CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Jeffrey C. Friedman

Project Number
J0999

Project Title
Can I Breathe?

Abstract

Objectives/Goals
My objective was to discover how carbon dioxide effects global warming, the greenhouse effect, and the enhanced greenhouse effect by determining which of four gas sources produced the highest concentration of carbon dioxide.

Methods/Materials
The four sources of varied gases included; ambient air, human exhalation, automobile exhaust, and a combination of baking soda and vinegar. I also included wood smoke and exhaust from a hybrid vehicle in my third trial. Gases were collected, and discharged into individual test tubes, which contained a dilute concentration of Bromthymol Blue indicator solution. Each sample was analyzed by titrating with a dilute ammonia solution to measure the concentration of carbon dioxide.

Results
I discovered that the baking soda and vinegar produced almost pure carbon dioxide which isn't a common occurrence in daily life. The auto exhaust from the combustible engine produced ½ as much carbon dioxide but with the volume of cars in the world this is a great amount of carbon dioxide and a main contributor to global warming. The hybrid car produced ½ as much carbon dioxide as the combustible engine vehicle. Human exhalation and wood smoke produced some carbon dioxide. No effects were discovered in ambient air.

Conclusions/Discussion
My conclusion is that global warming is a major problem that can only be slowed down with worldwide participation. I see that hybrid cars could be a significant step towards a solution.

Summary Statement
My project was to explore the relationship between carbon dioxide, enhanced greenhouse effect, and global warming

Help Received
My Dad helped to type my backboard and he collected the samples of automobile exhaust.