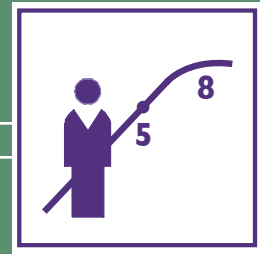


Health & Environment Activities Research Tool [HEART]



**Middle School Students Exploring
Environmental Health**

IEHMSP

INTEGRATED ENVIRONMENTAL HEALTH
MIDDLE SCHOOL PROJECT

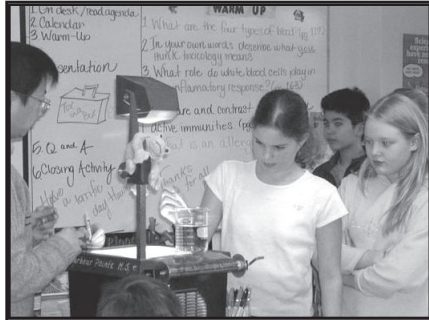
Interdisciplinary, Problem-Based Environmental
Health Education for Middle School Students

<http://depts.washington.edu/iehmSP/>

*“The goal of environmental health is to maintain a healthy, livable environment for humans and other living species, an environment that promotes well being and a high quality of mental and physical health for its inhabitants.”**



* From the summary from the Institute of Medicine Roundtable: Rebuilding the Unity of Health and the Environment: A New Vision of Environmental Health for the 21st Century; June 2000



For information about the Integrated Environmental Health Middle School Project, please contact Katie Frevert, IEHMSP Program Manager, at (206) 616-7557 or kfrevert@u.washington.edu.

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Teacher Tools

Table of Contents



Project Overview

About the Integrated Environmental Health Middle School Project (IEHMSP)	1
How to Contact Us	1
About the NIEHS	2
About the Research Centers	2
Introduction to the HEART manual	3



Teacher Key

Teacher Tools

Step by Step Guide for Teachers	5
Student Research Projects Curriculum Web	11
Student Learning Outcomes	13
Connecting to the Washington State Essential Learning Requirements (EALRs)	15
Environmental Health Research Topics	19
Student Introduction: Environmental Health (Teacher Key)	21
Rubric for Final Project Presentations	27



Student Handout

Student Activities

Introduction to Environmental Health (Student Handout)	31
Research Project Guidelines #1: The Student Research Project	35
Research Project Guidelines #2: Defining Your Community	37
Research Project Guidelines #3: EH Website Evaluation Activity	39
EH Websites for Students	45
Research Project Guidelines #4: Sharpening Your Focus	49
Research Project Guidelines #5: Collecting and Analyzing Information	51
Research Project Guidelines #6 Communication and Action	55
Research Project Guidelines #7: Final Presentation Checklist	59

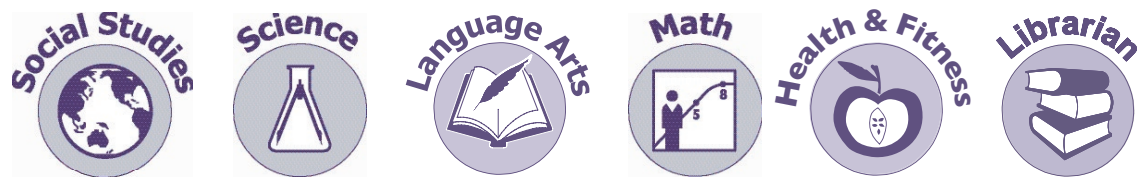


Teacher Resources

The Quicksilver Question Web Module	63
Websites for Teachers	67
Other Curricula and Lesson Resources	71
Environmental Health in the News	77
Environmental Justice Resources	81

Key to Symbols

Throughout this manual, you will encounter a variety of symbols. Icons clearly indicate the SUBJECT AREA for which a lesson plan or resource is aligned.



This icon in the margin indicates points in the lesson plan that provide good **Opportunities for Student Assessment**.



This icon in the margin indicates a handout that should be **Copied and Distributed to Students**.



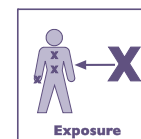
Student Handout

This icon in the margin indicates a **Teacher's Answer Key for a Student Handout**.



Teacher Key

This icon in the margin indicates content that relates to the core environmental health concept of **Exposure**.



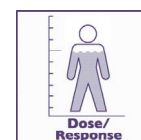
Exposure

This icon in the margin indicates content that relates to the core environmental health concept of **Toxicity**.



Toxicity

This icon in the margin indicates content that relates to the core environmental health concept of **Dose/Response**.



Dose/Response

This icon in the margin indicates content that relates to the core environmental health concept of **Individual Susceptibility**.



Individual Susceptibility

This icon in the margin indicates content that relates to the core environmental health concept of **Risks and Benefits**.



Risks & Benefits

This icon in the margin indicates content that relates to **Environmental Justice**.



Environmental Justice

This icon in the margin indicates content that relates to **Community Resources and Action**.



Community Resources & Action

Teacher Tools

About the IEHMSP

The Center for Ecogenetics and Environmental Health (CEEH) at the University of Washington, along with the New Mexico Center for Environmental Health Sciences at the University of New Mexico, received funding from the National Institute of Environmental Health Sciences (NIEHS) for a collaborative seven-year project. The Integrated Environmental Health Middle School Project (IEHMSP) trains middle school teachers in environmental health, giving them the expertise to help students identify and research environmental health issues in their communities. The IEHMSP is part of a national Environmental Health Sciences as an Integrating Context (EHSIC) program funded by the NIEHS. The IEHMSP involves teachers from a variety of subjects, as well as school librarians and technology coordinators. Students and teachers from several districts in Washington and from several schools in New Mexico are participating.

How to Contact Us

As the organizers of the Integrated Environmental Health Middle School Project, we are here to serve as resources for students and teachers involved in the project. Please feel free to contact any of us with questions, concerns or requests for more information on a research topic.

IEHMSP Mailing Address:

Integrated Environmental Health Middle School Project
c/o CEEH-COEP
4225 Roosevelt Way NE, Suite 100
Seattle, WA 98105

Phone Number: (206) 616-7557

Fax Number: (206) 685-4696

IEHMSP Website: <http://depts.washington.edu/iehmstp/>

The HEART Manual was compiled by:

Kristen Clapper Bergsman, Katie Frevert, Lyle Rudensey and Jon Sharpe



About the NIEHS

The National Institute of Environmental Health Sciences

The National Institute of Environmental Health Sciences (NIEHS) is one of 25 Institutes and Centers of the National Institutes of Health (NIH), which is a component of the Department of Health and Human Services (DHHS). The Director of the NIEHS is Dr. Kenneth Olden.

Mission Statement

Human health and human disease result from three interactive elements: environmental factors, individual susceptibility and age. The mission of the National Institute of Environmental Health Sciences (NIEHS) is to reduce the burden of human illness and dysfunction from environmental causes by understanding each of these elements and how they interrelate. The NIEHS achieves its mission through multidisciplinary biomedical research programs, prevention and intervention efforts, and communication strategies that encompass training, education, technology transfer, and community outreach.



About the Research Centers

The University of Washington (UW) **NIEHS Center for Ecogenetics and Environmental Health** strives to understand and communicate how genetic factors influence human susceptibility to environmental health risks. Center researchers study the biochemical and molecular mechanisms underlying human variability in response to environmental exposures. The Center's more than 50 core investigators hold appointments in 15 departments within the UW Schools of Medicine, Public Health and Community Medicine, Law, and Pharmacy, as well as the Fred Hutchinson Cancer Research Center. The Center's organizational structure encourages collaboration among these distinguished scientists.

For more information, go to: <http://depts.washington.edu/ceeh/>

The New Mexico Center for Environmental Health Sciences is an NIEHS funded center at the University of New Mexico (UNM) Health Sciences Center and Lovelace Respiratory Research Institute. The Center addresses the needs and concerns of Southwestern communities relating to environmental health issues and conducts basic and transnational research on regionally-relevant environmental public health issues. Many New Mexico and Tribal communities in the Southwest have historically borne a disproportionate share of exposure to a wide variety of environmental toxicants in the air, water and soil, and recent evidence raises concerns that members of many communities are suffering adverse health effects from environmental exposures. The theme of this NIEHS Center is "Environmental Disease and Health Promotion in Susceptible Southwestern Populations."

For more information, go to: <http://hsc.unm.edu/envirohealth/>

Introduction to the HEART manual

The Health & Environment Activities Research Tool (HEART) is an instructional tool. It is intended to provide guidance on how to incorporate environmental health into your curriculum by engaging students in locally relevant research projects.

The manual contains four sections. **Project Overview** provides information about the Integrated Environmental Health Middle School Project (IEHMSP). **Teacher Tools** provides step-by-step information on planning environmental health research projects. **Student Activities** provides lesson plans, activities and worksheets to guide students as they develop research projects. **Teacher Resources** provides information on environmental health curricula, activities resources and agency and community contacts.

The mission of the IEHMSP is to enhance middle school students' awareness of the fundamental relationship between the health of the environment and human health. Environmental health topics offer a natural way for students to make connections between math, language arts, social studies, science, health and fitness and technology. By using environmental health as the integrative theme across the curriculum, the IEHMSP encourages teachers to work in interdisciplinary teams. The HEART manual helps teachers engage students in research projects focused on locally relevant environmental health topics. Students are encouraged to use the resources in their local community and to report back their research findings to that community in some manner. Through the community research projects, students learn firsthand about community structure, resources, and civic forums for communication. When students translate their research findings into constructive action that can be taken on their issue, they strengthen their own sense of place within the community. In addition, student projects have the potential to affect the general public, empowering friends, neighbors and community members to make informed, responsible choices about how they interact with the environment.

The HEART manual is intended to help teachers plan problem-based learning experiences for students, in the form of a community based research project. Problem-based learning experiences are valuable for several reasons. By researching relevant environmental health issues, students will improve their critical thinking skills and develop a sense of personal involvement in societal issues that affect themselves, their families, and communities. Problem-based learning experiences can be student-driven, in a way that allows the students' own ideas, questions, theories and interests to guide their investigation of the research topic. In this way, the students' learning is meaningful and relevant to their own interests. Students are encouraged to become experts on their research topic, which in turn allows them to become active in their own learning. Rather than seeking instruction from the teacher, the students have the opportunity to become the classroom expert on their topic by using primary sources.

The research project experiences will also help prepare students for Washington State's new graduation requirement for a culminating senior project. The skills learned by students in communicating their research projects will better prepare them for this graduation requirement.

The strength of the HEART manual is that it has a variety of resources and tools. To get started, take a look at the **Step by Step Guide for Teachers**. You will find recommendations on how to approach an environmental health research project with your students.

Special Note: Teaching about Environmental Health

The most important environmental health topics to share with students are those that have a direct impact on them and the things that they have control over in their lives. By being aware of an environmental health issue in their own community, students can become empowered with that knowledge to reduce their personal risks and lessen their opportunities to come in contact with the hazard.

Environmental health hazards are present within your students' own environment; at home, at school and in their community. With an understanding of core environmental health concepts, students can learn how to protect themselves and their family members from these health hazards. The prevalence of environmental health hazards makes it an important topic for the middle school curriculum.

When teaching about environmental health issues, it is important to keep in mind that some of the students in your class may be personally impacted by these environmental exposures. Middle school students often want nothing more than to fit in with crowd. Be sensitive to this by avoiding pointing out students in your class that may be impacted by an environmental health issue. Rather, let them bring their experience to the discussion, if they choose to do so.

Step by Step Guide for Teachers

This manual will help you guide your students through the process of creating student research projects around relevant environmental health (EH) issues. Focusing the projects on locally relevant environmental health issues is a great way to spark students' interest in their own communities. The process of researching an environmental health issue and presenting their findings allows students to develop their critical thinking and problem solving skills. Whether you are working as part of a teaching team, or working alone, the student research projects provide many opportunities to make connections between multiple disciplines.

By following these steps, you will help your students build relevant environmental health projects, while meeting the Washington State Essential Academic Learning Requirements (EALRs), or your own state learning standards, in an effective and creative way.

Step 1: Envisioning environmental health projects

What is a community-based EH research project?

A quality research project that is focused around EH themes should aim to incorporate the following components:

- The students should be able to choose research topics that are real and important to them. Students should be actively engaged in choosing projects after they have defined their community, explored local EH issues, and thought about what issues are the most relevant to their lives.
- The students should examine how the following EH core concepts are related to the issue: dose/response, exposure, toxicity, individual susceptibility, risks & benefits, environmental justice, and community resources & action.
- The projects should benefit from teachers taking an interdisciplinary approach by either working with teachers from other disciplines, or incorporating skills from other disciplines into the projects. Most EH issues naturally integrate skills from many disciplines; these skills will help enrich and guide the students' research and presentation.
- Students should seek out members of their community as information resources. There are many local experts and community members who are probably knowledgeable and willing to help students with their research. Also, students should be encouraged to use resources in addition to websites, such as books, films, newspaper articles and scientific studies.
- Students should present their research findings back to the community of concern, and should consider positive actions for enacting change.

How do I begin?

Begin by looking through the contents of the **Teacher Tools** section of this manual.

The **Curriculum Integration Web** demonstrates how environmental health content is relevant to a variety of disciplines. By engaging your students in EH research projects, they will be challenged to address questions and use skills from across the disciplines. In addition, you may to review **Environmental Health Research Topics** to provide you with a sense of the kind of research topics your students may choose as their project focus.

Reviewing the **IEHMSP Student Learning Outcomes** will give you a sense of the overall learning goals of the IEHMSP, and how they relate to different disciplines. Washington State teachers will find the document, **Connecting to the Washington State Essential Academic Learning Requirements (EALRs)** useful in understanding what students will gain by completing a community-based EH research project, and how the projects are aligned to the EALRs. Teachers from other states may find this information useful in aligning the project elements to their own state learning standards.

Reading the **Student Introduction: Environmental Health** will familiarize you with the seven core EH concepts and important vocabulary. Before beginning their research projects, all students should read this document.

You may choose to use the **Quicksilver Question Web Module** as a way to introduce students to the idea of conducting community-based research. The storyline of the module models how students may investigate a local issue by assessing resources in their community. You can preview the module by choosing the Quicksilver Question option from the IEHMSP website at <http://depts.washington.edu/iehmisp/>. Then, choose the Teacher tab, and follow the registration directions.

The flow-chart on **Research Project Guidelines #1: The Student Research Project** shows the process by which projects can be created. This chart parallels **Research Project Guidelines #2: Defining Your Community**, and the project guidelines on **Research Project Guidelines #4-6**. Begin by guiding students in defining and describing their own communities. Who do they consider to be their community? Their school? Neighborhood? Cultural group in their neighborhood? Their city or town? Once students have done this, they can begin to think about the kinds of environmental health issues that may be affecting their community. Oftentimes, these issues arise out of the process of looking around their own school or neighborhood. For example, at one school, a group of students took a walk around their school and began noticing that there were a lot of cigarette butts on the ground. They decided to pick start picking them up, and counting them. Soon they found 10,000 cigarette butts in the two-block radius around their school! The students made the connection between the environmental problem (litter) and the human health problem (tobacco smoke). This spurred the students to dive into projects concerning cigarette smoking and its effect on the health of their community.

