



ENVIRONMENTAL CLASS CURRICULUM

A high school level curriculum to introduce students to
environmental health issues and science.

Table of Contents

Lesson Plan Topic	Page
Curriculum Outline	2
Introduction	6
Flint Water Crisis	8
Lead and Hazard Assessment	10
Lead Toxicology	12
Microsoft Excel Walk Through	14
Lead Intervention	17
Water Contaminants and Treatment	22
Water Filters	25
NSF International and Bottled Water	27
Water Regulation and NRDC	29
Government and Policy	31
Environmental Justice	35
Ethics in Environmental Health	40
Risk Assessment	44
IEUBK Model	46
Health Communication	48
Final Project	50

CURRICULUM OUTLINE

Lesson	Lesson Goal	Activities	Material Needs
Introduction	Students will be introduced to environmental health, environmental hazards, and the role of environmental health professionals. TOTAL TIME: 1 hour	<ul style="list-style-type: none"> Toxic Release Inventory (TRI) Analysis Activity 	TRI Analysis activity <ul style="list-style-type: none"> Computers
Flint Water Crisis	Give thorough background and sequence of events involved in Flint Water Crisis and introduce students to public health emergency situations and government responsibility to prevent such situations. TOTAL TIME: 1 hour 50 minutes	<ul style="list-style-type: none"> Testing Lead In Water Flint Water Crisis Case Study Note Activity 	<ul style="list-style-type: none"> Lead in water test kit (can be found at most hardware stores: \$ 13.99)
Lead and Hazard Assessment	Introduce students to lead and teach them how to properly assess lead hazards based on different exposure routes. TOTAL TIME: 1 hour 30 minutes	<ul style="list-style-type: none"> How to check a lead service line activity (Demo) Lead paint demo activity 	LSL Demo: <ul style="list-style-type: none"> Key or screwdriver Refrigerator magnet Lead paint Demo: <ul style="list-style-type: none"> Lead check sticks: 8 swabs per pack, 6 packs: (Amazon: \$122-145) Different objects that contain lead (ex: paint surfaces in classroom, metals etc.)
Lead Toxicology	Students will have an understanding of lead toxicology and will have the skills to use national models to track lead poisoning trends. TOTAL TIME: 1 hour and 15 minutes	<ul style="list-style-type: none"> Environmental Public Health Tracking Activity 	<ul style="list-style-type: none"> Computers
Excel Walk Through	Introduce students to Excel software and data presentation; teach students to present scientific data in a tangible and professional format. TOTAL TIME: 50 minutes	<ul style="list-style-type: none"> Thanksgiving Dinner Shopping Activity Pivot Table Activity 	<ul style="list-style-type: none"> Computers with excel application Tape Thanksgiving price list Student instruction sheet Assignment rubric
Lead Intervention	Introduce students to an overview of common interventions employed in combatting lead effects with a focus on nutrition interventions. TOTAL TIME: 1 hour 30 minutes	<ul style="list-style-type: none"> Nutrition Tag My plate 	Nutrition tag <ul style="list-style-type: none"> Ropes, cones or anything that can create a boundary Lead blocker identification tags MyPlate activity <ul style="list-style-type: none"> Cochrane report Computers
Water Contaminants and Treatment	Students will be able to identify the potential hazards and threats of water contaminants; students will know where to acquire information for local water quality; introduce students to water treatment processes and practices. TOTAL TIME: 2 hours 30 minutes	<ul style="list-style-type: none"> Flocculation test activity Corrosion test activity 	Flocculation test <ul style="list-style-type: none"> Alum (\$3.44-6.00) Container for collecting water (ex: buckets) Two 250 mL beakers (Walmart: \$2.50/each) Corrosion test <ul style="list-style-type: none"> Two 250 mL beakers (Walmart: \$2.50/each) Distilled water (Target: \$0.89)

Lesson	Lesson Goal	Activities	Material Needs
			<ul style="list-style-type: none"> • 2 crumpled pieces of aluminum foil (Walmart: \$2.77) • NaCl/table salt (\$ 1.48-5.00)
Water Filters	<p>Students will discuss different water filters and treatments; students will discuss which water filter is best circumstantially; students will learn how to build a filter.</p> <p>TOTAL TIME: 1 hour 30 minutes</p>	<ul style="list-style-type: none"> • Homemade water filter 	<p>Filters</p> <ul style="list-style-type: none"> • Plastic soda or juice bottle • Vase or tall drinking glass • Gravel or small stones • Clean sand (Lowe's: \$4.00-5.00) • Activated charcoal (\$5.00-10.00) • Cotton balls (Walmart: \$4.00-6.00) • Small cloth (Walmart: \$10.00-15.00) • coffee filter (Walmart: \$2.00-10.00) • Gardening dirt (Home Depot: \$1.75- 7.00) • Water • Scissors
NSF International and Bottled Water	<p>Introduce students to NSF International and bottled water regulation. Additionally, provide students with information needed to distinguish between various types of bottled water, and how to safely store bottled water.</p> <p>TOTAL TIME: 1 hour 20 minutes</p>	<ul style="list-style-type: none"> • Fact check activity • Small debate: tap vs. bottled 	<p>Fact Check activity</p> <ul style="list-style-type: none"> • Computers <p>Debate</p> <ul style="list-style-type: none"> • Handout for class debate
Water Regulation and NRDC	<p>Students will understand the role NRDC plays in environmental justice; students will be introduced to the different areas of work within the NRDC; NRDC's influence on policy and legislative decisions will be explored through history and current events.</p> <p>TOTAL TIME: 2 hours 10 minutes</p>	<ul style="list-style-type: none"> • NRDC map activity 	<ul style="list-style-type: none"> • Computers
Government and Policy	<p>Introduce students to environmental health policy; explore the influence of politics on policy; encourage students to be actively involved in local and national policy issues.</p> <p>TOTAL TIME: 50 minutes</p>	<ul style="list-style-type: none"> • Paris accord debate • Govtrack activity • Kahoot activity 	<p>Govtrack</p> <ul style="list-style-type: none"> • Computers • Worksheet <p>Kahoot</p> <ul style="list-style-type: none"> • Computers • Game code (get from website) <p>Paris accord debate</p> <ul style="list-style-type: none"> • Computer and link
Environmental Justice	<p>Help students to examine how the benefits and burdens of society are distributed. It explores the social, political, and economic systems that create inequality based on race and class, and how this can lead to disparate burdens of pollution in communities.</p> <p>TOTAL TIME: 1 hour 30 minutes</p>	<ul style="list-style-type: none"> • Four Corners Toxic Waste Activity • EJS SCREEN Activity 	<p>4 toxic corners activity</p> <ul style="list-style-type: none"> • Waste basket • Information sheet • Chalk • White board <p>EJS SCREEN activity</p>

Lesson	Lesson Goal	Activities	Material Needs
Ethics in Environmental Health	In this lesson students will reflect on what ethics means to them and discuss solutions to ethical dilemmas from their own lives. TOTAL TIME: 1 hour 30 minutes	<ul style="list-style-type: none"> Ethics Column Activity 	<ul style="list-style-type: none"> Computers Ethics Column <ul style="list-style-type: none"> Pens Paper Two containers (hats etc.) Student journal Classroom board Copies of the ethicist
Risk Assessment	Introduce students to basics of health risk assessment to understand and communicate health risk from environmental exposures. TOTAL TIME: 1 hour and 20 minutes	<ul style="list-style-type: none"> Health risk assessment activity worksheet Exposure assessment activity worksheet 	None
IEUBK Module	Introduce students to basics of EPA's IEUBK Model and its applications for child blood lead level exposure. TOTAL TIME: 1 hour and 25 minutes	<ul style="list-style-type: none"> IEUBK activity 	<ul style="list-style-type: none"> Computers
Health Communication	Introduce students to basics of health communication to obtain a better understanding on how health information is distributed to the public. TOTAL TIME: 50 minutes	<ul style="list-style-type: none"> Health communication activity handout 	None
Final Project: Becoming an Environmental Advocate	Students will identify one environmental and human health problem and become part of the solution to that problem. TOTAL TIME: 2-3 weeks (at teacher's discretion)		

Introduction to Environmental Health

Lesson Goal

Students will be introduced to environmental health, environmental hazards, and the role of environmental health professionals.

