

## *Get the Lead Out!*

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Your Environment... Your Health!

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# What is Lead?

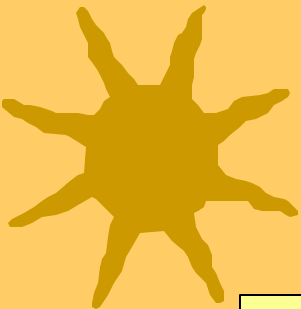


- ★ It is an element found in the environment
- ★ Lead does not break down.



**PERIODIC TABLE OF THE ELEMENTS**

The image shows a standard periodic table of elements. A red circle is drawn around the element Lead (Pb), which is located in the 6th period and 14th group. The table includes various element symbols, atomic numbers, and names. The title 'PERIODIC TABLE OF THE ELEMENTS' is prominently displayed at the top of the table.





## *Historical use of lead*



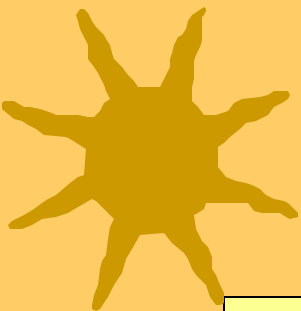
★ Ammunition

★ Solder



★ Plumbing

★ Ceramics



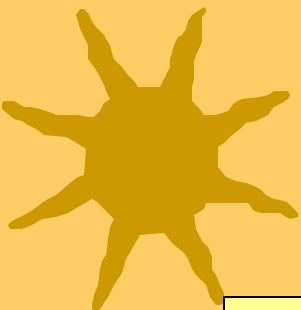
★ Gasoline-banned  
in 1996

★ Paints-banned in  
1978





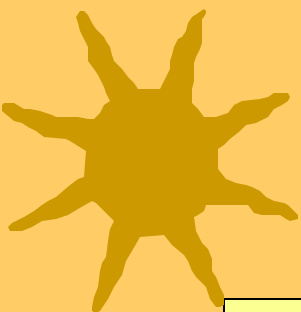
# Historical use of lead



Created and supported by the COEP of the EHS Center at Wayne State University , Grant ES06639



# *Causes of Home Exposures*



**Lead-based paint  
in pre-1978 houses**

**Imported  
food cans**

**Doors & windows**

**Old painted toys  
& furniture**



**Calcium  
supplements**

**Colored newspaper  
& bread wrappers**

**Lead in soil**

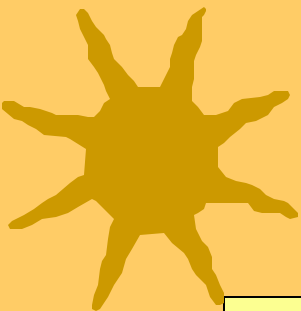
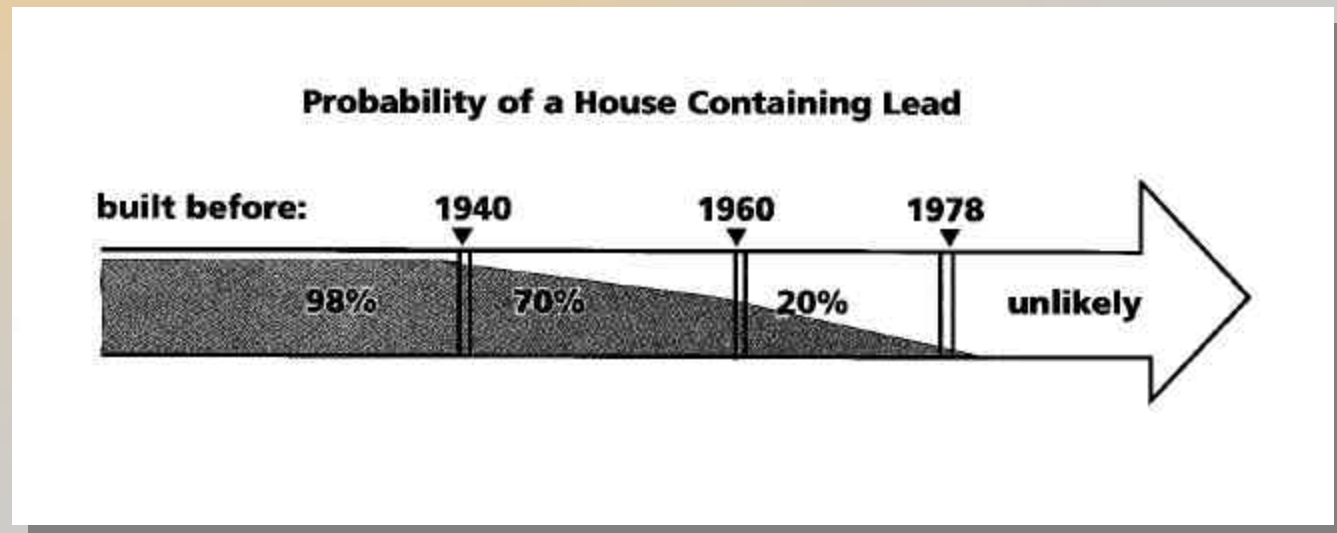
**Old plumbing  
fixtures**



