

WELCOME TO CLIPBIRD LAND!

Warm Up:
Make sure you have page 64 and 65 labeled
“Clipbirds Lab” w/ pages glued on them.



Background Knowledge

- ▶ Evolution is the result of natural selection acting upon variation within a population. Organisms with favored traits within a given set of environmental circumstances have a selective advantage over individuals with different traits. It is this mechanism that leads to speciation. It is important to understand that favored traits are only advantageous within a particular situation and may not aid survival in another circumstance.

Problem

- ▶ How does food availability affect beak type?

Purpose

- ▶ To investigate how food availability will affect beak type in a fictional bird species.

Create Hypothesis

▶ If _____ then,
_____ because

Materials

- ▶ 1 ½ lb of popcorn kernels
- ▶ 1 ½ lb lima beans
- ▶ 255 marbles
- ▶ 20 large binder clips
- ▶ 20 large medium binder clips
- ▶ 20 small binder clips
- ▶ 30 plastic cups
- ▶ 6 brown bags

Directions

- ▶ Select twelve individuals to represent birds. Six will represent east, six will represent west.
- ▶ Give two students on each side large clips, two medium clips, and two small clips. Then, give all twelve students a small cup to represent their stomachs.
- ▶ Spread the season two food out on each table
- ▶ In fifteen seconds, individuals are to use their clips to grab as much as food as the can. They must "clip" the food and deposit it in their cups.
- ▶ After 45 seconds, use the food value guide and calculate the value of the food. If an individual does not meet the required value, then they will turn in their clip. If an individual does survive, they receive an additional clip and may choose another student to play the game.
- ▶ Clean up uneaten food from season two.
- ▶ Record results in data table
- ▶ Follow directions 3-7 for seasons three and four.

Food Values

Marblefruit	10
Big fruit	5
Tiny fruit	2

	To Survive	To Reproduce
Bigbill	80 mcal	160 mcal
Mediumbill	50 mcal	100 mcal
Smallbill	25 mcal	50 mcal

Data: Number of Survivors

<u>East Cipland</u>	1 st season	2 nd season	3 rd season	4 th season
<u>Bigbill</u>				
<u>Mediumbill</u>				
<u>Smallbill</u>				

<u>West Cipland</u>	1 st season	2 nd season	3 rd season	4 th season
<u>Bigbill</u>				
<u>Mediumbill</u>				
<u>Smallbill</u>				

Analysis Questions

- ▶ 1. Was your hypothesis confirmed or rejected? Be sure to provide evidence for your claim.
- ▶ 2. Identify the independent, dependent, and constant variables.
- ▶ 3. Can this investigation be repeated?
- ▶ 4. Is clipbird beak size an adaptation? Justify your answer with evidence from lab.
- ▶ 5. What trends do you notice in western clipland?
- ▶ 6. What trends do you notice in eastern clipland?
- ▶ 7. How can an adaptation for one individual in a species can impact the survival for the entire species?
- ▶ 8. How does the environment influence natural selection? Explain your answer.

Mini Poster Requirements

Rubric	Points Earned	Points Possible
Testable Question		10
Hypothesis (in correct format)		10
Identify the Independent and Dependent Variables		10
Analysis Questions		40
Two Bar Graphs: East Data and West Data		20
Decorated Cover		5
Neatness and Accuracy		5
Total Points		100

Testable Question:

How does food availability affect beak type?

Purpose:

To investigate how food availability will affect beak type in a fictional bird species.

Hypothesis:

If the birds don't get enough food they would die and if they get a lot of food they could reproduce but if they reproduce too much there would not be enough food for the birds.

Variables:

Independent variable:

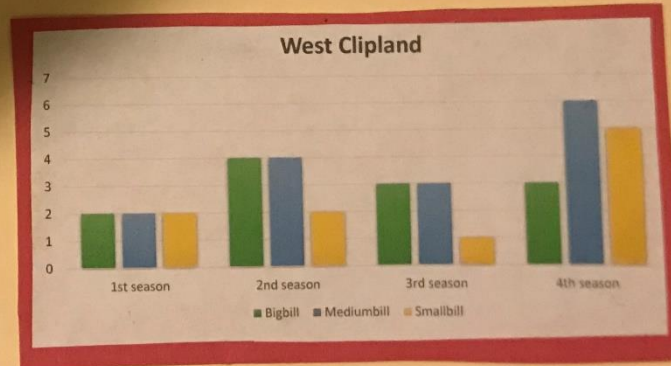
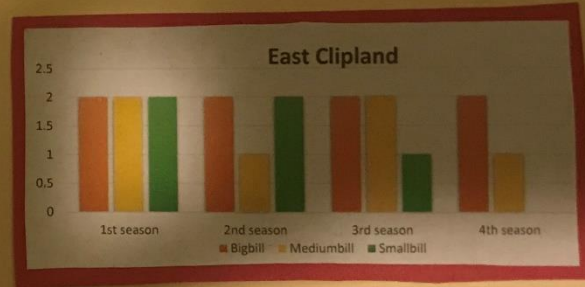
Food -\