Activities

- Toxic Release Inventory (TRI) Analysis activity

Materials

TRI Analysis activity

- Computer

Lesson Objectives

- Describe environmental public health
- Discuss environmental public health surveillance
- Describe types of environmental public health data
- Discuss laws & regulations on environment & health data
- Monitoring environmental public health
- Environmental health career opportunities
- Students will discuss current environmental issues that they think could potentially impact them

Background

The purpose of this lesson is to introduce students to the curriculum and basic concepts about environmental health. In addition, students will have the opportunity to learn how environmental conditions are linked to human health. This lesson will also utilize EPA's Toxic Release Inventory analysis (TRI) to view information about waste management practices, examine trends in releases and pollution prevention activities in their communities.

Course Materials

- Video about TED Talk: https://www.ted.com/talks/bill_davenhall_your_health_depends_on_where_you_live
- TRI National Analysis: <https://www.epa.gov/trinationalanalysis/where-you-live>
- What is the TRI National Analysis: <https://www.youtube.com/watch?v=p9y18YUVL9w>

Time Breakdown:

30-45 minutes	Introduction PowerPoint and Video
15-20 minutes	TRI Analysis activity and Discussion
5 minutes	Course curriculum review

Lesson Breakdown:

First 10 minutes: **Introduction**

- Teacher will introduce self to class
- Students introduce themselves to teacher
- Ice Breaker (can choose from ice breaker options)
 - Paired sharing
 - Birth map
 - Famous people/cities

Next 30-45 minutes: **PowerPoint**

- What is Environmental Health?

- Ted Talk about Environmental Health and location (found under course materials)
- Role of the Environment in public health
 - Example: Erin Brockovich story
- What are Environmental Hazards?
- Health Effects
- Important Factors
 - The impact of the environment on individuals is affected
 - Risk or toxicology
 - Exposure
 - Demographics and socio economic status
- Why is understanding the environment-health connection important?
- Emerging Issues
- What do Environmental Health Professionals Do?

Next 15-20 minutes:

- Watch the “What is the TRI National Analysis?” YouTube video
- Open the TRI National Analysis website. Explore the “Data to display” and talk about differences throughout the country.
- Click on your state and view the factsheet. Discuss.
- Type in your zip code and view the factsheet. Discuss.
- Discussion:
 - What environmental issues do you think should be the biggest concern in our country and world?
 - Which ones are you most concerned about?
 - Which ones do you think affect you the most?

Next 5 minutes: **Curriculum**

- Go over topics that will be covered during the school year in the class
 - Flint
 - Lead
 - Risk assessment
 - Water contaminants
 - Water regulations
 - Environmental Justice and ethics Water sample collection
 - Health Communication

Homework Assignment:

- Have students bring an old water bill statement from home in preparation for the Flint Water Crisis Lesson.

Flint Water Crisis

Lesson Goal

Give thorough background and sequence of events involved in Flint Water Crisis and introduce students to public health emergency situations and government responsibility to prevent such situations.

TOTAL TIME: 1 hour 50 minutes

Activities

- Testing for Lead in Water
- Flint Water Crisis Case Study Note Activity

Materials

- Lead in water test kit (can be found at most hardware stores): \$13.99

Lesson Objectives

- Discuss the health effects of lead in Flint water sources
- Discuss the government's role during the Flint water crisis and introduce current regulations for water such as SDWA and LCR
- Educate students on sequence of events from beginning to present situation in Flint, MI
- Identify violations of set regulations and how violations led to water crisis
- Introduce environmental justice and public health ethics
 - a. Government response to residents
 - b. Identify disadvantaged populations

Background

The main focus of this lecture is to give students background on the Flint Water Crisis and how it was allowed to happen. Who was involved? How did it get this far? The lesson will also walk through the various violations and students can discuss where the blame could potentially be placed. Students will test water samples for lead as their main activity.

Course Materials

- Flint Water Crisis Case Study Worksheet
- Summary video: <https://www.cnn.com/videos/us/2016/01/21/flint-michigan-water-crisis-ganim-dnt-ac.cnn>

Time Breakdown:

5 minutes	Open class with question
10 minutes	Water lead test experiment
30 minutes	Flint lecture on background and health effects
10 minutes	Discussion; HW assignment 1: Flint Timeline
10 minutes	Ask students to discuss chosen timeline event
30 minutes	Flint lecture on violations and current issues
15 minutes	Discussion; Assign homework 2

Lesson Breakdown:

- Open class with question
 - Question: What do you know about Flint Water crisis? When/how did you get this information?
 - Short discussion to gauge student knowledge
- Water lead test experiment
 - Ask students to collect water samples
 - One cup from a water fountain

- One cup from a bathroom sink
 - One cup from student's personal water bottle if possible
- Use lead in water kits (can purchase from a hardware store) and follow experiment protocol to test levels of lead in each water sample
- Can perform this activity in groups as the teacher sees fit.
- PowerPoint lecture
 - Timeline of events and health effects
 - Handout Flint Water Crisis Case Study notes sheet to fill out during video and PowerPoint
- Discussion
 - Go over key points for hand out completion
- Assign homework
 - Homework 1: Give students timeline of events for Flint and ask students to choose a moment from timeline. Student must describe the decision/action made at that time and discuss what influence/outcome it had in the crisis. Student must also put themselves in Flint and discuss how they would've responded as a public health professional or resident of Flint.

SECOND CLASS PERIOD:

- Opening Class Discussion
 - Ask 3 students to present their homework. Try to get a student that picked a moment from beginning, middle, and end
- PowerPoint lecture
 - Regulations, violations, government involvement and community response
 - Ask students to continue filling out Flint Water Crisis Case Study notes sheet during PowerPoint presentation
- Discussion
 - Go over key points for hand out completion
- Assign Homework
 - Homework 2: Students may choose any level of government to address a letter to in regards to the Flint Water Crisis. Students may also choose to write from a resident perspective or a public health advisor. Instruct students to address the problem, note what mistakes chosen level of government made, and include a suggestion to help resolve the public health crisis (regulation revision, alternative interventions, financial planning etc.).

Lead and Hazard Assessment

Lesson Goal

Introduce students to lead and teach them how to properly assess lead hazards based on different exposure routes.

Lesson Objectives

- Students should have an understanding of the results they obtained from previous lecture
- Have an understanding of the history of lead use and lead requirements
- Have an understanding of the movement of lead in the environment
- Be able to identify a lead service line in their home
- Be able to use a lead check stick to identify lead in paint or other metal objects

TOTAL TIME: 1.5 hours

Activities

- Identify objects containing lead
- How to ID a lead service line (LSL)
- How to ID lead paint

Background

The main focus of this lecture is to teach students about lead and how to identify lead in their environment. Students will learn about different forms of lead, where it can be found in their environment, and the different properties of lead. There is a brief video included that covers the history of lead use, with slides to follow covering the history of lead based paint, lead in gasoline, and toxicology. Activities will teach students easy ways to identify lead in their homes so that students can properly protect themselves and their families from possible hazards.

Materials

For LSL Demo:

- key or screwdriver
- refrigerator magnet
- lead pipe, galvanized steel pipe,
- copper pipe

For Lead Paint Demo:

- lead check sticks
- different objects containing lead: copper statues, fishing weights, Christmas tree lights, bullets

Course Materials

- Video about the History of Lead: <https://www.youtube.com/watch?v=CM1u29BeqCO>
- Lead objects clip art/Student Handouts
- How to ID lead service line: <https://apps.npr.org/find-lead-pipes-in-your-home/en/#intro>

Time Breakdown:

15 minutes	Review material from previous lecture /Video on Lead
45 minutes	What is Lead?
	Brief History
	Lead in the Environment
30 minutes	How to ID a lead service line/ How to ID Lead Paint

Lesson Breakdown:

- Review material from previous lecture
- Hand out “Lead Video Organizer” to students. This can be found in the Lead and Hazard Assessment folder.
- Instruct students to fill in worksheet as they watch the video
- Play the video (link included under course materials and can be found in PowerPoint)
- Hand out “Lecture Student Organizer”. This can be found in the Lead and Hazard Assessment folder. Have students fill this worksheet out as you work through slides.
- Begin PowerPoint.
- When you get to Slide 5:

- Have students break into groups of 3 or 4. Hand out cut outs of pictures of objects that may contain lead and objects that definitely don't contain lead. Have students separate pictures into objects that contain lead and those that don't. Give students around 5 minutes to complete. Have one representative from each group explain their choices. Tell students which ones have lead and which ones do not as they move through these.
- These cut outs can be found in the Lead and Hazard Assessment folder under "Lead Sort Activity"
- When you get to Slide 6:
 - Open up discussion to students:
 - Looking at graphic, identify ways that you are potentially exposed to lead. Give students a few minutes to write ideas down, then ask for students to volunteer their ideas.
- Slide 17:
 - "How to check for a lead service line" Activity
 - Follow instructions on PowerPoint
- Slide 23:
 - "Lead Paint Hazard Assessment" Activity
 - Using lead check sticks, have students test different objects that may contain lead, paint on the walls of the classroom, different metals.

