

Equipping the Canary to be an Agent of Change:

Educating Students to be Activists

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Keywords

CHANGE AGENT, LEAD, LEAD POISONING, ADVOCATE

Abstract

This curriculum unit examines America's use of lead and the legacy of harm that lead remaining in the environment continues to cause even now, decades since it has been removed from items that have caused great harm to the public. The curriculum will serve to empower students to express their desire to take action for better practices in dealing with the remnants of the lead industry and for future commodities that become known dangers, but lack action. Student participation will involve taking action via making an informative comic and writing a letter to the City Council.

Unit Content

Content Objectives

Most medical studies, since the beginning of academic research, have centered around white adult men. More and more, however, studies are including women, people of color, and children in ways that seek to understand how they are affected, infected, and can affect. It would seem that the collective "we" have enough differences to warrant separate investigation in the hopes of recognizing potential cures and killers. In the absence of inclusive research, the outcomes have been that what works for some didn't work for all and those it didn't work for suffered the consequences of ineffective or dangerous practices. To focus on children in this context is to acknowledge that conducting medical research on children poses a myriad of ethical questions and dilemmas. Thus the lack of research? Yes and no. While there is a significant breadth of knowledge about children's psychological development, the amount of acetaminophen they should ingest; there have been limitations on the breadth and depth of investigation the medical establishment will do in order to get answers about little bodies. The rationales make sense: they are too little, they can't give consent, we have not handled research on vulnerable populations in the past well and can't repeat those negligent and harmful procedures. Many of the medical recommendations for children are extrapolations from adult research (Field & Berman, 2004). So, the littlest and most vulnerable of our population have been canaries in the coal mine, warning us too late of troubles ahead at their own expense.

While we want to protect children because in fact they are so vulnerable, parents are putting them at significant risk without knowing that they are. This is not a pointing-the-finger argument. In fact, it should be noted that risks to children's health are correlated to risks to adult health due to nature and nurture (Field & Berman, 2004). It makes sense again: kids are in close proximity and sharing so many of life's experiences with their caregivers, it's no wonder they share health outcomes. The difference worth pointing out is how this paper started: we don't fully know the extent to which some things affect children in the ways they affect adults. So while moms' and dads' bodies respond one way, kiddo's bodies may respond very differently. This is definitely true when it comes to the effects of lead.

I work with elementary age school children in the City of Philadelphia. Programs have existed during my tenure to help kids battle obesity and diabetes, and reduce asthma stressors. While heredity can play a role in children getting these conditions, environment is a big factor also. I've had my own

home evaluated for lead from a study when my daughter was born because I live in a high lead area. Life has the potential to be very dangerous for kids. It's time to equip our young people with the tools needed to advocate for themselves.

As a teacher for over 20 years, I wish I had a dollar for every time I said, "It's actually called a mechanical pencil. Lead has never been used in our type of pencils- ever, it's poisonous" or, if I'm in a hurry to start the lesson, "It's called graphite, lead is poisonous". I might not be a millionaire, but a few thousand bucks would be nice right now. The truth is that lead as a writing instrument existed thousands of years ago in an ancient city across a massive ocean from where we are now, but the name and idea stuck. And in a way, it must have been convenient for lead lobbyists: parents, kids, and probably teachers thought lead was safe enough to be used in pencils; pencils that kids used every day. Clearly, it must be harmless? How mechanical pencils took on the name "lead pencils" is unknown to me, but again, the name stuck and I can only endeavor to change 20 to 25 young minds a year.

The history of lead in the US is scary to me. While we know now that its effects can be devastating, would you be shocked to learn that when we first learned of its harmful effects, it wasn't regulated for another 40 years? And to this day, 60 years after its use was banned in most products, kids are still getting lead poisoning? How can all this be true? How are we the "greatest nation" on Earth, and we can't protect our kids from brain damage or death due to lead exposure? In order to answer this question, it's important to look at the rise and fall of lead as an integral part of industry and development within our nation and how such an element can slip through the cracks to reach our most vulnerable. What's to say it isn't happening now with another product in common use?

According to the EPA (2023),

Lead can be found in all parts of our environment – the air, the soil, the water, and even inside our homes. Much of our exposure comes from human activities including the use of fossil fuels including past use of leaded gasoline, some types of industrial facilities and past use of lead-based paint in homes. Lead and lead compounds have been used in a wide variety of products found in and around our homes, including paint, ceramics, pipes and plumbing materials, solders, gasoline, batteries, ammunition and cosmetics.

