



Urban Soils: Testing for Lead

Why is soil testing for lead important?

Lead naturally occurs in soils at concentrations that range from 10 – 50 parts per million (ppm). In urban soils, these concentrations can be much higher due to widespread use of lead paint pre 1970, use of leaded gasoline pre 1980s, & industrial sources such as smelters, electroplating facilities, & more. Lead does not biodegrade & is a relatively immobile element meaning it can remain in soils for thousands of years. Exposure to lead from contaminated soil occurs when soil particles are inhaled or ingested. This is dangerous because there are no “safe” levels of lead exposure. Children are at an especially high risk for the negative health implications of lead toxicity in the form of developmental delays (reduced growth and IQ), learning disabilities, hearing loss, insomnia, and hyperactivity. In adults, chronic lead exposure can lead to organ failure.

How do I address lead contamination in my soil?

Removing & replacing soil is the only sure way to eliminate & fully remediate the contamination. However, this can be an expensive option. There are 3 strategies to address contamination:

1. **Mitigate** the risk of exposure: Keep thick ground cover such as turf grass, and woodchips. In extreme cases, paving the surface might be the best solution. Isolate the contaminated area & do not use for play spaces or gardening.
2. **Ameliorate** the soil to reduce risk: If you can dilute a pollutant enough, the resulting intensity of the pollution is reduced. Add clean soil to dilute concentration of lead contaminants. Incorporation of organic matter, such as compost & cover crops, furthers the goal of reducing pollution because the lead particles bind to phosphate in organic matter creating a stable bond. These bonds degrade less easily and are not absorbed by the body as easily when accidentally ingested.
3. **Remediate** or completely remove threat of exposure: Have the soil excavated & removed. Have the soil chemically washed & returned or replace with new, clean fill.

What do my soil test results mean?

Laboratory test results will report soil lead concentrations in terms of $\mu\text{g/g}$ (micrograms per gram), mg/kg , or ppm (parts per million). These are all equivalent units of measurement. Interpreting soil lead results can be challenging. There is no single threshold that defines acceptable levels of lead in soil. The chart below indicates the degree of risk associated with various soil lead concentrations utilized by the City of Pittsburgh.

HIGH RISK: 1,000+ PPM

Do not garden in soil with contamination in this range. Keep children & pets away from areas with bare soil & take steps outlined in other risk categories to reduce dust & in-ground lead mobility. Keep the area covered. If lead contamination exceeds 2,000 ppm, contact your local health department, Penn State Extension office, or regional DEP office for specific advice on lead abatement measures that should be taken.

MEDIUM RISK: 401- 1,000 PPM

As lead moves from the higher end of low risk into medium risk, working in the soil becomes more difficult. At a medium risk level in-ground gardening of leafy greens and root crops should be moved to raised beds with clean soil. Covering the ground with mulch or thick turf can also help by reducing the presence of dust.

LOW RISK: 151- 400 PPM

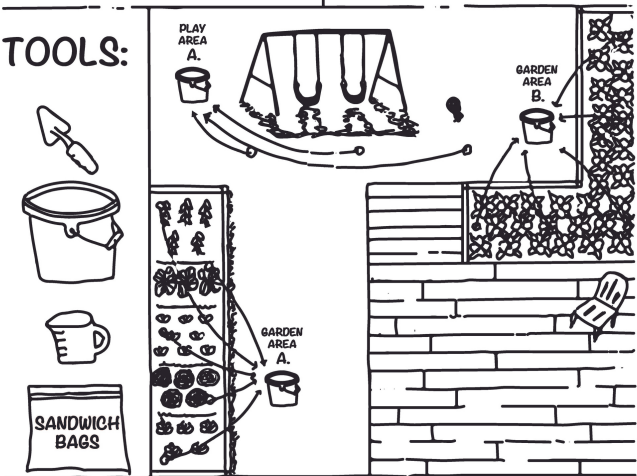

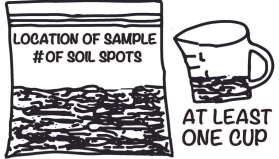
At this range of risk, it is important to make sure that people (especially children) interacting with soil thoroughly wash their hands and keep shoes at or near the door to avoid bringing dust indoors. When gardening in this soil, wash all produce thoroughly, make sure pathways are covered to reduce dust, & place garden beds away from roads, driveways, & old painted structures.

VERY LOW RISK: 0- 150 PPM

This is the range of lowest risk, but because we understand that lead contamination occurs on a continuum, it is important to make sure a “clean hands policy” is always used.

How can I get my soil tested?

1. Identify 1 area of interest at a time (yard, garden bed, playground, etc.). This area should not exceed 100 square feet (10' by 10'). If it is larger, split it into separate samples.
2. Put on protective gear! To reduce risk of inhaling or ingesting soil with lead contaminants, wear gloves and mask.
3. Use shovel to collect 3-5 small scoops from different spots in that area. Collect from the top 2 inches for lawns and play areas, & 6 inches for garden areas. If the soil is wet, lay it on a piece of paper in the sun to dry.
4. Mix those 3-5 scoops together in a bucket.
5. Remove any large debris like large rocks, leaves, grasses, or trash.
6. Transfer ½ to 1 cup of the mixed soil into a clear plastic bag that is labeled so you know where it came from.
7. Repeat steps 2-5 with other areas of interest for soil sampling like a different garden bed or area of the yard.
8. Wash your hands immediately after collecting soil samples.
9. What to do with collected soil samples:
 - a. Bring sample(s) to the Allegheny County Conservation District's next free soil screening events. Our event schedule can be found at www.accdpa.org/events
 - b. Request assistance with rolling soil screenings online at accdpa.org/farm-assistance
 - c. Don't want to wait for ACCD's next event? Send your collected samples to Penn State Extension or UMASS. For a fee, these universities will analyze your soil sample.

FOR GARDEN AREAS take sample from top 6 inches of soil	FOR PLAY AREAS take sample from top 2 inches of soil
TOOLS: 	
MIX WELL AND DRY IN THE SUN <small>OR</small> ON NEWS PAPER  NO ROCKS OR TWIGS! 	LABEL SAMPLE BAG 

How can I reduce my risk of exposure to lead in the soil?

In Allegheny county, there has been a surge in interest in revitalizing vacant lot space to be used for urban agriculture, community green space, play yard construction, & more. Remember, there is no "safe" level of lead exposure. For sites with "Very Low" or "Low" risk as a result of soil testing, consider implementing these "Safe & Clean Gardening Guidelines":

- Wash your hands after working in the soil; consider wearing protective gear (gloves, masks, etc.) to avoid ingestion or inhalation.
- Remove shoes before entering indoors to avoid tracking dust indoors
- Mulch walkways at least 4 inches to reduce dust
- Thoroughly wash all produce to remove soil particles
- Throw away outer leaves of leafy greens & peel root crops
- Opt to grow fruiting crops like tomatoes, peppers, & eggplants instead of leafy or root vegetables
- Keep tools & equipment clean
- Watch children to avoid hand-to-mouth contact with contaminated soil.
- Use raised beds with a landscape fabric barrier instead of planting directly into ground



Want to learn more about **Allegheny County Conservation District's** work to protect, restore and preserve Allegheny County's natural resources?

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