

Risk Assessment Exercise

Purpose

To identify environmental health risk factors present at a field location and to assess them in terms of routes of exposure and potential for harm to human health.

Overview

Students use the provided worksheet to list possible sources of harm to humans, how humans might be exposed to these sources, the range of possible linked health effects, and the means of managing each risk. Then students use local and Internet resources to create a rough map of identified sources of pollution and general land use issues pertaining to the field site.

Time

One hour on site or in classroom followed by one hour using maps and Internet resources

Separate time may be needed for the collection of soil, water samples, etc.

Key Concepts

Every environmental health risk factor can be broken into two components: toxicity (or severity) and exposure (dose).

Land use is a critical factor in determining routes of human exposure to toxins or safety risks.

Visually apparent pollution (such as litter) poses little risk to human health, while seemingly hidden factors often can be more dangerous (i.e. water or soil contamination).

Skills

Generating questions

Following instructions

Field exploration

Documentation of findings

Hypothesis making

Mapping

Internet research

Materials

Worksheets provided

Equipment for taking and labeling samples of soil, water (optional)

Camera (optional)

Computer with Internet access

Maps of the field location with basic geographic features, notable uses

Facilitator Preparation

You will be acting as a guide for the students' own research and analysis into a chosen location/case study.

Select a locally accessible site that presents a range of potential environmental health issues. Ideally this exercise should take place at this site initially as a field trip; alternatively, a particular well known case study could be used (such as Love Canal or the Florida Everglades). Issues concerning environmental justice and ethics (including exercises from the Ethics module) could be raised as a follow up to this exercise.

Teachers should complete the worksheet for their field site ahead of time, using the key created for Virginia Key Beach as a sample. It may be useful to do a search of local newspaper and magazine articles about your field site; these may give some clues as to the main environmental hazards present. Students tend to be very visual and literal; they may be very focused on dangerous or ugly things they can see. It is important, therefore, to stress that without a route of exposure to the human body, there is not a health danger. Consider air, water and soil issues. Raise the question of special populations (i.e. workers, children or persons with underlying illnesses).

Several of the key concepts in this activity can be reinforced by also doing the Toxicology Module.

Procedure

1. Precede this exercise with an introductory discussion of environmental health (such as the Introduction to Environmental Health exercise), so students are familiar with the concept.
2. Begin by discussing the concept of risk assessment: "What is risk? What are some health risks, or risk factors?" Explain the ideas of toxicity ("How seriously can this factor harm a person?") and exposure/dose (How does a person come in contact with a substance or risk factor and how much of it are they getting?"). After getting some general comments, focus on the field site. (It will be helpful do this exercise on site if possible.) After the introduction, hand out the work sheet and ask students to complete the first section in small groups.
3. Relocate the class to a library or other area with map resources and computers with Internet access. Direct the students to either maps or computers (in turn) to make their maps as described in second section of the worksheet. The final maps should indicate obvious features such as major highways, schools, industrial areas, parks, hospitals, etc. The websites will help students identify known environmental problem areas such as sewage treatment outflows or Superfund sites. You may select a larger geographic area for the second section of the worksheet than for the first, in order to examine a wider area of land use issues, and to improve the likelihood of students finding information about their area on the Internet.

4. After completing the second section, give students the opportunity to add or modify the first section and then ask them to rank the risk factors in order of overall importance to human health.

Further Investigation

Students can take samples of soil, water, air or whatever they think they may want to test for contaminants. It may be helpful to invite a local environmental official who has experience in environmental sampling to guide students as well as to provide a “career model”. Students can also videotape or photograph a site (with permission from the relevant authorities) in order to document any presentations they will be making. Teachers should be prepared to test any material gathered and should be cautious about sampling any material suspected to be seriously hazardous.

Student Assessment

Students should complete the worksheet fully, using extra sheets if necessary. Student groups should have identified a wide range of risk factors and be able to justify their choices. Site maps should identify all easily noted features but also should identify areas which students hypothesize could pose a risk under certain circumstances. Students should be able to rank risks in a reasonable fashion and be able to discount risk factors for which there is no known exposure route to humans or there is no known toxicity information available. Students should, finally, be able to generate some straightforward ideas about how to minimize their most highly ranked risks.

Site to be evaluated: _____

Section Two

Use the space below to map the site. Use maps available in a library or on the Internet to identify main geographic and topographical features such as roads, schools, and major structures. Use the Internet websites listed below with others to identify known environmental problem areas, such as dump sites or locations with special permits for toxic waste disposal, etc. After noting specific features of the site, identify the main land uses of the site (i.e. wildlife preservation, residential, recreational, commercial, industrial, etc.) with shading in various colors. Be sure to make a key for your shading system.

www.epa.gov/enviro-mapper

www.scorecard.org

A large, empty rectangular box with a thin black border, intended for the student to draw a map of the site. The box is currently blank.