

**Youth Network  
for Healthy Communities**

# **Teacher's Guide 2009-2010 School Year**

Using videoconference technology to connect  
middle and high school students  
to environmental health professionals  
in Washington State

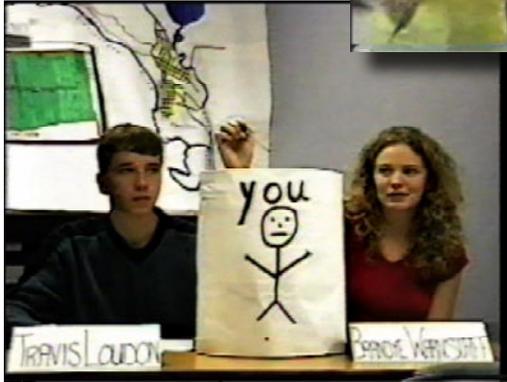


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# YNH



Clockwise from top: Students from Wenatchee High School perform a song about the health effects of wildfires; former NIEHS Director Ken Olden, CEEH Director Dave Eaton, and other environmental health experts listen to student YNH presentations; Wenatchee High School students and teachers with Senator Linda Evans-Parlette (R-Wenatchee); Students from Oroville High School demonstrate dose-response.



## YNHC Participating Sites (since 9/2000)

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# Introduction



# **YNHC Teacher Orientation Session Agenda**

## **Introductions & Background (CEEH Staff)**

History of the YNHC Project  
About the Center for Ecogenetics and Environmental Health  
About the Youth Network for Healthy Communities (YNHC) Project  
Teacher packet overview

## **Introduction to Environmental Health (CEEH Staff)**

Please see following pages for notes to accompany this Powerpoint presentation.

## **Student Project Overview (Jay Young, Wenatchee High School)**

Project Guidelines Reviewed  
Project Topic Suggestions

## **Successful Videoconferencing (Nancy Sedlacek, Yelm Extension School)**

Teacher and Student Videoconference Hint Sheets Reviewed

## **Questions & Answers**

**Having trouble getting connected?  
Call the UW videoconference facility  
at (206) 616-7250 for assistance.**

# Overview of Environmental Health

To download this file, go to: <http://whs.wsd.wednet.edu/Faculty/Young/YNHC/ynhchome.htm>

## What is Environmental Health?

A Student Introduction

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## What is the environment?

The trees, air, & soil around us

ALL the places we live, work & play

Our fields, farms & the food we grow

Our oceans, lakes, and rivers

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## What is health?

Nutritious foods help us stay healthy.

Regular exercise helps keep us strong and healthy.

Doctors, hospitals & medicines help us get healthy if we're sick.

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## Environmental Health?

The study of how the environment affects your health.

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## Hazards

A hazard is anything in the environment that can hurt you or make you sick.

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## Environmental Health Careers

People working in the field of environmental health . . .

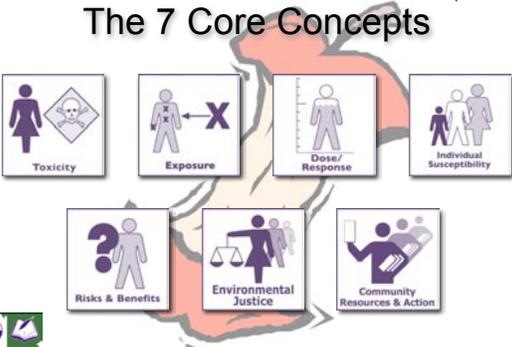
Work as scientists in research labs

Work for corporations making sure workplaces are safe for workers

Work for the government writing regulations and studying pollution

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## The 7 Core Concepts



Toxicity

Exposure

Dose/  
Response

Individual  
Susceptibility

Risks & Benefits

Environmental  
Justice

Community  
Resources & Action

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Toxicity

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## A Toxic Word Game

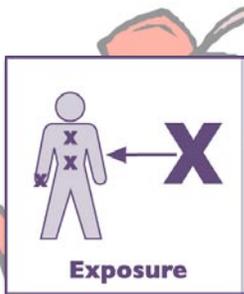
**Toxic** means poisonous or dangerous .

**Toxicology** is the study of poisons.

**Toxicity** is a measure of how dangerous a chemical is.



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Exposure

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## Exposure is



The total amount of a hazard that comes in direct contact with your body.



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## The 3 parts of exposure

The Source

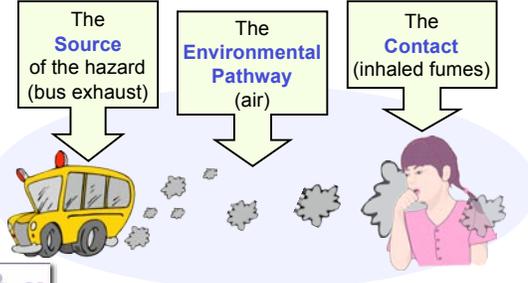
of the hazard  
(bus exhaust)

The Environmental Pathway

(air)

The Contact

(inhaled fumes)





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### Route #1: Inhalation

**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.

Exposure Integrated Environmental Health Middle School Project • University of Washington © 2005 13

### Route #2: Ingestion

**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.

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### Route #3: Dermal Absorption

**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.

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### What is dose?

**Dose is the amount of a hazard that actually enters your body.**

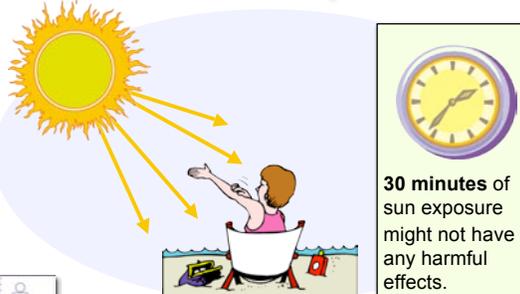
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### Dose can depend on...

- Duration of Exposure:** How long?
- Frequency of Exposure:** How often?
- Body Size:** How big or small are you?

Dose/Response Integrated Environmental Health Middle School Project • University of Washington © 2005 18

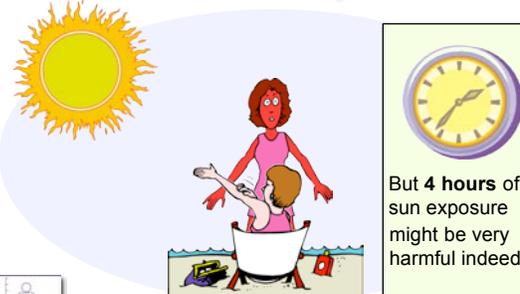
### Duration of Exposure



**30 minutes** of sun exposure might not have any harmful effects.

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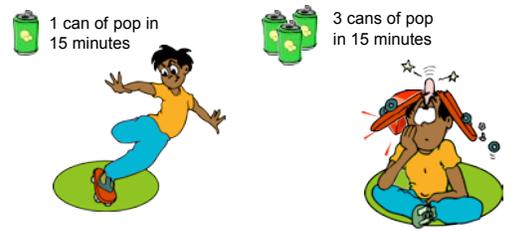
### Duration of Exposure



But **4 hours** of sun exposure might be very harmful indeed!

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### Dose/Response Relationship



1 can of pop in 15 minutes      3 cans of pop in 15 minutes

The larger the **dose**, the more extreme the **response** will be.

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### Individual Susceptibility



**Individual Susceptibility**

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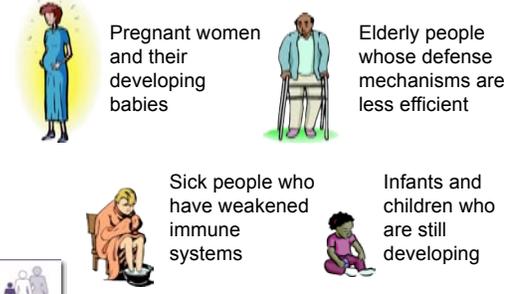
### Individual Susceptibility



Why are these people more likely to be harmed by exposure to a hazard than the man below?

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### Individual Susceptibility



Pregnant women and their developing babies

Elderly people whose defense mechanisms are less efficient

Sick people who have weakened immune systems

Infants and children who are still developing

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## Genes & Susceptibility



Your genes can also make you more or less susceptible to harm from an environmental hazard. For example, some people are more likely to get sick when they are exposed to certain kinds of pesticides.



## What are the risks & benefits?



## Risks & Benefits

What are the risks and benefits when grape growers use pesticides on their crops?