This claim corroborates the extreme exposure some kids can have. But how did things get so bad that lead is everywhere? Especially considering it has been a known poison for 6,000 years?

The first time lead was recorded as poisonous was in Ancient Greece. The doctor Hippocrates made note of the symptoms that lead metal workers had. How is this history relevant to students? More and more, younger people are standing up to and rejecting old narratives and ideologies. They are suspicious of government reporting and are skeptical of "what's worked in the past". For many young people, activism has been a bigger part of their lives than previous generations at such young ages (Malawana, 2019). According to Circle at Tufts (2023), in recent years youth activism has increased. The faces of the climate change, Me Too, and Black Lives Matter movements are younger and younger folks, who both support and promote their causes.

In 2018, the South African Constitutional Court in response to the freedom of assembly case of *Mlungwana v. The State* stated,

"In particular, it must be emphasized that for children, who cannot vote, assembling, demonstrating, and picketing are integral to their

involvement in the political process. By virtue of their unique station in life the importance of the section 17 right has special significance for children who have no other realistic means of expressing their frustrations.”

The United Nations Human Rights Office of the High Commission COMMITTEE ON THE RIGHTS OF THE CHILD (2020) takes the rights of children to protest even further in that it recommends that they be educated about that right: “Children have a right to participate in peaceful assemblies, and civic education needs to ensure that children, parents and teachers all understand this”. The future is young, powerful, and willing to stand up for what they believe in.

This curriculum unit seeks to have students learn about the history of lead in the USA and then share their feelings and concerns with others as agents of change. One major goal will be for students to feel empowered to take action and use their words, experiences, and research to take a stand for their own health and well-being.

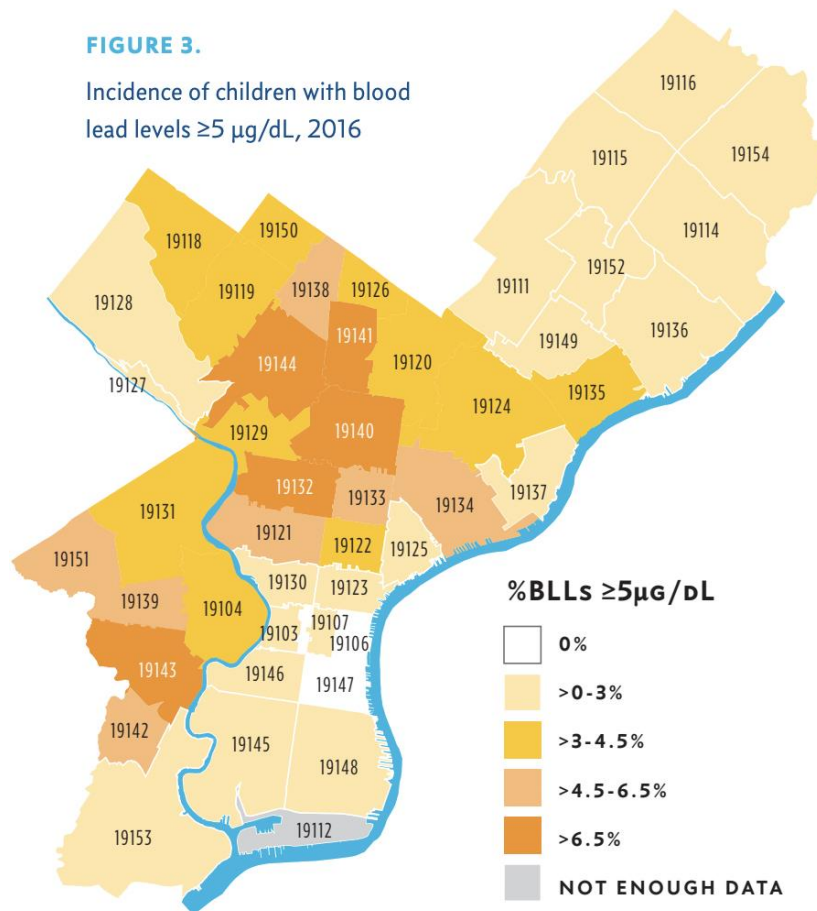
The challenge in teaching elementary age students about lead poisoning is that they and their siblings are the ones that could be in immediate danger or have already been exposed. The knowledge of how lead can affect a family was not absent from my mind as I sought to find a way to deliver this content to younger kids. However, the benefit of having kids know the truth about a very serious health concern in order to live safer lives and inform others so that they may live safer lives is all the motivation that was needed. Challenge accepted!