Homework Assignment

- Can do one of the two:
 - Check your water service line for a lead service line and report findings to the class
 - Using a lead check stick, test an object in your home that could contain lead and report findings back to the class

Lead Toxicology

Lesson Goal

Students will have an understanding of lead toxicology and will have the skills to use national models to track lead poisoning trends.

TOTAL TIME: 1 hour and 15 minutes

Activities

- Environmental Public Health Tracking Activity

Materials

- Computers for students

Lesson Objectives

- Students will be able to explain to peers possible lead exposures in home
- Students will be able to explain the toxicology of lead at a basic level
- Students will have an understanding of the health effects of lead
- Students will be able to use an EPH tracking model to collect data

Background

The main focus of this lecture is to teach students about lead toxicology. Students will learn about exposure, toxicity, acceptable levels of lead, and the biologic fate of lead. Along with that, students will learn about the health effects of lead, particularly low dose health effects in children and adults, developmental and reproductive effects, and signs and symptoms of lead poisoning. Students will use a tracking model to observe childhood lead poisoning rates and analyze this data in a later activity.

Course Materials

- Tracking Model: <https://ephtracking.cdc.gov/DataExplorer/index.html?c=6&i=-1&m=-1>

Time Breakdown:

15 minutes	Discuss previous lesson, review homework
30 minutes	Worksheet and Video
	Lead Toxicology
	Health Effects
30 minutes	EPHT Activity

Lesson Breakdown:

- Start with the slides
- Last slide is an intro to the CDC's Environmental Public Health Tracking Model or EPHT model.

Using EPHT Model:

- Once everyone has been able to access the website, you will work through an example
- The purpose of this activity is for the students to collect data

First Step

- Choose Childhood Lead Poison (this will remain constant for everyone)
- Choose Age of Housing
- Choose Number of homes built before 1950
- Choose National by State
- Click Go

Second Step:

- Click “select data” in the second view screen
- Choose Childhood Lead Poisoning
- Choose Age of Housing
- Choose Number of Homes built between 1950 and 1979
- Choose National by State
- Click Go

Students should understand that there should only be one thing that changes when they are deciding on the parameters to measure.

Assignment:

- Explore lead in relation to sociodemographic, housing indicators and other variables
- Export the data you want to explore

Excel and Data Presentation

Lesson Goal

Students will be introduced to MS Excel software and data presentation techniques. They will learn to present scientific data in a tangible and professional format using MS Excel.

TOTAL TIME: 1.5 hours

Activities

- Thanksgiving dinner shopping activity

Materials

- Computers with Excel application
- Thanksgiving price list
- Student Instruction sheet
- Assignment Rubric

Lesson Objectives

- Introduce students to Excel software and data presentation
- Define uses and applications of data presentation in Excel
- Understand basic elements of charts, tables, and graphs
- Understand the similarities and differences of charts, tables, and graphs
- Differentiate the applicability of charts, tables, and graphs when presenting data
- Construct a chart with appropriate data labels for scientific data presentation

Background

In this lesson plan students will learn the basic review of excel toolbars, buttons, function, cursors, tables, and how to utilize Excel as a tool for manipulating and managing data. In addition, students will practice using excel functions through creating a spreadsheet and chart comparing thanksgiving dinner prices for two stores. Lastly, students will practice making pivot tables to build a unique list of values and create summary tables.

Course Materials

- Examples of how to do the activity “ Thanksgiving dinner shopping activity”; <http://oakdome.com/k5/lesson-plans/excel/excel-thanksgiving-dinner-shopping-list.php>

Time Breakdown:

20 Minutes	Data Presentation: Charts, Tables, and Graphs
	Pie Chart, Column Chart, and Line Chart
	Bar Chart, Area Chart, and Scatter Plot
30 Minutes	Creating a Chart
	Pivot Tables
50 Minutes	Thanksgiving Dinner Activity

Lesson Breakdown:

20 minutes

- Data Presentation: Charts, Tables and Graphs
 - Pie chart
 - Pie of pie chart
 - Bar of pie chart
 - Column Chart
 - Clustered column chart
 - Stacked column chart
 - Line Chart
 - Stacked line chart
 - 100% stacked line chart

- Bar Chart
 - Stacked bar chart
 - 100% stacked line chart
- Area Chart
 - Stacked area chart
 - 100% stacked area chart
- Scatter plots

30 minutes

- Creating a Chart
 - Change chart type
 - Switch row/column
 - Chart Title
 - Legend position
 - Data labels
- Pivot Tables
 - Insert a Pivot Table
 - Drag Fields
 - Sort and Filter
 - Change Summary Calculation
 - Two-dimensional Pivot Table

Thanksgiving Dinner Activity

- Students create a spreadsheet and chart comparing Thanksgiving dinner prices for two stores. Students choose the same 6 or 7 items from each store to compare. Students create their spreadsheet using prices from the Thanksgiving price list. Students may also use local newspaper store ads if available. Students format the numbers with dollar signs and use a formula (SUM) to calculate total costs. Students create a chart illustrating their expenses.
- Thanksgiving Dinner Price List (can be found on drop box)
 - **How to use this file:**
 - Download and print this file for students to use. You could go paperless by downloading and opening this file in a pdf reader and projecting it onto your whiteboard or by sharing it digitally for students to reference.
 - Students use this list to choose items to create their spreadsheet and chart. Students create their spreadsheet using the list of their chosen items and prices.
- Thanksgiving Dinner Spreadsheet Finished Example (can be found on drop box)
 - **How to use this file:**
 - Download and open this file in Microsoft Excel or a compatible spreadsheet application. Use this example to illustrate to students how to enter their title, merge and center the title, and how to change the font, font size, and font color. Demonstrate how to enter data and format the number values with \$ dollar signs. Demonstrate how to select the data in columns A and B, and create a chart using that selection.
 - Demonstrate how to format the chart bar colors, and how to resize and position the chart so that everything fits on a single printable page. Demonstrate how to use "print preview" to check the appearance and layout prior to printing the page.

References

Oakdome: <http://oakdome.com/k5/lesson-plans/excel/excel-thanksgiving-dinner-shopping-list.php>

Lead Intervention

Lesson Goal

In this lesson students will explore the common interventions employed in combatting lead effects with a focus on nutrition intervention.

TOTAL TIME: 1 hour 30 minutes

Activities

- Nutrition Tag (optional)
- My Plate

Materials

Nutrition Tag Activity:

- Lead Blocker Tag Identification Cards
- Cones or rope to mark boundaries

My Plate Activity:

- Cochrane report “ Household Interventions for Poisoning Domestic Lead Exposure”
- Computer access

Lesson Objectives

- Identify exogenous and endogenous exposures to lead
- Identify common interventions used
- Understand distribution of lead in body
- Introduce students to overview of calcium
- Introduce students to overview of iron
- Understand the health effects of lead
- Model how lead absorption can be reduced with certain nutrients
- Present case-study to students
- Go over two assignments

Background

In this lesson, students will first be provided with a general overview of the issues around lead poisoning in order to become more aware of the dangers and effects it has on the human body. Students will then explore common lead prevention methods that can be utilized by them and their parents. For example, it is important to keep lead-based paint in good condition and free of dust. If you plan to renovate, make sure you use a Lead-safe Certified contractor who follows lead-safe work practices. Additionally, students will learn how eating a balanced healthy diet, containing vitamin C, calcium, and iron can help minimize lead absorption in the body.