# *Lead Paint is the Primary cause of Lead Poisoning*



- ★ Primary source is lead dust in the homes built prior to 1978





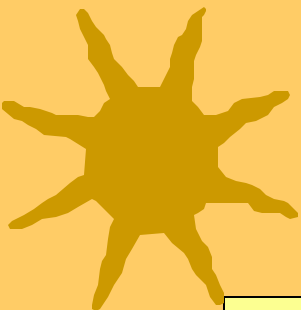
## *Other Exposures*



★ Hobbies that use lead products



★ Occupational exposures



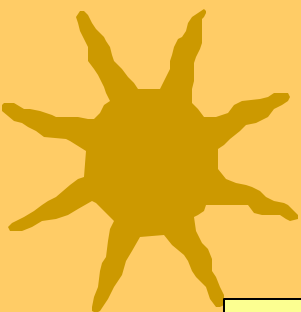
★ Foreign medicines and home remedies



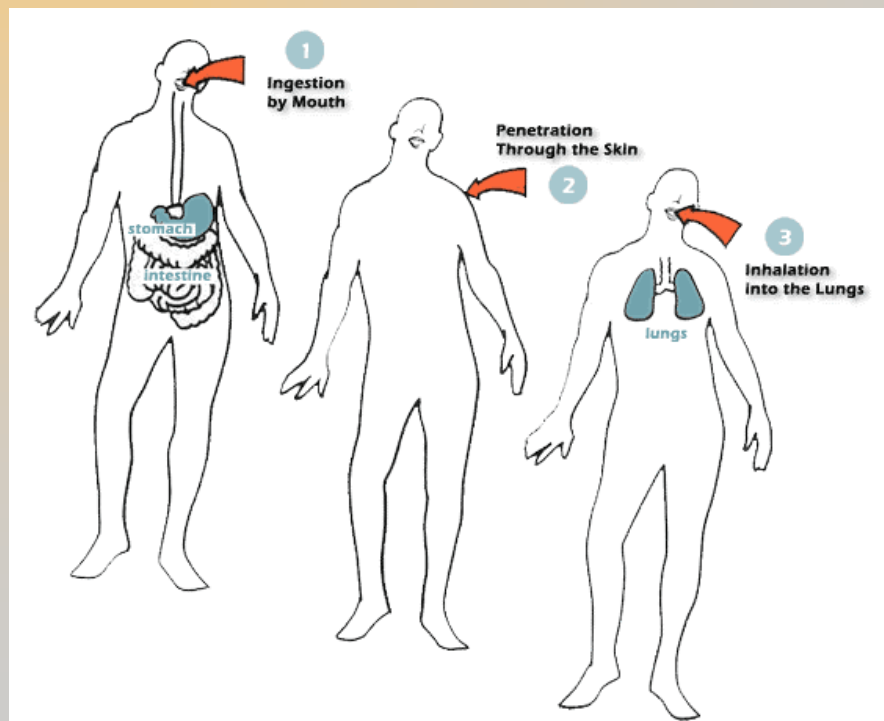
★ Food additives



# Routes of Exposure



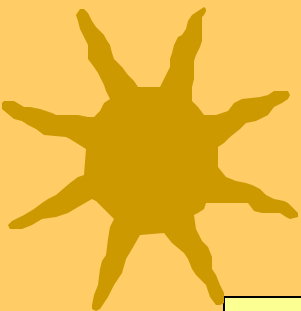
Lead poisoning develops after repeated exposure to lead, most often this is through ingestion of paint chips or dust.



