April 2021

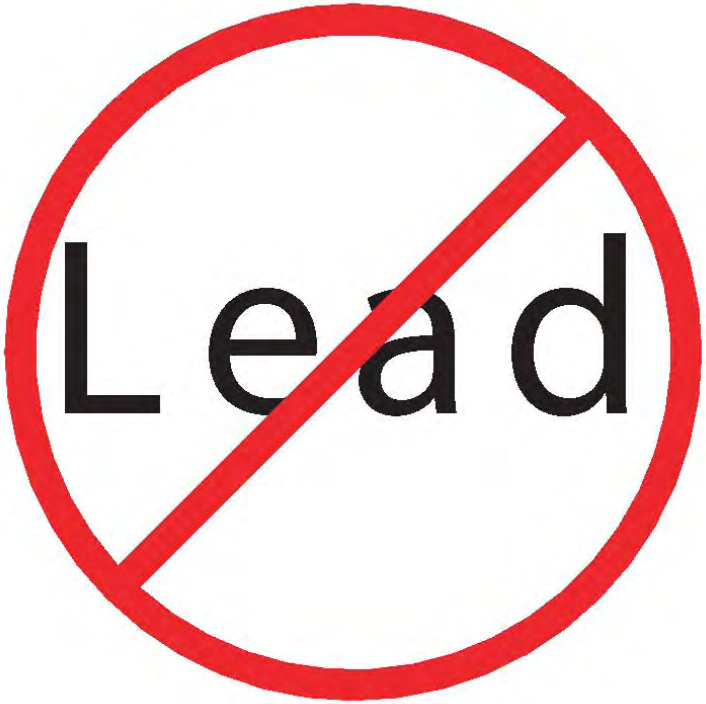
PowerPoint - Why and How is Lead Toxic?

Center for Urban Resilience

Urban EcoLab Curriculum

http://www.urbanecolabcurriculum.com

Why and How is Lead Toxic?



Module 4 Lesson 6

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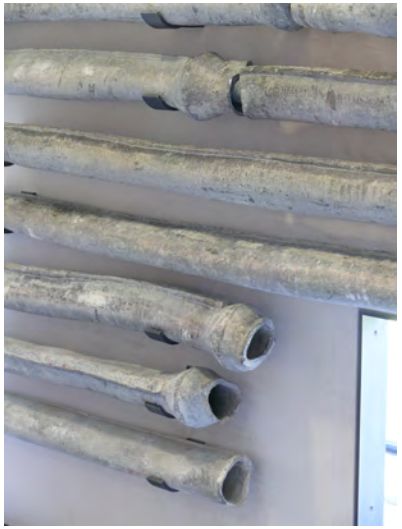
Physical Properties of Lead

- Bluish-white lustrous metal
- Very soft
- Malleable
- Ductile
- Relatively poor conductor of electricity

Everyday Uses



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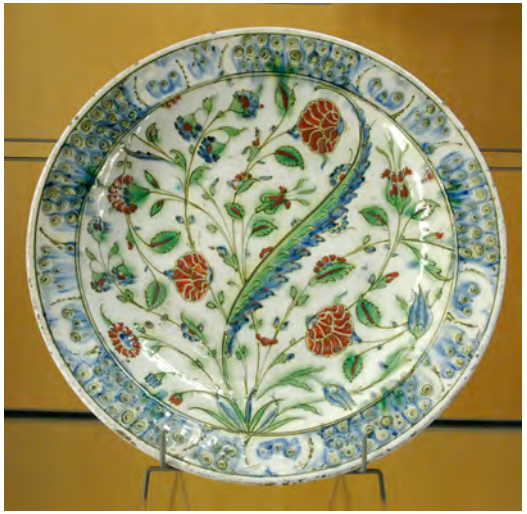
- Lead pipes
- Lead-acid car batteries
- Ceramic glazes
- Glass of computer and television screens
- Cables
- Solders
- Lead crystal glassware