Step Two: Integrating into your curriculum

How will it fit with the rest of what I need to teach?

Take a look at your teaching plan, and see how the EH projects might fit in. There may be natural places to provide background information about the EH core concepts using the **Introduction to Environmental Health** handout and/or lessons from other IEHMSP curricula. The **Student Research Projects Curriculum Web** provides ideas on how to integrate environmental health across disciplines and throughout your curriculum. The chart on **Connecting to the Washington State Essential Academic Learning Requirements** also provides information on how the different activities involved in the research projects are aligned to state learning standards in multiple disciplines.

If you are working as part of a teaching team, you will want to discuss with partners who will take responsibility for teaching each part of the research projects and

presenting each of the student handouts. Examining the **Student Research Projects Curriculum Web** may give your team some ideas on how different project elements fit into your individual disciplines. As a team, you can plan out who will be responsible for each step of the research process and for assessing the students' work.

How can I introduce the topic?

We have two useful tools to help you introduce the topic of environmental health to your students: a student reading with an accompanying PowerPoint presentation and an interactive web module.

- The topic of environmental health should be introduced using the **Student Introduction: Environmental Health**. An accompanying PowerPoint presentation can be downloaded from our website at <http://depts.washington.edu/iehmosp/>.
- The **Quicksilver Question Web Module** is an exciting way to introduce students to conducting community-based environmental health research projects. This interactive computer-based activity models the process of researching an environmental health project in a community. The module is designed as a problem-based learning exercise, where students must engage with people and places around the fictional town of Quicksilver to investigate an environmental health issue. The **Quicksilver Question Web Module** can be downloaded from our website; more information on the module and its accompanying extension activities can be found in the **Teacher Resources** section of this manual.

How will it conclude?

The student projects should culminate in some kind of presentation. Will the students work in teams and present as a group? Decide whether you would like the presentations to be in-class, for the whole school, or open to parents and the larger community. Will they present posters, PowerPoint presentations, use a town meeting format, debates? Brainstorm the possibilities, using the ideas on **Research Project Guidelines #6: Communication & Action**.

How will I evaluate the projects?

A rubric for evaluating student presentations is provided for teachers. The **Rubric for Final Project Presentations** allows you to evaluate students' research projects, ensuring that they included all of the required elements in researching an environmental health topic. The teacher's rubric also includes criteria for evaluating presentations such as organization, creativity, delivery, and teamwork. The teacher's rubric is similar to **Research Project Guidelines #7: Final Presentation Checklist**, which is a tool students can use to make sure they have incorporated all of the essential elements into their research projects and presentations. The Final Presentation Checklist corresponds to the steps outlined in the student research guidelines on **Research Project Guidelines #4-6**.

How long will it take?

Only you will know how much you (and your teaching team) can devote to these projects. Your timeline for student research projects might be as follows on the table below. The sequence and time allotted to each activity will vary according to your needs, and there may be gaps between activities. You may also be able to work on the projects while also covering other related topics and class material. As you can see, the suggested sequence below would require about twenty class periods to complete.

Class Periods	Research Project Element
1	Introduce the topic of environmental health using the Student Introduction: Environmental Health and accompanying PowerPoint Presentation.
2-3	Engage students in <i>The Quicksilver Question Web Module</i> , which models the process for undertaking a community-based environmental health research project. (You will need access to a computer lab for this activity).
4-7 (variable)	Introduce the research projects using Research Project Guidelines #1 . If students will be working in groups, make group assignments. Assign and discuss Research Project Guidelines #2 – 4 . At this point, students will choose their research topics and develop their focus questions. (Students will need computer access for several of these activities).
8-13 (variable)	Assign Research Project Guidelines #5: Collecting & Analyzing Information . (Students will need access to the research materials, computers and the library).
14-17 (variable)	Provide in-class time for students to plan their presentations and create visual aids. Research Project Guidelines #6-7 will help them plan their presentations.
18-20 (variable)	Provide in-class time for student presentations, unless you are planning a special event. The timing for student presentations will depend on whether students are presenting as individuals or groups.

Step 3: Following the project guidelines

The **Student Activities** section of this manual includes research project guidelines to help guide students through the process of researching and presenting their environmental health projects. The activities are described below:

Student Introduction: Environmental Health

The **Student Introduction** provides students with the background knowledge and key vocabulary they need about environmental health before proceeding with their research projects.

Research Project Guidelines #1: The Student Research Project

This handout introduces a model for the steps in conducting a community-based research project. Students progress from examining their foundation knowledge to collecting data and sharing their findings with the affected community.

Research Project Guidelines #2: Defining Your Community

This handout walks students through the process of identifying and describing their community, and identifying potential environmental health issues.

Research Project Guidelines #3: EH Website Evaluation Activity

Most students turn to the Internet when conducting research. This handout demonstrates how students can critically evaluate each website they visit. A list of EH websites is included.

Research Project Guidelines #4: Sharpening Your Focus

In this handout, students sharpen their focus by identifying their environmental health issue, developing their focus question, and identifying community resources.

Research Project Guidelines #5: Collecting & Analyzing Information

Students are now ready to collect research and analyze data about their environmental health issue. This handout prompts students to consider human health effects, stakeholders' viewpoints, and possible solutions.

Research Project Guidelines #6: Communication & Action

The culmination of the student research projects is the creation and delivery of presentations. This handout encourages students to approach their presentations with creativity, while keeping them on track with the required elements. You may want to add your own requirements, such as an accompanying persuasive paper or a poster presentation.

Research Project Guidelines #7: Final Presentation Checklist.

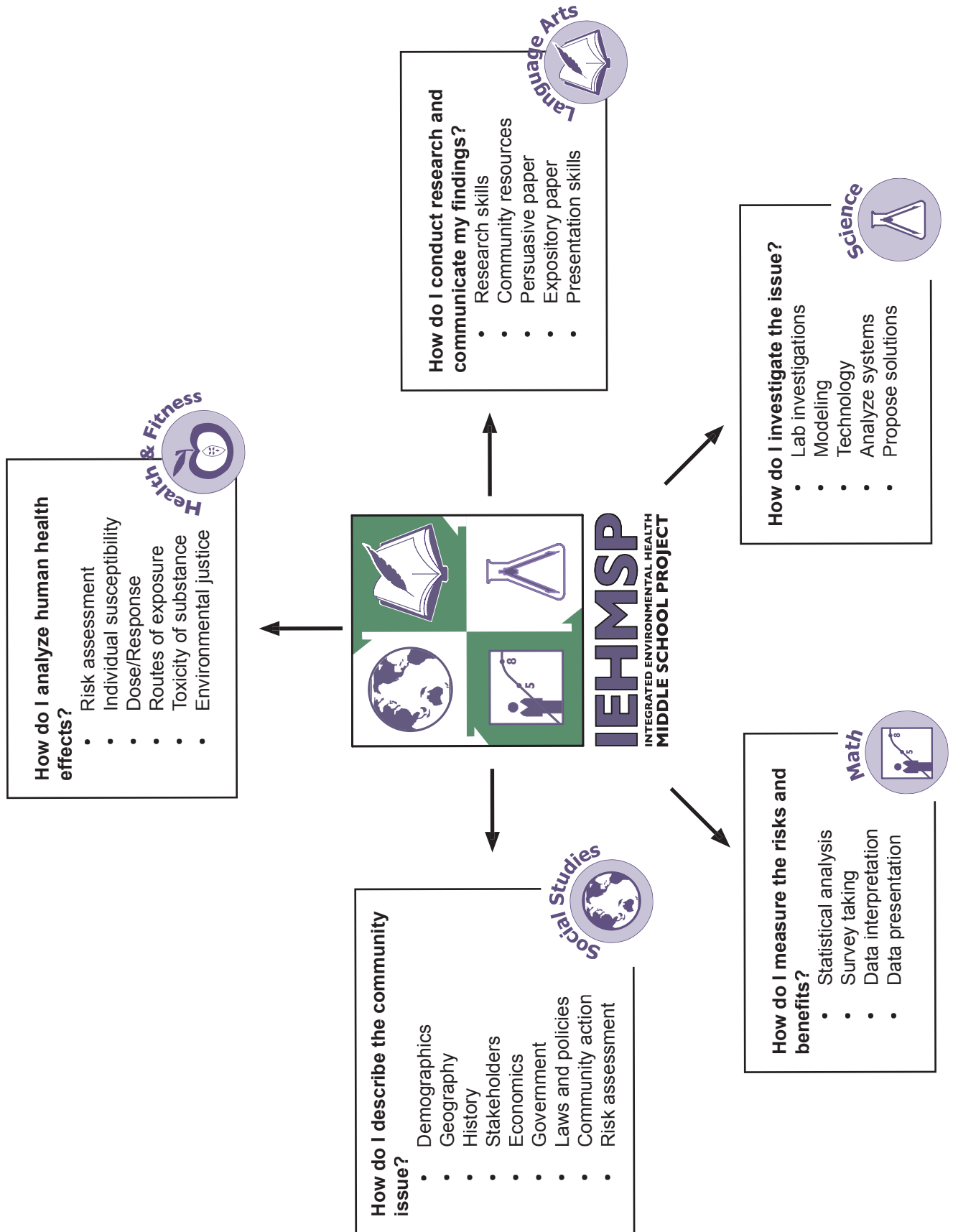
Students can use this checklist while preparing their own presentations to be sure they have included all of the required elements.

Step 4: Getting started

The resources in this manual will help you envision, plan, and execute community-based environmental health student research projects in your classroom. Your school and community resources, and your students' own creativity, will help sculpt the actual look and feel of these projects.

As you undergo this exciting process, please feel free to contact IEHMSP staff with questions, concerns or requests for more information on a research topic. We also have a variety of other curriculum materials and information on our website which may be helpful to you as you bring environmental health into your classroom. Our contact information can be found on page one. Good luck and have fun!

Student Research Projects Curriculum Web



IEHMSP Student Learning Outcomes

The Student Learning Outcomes are provided to give you a sense of the overall learning goals of the IEHMSP. By engaging your students in community-based research projects, your students will meet many of the overall learning outcomes for the project. These learning outcomes are aligned to the Washington State Essential Academic Learning Requirements (EALRs).

1. Students will understand the relationship between human health and the environment.

- Students will understand that the inherent properties of a substance (toxicity) and the overall amount of a substance that gains entry into the body (dose/response) are critical factors in determining whether the substance has an effect, positive or negative, on health.

EALRs: Science 1.2 and 1.3; Health & Fitness 3.1

- Students will understand that duration, frequency and routes of exposure are critical factors in determining whether a substance has an effect either positive or negative on health. Students will be able to describe the three ways in which a chemical can enter the human body: by inhalation (breathing), ingestion (swallowing), and dermal absorption (contact with skin). Students will also be able to identify which body systems (respiratory, nervous system, etc.) are impacted.

EALRs: Science 1.2 and 1.3; Health & Fitness 3.1

- Students will understand how individual factors (for example genetics, age, gender, and body size) can affect the overall impact of environmental exposures on health.

EALRs: Science 1.2 and 1.3; Health & Fitness 2.3, 3.1 and 4.1

2. Students will investigate the roles that individuals, communities and governments play in decisions that can affect human health.

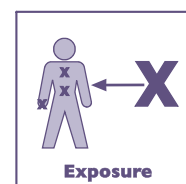
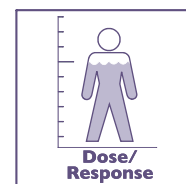
- Students will understand that we make decisions by weighing the risks and the benefits of a particular action. A student's ability to critically ask the right questions (such as 'what is the route of exposure?', 'what is the dose?' and 'are there specific individual susceptibilities to consider?') and assess these factors is fundamental.

EALRs: Health & Fitness 3.1, 3.2 and 4.1

- Students will acquire the skills to reduce their environmental health risks at home, school, work, and in the community.

EALRs: Math 5.2 and 5.3; Health & Fitness 2.3, 3.1 and 4.1

- Students will recognize that some groups of people are exposed to more environmental pollution than others are, and may suffer higher rates of



health problems. These groups often have less economic and political impact on the development of public policy and decision-making.

EALRs: Health & Fitness 3.1; Civics 4.1 and 4.3; Geography 3.1 and 3.3

- Students will understand that it is important to consider ethical, legal and social implications of environmental health research and community health issues.

EALRs: Science 3.2; Health & Fitness 3.1 and 3.3; History 3.3

- Students will recognize that different groups of people have different beliefs and opinions about environmental health issues depending upon their interests (economic, cultural, spiritual, etc.).

EALRs: History 1.3 and 3.3; Geography 3.1, 3.2 and 3.3

- Students will be able to effectively research an environmental health issue by gathering information and data from government agencies, community groups, businesses, scientists and scientific articles, and individual citizens with relevant knowledge.

EALRs: Math 4.1 and 5.2; Health & Fitness 3.1 and 4.1; Geography 3.1.2a; History 2.1; Social Study Skills 1.1 and 3.1; Reading 3.1

- Students will be able to describe the information or data that already exists about an issue and identify what data or information still needs to be collected in order to address the problem.

EALRs: Science 2.1; Math 4.1, 4.2, 4.3 and 5.3; History 2.1; Social Study Skills 1.1 and 3.1; Reading 3.1

- Students will identify appropriate local civic forums (community council, newspapers, etc.) that they may approach to address issues, present findings and seek change.

EALRs: Civics 4.2; Social Study Skills 2.1; Communications 2.1, 2.2, 2.3, 2.4, 2.5 and 3.3

- Students will understand that problem solving and decision-making occurs at the personal, local, state, national and international level.

EALRs: Civics 4.1 and 4.2

- Students will be able to clearly and effectively communicate their findings to their peers and other audiences (teachers, parents, community members, etc.).

