



**CALIFORNIA STATE SCIENCE FAIR  
2015 PROJECT SUMMARY**

<b>Name(s)</b> <b>Laura L. Powers</b>	<b>Project Number</b>  35462
<b>Project Title</b> <b>How Does Crumb Rubber Leachate Affect Paramecium?</b>	
<b>Objectives/Goals</b> Crumb rubber is used in playgrounds and turf fields because of its elasticity which provides a cushion for breaking falls. However, rubber has been found to contain many harmful chemicals that could lead to cancer and other birth defects. If the rubber leachate has an adverse effect on paramecium, it increases the chance that it also has an adverse effect on humans. Also, if rubber has a negative effect on paramecium, it would have a negative effect on the entire food chain. I believe aged and ultra baked rubber leachate will cause the greatest drop in paramecium population. I think that direct contact with rubber will cause the 2nd largest drop in population. I think that soaked and filtered rubber will not have a great effect on the paramecium. <b>Abstract</b> Crumb rubber is used in playgrounds and turf fields because of its elasticity which provides a cushion for breaking falls. However, rubber has been found to contain many harmful chemicals that could lead to cancer and other birth defects. If the rubber leachate has an adverse effect on paramecium, it increases the chance that it also has an adverse effect on humans. Also, if rubber has a negative effect on paramecium, it would have a negative effect on the entire food chain. I believe aged and ultra baked rubber leachate will cause the greatest drop in paramecium population. I think that direct contact with rubber will cause the 2nd largest drop in population. I think that soaked and filtered rubber will not have a great effect on the paramecium. <b>Methods/Materials</b> I cultured paramecium to get a big enough supply. To make my measurements, I made a microscope slide with a grid and well to hold my culture sample. I had 4 tests and a control. I first treated the rubber and then soaked it in water to get the leachate. I let plain rubber soak for 2.5 weeks (Soaked Rubber), I poured water over rubber in a coffee filter (Filtered Rubber), I heated and tumbled rubber (Aged Rubber), I put rubber in the paramecium culture (Direct Contact), I heated rubber at a high temperature (Ultra Baked Rubber), and I had a Positive Control where I put vinegar into the paramecium culture. <b>Results</b> The Direct Contact and Control increased 40% after 48 hours. At 120 hours, both tests decreased down to 20%. Old Rubber, Filtered Rubber, and Soaked Rubber all had similar changes, fluctuating between only -15% and 24%. Both Ultra Baked and Positive Control decreased immediately going down to about -40% in the first 24 hours and the Ultra Baked to almost -80% by the end. <b>Conclusions/Discussion</b> My hypothesis was partially correct. Paramecium reproduce asexually but in a stressful environment, paramecium reproduce sexually, which is slower. This is why Soaked, Filtered, and Old rubber tests seemed to have an effect causing them to have flat growth rates. Direct Contact and Control grew until they reached a population limit, meaning there were too many paramecium for the amount of food available. Ultra Baked Rubber and Positive Control directly killed the paramecium. My project showed rubber had a negative effect on paramecium.	
<b>Summary Statement</b> If the rubber leachate has an adverse affect on paramecium, it increases the chance that it also has an adverse effect on humans and the environment.	
<b>Help Received</b> My father helped me to heat the rubber.	