## Risks & Benefits

### BENEFITS

- No bugs!
- Better looking fruit that is more visually appealing
- Bigger crops so farmers can make more profit



### RISKS

- People ingest pesticides with the fruit and get sick
- Pesticides get into dirt and water
- Animals ingest pesticides and get sick



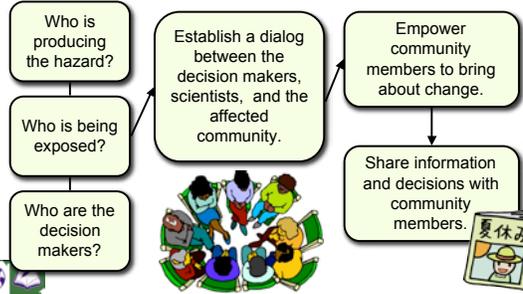
## What is environmental justice?



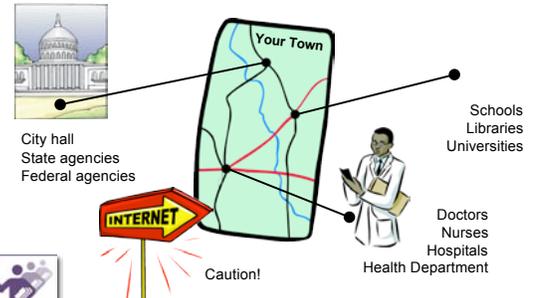
**Environmental Justice (EJ)** means that everyone has a right to live in an environment that doesn't make them sick, regardless of their race, culture, or income.



## The EJ Process



## Where can you go for information?



## How can you take action?



## Any Questions?



# History of the YNHC Project

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In September of 2000, the CEEH sponsored a statewide town meeting entitled Voices for Healthy Environments, Healthy Communities. This event gave community members a chance to discuss local environmental conditions that affect human health. It included an open microphone session, visual displays, presentations by community groups, and a series of focused workshops and discussion circles. CEEH staff collaborated with a wide range of community organizations and government agencies to assure that meaningful participation was available to all. Young people in particular were identified as a group that needed to be widely represented if the meeting was to succeed. Today's youth are, after all, tomorrow's decision makers.

In May 2000, while preparing for the meeting, CEEH staff asked thirty teachers participating in a workshop for their ideas on how to involve youth from around Washington State in the upcoming town meeting event. Two high school teachers, Jay Young and Nancy Sedlacek, suggested that this would be a perfect use of the new statewide K-20 videoconferencing network. They pointed out that it was nearly impossible for teachers and students to travel large distances to participate in events and that it would therefore be difficult to get meaningful involvement from any schools except those in the greater Seattle metropolitan area. Working together with these teachers, CEEH staff launched the YNHC project.

Four weeks before the town meeting was scheduled to take place, seven teachers from middle and high schools around the state attended a videoconference orientation during which they were introduced to the project materials and given an overview of the core concepts of environmental health and toxicology. The teachers represented a variety of subjects including social studies, English as a second language (ESL), science, and language arts. During the next month, the teachers helped their students identify and research community-based EHS research projects. Finally, on the first day of the town meeting event, student groups from each site presented their findings in a videoconference session attended by NIEHS Director Dr. Kenneth Olden, his staff, and other key EHS scientists. The project has now become a quarterly event for the CEEH.

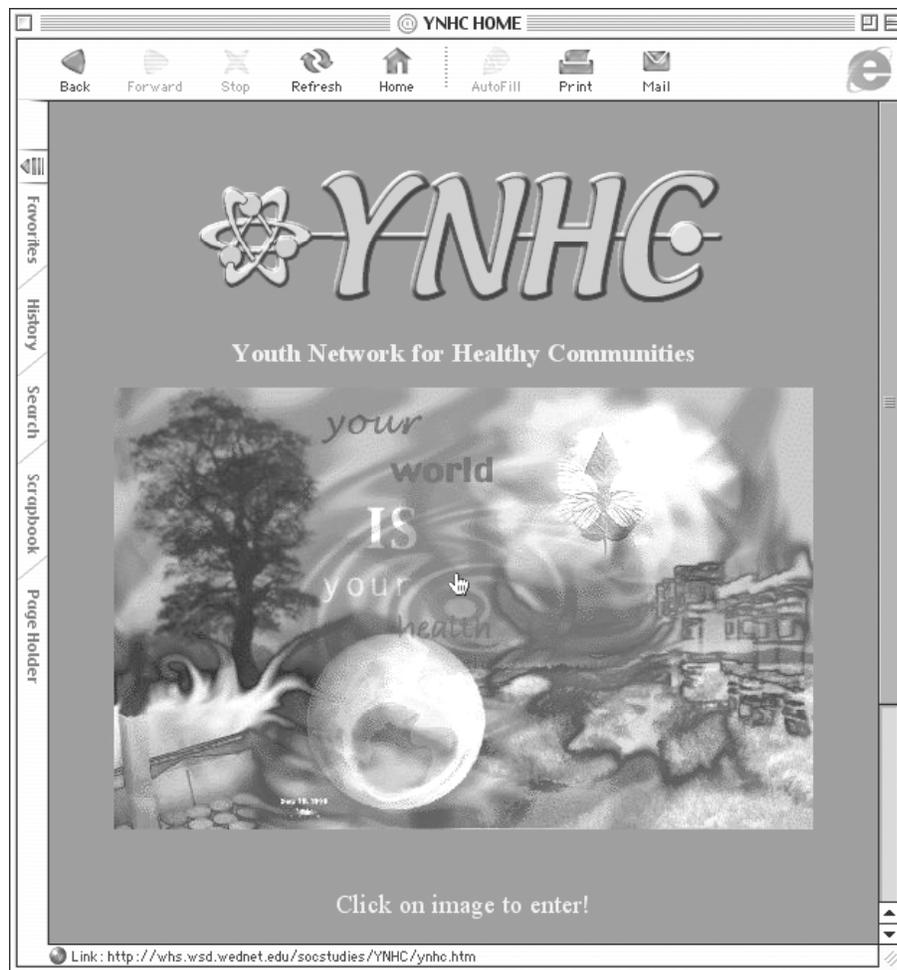
The materials developed to support the teachers and students include student project guidelines, research topic suggestions, hints for both teachers and students on how to successfully use the videoconferencing technology, resources for further study, and background materials on various EH topics.. The student project guidelines informally replicate the risk assessment and risk management process by emphasizing problem identification, toxicity assessment, exposure assessment, risk characterization and risk communication. The guidelines also explicitly discuss source bias and aim to develop a healthy skepticism on the part of the students, making science-based action, not activism, the desired endpoint of the students' work.

# The YNHC Web Site

Students at Wenatchee High School have worked cooperatively with project staff at the Center for Ecogenetics & Environmental Health to develop and launch the new YNHC web site. We hope the site will serve as a valuable resource for participating teachers and students. The site includes:

- Basic information about the project
- An interactive map of Washington showing past project participants
- A complete list of student projects to date
- Email access to teachers who have participated in past sessions
- Links to sponsoring organizations

VISIT US AT: <http://whs.wsd.wednet.edu/Faculty/Young/YNHC/ynhchome.htm>



## About the Sponsoring Organizations

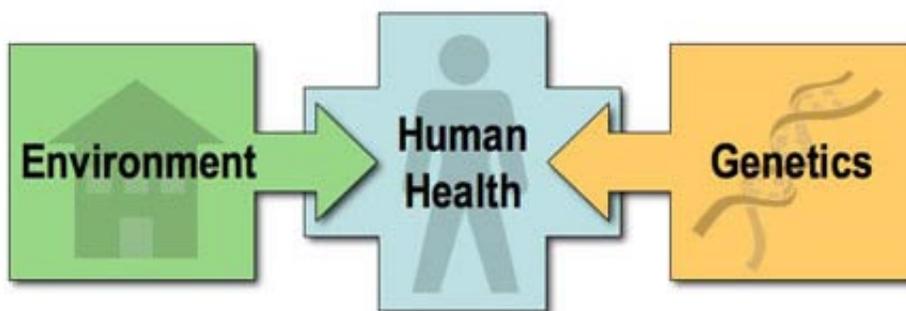
### Center for Ecogenetics and Environmental Health

Department of Environmental Health  
University of Washington



The Center for Ecogenetics and Environmental Health (CEEH) at the University of Washington provides administrative and technical support to 99 scientists who are working to understand the complex connections between genetics, human health, and the environment. The Center is supported by the National Institute of Environmental Health Sciences and is part of the Institute's EHS Core Center program.