EALRs: Math 4.2, 4.3 and 5.3; Social Study Skills 1.1; Communications 2.1, 2.2, 2.3, 2.4 and 2.5; Writing 2.1, 2.2 and 2.3



Connecting to the Washington State Essential Academic Learning Requirements (EALRs)

Health and Environment Activities Research Tool (HEART)	Introduction: Introduction to Environmental Health	Guidelines #1: The Student Research Project	Guidelines #2: Defining Your Community	Guidelines #3: EH Website Evaluation Activity	Guidelines #4: Sharpening Your Focus	Guidelines #5: Collecting & Analyzing Information	Guidelines #6: Communication & Action	Guidelines #7: Final Presentation Checklist
Social Studies: History								
1.3 Examine the influence of culture on U.S., world and Washington State history.			X					
2.1 Investigate and research. Locate and obtain sources of information.			X	X	X	X		
3.3 Understand how ideas and technological developments influence people, resources and culture.						X		
Social Studies: Geography								
1.1.2b Use data and a variety of symbols and colors to create maps and graphs.							X	
1.2 Analyze how human spatial patterns emerge from natural processes and human activities.			X					
1.2.2a Locate physical and human features and events on maps and globes.			X					
2.1 Use observation, maps and other tools to identify physical characteristics of places and regions.			X					
2.2 Describe the patterns humans make on places and regions.			X					
3.1.2b Explain how the actions and interactions of human societies affect and are affected by the environment.	X		X			X	X	X
3.2 Analyze how the environment affects people.	X		X			X	X	X
3.3 Identify the many groups and subcultures and how they interact.			X				X	
Social Studies—Civics								
4.1 Understand individual rights and their accompanying responsibilities.						X	X	
4.2 Participate in civic discussions with the aim of solving problems.							X	X
4.3 Explain how citizen participation influences public policy.			X				X	

Teacher Tools

Health and Environment Activities Research Tool (HEART)	Introduction: Introduction to Environmental Health	Guidelines #1: The Student Research Project	Guidelines #2: Defining Your Community	Guidelines #3: EH Website Evaluation Activity	Guidelines #4: Sharpening Your Focus	Guidelines #5: Collecting & Analyzing Information	Guidelines #6: Communication & Action	Guidelines #7: Final Presentation Checklist
Social Studies: Economics								
1.1.2a Provide examples of how groups and individuals face economic choices.			X			X	X	
Social Studies Skills								
1.1.2e Take notes, paraphrase, summarize and enter data.			X	X	X	X	X	
1.1.2f Create a product that uses social studies content to support findings; present product in appropriate manner.							X	X
3.1.3d Analyze and evaluate the impact of ideas, events, and/or people on groups, environments, economic systems, and/or subsequent events.						X	X	X
Science								
1.2 Recognize systems and the interactions within and among them.	X							X
1.3 Explain how human societies' use of natural resources affects quality of life and the health of ecosystems (Environmental & Resource Issues).	X		X		X	X	X	X
2.1 Develop the skills necessary to do scientific inquiry.						X		
2.2 Identify and examine common, everyday challenges or problems in which science/ technology can be or has been used to design solutions.	X					X	X	X
3.2 Investigate the use of science, mathematics, and technology within occupational/ career areas of interest.	X							
Health & Fitness								
2.2 Describe health care practices that result in early detection, treatment and monitoring of non-communicable diseases.	X					X		
2.3 Anticipate risky situations and demonstrate behavior to reduce risks.	X					X	X	X
3.1 Understand how environmental factors affect one's health.	X		X	X	X	X	X	X

3.2 Gather and analyze health information. Identify ways people make healthy and unhealthy decisions.	X		X	X	X	X	X	X
4.1 Assess needs and resources.			X	X	X	X	X	
4.1 Identify workplace health and safety issues.	X		X					

Health and Environment Activities Research Tool (HEART)	Introduction: Introduction to Environmental Health	Guidelines #1: The Student Research Project	Guidelines #2: Defining Your Community	Guidelines #3: EH Website Evaluation Activity	Guidelines #4: Sharpening Your Focus	Guidelines #5: Collecting & Analyzing Information	Guidelines #6: Communication & Action	Guidelines #7: Final Presentation Checklist
Reading								
1.1 Use word recognition and word meaning skills to read and comprehend text.	X			X		X		
1.2 Build vocabulary through reading.	X			X				
1.5 Use features of nonfiction text and computer software. Analyze the validity of electronic information.				X				
2.1 Comprehend important ideas and details. Demonstrate comprehension.	X					X		X
2.2 Expand comprehension by analyzing, interpreting and synthesizing information and ideas.						X		
2.3 Evaluate the validity of what is read.				X				
3.1 Read to learn new information.	X		X	X	X	X	X	
Writing								
1.3 Write clearly and effectively. Apply writing conventions.	X	X	X	X	X	X		
3.5 Publish. Produce a final product.						X		
Communication								
2.1 Communicate clearly to a range of audiences for different purposes.								X
2.1 Communicate using different forms of oral presentations such as reports.								X
2.2 Select and document sources. Develop a rational argument.								X
2.3 Use effective delivery.								X

Teacher Tools

Health and Environment Activities Research Tool (HEART)	Introduction: Introduction to Environmental Health	Guidelines #1: The Student Research Project	Guidelines #2: Defining Your Community	Guidelines #3: EH Website Evaluation Activity	Guidelines #4: Sharpening Your Focus	Guidelines #5: Collecting & Analyzing Information	Guidelines #6: Communication & Action	Guidelines #7: Final Presentation Checklist
2.4 Use effective language and style.								X
2.5 Use a variety of media and technology to illustrate ideas.					X		X	X
3.2 Work cooperatively as a member of a group. Contribute to group.				X	X	X	X	X
3.3 Seek agreement and solutions through discussion. Define challenges and encourage others to action.						X	X	X
4.1 Assess strengths and need for improvement.								X
4.2 Seek and offer feedback.								X
4.3 Analyze mass communication. Identify the impact of fact, opinion, bias, etc. in mass communication.				X				
Math								
1.4 Identify how statistics can be used to support different points of view (Statistics).						X		
1.4 Collect a random sample of data that represents a described population.								
2.1 Investigate situations. Identify missing or extraneous information.					X	X		
2.2 Formulate questions and define the problem.					X	X		
2.3 Construct solutions using appropriate mathematical tools.						X	X	
3.1 Analyze information from a variety of sources.				X	X	X		
4.1 Gather information. Read, listen, and observe to access and extract mathematical information.				X	X	X		X
4.2 Organize and interpret information.						X		
4.3 Represent and share information using both everyday and mathematical language (Represent and Share Information).						X		X
5.3 Relate mathematical concepts and procedures to real-life situations.						X		X

Environmental Health Research Topics

Now that you know a little bit about environmental health, here is a list of the kinds of topics that you might end up researching for your project. This list is meant only as a starting place – you might decide on a topic that isn't on this list!

- Agricultural chemicals and human health
- Air Pollution
- Animal waste and water pollution
- Animal-borne disease (West Nile Virus, bird flu, mad cow)
- Asbestos
- Asthma
- Bioaccumulation of heavy metals in seafood
- Biodiesel and air quality
- Biotechnology in agriculture (GMOs/genetically modified organisms)
- Birth defects
- Cancer/cancer clusters
- Children's environmental health issues
- Diesel pollution from school buses and other vehicles
- E coli and other food pathogens
- Electromagnetic fields (power lines, cell phones)
- Environmental justice issues
- Ergonomics
- Fetal alcohol syndrome
- Fish and bioaccumulation of heavy metals
- Food contaminants
- Genetic susceptibility to toxic substances
- Hazardous waste
- Health and safety issues young workers face on the job
- Historical uses of heavy metals (lead, mercury, etc.)
- Household hazardous chemicals
- Indoor air quality
- Lead exposure in children
- Local hazardous waste sites
- Medicinal uses of animal toxins
- Medicinal use of plant toxins
- Multiple chemical sensibility
- Noise Pollution
- Nuclear radiation
- Nutrition
- Obesity
- Pesticide residues on former agricultural sites
- Pfiesteria
- Phthalates
- Radon
- Radiation exposure
- Risk Communication
- Seafood contamination
- Soil pollution
- Superfund sites
- Tobacco use and human health
- Toxic chemicals in the food chain
- Ultraviolet radiation
- Waste incineration
- Water quality in a local stream, lake, river, or pond and human health effects
- Workplace hazards



Teacher Key

Student Introduction: ENVIRONMENTAL HEALTH

Introduction Overview

The **Student Introduction: Environmental Health** provides students with the background knowledge they need about environmental health before proceeding with their EH research project. The **Student Introduction** should be presented by the first teacher in the team to introduce the topic. The reading is accompanied by **Check Your Understanding** questions that can be used to assess student understanding of the material. Enrichment activities are also provided for a more in-depth investigation of environmental health and asthma.

Suggested Grade Levels: 6-8

Topics: Environmental health and human biology

Procedure

The **Student Introduction** is accompanied by **Check Your Understanding** questions. The questions will help guide students' reading and will help you to evaluate student understanding of the material. The **Teacher Key** provides sample answers to all of the questions.

You may want to assign the **Student Introduction** as homework or as an in-class reading. Additionally, students can work in small groups to read aloud and discuss the questions. Alternatively, you may ask for student volunteers to each read aloud a short section of the reading to the entire class. You may want to approach the **Check Your Understanding** questions as a written assignment or a class discussion. Students may be able to check their own work after the class discusses the answers.

A PowerPoint presentation is available for introducing key environmental health concepts to your students. The PowerPoint presentation can be presented along with the student reading. You can download the presentation at: <http://depts.washington.edu/iehmsp/>.

If you have time, you may want to involve students in one or more short activities related to the **Student Introduction**. A list of suggested activities is provided below. These activities will help your students deepen their general understanding of asthma and environmental health before you proceed to the subject-specific lesson plans.

Student Assessment



Student work can be assessed in the following ways, for a total of 100%.

25%	Did students read the Student Introduction: Environmental Health ?
50%	Did students correctly answer the Check Your Understanding Questions ?
25%	Did students view the PowerPoint Presentation: What is Environmental Health ?

Extension Activities

Environmental Health Collage: Create a collage of environmental hazards and environmental health-related jobs.

Classroom Speaker: Ask an environmental health professional from your community to visit your class to talk about his or her job. Possible professionals include your school nurse, a public health nurse, a toxicologist or environmental health specialist.

Hazards in Your Community: Make a list of possible environmental hazards in your community. Discuss what you can do to protect yourself from the hazards. Explore how you might be able to reduce or eliminate the hazards.

Student Introduction: ENVIRONMENTAL HEALTH



Teacher Key

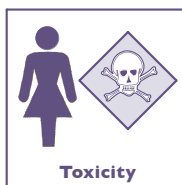
What is Environmental Health?

Your health depends on the environment around you. **Environmental health** is the study of how the environment affects human health. It differs from the study of how humans affect the environment, because it focuses on people's health. An environmental scientist might study how water pollution is hurting fish. An environmental health scientist would study what happens to the health of people when they catch and eat those fish. Environmental health is not just about the health of the environment – it always comes back to you and whether the environment you are part of is helping you stay healthy, or making you sick.

Every day, you come in contact with things in your environment that can help you or hurt you. Some of these things are important for keeping you healthy, such as oxygen or medications. However, some of these things may be harmful to your health, such as tobacco smoke or snake venom. Things in the environment that are harmful are called **hazards** and include things like **chemicals**, disease-causing bacteria, loud noises and even stress. Hazards can be natural or human-made.

People working in the fields of environmental health do many different jobs. They work to identify environmental hazards, and prevent people from being harmed by them. Some are scientists working in laboratories. Some work for the government writing regulations and studying pollution. Some work for corporations to help make sure that workplaces are safe and that the environment is kept as clean as possible. Most of these jobs require a solid understanding of science and math, knowledge about history and the law, and good communication skills.

To understand the field of environmental health, you need to understand seven core concepts: **Toxicity, Exposure, Dose/Response, Individual Susceptibility, Risks & Benefits, Environmental Justice, and Community Resources & Action.**



Toxicity

Most people working in environmental health-related jobs have taken classes in the science of **toxicology**. Toxicology is the study of how environmental hazards, such as natural and human-made chemicals, can enter our bodies and make us sick.

When scientists study different chemicals in the environment to see if they might be dangerous to humans, they are trying to understand the **toxicity** of those chemicals. Toxicity is a measure of how dangerous a chemical is. The greater a chemical's toxicity, the less it takes to make a person sick or even kill them. The Environmental Protection Agency, for example, uses the following scale to rate the toxicity of products commonly used in the home.

Environmental Health:
How the environment affects human health.

Hazard:
Something that can harm the health of humans or the environment.

Chemical:
Any substance that is made from elements combined into molecules.

Toxicity:
A measure of how dangerous a chemical is.

Toxicology:
The study of the harmful effects of chemicals on living things.

Teacher Tools

Source of Exposure:

A hazard's point of origin, such as cars, industry, or a volcanic eruption.

Environmental Pathways:

How a hazard travels from its source to humans. These include air, water, food, and soil.

Exposure:

The total amount of a chemical that comes into direct contact with the body.

Inhalation:

Breathing. When chemicals enter the body through this route of exposure, they can get stuck in the lungs and/or be taken up into the bloodstream.

Ingestion:

Swallowing (usually by eating or drinking). When chemicals enter the body through this route of exposure, they can easily be taken up into the bloodstream.

Dermal Absorption:

Absorbing a chemical through any part of the skin, including the eyes. When chemicals come in contact with the skin, they can sometimes enter the bloodstream through this route of exposure. However, for many chemicals the skin provides good protection of your body.

Routes of Exposure:

The ways in which a chemical can enter the human body. The three main routes of exposure are inhalation, ingestion, and dermal absorption.

Dose:



The total amount of a chemical that gets into a human or other living thing, relative to the individual's body weight.

Duration of Exposure:

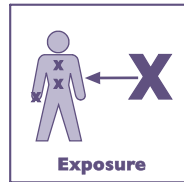
The length of time you are in direct contact with a hazard.

Frequency of Exposure:

How often you are in direct contact with a hazard.

Toxicity Rating	Word and symbols that appear on product's label	Approximate amount need to kill an average size adult
1 – Highly Toxic	DANGER or POISON 	A few drops to one teaspoon
2 – Moderately Toxic	WARNING 	One teaspoon to one ounce
3 – Slightly Toxic	CAUTION	More than one ounce
4 – Not Toxic	none	

A bottle of bleach, for example, will have the word DANGER on the label, because it is highly toxic if ingested (toxicity rating = 1). Borax powdered cleaner, however, is rated as slightly toxic (toxicity rating = 3) and will have the word CAUTION on the label. This is just one example of a system used to measure the toxicity of hazards.

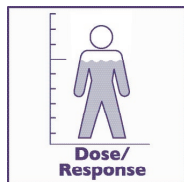


Exposure

We all know what it means to be “exposed” to something like a cold or a flu. Everyday our bodies are exposed to all sorts of environmental hazards, such as bacteria, viruses, and the sun’s ultra-violet (UV) rays. Some of these hazards exist naturally and some of them are the result of human activities. There are many possible **sources** of

hazards, such as cars, industry, even volcanic eruptions. In order for us to be exposed, however, the hazard has to get from the source to us. To do this, it travels along an **environmental pathway**. Pathways include the air we breathe, the water we drink, the food we eat, and even the soil we work in, play in, and use to grow much of our food.

Environmental health scientists use the term **exposure** to describe the total amount of a hazard that comes in direct contact with your body. Once you have come into contact with a hazard, it can get into your body through different routes. You can breathe it in (**inhalation**). You can eat or drink it (**ingestion**). You can get it directly on your skin or in your eyes (**dermal absorption**). You can also get it directly into your body through an injection. Inhalation, ingestion, and dermal absorption are the three main **routes of exposure**. Things that help us stay healthy, like vitamins, nutrients, and medications, enter the body through these routes of exposure, but hazards can use these same routes to enter the body and make us sick.



Dose/Response

Imagine that someone has been exposed to a hazardous chemical through one of the three possible routes of exposure. They have now received a **dose** of that chemical. Dose is the amount of the hazard that actually enters your body. The amount someone gets into their body (their dose) depends on many factors, including how long you

are exposed, how often you are exposed, and how big or small you are. For instance, if someone is exposed over a long period of time to a hazard, their dose will be larger. For example, 30 minutes spent under the bright summer sun would give you a much smaller dose of UV rays than 4 hours spent under the sun. This is called the **duration of exposure**. The **frequency of exposure** can also influence the dose. If someone works in a factory and is exposed to a chemical every day at work, their dose might be larger than someone who is only exposed once.

Dose can also depend on how big or small you are. When a doctor prescribes a medication for you, he or she calculates the amount of the medicine you should have based on your body size. The doctor can then give you the correct dose of the medicine for your body weight. While a teaspoon of medicine might be right for an adult, it may be far too large of a dose for an infant.