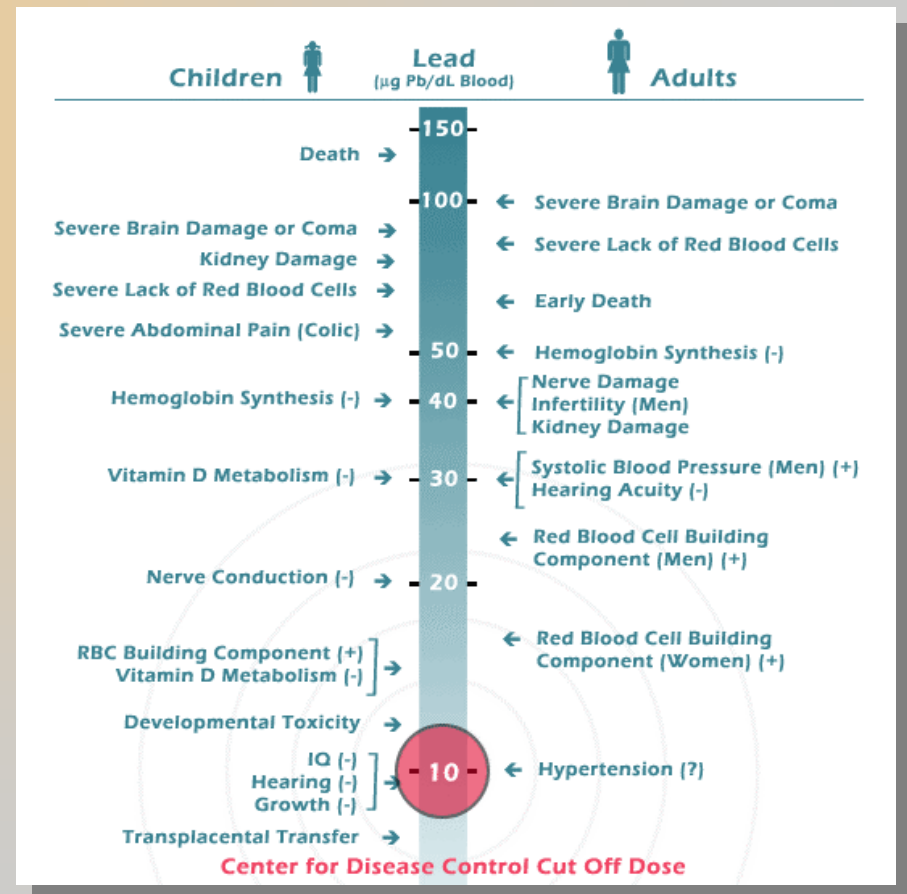




# Important points

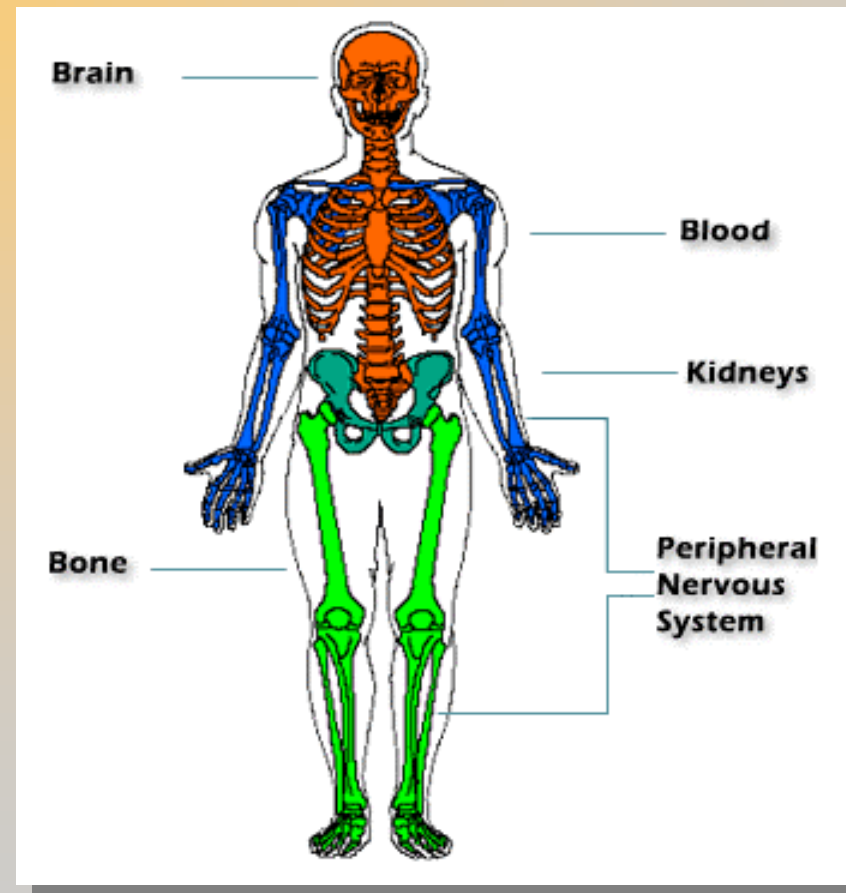
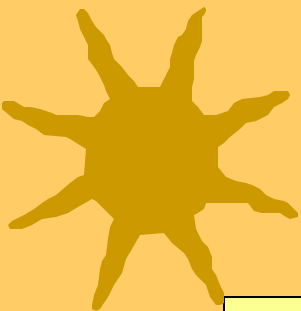


