



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Benjamin L. Francis	Project Number J0515
Project Title What's in Your Exhaust?	
Objectives/Goals The objective of this project is to see which octane grade of gasoline releases the most carbon dioxide.	
Abstract Methods/Materials I used 3 different cars with 3 different grades of octane (regular, medium, and premium), bromothymol blue solution, distilled water/ammonia solution, and 18 balloons. I got balloons placed behind the exhaust of 3 different cars. The balloons collected the exhaust from 3 different octane grades of gasoline after the cars were on for 15 minutes. Each balloon was detached and tied to keep as much exhaust from escaping as possible. I slipped a funnel straw into the neck of the balloon and placed the other end in a test tube containing bromothymol blue solution. I counted how many drops of distilled water/ammonia solution it took to change the color from yellow back to blue.	
Results The grades of gas that takes the most amount of drops to neutralize the solution released the most carbon dioxide. The highest amount of drops to neutralize the carbonic acid was 13 which the premium grade gas in trial 2 and 5, and the lowest was 2 which was medium grade gas in trial 2; the average amounts of drops was 10.7 for premium, 3.0 medium, and 4.3 regular.	
Conclusions/Discussion My hypothesis was supported because premium gas did the most carbon dioxide in the air. One important factor I would try to change is to use the same model and year of car. I also would take a "field trip" to a smog shop to talk to an expert and see their equipment.	
Summary Statement Looking at the amount of carbon dioxide released based off of the gasoline octane.	
Help Received Dad helped collect exhaust, Mom helped type reports	