The dose you receive can influence how your body responds to a hazard. For most hazards, the larger the dose, the more extreme the **response** will be. The smaller the dose, the more mild the response will be. Drinking one can of a caffeinated soda might be fine. Drinking three cans in a row may make you jittery. Drinking five cans of soda might make you feel light-headed and sick.



Individual Susceptibility

Some people are more likely than others to get sick when they are exposed to environmental hazards. This might be because of their **genetics**, body size, age, gender or general health. This is called their **individual susceptibility**.

For example, some people are more likely than others to get sick when they are exposed to certain kinds of pesticides, just because of their genes. We all know that genes help determine things like hair color and eye color, but they also lead to some important (and invisible) differences in the way bodies work. It turns out that some people have a more extreme response to certain pesticides because of their genes. These people are said to be more “individually susceptible” to pesticide poisoning. Someone who lives or works on a farm where pesticides are sprayed might want to know how susceptible he or she is in order to avoid exposure and stay healthy.



Risks and Benefits

We live in an industrial society that depends on the use of both natural and human-made chemicals to function. The use of these chemicals results in **benefits** to society as well as **risks**. Pesticides, for example, make it easier to grow fruit. Unfortunately, in some cases, pesticides can make people sick. Most of us have heard that

we can reduce the risk of getting sick without giving up the health benefits that fruit offers by washing or peeling the fruit before we eat it.

Scientific researchers and government officials measure the risks and benefits that we face when we manufacture or use certain products. They work to explain what they have learned to the public and create safety standards that help people protect themselves from unnecessary risk. Their goal is simple – to help us enjoy the greatest benefits from the products that we manufacture, while exposing ourselves to the least possible risk. By understanding the risks and benefits that we face each day, we can make decisions that reduce our risk and keep us as safe and healthy as possible.



Environmental Justice

Everyone has the right to live in an environment that does not make them sick, regardless of their race, culture, or income. This is called **environmental justice (EJ)**.

Unfortunately, some neighborhoods or communities are exposed to more environmental hazards than others, and may suffer higher rates of health problems. These communities often have less economic or political power in society when decisions are made. For

Response:

The reaction to an exposure or dose of a hazard. A response can be anywhere from mild (e.g. headaches, a rash) to severe (e.g. brain damage, cancer).

Genetics:

Information that is contained in the genes (DNA) of a person's cells. Genetic information is passed down from parents to their children.

Individual Susceptibility:

Differences in the ways that individuals react after exposure to the same amount of a hazardous chemical. Differences in susceptibility can be caused by differences in body size, age, genetics, gender and general health.

Benefit:

Something that results in increased well-being or good health.

Risk:

The likelihood that a harmful consequence will occur as a result of exposure to a hazard.

Environmental Justice:

The fair treatment of people regarding the development of environmental laws, regulations and policies.

example, toxic waste dumps, polluting factories, and busy highways are often built in lower-income neighborhoods or communities of color. Communities recognize this as an environmental health issue and work to seek environmental justice.

Community Resources and Action:

An individual's ability to access resources and act on new information in order to create positive change in their own community.



Community Resources and Action

Where can you go in your own community to collect information about an environmental health issue? You can learn more about specific issues, understand environmental laws or seek environmental justice by using community resources. Community resources include places like the library and city hall. You could search the Internet for local, state, or federal agencies that can give you information about your issue. You can also talk to environmental health scientists at local universities or health departments, and ask your teachers and family members what they know about the issue.

Once you have gathered your resources and studied the issue carefully, it is time to take action! First, ask yourself what you as an individual can do to help solve the problem. If you are concerned about air pollution, for example, you might decide to walk to school instead of getting a ride in a car. Next, ask yourself how you can share what you have learned with others so that they can help too. Maybe you could write a letter to the editor of your local newspaper or speak to your community council or school board. Maybe you could create a flyer to hand out in your neighborhood. There are many great ways to get the word out and make positive changes in the world – use your imagination and be creative!

Check Your Understanding

1. Name one product that can be found in your home that might be considered to be highly or moderately toxic. **Answers will vary, but may include bleach, ammonia, furniture polish, nail polish remover, weed killer, rat poison, motor oil, antifreeze, etc.**
2. List the three routes of exposure. For each one, give an example of an environmental hazard to which you could be exposed through that route. **Inhalation (e.g. tobacco smoke), ingestion (e.g. drug overdose), dermal absorption (e.g. acid).**
3. Explain how the concept of “exposure” is different from the concept of “dose.” **Exposure is a measurement of how much of a hazard your body comes in contact with, while dose is a measurement of how much of the hazard actually enters your body.**
4. Pick four vocabulary words from the margin on the previous pages and use each one in a complete sentence. **Answers will vary.**

RUBRIC FOR FINAL PROJECT PRESENTATIONS

This rubric is provided to help you assess your students' environmental health (EH) research project presentations. Depending on the subject you teach, you may want to stress some of the criteria more than others. Therefore, the rubric does not have point-values assigned to it. You can assign your own point-values to the different levels of success. Some of the criteria are more appropriate for students who worked together in groups, rather than those that worked as individuals on their presentations. You may want to share this rubric with your students before they begin planning their project presentations to provide them with a framework of what a very successful project presentation looks like.

Research Project Rubric

CRITERIA	Very Successful	Successful	Somewhat Successful	Not Yet Successful
Description of EH Issue	Excellent description of issue including many aspects of the problem. Succinct and very clear focus question.	Good description of issue including several aspects of the problem. Clear focus question.	Understandable though fairly brief description of issue. Focus question stated but not totally clear.	Did not describe the central EH issue, or did so minimally. Focus question not clear.
Description of Target Community	Excellent description of the community, supported by research. May include information on demographics, geography, values and history.	Good description of the community but may not be comprehensive.	Understandable though brief description of the community. May lack in supported research.	Did not describe the community, or did so minimally without any research.
Description of Interest and Knowledge	Excellent description of personal interest, and existing knowledge about the issue.	Good description of personal interest and existing knowledge.	Brief description of personal interest and existing knowledge.	Did not describe personal interest and existing knowledge, or did so minimally.
Collection of Information	Excellent use of note taking and organizational tools.	Good use of note taking and organizational tools.	Fair use of note taking and organizational tools.	Did not use note taking and organizational tools, or did so minimally.
Description of Health Hazard	Very clear description of health hazard covering all the core EH concepts: <input type="checkbox"/> Dose/Response <input type="checkbox"/> Exposure <input type="checkbox"/> Toxicity <input type="checkbox"/> Individual Susceptibility <input type="checkbox"/> Risks and Benefits <input type="checkbox"/> Environmental Justice <input type="checkbox"/> Community Resources and Action	Good description of health hazard involved in this issue covering most of the core EH concepts: <input type="checkbox"/> Dose/Response <input type="checkbox"/> Exposure <input type="checkbox"/> Toxicity <input type="checkbox"/> Individual Susceptibility <input type="checkbox"/> Risks and Benefits <input type="checkbox"/> Environmental Justice <input type="checkbox"/> Community Resources and Action	Provided basic information of health hazard including some of the core EH concepts: <input type="checkbox"/> Dose/Response <input type="checkbox"/> Exposure <input type="checkbox"/> Toxicity <input type="checkbox"/> Individual Susceptibility <input type="checkbox"/> Risks and Benefits <input type="checkbox"/> Environmental Justice <input type="checkbox"/> Community Resources and Action	Did not provide important information about the health hazard, and referred only a little (or not at all) to core EH concepts: <input type="checkbox"/> Dose/Response <input type="checkbox"/> Exposure <input type="checkbox"/> Toxicity <input type="checkbox"/> Individual Susceptibility <input type="checkbox"/> Risks and Benefits <input type="checkbox"/> Environmental Justice <input type="checkbox"/> Community Resources and Action
Clarification of Viewpoints	A wide variety of viewpoints on the issue were expressed.	Several different viewpoints on the issue were expressed.	At least two different viewpoints on this issue were expressed.	Only one or not viewpoint was expressed.
Sources of Information	Six or more high quality, verified sources were used and citations provided.	Four to five verifiable sources were used, and citations provided.	Two or three sources were used; most were good sources and verifiable, but not all.	Less than two verifiable sources were used.
Presentations of Solutions and positive Actions	Several possible solutions and suggested positive actions were presented, well researched, and seemed feasible.	More than two possible solutions and positive actions were presented and seemed well researched and feasible.	At least two solutions or positive actions were presented that seemed feasible.	No plausible research solution was presented.
Demonstration of Understanding of EH issue	Showed a deep level of understanding of the EH topic, focus question and related issues.	Showed reasonable level of understanding of the EH topic, focus question and related issues.	Showed fair or partial understanding of the EH topic, focus questions and related issues.	Did not show a basic understanding of the EH topic, focus question and related issues.

Student Presentation Rubric

Organization	Presentation was very easy to follow and very well organized.	Presentation was clear and organized.	Presentation was understandable but could have been better organized.	Presentation was poorly organized and difficult to follow.
Creativity	Presenter(s) used several novel and interesting ways of presenting important points.	Presenter(s) used at least one novel and interesting way of presenting their topic.	Presenter(s) used standard presentation methods, but maintained interest.	Presentation did not maintain interest.
Delivery	Presenter(s) appeared confident, used a professional tone, spoke clearly without reading, made eye contact with audience, and went at a good pace (not too fast or slow).	Presenter(s) had a slight problem with one of the following: confidence, tone, speaking, eye-contact or pace.	Presenter(s) had a problem with several of the following: confidence, tone, speaking, eye-contact or pace.	Presenter(s) did not show confidence, did not use a professional tone, did not make eye-contact, read presentation from notes, and went either too fast or too slow.
Visual Aids	A variety of visual aids were used and were very neat, clear and understandable.	Visual aids were clear and understandable.	Visual aids were somewhat neat, clear and understandable.	Visual aids were not neat, clear or understandable.
Teamwork	All participants were active, and they coordinated well with each other. They were positive and mutually encouraging.	Most participants were active, some more than others. They worked well together.	Some members of the team clearly did more work than others, and teamwork could have been better.	Little evidence of teamwork.

RUBRIC FOR FINAL PRESENTATIONS

Student Name: _____ Date: _____

Research Project Title/Topic _____

Student Research Project Rubric

Criteria	Very Successful Score =	Successful Score =	Somewhat Successful Score =	Not Yet Successful Score =
Description of EH Issue				
Description of Target Community				
Description of Interest and Knowledge				
Collection of Information				
Description of Health Hazard				
Clarification of Viewpoints				
Sources of Information				
Presentation of Solutions and Positive Actions				
Demonstration of Understanding				

Research Project Grade: _____

Comments:

Student Presentation Rubric

Criteria	Very Successful Score =	Successful Score =	Somewhat Successful Score =	Not Yet Successful Score =
Organization				
Creativity				
Delivery				
Visual Aids				
Teamwork				

Research Project Grade: _____

Comments:



Student Handout

Student Introduction: ENVIRONMENTAL HEALTH

Name _____

Date _____

What is Environmental Health?

Your health depends on the environment around you. **Environmental health** is the study of how the environment affects human health. It differs from the study of how humans affect the environment, because it focuses on people's health. An environmental scientist might study how water pollution is hurting fish. An environmental health scientist would study what happens to the health of people when they catch and eat those fish. Environmental health is not just about the health of the environment – it always comes back to you and whether the environment you are part of is helping you stay healthy, or making you sick.

Every day, you come in contact with things in your environment that can help you or hurt you. Some of these things are important for keeping you healthy, such as oxygen or medications. However, some of these things may be harmful to your health, such as tobacco smoke or snake venom. Things in the environment that are harmful are called **hazards** and include things like **chemicals**, disease-causing bacteria, loud noises and even stress. Hazards can be natural or human-made.

People working in the fields of environmental health do many different jobs. They work to identify environmental hazards, and prevent people from being harmed by them. Some are scientists working in laboratories. Some work for the government writing regulations and studying pollution. Some work for corporations to help make sure that workplaces are safe and that the environment is kept as clean as possible. Most of these jobs require a solid understanding of science and math, knowledge about history and the law, and good communication skills.

To understand the field of environmental health, you need to understand seven core concepts: **Toxicity, Exposure, Dose/Response, Individual Susceptibility, Risks & Benefits, Environmental Justice, and Community Resources & Action.**



Toxicity

Most people working in environmental health-related jobs have taken classes in the science of **toxicology**. Toxicology is the study of how environmental hazards, such as natural and human-made chemicals, can enter our bodies and make us sick.

When scientists study different chemicals in the environment to see if they might be dangerous to humans, they are trying to understand the **toxicity** of those chemicals. Toxicity is a measure of how dangerous a chemical is. The greater a chemical's toxicity, the less it takes to make a person sick or even kill them. The Environmental Protection Agency, for example, uses the following scale to rate the toxicity of products commonly used in the home.

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How the environment affects human health.

Hazard:
Something that can harm the health of humans or the environment.

Chemical:
Any substance that is made from elements combined into molecules.

Toxicity:
A measure of how dangerous a chemical is.

Toxicology:
The study of the harmful effects of chemicals on living things.

Student Handouts

Source of Exposure:

A hazard's point of origin, such as cars, industry, or a volcanic eruption.

Environmental Pathways:

How a hazard travels from its source to humans. These include air, water, food, and soil.

Exposure:

The total amount of a chemical that comes into direct contact with the body.

Inhalation:

Breathing. When chemicals enter the body through this route of exposure, they can get stuck in the lungs and/or be taken up into the bloodstream.

Ingestion:

Swallowing (usually by eating or drinking). When chemicals enter the body through this route of exposure, they can easily be taken up into the bloodstream.

Dermal Absorption:

Absorbing a chemical through any part of the skin, including the eyes. When chemicals come in contact with the skin, they can sometimes enter the bloodstream through this route of exposure. However, for many chemicals the skin provides good protection of your body.

Routes of Exposure:

The ways in which a chemical can enter the human body. The three main routes of exposure are inhalation, ingestion, and dermal absorption.

Dose:



The total amount of a chemical that gets into a human or other living thing, relative to the individual's body weight.

Duration of Exposure:

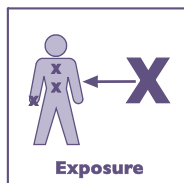
The length of time you are in direct contact with a hazard.

Frequency of Exposure:

How often you are in direct contact with a hazard.

Toxicity Rating	Word and symbols that appear on product's label	Approximate amount need to kill an average size adult
1 – Highly Toxic	DANGER or POISON 	A few drops to one teaspoon
2 – Moderately Toxic	WARNING 	One teaspoon to one ounce
3 – Slightly Toxic	CAUTION	More than one ounce
4 – Not Toxic	none	

A bottle of bleach, for example, will have the word DANGER on the label, because it is highly toxic if ingested (toxicity rating = 1). Borax powdered cleaner, however, is rated as slightly toxic (toxicity rating = 3) and will have the word CAUTION on the label. This is just one example of a system used to measure the toxicity of hazards.

