# The Effects of Pre-Heating the Intake of an Engine on the Output of Emissions

Smith, Kaycee

Today, emissions, a greenhouse gas, are a very controversial topic as many environmentalists believe they are part of the cause of global warming. In this project, I wanted to test one possible way to reduce emissions produced from vehicles, After doing research, I found that pre-heating the intake of an internal combustion engine would reduce the amount of time that it took to warm up an engine, otherwise known as a cold start. I modified an engine to suit this experiment by extending the exhaust pipe and creating pre-heat tubes. I found that when the intake was not pre-heated, the engine tended to run lean, especially when the turbo came up on boost. This proved to be the case whether it is idle or driving. Next, I tested the pre-heated intake, I found that the engine ran far richer, especially during the driving test. While this experiment did not go as I expected it to, I gained extensive knowledge of this topic. The richer an engine, the more emissions are produced. Because it is richer, one could reduce the size of the jets in the carburetor in order to get the same effects of a leaner air to fuel ratio (AFR). Because this engine was turboed, it needs to be run richer so that when under boost, it does not run lean. By running it lean, there is the possibility of destroying an engine. In conclusion, my hypothesis was incorrect, but I learned extremely valuable information.

**Awards Won:**