Ecogenetics is the study of how genetics and environment interact to determine health. The graphic below illustrates this relationship.



Our scientists work in a variety of disciplines, but they all share a commitment to improving human health by reducing the burden of diseases such as cancer, chronic neurological diseases, cardiovascular and respiratory diseases, and chronic liver and kidney diseases. They believe that preventing and treating these diseases requires a better understanding of the gene-environment interactions that cause them. They also believe that they have a responsibility to involve the community to the greatest extent possible in their work and to consider the ethical, legal, and social implications of their research endeavors.

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

### National Institute of Environmental Health Sciences

The National Institute of Environmental Health Sciences (NIEHS) is one of 27 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. Linda Birnbaum. The mission of the NIEHS is to reduce the burden of human illness and disability by understanding how the environment influences the development and progression of human disease.

**For more information, go to:** <http://www.niehs.nih.gov/>

# Introduction to Environmental Health

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Environmental health is the study of how environmental factors can harm human health and how to identify, prevent, and control these effects. The field concerns itself with:

- maintaining a safe supply of food and drinking water
- discovering the mechanisms of environmentally related diseases
- treating and disposing of solid and toxic wastes
- reducing air, water, food, and noise pollution
- controlling workplace hazards.

Environmental health gives first priority to people and their health and indirectly concerns itself with environmental quality and the health of ecosystems.

How important are environmental factors in human health? Environmental agents likely play a role in childhood asthma, adult respiratory diseases, and various cancers. In addition, there is accumulating scientific evidence linking environmental factors with some neurological diseases, such as Parkinson's disease, Alzheimer's disease, and Lou Gerhig's disease (amyotrophic lateral sclerosis, ALS).

Five out of every six people think such diseases are linked to environmental pollution and contamination, according to a 1999 survey by the Pew Charitable Trusts. The survey found that environmental health and public health were higher spending priorities than road construction, missile defense, and cutting taxes. Only education was viewed as more important.

"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

## How to Contact Us

Please feel free to contact any of the project staff listed below.

### **Teacher Organizers:**

Nancy Sedlacek, Yelm Extension School  
(360) 458-2002, nancy\_sedlacek@yws.wednet.edu

Jay Young, Wenatchee High School  
(509) 663-8117 (ext. 205), young.j@mail.wsd.wednet.edu

### **Center for Ecogenetics and Environmental Health, Education & Outreach Program Staff:**

Kelly Fryer Edwards, Community Outreach and Ethics Core (COEC) Director  
(206) 221-6622, edwards@u.washington.edu

Jon Sharpe, COEC Program Manager  
(206) 685-5333, jsharp@u.washington.edu

Dianne Botta, Research Scientist - YNHC Project Coordinator  
(206) 616-2645, diann@u.washington.edu

### **Videoconferencing Technical Contacts:**

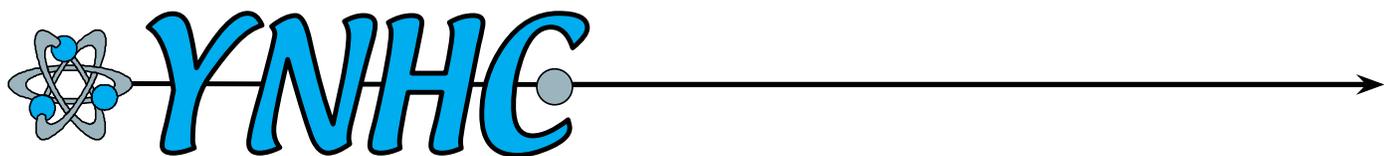
UW Videoconferencing: (206) 616-7250  
K20 Bridge: (888) 934-5553 (press option 1 and give conference ID#)

### **CEEH Mailing Address:**

CEEH-COEC  
University of Washington, DEOHS  
Box 354695  
Seattle, WA 98195-4695

**CEEH Fax Number:** (206) 685-4696

**CEEH Web Site:** <http://depts.washington.edu/ceeh/>



# Teacher Materials



# YNHC Teacher Guidelines

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Welcome to the Youth Network for Healthy Communities (YNHC) project!

Two Washington teachers who wanted to see the statewide K20 videoconference network put to good use created this project with support from faculty and staff at the University of Washington. The project began in fall of 2000 and is funded by the National Institute of Environmental Health Sciences.

The goal of the project is to train middle and high school teachers to help students research environmental health issues in their communities. The students then present their projects to university scientists and environmental health professionals at the University of Washington using videoconference technology. The teacher orientation is also conducted via videoconference.

As a participating teacher, you will receive:

- Experience using the K20 videoconference network
- A YNHC Teacher's Guide with handouts, resources, etc.
- An introductory project orientation via videoconference
- Substitute reimbursement for the day of the student presentation videoconference (if needed)
- A \$100 stipend to help purchase materials for your classroom
- A letter of thanks for your participation sent to your principal
- Certificates of achievement to distribute to students who participate

In exchange, you agree to:

- Locate your school technology person and arrange to use the videoconference equipment on the scheduled dates.
- Attend the orientation videoconference (with a few students if possible).
- Administer the **Student Pre-test** before you begin the project (optional).
- Use the **Student Introduction: Environmental Health** lesson and accompanying powerpoint presentation to introduce your students to the seven core concepts of environmental health.
- Use the materials included in this guide to help your students identify and research environmental health projects and locate reliable resources.
- Submit **Student Research Abstracts** to project staff at the UW at least two weeks before the student presentation session.
- Distribute **Videoconference Release Forms** to participating students, then collect and return them to project staff at UW.
- Bring one or more groups of students to the student presentation session to present their project(s). Each teacher will have approximately 15 minutes of "air time" to divide up as they see fit.
- Administer the **Student Post-test** after you have completed the videoconference, then compare the results to the **Student Pre-test** to assess your students' learning.
- Distribute **Student Evaluation Forms** to participating students, then collect and return them to project staff at UW.
- Complete and return the **Teacher Evaluation Form** to UW staff.

The materials in this Teacher's Guide should help you make this project a success. Handouts are included as samples only – a separate set of clean master copies is included in your introductory mailing. Good luck!



# YNHC Student Pre-Test (Teacher Key)

Student ID Number \_\_\_\_\_

**Instructions:** You are about to do begin a unit on environmental health. Please answer these questions the best you can. It will help us to understand how much you already know about environmental health at this time.

1. Which definition best describes **environmental health**?
  - A. The study of the health of the environment.
  - B. The study of how humans affect the health of the environment.
  - C. The study of how the environment affects human health.**
  - D. Both A and B
  
2. Which of the following is the best example of an **environmental health** issue?
  - A. A factory is releasing chemical wastes into a river and the fish are unhealthy.
  - B. People are getting sick from eating fish from a polluted river.**
  - C. An oil spill in the ocean harms the health of the sea bird population.
  - D. The water temperature is rising around a coral reef and the coral is dying
  
3. Ms. Lena Parvaz works in the field of **environmental health**. Which of the following is the most likely description of the type of work she does?
  - A. Ms. Parvaz studies how air pollution affects children with asthma.**
  - B. Ms. Parvaz gives children medications to treat their asthma.
  - C. Ms Parvaz studies how air pollution affects the rain forest.
  - D. All of the above
  
4. Which of the following situations is an example of **environmental justice**?
  - A. An environmental group sues a logging company to keep an old growth forest from being clear cut.
  - B. A police officer gives a ticket to a group of people for making too much noise and littering in a city park.
  - C. People from a low income neighborhood work together to shut down a polluting factory nearby.**
  - D. All of the above

(Continued on other side)

**Instructions:** Use the following information to answer numbers 5 through 10.



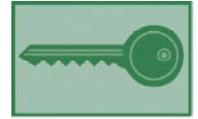
### **Pest-Be-Gone**

Jannelle enjoys her job at the Pest-Be-Gone Company. Every day, she sprays a chemical pesticide inside buildings to get rid of unwanted insects. While at work, she wears protective gloves, goggles and her regular clothes. When Jannelle gets home from work, she enjoys hugging both her one-year-old nephew, Max, and her twelve-year-old niece, Mary.

Lately, Max has not been feeling well. Jannelle is worried that Max might be getting sick from the chemical pesticide she uses all day at her job. Mary is healthy.

