



**CALIFORNIA STATE SCIENCE FAIR  
2007 PROJECT SUMMARY**

<b>Name(s)</b> <b>Abhishek P. Kodukulla</b>	<b>Project Number</b> <b>J0912</b>
<b>Project Title</b> <b>Recycled Copy Paper vs. Recycled Newsprint: Which Is Stronger?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> To test the effect of starch as an additive on the strength of recycled copy paper and that of recycled newsprint</p> <p><b>Methods/Materials</b> Two kinds of paper were used in the experiment: copy paper and newsprint. Two sheets each of the copy paper and newsprint were shredded and blended with water to form a pulp. The pulp was stirred vigorously and quickly poured into a mould. For the pulp containing starch, 1 tablespoon of cornstarch was added to the paper and water mixture during blending. The pulp without any additive served as the control. The independent variable was starch and the dependent variable was the strength of the paper. After drying, the paper samples were cut into thin strips and holes were punched through the taped parts. The paper was hung vertically by tying a piece of string through one of the holes. Another piece of string was tied to the bottom end. Weights were slowly added to the bag until the strips tore. The weight needed to tear each strip of paper was recorded. The procedure was repeated ten times for each sample.</p> <p><b>Results</b> Recycled copy paper with starch as the additive was the strongest of all paper samples (1451 grams <math>\pm</math> 9.9). This was followed by recycled copy paper without any additive (1305 grams <math>\pm</math> 4.2). Recycled newsprint with starch as the additive came in third with a tear strength of 964.76 grams (<math>\pm</math> 4.2). The weakest among all recycled paper samples was newsprint recycled without any additive (828.66 grams <math>\pm</math> 4.8). Within each category (control, starch), the strength of recycled copy paper was slightly higher than that of recycled newsprint.</p> <p><b>Conclusions/Discussion</b> Copy paper recycled using starch as the additive was the strongest of all recycled papers. My hypothesis was correct. Addition of high molecular weight chemicals such as starch can help increase the strength of recycled paper. The experiment had a few limitations. Because the recycling process was repeated multiple times, the texture of the finished paper varied. Perhaps refining the procedure would minimize this variability. The strength of the recycled paper also depends on the strength of the original paper. The use of additives (like starch) during recycling can produce papers of varying strengths that can be used for different applications.</p>	
<b>Summary Statement</b> The purpose was to test the effect of starch as an additive on the strength of recycled copy paper and that of recycled newsprint.	
<b>Help Received</b> Science teacher, Mrs. Vodraska and my parents for their encouragement and support.	