GP-EXTRA
Geoscience Education through Authentic Research

Session 2:

- *Lead in the Environment
- *Lead in Abandon Lot
- *Lead in Soil Outside Your House

Jefferson Junior High School, 7th Grade
December 12, 2022

What did we do last time?

Who are Earth Scientists?

Lead in the environment

Lead implications on human health

Collecting soil samples

YOU!

Who are Earth Scientists?

What do we know about Lead?

- Lead is a heavy metal that is naturally occurring.
- Was used in paint, gasoline, and pipes.
- Lead has been banned, but we still find it in our environment.

Human contact with lead-contaminated soils

1. **Direct ingestion of contaminated soils.**
   a. Children hand-mouth activities
   b. Contaminated soil attached to produce
2. **Inhalation of dust/fine particles.**
   a. Dust in the environment (gardening)
   b. Dust tracked into the house/ workspace
3. **Water and food consumption.**
   a. Water from contaminated pipes/ solder.
   b. Food grown in/ on contaminated soils.

Health Impacts of Lead

CLEAN WATER ACTION
CLEAN WATER FUND

Exposure to high levels of lead can cause severe damage to the brain, blood and kidneys. Children under six are most at risk from lead poisoning. Even low levels of lead exposure have been found to permanently reduce cognitive ability and cause hyperactivity in children.

ADULTS

Brain
Memory loss, lack of concentration, headaches, irritability, depression.

Digestive System
Constipation, nausea and poor appetite

Nervous System
Damage including numbness and pain in the extremities

Body
Fatigue, joint and muscle pain

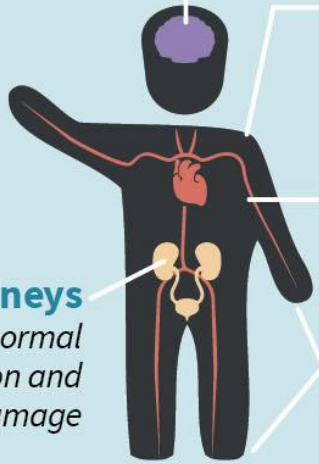
Cardiovascular
High blood pressure

Kidneys
Abnormal function and damage

Reproductive System
Men: Decreased sex drive and sperm count, and sperm anomalies. Women: Spontaneous miscarriage

CHILDREN

Brain
Behavior problems, lower IQ, hearing loss, learning disabilities



Body
decreased bone and muscle growth

Blood
Anemia

Kidneys
Abnormal function and damage

Nervous System
Damage

YOUR JOB AS EARTH SCIENTISTS!

1. Go home, get the permission slip signed.
2. Find a location around your house (drip zone or garden) and collect a soil sample.
3. Write where you collected your sample on the bag (address and type of sample).
4. Bring in the soil sample and signed permission slip back to school!

What are we going to do today?

Lead in the Environment Activity

- Lead was used for over 6,000 years, around the industrial revolution (~1800) lead use was very popular.
- Let's look at how different factors like time and location have influenced children's blood lead levels.

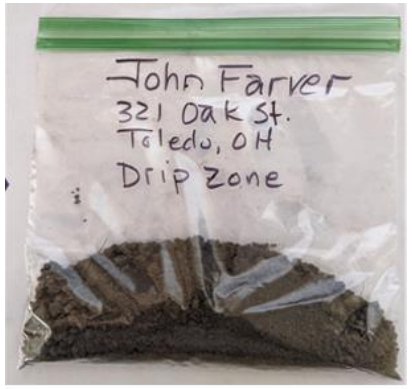
- Interpreting data like a scientist!

Abandoned Lot Project

- You're hired by the city to help analyze an abandoned lot for a new use!
- You'll need to talk to neighbors, look for evidence and choose where to test the soil.
- Then, you'll use all the information given to plan the best (and safest) locations for a garden, playground, and parking lot.

Analyzing Your Soil Samples!

- We'll teach you how to use a portable X-ray Fluoresces Spectrometer to analyze your soil samples!



Today's Plan:

1. Divide into groups of 3-4
2. Start with the "lead in the environment" activity. Be sure to discuss ideas with your group!
3. When finished check in with the teacher and begin the "Abandoned Lot Project"

- Groups will be called up 1 at a time to analyze samples with the XRF.

- Today you are an **Earth Scientist** in the lab, use time wisely and stay on task!