



**CALIFORNIA STATE SCIENCE FAIR  
2005 PROJECT SUMMARY**

<b>Name(s)</b> <b>Cordelia D. Holmes</b>	<b>Project Number</b> <b>S1505</b>
<b>Project Title</b> <b>Determining the Type of Particle in an Air Sample by Using Laser Light Scattering</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The purpose of the project was to correlate the type of particles in a sample by analyzing their laser light scattering properties. The hypothesis was that it will be possible to correlate the type of particles by measuring the laser light scattering properties. <b>Methods/Materials</b> A circular tube was set up so that air circulated through it and a laser was pointed through an opening in the tube. The digital camera was set up at an angle to the laser beam. The air was first cleaned by placing a filter on the in valve. Three pictures were taken of the "clean" air as a control. A sample was then placed inside the in valve and the fan turned on. Four pictures were taken of the air with the sample in it. The pictures were then downloaded onto the computer and the program was used to find the brightness of the beam for each angle number. The values were then graphed. <b>Results</b> The graphs of the brightness vs. angle number were different for all four samples. When the air was cleaned, there was almost no brightness. The graphs of the flour and sawdust both peaked at a brightness level of 255, which was the camera's limit. <b>Conclusions/Discussion</b> The hypothesis was partially correct. Using the tools available, it is extremely difficult to measure exact particle size. The set up was simply not sensitive enough. It was possible to use the other set up and find the intensities of the beam at different angles. By plotting these on a graph, one can see a difference in their graphs. The samples whose composition was more uniform had smoother graphs while the samples that had larger particles mixed with smaller particles had more difference between the highs and the lows. Once the graphs of a certain particle are found, they can be compared with a graph of an unknown substance and then matched to determine what the unknown substance is. In that manner, it is possible to determine the type of particles in a sample by using laser light scattering.	
<b>Summary Statement</b> To find whether the relative size of a particle can be determined by the scattering of laser light and to correlate the type of particles in a sample with their intensity vs. angle graphs.	
<b>Help Received</b> Mother helped set up board, Father wrote program and helped construct testing apparatus.	