- ★ Lead poisoning is preventable!
- ★ Lead poisoning is usually a silent disease
- ★ It is primarily a childhood illness
- ★ At high levels (50-100  $\mu\text{g}/\text{dL}$  in children, many organs are affected
- ★ At low levels (10  $\mu\text{g}/\text{dL}$ ) more subtle changes happen in brain function





# Target Organs





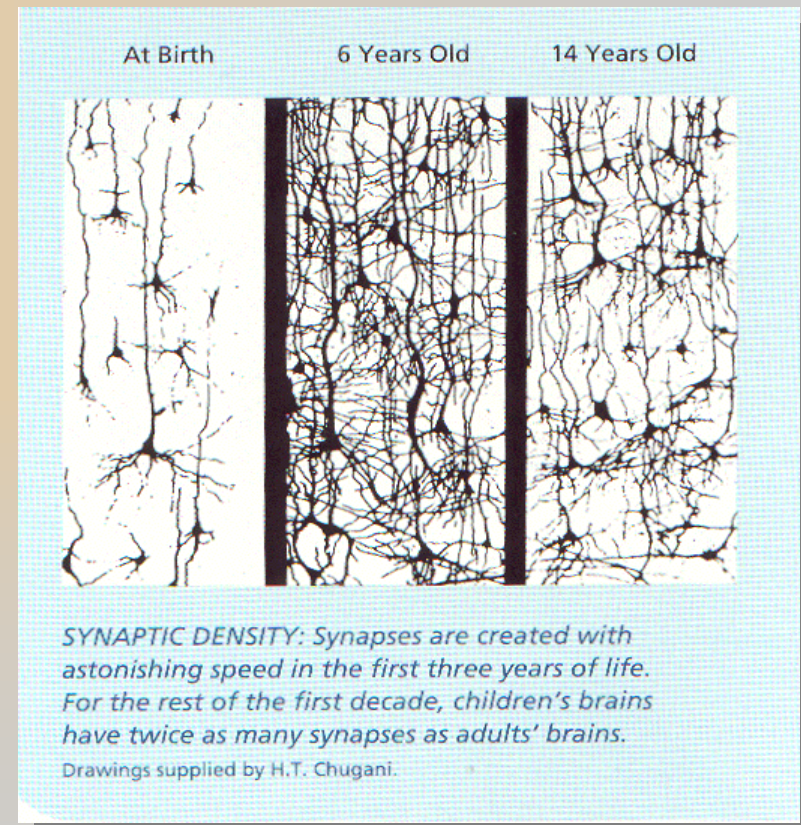
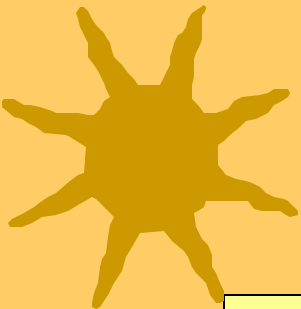
# Brain Effects



- ★ Behavioral effects usually are seen in children less than six years old, because brain cells and connections are still being formed



- ★ Neuronal (brain cell) damage in children is usually **not** reversible, because more connections and cells are permanently lost than in a non-lead exposed child