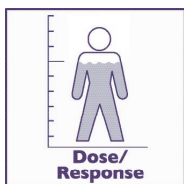


Exposure

We all know what it means to be “exposed” to something like a cold or a flu. Everyday our bodies are exposed to all sorts of environmental hazards, such as bacteria, viruses, and the sun’s ultra-violet (UV) rays. Some of these hazards exist naturally and some of them are the result of human activities. There are many possible **sources** of

hazards, such as cars, industry, even volcanic eruptions. In order for us to be exposed, however, the hazard has to get from the source to us. To do this, it travels along an **environmental pathway**. Pathways include the air we breathe, the water we drink, the food we eat, and even the soil we work in, play in, and use to grow much of our food.

Environmental health scientists use the term **exposure** to describe the total amount of a hazard that comes in direct contact with your body. Once you have come into contact with a hazard, it can get into your body through different routes. You can breathe it in (**inhalation**). You can eat or drink it (**ingestion**). You can get it directly on your skin or in your eyes (**dermal absorption**). You can also get it directly into your body through an injection. Inhalation, ingestion, and dermal absorption are the three main **routes of exposure**. Things that help us stay healthy, like vitamins, nutrients, and medications, enter the body through these routes of exposure, but hazards can use these same routes to enter the body and make us sick.



Dose/Response

Imagine that someone has been exposed to a hazardous chemical through one of the three possible routes of exposure. They have now received a **dose** of that chemical. Dose is the amount of the hazard that actually enters your body. The amount someone gets into their body (their dose) depends on many factors, including how long you

are exposed, how often you are exposed, and how big or small you are. For instance, if someone is exposed over a long period of time to a hazard, their dose will be larger. For example, 30 minutes spent under the bright summer sun would give you a much smaller dose of UV rays than 4 hours spent under the sun. This is called the **duration of exposure**. The **frequency of exposure** can also influence the dose. If someone works in a factory and is exposed to a chemical every day at work, their dose might be larger than someone who is only exposed once.

Dose can also depend on how big or small you are. When a doctor prescribes a medication for you, he or she calculates the amount of the medicine you should have based on your body size. The doctor can then give you the correct dose of the medicine for your body weight. While a teaspoon of medicine might be right for an adult, it may be far too large of a dose for an infant.

The dose you receive can influence how your body responds to a hazard. For most hazards, the larger the dose, the more extreme the **response** will be. The smaller the dose, the more mild the response will be. Drinking one can of a caffeinated soda might be fine. Drinking three cans in a row may make you jittery. Drinking five cans of soda might make you feel light-headed and sick.



Individual Susceptibility

Some people are more likely than others to get sick when they are exposed to environmental hazards. This might be because of their **genetics**, body size, age, gender or general health. This is called their **individual susceptibility**.

For example, some people are more likely than others to get sick when they are exposed to certain kinds of pesticides, just because of their genes. We all know that genes help determine things like hair color and eye color, but they also lead to some important (and invisible) differences in the way bodies work. It turns out that some people have a more extreme response to certain pesticides because of their genes. These people are said to be more “individually susceptible” to pesticide poisoning. Someone who lives or works on a farm where pesticides are sprayed might want to know how susceptible he or she is in order to avoid exposure and stay healthy.



Risks and Benefits

We live in an industrial society that depends on the use of both natural and human-made chemicals to function. The use of these chemicals results in **benefits** to society as well as **risks**. Pesticides, for example, make it easier to grow fruit. Unfortunately, in some cases, pesticides can make people sick. Most of us have heard that we can reduce the risk of getting sick without giving up the health benefits that fruit offers by washing or peeling the fruit before we eat it.

Scientific researchers and government officials measure the risks and benefits that we face when we manufacture or use certain products. They work to explain what they have learned to the public and create safety standards that help people protect themselves from unnecessary risk. Their goal is simple – to help us enjoy the greatest benefits from the products that we manufacture, while exposing ourselves to the least possible risk. By understanding the risks and benefits that we face each day, we can make decisions that reduce our risk and keep us as safe and healthy as possible.



Environmental Justice

Everyone has the right to live in an environment that does not make them sick, regardless of their race, culture, or income. This is called **environmental justice** (EJ).

Unfortunately, some neighborhoods or communities are exposed to more environmental hazards than others, and may suffer higher rates of health problems. These communities often have less economic or political power in society when decisions are made. For

Response:

The reaction to an exposure or dose of a hazard. A response can be anywhere from mild (e.g. headaches, a rash) to severe (e.g. brain damage, cancer).

Genetics:

Information that is contained in the genes (DNA) of a person's cells. Genetic information is passed down from parents to their children.

Individual Susceptibility:

Differences in the ways that individuals react after exposure to the same amount of a hazardous chemical. Differences in susceptibility can be caused by differences in body size, age, genetics, gender and general health.

Benefit:

Something that results in increased well-being or good health.

Risk:

The likelihood that a harmful consequence will occur as a result of exposure to a hazard.

Environmental Justice:

The fair treatment of people regarding the development of environmental laws, regulations and policies.

Community Resources and Action:

An individual's ability to access resources and act on new information in order to create positive change in their own community.



Community Resources and Action

Where can you go in your own community to collect information about an environmental health issue? You can learn more about specific issues, understand environmental laws or seek environmental justice by using community resources. Community resources include places like the library and city hall. You could search the Internet for local, state, or federal agencies that can give you information about your issue. You can also talk to environmental health scientists at local universities or health departments, and ask your teachers and family members what they know about the issue.

Once you have gathered your resources and studied the issue carefully, it is time to take action! First, ask yourself what you as an individual can do to help solve the problem. If you are concerned about air pollution, for example, you might decide to walk to school instead of getting a ride in a car. Next, ask yourself how you can share what you have learned with others so that they can help too. Maybe you could write a letter to the editor of your local newspaper or speak to your community council or school board. Maybe you could create a flyer to hand out in your neighborhood. There are many great ways to get the word out and make positive changes in the world – use your imagination and be creative!

Check Your Understanding

1. Name one product that can be found in your home that might be considered to be highly or moderately toxic.
2. List the three routes of exposure. For each one, give an example of an environmental hazard to which you could be exposed through that route.
3. Explain how the concept of “exposure” is different from the concept of “dose.”
4. Pick four vocabulary words from the margin on the previous pages and use each one in a complete sentence.

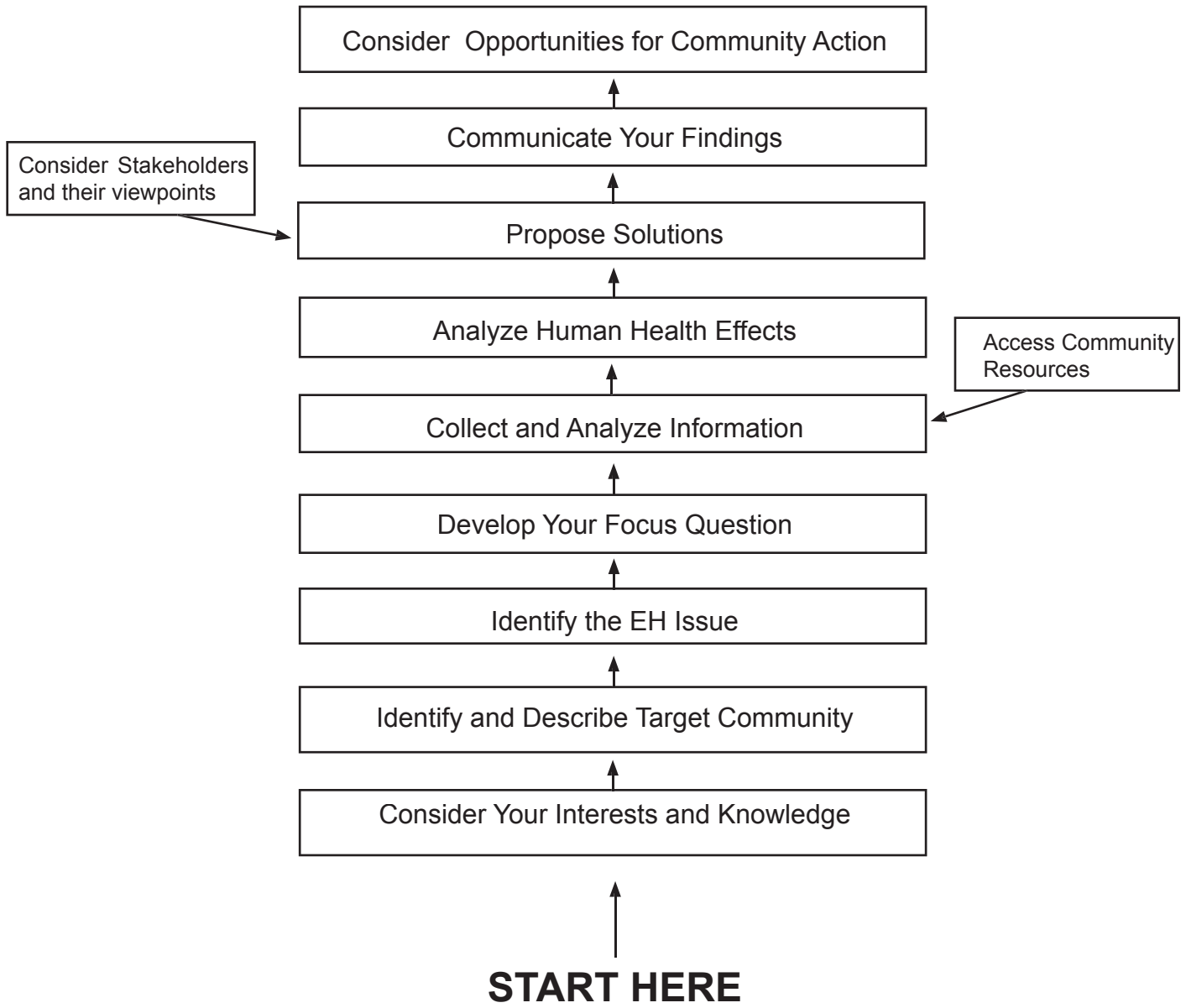


Research Project Guidelines #1: The Student Research Project

Name _____

Date _____

You are about to begin researching an environmental health issue in your own community. The flow-chart graphic on the next page shows the steps you will take in researching an environmental health issue. First, you will begin by considering your own interests, your existing knowledge, and describing your community. This process will help you to identify an environmental health issue that is important to you and your community. Next, you will develop a focus question, which will guide your investigation of the issue. You will then collect and analyze information about your issue using a variety of sources. You will prepare a presentation based on your research, giving you an opportunity to share your findings. You will also consider opportunities within your community to help bring about a solution to your environmental health issue.





Student Handout



Community Resources & Action

Research Project Guidelines #2

Defining Your Community*

Name _____

Date _____

You are about to begin an environmental health research project. You will be identifying environmental health issues in your own community. First, you need to define your community. A community is a group that shares a common identity or interest, or geographic place. This can be defined as your neighborhood, school, town, city, or another geographic region. Answering the questions below will help you to define the community that you want to investigate.

1. What is the geography of your community? That is, approximately how many square miles does it cover? What are its major geographic features (rivers, lakes, mountains, valleys, etc.)?

2. What is the community's population?

3. What is unique about this community's history? Are there any historical landmarks? Are there any legends or stories about the community?

4. What does this community value (hard work, status, education, etc.)? How do you know that?

5. What groups in this community are considered decision-makers? Who has the power to bring about change and to make major changes about the community?

*Adapted from "A Model for Applying the Scientific Method in Your Community" NSF Project HRD-9450053.
<http://depts.washington.edu/rural/RURAL/design/community.html>



Research Project Guidelines #3

EH Website Evaluation Activity

Name _____

Date _____

As you research an environmental health issue, you will need to go to a variety of resources for information. The Internet is a popular place to get information because you can access thousands of different websites for free. However, the Internet can also be a source of misinformation. For the same reasons that the Internet is a popular resource, you need to critically evaluate each website you visit to decide if the information is reliable or questionable.

Just think about it, anyone can publish anything that they want on the Internet for free. Unlike a book, a website does not need a publisher or an editor to carefully go through the information and validate it. Some people work very hard to make their website look like it comes from a real organization or business, hoping that people will read their website and believe what they say—even though it may not be the truth. Also, the Internet is a popular outlet for many people to express their point of view, share their experiences, or tell stories. While these kinds of websites may be entertaining, they probably are not a reliable source of data or facts.



Directions:

Choose one of the websites from the list **EH Websites for Students**. As you review the website, answer the questions on this worksheet. The questions will help you think critically and try to determine if the website is a reliable resource. In the future, when you visit other websites, try to keep these kinds of questions in mind. Remember, anyone can publish anything on the Internet. It is up to you to evaluate each website you visit.

Website Name and address: _____

1. Who is the website's author? You can find information on the author of a website by looking for a section titled something like "About Us," "Background," or "Philosophy." Also, try looking at the bottom of the page at the fine print.

- A. Who is the author of the website? (The author can be an individual or a group, organization, business or agency).

- B. What are the author's credentials such as occupation and education?

- C. Do you feel that the author is knowledgeable about this topic? Why or why not?

- D. What is the author's contact information, such as a phone number, mailing address or email address?

CAUTION: An email address alone is not enough information about the author. If an author is credible, usually they will provide information on how you can contact him or her. Anyone can register for an email address with a fake name.

2. Where did the website come from? Oftentimes, a website address can tell you a lot about the website and its author. Look at the website address for the following questions.

A. Put a check next to the type of website it is.

- Personal website.** Look for someone's name, such as "Smith" following a ~ or a % in the address. Also look for the words "users", "members", or "people" in the address.
- Educational.** Look for .edu
- Commercial.** Look for .com
- Nonprofit.** Look for .org
- U.S. Government.** Look for .gov, .mil or .us
- Foreign website.** There will be a country code in the address. For example, .de for Germany, .in for India, or .au for Australia.

B. Is this type of website appropriate, considering what the website is about? Why or why not?

CAUTION: Foreign websites may be a good source of information, and may provide a different viewpoint than U.S. websites. However, remember that other countries have different environmental laws and regulations, and different kinds of environmental health problems. Data that you get from another country's website might not be completely relevant to the U.S., especially when examining laws and regulations.

3. What is the Website's purpose? Every author has some purpose in mind when they write something. It is important to think about the author's intent and to question why did they create this website?

A. What do you think is the author's intent for creating this website?

- Sell you something
- Convince you of a point of view about the topic.
- Share a personal story or experience with you.
- Inform you about the topic with supporting facts and data.
- Entertain you.
- Other: _____

B. Who is this website aimed at?

- a. Is it aimed at a specific age group?
- b. Is it aimed at people who work in a certain profession?
- c. Is it aimed at people with a certain level of education or background knowledge?

4. Is the website current?

A. Is there a date that tells you when the site was last updated, or how often it is updated?

B. Are there any links that do not work? (This shows that the website has not been updated recently).

5. Is the website accurate?

A. Where does the information on the website come from? (Check all that apply).

- Newspaper
- Book
- Database
- Personal opinion
- Scholarly/academic journal
- Research study
- Interview
- Does not say where the information comes from
- Other: _____

B. Are the sources of information documented? If so, give an example of one. (For example, Newspaper=New York Times or Database= EPA Database.

C. Is the spelling and grammar accurate throughout the website?

6. Is the website objective?

A. Does the site appear biased? If so, in what way?

B. Is the information fact, opinion or a combination? How can you tell?

C. Look to see if there are any links to other related websites.

a. Do the links represent other viewpoints about the issue?

b. If not, does the absence of other viewpoints indicate a bias?

