A Simplified Method to Measure Ground-Level Ozone in the Atmosphere

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This project in its present form is the result of a simplified method to analytically measure ground-level ozone in the atmosphere in our rural town at low temperatures. The researchers hypothesized that at the peak heat of the day, at locations such as gas stations, factories, and parking lots full of idle cars will have higher ozone concentrations than those at any other time of the day at any other location. The researchers built a homemade vacuum pumping system to bubble air from ground-level locations through a diluted potassium iodide (KI) solution. The researchers took readings from five different locations that included a gas station, factory, house in the country, house in town, and our high school parking lot. The researchers took readings at three different times for each location to determine the relationship that temperature has on ozone concentrations. A diluted starch solution was added to and then acidified each and placed them into zero-degree Celsius ice baths. After icing for 10 minutes, they were removed from the ice and placed in a cuvette to set at 25 degrees Celsius or room temperature before data was collected using a spectrophotometer. Ozone concentrations were highest at 12:00 pm for each location and lowest at 8:00 am. The researchers concluded that the gas station, high school parking lot, and the beet factory had the highest concentrations of ozone at the peak heat of the day because of the heavy air waste produced by car traffic and factory pollution.

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