In order to engage students, in what may prove to be a sensitive topic, this unit endeavors to build children’s level of empowerment by not only helping them become change agents, but to take the hero aspect of change agent to the next level. This unit utilizes a superhero comic book aesthetic to disseminate the content of the lessons. Additionally, students will have the option to produce a comic/graphic novel style artifact. Smith (2023) explains that inherent in the nature of comics' need for “selective” text to fit in short, limited space panels and its coupling with almost explanatory images, comics as a medium has the advantage of creating complex context in brevity. By allowing students to create an informative flyer in the style of a comic, they will *become* the hero that explains the need for awareness of the continued lead crisis and become advocates for safety with a short, but powerful message.

Author’s Note

Although the following lessons are written in a way so that younger children can understand and absorb the information without fear, there are several points that are important to include for teacher background. This unit was especially hard for me to write as the subject matter can be difficult to take in without feeling angry, frustrated, and scared. The anger comes from learning that the government didn’t ban lead in paint until 1978 even though it was a known hazard in 1902. Also, the CDC sets “acceptable” lead levels in the blood based on research at the time. This means that early on in the century when kids had high levels, their levels were considered “ok” and they had no intervention at all. The frustration comes from learning that big business and financial gain is the main reason lead continues to be a part of our lives decades (if not millennia) after it’s known devastating health effects. Additional frustration comes from knowing that lead poisoning is an environmental justice issue, meaning that people of color and people living in poverty are disproportionately affected. Fear comes from knowing that lead poisoning can cause significant cognitive deficits that are totally avoidable but lead is still prevalent in our environment-- particularly my neighborhood and work spaces. Teaching kids

about lead poisoning in the hopes that their families learn as well, is the major goal of this curriculum unit. Please find it helpful in your role as Teacher Change Agent.



Teaching Strategies

To answer the essential question: what is an agent of change, the first section of the unit proposes several teaching strategies. They include **defining, identifying, sorting, studying, planning and creating**. Each strategy moves the students towards more and more independent thought and action. Initially, students would be introduced to the term “agent of change” and its definition in the first lesson. Teachers would also have the opportunity to ask the question: what are some problems you see in the world? This question will prime them for later discussions about lead and its negative impact.

Next, students would explore five strategies that an agent of change might use: Acknowledge the Problem, Identify Stakeholders, Choose a Position, Spread the Word, Walk the Walk. In order to acknowledge the problem, students would have to become informed about problems in the world. From there, they would choose an issue that is relevant to them or that they feel strongly about. In order to identify stakeholders, they would need to know that stakeholders are people, businesses, or government agencies that have something significant to do with the issue. By finding out who is involved, students can identify who needs help, as well as, who might be causing the problem they want to solve. The next strategy students would learn about is choosing a position. This strategy requires a little research. If students want to seek change, they will have to find out what is recommended by

experts who have significant knowledge on the subject. Fighting a problem is best done when solutions can be offered, therefore knowing where you stand regarding the problem and possible solutions is important. As agents of change, spreading the word about the problem and solution may be the single most imperative strategy. Spreading the word can be done in many ways and students should not only be told about writing pamphlets, promoting their ideas on social media, writing letters, talking to neighbors, and telling their family what you know, but also allow students to come up with their own ways to inform the public. The last proposed strategy may be considered optional, depending on what issue students choose, but when it comes to lead safety, it cannot be overlooked: students must walk the walk. Walk the walk means that they do things in their own lives that bring about positive outcomes. In other words, they become examples of the right way to handle the situation.

Once students have a good understanding of what they need to do to choose a focused topic and how to get started, they will have to learn about ways to be an agent of change. They will play a sorting game to divide strategies into working alone vs working with others categories. The purpose of this teaching strategy is to give students options when it comes to how they want to find their voice as an agent of change. Students will need to feel empowered to do this very serious work, and if they are more confident in the method with which to deliver their message, they could have a lessened effect. HumanRightsCareers.com (2023) offers 13 ways to become an activist, all of which are possible for students to either host or promote.

