generation and if the fish is able to survive.
- In test 1, alleles were removed because it shows blue fish had a frequency of 20%, by the 4th generation it had a frequency of 11%.
- In test 2, it shows yellow alleles removed, first at 20% then ended with 10%.
- The blue and yellow allele would soon be eliminated but carried on by green fish.
- In test 3, the frequency of the different



- color fish stayed accurate but decreased over time. Blue and yellow decreased similar.
- In test 4, the allele frequency decreased overtime. By generation 4, both blue and yellow alleles dropped to 6%.