Lead Contamination Scenario  (Exercises #1-5)

Exercise 1

Purpose

To use a hypothetical case study to learn basic principals of epidemiology and to explore the concept of environmental health, specifically in regard to soil contamination.

Overview

A scenario is introduced and students use an inquiry-based learning module to generate questions, draft a research plan, and generate possible solutions. Students create a dossier on each of three identified cases. Each exercise develops the story further and emphasizes critical thinking and problem solving.

Time

One two-hour block class period for each exercise and one possibly devoted to research

Key Concepts

As a result of industrialization, lead is everywhere in our environment. Lead has a number of pathways into the human body. Its effects vary depending on the age of the individual exposed and the dose received. Lead is a major problem facing inner city children especially. Analysis of data using mathematics, mapping skills and critical thinking can help us determine the source of an environmental health problem.

Skills

Generating questions
Making a research plan
Working in a group
Reading carefully and critically
Sharing information with others
Organizing research material
Calculating means
Graphing data
Mapping data
Weighing solutions

Materials

Five exercises administered in order.
Three "dossiers" (legal size folders with clips to secure documents)
Hole punch
Overhead projector
Facilitator Preparation

You will be acting as a guide for the students' own research and analysis of the presented case study. You should be familiar with the AMBIENT Teachers' Guide to Lead before starting the segment. Each exercise has a teacher's key providing guidance as to what direction the students need to be heading in order to proceed to the next step. If students go off on a tangent, bring them back to the lead issue with a focused question. The segment is designed to alternate small group discussion with whole class intergroup presentation.

Procedure

Have students read the following scenario and answer the questions.

Three toddlers that belong to the same central Miami playgroup are diagnosed with lead poisoning. The families of the children are upset and have lots of questions about what lead poisoning is and how this could have happened. You are the teenage siblings of the children. When faced with this crisis, you get together, determined to solve the mystery in order to protect your families and yourselves against this silent hazard.

Questions for your group:

1) What is the problem?

2) What do we know?

3) What do we need to know?

4) What might a "solution" be?

Student Assessment

1. After viewing the videos, students discuss their feelings regarding the messages presented by various people in the videos. Were they aware of this potential environmental health problem before viewing the tapes?

2. After reading the scenario of the three young children on the playground, have students identify the problem in their own words, establish what they already know about lead poisoning, and what they think they need to know to find a solution. Students are encouraged to work in groups as they write down their ideas.

3. Students are to be divided into 3 groups and will research various aspects of the scenario. Topics easily researched include:
Lead Scenario

- Health effects of lead poisoning
- Risk factors for lead poisoning
- How to protect oneself and one’s children from lead

Give the following presentation design components to each student team as a guide to their group presentations:

- Decide what is important about their findings.
- Design an overhead that summarizes the information (may need 2 or more sheets).
- Practice and keep their presentation within the time allotted.
- Each group member should take part in the presentation, even if just to read or explain one piece of the presentation.

Assign points for the following components of the team presentation:

- Is the overhead easy to read?
- Were pictures/maps/illustrations used?
- Were proper environmental health terms used?
- Was the presentation easy to understand?
- Is each member actively taking part in the presentation?
- Did the group report their source?
- Could the group answer questions from the audience?

4. Students are to be divided into 3 groups again. This time each team will be responsible for one family – the Petersons, the Hernandez family, and the Pierres. Each group is given a page describing the health inspectors' notes. The students are to identify risk factors and protective factors for lead exposure in the written information presented to them. Each team will create a “dossier” on their case using the research information they have gathered (either in their group or from other students' presentations).

5. In the Math Lab, students answer questions as they describe sampling, mean blood levels, prevalence, expected rates, and other simple epidemiological concepts.

6. In the Nitty-Gritty exercise, students answer questions involving options for solving the problem of the lead-exposed children and make recommendations to the children’s families.