

2011

Heavy Metals in West Chester, PA: an Open-ended, Inquiry-based Project by Students in Environmental Geochemistry

Cynthia Hall

West Chester University of Pennsylvania, chall@wcupa.edu

Follow this and additional works at: http://digitalcommons.wcupa.edu/gna_soils_series

 Part of the [Educational Methods Commons](#), [Environmental Monitoring Commons](#), and the [Geochemistry Commons](#)

Recommended Citation

Hall, Cynthia, 2011. Heavy Metals in West Chester, PA: an Open-ended, Inquiry-based Project by Students in Environmental Geochemistry. Boulder, CO: Geological Society of America Abstracts with Programs, Vol. 43, No. 5, p. 135

This Article is brought to you for free and open access by the Gordon Natural Area Soils Studies at Digital Commons @ West Chester University. It has been accepted for inclusion in Gordon Natural Area Soils Studies Documents by an authorized administrator of Digital Commons @ West Chester University. For more information, please contact wressler@wcupa.edu.

2011 GSA Annual Meeting in Minneapolis (9–12 October 2011)

Paper No. 45-15

Presentation Time: 9:00 AM-6:00 PM

HEAVY METALS IN WEST CHESTER, PA: AN OPEN-ENDED, INQUIRY-BASED PROJECT BY STUDENTS IN ENVIRONMENTAL GEOCHEMISTRY

HALL, Cynthia, Department of Geology and Astronomy, West Chester University, 750 S. Church Street, West Chester, PA 19383, chall@wcupa.edu

Students in Environmental Geochemistry at West Chester University (WCU) have historically found difficulty fusing their inherent interest in geology with one of their favorite foes, chemistry. After the Department of Geology and Astronomy acquired a handheld X-Ray Fluorescence (XRF) Analyzer, the possibilities for conducting field work and obtaining results quickly and easily became real. The final project in this course is a collaborative research project in which students utilize the XRF technology to address current, local topics in environmental geochemistry. The project is comprised of four phases: 1) preliminary, background research; 2) data collection; 3) data analysis; and 4) preparation of oral presentations. Students, in groups of 3-4, select a topic in the area of heavy metals in environmental geochemistry. They conduct a literature review of their chosen topic and seek to find articles that are current and relevant to our local conditions in Southeastern Pennsylvania. After the literature search, the group then develops a research question and hypothesis that can be answered in 1 3-hour class period. The next task is for the groups to determine what type(s) of sample they will need to analyze to answer their question. The Handheld XRF has the ability to non-destructively determine heavy metal concentrations in rock and soil/sediment samples in about 1 minute per sample. As a class, we take the XRF to a protected natural area on WCU's campus, the Gordon Natural Area (GNA) for collecting data. Most of the groups will design their projects to analyze samples in the GNA but students can collect samples in other locations to bring to class for analysis during the field trip. The final presentations that the groups in Environmental Geochemistry put together suggest that students learn a great deal during the process of open-ended inquiry-based learning. Many of the concepts that they learn throughout the semester, such as redox reactions and biogeochemical cycling, finally become tangible to the students. These upper-level geology students acquire skills in conducting independent research and communicating their results to a scientific audience. We have also learned a great deal about heavy metal concentrations in the soils of West Chester, PA and what processes influence these results.

[2011 GSA Annual Meeting in Minneapolis \(9–12 October 2011\)](#)

[General Information for this Meeting](#)

Session No. 45--Booth# 344

[Innovative Hands-on Geoscience Lab and Class Activities for use in Undergraduate Teaching \(Posters\)](#)

Minneapolis Convention Center: Hall C

9:00 AM-6:00 PM, Sunday, 9 October 2011

Geological Society of America *Abstracts with Programs*, Vol. 43, No. 5, p. 135

© Copyright 2011 The Geological Society of America (GSA), all rights reserved. Permission is hereby granted to the author(s) of this abstract to reproduce and distribute it freely, for noncommercial purposes. Permission is hereby granted to any individual scientist to download a single copy of this electronic file and reproduce up to 20 paper copies for noncommercial purposes advancing science and education, including classroom use, providing all reproductions include the complete content shown here, including the author information. All other forms of reproduction and/or transmittal are prohibited without written permission from GSA Copyright Permissions.
