GP-EXTRA
Geoscience Education through Authentic Research

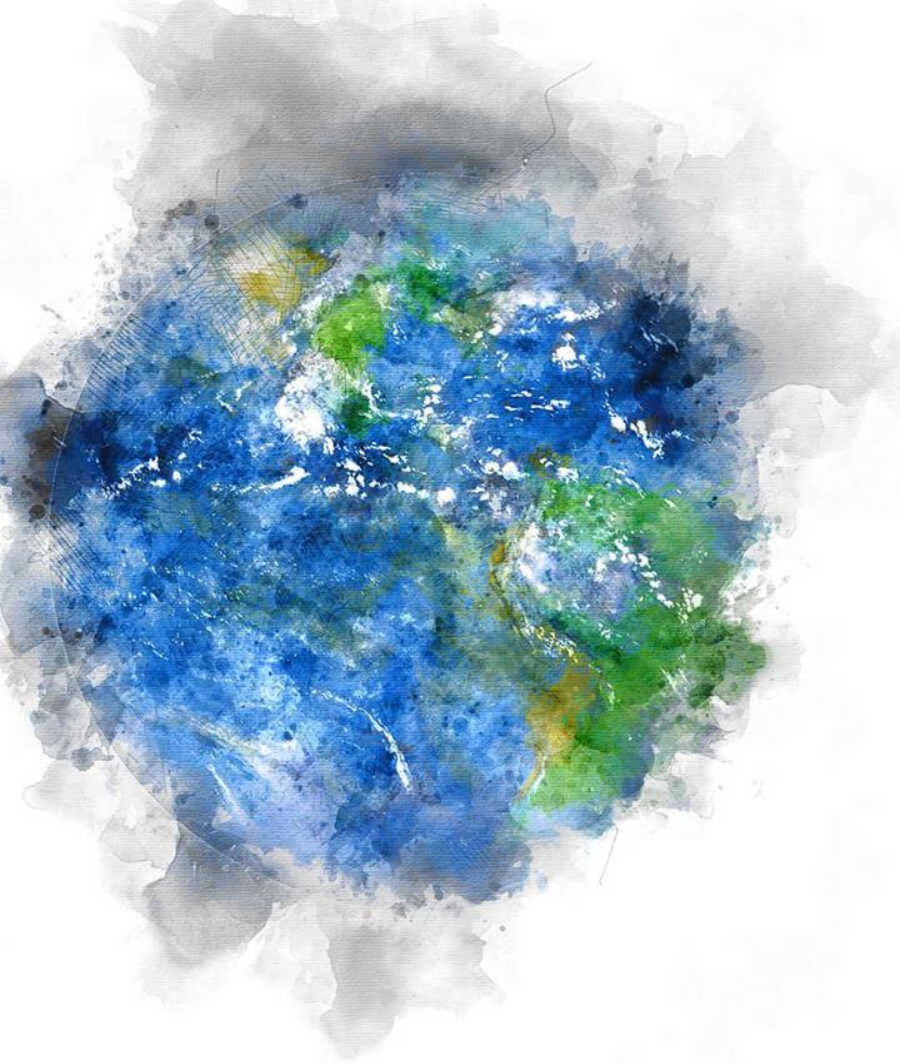
Session 1:

* Earth Scientists
* Lead in Soils
* Sampling of Soils

Jefferson Junior High School, 7th Grade
November 14, 2022

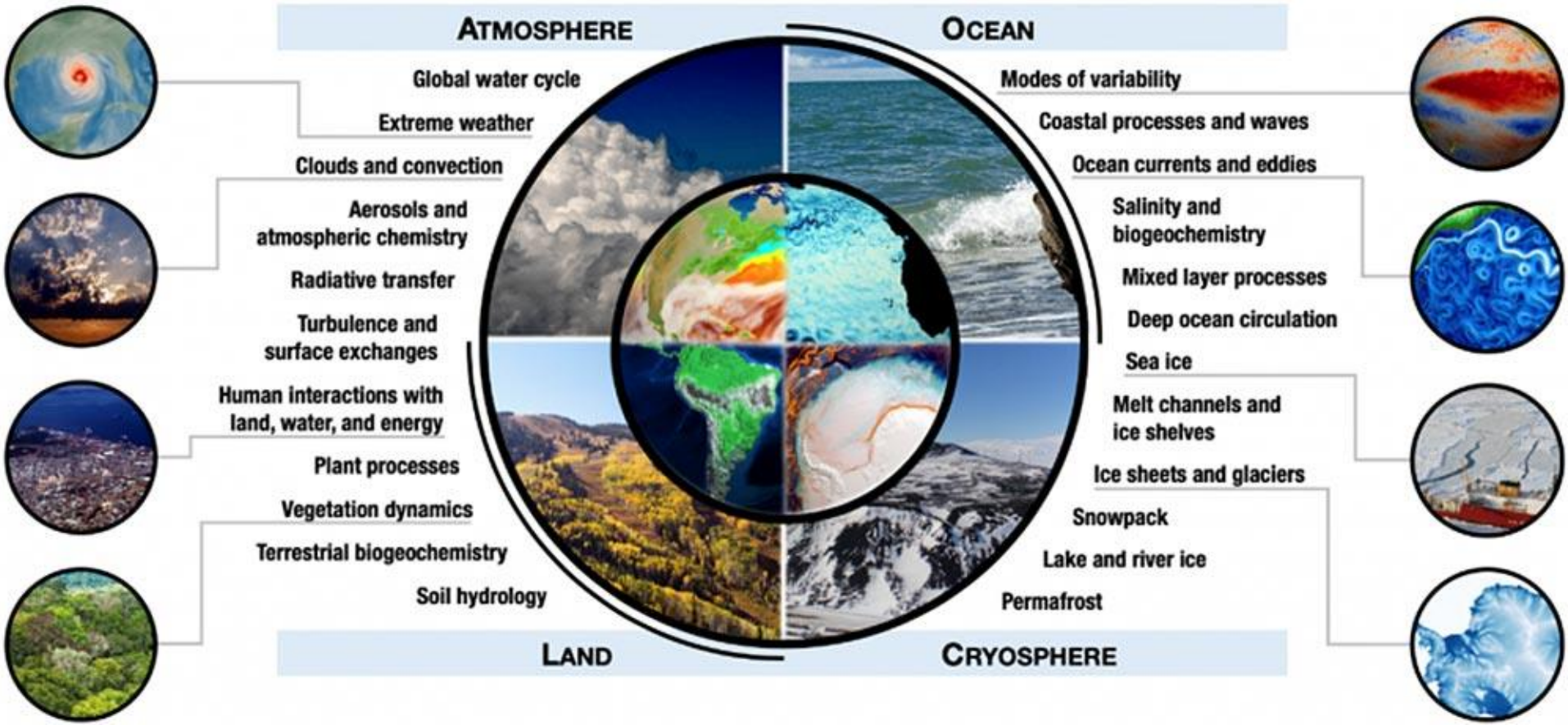
Pre-Survey

1. Put name in upper right hand corner of paper (you will tear this off when you complete the survey)
2. Answer the survey questions to the best of your ability, responses will not impact your grade and will remain anonymous.



What is Earth Science?

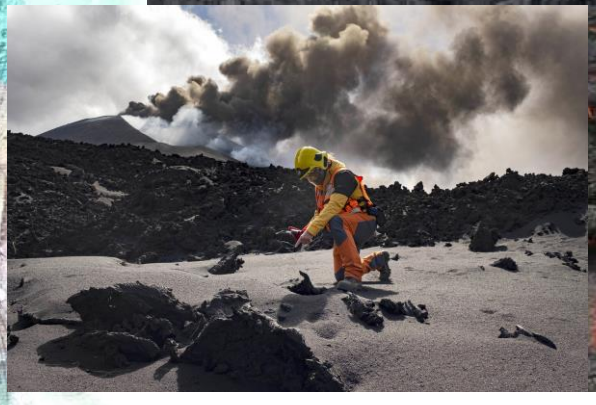
The study of Earth, its processes, structure, and properties.


ATMOSPHERE
Global water cycle
Extreme weather
Clouds and convection
Aerosols and atmospheric chemistry
Radiative transfer
Turbulence and surface exchanges
Human interactions with land, water, and energy
Plant processes
Vegetation dynamics
Terrestrial biogeochemistry
Soil hydrology
OCEAN
Modes of variability
Coastal processes and waves
Ocean currents and eddies
Salinity and biogeochemistry
Mixed layer processes
Deep ocean circulation
Sea ice
Melt channels and ice shelves
Ice sheets and glaciers
Snowpack
Lake and river ice
Permafrost
LAND
CRYOSPHERE

Who are Earth Scientists?