The next strategy is for students to study the works of other kid activists and their methods. Students will watch a video of Greta Thunberg (2019), Malala Yousafzai (2013), Naomi Wadler (2021), and Xiuhtezcatl Martinez (2018). Each youth activist has a unique personal story that propelled them to the world stage as they fight for a more just world, no matter the issue closest to their hearts. The video of Xiuhtezcatl Martinez is intentionally last so that students can see how music can be used to spread a message and hopefully at least one student considers using music as a platform for their message as well!

At this point students will have a strong background: they know what an agent of change is, how they operate, and what they can do in real life. The next teaching strategy to employ is having students make a plan. How this looks in your classroom may be different. This unit proposes teachers try a workflow or flowchart type of plan, with a complexity matching your students ability. A workflow chart is very much aligned to sequencing, an ELA standard. Students can map out the steps they will take to create a movement around the important topic they chose (later it will definitely be lead). The advantage to using a workflow chart here is that students will have a visual representation of their plan and they can see where they are in the process of going from idea to action.

The final teaching strategy in this first half of the unit is about allowing students to create their identity as an agent of change. In a sense, they will be finally stepping into the role of change agent by making some “official” statements about who they are and what they represent. Students will create a badge and write a mission statement and pledge. If possible, print out the badges and laminate them to wear, tape to their desks, or carry in their wallets.

To answer the essential question from the second half of this curriculum unit: what are the dangers surrounding lead?, students will have to get a lesson in... lead. A good teacher reference for this topic is The American Academy of Pediatrics Policy Statement on Preventing Lead Toxicity. As stated previously, the topic of lead poisoning in America, may be somewhat heavy for students. The focus of their lessons on lead is for them to create better and safer living environments. Another focus is to learn that what may seem safe, may not be, so to approach situations that are related to health focusing on the science while recognizing that other agendas and motivations may be pushing back against it

(Campbell et al., 2016). The teaching strategies used in these lessons are: recognize/ define, examine, identify/ sort, evaluate, discuss/ brainstorm, and create.

Defining lead poisoning, examining its history in the US, and identifying sources of lead are the first three teaching strategies. A good teacher reference is Needleman, 2009. Their order and position will give students a background about lead and hopefully motivate them to focus their newly minted change agent mindsets on this topic. By defining, examining and then identifying, students begin to use the knowledge they are learning. These strategies will also allow teachers to share information about the effects lead has on the body and, without scaring them, help them to realize that although some lead exposure is unavoidable, lead poisoning definitely is avoidable.

While the next strategy is for students to evaluate lead avoidance tactics or techniques, the age and ability of students will really play a part. Teachers can have more advanced students do research on the best practices to avoid lead poisoning, while younger less advanced students may just be given a kid-friendly Likert scale for different practices and then using their own data rate the tactics. For example, older students may find out about water filters that remove lead and couple that with testing the outside of their pipes to see if they are lead and running the tap water for 3 minutes to flush out the lead as strategies to mitigate their lead exposure from drinking water at home. Another example for younger students may be that they rated wearing gloves when gardening a “5- this method works very well” above signing up for text alerts because they don't have a phone and rated that a “2- may work but not for everyone”.

Prior to putting all their lead knowledge into actionable steps to educate others, students should brainstorm more solutions or discuss the ones they found out about. Talking about what they've recently learned takes information from experts who they learned from and allows students to make it their own, essentially letting them own the new information they learned. Students can do this via a whole class discussion, with a Turn and Talk, or with a Post-Its on chart paper approach. The point is to provide opportunities to respond for every student, empowering them to own their new ideas and be willing and able to share them.

The last teaching strategy of the unit is having students create an artifact that will represent their campaign for change. While the artifact you choose for students to create should be entirely based on your level of comfort with producing said artifact, this unit proposes you at a minimum have students create a pamphlet or poster to educate others. Their artifact should have three things: lead poisoning avoidance, lead poisoning effects, and lead poisoning sources. The ultimate goal of this unit is to have healthier kids in Philadelphia, so having students disseminate as much pertinent information as possible is essential. Students might also create a song or rap, make a PSA video, or any other way to become an activist from the first half of the unit.

