



CASE STUDY

HEAVY METALS

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The problem based learning (PBL) case: “(Toxicity of) Lead and other heavy metals -environmental and human relevance”, is also part of WP3 (Emerging and Priority Pollutants and Exposures).

The PBL focuses first in depth on lead as a very important example, studying several real-life exposure scenarios. Then, information on some other toxicologically relevant (heavy) metals will be gathered, again using examples of real-life exposure scenarios.

The plan and material of the PBL are designed for a group of 20 students and can be modified for smaller or larger groups. It is intended for a total of 17 hours, which consist of a half day self-study preparation, one full or two half days of main PBL work, plus a half day for finishing presentations.

Cases or scenarios to work on within the student groups are for the first group work part:

- Lead and bone
- Airborne lead and children
- The Flint water crisis
- Lead in soil

For each of these scenarios, questions are stated and literature is recommended. The task is to prepare a power point presentation.

Scenarios for the second group work part are:

- Arsenic in books
- Arsenic in drinking water in Bangladesh
- Mercury exposure in gold miners
- Mercury in food
- Mercury in dental fillings
- Aluminium in food packaging and cosmetics
- Cadmium in food – are vegetarians exposed?
- Thallium poisoning
- Heavy metals in herb or spice preparations

Internet sources or literature is provided. Additional internet research is required. The task is to prepare a collection of statements covering the most important points with regard to these scenarios.

The suggestion for schedule and interactive activities is designed for an in presence PBL, but the structure is also suitable for an online PBL with break out groups.

After completing the PBL, students:

- ...understand the toxicity of historic and current exposures to heavy metals
- ...have acquired in depth knowledge about lead poisoning
- ...have researched information on the internet regarding specific questions regarding toxic exposures to several toxicologically relevant (heavy) metals

- ...have exercised group work in different group sizes and with various requirements for production of material; they have worked under guidance as well as in the form of self-organized group work.
- ...have exercised to present material to the class
- ...have discussed their work and responded to questions related to their task or topic
- ...have exercised to prepare written material for the class with in depth as well as more basic contents, focusing on the most relevant aspects of the topic
- ...have exercised time management within a multifaceted task