Course Materials

- Cochrane report “ Household Interventions for Poisoning Domestic Lead Exposure
http://www.cochrane.org/CD006047/BEHAV_household-interventions-preventing-domestic-lead-exposure-children

Time Breakdown:

10 Minutes	Exogenous and Endogenous exposures to lead
	Prevention is key! examples
	Common Interventions
30 Minutes	Distribution of Lead
	Calcium
	Iron
50 Minutes	Fighting Lead with Healthy Foods case-study
	Conclusion: Activities

Lesson Breakdown:

PowerPoint

10 minutes

- Exposure to lead
 - Exogenous examples
 - Endogenous examples
- Prevention is key!
 - Examples
- Common interventions
 - Removing source
 - Medical intervention
 - Cognitive interventions
 - Nutrition interventions

30 minutes

- Distribution of lead
 - Biological fate of lead
 - Bone-to-blood mobilization of lead
- Calcium
 - Function in body
 - Requirements
 - Sources
 - Calcium and lead
 - CDC recommendation for children
- Iron
 - Function in body
 - Requirements
 - Sources
 - Iron and lead
 - CDC recommendation for children

10 minutes

- Fight lead with healthy foods
 - Case-study on Flint, Michigan

Conclusion with one of the assignments:

1. Cochrane report (possibly at the beginning of the lecture)
 - a. Apply your nutrition knowledge! Assignment
2. Nutrition Tag

Nutrition Tag

1. Students will be modeling how certain nutrients (iron, vitamin C, and calcium) can minimize the absorption of lead by playing a game of tag.
2. Mark off the boundaries of a field. Use a large playing area, but clearly state the boundaries to the students. Cut out tag identification cards. Laminate if you wish them to be permanent.
3. Depending on your class size and size of field, select two students to be “it.” The “it” students represent lead. (Note: if you have a small class size, only select one student. If you have a very large class size (over 35, you may select three students to be it). Give the students who are “it” the appropriate tag identification card.
4. The rest of the students will represent themselves (i.e.: children). For the first round, all students will be able to move freely across the playing field. On the second round, give each student an identification card. Each student will receive a card telling them what to do as they move across the field. This card will tell students what they had to eat that day. Children with a not-so-healthy item (i.e.: pizza, cookies, soda) must perform the task on their card while moving across the field.
5. Have students gather on one end of the marked boundary. Explain that the 2 “it” students are lead trying to tag the other students to “contaminate” them. The it students will position themselves halfway between the start and finish areas
6. In Round 1, on your mark, students may move freely across the field. In round 2, students must perform the instructions written on their card as written (i.e.: pausing every 3 steps). The “it” students will try to tag as many students as they can. Once a student has crossed the boundary line at the other end of the field, he or she is safe and cannot be tagged. Students who are tagged must line up along the edge of the playing field.
7. At the end of the first round, ask the students how many students were contaminated by the lead. Remember or write down this number. Do the same for each subsequent round. Compare this number with the number of students tagged during Rounds 2 & 3.
8. For Round 3, any students who were tagged but had a lead blocker card (a star in the upper right corner of their card), may re-enter the starting line. This means that the item he/she had eaten was a lead blocker. Any students who were tagged, but did not have a lead blocker sit out. This means that those students absorbed the lead when they were tagged. Students who were not tagged also go back to the starting line.
9. Perform Round 3 as in previous rounds.
10. After the round is complete, observe which students were tagged, and how many were along the sidelines.

Wrap Up Questions

1. Which students were easier to tag? The students with the healthy diets or the students with the not-so-healthy diets? Why?
2. What did the task the not-so-healthy students had to do represent?
3. What food/drinks are high in iron, calcium, and vitamin C? How would these help protect you from lead poisoning?
4. How can we prevent lead from entering our homes and schools?

My Plate Activity

I. Reading Assignment

Read Cochrane report on “Household Interventions for Preventing Domestic Lead Exposures” found here: http://www.cochrane.org/CD006047/BEHAV_household-interventions-preventing-domestic-lead-exposure-children

Be prepared to discuss in class.

II. Apply your nutrition knowledge!

In class, you were introduced to nutrition’s role in impacting lead absorption. You were also introduced to a case-study video on Flint, Michigan titled “Fighting lead with Healthy Diets”.

You are to form groups of 3’s and come up with a nutritious meal plan based on the nutrients we spoke of.

1. Follow MyPlate guidelines.
2. Come up with a meal plan with breakfast, lunch and dinner, and make room for snacks.
3. Highlight the items that contain iron and calcium.

You can use the following hand-out as a reference of items that contain the nutrients:

https://wicworks.fns.usda.gov/wicworks/Sharing_Center/KYlead.pdf

References

EPA Lesson plan "Lead Blocker".

<https://www.epa.gov/sites/production/files/documents/leadblockers.pdf>

Water Contaminants and Treatments

Lesson Goal

Students will analyze the relationship between humans and the earth's resource through, evaluating the interrelationship between humans and water quality and quantity. Students will also be introduced to water treatment processes and practices.

TOTAL TIME: 2 hours 30 minutes

Activities

- Flocculation test activity
- Corrosion test activity

Materials

Flocculation test activity

- Alum (\$3.44-\$6.00)
- Container for collecting water (buckets)
- Two 250mL beakers (\$2.50/each at Walmart)
- View link under course materials "flocculation test experiment"

Corrosion test

- Two 250 mL beakers (\$ 2.50 a piece at Walmart)
- Distilled water (\$.89 at Target)
- 2 crumpled pieces of aluminum foil (\$2.77 at Walmart)
- View attached document in folder on drop box for material list.

Lesson Objectives

- Work in groups to collect water contaminate data
- Communicate public health hazards of different water contaminants
- Distinguish the differences between point source and non-point sources
- Students will understand the importance of proper water treatment and how it protects the public's health
- Discuss environmental monitoring and lab analysis
- Identify the impacts of corrosion control in water treatment

Background

Through visual presentation, students will learn about different water contaminant groups, health hazards each pose and their Maximum contamination level (MCL'S). Students will also utilize the SDWIS website to find their drinking water supplier and view its violations and enforcement history. Students will proceed to conduct a flocculation test to determine coagulant dosage in water treatment. In addition, students will conduct a corrosion test and compare samples of corroded and un-corroded metals such as iron, aluminum, copper, zinc, silver and magnesium.

Course Materials

- Video about Flocculation: <https://www.khanacademy.org/partner-content/mit-k12/mit-k12-materials/v/flocculation>
- SDWIS website: <https://www3.epa.gov/enviro/facts/sdwis/search.html>
- Flocculation test experiment: https://www.teachengineering.org/activities/view/usf_flocculant_activity01

Time Breakdown:

30 minutes	Water contaminates lecture
20 minutes	SDWIS website and Activity
40 minutes	Flocculation and or Corrosion test
30 minutes	Water Treatment Lecture
10 minutes	DC water case study
15 minutes	Discussion table
15 minutes	Venn diagram comparing Flint and DC
5 minutes	HW assignment

Lesson Breakdown:

- Open class with question
 - Ask students to list what water contaminants they are aware of
 - Short discussion to determine students' knowledge
- PowerPoint Lecture
 - Brief description of different contaminant groups and health hazards each pose, MCLs
- SDWIS website
 - View SDWIS website with students and complete activity
- Flocculation and Corrosion test
 - Flocculation experiment directions on website link above; corrosion experiment directions in dropbox
 - Set up 6 stations, 3 stations per experiment
 - Put students in groups of 4-5 and have them spend 10 minutes at each experiments and then switch sides to other experiment
 - Students should answer questions on experiment worksheets during experiments
 - **(Both experiments can be conducted at the same time or just one)**
- PowerPoint lecture
 - Corrosion control process, what and how treatment works, water delivery
- DC water case study
 - Hand out short article on DC treatment switch and lead increase from corrosiveness
- Discussion table
 - Separate board into 5 major parts: what happened, who did it hurt/affect, how did public health respond, why did this happen, what should have happened
 - Discuss DC article and have students participate in competing table
- Field Trip to water treatment facility?

Homework assignment

- Students should research countries with poor water quality and choose one country to write one page paper that includes: health disparities due to poor water quality, what has caused these conditions, and recommendations for treatment if country acquired the ability to implement water treatment

Water Filters

Lesson Goal

Introduce students to water filters and treatments.

TOTAL TIME: 1hr

Activities

- Homemade water filter

Materials

Homemade Water Filter:

- plastic soda or juice bottle
- vase or tall drinking glass
- gravel or small stones
- clean sand
- activated charcoal
- cotton balls, small cloth, coffee filter
- gardening dirt
- water
- scissor

Lesson Objectives

- Understand various water filters and treatments
- Recognize which water filters are best used in different circumstances
- Learn to build a small-scale filter

Background

The main focus of this lecture is to teach students about water filters and treatments. Moreover, students will learn about various types of water filters, as well as different forms of filtration. Lastly, students will be instructing on how to make their own homemade water filters.

