



ENVIRONMENTAL CLASS CURRICULUM

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

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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.)
Water Filters	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. TOTAL TIME: 1 hour 30 minutes	<ul style="list-style-type: none"> Homemade water filter 	Filters <ul style="list-style-type: none"> Plastic soda or juice bottle Vase or tall drinking glass Gravel or small stones Clean sand (Lowes: \$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
Becoming an Environmental Advocate	In this lesson students will explore environmental issues and how they become involved in change. TOTAL TIME: 1 hour	<ul style="list-style-type: none"> PBS "Celebrating Earth Day" Environmental Issue highlights Local environmental issue discussion Letter-writing campaign 	<ul style="list-style-type: none"> Paper Stamps Envelopes Writing utensils

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 and regulations on environment and 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.

TOTAL TIME: 1.5 hours

Lesson Objectives

- 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

Activities

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

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

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.

Course Materials

- Video about the History of Lead: <https://www.youtube.com/watch?v=CM1u29BeqC0>
- 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:

- 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

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 instructed 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

Becoming an Environmental Advocate

Lesson Goal

In this lesson students will explore environmental issues and how they become involved in change.

TOTAL TIME: 1 hour

Lesson Objectives

- Discuss current environmental issues.
- Identify environmental issues and learn how to take action.
- Engage students in activities affecting policy (e.g. letter-writing campaign)

Activities

- PBS “Celebrating Earth Day” Environmental Issue highlights
- Local environmental issue discussion
- Letter-writing campaign

Materials

Letter-writing campaign

- Paper
- Stamps
- Envelopes
- Writing utensils

Background

The main focus of this lesson is to expose students to environmental issues and possible routes of action they can take to effect change. The assignment will engage students in a letter-writing campaign to local government expressing their concern for local environmental issues discussed during the lesson.

Course Materials

- Information on environmental issues:
https://lpb.pbslearningmedia.org/collection/celebrate-earth-day/?utm_medium=Email&utm_source=ExactTarget&utm_campaign=20180407EducationNewsletter&mc_key=00Qi000001UhopxE#.XVbafOhKiUk

10 Minutes	Environmental advocacy introduction
25 minutes	Environmental issue presentations and discussion
25 minutes	Letter writing campaign

Lesson Plan

10 minutes

- Introduce environmental advocacy. Discuss why it is important for youth to be involved in environmental advocacy efforts.

25 minutes

- Pick 2-4 topics on the PBS “Celebrate Earth Day” website and watch the videos. After each video, lead a discussion of courses of action students can take to alleviate this environmental issue, i.e., call their legislature, write letters to local government.
- Discuss one or two local environmental issues (google environmental issues + your town to get some ideas). Ask students how they think these issues can affect them in their daily life and what they can do to help fix the problem.

25 minutes

- Letter-writing campaign:
 - Ask students to write a letter to councilmembers, the mayor, etc. regarding the issue that affected them most that they learned about during the lesson.