



**CALIFORNIA STATE SCIENCE FAIR  
2010 PROJECT SUMMARY**

<b>Name(s)</b> <b>Richard L. Agajanian</b>	<b>Project Number</b> <b>J2201</b>
<b>Project Title</b> <b>Broken Barcodes</b>	
<b>Abstract</b> <b>Objectives/Goals</b> My project was to test which barcode symbology is best constructed for readability when damaged. My hypothesis was to prove that the 2 dimensional Data Matrix barcode was the best barcode symbology for readability when damaged. <b>Methods/Materials</b> I used barcode creation software to build Code39, Code128 and GS1-128 linear barcodes and QR Code, PDF417, Data Matrix and Aztec two dimensional barcodes. The barcodes were then read using a Motorola MC75 Mobile Computer with integrated barcode imager. I then proceeded to damage the barcodes by cutting 25% of the barcode in the horizontal and vertical directions. I also damaged the barcodes by tearing a hole in the middle and through wrinkling. I attempted to read each damaged barcode with the barcode reader and recorded the results. <b>Results</b> The linear barcodes could not be read when they were damaged in the horizontal direction however when damaged in the vertical direction, only 10% of the barcode needed to exist in order to be successfully read.. Two dimensional barcodes were able to sustain damage in both horizontal and vertical directions and still be read. The best two dimensional barcode could sustain damage in both horizontal and vertical directions and still be readable. It could also be read when a hole was torn in the middle as well as when it was wrinkled. This barcode was the PDF417. <b>Conclusions/Discussion</b> My hypothesis was incorrect. The Data Matrix barcode was not the best symbology for readability when damaged. Through experimentation, I found that the PDF417 was the best barcode symbology for readability when damaged. It was readable through every type of barcode damage tested.	
<b>Summary Statement</b> This project tests various barcode symbologies for readability when damaged.	
<b>Help Received</b> My father helped install te barcode creation software and loaned me the barcode reader equipment for the project.	