



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

<b>Your Name</b> (List all student names if multiple authors.) <b>Tim J.A. Crossley</b>	<b>Science Fair Use Only</b>  <h1 style="margin: 0;">J1108</h1>
<b>Project Title</b> (Limit: 120 characters. Those beyond 120 will be ignored. See pg. 9) <b>SOLO - Simulation of Living Organisms</b>	<b>Division</b> <u>X</u> <b>Junior (6-8)</b> _ <b>Senior (9-12)</b>
<b>Preferred Category</b> (See page 5 for descriptions.) <b>11 - Mathematics &amp; Software</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><b>Objective</b> To see the effect of varying the food supply in a simulated population of evolving cellular automata.</p> <p><b>Hypothesis</b> Too little food will cause the creatures to starve. Too much food will lead to overpopulation, and the food will all be eaten, again causing the creatures to starve.</p> <p><b>Methods</b> I taught myself the Java(TM) Programming Language using the online tutorials, and with help from my father. I then wrote a computer program for the cellular automata.</p> <p>Each simulated creature moves around a "universe" looking for food; if it does not find food within a certain time, it dies. If two creatures encounter each other, they might produce a new creature. The patterns of movement and behavior on encountering another creature are encoded in "genes"; new creatures inherit a mix of their parent's genes, and might also have some mutations.</p> <p>The program was run a number of times with a fixed initial population, varying the rate of food supplies. The final population size was recorded after each run.</p> <p><b>Results</b> The results showed that if the rate of food supply was very low, the final population size was very small or zero. If the rate of food supply was very high, the final population was also low.</p> <p><b>Conclusion</b> The food supply affects the population growth as predicted: too little food leads to starvation, and too much food leads to overpopulation followed by starvation before the creatures have had time to evolve into better food gatherers.</p>	
<b>Summary Statement</b> (In one sentence, state what your project is about.) Computer simulation of evolving population using cellular automata	
<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. My father helped me learn Java, and helped with the graphical interface.	