

Toothpick Birds

Modeling Predator Behavior in an Outdoor Lab

PURPOSE

In this activity you will observe how protective coloration helps some animals to survive in nature. You will model predatory behavior by feeding on toothpick prey items in an outdoor area.

Safety Alert

1. Be careful when picking up the toothpicks as they are sharp and can scratch and/or poke your skin.
2. Do not push, trip, tackle or engage in other horse play in the lab or during a lab outside.

PROCEDURE

1. Read through the entire procedure before beginning.
2. In the space marked Hypothesis on the student answer page, formulate a hypothesis as to which “insect” will be selected the least and which one will be selected the most. The toothpick colors include wood, red, yellow, green and blue.
3. In the space marked Purpose on the student answer page, write the purpose of the lab.
4. In the space marked Data Table on the student answer page copy the data table as your teacher instructs. You must draw the lines with a ruler or straight-edge. (R1 is an abbreviation for round one, R2 for round two, and so on...)
5. You are going to be a predatory “bird” feeding on “insects” to survive. Colored toothpicks will represent your insect prey. When instructed to begin, you will have one minute to “feed” on at least four “insects” in the feeding area outlined by your teacher. If you do not capture at least four prey toothpicks, you will die from starvation and have to sit out for the remaining rounds. After several rounds, only one “Super Predator” will survive.

Here are the rules:

- You must use your “beak” (forefinger and thumb) of one hand only.
 - You may “eat” only one “insect” at a time.
 - You must place the “insect” in your “crop” (your other hand) before you can reach for another insect.
 - You must stop feeding when time is called. If you are reaching for an insect and your teacher has called time, do NOT finish reaching for it and stand up straight.
 - You must line up along the boundary that your teacher has designated, with your back turned to the area of predation.
 - Yellow “insects” are poisonous. Do not eat a yellow insect. If you accidentally pick up a yellow “insect” into your beak, put it back onto the ground. If you put the yellow insect into your “crop”, then you will be poisoned and you will have to stop feeding and sit out the duration of this round.
6. After time is called for each round, put all captured insects into the plastic cup labeled, “Round 1”. The “dead” predators will then sit in a designated area. All of the surviving birds will feed again in “Round 2”, with each bird again eating at least 4 “insects”. The eaten “insects” for Round 2 will go in the cup labeled, “Round 2”. The class will do as many rounds as are necessary to decrease or “select” the population down to one surviving bird, the “Super Predator”.
 7. When there is only one “Super Predator” left, return to the room and complete your data table. Use the cups collected during each round to determine how many toothpicks of each color were consumed.
 8. Use the following formula to determine the % selected for each color toothpick.

$$\% \text{ selected} = \frac{\text{total number of a particular color collected}}{\text{number of that color of toothpick your teacher distributed}} \times 100$$

9. In the space marked Explanation on your data table, provide a specific reason as to why you and the class collected the particular insects that you did. Do not state reasons that are not factual; for example, do not say that the insects tasted good since you did not really taste them.

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HYPOTHESIS

DATA TABLE

Color of Prey	R1	R2	R3	R4	R5	R6	Total Selected	% Selected	Reason for Selection or Non-Selection
Red									
Blue									
Green									
Wood									
Yellow									
Yel/Red									

CONCLUSION QUESTIONS

1. Which color of prey was selected more than any other color and therefore survived the least?
2. Why was the color of prey in question #1 selected the most?
3. Excluding the yellow poisonous prey, which color of prey was selected least and therefore survived the most?
4. Why was the color of prey in question #3 selected the least?
5. Why did the predators not select the yellow “insects”?
6. Why did the predators not eat yellow-and-red-striped “insects”?
7. Which color(s) of insect is an example of camouflage?
8. Name one example of camouflage in the natural world.
9. Which color of insect is an example of mimicry?

10. Give an example of mimicry in the natural world.

11. If this simulation activity is similar to what occurs in nature, then what survival strategies are most effective in avoiding predation?

12. Explain how, in nature, the color of an insect may determine whether it will be preyed upon or not?

13. Explain how predators help to “select” which animals will survive in nature.