D. Verify the information provided at this website by comparing it to information you gather from two other websites about this same topic. It is especially important to check websites that may promote a different point of view on the issue. If there is a conflict in the information presented between the websites, explore several other sources to try to get at the facts.

a. Write down the names and website addresses of the two other websites you used to verify the information.

- b. Does the information conflict with what you have read or seen elsewhere?

CAUTION: It is always important to look for the bias in anything that you read, whether it is on the Internet, in the newspaper or in a book. It is especially important to consider the bias when you agree with what you are reading because it is easy to overlook the bias of the author. You may agree with it, but what are the other viewpoints on this issue? What are other resources that may provide you with different kinds of information?

7. Does the Website cover the topic?

A. Is the topic(s) covered in enough detail to be useful to you?

B. What else do you still want to know about this topic(s)?

8. Is the website easy to use?

A. Is it easy to navigate through the site?

B. Is the information written so that you can understand it?

C. Does the overall design of the website make sense to you?

9. Conclusions

A. Could you get this same kind of information from another resource?

B. If this site contained information about your EH research project topic, would you use it as a resource? Why or why not?

C. Would you recommend this website to someone else? Who?



Environmental Health Websites for Students

NIEHS Fact Sheets

The National Institute of Environmental Health Sciences (NIEHS) provides a list of fact sheets on a variety of topics. This site also contains a search feature that will allow you to look for your specific topic.

<http://www.niehs.nih.gov/oc/factsheets/fsmenu.htm>

NIEHS A to Z Topics

This is the link from the NIEHS that provides an alphabetical listing of environmental health issues.

<http://www.niehs.nih.gov/external/faq/faq.htm>

NIEHS Kids Page

This is the kids page of the previous site. Here you can find information and links about lots of environmental health topics. Don't miss the link NIEHS Health Index where you can search for information about any EH topic, or the Science Projects Help link under the Careers and Science Projects section.

<http://www.niehs.nih.gov/kids/>

Scorecard

Go to this site and type in your zip code; you will get detailed information on who is polluting in your area, cancer risks, environmental justice data (e.g. how people are affected by toxins sorted by ethnicity, income, education, etc).

<http://www.scorecard.org>

Teen Health

A site where you can search for readable information about almost any health topic, especially those relevant to teens.

<http://www.teenshealth.org/>

Kids Health

A site for kids with easily digestible information about many health topic.

<http://cybersleuth-kids.com/sleuth/Health/>

Tox Town

A very cool site where you can click on images in a scene of everyday life, and learn about hazards that could be present. Tons of information and fun.

<http://toxtown.nlm.nih.gov/>

Brain Pop

On this great site you can watch short movies on math, english, health and technology topics, including some on environmental health. The movies are usually animated, and are educational and fun. There are also sections for parents and teachers.

<http://www.brainpop.com/>

Children's Health Environmental Coalition

Here you can find fact sheets on how to make your home safe for small children by reducing risks. Such risks include household chemicals, outdoor pesticides, water quality, renovation tips, etc. Use this site for any home-related issues.

<http://www.chechnet.org/>

Environmental Health Perspectives

This is the Environmental Health Perspectives journal search page. This journal contains the latest research and update on many EH issues. Use the search engine within the site to find your topic.

<http://ehpnet1.niehs.nih.gov/docs/ehpsearch.html>

Environmental Health Corner

The National Safety Council's Environmental Health Corner page is full of great information on a variety of issues. Search for your specific topic by clicking on one of the broader areas on the left of the page.

<http://www.nsc.org/ehc.htm>

Toxicology Library

The National Library of Medicine's homepage for toxicology and environmental health links you to some other useful sites by category. Chemical information, a toxic substance database, and pathogens, and a toxicology tutorial are a few of the links.

<http://sis.nlm.nih.gov/Tox/ToxMain.html>

EPA for Students

This is the Environmental Protection Agency's site for middle school and high school students. This page is set up to be a research tool for students. You can find information on just about any environmental topic here. Check out the human health link on the left side of the page.

<http://www.epa.gov/students/>

Toxic Home Tour

This site takes you on a tour of your home to look for hazardous chemicals. It is very easy to navigate and although it seems geared for younger kids, it does contain quite a bit of valuable information.

<http://www.epa.gov/kidshometour/tour.htm#view>

Superfund for Kids Pages

Great information about hazardous waste cleanup and the EPA Superfund Program, developed especially for kids.

<http://www.epa.gov/superfund/kids/index.htm>

Bio Rap

A collection of student pages and teacher lesson plans on: aging, product safety, cancer, sun & skin, AIDS, and risk assessment. Each topic contains links to lots more information.

<http://www.biorap.org/>

Children's Environmental Health

Resource guide on children's environmental health. Many resources—some pretty technical—on many EH topics, listed alphabetically.

<http://www.cehn.org/cehn/resourceguide/keywordindex.html>

Ask a Scientist

At this site you can ask a biology question via email, and receive an answer from a real scientist!

<http://hhmi.org/askascientist/>

Clean Cities

A great site with local information about the movement toward alternative fuels and reducing dependence on petroleum.

<http://www.pugetsoundcleancities.org/default.htm>



Research Project Guidelines #4: Sharpening Your Focus



Name _____

Date _____

Your mission is to identify and research an environmental health issue in your community. An environmental health (EH) issue is a situation in which something in the environment (air, water, soil, etc.) has the potential to make people sick. The following questions will help you begin your research project, as you decide on an environmental health issue and develop your focus question.

The icons for the seven core environmental health concepts are placed in the margins. As you explore your environmental health issue, try to keep these core concepts in mind.

1. Identify Your Target Community

- a. Who is your target community? (See Research Project Guidelines #1 – Defining Your Community).

2. Identify the Environmental Health Issue

- a. What community-based environmental health issue are you interested in researching? (For example, “There is lead in the drinking water in many of the schools in my school district”).
- b. What is the health hazard that is causing a problem for this particular environmental health issue? (For example, “Lead”).

3. Consider Your Interests and Knowledge

- a. Why are you concerned about or interested in this issue?
- b. What do you already know about this issue?
- c. What do you want to know about this issue?



Student Handout

Research Project Guidelines #5

Collecting and Analyzing Information

Name _____

Date _____

1. Analyzing human health effects

- a. What is the **source** of the health hazard? (For example, lead in drinking water may come from old lead plumbing).

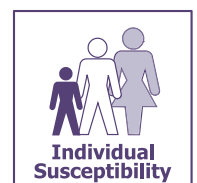
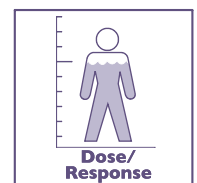
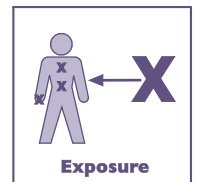
- b. Through what **environmental pathway** are people exposed to the hazard (e.g. via air, water, food, soil)? (For example, lead in drinking water exposes people to lead through water).

- c. Through what **route(s) of exposure** does the hazardous substance get into the body? (For example, people ingest water that is contaminated with lead).

- d. What **doses** are people getting and what **responses** (health effects) are people having to the hazard? (You will have to do some research to find out what dose of the substance is dangerous, and what kind of health effects the substance can cause).

- e. Who is at **risk** of being affected by this problem? (For example, students, teachers and staff in my school district who drink water from fountains at schools with old plumbing are at risk for lead exposure).

- f. Of those at risk, who is **most susceptible**? (For example, young children and pregnant women are most susceptible to lead poisoning).





2. Consider Stakeholders and their Viewpoints

- a. For almost every environmental health issue, there are both **risks** and **benefits** to society. For example, lead may have been a useful material for making plumbing (benefit), but now we know that the lead can get into drinking water and may make people sick (risk).

Think of three different groups of people that are affected by your issue (For example, students, business owners, government agencies, industry representatives, community advocates, health care workers, etc.). For each of these groups, use the table below to list the risks and benefits that could apply to each one.

Group	Risks	Benefits



- b. Does your environmental health issue affect people of color or low-income communities more than other communities? Do you think this is an **environmental justice**? If so, explain why.

3. Propose Solutions

- a. Based on your findings, what is your most accurate answer to your focus question?
- b. What are two possible solutions to the issue that will help protect those at risk?
- c. For each of your solutions, list as many pros (benefits) and cons (costs) as you can:

Solution	Benefits	Costs
#1:		
#2:		



Research Project Guidelines #6: Communication & Action

Name _____

Date _____

Now that you have investigated your environmental health issue, it is time to share your findings with others. First, you will organize and deliver a creative presentation. Secondly, you will identify and evaluate other ways to share information about your issue. Use **Research Project Guidelines #7: Final Presentation Checklist** to make sure your presentation is complete and well organized.

1. Communicate Your Findings

- a. Consider how you can effectively summarize and present your answers to the questions on **Research Project Guidelines #2, #4 and #5**. In addition to a more traditional presentation format where each student takes a section of the research findings and presents them as part of a group presentation, you may also want to consider the following formats to effectively communicate your work:
 - Create a poster, brochure, or museum exhibit to educate people about the issue.
 - Write and perform a skit about the issue.
 - Create a short documentary film about the issue.
 - Hold a mock town meeting focused on the issue.
 - Film a mock newscast about the issue, complete with reporters, field correspondents, and interviews with eyewitnesses.
 - Take a series of photographs about the issue. Assemble them into a slide show or Power Point presentation along with descriptions of the photographs.

Write a brief description of how you plan on presenting your findings:

- b. Consider what visual aids or other elements will be most useful to help you communicate the most important parts of your presentation. Depending on the format you choose for your presentation, you might want to include some of the following elements below. Choose the ones that will be most effective to communicate your particular research findings to your audience:
 - Conduct a community survey of people's experiences and feelings about the issue. Organize the findings into charts and tables.

- c. Look at the two solutions you proposed (see **Research Project Guidelines #5**, Question 3). Pick the one you think is best. How can you as an individual work towards making that solution a reality? What can you encourage others in your community to do?
- d. By researching your environmental issue, you may have become interested in knowing how to bring about positive changes. One of the most powerful things you can do to bring about change is to educate your community about the problem. If people are well informed about the issue, they will talk about it and may work on solving the problem themselves.

Here are some positive actions you could take to help bring about a solution to your environmental health issue:

- Write a letter to the editor of your community or school newspaper.
- Write letters to your government representatives. This could include the mayor, governor, members of Congress, or an agency responsible for regulating the issue (especially during public comment periods).
- Email a local radio talk show and encourage them to feature the issue in an upcoming show.
- Create a community website about the issue. Include links to a variety of sources of information about the issue.
- Give testimony at a City Council meeting or other similar civic forum.
- Organize a community potluck with the issue as the “conversation theme.” Ask people to sit at tables focused around different conversation-starting questions.
- Organize an art show created in response to your issue. Invite artistic friends to contribute works of art.
- Invite experts on the subject to be part of an “expert panel.” The expert panel can take place at your school or another community location. Audience members can ask questions of the experts, and the experts can take turns responding.
- Draw an editorial cartoon about the issue. Submit it to a school or community newspaper.



Research Project Guidelines #7: Final Presentation Checklist



Your Name: _____ Date _____

Presenters Name: _____

Environmental Health Issue: _____

There are a lot of things to keep in mind as you prepare your research project presentation. This checklist can be used as you prepare, making sure that you have included all of the required elements.

Did you:

- Identify your environmental health issue?
- Identify and describe your target community?
 - What are the demographics?
 - What is the community's history?
 - What are the community's values?
 - Who are the community's decision makers?
 - Who/what are resources in the community?
- Describe your interest and knowledge about the issue?
 - Why were you interested?
 - What did you already know?
 - What did you want to know?
- State your focus question?
- Collect and analyze information?
 - What format will I use to take notes?
 - How will I organize the information that I gather?
 - How will I keep track of my sources and their citations?
- Identify the hazard?
 - What is the human health hazard?
 - What is the source(s) of the hazard?
 - What are the environmental pathways through which people might be exposed to this hazard?

- Present an environmental health analysis, including EH core concepts:**
 - Who is at risk of being affected?
 - Who is most susceptible?
 - What is the toxicity of the substance?
 - What are the routes of exposure?
 - What is the evidence that there is a problem?

- Identify the different stakeholders and describe their viewpoints on the issue?**

- State whether or not there is an environmental justice aspect to the issue?**

- Propose different possible solutions to the problem?**
 - What are the benefits of each solution?
 - What are the costs of each solution?

- Describe resources in your community where you gathered information?**
 - What additional information did you need?
 - Where did you go for more information?
 - How did you collect the information?

- Answer your focus question?**

- Suggest positive actions that could be taken to improve the situation?**
 - What is already being done about the issue?
 - Has it been effective?
 - What positive actions do you suggest people take on this issue?

Presentation Format

It is important to consider the format of your presentation. The questions below will help you think about how you will present your research project findings. Answer each question in the space below.

- Who is the audience to whom you are presenting?

- What do you think they will already know about the issue?

- What questions do you think they will have about the issue?

- How will you use creativity in your presentation?

- What visual aids will you use in your presentation?

Presentation Tips

This is your chance to shine! Consider the following presentation tips to help make your presentation a shining success.

- Organize the information that you want to present so that it follows an order that will make sense to your audience.
- Do not read from your notes. Practice your presentation enough times so that you can speak to your audience and make eye contact with audience members.
- Speak clearly and effectively. Use a tone that is appropriate for your audience. Practice speaking in a comfortable pace that is not too fast or too slow.
- Create visual aids that are neat, clear and easy to understand.
- If you are working with a group, make sure all members actively participate in the presentation.

Have fun! Do your best to keep your audience interested.



The Quicksilver Question

An Environmental Health Web Module

Announcing the release of **The Quicksilver Question Web Module**, an innovative, interactive computer-based curriculum designed to introduce middle school students to environmental health.



The **Quicksilver Question Web Module** is designed as a student-centered problem-based learning exercise. Students navigate through the information contained in a virtual town, collecting eight key documents. Along the way, they visit interactive virtual environments. There, they obtain facts, information, perspectives and advice about how to formulate questions and evaluate health concerns. An online Pop Quiz and a supplementary Student Worksheet help guide student learning. Eight Enrichment Activities provide opportunities to further explore the topics brought up in the module.

Available for free! Choose the "Quicksilver Question" tab and sign-in as a teacher at:

<http://depts.washington.edu/iehmstp/>

Integrated Environmental Health Middle School Project

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Website: <http://depts.washington.edu/iehmstp/> **Department phone:** (206) 616-7557



IEHMSP
INTEGRATED ENVIRONMENTAL HEALTH
MIDDLE SCHOOL PROJECT

The Quicksilver Question Web Module: Lessons At a Glance

These eight extension lessons accompany the Quicksilver Question Web Module, providing opportunities for an in-depth investigation of the issues and topics highlighted in the module.



Social Studies: Expedition Medicine

Lesson Overview: Students learn about the state of medical knowledge during the time of the Lewis and Clark Expedition. They develop a list of medicines and equipment to bring on a wilderness journey, then compare their lists to items compiled by Lewis. The use of mercury-containing medicines has enabled archeologists to use privy pits as a way to locate the expedition's famous camps.

