AMBIENT – Elementary Level
Lead Detection

Purpose

To learn one method for the detection of lead.

Overview

This investigation is one method used in the detection of lead. The detection of the presence of lead can be determined sensitively using inexpensive swabs.

Time

1 hour

Key Concepts

The major cause of soil contamination by lead in populated areas is the weathering, chipping, scraping, or sandblasting of structures bearing lead-based paints.
It is not unusual to find lead in the soil and paint in our surroundings
There are proven and inexpensive means for the detection of lead in soil and other items find in our homes.
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Skills

Making observations
Forming hypotheses
Testing hypotheses
Understanding and describing interrelationships in nature
Communicating observations and interpretations orally and in writing

Materials

Lead Check Swabs
Samples of: Pottery
Window Blinds
Fishing Sinkers

Facilitator Preparation

ETHICS NOTE: Facilitators may choose to bring prepared samples for testing for the students rather than having students bring items from their homes. Because it is not unusual to find detectable levels of lead in soil taken from urban areas, students may be distressed to find positive results. Ethically, the facilitator must be prepared to deal with feelings of anxiety or panic when students identify soil or paint that contains lead. If the facilitator does choose to use students' samples, a discussion should prepare them for fact that is it likely that they will have some positive tests.

Background

Soil is often contaminated with lead-paint chips flaking from exterior house paint, from sand blasting near-by metal structures such as bridges or highway overpasses, and from automobile exhaust fumes on a busy street. Lead can also be found in the glaze of pottery from some countries, such as Mexico or China. Lead Check Swabs are designed to be used as a presumptive test for lead. As such, they cannot be used to determine how much lead is present.

Procedure

The following protocol can be used to determine if your soil contains a HIGH level of lead:

1. Have students collect several spoonfuls of soil from various parts of their yards at home. Students should place the samples in flexible plastic bags. Break up large lumps of dirt by squeezing the plastic bags. Within each plastic bag, mix the dirt together thoroughly.
2. Students can also bring pottery and other items they may want to test for lead contamination.
3. Activate the Lead Check Swab according to the instructions provided. Be sure there is yellow at the tip of the swab.
4. Rub the Lead Check Swab directly on the sample.
5. If pink is observed, on the swab, on the plastic wrap or on both, high levels of lead are present in the item tested.

Student Assessment

Before the testing of the soil samples, students should hypothesize whether the soil sample may have lead contamination and why. Was the sample taken from a “high risk” area? Have students describe what they see happening with the soil samples and the corresponding swabs. Students should write a brief description of what they observe as the various soil samples interact with the swabs. They

should describe what the next step might be in lead detection within soil and the other samples. Students are encouraged to include their opinions and educated guesses. Students can also map the sources of their samples and label them as positive or negative.