

Ubiquitous Pb contamination in Philadelphia soils: Insights taken from community workshops using XRF Analyses

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Lead (Pb) is a dangerous neurotoxin that has been a concern for public health for at least the last 100 years. Pb was introduced into our environment mainly through the addition of the heavy metal in two products: paint and gasoline. When these two leaded products were introduced on the market, they became the preferred choice to their unleaded predecessor. Deposition onto surface soils continued until the two products were removed from the consumer market 30-40 years ago.

The present study investigates surface soils throughout Philadelphia, PA using a handheld X-Ray Fluorescence (XRF) Analyzer and obtains data during community workshops that teaches participants about soil health and its relation to public health. These informal science experiences expose community members to current environmental issues in their neighborhoods and engage a diverse and mostly underrepresented population to earth science. The Handheld XRF is used during the workshop and participants are exposed to the state-of-the-art instrumentation.

The data presented here were collected during community workshops in various locations throughout the city and show high concentrations of Pb in surface soils. These locations can be categorized by their historical land use, which accounts for the range in results. The three major categories are: 1) Former Industrial (FI), 2) Painted before 1978 (PB), and 3) Painted after 1978 (PA). The highest concentrations are found in the FI and PB sites, with levels exceeding 3000 ppm, almost 10x the EPA standard for residential soils where children are exposed. However, all locations within Philadelphia exhibit measurable amounts of Pb in the soil, which creates potential exposure to a dangerous toxin for all residents.