Suggested Grades: Grades 7-8

Curriculum Connections: U.S. History, Lewis and Clark, medical history

EALRs: History 1.2.2, and 2.2.2



Social Studies: Gold Mining in South America

Lesson Overview: In this activity, students learn about artisanal gold mining operations in South America, a source of mercury poisoning for young children. Then, students create a map that illustrates the distribution of artisanal gold mining operations across South America.

Suggested Grades: Grades 6-7

Curriculum Connections: South America, geography, mapping skills

EALRs: Geography 1.1.2a; Geography 1.1.2b and 3.1.2b



Science: Up the Food Chain

Lesson Overview: In this lesson, students play two simulation games to understand how biomagnification and bioaccumulation of mercury can affect aquatic ecosystems—and harm people.

Suggested Grade Levels: Grades 7-8

Curriculum Connections: Food chains, aquatic ecosystems, pollution

EALRs: Science 1.3



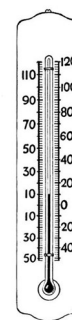
Science: Mercury Rising

Lesson Overview: Students learn how mercury thermometers work. Then they build their own working thermometer models. Students can calibrate their water thermometers and/or create a graph that shows temperature throughout the day. Students also learn about non-toxic alternatives and how to dispose of a broken mercury thermometer.

Suggested Grade Levels: Grade 6-7

Curriculum Connections: Thermometers, temperature, graphing, calibration, building models

EALRs: Science 1.3 and 2.1





Language Arts: The Mercury Message

Lesson Overview: Students have the opportunity to send a persuasive letter that can travel back in time, reaching a group of Arkansas teenagers the day before they discover a barrel of abandoned mercury. In the letter, the students warn the teens about the dangers of mercury to human health and the environment.

Suggested Grade Levels: Grade 7-8

Curriculum Connections: Persuasive writing, letter writing, human health

EALRs: Writing 2.1 and 2.2



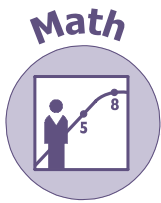
Language Arts: Toxic Tales

Lesson Overview: Students learn about a historical case of mercury poisoning in Iraq caused by eating imported wheat seeds. Students learn about the use of symbols as a form of communication. They also learn about the international symbols for hazardous chemicals and design a label that could have been used to warn the Iraqi people about eating the wheat seeds.

Suggested Grade Levels: Grade 6-7

Curriculum Connections: Communication, symbols, cultural assumptions

EALRs: Communication 3.1 and Reading 3.1



Math: Mercury in Your Everyday Life

Lesson Overview: In this activity, students recognize the many sources of mercury in our daily lives. They examine a data table that illustrates the major sources of mercury pollution from human sources in Washington State.

Suggested Grade Levels: Grade 6-7

Curriculum Connections: Reading data tables, calculating percentages

EALRs: Mathematics 1.1 and 4.3



Math: Cookie Mining

Lesson Overview: In this lesson, students become miners who need to purchase a piece of land (cookie). Students make money by mining chocolate chips. The activity introduces some basic mining economics, as well as considering the cost of environmental damage.

Suggested Grade Levels: Grade 7-8

Curriculum Connections: Economics, profit and loss, environmental damage

EALRs: Mathematics 5.3



Integrated Environmental Health Middle School Project

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Websites

Websites for Teachers

Environmental Health Websites

NIEHS for Teachers

This site is a great place to start when incorporating EH into your teaching. It includes links to on-line curricula, background information about a variety of topics, and links to pages designed specifically for kids.

<http://www.niehs.nih.gov/external/teacher.htm>

EPA Teacher Pages

A wealth of links for teachers. The Curriculum Resources page has great links for EH topics, especially the Air, Human Health, Waste & Recycling, and Water sections.

<http://www.epa.gov/science-education/>

EH Center

National Safety Council's Environmental Health Center. Includes information on air quality, children's EH, hazardous chemicals, radiation, solid waster, and water quality. Also has a special section for educators.

<http://www.nsc.org/ehc.htm>

Toxicology Library

The National Library of Medicine (NLM) page for toxicology and Environmental Health. Great links for detailed background information on a variety of topics and substances. Includes a great in-line "Toxicology Tutor."

<http://sis.nlm.nih.gov/enviro.html>

Agency for Toxic Substances and Disease Registry

This site includes very detailed information about a wide variety of hazardous substances ("Toxicological Profiles" section). It also gives you an up-to-date list of all the hazardous waste sites in Washington ("Hazardous Waste Sites by State").

<http://www.atsdr.cdc.gov/>

Superfund for Kids Pages

Great information about hazardous waste cleanup and the EPA Superfund program developed especially for kids.

<http://www.epa.gov/superfund/kids/index.htm>

Scorecard

Go to this site and type in your zip code; you will get detailed information on who is polluting in your area, cancer risks, environmental justice data (e.g. how are people affected by toxins by race, income, education, etc).

<http://www.scorecard.org>

Washington Toxics Coalition

Seattle-based activist organization promoting environmental health: news, up-to-date information, legislation, and activism opportunities.

<http://www.watoxics.org>

Teacher Resources

Tox Town

A very cool site where you can click on images in a scene of everyday life, and learn about hazards that could be present. Tons of information and fun.

<http://toxtown.nlm.nih.gov/>

National Center for Disease Control

This site of the National Center for Disease Control can be searched for the latest information on many health topics.

<http://www.cdc.gov/health/default.htm>

King County Health Hazards

This site provides fact sheets, reports, and guidelines about toxic hazards in King County, Washington.

<http://www.metrokc.gov/health/hazard/hazindex.htm>

Children's EH Fact Sheets

Fact sheets exploring environmental links to autism, asthma, ADHD, etc.

<http://www.childenvironment.org>

Children's EH Resources

Environmental Health Information Resources for Public Health Professionals. This site contains a webcast TV program that you can watch that describes many great websites for gathering information on EH topics, and how to use them. Click on "Topics and Resources discussed during Satellite Broadcast" and "Children's Environmental Health Resources Sampler" for the list of sites. You can also download the transcript of the webcast, which contains the written instructions for navigating the sites.

<http://phpartners.org/cehir/>

Burning Issues

This site provides information and educational materials about health hazards of exposure to wood smoke and other fine particulate pollution.

<http://www.webcom.com/~bi/>



Websites

Other Useful Environmental Health Related Websites

Groundwater Resources

Great resources on groundwater (including an excellent poster) that can be acquired cheaply. From the Wisconsin Department of Natural Resources.

<http://www.dnr.state.wi.us/org/water/dwg/gw/educate.htm>

Genetics Outreach Program

Washington state genetics outreach programs. A listing of programs that will provide speakers, activities, and equipment loan to schools doing genetics or other biology.

<http://genetics-education-partnership.mbt.washington.edu/guide/programs.html>

Consumer and Patient Health Information

A listing of web sites with reliable kids health information.

<http://caphis.mlanet.org/consumer/consumerKidscon.html>

Groundwater Pollution

An excellent site about the health impacts of groundwater pollution.

<http://edugreen.teri.res.in/explore/water/health.htm>

The Why Files

This searchable site provides articles on many subjects, including many EH topics.

<http://whyfiles.org/>



OTHER CURRICULA AND LESSON RESOURCES

Complete Classroom Curricula

Chemicals, the Environment, and You: Explorations in Science and Human Health

Publisher: NIEHS with BSCS and Videodiscovery

Grade Level: 7 & 8

Format: Print materials with CD-ROM

Students explore the relationship between chemicals in the environment and human health, utilizing basic concepts in the science of toxicology. Includes lessons on chemicals in our world, dose-response, susceptibility, risk, and environmental hazards. Also has CD-ROM. (Free to teachers - see url below to order.)

<http://science.education.nih.gov/Customers.nsf/middleschool.htm>

The SEPUP Modules

Publisher: Lawrence Hall of Science, UC Berkeley

Grade Level: 6 through 9

Format: Print materials and science kits

A SEPUP (Science Education for Public Understanding) Module is a series of related activities designed for the secondary grades. These activities use inquiry-based problem-solving approaches to learning which emphasize the importance of basing one's decisions on evidence. There are 12 different modules. Modules cover topics such as risk, threshold limits, water quality, toxic waste, food additives, and household chemicals. Each module includes a kit containing materials needed to complete the activities, student pages, and background and instructional materials for the teacher. (Cost varies)

<http://sepuplhs.org/>

ToxRAP: Mystery Illness Strikes the Sanchez Household

Publisher: EOHSI

Grade Level: 6 through 9

Format: Print materials

ToxRAP (Toxicology, Risk Assessment & Pollution) is a series of modules that utilizes concepts from toxicology and environmental health risk assessment to teach applied science. This module, created for middle school, asks students to investigate indoor air contaminants, especially dust from lead-based paints. (\$75.00)

<http://www.eohsi.rutgers.edu/rc/toxrap.html#mystery>

Exploring Environmental Issues: Focus on Risk

Publisher: Project Learning Tree

Grade Level: 9 through 12

Format: Print materials

This module helps students explore the different aspects of environmental and human health risks that affect their everyday lives. It incorporates science, social studies, math, geography, and language arts. Through eight hands-on activities, students analyze,

explore, discover, and learn about risk assessment, risk communication, risk perception, and risk management. (Free to teachers who participate in a workshop.)

<http://www.plt.org/curriculum/risk.cfm>

Project Hydroville

Publisher: Oregon State University, Corvallis, OR.

Grade Level: 7 - 12

Format: Print materials

An excellent integrated curriculum based on a hypothetical pesticide spill. Activities train students to be “experts” in four jobs necessary to cleaning up the spill: mechanical engineer, environmental toxicologist, soil scientist, and analytical chemist. Very well laid-out, with activities and extensions to the four major subject areas. Teacher training workshops available.

<http://www.hydroville.org/>

Thinkport: Environmental Health Connections

Publisher: Maryland Public Television and Johns Hopkins University Center for Technology in Education

Grade level: 6-8

Format: Web site

Curriculum modules designed by teachers include several lessons on environmental health. Most involve watching short video clips- topics such as asthma, water, air pollution, waste water, cholera. For lessons and videos, type a keyword into the search box on the homepage, and scroll down below the advanced search menu. Also, there are two excellent “mystery” scenarios about Environmental Health issues (mold/asthma and water) featuring excellent videos and supporting materials.

<http://www.thinkport.org/>

Ambient: Modules. Contaminants Affecting Human Health: In Water, Soil, Air and Food

Publisher: University of Miami, NIEHS

Grade level: 9 - 12

Format: Web site

A comprehensive interdisciplinary environmental health curriculum targeted to urban students in a culturally sensitive manner. There are modules on Air, Water, Soil, Food, Toxicology, Ethics, and soon Global Change. The curriculum has evaluation pages also.

<http://www.rsmas.miami.edu/groups/niehs/ambient/modules.html>

PEER (The Partnership for Environmental Educational and Rural Health) Modules

Publisher: Texas A&M (NIEHS supported)

Grade Level: 6 -8

Format: Web site, CD-ROM, print materials

Two types of modules are available, and there are many choices within each set. One set is the **Integrated Health Module**. These units integrate science with non-science subjects. These integrative materials follow a written story (adventure narrative) in which the characters (young middle-school aged students) travel to different parts of the world and are faced with various health problems which they are required to solve.

PEER Environmental Health Science Modules are the other type of module that PEER offers. They consist of six complete modules that emphasize function (e.g. what cells or organs do, rather than their anatomy). Each unit has a “Hazards” link that leads to a menu of study units on various environmental hazards (such as organic solvents - including alcohol, heavy metal poisons, and others). Units are: Water’s the Matter, Toxic or Not, Properties of Hazards, Cells Are Us, Organ Systems, Ecosystems. Each lesson has pre and post tests of student understanding.

<http://peer.tamu.edu/Integrated/Curriculum.html> & http://peer.tamu.edu/curriculum_modules/

Risks & Choices Staff Development Units

Publisher: Miami University Center for Chemistry Education, Univ. of Cincinnati Medical Center, funded by NIEHS

Grade Level: 7-12

Format: Web site, pdf files

The following academy topics are available for download at no cost: environmental toxins, hands-on use of the scientific method, risk perception, and water quality. (Click on the “Free Resources” link and go to the Terrific Science Lesson and Lab Exchange.) Activity instructions (written procedures, questions, and background information) are included, as well as instructor notes (materials lists, procedure notes, anticipated outcomes, sample calculations, and answers to student questions). Detailed background handouts for participants are also provided.

<http://www.terrificscience.org/lessonexchange/environmentalhealthrisks.shtml> <http://www.terrificscience.org/risks/>

Risks & Choices: The Daily Planet.

This news bulletin is an interactive learning tool for students that contains relevant and provocative activities that engage students in real environmental health science issues with experiments and other active learning experiences. Each issue examines a multidimensional environmental health scenario, and asks students to weigh economic, environmental, and health considerations. Associated pages are included that are meant to be a springboard to help students research the issues presented in each issue of The Daily Planet, by using hyperlinks to up-to-date materials. Most issues include lab or other activity.

Assessing Toxic Risk

Publisher: NSTA Press

Grade Level: 7 -12

Format: Books (teacher and student editions)

Good curriculum about toxicology concepts aimed at high school students. Focuses on bioassays; e.g. testing the effects of chemicals on duckweed, daphnia, or seed germination. Includes laboratory activities, and a section to help students plan bioassay experiments to test the effects of suspected toxics. Student and teacher editions are available.

<http://store.nsta.org>

Toxic Leak! An Event-based Science Module

Publisher: Addison-Wesley

Grade Level: 7 -12

Format: Books (teacher and student editions) and accompanying video

An interdisciplinary curriculum centered around a real gasoline leak, that contains activities to study groundwater, pollution, permeability and porosity of soils, and geology.

The unit is inquiry-oriented and emphasizes cooperative learning, teamwork, independent research, and hands-on investigations.

<http://www.mcps.k12.md.us/departments/eventscience/index.html>

University of Arizona Center for Toxicology Educational Activities and Curricula

Publisher: University of Arizona (NIEHS supported)

Grade Level: 7 -12

Format: Web site

At this site there are a variety of curricula that involve both online and lab activities, with downloadable instructions, overheads, and handouts:

Air Quality: Great animations about oxygen, ozone, carbon monoxide, and the lungs, how inversions happen plus an air-data exercise.

Water & Health: Health related information and interactive games about the water quality standards that will be monitored in real-time by Tucson Water.

Basic Toxicology Lab Stations: Lab stations to demonstrate basic toxicology concepts.

California Blackworms Curriculum: Lab experiments that test the effects of toxicants on blackworms.

Chemicals and Human Health: Activities allowing students to collect and analyze data on second-hand smoke, and online activities and problem sets on toxicology, kidney toxicology, lung toxicology.

Cluster Busters: A game of disease mystery-solving. Students research disease clusters that may be environmentally related.

Good Cells Gone Bad: A set of cartoon images about how cancers arise.

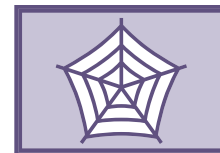
Naturally Occurring Pesticides: Students make plant extracts and examine natural pesticide effect on insects.

Race to Find the Cure: Simulation of the extraction, identification, and separation of plant chemicals using chromatography in a simulated race for the cure for cancer.