Another optional activity would be to have students write a letter to someone on the City Council. Students can present themselves using their latest identity as a change agent, and use the information they shared in their artifact to appeal to the council members via a kid-friendly information brief. This type of letter lets the reader know that the sender has the facts, knows the problems and effects, and expects the City Council member to take action.

Classroom Activities

Lessons About Being an Agent of Change

Unit Essential Question: What is an agent of change?	
Lesson 1	<p>Lesson Essential Question: What is an agent of change?</p> <p>Teacher Facing: The definition for "Agent of Change" is almost in the term itself. Students should grasp the concept easily. Use images to help kids "see" issues that need changing.</p> <p>Student Facing: "Agent of Change" is a term used to describe someone who takes action to change a situation that they see as unfair, unjust, or wrong. An agent of change does not simply see a problem, but wants to help fix the problem they see.</p> <p>What are some problems you see in the world?</p>
Lesson 2	<p>Lesson Essential Question: What activism strategies exist to have the most impact?</p> <p>Teacher Facing: The internet is filled with ideas for kids to become youth activists. Here are the steps needed before they jump into action without the research or thinking behind the need and how to affect change.</p> <p>Student Facing: Making changes in the world seems like a tall order! However, the truth is, change can happen when ordinary people just like you grow up in a situation where they saw or experienced injustice in some way and as adults they decided to do something about it. So what can you do?</p> <p>Change Agent Strategies: Acknowledge the Problem, Identify Stakeholders, Choose a Position, Spread the Word, Walk the Walk</p>
Lesson 3	<p>Lesson Essential Question: What methods of activism are there?</p> <p>Teacher Facing: Again, the internet is filled with ways for youth to take action. Choosing to share methods that you can support and take from idea to action is the most important criteria for which ones you want to share with students.</p>

	<p>Student Facing: Activism is the strong actions taken to bring about change (or stop change in some cases). An activist may campaign, or take multiple actions, for a cause by protesting, making signs, or creating a petition.</p> <p>Which of these methods of activism can be done alone and which ones need a group of people working towards the same goal?</p>
Lesson 4	<p>Lesson Essential Question: Are there any youth agents of change? What did they do?</p> <p>Teacher Facing: Watch videos about youth activists. Greta Thunberg. Malala Yousafzai. Naomi Wadler. Xiuhtezcatl Martinez. (The Naomi Wadler video has a curse word via a hand signal. Please change the video if you think your students cannot handle it.)</p> <p>Student Facing: Look and listen to the voices of other young people who decided to become agents of change.</p>
Lesson 5	<p>Lesson Essential Question: How can I plan to succeed? (If you fail to plan, plan to fail!)</p> <p>Teacher Facing: Students should create a plan of action. This can take many forms, many of which can tie to ELA standards. Students can write a sequenced essay of action steps, make a checklist, create a timeline, or in this case make a workflow chart.</p> <p>Student Facing: A WorkFlow is a visual representation of the steps you will follow with expected outcomes and next steps. Here are two examples. Create your own workflow diagram that ends with you taking action as a change agent!</p>
Lesson 6	<p>Lesson Essential Question: Who am I as an agent of change?</p> <p>Teacher Facing: Please allow students to have fun in this lesson as they create their Change Agent identity. The cooler they feel with their official badge that they can show off, the more committed they will be to actually becoming a change agent.</p>

Student Facing: I am an Agent of Change! My mission as a change agent is to...
I pledge to fight for... Here is my Change Agent badge with...

Lessons About Lead

Essential Question: What is lead poisoning?

Lesson 1

Essential Question: What is lead? How is it used? Why is it dangerous?

Teacher Facing: The introduction to lead is the most sensitive of the lessons and how much depth you go into with students should be based on your evaluation of their maturity. At minimum, students need to know that lead exposure can lead to lead poisoning if safety precautions are not followed and that there indeed are safety precautions that greatly reduce and in some cases eliminate the threat of lead poisoning. Help students to realize that when old windows are opened and closed, the paint can rub and turn to dust that is dangerous to breath in; lead paint that is peeling or chips off can be tasty to babies or toddlers and they don't know they are eating something dangerous; and lastly that lead dust gets into soil via property demolition and if you don't wear gloves, you aren't protected.

