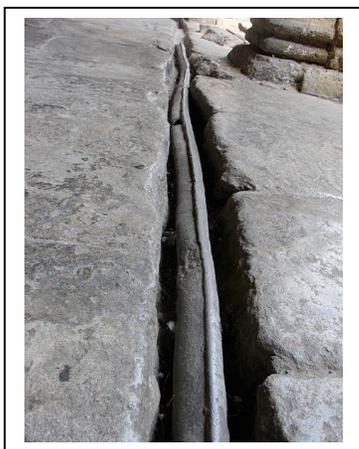


Module 4 – Lesson 7: *Lead, a modern Problem With Ancient Roots*

Since the dawn of technology, in a period in history called the Bronze Age (3500BC), lead has been a key element in many industries. As a metal, it is easily fashioned into bowls, cups, pipes and plates. Lead is found in pewter, which is a mixed metal, called an alloy. Plates, bowls and cups made of alloys of pewter were common in households around the world for centuries. The Romans used lead pipes, like those pictured below, to bring water to their ancient cities.



In more modern times, lead was used as an additive in paints, stained glass, batteries, cosmetics and even as a sweetener in red wine. For nearly 100 years, lead in the form of tetraethyl lead was added to gasoline in order to cool and lubricate the engine. Lead is used in pesticides and in some forms of pottery. Lead is a key part of electronic circuit boards, which are found in all modern electronic devices. No question about it, lead has changed the world we live in.

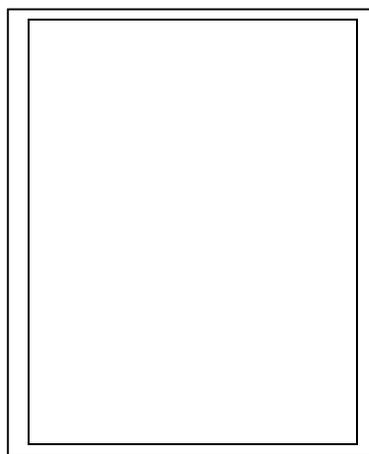
The problem with lead is that it is toxic to humans, even in very small amounts. Lead disrupts your nervous system, impedes human growth and disrupts digestion. Lead binds to proteins in your blood, which help transport the oxygen to the muscles. Lead poisoning has

been shown to cause hyper-activity and brain damage.

Clearly, lead is dangerous. But how does it get into our environment? Although lead is generally very stable, it is reactive in many ways. Small amounts of lead can dissolve in water as lead chloride, or in fat and oils as lead acetate. It can even be found in soils and in the air. People can get lead through their foods, water and the air they breathe.

One of the most dangerous sources of lead is in the form of dust from lead paint. Houses with lead paint can be toxic, especially to very young people, who are growing at a rapid rate. As they breathe in the lead dust from old paint, their bodies take in the lead and their growth rates slow and their brains are made sick.

We have developed better technologies for measuring lead levels in human tissues, such as hair, skin and blood. Scientists have even been able to investigate lead toxicity in deceased people. Some very famous people have died from lead exposure. For example, classical music composer, Ludwig von Beethoven (pictured below) was generally considered to be insane in his later life. In fact, he died in 1827 from lead poisoning.



Although we have made great strides as a society to rid our environment of lead, there are still many problems left to solve. In this lesson, you will test your environment for the presence of lead.

Closer to Home Boston Metropolitan Area: Getting g the Lead Out- Massachusetts Childhood Lead Poisoning Prevention Program

During the 1970's, Federal and State governments took great strides in reducing the lead in our environment. The *Federal Clean Air Act* and the *Clean Water Act* mandated the removal of lead from The Nation's air and water. Unleaded gasoline became mandatory and catalytic converters were added to all new cars in order to remove additional lead from the atmosphere. The period of time following 1970 saw tremendous reductions of lead in the environment.

However, thousands of young children under the age of six were still being sickened by lead poisoning each year. Children living in urban areas were particularly hard hit. On average, children in cities had lead levels in their blood that were twice as high as those children living in rural areas. Children living in neighborhoods that were near industrial smelters, where metals are made into alloys, had lead levels ten times higher.

By the early 1990's, Massachusetts was reporting nearly 32,000 children each year with lead levels that were considered toxic. State health officials consider lead levels above 10 micrograms for each deciliter (10mcg/dL) unhealthy. Many of those children got sick each year in Massachusetts from ingesting dust from lead paint that was peeling from walls inside and outside their home (see picture below). The problem was particularly bad in Boston as nearly half of all the homes in the city were built before 1950, when lead paints were in widespread use.



Today, lead is not found in any paints used within the home. But there is a real need to make sure that children are isolated from the lead that exists in old paints. This is where the *Massachusetts Lead Poisoning Prevention Program* (CLPPP) comes in.

Through the Departments of Occupational Safety, Environmental Protection and Public Health, regulations were created to help guide homeowners, renters and contractors. Education programs were launched to help parents and physicians monitor children for signs of lead poisoning. The Campaign – *Get the Lead Out*, helped parents learn more about lead poisoning and how to protect their children (see below).



The efforts are working. According to the Federal Centers for Disease Control, children with levels of lead at 20mcg/dL or above dropped by 66% between 1994 and 1999. That means that in less than a decade, the work of health officials, physicians and neighborhood community groups, helped to improve the lives of tens of thousands of children in Massachusetts.

More work remains to be done. Local community groups can have a tremendous positive impact in their neighborhoods by helping people learn about lead poisoning. The Massachusetts CLPP website has many useful ideas and sources of data for people to use.

<http://www.mass.gov/CLPP>