Fishable and Swimmable in 7 Years

Lesson 3 - Explain

Overview

The pollution of the Ala Wai Canal can come from the 3 streams that feed into it (Mānoa, Pālolo, and Makiki). The type of pollution differs based on the section of the stream.

The first part of this lecture focuses on midstream pollution, which contributes to a large amount of trash going into the canal. The second part of this lecture focuses on sludge, and ways to mediate that problem.

Goal

Students understand how pollutants accumulate in a watershed, and potential solutions for those problems.

Essential Question

How can we encourage others to care?

Enduring Understandings

It can be difficult to pinpoint the sole cause of a problem.
Problems can have more than one solution.

- There are multiple ways to address the Ala Wai Canal's pollution
- There are multiple ways to encourage people to care.

Digital Resources

Video - Life of the Ala Wai Canal (***checking on usage due to copyright*)

Ala Wai Watershed Association - https://www.alawai.org

Genki Ala Wai Project - https://genkialawai.org

Lesson 3 - Explain

Lesson Time = 40 minutes

Lecture - Midstream Pollution (10 minutes)

Content:

- Different parts of the stream provide different types of pollution.
  - Upstream = environmental pollution (leaf litter, animal droppings, bacteria, etc.)
  - Midstream = human pollution (trash, fertilizer, oil from cars, etc.)
  - Downstream = commercial pollution (oil from cars)

- Midstream pollution.
  - The Ala Wai Watershed Association tagged trash in the residential areas using a GPS system.
  - A lot of the trash they found was diapers.
  - People tend to dump their large trash items in secluded areas in the mountains like Tantalus. They back up their pickup trucks to the edge of the mountain, and push the rubbish into the stream.

1. You may use other videos to supplement the information if the video "Life of the Ala Wai Canal" is not available.

2. Use videos to show:
   a. Midstream pollution
   b. Illegal dumping of trash
   c. The use of barricades to deter illegal dumping.

Lesson 3 - Explain

Discussion - Midstream Pollution (10 minutes)

Content:

- Midstream pollution solutions.
  - Manual clean up
    - Pros - Trash is removed
    - Cons - Have to keep doing it, people won't stop
  - Put up barricades
    - Pros - Makes it harder to dump trash
    - Cons - People will dump trash someplace else
  - Change behavior
    - Pros - Trash isn't dumped illegally in the first place
    - Cons - How can we encourage others to care?

1. Lead a discussion on the solutions for midstream pollution. You can present solutions, or have students come up with ideas.
2. Ask students to share pros and cons for each idea.
3. Lead the discussion to "how can we encourage others to care?"

Lesson 3 - Explain

Lecture - Bioremediation (10 minutes)

Content:

- Sludge
  - It is rotting waste from living or previously living things
  - It is a home for pathogens (disease causing things), heavy metals, and harmful bacteria.

- Sludge Cleanup #1 - Dredging
  - Occurs every 20 years or so.
  - Uses machines to scoop up sludge and place them on boats.
  - The boats dump the sludge into the ocean, about 4 miles away from the airport.
  - The site of sludge dumping is approved by the Environmental Protection Agency.

- Sludge Cleanup #2 - Bioremediation
  - The presence of sludge suggests decomposer imbalance.
  - Bioremediation uses microorganisms to clean up the sludge
    - Bio = living, remediation = to fix
    - Yeast, lactic acid bacteria, and phototrophic bacteria are naturally found in the environment.

1. You may use other videos to supplement the information if the video "Life of the Ala Wai Canal" is not available.
2. Use videos to show sludge, dredging, and bioremediation

Discussion - Bioremediation (10 minutes)

1. Lead a discussion and ask students to share their thoughts on dredging and bioremediation.