



California Science Center  
**CALIFORNIA STATE SCIENCE FAIR**  
**2001 PROJECT SUMMARY**

<b>Your Name</b> (List all student names if multiple authors.) <b>Marguerite Matthews</b>	<b>Science Fair Use Only</b>  <b>S0210</b>
<b>Project Title</b> (Limit: 120 characters. Those beyond 120 will be ignored. See pg. 9) <b>Comparing the Effects of Enrichment and Exercise on Learning</b>	<b>Division</b> <u>S</u> Junior (6-8) <u>S</u> Senior (9-12)
<b>Preferred Category</b> (See page 5 for descriptions.) <b>15 - Physiology</b>	
<b>Abstract</b> (Include Objective, Methods, Results, Conclusion. See samples on page 14.) Use no attachments. Only text inside these boxes will be used for category assignment or given to your judges. <p>Prior evidence has indicated that exercise and environmental stimulation enhance performance in learning and memory tasks in adult mice. In the present study, a direct comparison of the effects of both running and enrichment is being examined.</p> <p>The six-week old mice were divided into three groups and placed in standard housing, housing with environmental stimulation, or housing with access to a running wheel. After being exposed to their respective environments for six weeks, the mice were tested on a series of tasks to measure their ability to learn. In the first task, the mice were placed on an accelerating rotarod and the length of time they were able to stay on the rotating rod was recorded. Next, the mice were placed in an automated activity-recording chamber to measure their habituation to a novel environment during a forty-five minute long period. The last task was the water maze test. The time needed to reach the hidden platform was measured over six days. This task was a measurement of their spatial learning.</p> <p>Both mice placed in the enriched and running environments performed better in the learning tasks as compared to the control group. In the water maze test, the runners and enriched mice performed similarly, with little significant difference in performance. However, in the activity chamber, mice in the running group performed better than the enriched group. In the rotarod task, the enriched group performed better than the runners.</p>	
<b>Summary Statement</b> (In one sentence, state what your project is about.) Because previous research has shown that environmental enrichment and exercise both affect learning in adult mice, this study will compare exercise and enrichment to determine whether or not one is more beneficial to learning than the other	
<b>Help Received in Doing Project</b> (e.g. Mother helped type report; Neighbor helped wire board; Used lab equipment at university X under the supervision of Dr. Y; Participant in NSF Young Scholars Program) See Display Regulation #8 on page 4. Larry Nordell helped edit and organize the report; Dr. Henriette van Praag assisted in numerous ways with guidance for experimentation and report write-up; Dr. Gage and the Salk Institute allowed me to use the animal facilities and equipment.	