

# Science Project Outline

## Lead Testing

### Lead in the Household "Getting the Lead Out"

#### Excellent Project Idea - Very Educational!

- 1) Learn about the hazards of lead in the household!
- 2) Do some fun lead testing with items found around the house!
- 3) Present your findings in the class or science fair!

#### Project Protocol (Procedure)

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<b>Developer:</b>	Abotex Enterprises LLC P.O. Box 211 Waynesville, Ohio 45068 USA	<b>Lead Inspector Lead Test Kits</b> - Produced by Abotex Enterprises LLC. Kits are available at: <a href="http://www.leadinspector.com">www.leadinspector.com</a> Phone Orders: Call 1-800-268-5323
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<b>Grade Levels:</b>	6 to 12
	- Ideally sized & priced kit for a science fair project or small group class experiment. - This hands-on-science experiment can also be used in cooperative learning groups.

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<b>Disciplines:</b>	Environmental Science
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<b>Goals:</b>	<ol style="list-style-type: none"><li>1. To heighten student awareness of the impact of having high levels of lead in the home.</li><li>2. To introduce students to a safe and simple method of testing for the presence of lead in household items.</li><li>3. Learn how to reduce the risk of lead poisoning in the household</li><li>4. Introduction to basic chemistry testing, following a protocol and testing observations.</li></ol>
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**Objectives:**

- Student will be able to test for the presence of lead in the home.
- Student will collect and gather data based on their observations.
- Student will interpret their results and decide what options are available or what precautions should be taken to reduce their family's exposure to lead.

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**Background:**

Lead is an odorless, tasteless, soft, gray metal. On exposure to air, lead is rapidly covered with a film of oxide, hydroxide, and carbonate. Similarly, when lead is exposed to water with dissolved oxygen, lead hydroxide, sulfate, and carbonate are formed. A small amount of the salts then pass into solution. Lead salts are found in air, food, household dust and soil. If ingested or inhaled over a period of time, lead and its salts may cause serious internal damage such as impaired kidneys, nervous system and red blood cells. Small children are particularly susceptible to the toxic metal and salts.

Lead gets into the drinking water through the use of pipes that contain lead, solder, brass, and chrome-plated faucets. The homes most likely to have a lead problem are older houses with lead pipes and homes with lead service lines.

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**Materials:**

1. Abotex Lead Inspector lead test kit (24 or 100 test pack - order [here](#)).
2. Any of the following items: drinking (potable) water, ceramic pieces, dishes, antiques, dust or dirt samples, children's vinyl lunch boxes, soil, glassware (including lead crystal), old toys, paint chips, candle wicks, children's jewelry, food cans (seams), leaded and lead-free solder, lead sinkers.
3. Camera (regular or digital)

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**Safety Tips:**

1. If you do touch an item that tests positive for lead, wash your hands thoroughly.
  2. Avoid contact with activated swab tips or Indicator Solution. If you touch it accidentally, wash your hands thoroughly.
  3. Do testing in a well-ventilated area (outdoors, if possible).
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**Procedure:****Data Collection:**

1. Test the items or surfaces using the kit and record results using the chart below.
- 2) Take a photo of both the item and the test result swab / solution.
- 3) Attach photos and list data on a bristle board for presentation.

<b>Materials Tested</b>	<b>Lead Present (Brownish - Black Color) Concentration of Lead?</b>	<b>Lead Not Present (No color change)</b>	<b>Comments</b>
drinking (potable) water			
ceramic pieces, dishes, pottery			
antiques, (dishes etc.)			
dust or dirt,			
children's lunch boxes,			
soil,			
glassware (including lead crystal), old toys, toy cars etc.			
painted surfaces (paint chips etc.)			

candle wicks

baby cribs

children's jewelry

children's plastic  
toys

food cans (seams),

leaded solder

and lead-free solder,

lead sinkers

mexican candies

**Class  
Presentation:**

Student to prepare a brief oral presentation of the data as a basis for their project.

1. Illustrate the proper way to use the Lead Inspector Kit for the class.
2. Illustrate how to handle the various test objects.
3. Pass the kit around to the students.
4. Analyze and discuss data.
5. Discuss ways on how you can reduce the risk of lead poisoning or exposure in one's household.
6. Finally, pupils will discuss what precautions they will take now and in the future to reduce their family's exposure to high levels of lead.

**Optional (for senior grades):** Discuss the chemistry involved using the kit.

The active ingredient in the Indicator Solution is Sulphide anions (S<sup>2-</sup>). When mixed with water, reacts with lead cations (Pb<sup>2+</sup>) to produce a distinctive brownish-black color. The chemical equation is as follows:



~ Sodium Sulphide mixed with water and lead produces lead sulphide (PbS). Bi-products in reaction include hydrogen sulfide H<sub>2</sub>S gas, sodium ions (Na<sup>+</sup>) and hydroxide ions (OH<sup>-</sup>)

Balanced equation:  $2\text{Na}_2\text{S} + 2\text{H}_2\text{O} + \text{Pb}^{2+} > \text{PbS} + 4\text{Na}^+ + 2\text{OH}^- + \text{H}_2\text{S}$

**Good Luck with your project!**

How did this project work for you? Any suggestions or comments are welcome!