Course Materials

Video demonstrations:

- NSF Water Treatment Systems Certification Process, Types of Filters: <http://www.nsf.org/consumer-resources/what-is-nsf-certification/water-filters-treatment-certification/water-treatment-systems-certification>
- Osmosis Illustration: <https://www.youtube.com/watch?v=sdiJtDRJQEc>
- Reverse osmosis: <https://www.culliganwater.com/all-about-water/>
- Ion Exchange System: <https://www.behance.net/gallery/7922569/Water-Filter-Animations>
- Kit Reference Video" : <https://www.youtube.com/watch?v=vrAtyF4D67Q>

Time Breakdown:

15 minutes	Water Filters and Treatments
15 minutes	How do filters work?
	Which filter do you need?
30 minutes	Homemade Water Filter

Lesson Breakdown:

- Slide 2, Class discussion:
 - What is a filter?
 - Are all filters the same?
 - Why or why not?

- Slide 3, Water Filters and Treatments
 - Watch video on slide show about water treatment and filters
 - List the different types of filters mentioned in the video.
 - List the different factors that may determine the kind of filter or water system that suits a person's needs.
 - How do we know our water supply is safe?

- Slide 7, Reverse Osmosis Filter System
 - Watch videos on osmosis and reverse osmosis

- Slide 8, Ion Exchange System
 - Watch video on Ion Exchange

- Slide 18, Begin Water Filter activity

NSF International and Bottled Water

Lesson Goal

Introduce students to NSF International and bottled water regulation. Additionally, provide students with information needed to distinguish between various type of bottled water, and how to safely store bottled water.

Lesson Objectives

- Understand the role of independent testing labs and regulators in ensuring bottled water quality.
- Be able to distinguish between different types of bottled water based on its origins and production.
- Learn how to appropriately store bottled water.
- Learn about the pros and cons of bottled and tap water.

TOTAL TIME: 1 hour, 20 minutes.

Activities

- Fact Check Activity, an interactive classroom activity on bottled water regulation and storage.
- Small debate, tap v. bottled water.

Background

The purpose of this lecture is to introduce students to bottled water—how it is regulated, proper maintenance, as well as the pros and cons associated with its production. These concepts will be reinforced through in-class activities that will allow students to test their preexisting knowledge and teach them how to identify bottled water that has been certified by independent labs. Additionally, students will engage in a small debate concerning tap water v. bottled water.

Materials

- Computers for bottled water activity
- Handout for class debate

Course Materials

- NSF website: : <http://www.nsf.org/about-nsf/>
- NSF Bottled Water Tips: <http://www.nsf.org/consumer-resources/health-and-safety-tips/bottled-water-tips>
- NSF Certified Products and Systems: <http://www.nsf.org/certified-products-systems>

Time Breakdown:

5 minutes	Open discussion: How do we gauge the safeness of consumer products we use, eat, and drink?
40 minutes	What is NSF International?
	What is the NSF Mark?
	Bottled water: Types of bottled water, Fact Check Activity, Bottled Water Activity
35 minutes	Debate: Bottled water v. Tap water

Lesson Breakdown:

Begin Power point

Slide 3: Open discussion- How we determine the safeness of the products that we use, eat, or drink?

Questions that may prompt conversation:

- What are consumer goods?
- What are some standards that we use as a nation to ensure that products like food and water are safe? (EPA, FDA, etc.)
- Has anyone heard of NSF International?

Slide 7: Transition from talking about NSF International to bottled water, one of the world's most popular consumer products.

Slide 8: Have students identify the types of bottled water they purchase. Additionally, have students state factors that may make the various types of water shown on the slide different from one another.

Slides 9-20: Fact Check Activity. Each Fact Check consists of two slides, one will contain a question and the other an answer to the question previously proposed. During this portion of the lecture allow students to talk about what they think the answers to each of the questions are before revealing the provided answers.

Slide 21: Bottled Water Activity: During this portion of the lecture allow students to break up into teams of 3-4 to research which bottled water brands have been certified by NSF International. (Instructions on how to do this may be found in the slide notes) Each group's answers should be recorded on a sheet of paper. This should take approximately 15 minutes.

Slide 22: After students have looked up each brand reveal the correct answers and allow students to discuss their initial reactions.

Slide 23: Debate- Tap v. Bottled Water (Which is the best option?) In this last portion of the lecture students will get the chance to talk about some of the pros and cons of bottled water.

Format of the debate:

(~15 mins) Break students into 2 teams, allow teams to discuss and answer questions on handout

(~10 mins) Give each team 3 minutes to present their argument. Between each presentation allow the opposing team to ask questions for CLARITY only.

(~10 mins) Allow teams to address their opponent's arguments and answer questions that may come up.

(~5 mins) Conclusion: Who would switch sides knowing all this information, and why? What are some of the benefits of bottled water? What are some of the downfalls of bottled water?

Water Regulation & National Resources Defense Council

Lesson Goal

Students will understand the role NRDC plays in environmental justice and be introduced to the different areas of work within the NRDC. NRDC's influence on policy and legislative decisions will be explored through history and current events.

Lesson Objectives

- Discuss actions that have been taken by the NRDC to influence policy decisions
- Explore NRDC's role in the Flint water crisis
- Work in partners to research lead exceedance levels using NRDC interactive map
- Develop a risk management and communication plan for selected community from NRDC map and present to class

TOTAL TIME: 2 hours 10 minutes

Activities

- NRDC map activity

Materials

NRDC map activity

- Computer

Background

The main focus of this lecture is to teach students about water regulations and about stakeholders who play a part in protecting water sources. Students will also learn about the NRDC and how they conduct research to create informed policy. Students will use the NRDC interactive map to explore lead problems across America and create a policy brief. The policy brief will be accompanied by a physical representation of a public announcement in an effort to demonstrate risk communication.

Course Materials

- NRDC Interactive Map : <https://www.nrdc.org/resources/whats-your-water-flint-and-beyond>

Time Breakdown:

30 minutes	Brief background and intro of NRDC
20 minutes	NRDC video clip
20 minutes	NRDC lecture
30 minutes	Demonstration of NRDC interactive map
10 minutes	Partner pairing and research
15 minutes	Assignment Presentations
15 minutes	Discussion on effective risk communication
5 minutes	HW assignment (have students complete NRDC assignment at home if need be)

Lesson Breakdown:

- Begin class with PowerPoint lecture, streaming the video after the first slide
- Finish lecture and teach remaining slides
- Use link under course material to access the NRDC interactive map
 - Show students how to gather information from the site using the example in the lecture
- NRDC Assignment
 - Assign partners or allow students to choose partners
 - Students should be given time to familiarize themselves with the interactive map
 - Instructions:

- Pick a community from the map with lead exceedance levels
 - Collect all data and information from the interactive map site
 - Students are encouraged to do extra research of the community using other resources as well
 - Together students must decide who will play the role of a lawyer in the NRDC and who will play the role as an activist for the NRDC
 - Each pair must create a one-page policy brief and a public announcement to the community (PR via flier, pamphlet, poster, commercial, social media, etc.)
 - Students will be given 5-10 minutes the following class period to present their work
- Risk communication
 - After each presentation have class evaluate what was effective about media used for announcements and why
 - Have class give feedback as to why policy may or may not pass and which stakeholders would be most supportive

Government and Policy

Lesson Goal

In this lesson students will explore the influence of politics on environmental policy.

TOTAL TIME: 1 hour 50 minutes

Activities

- Paris Accord Agreement Debate
- Govtrack Activity(homework assignment)
- Kahoot Activity

Materials

Paris Accord Debate Activity:

- Links to websites which can be accessed in course materials

Govtrack Activity:

- Govtrack assignment sheet
- Computer access

Kahoot Activity:

- Internet Access

Lesson Objectives

- Define environmental health policy
- Discuss current environmental health policy issues
- Identify the basis of policies and policy actors
- Differentiate between a bill, laws, statute, rule , regulation, and ordinance
- Understand the role of the EPA and major environmental statutes related to water
- Identify local environmental policy issues and learn how to take action
- Learn how to use Govtracks to follow current policies
- Analyze the Paris Accord Agreement

Background

The main focus of this lecture is to teach the ways in which problems are identified and addressed through policy. In addition, students will learn about the rational – comprehensive model of policy formation and the steps involved in using it. Further, explore the role the EPA plays in environmental policy and regulation. Lastly, the assignment will engage students in interactive activities that will allude to the cost and benefits involved in policy making.