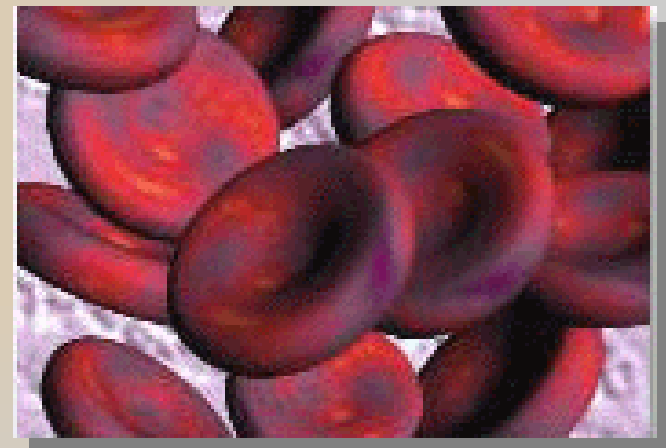
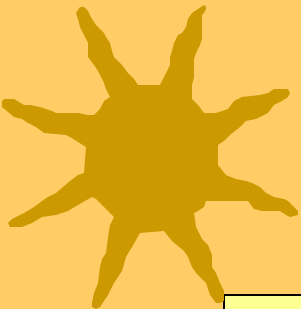
# Blood Effects



- ★ In the bone marrow lead interrupts:
  - hemoglobin synthesis (the oxygen carrying part of the red blood cell)
  - the making of red blood cells, resulting in a decrease in the number of red blood cells (anemia).



- ★ Lead also decreases the "life span" of a red blood also resulting in anemia.

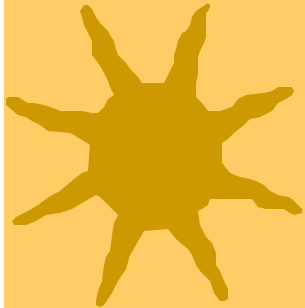




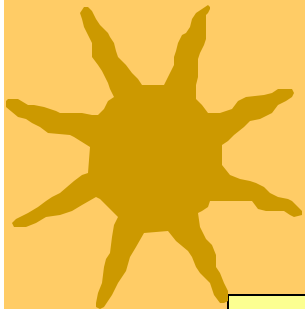
# *Kidney Effects*



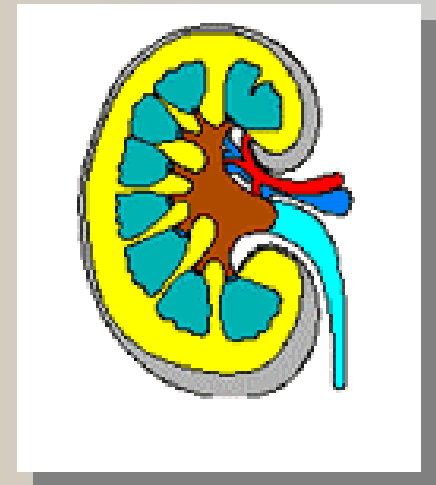
★ The kidney is sensitive to the poisoning effects of lead because it receives 25% of the blood from the heart at all times, and eventually filters all of the body's blood



★ Lead damages special cells in the kidney (tubular cells) which then may slowly lead to kidney failure.

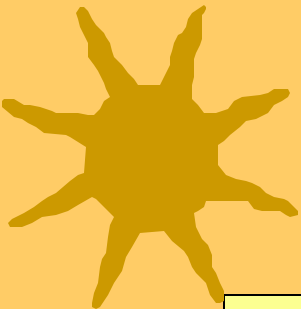


★ Lead also interferes with the Kidney's production of vitamin D which is needed for strong bones