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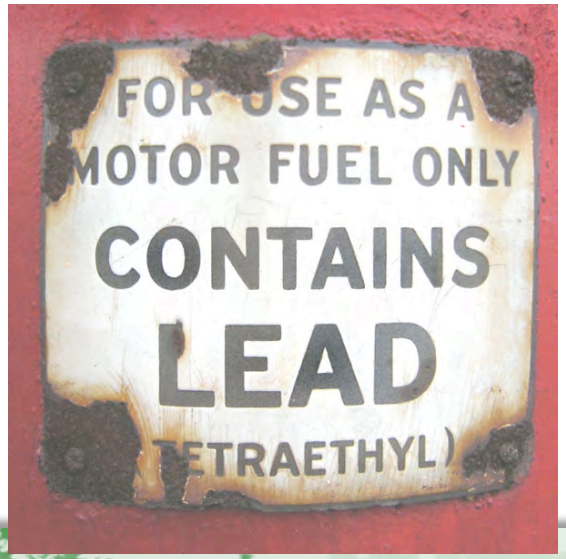
Everyday Uses

Previously used in U.S:

- gasoline (prior to 1980)
- paint (banned in 1978, but still present in older houses and imported products)



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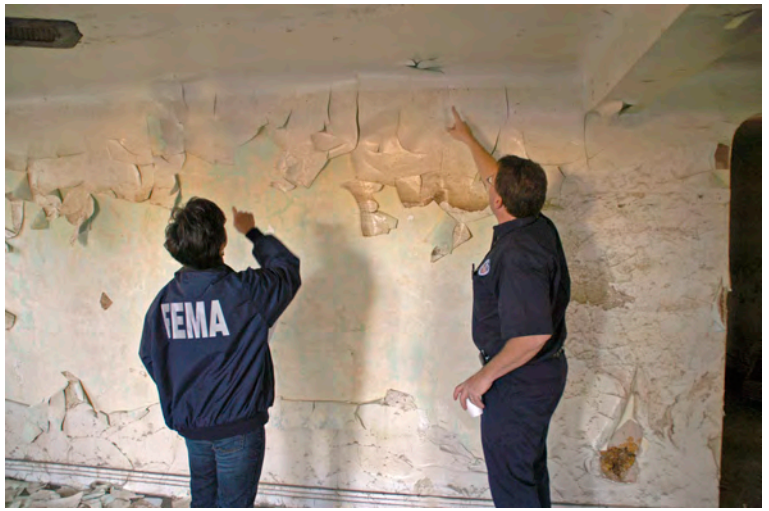

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How Lead Enters the Body and Some Sources

- Ingestion
  - ✧ Pesticides and fertilizers
  - ✧ Lead paint chips
- Water
  - ✧Corrosion of pipes that carry drinking water
- Air
  - ✧ Dust from lead paint

Where does Lead go once it is in the Body?

Once in the bloodstream, lead gets stored in three basic places:

- Blood

- Mineralizing tissue
  - 95% of the total lead in the adult body is found in bones and teeth

- Soft Tissues

Why is Lead a Problem?

Lead appears to serve no useful purpose in the human body.

When it does get into the body, however, it seems to interrupt important processes:

1. It inhibits and mimics the actions of calcium. (Pb^{2+} takes the place of Ca^{2+})
2. It interferes with the work of several proteins.

Dangerous Amounts

Because calcium is an important ion that is associated with many processes that occur in the body like….

- brain function
- kidney function
- fertility

NO AMOUNT OF LEAD EXPOSURE IS SAFE because it disrupts these natural processes.

Lead Poisoning in Children: A Big Problem

About 310,000 U. S. Children ages 1 to 5 have elevated blood lead levels which can accumulate over months and years and cause serious health problems

Children suffer neurological effects at much lower exposure levels.

- Neurological effects may begin at blood levels at or below 10 µg/dL in some cases, and it may not be possible to detect them on clinical examination.

Lead Poisoning in Children: A Big Problem

• Some studies have found, for example, that for every 10 µg/dL increase in blood lead levels, children's IQ was found to be lower by four to seven points (Yule et al., 1981; Schroeder et al., 1985; Fulton et al., 1987; Landsdown et al. 1986; Hawk et al. 1986; Winneke et al. 1990 as cited in AAP 1993).

• There is a large body of evidence that associates decrement in IQ performance and other neuropsychological defects with lead exposure

• There is also evidence that attention deficit hyperactivity disorder (ADHD) and hearing impairment in children increase with increasing blood lead levels, and that lead exposure may disrupt balance and impair peripheral nerve function (ATSDR 2005).

• Some of the neurological effects of lead in children may persist into adulthood.

Prevention and Treatment

The ban on leaded gasoline and paint have helped reduce the average blood lead levels found in U.S. children.

A diet that is high in calcium is also thought to help prevent lead poisoning.
Why do you think this is?