Course Materials

- Kahoot (teacher): <https://play.kahoot.it/#/?quizId=1c456190-c7c8-4b6b-b445-2a3401e2522a&playId=62b4e2de-8b5f-4736-94a0-9ca61c7cf4e6>
- Kahoot (Student): <https://kahoot.it>
- 2017 Presidential Candidate’s outlook on environmental/climate issues : <http://pbseduelectioncentral.com/interactive-map>
- Video about the Brief History of Environmental Justice: <https://www.youtube.com/watch?v=30xLg2HHg8Q>
- Video: “Can Paris produce a climate change deal that sticks?” <https://www.pbs.org/newshour/show/paris-climate-talks-enter-next-phase-but-political-roadblocks-remain>
- Tenets of the Paris Climate Agreement: https://ec.europa.eu/clima/policies/international/negotiations/paris_en

TIMELINE

20 Minutes	Kahoot Activity
	Policy and Environmental Health
	Right to Clean Environment?
	Foundations of Policy
20 Minutes	U.S. Civics
	EPA and Water
15 Minutes	Major Environmental Statutes
	National and Local Focus
	Paris Accord Debate
	Introduction to Govtrack (Homework assignment)

Kahoot Activity

As a warm-up, use this interactive Kahoot survey to allow students to share their preliminary views on environmental policy. The teacher should go on his or her computer and select the “Player vs. Player” mode. Each student will require a smartphone, laptop or computer and should go to the [Kahoot](#) website and enter the Game PIN that will appear on the teacher’s screen. It is the teacher’s responsibility to click to the next question once each student has answered.

[If you do not wish to have students play the game on their devices, then ask the following questions:

1. Do you believe that climate change is caused by human activities?
2. Do you believe that the U.S. government should invest in renewable energy sources?
3. Should the government prioritize environmental protections or economic growth?

Lesson Plan

15 minutes

- Policy and Environmental Health
 - Environmental Health Policy
 - Current Environmental Health Policy Issues
 - Local, state, national, and global
- Right to Clean Environment?
 - U.S. Constitution
- Foundations of Policy
 - Basis of Policies
 - Policy Actors

20 minutes

- U.S. Civics
 - Definitions: Bills, Law/Legislation, Statutes, Rules & Regulations, and Ordinances
 - Branches of U.S. Government: Legislative, Executive, and Judicial
 - The “Revolving Door”
 - Law and Rule Making Processes
- EPA and Water
 - Federal Administrative Agencies
 - EPA
 - Popular environmental health topics
 - Water

15 minutes

- Major Environmental Statutes
 - Safe Drinking Water Act (SDWA)
 - Lead and Copper Rule (LCR)
 - Reduction of Lead in Drinking Water Act
- National and Local Focus
 - Healthy Homes and Lead Poisoning Prevention Program
 - NOLA Unleaded
- Introduction to Govtrack
 - Follow a current environmental health policy

Paris Accord Debate

Have students complete the following:

1. Visit the PBS Election Central website's [interactive map](#) and click on "Candidates & Issues" on the bottom right of the screen. Read the section entitled "Environmental/Climate" to become familiarized with both sides of the issue.
2. View the three remaining candidates' quotes on the environment by selecting their names in the "Environmental/Climate" section. Does the candidate you support share your views?
3. Debate environmental policy with your classmates in a Socratic Seminar (group discussion focusing on thoughtful and respectful responses in which the teacher only interjects to facilitate the conversation) using the following questions:

Learn more about the challenges that surrounded the talks using the PBS News Hour video story: '[Can Paris produce a climate change deal that sticks?](#)' Read the tenets of the Paris Climate Agreement found [here](#).

1. What parts of the agreement are most important?
2. Are there any parts that are not important?
3. What are some of the costs and benefits involved?
4. Are there any aspects that you would change?

Govtrack Activity

After diving into the complexity and inner-workings of government and environmental health policy, it's time to do some policy research. At the end of the lesson, we introduced 'Govtrack,' which is a website used to monitor the status of proposed bills in Congress. Read about any bill or resolution on a relevant environmental topic of your choice, and draft a report (no longer than 1 page) summarizing the specifics of the selected legislation. Before our next lesson, 5 student volunteers will be required to share their findings (~2 minutes) with the class.

Questions that should be answered in your research:

- What the bill is called
- Who sponsored it (Name, House/Senate, State, and Party)
- What it calls for
- Dig a little deeper online to see what opponents and proponents say about it
 - o Industry officials
 - o Advocates
 - o Politicians
 - o Public, tribes, etc. (any relevant stakeholder)
- The status of the bill
- Govtrack's prognosis
- Your thoughts

Govtrack: <https://www.govtrack.us/>

Environmental Justice

Lesson Goal

Help students to examine how the benefits and burdens of society are distributed. It explores the social, political, and economic systems that create inequality based on race and class, and how this can lead to disparate burdens of pollution in communities.

TOTAL TIME: 1.5 hours

Activities

- Four Corners Toxic Waste Activity
- EJSCREEN Map Activity (Optional Homework Assignment)

Materials

Four Corners Toxic Waste Activity:

- Waste basket (as the metaphor for toxic waste)
- Two to three copies of the worksheets for each of the five groups
- Chalk/white board to record the vote

EJSCREEN Map Activity:

- EJSCREEN assignment Sheet
- Computer access

Lesson Objectives

- Define environmental justice, equity, and health
- Identify the 4 characteristics of a classic Environmental Justice Community
- Understand the Environmental Protection Agency's (EPA) role in environmental justice and environmental stewardship.
- Learn how to use the EJ Screen: Environmental Justice Screening and Mapping Tool.
- Identify environmental justice cases and communities in Louisiana
- Explain why people may not participate in decision making
- List ways to encourage communities to participate in decision-making and make their voices heard

Background

The main focus of this lecture is to give an introduction to the principles and concepts of Environmental Justice and community voice and power. There is a video that gives a brief synopsis of the history of environmental justice, with slides that cover the characteristics of EJ communities, the (EPA) Environmental Protection Agency's environmental justice mandate, and the role ethics plays in science. Students will engage in an interactive exercise that will help them to examine how the benefits and burdens of society are distributed. As well as learn about the importance of community activism.

Course Materials

- Video about the Brief History of Environmental Justice:
<https://www.youtube.com/watch?v=30xLg2HHg8Q>

Time Breakdown:

30-40 minutes	Four Corners Toxic Waste Activity
50 minutes	Video on Environmental Justice History
	Environmental Justice PowerPoint
	Ethics and Environment Justice Summary

Lesson Breakdown:

Four Corners Toxic Waste Management Activity

Suggested Preparation for the Facilitator/ Teacher

- Divide the room into groups of five. (We usually have them count 1, 2, 3, 4, 5 around the room so that participants are not with their friends). Send groups 1-4 to the four corners of the room. Group 5 is the toxic waste management team, who makes the final decision about where the toxic waste will go.
- Tell the whole group that they represent specific communities. You are the owner of a waste management company and you are holding a public meeting to help decide where toxic (contaminated) waste should go.
- Place the toxic waste basket in a prominent place and tell them it's full of contaminated waste that can cause cancer, chronic diseases, and get into the environment through the soils, air, water, etc.
- Hand out community descriptions to each group (below).
- Community 2 is secretly designated as the "vulnerable" community that has not been given the opportunity to vote. You will need to talk with them and make sure they understand their instructions and that they should not speak until given a sign that is it okay to talk (e.g., touching your earlobe).
- Be sure to wander around to each group and answer questions, etc.
- Use a chalk/white board to record responses and votes.

Toxic Waste Placement Meeting (Instructions to class)

Prompt: (Give two copies of the prompt to each group)

1. I am the Manager of Waste Management Development Company and we would like to truck a container of extremely toxic waste to one of the communities in the room (meant to represent a city/county/state).
2. The toxic waste must go to ONE of the communities in this room. It cannot go anywhere else. It cannot be split up.
3. By the end of the discussion, you will have to cast ONE vote per community deciding where the toxic waste will go. Our toxic waste managers will make the final decision.
4. This exercise occurs in six parts:

Section 1: Community Descriptions(5-10 minutes)

You have five minutes to discuss your community and make up what you want about it. (I have given you a little bit of information about your community in your community sheets that I have passed out). Then be prepared to tell the other communities in the room the following:

1. What is the name of your community (make up a name)?
2. Given the data in your tables is this community high, middle, or low in terms of:
 1. a) Income
 2. b) Race/ethnicity
 3. c) Speaking other languages than English

4. d) Levels of pollution
 5. e) Green space
 6. f) Health
3. Where do you think this community fits in terms of how much decision-making power it has (high, medium, low)?

Section 2: Tell the room who you are (3 minutes each)

Pick one or two people from your group to describe your community. Do not just read off the information that I have given you, be more descriptive.

Section 3: Who gets the toxic waste? (3 minutes)

You have just heard about the other communities in the room. It is now time to come to a consensus about where you want the toxic waste to go. Your community gets ONE vote.

