



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) James Robillard	Project Number S0813
Project Title Dusty Problem Misty Solution: The Design and Testing of a PM-10 (Particulate Matter) Suppressant	
Objectives/Goals The project's purpose tested a new way to suppress anthropogenic atmospheric PM-10 with water. I believe that a spray device attached to a farm disc with proximal water delivery could reduce PM-10 below the standards set by the nation and the State of California. This device would be an affordable, efficient, solution to soil erosion, and health problems, while significantly improving air quality and visibility.	
Abstract In the experiment, PM-10 was introduced, in the form of baby powder, 5.08 cm above the base of a self designed 61 cm cylinder. On the contra lateral of the cylinder, water was sprayed from five different heights. PM-10 and the water were simultaneously introduced, spraying for three seconds. The PM-10 was allowed to settle for ten seconds. At the base of the cylinder, pre-massed filter-paper was used to collect the PM-10 and water that returned to the ground. The water was allowed to evaporate for 24 hours. Once dried, the amount of PM-10 collected was re-weighed.	
Methods/Materials In the experiment, PM-10 was introduced, in the form of baby powder, 5.08 cm above the base of a self designed 61 cm cylinder. On the contra lateral of the cylinder, water was sprayed from five different heights. PM-10 and the water were simultaneously introduced, spraying for three seconds. The PM-10 was allowed to settle for ten seconds. At the base of the cylinder, pre-massed filter-paper was used to collect the PM-10 and water that returned to the ground. The water was allowed to evaporate for 24 hours. Once dried, the amount of PM-10 collected was re-weighed.	
Results The most effective heights for PM-10 abatement were 19.05 and 29.21 centimeters. At these heights the spray device was 26.7% most effective in reducing PM-10 pollution. Results here suggest an onboard device where a proximal delivery of water may significantly reduce the amount of PM-10 being emitted by farm equipment. When this measured 26.7% reduction is applied to data provided by the California Air Resources Board, PM-10 could safely fall within national and California State standards.	
Conclusions/Discussion PM-10 triggers asthma attacks, weakens crops, and contributes to Valley Fever. PM-10 is a main component of air pollution, and has been implicated as one factor in air-quality related deaths. A spray device can have significant and immediate effects in areas of high agricultural activity, such as the San Joaquin Valley. A device with the advantage of onboard proximal water delivery could reduce health problems with improved air quality and visibility.	
Summary Statement This project tests a way to efficiently reduce PM-10 with water, in an effort to improve air quality, reduce soil erosion, health problems, and unnecessary premature deaths caused by the particles.	
Help Received	