5. Through which **route** is Jannelle most likely to be exposed to the pesticide?
- A. Dermal absorption (through the skin of into the skin).
  - B. Inhalation (through breathing).**
  - C. Ingestion (through eating or drinking).
  - D. None of the above
6. How could Max be **exposed** to the pesticide that his aunt uses at work?
- E. Max might not cover his mouth when he coughs.
  - F. Max might touch the clothes his aunt wore at work.**
  - G. Max might kiss his aunt after she has showered.
  - H. All of the above
7. If Max is being exposed to the pesticide that his aunt works with, he is getting a **dose** of the pesticide. Choose the definition that best describes his dose.
- A. The amount of the pesticide that Max comes in contact with.
  - B. How often Max is around the pesticide.
  - C. The amount of the pesticide that enters Max's body.**
  - D. All of the above
8. Jannelle's niece and nephew are exposed to the pesticide, but only Max is getting sick. Why is Max more **susceptible** to getting sick from the pesticide than his sister is?
- A. Max is a boy and Mary is a girl.
  - B. Max is younger than Mary.**
  - C. Max needs more sleep than Mary.
  - D. All of the above
9. Some pesticides have a higher **toxicity** than other pesticides. What does "toxicity" mean?
- A. Some pesticides are more dangerous to human health.**
  - B. Some pesticides don't dissolve in water.
  - C. Some pesticides have a stronger smell.
  - D. All of the above.

# Student Introduction: Environmental Health (Teacher Key)



Teacher Key

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

## Introduction Overview

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/iehmisp/>.

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.

## Procedure

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

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

## Student Assessment



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## 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.

**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:**

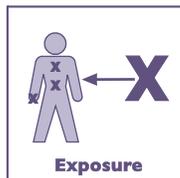
The length of time you are in direct contact with a hazard.

**Frequency of Exposure:**

How often you are in direct contact with a hazard.

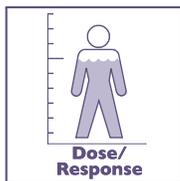
Toxicity Rating	Word and symbols that appear on product's label	Approximate amount need to kill an average size adult
1 – Highly Toxic	DANGER or POISON 	A few drops to one teaspoon
2 – Moderately Toxic	WARNING 	One teaspoon to one ounce
3 – Slightly Toxic	CAUTION	More than one ounce
4 – Not Toxic	none	

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.**

# Successful Videoconferencing - for Teachers

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Here are a few hints to make sure that you and your students get the most out of your videoconferencing experience.

1. Dial-up numbers and a conference ID# will be provided to your tech person, and it is a good idea to have this information with you in the conference room. In case of difficulties connecting, you can call the K20 bridge operator at (888) 934-5553 (press option 1 and give conference ID#) or call the UW host site directly at (206) 616-7250.
2. Be sure to find out your district policy on the need for permission slips for students to participate in video conferencing, creating a video and web site publication. Please also have the permission slips for each participating student for the YNHC records.
3. Some logistics:
  - If possible, go through the connection procedure at your site ahead of time.
  - Dial-in for the video conferences usually begins up to a half hour before the actual conference. Be sure to schedule the equipment and room accordingly.
  - Ascertain that all the equipment your students need for their presentation is available at the videoconference site, such as a computer for showing PowerPoint, a VCR for a video, etc.
  - Make sure you or a student can run all equipment you will need for the conference.
  - Consider signage that indicates where you are located. Students can make this, or your site may already have it.
  - Plan seating and speaker table so it fits the equipment at your site.
  - Be sure to always turn off your microphone whenever it is not in use.
  - Advise students to have a "Plan B" for their presentation in case the first plan doesn't work!
  - Remember to let your students do most of the talking. You may introduce them, but let them take it from there.
  - It is a good idea to remain in the room with the students during the entire conference.

Be sure to have this book with you at the conferences as it has phone numbers in case you need help!



# YNHC Teacher Evaluation Form

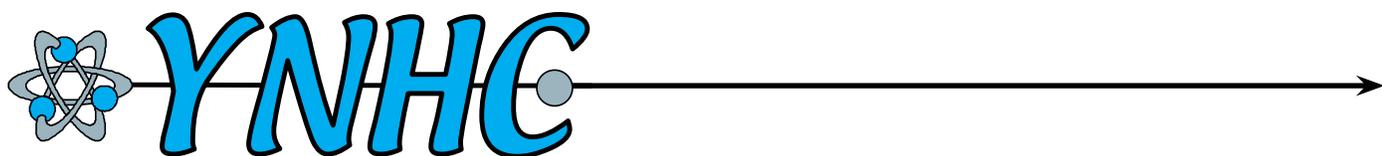
Thank you in advance for taking the time to answer the following questions regarding the environmental health video conference in which you took part. Your comments will help us plan and improve future video conferences.

1. Was the Teacher's Guide useful? What would you add or delete?
  
2. Was the Orientation Conference helpful? What would you add or delete?
  
3. Was the preparation time between the orientation and the student presentation session reasonable?
  
4. Is there any other support you would have liked to have had during this project? Did you feel comfortable with this process (training/orientation and videoconference)?
  
- 4b. Please list the specific lessons and activities you did with students as part of this project:
  
5. Did this work well as a process/product for your class?
  
6. How many of your students were involved in this project, including those who may not have actually participated in the culminating videoconference?
  
- 6b. How many hours of both in class and out of class time do you think your students spent on this project?

(continued on other side)

7. Was the time allotted to your students for their presentations sufficient? Should they have had more or less time to share their findings?
  
8. What did you like best or find most useful about the project?
  
9. What did you like least or find least useful about the project?
  
10. Do you think you will incorporate environmental health concepts into your teaching in the future?
  
11. What advice would you give future participants?
  
12. Please rate this project OVERALL on the scale below:  

Very Poor	Poor	Good	Excellent	Outstanding
1	2	3	4	5
  
13. Additional comments?
  
  
14. Please list any useful web sites or other resources that you or your students found.



# Student Materials



# YNHC Student Pre-Test

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Student ID Number \_\_\_\_\_

**Instructions:** You are about to do begin a unit on environmental health. Please answer these questions the best you can. It will help us to understand how much you already know about environmental health at this time.

1. Which definition best describes **environmental health**?
  - A. The study of the health of the environment.
  - B. The study of how humans affect the health of the environment.
  - C. The study of how the environment affects human health.
  - D. Both A and B
  
2. Which of the following is the best example of an **environmental health** issue?
  - A. A factory is releasing chemical wastes into a river and the fish are unhealthy.
  - B. People are getting sick from eating fish from a polluted river.
  - C. An oil spill in the ocean harms the health of the sea bird population.
  - D. The water temperature is rising around a coral reef and the coral is dying
  
3. Ms. Lena Parvaz works in the field of **environmental health**. Which of the following is the most likely description of the type of work she does?
  - A. Ms. Parvaz studies how air pollution affects children with asthma.
  - B. Ms. Parvaz gives children medications to treat their asthma.
  - C. Ms Parvaz studies how air pollution affects the rain forest.
  - D. All of the above
  
4. Which of the following situations is an example of environmental justice?
  - A. An environmental group sues a logging company to keep an old growth forest from being clear cut.
  - B. A police officer gives a ticket to a group of people for making too much noise and littering in a city park.
  - C. People from a low income neighborhood work together to shut down a polluting factory nearby.
  - D. All of the above

(Continued on other side)

**Instructions:** Use the following information to answer numbers 5 through 10.



### **Pest-Be-Gone**

Jannelle enjoys her job at the Pest-Be-Gone Company. Every day, she sprays a chemical pesticide inside buildings to get rid of unwanted insects. While at work, she wears protective gloves, goggles and her regular clothes. When Jannelle gets home from work, she enjoys hugging both her one-year-old nephew, Max, and her twelve-year-old niece, Mary.

Lately, Max has not been feeling well. Jannelle is worried that Max might be getting sick from the chemical pesticide she uses all day at her job. Mary is healthy.