Section 4: Come back and cast your vote (5-10 minutes) Pick someone in your community to explain:

Pick someone in your community to explain

- Cast your vote on which community should get the toxic waste
- Give your reasoning

Section 5: Waste managers (Group 5): final decision

What is your final decision based on what you read and heard?

Section 6: Discussion(15-20 minute)

Depending on the audience, there is a list of questions that the facilitator can ask participants. Below is a set of questions that can be asked:

- **To Communities 1, 3, 4**
 1. What do you think happened?
 2. Why did it happen?
 3. Why did the vote go the way it went?
 4. If Groups 1,3, and 4 did NOT vote for the “vulnerable” community, do you think this is what would happen in real life? Why or why not?
- **Waste Managers**
 1. Why did you make this decision?
- **“Vulnerable” Community(Community 2)**

Give community 2 signal that they can talk now(e.g., raise your hand)

 - a. Tell us who you are. Describe your community.
 - b. How did your feel when you were not able to talk?
 - c. What were you experiencing (mentally, physically)?
 - d. How do you think it affected you to not be able to speak up(individually and your community)?
 - e. Was it fair?
 - f. What are situations in real life where people might not be able to speak up?
- **Environmental Justice/racism**
 1. What was wrong with this meeting?
 2. What might you do to change the meeting (e.g., interpreters; set up meeting at an appropriate time and place that all constituents can attend; have an “expert” in attendance to explain the contamination problem, etc.)?
 3. How might you address the problem that communities with EJ concerns are currently living in contaminated areas with more environmental burdens than environmental goods?

4. Review the Environmental Justice definition. Does it make sense? What are the main criteria of the definition?

Note: It is worth spending a few minutes working through this definition and how it relates to this example.

5. Think about some (current and past) events where some people are able to vote or not and how it affects what they are able to do with the rest of their lives (having been in prison, identity cards, voting, etc.).

Video and PowerPoint:

- Play video(link can be found under course materials)
- Environmental Justice defined
 - Fair treatment & Meaningful Involvement
- Environmental Justice Communities
 - Louisiana Ranking
- EPA, Environmental Justice, and Environmental Stewardship
 - EJ 2020 Action Agenda
 - EJSCREEN
 - Environmental indicators
 - Demographics indicators
 - EJ Indexes
 - Environmental Stewardship
- Environmental Justice Cases/Communities in Louisiana
 - Mossville
 - Isle de jeans Charles
 - Bayou Corne Sinkhole
 - New Orleans: Claiborne Ave & Siting of I-10
- St. Joseph, LA Case Study
 - Contaminated drinking water and drinking water violations
 - Community-drive campaign and White House Petition
 - Independent investigation, impact, and declaration of emergency
 - St. Joseph update
- Ethics: What's is the role of the Scientist
 - Advocate vs. scientist
 - Troublemaker scientists
- Crossing the Imaginary Line
 - Rebuttal
 - Questions to ask oneself
- Ethics and Environmental Justice Summary
 - Achieving environmental justice

Homework Assignment: EJSCREEN Map Activity

- Administer a copy of the EJSCREEN Map Activity to each student to take home.
 - Have students report their findings to the class.

References

Just health action website: <http://justhealthaction.org/wp-content/uploads/2010/05/JHA-Lesson-Plan-2-Whose-Backyard-rev.pdf>

Ethics

Lesson Goal

In this lesson students will reflect on what ethics means to them, read letters to “The Ethicist” in The New York Times, and discuss solutions to ethical dilemmas from their own lives.

TOTAL TIME: 1.5 hours

Activities

- Ethics Column Activity

Materials

Ethics Column Activity:

- Pens/pencils
- Paper
- Student journal
- Two containers
- Classroom board
- Copies of the “The Ethicist: No Edit”

Lesson Objectives

- Explore and examine their own code of ethics by writing and talking about ethical dilemmas from their own lives.
- Read ethical dilemmas from classmates’ lives and discuss the ethical dilemmas in these situations in small groups.
- Write their own “Ethicist” column in response to their classmates’ questions.

Background

In this lesson plan students will read and discuss Randy Cohen’s ethics response column “The Ethicist: No Edit” and examine ethical issues raised by the anonymous letters. The activity will give students the opportunity to engage in ethical reflection through creating their own ethics advice column.

Course Materials

- Article “The Ethicist: No Edit”
[//www.nytimes.com/learning/teachers/featured_articles/20070716](http://www.nytimes.com/learning/teachers/featured_articles/20070716)
- If article does not work type in the name “The Ethicist: No Edit” into google search to access it.

Time Breakdown:

10 minutes	Warmup
60 minutes	Discussion of Reading
	Ethics Column Activity
15 minutes	Wrap Up

Lesson Breakdown:

Warm Up

- Write the following prompt on the board prior to class: “Describe a time when you had an ethical or moral dilemma. What did you choose to do, and why? Do you consider your choice to be an ethical one? Why or why not?”
 1. Allow students several minutes to respond, and then have them share what they have written. What types of ethical and/or moral dilemmas do kids or teenagers face most often? What influences people to act according to a code of ethics? What influences people to act against this code? Where did students learn their code of ethics? Does everyone agree about what is ethical and what is not? Why might people disagree?

Ethics Column Activity

- As a class, read and discuss the article “The Ethicist: No Edit” First provide students with a copy of the readers’ questions without Randy Cohen’s responses. Read the first question as a class focusing on the following questions:
 1. What reason does the unnamed teacher give for not editing his/her students’ application essays?
 2. For what reasons do other teachers decide to edit their students’ application essays?
 3. Which stance do you think is the most ethical?
 4. Which stance do you think is the most helpful to students in the short and long run?
 5. How would you answer this teacher’s question?

- Once they have answered these questions, have the class read Mr. Cohen’s response, focusing on the following questions:
 1. Do you agree with the Ethicist’s answer? Why or why not?
 2. What is the difference between “hands-on” tactics such as “editing or proofreading” and “guiding students toward producing first-rate work that is their own”?
 3. What forms of writing guidance does Mr. Cohen endorse?
 4. In what ways have teachers helped you become better writers?

- Read the second question from the column focusing on the following questions:
 1. What dilemma is “Name Withheld, Michigan” facing?
 2. Why is this a question of ethics?
 3. How would you answer this person’s question?

- Once they have answered these questions, have the class read Mr. Cohen’s response focusing on the following questions:
 1. What does Mr. Cohen advocate as the ethical response to this dilemma? b. Do you agree with his advice?
 2. Do you think that students in your class have a similar code of ethics to Randy Cohen? Why or why not?

- Brainstorm
 - Inform your students that they will be writing their own ethics column for the school newspaper and that they will be responding to questions from their classmates.
 - To begin, create a brainstorm list on the classroom board and label it “Virtues Possessed by an Ethical Person.” Have students offer characteristics that would be exhibited by an ethical person as you note them on the board. You may need to give a few examples to begin discussion (e.g., honesty, fairness, trustworthiness, reliability, responsibility, etc.). Explain to students that people may have differences of opinion about whether or not certain virtues should always be associated with ethical people. To illustrate this, ask students if an ethical person should always, under all circumstances, tell the truth. Is there a time when it stops being ethical to remain loyal to a friend? Is it always ethical to obey an authority figure? Why or why not?

- Draft Questions
 - Once students have completed this brainstorm, have them to look at the list and come up with a question from their own lives, or the life of a friend or family member that they believe to contain an ethical dilemma.
 - Instruct your students to draft a question to which they would feel comfortable having their classmates respond. If any students have difficulty coming up with a question, have them take a second look at the “Virtues Possessed by an Ethical Person” list on the board and think about an aspect of their lives or the life of a friend or family member that has dealt with questions of honesty, reliability, trustworthiness or any of the other virtues listed. Have they thought about lying to a teacher, family member, friend or boss? Have they ever considered not doing something that others were relying on them to do?

- Divide Class Into Smaller Groups
 - Once students have composed their questions, divide the class in half. Provide two containers (e.g., hats, small bags, or bowls), one for each half of the class, and have each half put its questions into the given container.
 - Next, instruct the halves to switch containers and have each student to remove one question from the container. Within each half of the class, have students split into smaller groups of three to five students each. Then, have students read their given questions to their group mates. Remind the class that there may be differences of opinion within groups and they should be respectful of each other’s ideas. For each question, groups should discuss the following questions:
 - 1) What is the question of ethics here?
 - 2) What makes it an ethical dilemma?
 - 3) What do you think is the most ethical advice to give to this person? Why?
 - 4) Is there more than one response to this question that could be considered ethical? Why or why not?
 - 5) What virtues would be displayed by this person if they chose to act ethically in this situation?