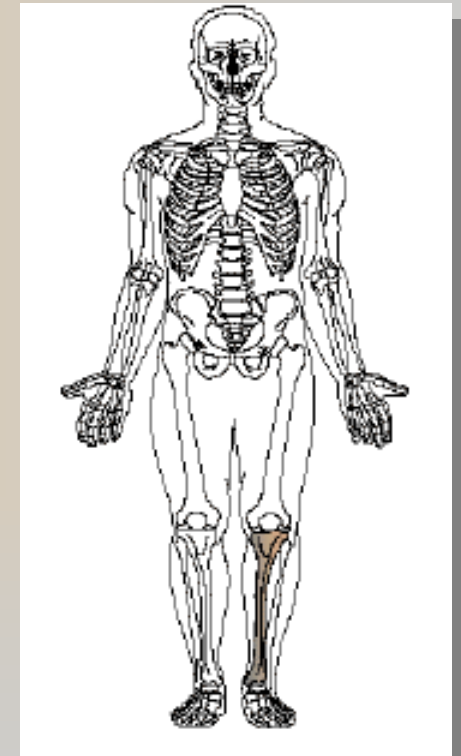




# *Bone Effects*

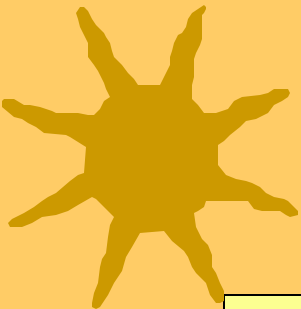


- ★ The bone acts as a major storehouse for lead
- ★ Lead enters and leaves the bone depending on the concentration of lead in the blood
- ★ Lead acts like calcium in the bones
- ★ Lead affects the bone forming and reabsorbing cells of the bone
- ★ Vitamin D from the kidneys needed for strong healthy bones is inhibited by lead

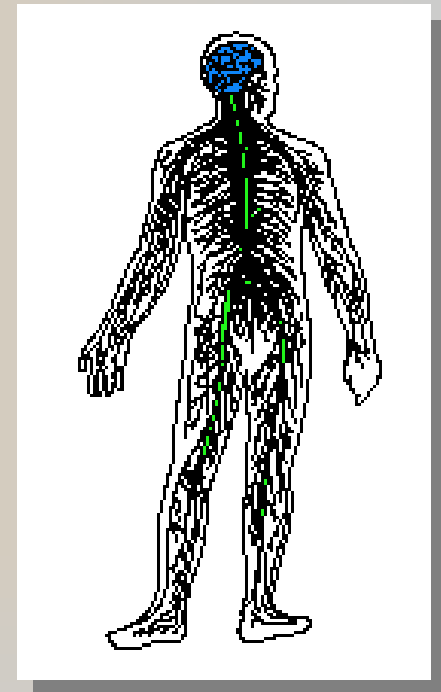




## *Effects on the Peripheral Nervous System (everything but the brain and spinal cord)*

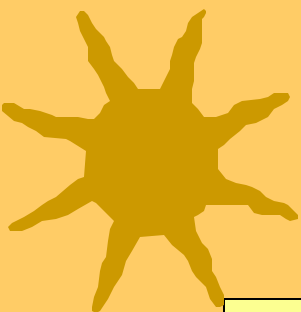


- ★ Effects are most evident on the nerves going to the muscles in the legs and arms.
- ★ Lead causes the protective covering (myelin) on these nerves to fall apart.
- ★ This loss of myelin causes the message moving to the muscle from the brain to be interrupted.
- ★ This loss of message may cause muscles to become weak (wrist drop).





# *Nutrition Effects*



## **Did You Know?**

- !** Children ages 6 months to 6 years can absorb about 30% of ingested lead, while about 15% is absorbed by adults
- !** The most common way lead is ingested is by lead dust. So wash those hands!
- !** Lead is absorbed 10X faster on an empty stomach. So eat healthy snacks often!





# Nutrition Effects



## Calcium

- Why is calcium important?
- How does lead affect calcium?
- What foods are high in calcium?
- The vitamin D connection

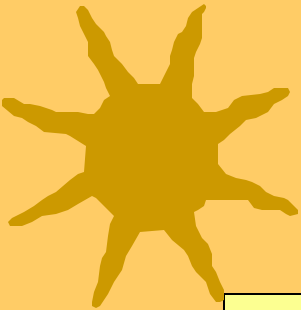
Lead and calcium have physical and chemical similarities. Lead replaces calcium at binding sites and is absorbed in bone like calcium



## Iron

- Why is iron important?
- How does lead affect iron?
- What foods are high in iron?

Lead inhibits the absorption of iron. Lead absorption increases when iron levels are deficient



## Eat low-fat snacks every day

- Why low fat?
- What snacks are low fat?