5. Through which route is Jannelle most likely to be exposed to the pesticide?
  - A. Dermal absorption (through the skin of into the skin).
  - B. Inhalation (through breathing).
  - C. Ingestion (through eating or drinking).
  - D. None of the above
  
6. How could Max be exposed to the pesticide that his aunt uses at work?
  - E. Max might not cover his mouth when he coughs.
  - F. Max might touch the clothes his aunt wore at work.
  - G. Max might kiss his aunt after she has showered.
  - H. All of the above
  
7. If Max is being exposed to the pesticide that his aunt works with, he is getting a dose of the pesticide. Choose the definition that best describes his dose.
  - A. The amount of the pesticide that Max comes in contact with.
  - B. How often Max is around the pesticide.
  - C. The amount of the pesticide that enters Max's body.
  - D. All of the above
  
8. Jannelle's niece and nephew are exposed to the pesticide, but only Max is getting sick. Why is Max more susceptible to getting sick from the pesticide than his sister is?
  - A. Max is a boy and Mary is a girl.
  - B. Max is younger than Mary.
  - C. Max needs more sleep than Mary.
  - D. All of the above
  
9. Some pesticides have a higher toxicity than other pesticides. What does "toxicity" mean?
  - A. Some pesticides are more dangerous to human health.
  - B. Some pesticides don't dissolve in water.
  - C. Some pesticides have a stronger smell.
  - D. All of the above.

# Student Introduction: Environmental Health



Student Handout

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.

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**Hazard:**  
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**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.

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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.

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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.

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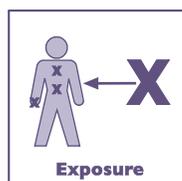
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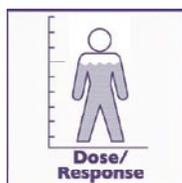
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**Dose/Response**

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

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**Community Resources and Action**

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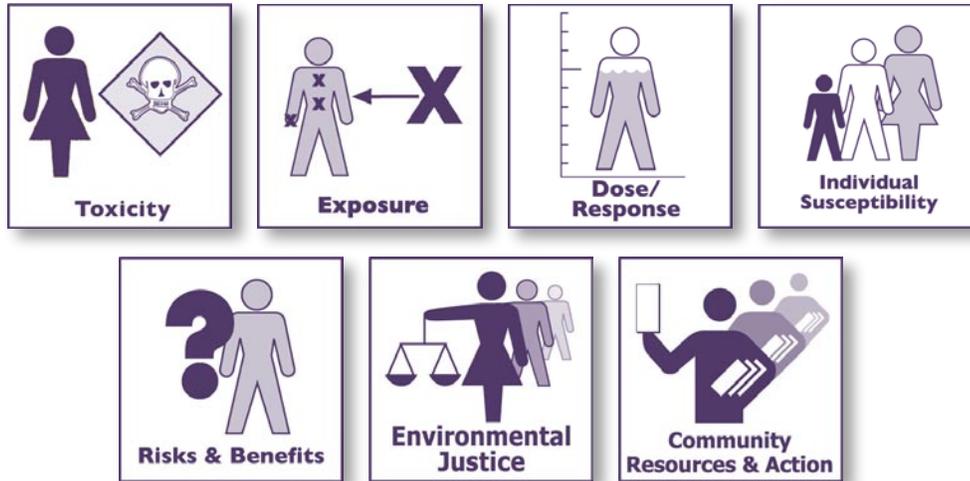
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1. Name one product that can be found in your home that might be considered to be highly or moderately toxic.
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3. Explain how the concept of “exposure” is different from the concept of “dose.”
4. Pick four vocabulary words from the margin on the previous pages and use each one in a complete sentence.

# YNHC Student Research Guidelines

## Step by Step Instructions for a Successful Presentation

1. Review the **Student Introduction: Environmental Health** lesson and make sure you understand the seven core concepts of environmental health:



2. Identify the community and environmental health issue you will be researching.
3. Use the questions below, as well as any other materials provided to you by your teacher, to guide your research and prepare your presentation.
4. Using the **Student Research Abstract Instructions**, prepare an abstract and have your teacher submit it to the project organizers for review. This needs to be done at least two weeks before the videoconference!
5. If you will be participating in the videoconference and appearing on camera, complete the **Videoconference Release Form** that your teacher gives you and return it prior to the session.
6. Practice, practice, practice before the videoconference session!
7. The day of the session, relax and have fun presenting your research to the panel of experts and other students from around the state! When you're not presenting, use the **Presentation Checklist** to take notes during the other presentations.

## Questions to Guide your Research

1. Who is your target community?
2. What community-based environmental health issue have you chosen to research? What is the actual health hazard (e.g. lead, polluted water, loud noises, carbon monoxide)?

3. Why are you concerned about this issue? How does it affect you, your family, or your community?
4. What resources will you use to learn more about this issue? Do you have a good mix of reliable web sites, experts to call and speak with, books and articles to read, etc.? Don't limit your research to online sources only.
5. What is the source of the health hazard (e.g. air, water, food)? How are people being exposed to it?
6. Through what route(s) of exposure does the hazard get into the body?
7. What specific health problems result from exposure to the hazard?
8. Who is most at risk of getting sick as a result of exposure to the hazard?
9. What are the various viewpoints about the problem? How do different groups (i.e. government agencies, industry representatives, community advocates, workers, health care workers, etc.) feel about the problem?
10. What is already being done about it?
11. What knowledge (data, surveys, brochures, hotlines, etc.) is still needed to address the problem?
12. What action still needs to take place to manage the problem and protect human health?
13. How can you effectively communicate everything that you've learned in a short videoconference presentation? Consider using creative ways to communicate your ideas such as skits, debates, or mock TV news segments. What visual aids will be most useful (posters, graphs, photographs, overheads\*)? What information must be included and what can be omitted?
14. Be prepared to tell your audience HOW you did your research. What sources did you use? What roadblocks did you encounter? What additional research could you do or action could you take?

\*Make sure to ask your teacher what equipment (VCR, computer, overhead projector, etc.) will be available for you to use at your local videoconference facility.

## YNHC Research Topic Suggestions

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This list is meant as inspiration – it is only a sampling of possible topics. The important thing is to find an environmental health topic that is interesting to you and important to your local community!

- Local hazardous waste sites
- Indoor air quality in your school buildings
- Water quality in a local stream, lake, etc.
- Toxic chemicals in the food chain
- Bioaccumulation of heavy metals in seafood
- Human health effects of waste incineration
- Environmental justice issues
- Children's environmental health issues
- Animal waste and water pollution
- Agricultural chemicals and human health
- Human health risks of exposure to UV rays
- Lead exposure in children
- Pesticide residues on former agricultural sites
- Fetal alcohol syndrome
- Human health effects of nuclear radiation exposure
- Biotechnology in agriculture (genetic engineered foods)
- Household chemicals – are they dangerous to your health?
- Uses of animal toxins
- Uses of plant toxins
- E Coli and public health
- Cancer clusters
- Health and safety issues young workers face on the job
- Tobacco use and human health

Specific projects researched by students in the past include:

- Health hazards from diesel power generator emissions
- Health impacts of the proposed Crown Jewel Gold Mine
- Heavy metals in the Coeur d'Alene watershed
- Safety of reclaimed water
- Human health effects of wildfires
- Illegal dumping
- Health and safety implications of meth labs
- Migrant farmworkers at risk from pesticides
- Possible health effects of MSG
- Water quality in Lake Osoyoos
- Water quality in the Wapato school district
- Technology and its dangers
- Fetal Alcohol Syndrome
- Latex allergies
- Alar and apples
- Tabacco use and human health
- Indoor air quality and molds



# Student Research Abstract Instructions

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All students or student groups participating in the YNHC videoconference are required to prepare and submit a brief abstract of their research at least one week prior to the event. This abstract allows us at the University of Washington an opportunity to recruit experts for the panel who have specialized knowledge in the topics being presented. It also helps us ensure that students are on the right track prior to the presentations and provides valuable experience with the real world task of abstract writing. One abstract should be submitted for each topic that will be presented during the videoconference.

The abstract should be **no more than 200 words long** and should answer the following questions:

1. What is your environmental health topic?
2. What group or groups of people does it affect?
3. How does it affect them?
4. Why is it important to you?
5. What is one source of information that you plan to use?
6. Is there any information you are having trouble finding?
7. How will you present your information at the videoconference (e.g. skit, newscast, mock interviews, artwork, posters, movie, etc.)

Please use the following format for your abstract:

TITLE OF THE PRESENTATION:

STUDENT NAME(S):

SCHOOL NAME:

ABSTRACT (200 word limit):

The abstracts must be submitted to Dianne Botta at least two weeks prior to the videoconference session. They can be sent as an email attachment, as hard copies, or faxed to:

Dianne Botta  
4225 Roosevelt Way NE, Suite 100  
Seattle, WA 98105

Email: [diann@u.washington.edu](mailto:diann@u.washington.edu)  
Fax: 206-685-4696

# Sample Student Research Abstracts

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The following abstracts are based on actual past projects presented by students.