They can look like… paleontologists

That can look like… volcanologist



They can look like…
Environmental Scientists

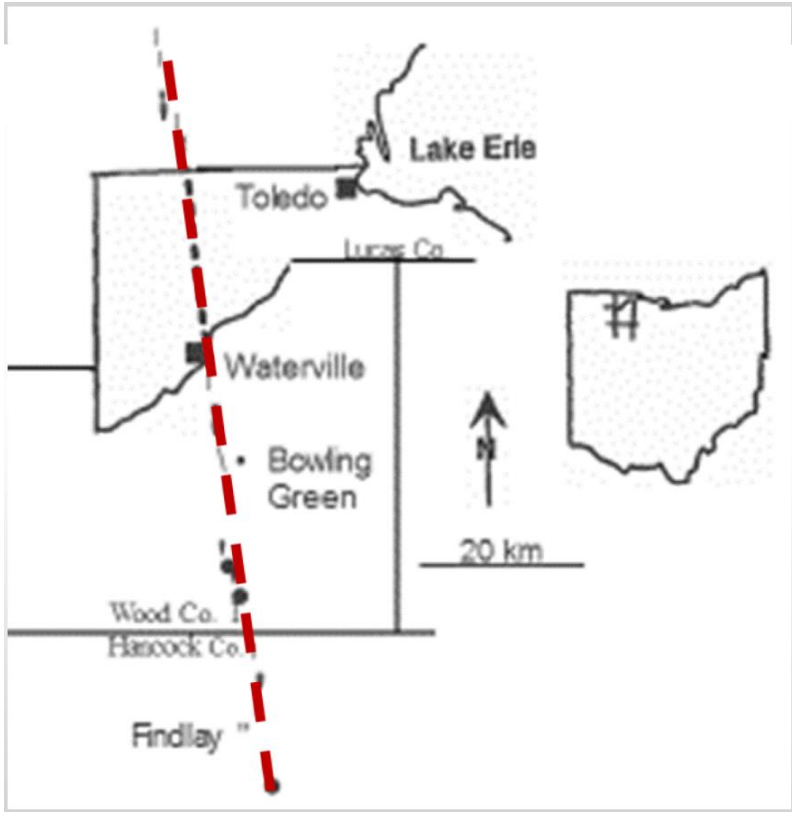
They can look like…

Earth Science in Toledo!

We may not have volcanoes or dinosaur bones but there is so much around us!

Lake Erie Algal Blooms

Bowling Green Fault, Waterville, OH Quarry

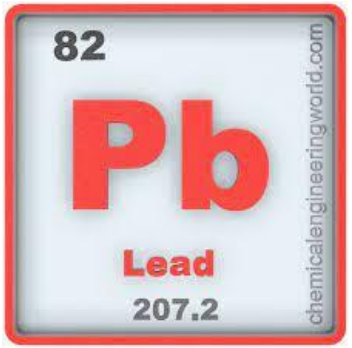


Toledo Community Gardens- Lead Contamination

What is Lead? How does it end up in soil?

Lead

- **Element on the periodic table**
- **Naturally occurring heavy metal**



What is lead used for?

Lead in Soils

Human contact with Lead

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
   c. Tobacco smoke
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.

Body
Fatigue, joint and muscle pain

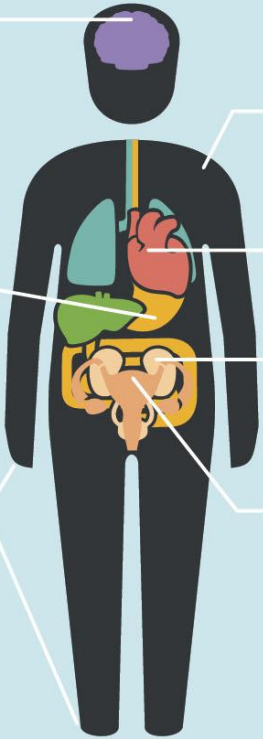
Cardiovascular
High blood pressure

Digestive System
Constipation, nausea and poor appetite

Kidneys
Abnormal function and damage

Nervous System
Damage including numbness and pain in the extremities

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



CHILDREN

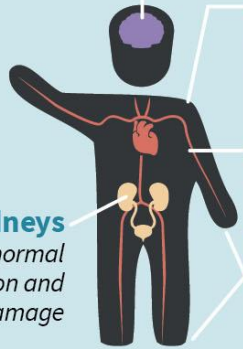
Brain
Behavior problems, lower IQ, hearing loss, learning disabilities

Body
decreased bone and muscle growth

Blood
Anemia

Kidneys
Abnormal function and damage

Nervous System
Damage



Lead in Toledo

- **73,690 housing units in Lucas County are at risk of exposing occupants to lead.**
- **In July 2017, Toledo received a $2.9 million grant from the U.S. Department of Housing and Urban Development to help reduce lead-based hazards in homes.**

We need your help!

YOUR JOB AS EARTH SCIENTISTS!

1. **Go home, get 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!**

Where should I collect my sample?

