

Natural Selection of the Bead Beetle

Directions:

1. Pick up your bag of beads; make sure you have 10 of each color (6 colors). These represent the original population (60) of the *Coloris caput* (Latin for colored bead) organism. We can call them Bead Beetles!

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

3. Get a piece of fabric from your teacher (if not provided with one) and spread it out on your tray. Take your bag of *Coloris caput* and dump your Bead Beetles (carefully so they don't go everywhere) on your fabric. Spread them around evenly.

4. One person in the group needs to be the timer. Another person is the predator (*Eatium beadius*). 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 beetle at a time 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. Remember: Predators feed on the ones that are easy to see and pick off.

5. Carefully slide your remaining Bead beetles off the fabric. These are your survivors! Each survivor will have one offspring. So, count the number of remaining beads for each color, double this number (to represent offspring) and record the data in column D on the table below. Spread the surviving beads on your piece of fabric. You will not actually add more beads for the offspring, this is only shown on the table.

6. Repeat step # 4 and # 5 two more times for round 2 and 3 (columns E and F). Always slide the beads off the fabric to ensure an accurate count.

7. Column F is your final population after natural selection has occurred. Calculate the percentage of survivors of each color using your final population in column F. Record these percentages in column G.

Data Table:

A	B	C	D	E	F	G
Color of bead from original population (list each color below)	# of each color from original population (record the # of each color)	% of each color from original population (#of color divided by 60, then X 100)	# of each color after natural selection round 1 (# X 2)	# of each color after natural selection round 2 (# X 2)	# of each color after natural selection round 3 (# X 2)	% of each color after natural selection (the # of each color in column F divided by the total # at the bottom of column F, then X 100)
	Total # of beads in original population (add this column) =	Your percentages should add up to 100% (or close to it)			Total # of beads after natural selection (add this column) =	Your percentages should add up to 100% (or close to it)

8. Return your beads to the bag. Return your fabric to the bag.

Discuss the following with your team before answering your CER:

1. How would you define “Natural Selection”?
2. Why did some colors increase in frequency while others decreased in frequency in the final population?
3. Were the bead beetles eaten due to their physical appearances or their DNA sequences?
4. Predict what would happen to your bead beetle population if you put them on a white and blue background?

Question: Does natural selection affect the phenotype of a population?

Claim <i>an answer to the question based on the data</i>
Evidence <i>specific data or observations, summary of data</i>
Reasoning <i>background knowledge and science that supports the claim based on the evidence</i>

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Discuss the following with your team before answering your CER:

1. How would you define "Natural Selection"?
2. Why did some colors increase in frequency while others decreased in frequency in the final population?
3. Were the bead beetles eaten due to their physical appearances or their DNA sequences?
4. Predict what would happen to your bead beetle population if you put them on a white and blue background?

Complete the CER on your own.

Question: Does natural selection affect the phenotype of a population?

<p>Claim <i>an answer to the question based on the data</i></p> <p><i>Natural selection _____ (does/does not) act on . . .</i></p>
<p>Evidence <i>specific data or observations, summary of data</i></p> <p><u>What</u> <i>changed in your population?</i> <u>What</u> <i>data shows this change occurred in your population?</i></p>
<p>Reasoning <i>background knowledge and science that supports the claim based on the evidence</i></p> <p><u>Why</u> <i>did these changes occur? Use natural selection, environment, survive and reproduce in your answer.</i></p>

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	Total # of beads in original population (add this column) =	Your percentages should add up to 100% (or close to it)			Total # of beads after natural selection (add this column) =	Your percentages should add up to 100% (or close to it)

8. Return your beads to the bag. Return your fabric to the bag.**Discuss the following with your team before answering your CER:**

1. Why did allele frequency change in the final population?
2. Were the bead beetles eaten due to their physical appearances or their DNA sequences?
3. Discuss some real-life examples this activity might represent.
4. Predict what would happen to your bead beetle population if you put them on a white and blue background?

Question: Does natural selection act on the phenotype or genotype of a population?

Claim <i>an answer to the question based on the data</i>
Evidence <i>specific data or observations, summary of data</i>
Reasoning <i>background knowledge and science that supports the claim based on the evidence</i>