Student Facing: Lead is a type of metal that had lots of uses and was used for thousands of years. Lead was used to make: plates, drinking glasses, bowls, butter dishes. Many businesses used it because it was so easy to work with. Lead: is easily and inexpensively produced, makes paint brighter, makes cars run "better" when added to gas. Unfortunately, lead is poisonous to all human beings! Worse still, lead is the most dangerous to children! Lead poisoning is when a person has been exposed to dangerous levels of lead and has negative reactions to that exposure. Lead poisoning can affect the brain, ears, arms, the stomach, hands and feet, and the overall whole body. Lead in your head can make it hard to think!

Lesson 2

Essential Question: Where has lead been? Where is the lead now?

Teacher Facing: Understanding that business and government have played a large role in the proliferation and then reduction of lead contamination in the environment may be desired fuel for their passion on this topic to burn, but is not necessary for them to become agents of change around this issue. Please gauge how deep into this part of the topic to go based on student age and maturity. At minimum, students need to know that lead poisoning is an environmental justice issue. People living in poverty, who are more often people of color, (Whitehead, et al) are disproportionately affected.

	<p>Student Facing: Believe it or not, lead has been banned in manufacturing, or making stuff, because it is a known poison and lots of people said, “NO!” to its use. Unfortunately, products that contain lead are still out there and people come in contact with them all the time. Why do so many things contain lead if we know it’s bad? Historically, lead has hurt people since ancient times, but because it was so inexpensive to make and so very useful, the negative health effects were, and sometimes still are, overlooked. Worse still, people that are poor and people of color have even more chances to get poisoned due to old paint, old pipes, and old belongings compounding the effects.</p>
<p>Lesson 3</p>	<p>Essential Question: What are the ways that children get lead poisoning?</p> <p>Teacher Facing: The truth is we are all exposed to lead, but it is often the compounding effects of multiple exposures (ie. windowsill dust, chipped paint, lead in the water pipes) that make lead such a hazard. Additionally, children are more susceptible to the effects of lead in the body.</p> <p>Student Facing: Lead poisoning occurs when lead is: breathed into the lungs, eaten, absorbed through the skin. How does that happen!?!</p>
<p>Lesson 4</p>	<p>Essential Question: How can parents/ children avoid lead poisoning?</p> <p>Teacher Facing: Right now, there are great ways to reduce the chances of lead poisoning, so getting these facts into the awareness of parents and families is very important. Playing a <i>would you rather</i> game with this content would be a great way to reinforce the concepts.</p> <p>Student Facing: Although it’s not possible to avoid lead exposure, you can avoid getting lead poisoning. You can also help other kids by telling them and their families about lead. To reduce lead poisoning:use gloves when gardening, get kids under 2 tested, sign up for product recall alerts related to lead exposure, keep little kids away from chipping paint & windows, wet mop once a week to remove lead dust from the floor where babies and toddler spend most of their day). Ok, all of this sounds like a good start, but I heard about some problems with lead that folks were having recently. It was in their drinking water! I don’t want to drink lead and I certainly don’t want you to drink lead! Luckily there is a simple solution: run the tap for 3 minutes before drinking or cooking.</p>
<p>Lesson 5</p>	<p>Essential Question: Can we be agents of change when it comes to lead?</p>

	<p>Teacher Facing: Here students are penning their very own agent of change Anti Lead Poisoning pamphlet. Kids may need handouts or some of the EPAs web pages at their disposal.</p> <p>Student Facing: Avoid Lead Poisoning Starting Today! (student created comic or pamphlet)</p>
Lesson 6	<p>Essential Question: How can we spread awareness to others?</p> <p>Teacher Facing: Students will wrap this unit with a letter to a City Council member. Please visit the webpage of your city Council to have them pick a person or the whole class pick a person.</p> <p>Student Facing: It sounds like we might need some help reducing our exposures to lead. Maybe as an Agent of Change, we can reach out to people in the government to help make water safer. What do you say? Do you want to write a letter with me?</p>

Resources

Bibliography

All images are used under Creative Commons unless otherwise noted.

All full color comic heroes from MidJourney.

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This is the document outlining the position on childhood activism.

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This book goes into detail making the case that kids should be able to be a part of medical research because their bodies are different and we can't just extrapolate adult data to kids.

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An amazing resource! Everything about lead poisoning is there!

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This article explains how South Africans needed a law to protect child protesters and advocates.

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<https://doi.org/10.1097/phh.0000000000000891>

This article ties lead to the factors that make it an social and environmental justice issue.

