

Predator! Analysis

Biology

After you played the Predator game, all the data you collected was analyzed. The results will be discussed in class and the analysis will be posted to the website.

The following assignment should be done individually (although you can discuss your answers with your partner while you work). Type your responses in a Google Docs document and submit your work through Showbie.

Here are the rules for the Predator program:

- The number of dots of each color starts off the same.
- The dots randomly shift position every few seconds.
- As dots get eaten, they are not instantly replaced.
- After several seconds, new dots will be generated. The dots are not generated randomly or evenly – if there are more existing dots of a certain color, there will be more new dots of that same color generated.
- If there are no dots of a certain color left, dots of that color will not appear again.

Now imagine that the following information is true:

- The dots are actually living organisms.
- You are a real predator that eats these organisms.
- The color of the dots is determined genetically – there is a gene for dot color, and there are seven different alleles for that gene (black, white, red, blue, yellow, pink, and green).
- Dots reproduce by dividing in two – so a red dot will reproduce by splitting to create two red dots.

Using the rules and the information above, answer the following questions individually:

1. At the end of each round of Predator, did evolution take place? How do you know? (Remember to use the definition of evolution we used in class.)
2. Was natural selection of the dots taking place? If so, explain the details of how it was occurring. (Remember to take into account the raw materials required for natural selection.) If not, explain how you know it was not occurring.
3. Using **ONLY** the rules and information above, do you think that it is possible that a new **species** of dot-like organisms could evolve? Explain your response.
4. TEST your ideas by playing a few more rounds of predator – try to accomplish the following:
 - a) Target a particular color (not the one that matches the background) and try to cause that color to become “extinct”.
 - b) Target the dots of the background color and try to cause that color to become “extinct”.

- c) Try to keep the number of dots of all the different colors even.
- d) Try to create a new species of dot organisms.

Do these tests seem to support your answers to questions 1-3 above? Explain why, using the vocabulary we've been using in class (in particular, make sure you use the terms "evolution", "natural selection", and "allele frequencies").

- 5. If all the dots had been the same color to begin with, could natural selection or evolution have occurred? Why or why not?
- 6. Where did the dots of different colors "come from"? In other words, imagine a time when there was only 1 color of dots and try to explain how dots of different colors may have appeared.