- **Drip Zone- 3-foot area surrounding the house.**
- **From your garden**
- **From next to a roadway**

Avoid:

- **Collecting mulch, roots, grass or added top soil.**

How to collect a soil sample

- **Chose a location**
  - **Drip zone, garden, next to the highway**
- **Clear away mulch or grass and dig down about 2 inches**
- **Collect 6-8 spoonfulls of soil in the baggie.**
- **Seal the bag, and write your name, location (address), and sample type (drip zone, garden, etc.)**
- **WASH YOUR HANDS**
- **Bring the sample to your teacher with the signed permission slip.**

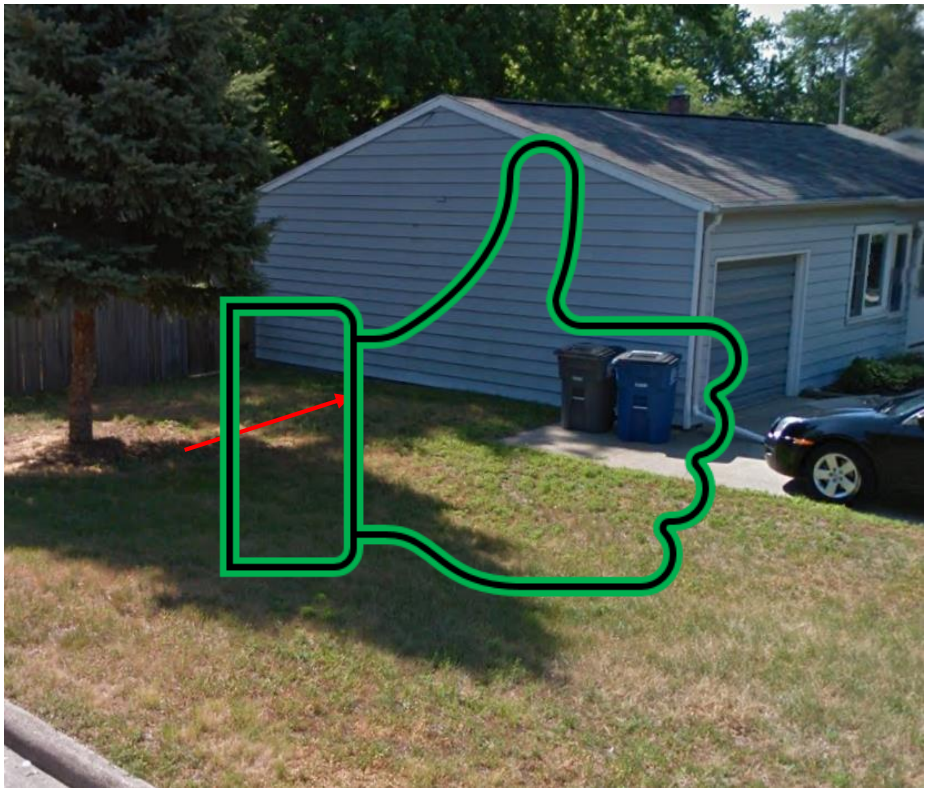
Soil Sampling

Measure

Dig Soil

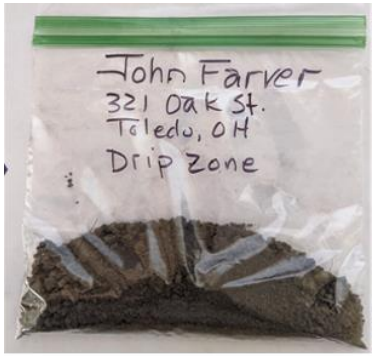
Put Soil into Labeled Bag

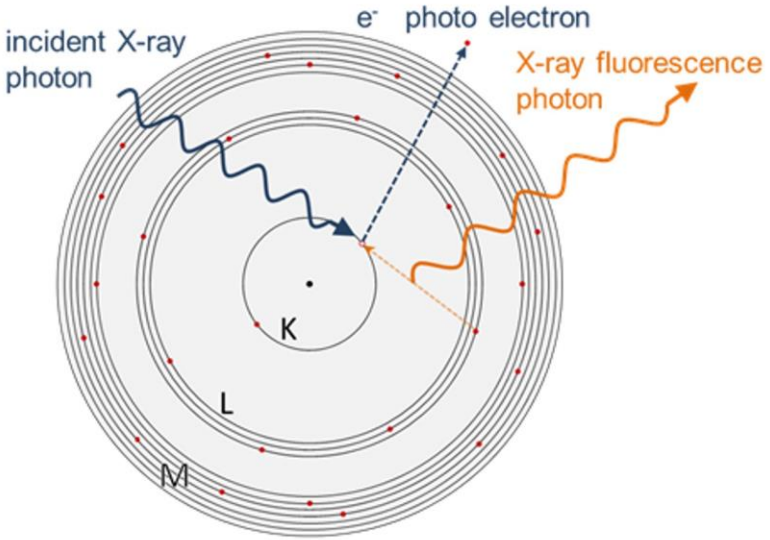
Is it a Good Soil Collecting Location?



Is it a Good Soil Collecting Location?

What will we do with the samples?





Questions?