Tobacco Induced Mutations: Students expose bacteria to 4 different concentrations of tobacco extract and observe the dose-response mutagenic effect on the bacteria. The bacteria change from red to white when they mutate. Photos of this change can be seen online.

Presentations: Three downloadable powerpoint presentations on: Toxicology Basics, Nicotine & Alcohol, and From Plants to Drugs.

<http://swehsc.pharmacy.arizona.edu/coep/exercises.html>



Websites

Web Sites with EH-Related Lesson Plans

Cars of Tomorrow and the American Community

Publisher: Northeast Sustainable Energy Association (NESEA)

Grade Level: 9 through 12

Format: Pdf files

This is an extensive curriculum dealing with transportation issues and the environment, including health implications. The curriculum contains extensive and readable information, including great information about alternative vehicles and fuels. Includes many usable lessons.

http://www.nesea.org/education/edmaterials/edu_download.html

Environmental Health Fair

Environmental Health Fair web page from Olympic View Middle School. A great project developed with the IEHMSP by an interdisciplinary team. Lessons to help students find an EH issue and develop a project around it, including points of view, stakeholders, etc. Also contains calendar, rubrics. EXCELLENT!!

<http://schools.mukilteo.wednet.edu/staff/johnsonjh/resources/eh/ehproject.htm>

Society of Toxicology for Teachers

This is the web site for teacher resources. It provides information about toxicology topics, workshops, curricula, and other resources for teachers.

<http://www.toxicology.org/ai/k12o/k-12educators.asp>

NY Times Lesson Plans

Search for excellent lesson plans on many topics. You can subscribe to get their weekly lessons by email.

<http://www.nytimes.com/learning/teachers/lessons/archive.html>

Science Lesson Plans

Winning lesson plans submitted by teachers on a variety of science topics for middle and high school. Includes sections on biotech, genetics, ethics. Don't miss the interdisciplinary TB Project (under "Classrooms of the 21st century").

<http://www.accessexcellence.org/>

Brain Pop

This is the teacher section of the brainpop website, which contains short animated movies on math, english, health, and technology topics, along with accompanying lesson plans. Anyone can watch two movies a day for free. Schools can purchase a subscription to allow classrooms of up to 35 students to view movies in a computer lab.

<http://www.brainpop.com/>

Bio Rap

A collection of lesson plans and student pages on: aging, product safety, cancer, sun & skin, AIDS, and risk assessment. Each topic contains links to more information.

<http://www.biorap.org/>

Indoor Air Quality

EPA guide on Indoor Air Quality and how to improve it in your school.

<http://www.epa.gov/iaq/schools/tools4s2.html>

Teacher Resources

The Green Squad

Kids taking action for greener healthier schools. A neat interactive web site where students can evaluate EH risks at school.

http://www.nrdc.org/greensquad/intro/intro_1.asp

Cybersleuth Activities

Activities for middle school pertaining to health and environmental health.

<http://cybersleuth-kids.com/sleuth/Education/Lessons/Health/>

A-Z Science Activities

Science activities for middle school: A - Z.

<http://www.reachoutmichigan.org/funexperiments/quick/middlesch.html>

Environmental Health in the News



Websites

Environmental Health News Sources

EH Perspectives Journal

This is the Environmental Health Perspectives journal's website for news relevant to children's EH. Great articles on a variety of topics.

<http://ehpnet1.niehs.nih.gov/children/>

The Environmental Working Group

A national watchdog organization that provides up-to-the-minute information on EH news.

<http://www.ewg.org/>

Environmental Toxicology Newsletter

One of the best newsletters for interesting environmental toxicology articles. Arrange for email notification of the latest issue.

<http://ace.orst.edu/info/extoxnet/newsletters/ucdnl.htm>

Environmental Health News

A new EH news service to increase public understanding of emerging scientific links between environmental exposures and human health. As part of its outreach effort, EHN publishes 3 websites:

<http://www.EnvironmentalHealthNews.org>

Our Stolen Future

Links to news and studies about endocrine disruptors

<http://www.OurStolenFuture.org>

Protecting Our Health

Focuses on possible environmental causes of diseases, disorders, and disabilities.

<http://www.ProtectingOurHealth.org>

Rachel's Environment & Health News

An excellent e-newsletter that you can subscribe to. Articles connect to environmental justice issues.

<http://www.rachel.org>

General News Reporting

The Seattle Times Website

The Seattle Times website has a good search engine for the latest news. The Health section often includes EH related stories.

<http://www.seattletimes.com>

The Seattle Post-Intelligencer Website

Search for news on any topic.

<http://seattlepi.nwsourc.com/>

The New York Times

The New York Times has a health section every day and a science section on Tuesdays. The health section can be searched for a variety of topics.

<http://www.nytimes.com>



TEACHER NOTE: It is often possible to get multiple copies of these stories from the publisher for use in a classroom setting.

In-depth Special Reports Related to EH

"Fear in the Fields: How Hazardous Wastes become Fertilizer"

An alarming and award-winning series from 1997 that led to the book: "Fateful Harvest: The True Story of a Small Town, a Global Industry, and a Toxic Secret." A must-read eye-opening exposé of the practice of turning hazardous waste into fertilizer.

http://seattletimes.nwsourc.com/news/special/fear_fields.html

"Our Troubled Sound"

A series of great articles about pollution in the Puget Sound.

<http://seattlepi.nwsourc.com/specials/sound/index.asp>

"The Mining of the West"

A series of articles about mining and its environmental (and environmental health) impacts.

<http://seattlepi.nwsourc.com/specials/mining/index.asp>

"Arsenic's Legacy"

A short series about the health risks of arsenic contamination by Asarco smelters and older pesticides containing arsenic.

<http://seattlepi.nwsourc.com/specials/arsenic/>

"Uncivil Action"

"Uncivil Action: Asbestos mining leaves a deadly legacy in Libby, MT and nationwide." This series also lists other recent coverage of asbestos issues.

<http://seattlepi.nwsourc.com/uncivilaction/>

"An Epidemic in Our Midst: Methamphetamines"

This series won an award for best environmental health story.

<http://seattlepi.nwsourc.com/methamphetamines/>

"Pipelines: America's Hidden Hazards"

Based on the pipeline explosion in Bellingham.

<http://seattlepi.nwsourc.com/pipelines/>

"A Tainted Land"

An award-winning report consisting of two articles about pesticide contamination and high leukemia rates in Whatcom county.

<http://seattlepi.nwsourc.com/specials/pesticides.shtml>

"Students Learn About Public Action"

An article describing an IEHMSP project about a mock pesticide spill at a middle school in Mt. Vernon, WA.

<http://www.skagitvalleyherald.com/articles/2003/04/03/news/news05.txt>

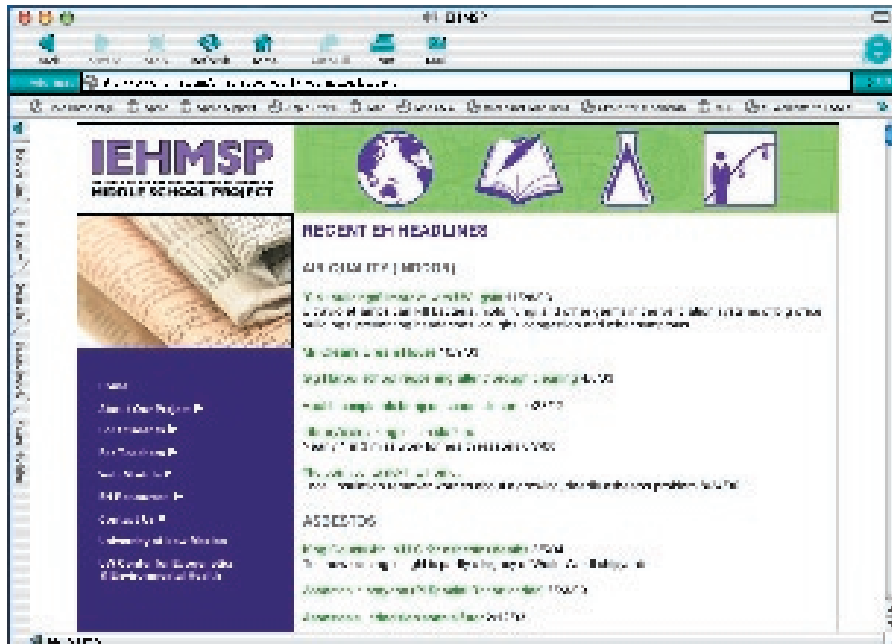
"Toxic Treats"

This six-part *Orange County Register* investigation follows the dangers of lead in candy imported from Mexico.

<http://www.ocregister.com/investigations/2004/leadindex.shtml>

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Environmental Health Headlines

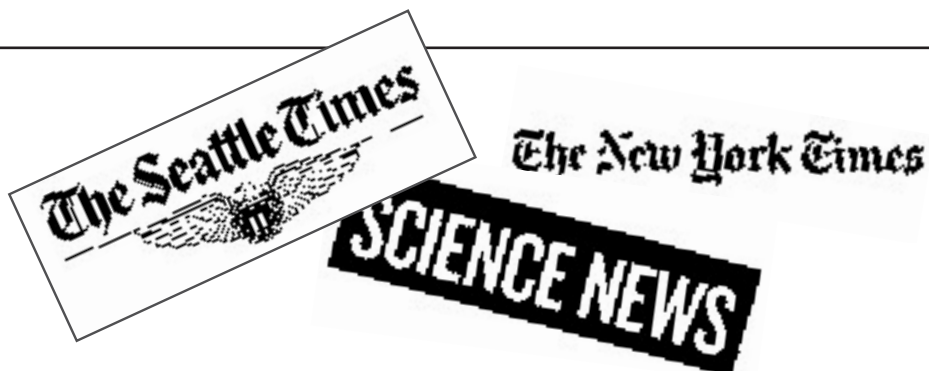


Subscribe to our EH Voices listserv and receive weekly dispatches filled with environmental health-related new stories. These new stories are a great way to prompt student discussions about current issues in environmental health.

To subscribe to the EH Voices listserv, contact Kristen Bergsman at: crowtalk@u.washington.edu or (206) 685-5378.

The IEHMSP has also developed a database to make it easy to find past articles relating to environmental health. The database can be searched for a variety of topics (e.g. air quality, lead, radiation, and hazardous waste) and includes articles from scientific journals and the popular press.

To search the database, contact the IEHMSP Resource Teacher, Lyle Rudensey, at lylecroc@u.washington.edu or (206) 616-1878.



Teacher Resources

Environmental Justice Resources



Environmental Justice Organizations

Community Coalition For Environmental Justice (CCEJ)

This local organization provides community education, speakers, activism opportunities, and an EJ library.

<http://www.ccej.org/>

Environmental Coalition of South Seattle (ECSS)

This group provides education and other resources on environmental health issues in south Seattle.

<http://www.ecoss.org>

Clear Corps

A community organization working to protect children from lead poisoning. They recently toured an excellent play with local student actors called "Jimmy's getting better".

<http://www.clearcorps.org/seattle.htm>

West Harlem Environmental ACTION (WEACT)

WEACT is a non-profit working to improve environmental policy, public health, and quality of life in communities of color. WEACT advances its mission through research, public education, advocacy, organizing, government accountability, litigation, legislative affairs and sustainable economic development. WEACT works for environmental and social justice on issues of land use, waterfront development, brownfields redevelopment, transportation and air pollution, open space, and environmental health.

<http://www.weact.org/>

Indigenous Environmental Network

Native American EJ issues webpage.

<http://www.ienearth.org/>

Environmental Justice Resource Center

Environmental Justice Resource Center of Clark Atlanta University. Great resource for reports, news, books, other resources.

<http://www.ejrc.cau.edu/>

Environmental Justice in Waste

EPA's Environmental Justice in Waste program. Good source for laws, regulations, programs, and resources.

<http://www.epa.gov/oswer/ej/index.html>

Center for Community Action and Environmental Justice (CCA EJ)

Resource center for community groups working on EJ.

<http://www.ccaej.org/>

The Environmental Justice and Health Union (EJHU)

They just announced the release of "Environmental Exposure and Racial Disparities" an analysis of racial exposure to environmental chemicals, which documents how people of different races living in the United States are exposed to different chemicals in the workplace and the home. See summary article at www.rachel.org (July 31, 2003 issue)

<http://www.ejhu.org/disparities.html>



Websites with Environmental Justice Related Content

Institute for Children's Environmental Health (ICEH)

A national organization that organizes collaborative projects, often involving affected communities, to promote children's environmental health.

<http://www.iceh.org/>

Scorecard

Go to this site and type in your zip code for detailed information on who is polluting in your area, cancer risks, and environmental justice data (e.g. how people are affected by toxins – sorted by ethnicity, income, education, etc.).

<http://www.scorecard.org>

Environmental Racism

Environmental racism in Chester, PA. This website provides excellent information about a city that suffers the effects of environmental racism. The website provides background about EJ, articles, and many resources. There is also a downloadable curriculum based on this situation ("Homesick? The Case of Chester, PA"). The curriculum is available at:

<http://www.terrificscience.org/risks/dailyplanet/index.shtml>.

<http://www.ejnet.org/chester/>

Recent New Stories Related to Environmental Justice

"Georgetown's Battlefronts"

Article about toxic waste in Seattle's Georgetown neighborhood.

<http://www.thestranger.com/1999-07-08/feature2.html>

"Toxics in the Air: Monitoring Station Should be Retained"

A good letter to the editor about toxic waste in Georgetown.

http://seattletimes.nwsources.com/html/editorialsopinion/134602780_thulets26.html

"SouthPark Stinks"

Article about the closing of Long's Paints, and other EJ issues in South Seattle.

<http://www.seattleweekly.com/features/0134/news-anderson.shtml>

"Environmental Justice: The View from Seattle"

Interviews with African American leaders in Seattle show that a broad understanding of environmental issues is required to bring together those concerned about both the environment and social justice.

<http://www.speakeasy.org/wfp/20/Justice.html>



Other Ethical, Legal, and Social Issues (ELSI) Resources

What is ELSI?

Great explanation of what ELSI is, from Lawrence Berkely Laboratory's ELSI Project.

<http://www.lbl.gov/Education/ELSI/what-is-elsi.html>

ELSI Debate

Good debate activity centered on EH implications of building an oil refinery.

<http://www.lbl.gov/Education/ELSI/Frames/pollution-ELSI-activity-f.html>

Bioethics Model

An excellent model for ethical decision making, using a case-study step-by-step approach. This is written for community college students, but could be simplified for middle school level.

<http://smccd.net/accounts/skyline/NCBC/bioethics/bioethics2.html>

Human Genome Project

This page provides links to many ELSI resources.

http://www.ornl.gov/TechResources/Human_Genome/links3.html#elsi

Ethical Dilemmas

Lesson entitled: Presenting Ethical Dilemmas in the Classroom, from Access Excellence.

<http://www.accessexcellence.org/AE/AEPC/WWC/1992/dilemmas.html>

Ethics of Love Canal

Case study about the Love Canal, from the Online Ethics Center for Engineering and Science at Case Western Reserve University.

<http://www.onlineethics.org/environment/lcanal/index.html>

Ethics Lesson Plans

Go to the NY Times learning page and search on the keyword, "ethics."

<http://www.nytimes.com/learning/teachers/lessons/archive.html>



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