Dependent variable:

beaks of birds -\

Analysis Questions:

1. My hypothesis was confirmed because it was something similar to it.
2. The independent variable was the food that was given, dependent was the different size of beaks, and the constant variable was the beaks of the birds.
3. Yes.
4. No because the beaks didn't change.
5. I noticed that they reproduced a lot.
6. I noticed that the numbers only went down but up price.



PRESENT ☆ JOB



Testable Question

Are favored traits only advantageous within a particular situation?

Hypothesis?

If food sources change, then bird's beaks will accommodate because if not, they will perish.

Independent Variable

1st season, 2nd season,

3rd season, + 4th season.

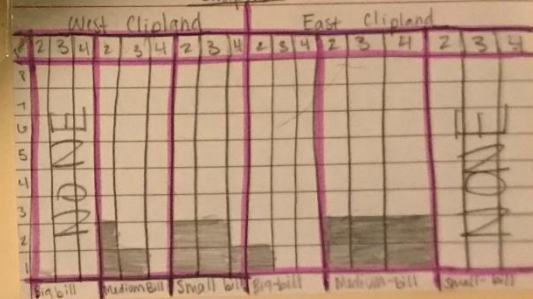
Dependent Variable

The outcome of the experiment; the number of survivors.

Analysis Questions

- 1) It was confirmed.
- 2) Independent - Seasons Dependent - outcome
constant - Bill sizes
- 3) Yes.
- 4) Yes, the beak size increases and decreases based on food variation.
- 5) Most small-billed birds survived.
- 6) All medium-billed birds survived.

Graphs



Even Hutchinson still is in Project

TESTABLE QUESTION

How Does Food Availability Affect Bill/Beak Type?

The most important function of a bird bill/beak is feeding. In any habitat, food is limited and the types of foods available may vary. Bill/beak variations enable birds to take advantage of available foods therefore, they will be more likely to survive.

HYPOTHESIS

The Larger the bill/beak, the more food they have access to therefore, the survival rate will be higher.

INDEPENDENT VARIABLE	FOOD SUPPLY
DEPENDENT VARIABLE	NUMBER OF SURVIVORS
CONSTANT VARIABLE	SIZE OF THE BILLS/BEAKS



	WESTERN CLIPLAND			
	1 ST SEASON	2 ND SEASON	3 RD SEASON	4 TH SEASON
SMALL BILLS	2	2	1	2
MEDIUM BILLS	2	4	3	6
LARGE BILLS	2	4	3	3

EAST CLIPLAND



	EASTERN CLIPLAND			
	1 ST SEASON	2 ND SEASON	3 RD SEASON	4 TH SEASON
SMALL BILLS	2	2	1	0
MEDIUM BILLS	2	1	2	1
LARGE BILLS	2	2	2	2



WEST CLIPLAND



SMALL	
MEDIUM	
LARGE	



ANALYSIS QUESTIONS

- Was your hypothesis confirmed or rejected?
 - My hypothesis was confirmed, the birds with the large bills/beaks were able to get more food, therefore the survival rate was higher than the birds with the medium and small bills/beaks.
- Identify the independent, dependent, and constant variables
 - Independent variable - Food supply (amount of food available)
 - Dependent variable - Number of survivors (birds) in each category
 - Constant variable - Size of the beaks
- Can this investigation be repeated?
 - Yes, it can be repeated with different beak sizes and different shapes
- Is clipland beak size an adaptation?
 - Yes, the bill/beak is important in a birds ability to feed; the number one use for the bill/beak is to gather or capture food
- What trends do you notice in Western clipland?
 - The birds with the smaller beaks stayed consistently at or below 2 in the population, while the birds with the medium and large were in the range 3 to 6
- What trends do you notice in Eastern clipland?
 - The beak size did not differ much, all remained at or below 2 in population