



**CALIFORNIA STATE SCIENCE FAIR  
2013 PROJECT SUMMARY**

<b>Name(s)</b> <b>Aisha Raheem</b>	<b>Project Number</b> <b>J2118</b>
<b>Project Title</b> <b>Q-Riosity: What Is the Optimum Distance of a QR Code?</b>	
<b>Abstract</b> <b>Objectives/Goals</b> Many companies are using QR (quick response) Codes to market their products, and QR Codes are being printed on many different things from tiny codes on medicine bottles, to clothes on jewelry, to signs in store windows, and even on the sides of buildings and billboards. Advertisers need to know how big to make their QR Codes so that it could be accurately scanned by their target audience. In addition, QR Codes are being developed in color and embedded pictures. Advertisers also need to know if these or other features affect the distance in which the QR Codes can be scanned. In this experiment, I plan to measure the maximum distance to QR Codes of varying sizes and density and see how well it compares to the maximum scanning distance predicted by a formula in use by a printer of QR Codes. I also plan to see how adding colors or embedded pictures affects the scanning distance. <b>Methods/Materials</b> I downloaded the app "QR Reader" in an iPhone. I searched for QR Codes of low, medium, and high density. I also searched for colored QR Codes and QR Codes with logos to find out if features affect a QR Code. Then, I printed each QR Code of approximately 1 inch, 2 inch, and 6 inch. I measured the distance scanned from an iPhone to a QR Code using a metric ruler. I used the formula to find out the predicted maximum distance of a QR Code and compared it with the actual measured maximum scanning distance. <b>Results</b> My results showed that that the difference between the measured and predicted scanning distance of a QR Code was only 2-3%. <b>Conclusions/Discussion</b> The formula seems useful for predicting the correct scanning distance or helping advertisers to select the right printed size for QR Codes in their advertisements. I concluded that the formula worked well for QR Codes with high contrast in their colors (black print on white background). It also worked well at high data densities. The formula didn't work well when the QR Codes were printed in different colors ( blue, red, etc.) and embedded pictures.	
<b>Summary Statement</b> My project is about comparing the measured and predicted scanning distance of a QR Code and to see how adding features (color and logo) would affect it.	
<b>Help Received</b> My mother helped me paste the board and Mrs. Muna Moinuddin guided me throughout my project.	