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<https://circle.tufts.edu/our-research/youth-activism-and-community-change#activism-on-the-rise>

This website has great information to help teach activism and provides data to support the growing number of youth activists.

Equitable K-12 Civic Learning

<https://circle.tufts.edu/index.php/our-research/equitable-k12-civic-learning>

Protect Your Family from Sources of Lead

<https://www.epa.gov/lead/protect-your-family-sources-lead>

Appendix

Appendix A

How to be an agent of change: [Kids Edition](#)

VOL
1

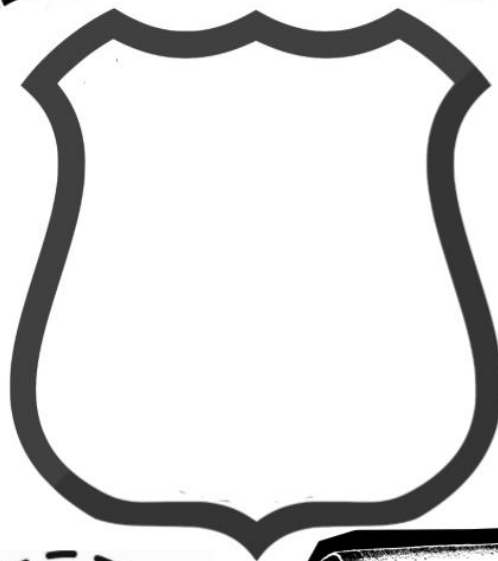
Agent Change

Reporting for Duty



Essential Question:
What is an agent of
change?

I am a Change Agent!



A Brief History of Lead: [Kids Edition](#)

VOL
2

The
Lead
Menace Returns!



Essential Question:
What are the dangers
surrounding lead?



Avoid Lead Poisoning!

BE LEAD SAFE!

Be Lead Safe!

BE LEAD SAFE!

LEAD SAFE ZONE!

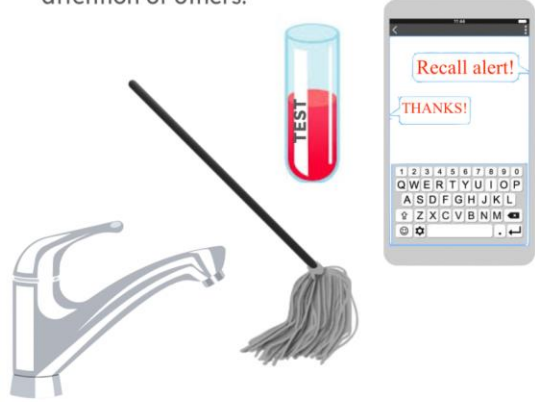
AVOID LEAD POISONING!

