

Greater San Diego Science and Engineering Fair 2015 PROJECT SUMMARY

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Project Title: Length of Memory for a Tetra of a Simulated Migration Route

Abstract

Objectives/Goals

This experiment's goal was to determine how long certain species of tetras can remember how to navigate their environment, a maze, before they forget. The experiment had 3 species of tetras and 2 different mazes to test what kinds of fish can remember how to navigate, and what kind of environment allows them to have a deeper memory.

Many different species of animals use visual cues to create a mental map, or cognitive mapping. **The hypothesis was that in the maze with no cues, the average time will be 1 minute and 40 seconds for each fish.** At the last test period after two weeks, the average time will be 1 minute and 20 seconds for each fish. In the maze with cues, the average time will be 1 minute and 10 seconds for each fish. At the last test period after two weeks, the average time will be 50 seconds for each fish.

Methods/Materials

Three different species, the Neon, Flame, and Ember Tetras, 20 of each species. Two mazes (one painted, one not) cut from two 16 (L) × 7.5 (W) × 1/2 (H) inch pieces of Styrofoam, Smoothfoam brand, a 280 (L) × 2 (W) × 1/2 (H) inch piece Styrofoam, Smoothfoam brand, 4 bottles of spray paint, 10 testing rubrics, White Lightning glue, blueprints for maze, stopwatch, and an exacto-knife. 10 fish from each species are put into each maze for 1 day, 2 days, 1 week, and 2 weeks after the previous test. While they are in their designated maze, record time, amount of mistakes, and stops.

Results

The Neon Tetras went from a time of 91 seconds, down to 69 seconds in the visual cues maze, while they scored 93 seconds, and ended at 106 seconds in the no visual cues maze. The Flame Tetras went from 87 to 68 seconds in the visual cues maze, while they scored 156 down to 57 seconds in the no visual cues maze. The Ember Tetras went from 24 seconds in the beginning and went down to 20 seconds in the visual cues maze, while they scored 121 to 135 seconds in the no visual cues maze. This shows that the color/visual maze helped stimulate the fish's memory, while each species of tetra had different lengths of memory.

Conclusions/Discussion

The data showed very different results than the hypothesis. The tetras all had a wide variety of scores, ranging from 93 to 24 seconds in the visual cues maze, showing each tetra have very different memory ranges and skills. It also shows that many fish had an improvement until the 3rd day, when they started to forget how to navigate the maze.

Summary Statement This experiment tests the length of time Ember, Neon, and Flame Tetras can remember how to navigate a simulated migration route and whether visual cues (e.g. color) has an effect on length of memory.

Help Received The Gao family provided fish to test with, area to test in, helped during testing and taking care of the fish.