Wrap Up Discussion

- Once each group has discussed all of its questions, have the class reconvene for a wrap-up discussion.
 - After writing and discussing these questions, what role do they think ethics plays in their lives?
 - How often are they faced with ethical dilemmas?
 - In general, do they consider themselves to be ethical?
 - Is it as important to make ethical decisions about everyday matters as it is to be ethical about more serious issues (e.g., health, safety, or wellbeing)? Why or why not?
- In a future class, students should share their responses and, as a group, vote on one to send to the school newspaper for publication, or to Randy Cohen at The New York Times. Queries to Mr. Cohen may be addressed to: ethicist@nytimes.com or The Ethicist, The New York Times Magazine, 229 West 43rd Street, New York, N.Y. 10036. Be sure to include a daytime phone number.

Reference: Kavanagh, Sarah, and Andrea Perelman. "The Good, the Bad and "The Ethicist". *The Learning Network: The New York Times*, 16. July.2007. Web. 4. June. 2018

Risk Assessment

Lesson Goal

Introduce students to basics of health risk assessment in order to better understand and communicate health risks from environmental exposures.

TOTAL TIME: 1 hour 20 minutes

Activities

- Health Risk worksheet
- Exposure Assessment worksheet

Materials

- None.

Lesson Objectives

- Understanding that risk assessment is a process in which information is analyzed to determine if an environmental hazard might cause harm to exposed persons and ecosystems
- Understanding the basics of health risk assessment paradigm and how it helps you understand and communicate health risk from environmental exposures
- Provide examples of health risk assessment during presentation and in-class assignment
- Unit conversions necessary for lead health-based risk assessments

Background

The main focus of this lecture is to teach students the basics of health risk assessment. Students will learn how to perform unit conversions necessary for risk assessment through an in-class assignment. This will help students understand how information is analyzed to determine potential environmental hazards.

Course Materials

Health Risk and Exposure Assessment worksheet

Time Breakdown:

30 minutes	Health Risk Power point
30 minutes	Health Risk worksheet
20 minutes	Exposure Assessment worksheet

Lesson breakdown:

30 minutes:

- Components of Risk Assessment
- Basic unit conversions
 - Worksheet will have more detailed examples of conversions and there will be questions
- Briefly go through components of risk assessment (hazard identification, dose-response assessment, risk exposure, and exposure assessment)
- Questions for ADD/LADD are a little more difficult and hints are provided for help

30 minutes:

- Handout the worksheets (Lecture 6 worksheet and Personal Data sheet) and allow students to work in groups
- Students will bring home the Personal Data sheet to be completed before Lecture 9
- After everyone is done, or near done, go over the answers with Lecture 6 Answer key

20 minutes:

- Allow students to write on chalkboard for comparison of lead exposures
- Students will tabulate data on board and on an excel sheet
- Make graphs/tables and hand to the class for each student to mark where their exposure are compared to the class. Take home assignment: (In preparation of EPA IEUBK Model lecture)
- Students will keep a diary to record drinking water intake (Personal Data worksheet)
 - Give students a log sheet with more than one measurement of water amount to practice their unit conversion
- Also, record family members as well (use another copy of the sheet)
- Measurements to record on log: volume consumed per day

EPA's IEUK Model and Exposure Assessment

Lesson Goal

Introduce students to basics of EPA's IEUBK Model and its applications for child blood lead level exposure

Activities

- IEUBK activity

Materials

- computer

Lesson Objectives

- Be able to download, navigate, and use EPA's IEUBK Model to get a potential BLL
- Evaluate BLL using IEUBK model and exposure data to derive estimates of childhood BLL
- Understand data and model estimates about EPA IEUBK's Model
- Understand potential health impacts of modeled BLLs
- Be able to discuss implications of results to peers, teachers, and families

Background

The main focus of this portion of the lecture is to teach students how to use EPA's IEUBK model. Students will also use this model to estimate childhood BLL.

Course Materials

Video about IEUBK:

https://www.youtube.com/watch?v=jver1TZ5_ac&feature=youtu.be

Time Breakdown:

15 minutes	Power point
30 minutes	IEUBK Parameter Setup Worksheet
40 minutes	IEUBK lecture worksheet

Lesson Breakdown:

15 minutes

- Brief introduction to EPA's IEUBK Model
 - Discuss underlying assumptions upon which model is based
- Run through 2 examples of varying exposure assumptions (high lead levels vs. low lead levels and water intake differences)
- Demonstrate to class how varying exposure assumptions (water intake) can impact BLLs
- Explain each input value and how the value was derived
- Ask students what interpretation means for each example

30 minutes

- Go through the worksheet "IEUBK Parameter setup" together as a class
- Allows students to practice with made up scenarios on EPA IEUBK's Model with IEUBK parameter setup worksheet as a guide
- Give assistance to class when needed

40 minutes

- Input their collected values from the health risk handout (Personal Data sheet) into the IEUBK model and work on IEUBK lecture worksheet
- Go over answers for IEUBK lecture worksheet towards the end of class

Health Communication

Lesson Goal

Introduce students to basics of health communication to obtain a better understanding of how health information is distributed to the public

TOTAL TIME: 50 minutes

Activities

- Health communication handout

Materials

- none

Lesson Objectives

- Understand the Healthy People 2020 goal: Health Communication and Health Information Technology goal.
- Identify the various levels at which health communication occur using the social ecological model.
- Identify the types and characteristics of effective health communication.
- Recognize steps to creating effective health communication strategies
- Understand the concept of health literacy and digital divide

Background

The main focus of this lecture is to teach students about health communication. Students will learn about the various levels of health communication and learn the steps needed to create effective health communication.

Course Materials

- Sources for social ecological model:
https://www.acha.org/HealthyCampus/Implement/Ecological_Model/HealthyCampus/Ecological_Model.aspx?hkey=f5defc87-662e-4373-8402-baf78d569c78

Time Breakdown:

15 minutes	Healthy People 2020 Introduction Where Health Communication occurs Hand out- Communicating effects of lead in drinking water at each level.
20minutes	Types of Health Communication
	Characteristics of Effective Health Communication
	Steps to create Effective Health Communication
15 minutes	Health literacy and Digital divide Conclusion: Assignment and assign homework

Lesson Breakdown:

15 minutes

- Introduction question: Why is health communication important?
- Healthy People (HP) 2020
 - Goal
 - Objective

Discussion points:

- What is the importance of having such a goal in the HP 2020?
- What other objectives do you think should go under the goal?
- Where Health Communication Occurs?
 - Different levels
- Hand-out– Communicating effects of lead in drinking water at each level

20 minutes

- Types of Health Communication
- Characteristics of Effective Health Communication
- Steps to create Effective Health Communication

15 minutes

- Health Literacy and Digital divide
 - What is it?
 - Why does it exist?
 - Factors influencing?

Discussion points:

- Can you provide an example of each (of the factors affecting health literacy)?
- What other factors contribute to the digital divide?

Assignment: Leaders, tell us about lead!

Homework: Read LCR report and answer questions.

Final Project Overview

Becoming an Environmental Advocate

For this project you will identify one environmental and human health problem and become part of the solution to that problem. There will be 3 parts to this project. First you will educate others in the community about the issue you have chosen to tackle. Second, you will develop and implement a plan to help solve the problem. Third, you will collect and analyze data to determine if your efforts were successful. If you were not successful, you will discuss what you could do differently to increase success.

Essential Questions

How can one individual influence change?

How can your local actions affect the global environment?

How can accountability toward the environment affect sustainability?

How can education and collaboration affect environmental stewardship?

Final Product

1. Education Materials and resources used to educate and solve problem.
 - a. OR Policy recommendations
 - b. OR Intervention and intervention plan
2. Project plan – identifies the problem to be solved and proposes ideas on how to solve the problem and data that could be collected.
3. Project report. Report should include a brief description of your project and analysis of the effectiveness of your project. In this description you should address how the local actions affect a global environment. You should include all data you collected and analysis of that data. You should also discuss if this project had an impact on the way you will live your life (ex. Has your sense of responsibility changed toward environmental and human health?)
4. Presentation to the class summarizing your project and what you have learned.

Timeline

Date	Material Due
Week of March 12 th – Exam week	Project proposal due at end of class. Your proposal should include a description of the problem you plan to address, an outline of how you will address the problem and the data you plan to collect.
Week of April 9th	Status report outlining work done and data collected on your project.
Week of April 30th	Report and project presentation due.