

Beaks Worksheet Flinn STEM Design Challenge™

Part A. Predetermined Beaks

Beak Survival

Food Items Collected	Outcome
Fewer than 10	Does not survive
10–20	Survives but does not reproduce
21–30	Survives and produces 1 offspring
31–40	Survives and produces 2 offspring
41–50+	Survives and produces 3 offspring

Generations 1, 2 and 3

Beak Variation	Generation 1		Generation 2		Generation 3	
	Number of Individuals	Phenotype Frequency (%)	Number of Individuals	Phenotype Frequency (%)	Number of Individuals	Phenotype Frequency (%)
Forceps	1					
Fork	1					
Skewer	1					
Total	3					

Change in Frequency

Beak Variation	Phenotype Frequency (%) in Generation 3 (A)	Phenotype Frequency (%) in Generation 1 (B)	Change in Phenotype Frequency (%) (A–B)
Forceps			
Fork			
Skewer			

Environmental Change: _____

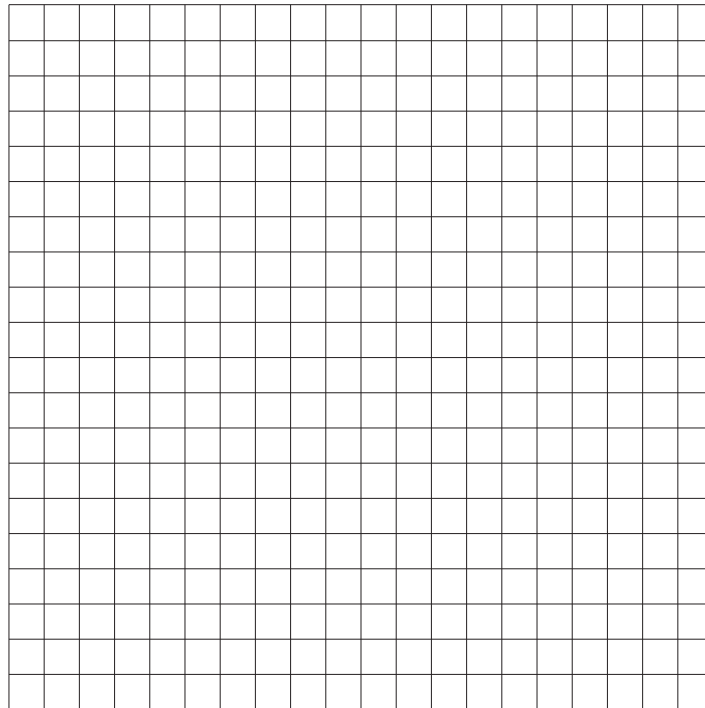
Beak Variation	Generation 4		Generation 5		Generation 6	
	Number of Individuals	Phenotype Frequency (%)	Number of Individuals	Phenotype Frequency (%)	Number of Individuals	Phenotype Frequency (%)
Forceps						
Fork						
Skewer						
Total						

Change in Frequency due to Environmental Change

Beak Variation	Phenotype Frequency (%) in Generation 6 (A)	Phenotype Frequency (%) in Generation 4 (B)	Change in Phenotype Frequency (%) (A–B)
Forceps			
Fork			
Skewer			

Post-Lab Questions

1. Using the data from Generations 1–3, determine which beak was the most successful and explain why.
2. When the food supply changed, was there a shift in the frequency of alleles? Explain your answer.
3. Using the grid below, create a line graph showing the success of each beak variation over all six generations. Be sure to include a title, labeled axes and an appropriate scale.



4. Describe the pattern of change for each beak and suggest reasons for the change.

- Besides variation in the types of beak, what other factors contributed to the success or failure of the “bird’s,” ability to survive and reproduce in this simulation?
- After reflecting on this activity and the parameters for Part B, describe the beak you believe will be the most successful in the most environments.

Part B. Beak Design Challenge

Survival Rules

Generation	Food Items collected to Survive
1	More than 20
2	More than 40
3	More than 60
<i>All students return to the ecosystem before generation 4 due to migration.</i>	
4	More than 20
5	More than 40
6	More than 60

Beak Data

Generation	Population Size (No. of students participating)	No. of Survivors	% Survival
1			
2			
3			
4			
5			
6			

Post-Lab Questions

- Describe the design of your beak and explain why you chose this design.
- How well did your beak perform in the first three generations?
- How would you alter your beak for better performance?
- Did microevolution occur throughout the six generations? Describe what you observed.
- Suggest one change to this activity that would more closely simulate the natural world.