Lead absorption and retention is stimulated by a high fat diet



# *Symptoms*



★ Headaches

★ Irritability

★ Abdominal Pain

★ Vomiting

★ Anemia

★ Weight loss

★ Poor Attention span

★ Learning difficulties

★ Slowed speech development

★ Hyperactivity

★ Seven-fold increase in failure to graduate from High School

Needleman et al. NEJM 322:83-88, 1990



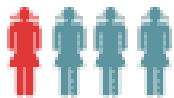
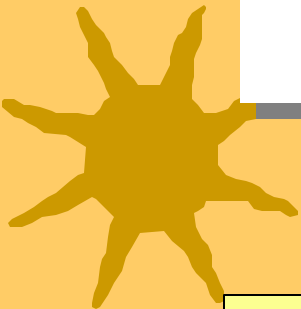
## *Relevance to Target Audience in the city of Detroit*



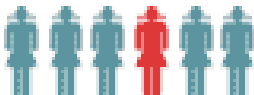
★ 1 out of every 4 children in the city of Detroit is thought to be lead poisoned



★ Only one out of 8 is screened for lead poisoning



Because Detroit has so many old houses, it is thought that 1 out of every 4 children in the city is lead poisoned!

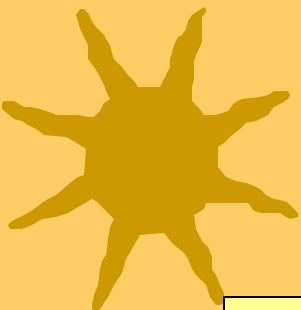


1 out of 6 lead-poisoned children suffers from learning and behavior problems!

Most large urban cities suffer from similar rates



# Action Items



If you think you have lead in your house:

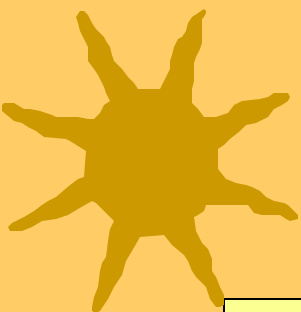
## Do These



- ✔ Wash hands after play, before meals and at bedtime
- ✔ Run cold tap water 1-2 minutes before using
- ✔ Wet-mop and wet-dust floors and window sills weekly, using a high-phosphatate cleaner like Cascade
- ✔ Wash toys and stuffed animals often
- ✔ Plant grass or bushes in bare spots in the yard
- ✔ Have a professional remove lead-based paint
- ✔ Clean up paint chips immediately
- ✔ Use a special filter vacuum (HEPA vacuum)
- ✔ If you rent, call your landlord about chipping and peeling paint



# Action Items



- ❌ Reuse bread wrappers to store food items in
- ❌ Use canned goods imported from other countries
- ❌ Use hot tap water for drinking or cooking
- ❌ Use a regular vacuum on floors, drapes and furniture
- ❌ Use calcium supplements made from bone meal, dolomite or oystershells
- ❌ Scrape sand, heat or remove lead-based paint
- ❌ Let children play with old or imported toys
- ❌ Refinish old or antique furniture. Have it refinished professionally

## DO NOT do these





# *Dietary Action Items*



**All of the following should be present in daily diet**

## **Calcium**

- ✔ Why is calcium important?
- ✔ How does lead affect calcium?
- ✔ What foods are high in calcium?
- ✔ The vitamin D connection

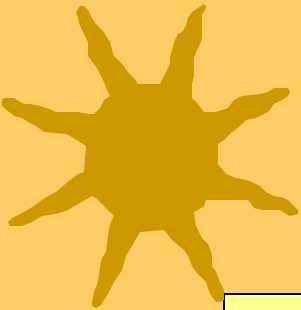
Yogurt, broccoli, milk, greens, salmon with bones



## **Iron**

- ✔ Why is iron important?
- ✔ How does lead affect iron?
- ✔ What foods are high in iron?

Iron-fortified cereal, spinach, beans, peanut butter, red meat



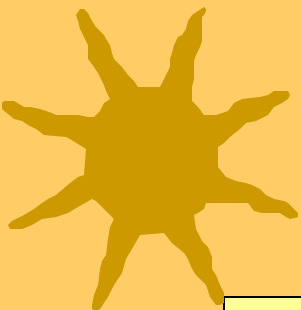
## **Eat low-fat snacks every day**

- ✔ Why low fat?
- ✔ What snacks are low fat?

Fresh fruits & vegetables, raisins



## *Conclusion*



- ★ Lead poisoning is a preventable disease
- ★ All children in a high risk areas (most large urban cities) should be routinely screened for lead poisoning
- ★ If you suspect lead exposure in your home, immediately call your pediatrician and follow the action item presented

***HELP KEEP OUR CHILDREN  
LEAD SAFE***