



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

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Project Title Using a Car's Tailpipe to Create Electricity	
Abstract Objectives/Goals The objective of this project is to determine whether electricity can be captured from an automobile tailpipe using a uniquely designed apparatus based on the principle of thermocouples. Methods/Materials A thermocouple device (a thermopile) utilizing copper and steel wires run in series was designed and assembled around an automobile tailpipe model. The device contained a cold junction and a warm junction, between which a large temperature gradient was created using flames at one end and ice at the other. According to the Seebeck effect, this temperature gradient along metal wires would produce electricity. A voltmeter was used to detect electric production along the temperature gradient and an infrared thermometer was used to measure temperature differences. Results The results of the testing clearly demonstrate that the apparatus is successful in producing a voltage as the temperature difference between the warm junction and the cold junction increases. Conversely, as the temperature difference decreases, the voltage production also diminishes. Conclusions/Discussion The results supported the hypothesis of successful electric production from a simple apparatus that can be applied to an automobile tailpipe. The ultimate objective of this study is to enable energy conservation and improved electric efficiency of an automobile from energy that would otherwise go wasted. This energy can be put toward function of the vehicle, recharging the battery, or for powering personal electronic devices.	
Summary Statement This project introduces a unique apparatus that creates electricity from the heat of a car's tailpipe based on the principles of thermocouples and the Seebeck effect.	
Help Received Mother helped acquire supplies. Father helped to secure the display board.	