## **SAMPLE ABSTRACT #1**

**TITLE:** Fishing for PCBs on the Columbia River

Our topic is the effects of Polychlorinated biphenyls (PCBs) on people due to exposure from the Columbia River. Anybody who swims in the river or eats food from the river is at risk. The possible effects include skin problems, such as rashes, liver damage, headache, cough, sores, and problems with brain development in children whose mothers were exposed during pregnancy. This is an important problem because of how little is known about it and how many potential bad health affects there are. The topic and some of our information came from a recent article in our town's local paper, The Columbian. Other information came from the EPA website. We are also hoping to get helpful information from a questionnaire that we sent off to experts from the City of Camas and the Clark County Health Department. We are having some trouble finding information about the specific health effects of PCBs on people. For our presentation, we will do a parody of a fishing show in which we will pretend to fish while talking about the bad effects that PCBs can have on people. We will also advise people not to swim in the river or eat fish caught from it. (200 words)

## **SAMPLE ABSTRACT #2**

**TITLE:** A Scary Story about Lead

We are researching the dangers of lead. Lead is a heavy, soft, bluish-gray metal that occurs naturally in the rocks and soil of the earth's crust. It has also been mined and used by humans for thousands of years, and is very toxic when it gets into the body. When it is inhaled or swallowed, it can cause damage to the nervous system as well as other effects. Lead is bad for everyone, but lead poisoning is particularly dangerous for children and pregnant women. Lead can be found in many places, such as older homes, plumbing systems, and old farmland. We are interested in researching this topic because we are worried that there might be lead in our school's drinking water and in the play areas around the school. So far we have found a lot of very good information from government web sites, but we don't know how we will find out if there is lead in our school's drinking water or in the dirt around the school. We plan to present the information in a live skit done in the style of a horror movie. (187 words)

## **1. Did the presenters:**

- Include a detailed description of the community being researched?
- Clearly state what environmental health issue they were researching?
- Give an overview of their environmental health issue?
- Describe the substance or substances that are potentially hazardous, including why they are hazardous and whom they might effect?
- Describe how various groups in the community feel about the issue?
- Suggest a possible solution to the issue?
- Summarize where they got their information?

## **2. Did the presenters cover how each of the following environmental health core concepts relates to their topic or issue?**

- Toxicity
- Exposure
- Dose/Response
- Individual Susceptibility
- Risks & Benefits
- Environmental Justice
- Community Resources & Action

## **3. What did you like best about this presentation?**

## **4. What could have been done to improve the presentation?**



# Successful Videoconferencing - for Students

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Here are a few hints to make sure that you get the most out of your videoconferencing experience:

- You should assume you can be seen “on camera” at all times during the conference, even when you are not aware of it.
- Remember to turn on the microphone to talk and to turn it off when not using it. If this is not done, the conference becomes a sort of echo chamber.
- Do not eat/drink during the session – at least if you are in viewing range of the camera at your site. (Unless you want a few hundred people to see you doing this!)
- For the presentation, be sure to include visuals such as charts, graphs, pictures, posters, video clips, a brief PowerPoint. This can really “jazz up” your presentation. Just keep in mind that what you use may be limited by the equipment available at your video conference site. Check with your teacher.
- Be sure any visuals can be seen during the video conference itself. If you are including a video clip, be sure it is clear and easily understood. Please limit any PowerPoint show to only a part of the presentation, not the entire presentation.
- Consider a creative approach to presenting your project, i.e.: role-playing or skits.
- Be prepared and have the timing down. Practice is incredibly important!
- It’s a good idea to videotape your presentation (for your use only) as you practice so that you can see how it will look to others.
- Be ready to answer questions about your presentation and topic that may be asked by the UW panel and other school teams.
- During your presentation, you are welcome to ask the panel at the UW questions regarding your topic. This may be especially useful if you could not find answers in your research.
- You are encouraged to ask other student teams questions about their presentations. Taking notes as they present may be helpful.
- Have fun and know your voice is being heard!

# YNHC Student Videoconferencing Release Form

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Dear Parent(s) or Guardian(s),

Your child has been invited to participate in the Youth Network for Healthy Communities (YNHC), a statewide educational project. Classes participating in YNHC research environmental health issues in their local communities and present their findings live, via videoconference, to scientists and professionals at the University of Washington in Seattle.

In order for your child to participate in this project, we ask you to take a moment to review and sign this Release Form. If you have questions, please contact me directly. Thank you for your time.



Dianne Botta, YNHC Project Coordinator  
NIEHS Center for Ecogenetics & Environmental Health  
University of Washington  
phone: (206) 616-2645  
email: diann@u.washington.edu

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I, the undersigned do hereby give and grant permission for my child to participate in the Youth Network for Healthy Communities project sponsored by The NIEHS Center for Ecogenetics and Environmental Health (CEEH) at the University of Washington. By signing this form, I agree to allow my child to participate in a statewide videoconference as part of a school environmental health project. This videoconference will be taped and the tape may be used for some or all of the following purposes:

- As part of informational presentations at regional or national teachers associations meetings
- As part of reports prepared for funding organizations
- For various CEEH related events and publications

I understand that still photographs and/or video clips of my child participating in this project may also be used in not for profit promotional materials such as newsletters, reports, and web sites. Only the child's first name would accompany his/her image.

Student's Full Name \_\_\_\_\_

Student's Age \_\_\_\_\_

Student's School \_\_\_\_\_

Today's Date \_\_\_\_ / \_\_\_\_ / \_\_\_\_

Name of Parent or Legal Guardian \_\_\_\_\_

Parent/Legal Guardian's Signature \_\_\_\_\_

Street Address \_\_\_\_\_

City, State, Zip code \_\_\_\_\_

Phone ( \_\_\_\_ ) \_\_\_\_ -- \_\_\_\_\_

# YNHC Student Post-Test

Student ID Number \_\_\_\_\_

**Instructions:** You have just completed a unit on environmental health. Please answer these questions the best you can. It will help us to understand how much you have learned about environmental health.

1. Which definition best describes **environmental health**?
  - A. The study of the health of the environment.
  - B. The study of how humans affect the health of the environment.
  - C. The study of how the environment affects human health.
  - D. Both A and B
  
2. Which of the following is the best example of an **environmental health** issue?
  - A. A factory is releasing chemical wastes into a river and the fish are unhealthy.
  - B. People are getting sick from eating fish from a polluted river.
  - C. An oil spill in the ocean harms the health of the sea bird population.
  - D. The water temperature is rising around a coral reef and the coral is dying
  
3. Ms. Lena Parvaz works in the field of **environmental health**. Which of the following is the most likely description of the type of work she does?
  - A. Ms. Parvaz studies how air pollution affects children with asthma.
  - B. Ms. Parvaz gives children medications to treat their asthma.
  - C. Ms Parvaz studies how air pollution affects the rain forest.
  - D. All of the above
  
4. Which of the following situations is an example of environmental justice?
  - A. An environmental group sues a logging company to keep an old growth forest from being clear cut.
  - B. A police officer gives a ticket to a group of people for making too much noise and littering in a city park.
  - C. People from a low income neighborhood work together to shut down a polluting factory nearby.
  - D. All of the above

(Continued on other side)

**Instructions:** Use the following information to answer numbers 5 through 10.



### **Pest-Be-Gone**

Jannelle enjoys her job at the Pest-Be-Gone Company. Every day, she sprays a chemical pesticide inside buildings to get rid of unwanted insects. While at work, she wears protective gloves, goggles and her regular clothes. When Jannelle gets home from work, she enjoys hugging both her one-year-old nephew, Max, and her twelve-year-old niece, Mary.

Lately, Max has not been feeling well. Jannelle is worried that Max might be getting sick from the chemical pesticide she uses all day at her job. Mary is healthy.