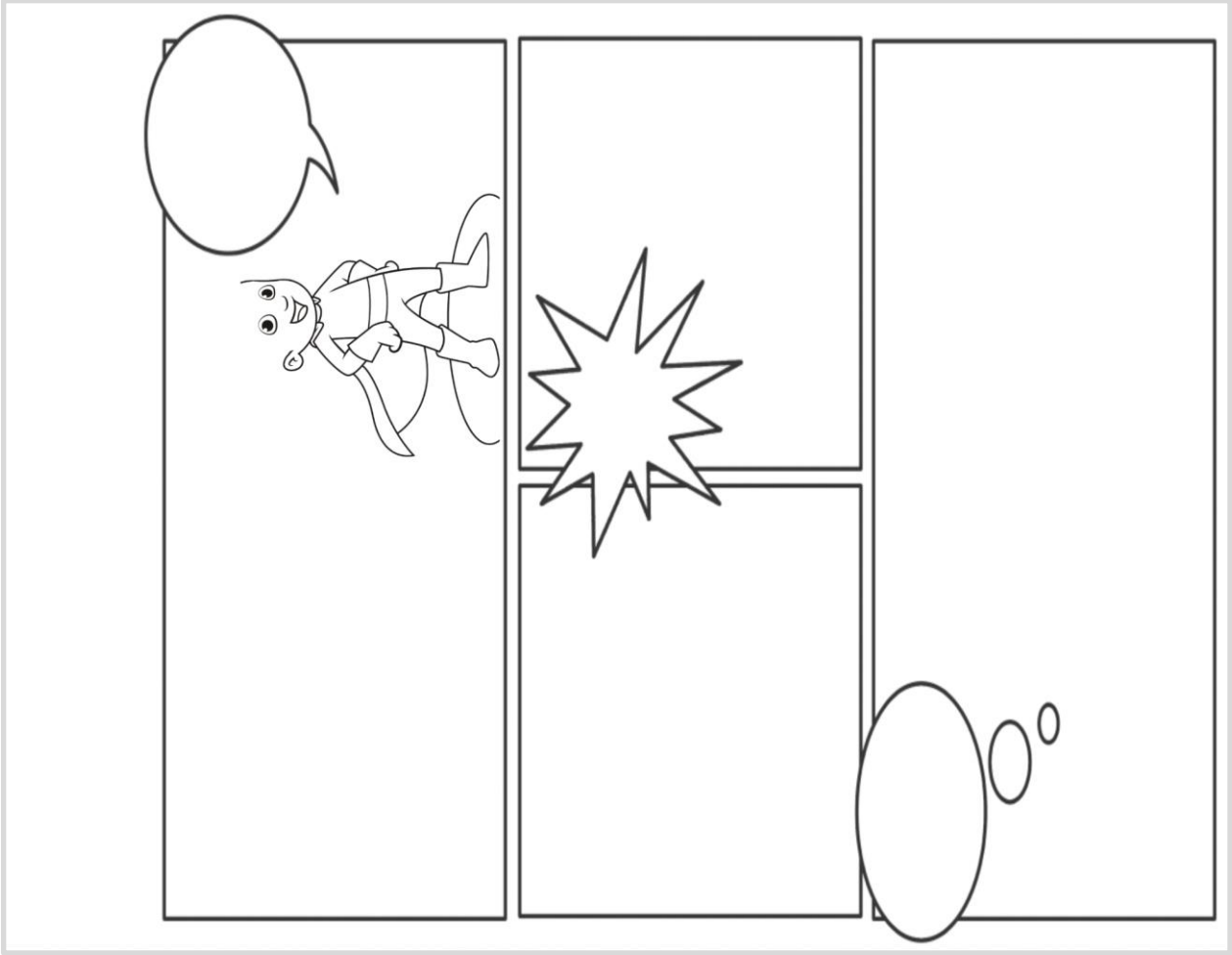
STOP LEAD POISONING!

MAKING LEAD SAFE ZONES!

DIRECTIONS

1. Cut out a title for your comic information sheet and glue to the top of your comic page.
2. Choose 4 facts about lead: 2 sources and 2 solutions.
3. Make it exciting and colorful to catch the attention of others!





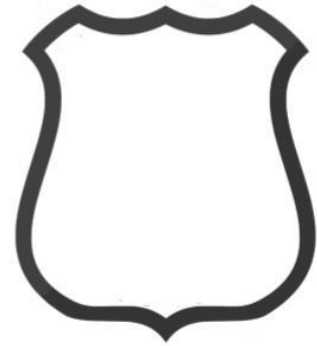


This important message was brought to you by Change Agent

Thank you for attention to this important matter.

If you would like to become an Agent of Change, take this pledge:

Avoid
Lead
Poisoning
Starting
Today!



**Lead
Poisoning
Effects**

**Lead
Poisoning
Sources**

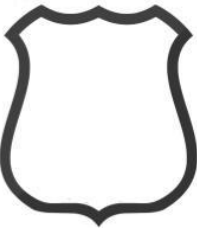
**Lead
Poisoning
Avoidance**

Dear City Council Member _____,

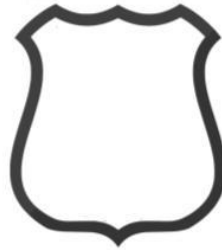
My name is _____ and I am an Agent of Change (see my official badge below). I am writing to you about lead and lead poisoning. I learned in school that lead poisoning can be avoided. I need you to help kids like me to be safer.

Lead EFFECTS. Lead SOURCES. Lead SOLUTIONS.

Please make sure lead stays out of drinking water, you inform more citizens about lead poisoning. Thank you in advance for your attention to this matter.



Sincerely,



Appendix B

Next Gen Science Standards

3-LS4-4. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.

4-ESS3-1. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment

5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

Common Core Literacy Standard

W.3.2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

W.3.7. Conduct short research projects that build knowledge about a topic.