



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Alex J. Keimach	Project Number S0709
Project Title The Effect of Circular Directional Waveguide Antennas of Varying Volume on the Signal-to-Noise Ratio of a Wireless Netwo	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of this experiment was to determine the effect of circular directional waveguide antennas of varying volume on the signal-to-noise ratio (SNR) of a wireless network. It is believed that increasing the volume of the antenna will cause an increase in the SNR. Directional waveguide antennas, or cantennas, work by focusing the gain from a theoretical isotropic source into a narrow beamwidth with a longer range. The strength of the signal transmitted by a directional waveguide antenna depends on the wavelength of the electromagnetic signal, the polarization of the waves, the shape and volume of the antenna, and the material from which it is made.</p> <p>Methods/Materials The cantennas were created by drilling a hole in the can, inserting the pigtail into the can and then attaching it to the router. The cantenna was mounted on a tripod and directed towards the wireless receiver chip in a laptop in another room. The program NetStumbler was used to gather the SNR data for each cantenna. Five trials were taken for each of two control groups and five data groups. Each trial consisted of twelve consecutive SNR readings.</p> <p>Results The first control group, using the Linksys omnidirectional antennas, had an average SNR of 36.98 dBm. Group 5, using the dried tomatoes cantenna, had the highest average SNR at 43.55 dBm. Group 6, using the Pringles cantenna, had the lowest average SNR at 36.07 dBm, below that of the control.</p> <p>Conclusions/Discussion These results do not support the original hypothesis. It is likely that the shorter cans, such as the dried tomatoes can, had a wider beamwidth than the longer antennas, which would have a stronger signal at such a short distance. Another possible factor contributing to these results is that the Pringles and cashews cans were made out of much thinner aluminum, while the other cans were constructed of solid metal.</p>	
Summary Statement This project is about finding the best cantenna to use for improving dead spots in a wireless network.	
Help Received Father helped construct cantennas and set-up experiment	