5. Through which route is Jannelle most likely to be exposed to the pesticide?
  - A. Dermal absorption (through the skin of into the skin).
  - B. Inhalation (through breathing).
  - C. Ingestion (through eating or drinking).
  - D. None of the above
  
6. How could Max be exposed to the pesticide that his aunt uses at work?
  - E. Max might not cover his mouth when he coughs.
  - F. Max might touch the clothes his aunt wore at work.
  - G. Max might kiss his aunt after she has showered.
  - H. All of the above
  
7. If Max is being exposed to the pesticide that his aunt works with, he is getting a dose of the pesticide. Choose the definition that best describes his dose.
  - A. The amount of the pesticide that Max comes in contact with.
  - B. How often Max is around the pesticide.
  - C. The amount of the pesticide that enters Max's body.
  - D. All of the above
  
8. Jannelle's niece and nephew are exposed to the pesticide, but only Max is getting sick. Why is Max more susceptible to getting sick from the pesticide than his sister is?
  - A. Max is a boy and Mary is a girl.
  - B. Max is younger than Mary.
  - C. Max needs more sleep than Mary.
  - D. All of the above
  
9. Some pesticides have a higher toxicity than other pesticides. What does "toxicity" mean?
  - A. Some pesticides are more dangerous to human health.
  - B. Some pesticides don't dissolve in water.
  - C. Some pesticides have a stronger smell.
  - D. All of the above.

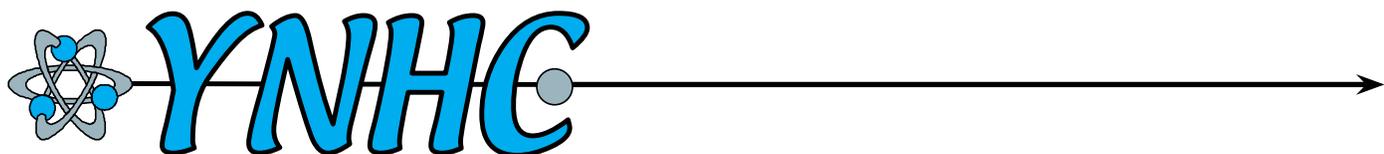
# YNHC Student Evaluation Form

Thank you for taking the time to answer the following questions regarding the Youth Network for Healthy Communities project. Your comments will help us plan and improve future videoconferences.

1. What did you like best or find the most useful about the conference?
2. What advice would you give future participants?
3. What would you have liked to see included - or done differently – in the videoconference?
4. Was the preparation time reasonable? (There were about five weeks between the teacher orientation and the presentation.)
5. Were the project guidelines clear and useful?
6. Was the amount of time allotted for your presentation reasonable?
7. Was the 2 hour videoconference session too long? Too short? Just right?
8. Please rate this project overall on the scale below:

Very Poor	Poor	Good	Excellent	Outstanding
1	2	3	4	5





# Resources & Further Information

A PDF version of this Teacher's Guide with clickable hyperlinks is available for your convenience. To download, please go to [http://depts.washington.edu/ceeh/education\\_ynhc.html](http://depts.washington.edu/ceeh/education_ynhc.html)



# Environmental Health Web Sites

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## Government Sponsored Sites

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

**The UW Center for Ecogenetics and Environmental Health.** This site features a variety of curriculum resources, fact sheets, and useful links for those interested in environmental health, ecogenetics, and bioethics.

<http://www.niehs.nih.gov/science-education/>

**NIEHS Environmental Health Science Education Pages.** This is a great place to start for students and teachers interested in learning more about environmental health. It includes links to on-line curricula, background information about a variety of topics, and links to pages designed specifically for students.

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

**ToxTown.** A great, user-friendly site where you can visit virtual places (city, town, port, farm, and US/Mexico border) and learn about the environmental health hazards that are found there.

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

**EPA Teaching Center.** 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://sis.nlm.nih.gov/enviro.html>

**The National Library of Medicine (NLM) Environmental Health and Toxicology Pages.** Great source for detailed background information on a variety of topics and substances. Includes a set of great online toxicology tutorials.

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

**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.epa.gov/superfund/kids/>

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

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

**The National Centers for Disease Control A-Z Index.** This site can be searched for the latest information on any health topic.

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

**Seattle and King County Public Health.** This site provides fact sheets, reports, and guidelines about toxic hazards and public health issues in Seattle and King County.

<http://phpartners.org/environmentalhealth.html>

**Partners in Public Health - Environmental Health Pages.** This site includes a comprehensive list of useful links to a variety of agencies and associations, substance-based resources, and professional associations.

## Non-Profit Organization Sites

<http://toxipedia.org/>

**Toxipedia.** Toxipedia is a wiki-website created to bring experts and lay people together to lessen the information gap between those with knowledge on environmental and public health and those that need the information to lead healthier lives.

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

**A Small Dose of Toxicology.** This web site has great information about the history of toxicology, the precautionary principle, nanotechnology, and ethical issues related to environmental health. You can download various PowerPoint presentations here, as well as access a number of resources in Spanish.

<http://www.scorecard.org>

**Scorecard.** Go to this site and type in your zip code to get detailed information about who is polluting your neighborhood.

<http://www.watoxics.org>

**Washington Toxics Coalition.** A Seattle-based non-profit organization dedicated to protecting public health and the environment by eliminating toxic pollution. The site includes news, updates on relevant legislative efforts, and activism opportunities.

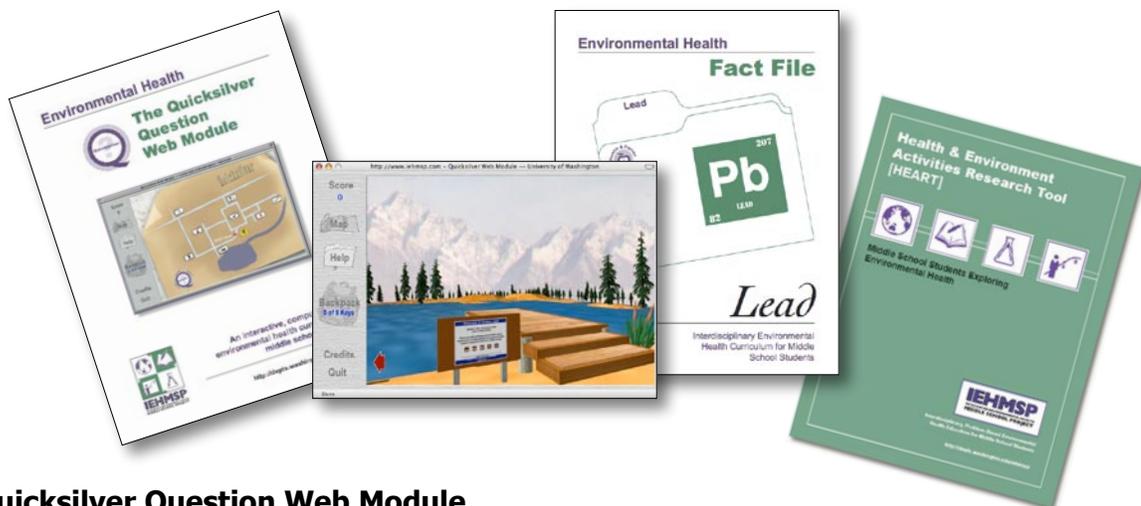
<http://www.healthandenvironment.org/>

**The Collaborative on Health and the Environment (CHE).** A diverse network of more than 3000 individual and organizational Partners in 45 countries and 48 states, CHE is working collectively to advance knowledge and effective action to address growing concerns about the links between human health and environmental factors.

The screenshot shows the homepage of the Center for Ecogenetics and Environmental Health (CEEH) at the University of Washington. The page features a navigation menu on the left with links to HOME, About the CEEH, CEEH Research, Ethics & Research, Community Partners, K-12 Education, CEEH Membership, Pilot Projects, and Events & Archive. The main content area is titled "Genetics + Environment = Health" and includes a diagram showing three interconnected boxes: Environment (green), Human Health (blue), and Genetics (yellow). Below the diagram, text explains that ecogenetics is the study of how genetics and environment interact to determine health. A paragraph states that scientists at CEEH work in various disciplines to improve human health by reducing the burden of diseases such as cancer, chronic neurological diseases, cardiovascular and respiratory diseases, and chronic liver and kidney diseases. They believe that preventing and treating these diseases requires a better understanding of the gene-environment interactions that cause them. They also believe that they have a responsibility to...

The screenshot shows the homepage of the website "A Small Dose of...". The page features a navigation menu on the left with links to Home, Toxicology, Precautionary Principle, Ethical Considerations, History of Toxicology, Nanotechnology, Teaching Resources, Author Biography, and This I Believe. The main content area is titled "Learn About the Health Effects of Common Chemicals" and includes a section for "Toxipedia - connecting science and people" with a link to www.toxipedia.org. There are also sections for "Explore the book A Small Dose of Toxicology" and "Visit Milestones and Discoveries in Toxicology". The page is designed with a blue and white color scheme and includes various images and text boxes.

