

# Taylor's Fuzzy Brained Mice

**Note:**

If your children wish to try this experiment for their science fair project, use the opportunity to teach them about care and compassion for animals. Our members report that after the experiment, these mice made good family pets. This experiment may not be appropriate if you have cats at home.

*by Lauri Pratt*

Science fair projects are a "hands-on" way for children to learn about the effects of synthetic food additives.

After reading a magazine article about an experiment done by another sixth grader, Taylor wanted to do his own yellow dye #5 challenge on some mice. We were a little hesitant to agree to the experiment he titled "Fuzzy Brained Mice," because we were not sure how it would turn out. Nevertheless, we headed out to the pet store and purchased four mice.



Fortunately, we already had two cages, water bottles, and wheels for hamsters that we had previously owned. After researching maze design on line, my husband decided to design one with Taylor, using graph paper. They built the maze with a plywood base.



After drawing the plans onto the wood, they hot-glued the fiberboard walls into place. All the wood was cut by a very generous man at Home Depot. Once it was completed, Taylor chose to paint it his favorite color, orange. Together, father and son sprayed it a cool fluorescent orange and green, finishing the construction in one afternoon.

Taylor separated his mice into two groups of two, and initially fed and watered them equally while he trained them to run the maze. After about three weeks of training, all four mice were running the maze with similar times of about twenty seconds. Then, he gave one set of mice 1/4 tsp of liquid Yellow Dye #5 in their 6 oz bottle of water.

We waited anxiously the next morning to see what the results would be. Would there be a change in one day? After all, the amount of coloring in the water was barely visible. How could it do anything?

The results were dramatic. The two mice who received the dye in their water had increased their maze time from about 20 seconds to over 100 seconds! Their performance continued to deteriorate over the next three days until they reached a maze time of more than 200 seconds (see the chart below). Even though they had previously known the maze route as well as the Pure Water Mice, they were confused and took dead-ends continuously. Additionally, one Yellow Dye Mouse became aggressive and attacked its cage mate.

### Average Daily Maze Time in Seconds

Here are the results for Taylor's mice.

\* Yellow dye was added to water for mouse 1 and 2 beginning on 11/7

DATE	MOUSE 1	MOUSE 2	MOUSE 3	MOUSE 4
11/1/2004	48	56	47	65
11/2/2004	34	39	39	52
11/3/2004	35	32	33	23
11/5/2004	21	34	25	20
11/6/2004	18	17	21	17
11/7/2004 *	109	105	20	16
11/8/2004	145	157	23	23
11/9/2004	129	123	23	18
11/10/2004	173	184	25	19
11/11/2004	205	205	20	16
11/12/2004	195	193	19	17

After documenting the poor performance of the "fuzzy brained mice," Taylor removed the dye from the water and gave the impaired mice pure water again for one week. He then retested all four mice, and the two Yellow Dye Mice's performance once again was about twenty seconds like the other two! **Their brains had retained the information of how to run the maze, but the dye had so disabled their ability to think clearly that they could not do it.**

## NOTES:

1. The mice drank as much of the yellow water as they did of the pure water, so the difference in performance was not a result of dehydration.
2. The amount of coloring used was 1/4 tsp liquid yellow food coloring per 6 oz of water.
  - The colored water was so pale that Taylor did not think it could possibly make any difference, and he was surprised at the dramatic deterioration in performance ability he documented.
3. Why don't the scientific studies show the same results?
  - They do, when they use a maze.
  - In 1982, Shaywitz reported on a study of rat pups which were given food dyes at .5 mg/kg (only a tenth of the amount that Taylor used). Nevertheless, after eating the dye, the rats took more than twice as long to escape from a maze that they had already learned.
  - Most of the scientific studies of the effects of coloring, however, measure weight change, swimming ability, wheel running, etc. Most of them do not use a maze or other learned behavior patterns to test the animal's ability to think and remember.