# Environmental Health Curricula



## The Quicksilver Question Web Module

Publisher: Center for Ecogenetics and Environmental Health

Grade Level: 6 - 8

Format: Online interactive game

WWW: [http://depts.washington.edu/ceeh/education\\_quicksilver.html](http://depts.washington.edu/ceeh/education_quicksilver.html)

Description: This web-based interactive curriculum introduces students to the connections between historic gold mining, mercury contamination, fish consumption and human health. Students explore the fictional town of Quicksilver, Washington searching for a series of key documents that will help them decide if fish from the local lake are safe to eat. A series of in-class extension activities are available for teachers in a variety of subject areas.

## The Environmental Health Fact File: LEAD

Publisher: Center for Ecogenetics and Environmental Health

Grade Level: 6 - 8

Format: PDF document

WWW: [http://depts.washington.edu/ceeh/education\\_resources.html](http://depts.washington.edu/ceeh/education_resources.html)

Description: A collection of integrated lesson plans designed to introduce middle school students to the topic of lead and its effects on human health. This curriculum provides EALR aligned lesson plans to teachers in a variety of subjects. At least two lessons are provided for each subject. The lessons are designed to be stand alone units, allowing teachers to mix and match lessons and present them in any order. Resource materials are also included to help school librarians who are facilitating student research projects. This Fact File is also a valuable resource for school nurses, out of school programs, and parents.

## The Environmental Health Fact File: ASTHMA

Publisher: Center for Ecogenetics and Environmental Health

Grade Level: 6 - 8

Format: PDF document

WWW: [http://depts.washington.edu/ceeh/education\\_resources.html](http://depts.washington.edu/ceeh/education_resources.html)

Description: A collection of integrated lesson plans designed to introduce middle school students to the topic of asthma and its effects on human health. This curriculum provides EALR aligned lesson plans to teachers in a variety of subjects. At least two lessons are provided for each subject. The lessons are designed to be stand alone units, allowing teachers to mix and match lessons and present them in any order. Resource materials are also included to help school librarians who are facilitating student research projects. This Fact File is also a valuable resource for school nurses, out of school programs, and parents.

### **The Health & Environment Activities Research Tool (HEART)**

Publisher: Center for Ecogenetics and Environmental Health

Grade Level: 6 - 8

Format: PDF document

WWW: [http://depts.washington.edu/ceeh/education\\_resources.html](http://depts.washington.edu/ceeh/education_resources.html)

Description: A collection of worksheets and resources that helps teachers engage their students in locally relevant environmental health research projects. These inquiry-based materials provide the scaffolding necessary for students to successfully identify and investigate how things in their environment impact their health.

### **The Youth Network for Healthy Communities (YNHC)**

Publisher: Center for Ecogenetics and Environmental Health

Grade Level: 6 - 12

Format: Videoconference network with dedicated classroom resources

WWW: [http://depts.washington.edu/ceeh/education\\_ynhc.html](http://depts.washington.edu/ceeh/education_ynhc.html)

Description: YNHC is a video conference series that gives middle and high school teachers in Washington state the opportunity to work with students on environmental health issues in their communities. Students prepare projects and present their findings to experts at the University of Washington via the statewide K20 video conference network. Participating teachers receive a stipend and Teacher's Guide that includes student worksheets and classroom resources.

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

Publisher: NIEHS with BSCS and Videodiscovery

Grade Level: 7 & 8

Format: Printer materials with CD-ROM

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

Description: 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.)

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

Publisher: University of Miami, NIEHS

Grade level: 9 - 12

Format: Web site

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

Description: 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.

### **The SEPUP Modules**

Publisher: Lawrence Hall of Science, UC Berkeley

Grade Level: 6 - 9

Format: Print materials and science kits

WWW: <http://www.lawrencehallofscience.org/sepup/>

Description: 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)

### **Exploring Environmental Issues: Focus on Risk**

Publisher: Project Learning Tree

Grade Level: 9 - 12

Format: Print materials

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

Description: 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.)

### **Project Hydroville**

Publisher: Oregon State University, Corvallis, OR.

Grade Level: 7 - 12

Format: Print materials

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

Description: 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.

### **Thinkport: Environmental Health Connections**

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

Grade level: 6-8

Format: Web site

WWW: <http://www.thinkport.org/Career/connections/default.tp>

Description: 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.

### **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

WWW: <http://peer.tamu.edu/>

Description: This Integrative Curricula follows an adventure story in which the characters (young middle-school aged students) travel in time and space to different parts of the world where they are faced with various environmental health problems which they are required to solve.

### **Strive to Thrive**

Publisher: Miami University Center for Chemistry Education

Grade Level: 7-12

Format: Web site

WWW: <http://www.terrificscience.org/thrive>

Description: The Strive to Thrive! activity handbooks, written directly to the young teen audience, allow for learning and discovery that draws teens, their families, and friends into discussions on these pertinent topics. These handbooks are great resources for self-directed learning in informal settings such as science clubs, youth organizations, and after school programs.

## **University of Arizona Center for Toxicology Educational Activities and Curricula**

Publisher: University of Arizona (NIEHS supported)

Grade Level: 7 -12

Format: Web site

WWW: <http://coep.pharmacy.arizona.edu/curriculum/index.html>

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

## **Assessing Toxic Risk**

Publisher: NSTA Press

Grade Level: 7 -12

Format: Books (teacher and student editions)

WWW: <http://www.nsta.org/recommends/ViewProduct.aspx?ProductID=12835>

Description: 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.

## **Toxic Leak! An Event-based Science Module**

Publisher: Addison-Wesley

Grade Level: 7 -12

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

WWW: <http://www.ebsinstitute.com/ebs.ToxicLeak.html>

Description: 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.

## EH News and Information

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

**Environmental Health Perspectives** (EHP) is a monthly journal of peer-reviewed research and news on the impact of the environment on human health. EHP is published by the National Institute of Environmental Health Sciences and its content is free online.

<http://www.EnvironmentalHealthNews.org>

**Environmental Health News** is a news service to increase public understanding of emerging scientific links between environmental exposures and human health.

<http://www.OurStolenFuture.org>

The book **Our Stolen Future** brought world-wide attention to scientific discoveries about endocrine disruption and the fact that common contaminants can interfere with the natural signals controlling development of the fetus. This website tracks the most recent developments in this area of research.

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

**Protecting Our Health** is the science web site for the Collaborative on Health and the Environment, a non-profit organization dedicated to raising awareness of the impacts of the environment on human health.

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

**The Environmental Working Group.** A national watchdog organization that provides up-to-the-minute information on EH news.

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

**The Environmental Toxicology Newsletter** is one of the best newsletters for interesting environmental toxicology articles. Arrange for email notification of the latest issue.

### **In-depth Special Reports Related to Environmental Health**

<http://www.pbs.org/wgbh/pages/frontline/poisonedwaters/>

**Poisoned Waters** is an excellent PBS series investigating the state of America's waterways and how they may be impacting human health. The program is available on DVD and includes resources for use in classrooms.

[http://seattletimes.nwsourc.com/news/special/fear\\_fields.html](http://seattletimes.nwsourc.com/news/special/fear_fields.html)

**"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://seattlepi.nwsourc.com/specials/sound/index.asp>

**"Our Troubled Sound."** A series of great articles about pollution in the Puget Sound.

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

**"The Mining of the West."** A series of articles about mining and its environmental (and environmental health) impacts.

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

**"Arsenic's Legacy."** A short series about the health risks of arsenic contamination by Asarco smelters and older pesticides containing arsenic.

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

**"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.nwsource.com/methamphetamines/>

**"An epidemic in Our Midst: Methamphetamines."** This series won an award for best environmental health story.

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

**"Pipelines: America's hidden hazards."** Based on the pipeline explosion in Bellingham.

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

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

# Environmental Justice Resources

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

**Community Coalition For Environmental Justice.** This Seattle-based organization provides community education, speakers, activism opportunities, and an EJ library.

<http://www.ecoss.org>

**Environmental Coalition of South Seattle.** This group provides education and other resources on environmental health issues in south Seattle.

<http://www.clearcorps.org>

**Clearcorps** is 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.weact.org/>

**West Harlem Environmental ACTION (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.ejrc.cau.edu/>

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

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

**Center for Community Action and Environmental Justice.** Resource center for community groups working on EJ.

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

**The Environmental Justice and Health Union.** 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](http://www.rachel.org) (July 31, 2003 issue)