Water Heroes Program

Lesson 2: Water Quality Testing

virgin islands MARINE ADVISORY VIMAS SERVICE

VIRGIN ISLANDS EPSCoR

UNIVERSITY OF THE VIRGIN ISLANDS 1962

CFVI Community Foundation of the Virgin Islands

Water is essential for life.

A Changing Climate

An increase to our annual global temperatures by just 2 degrees Celsius will result in severe, accelerated changes to the climactic systems that support life on Earth may become irreversible, according to a report by the UN's Intergovernmental Panel on Climate Change (IPCC).

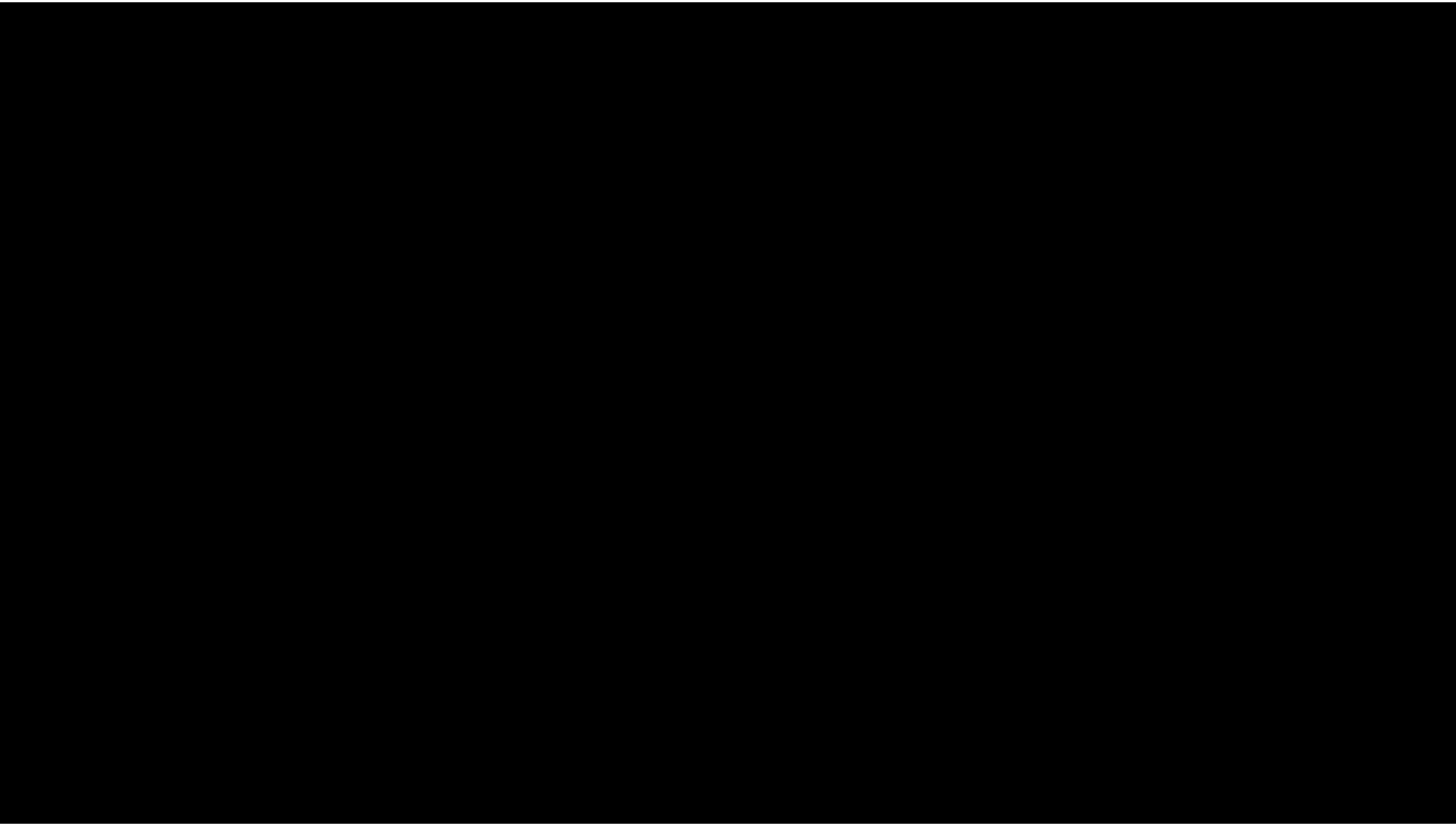
Water Contamination

- Nonpoint Source Pollution
- Point Source Pollution

Examples of Nonpoint Source Pollution

"NPS pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters and ground waters."

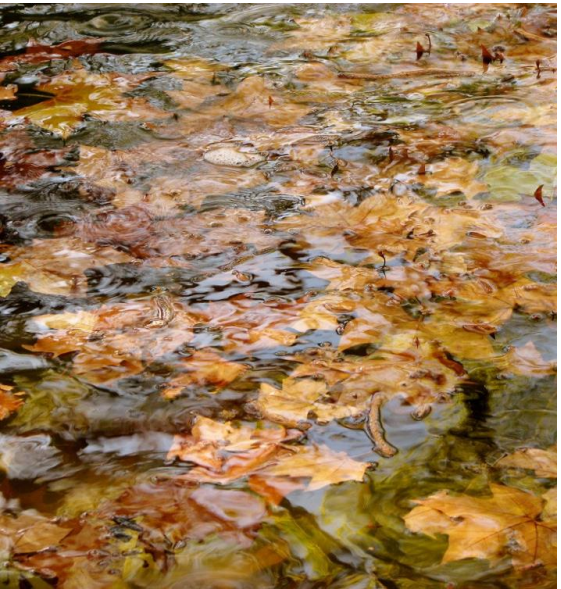
What does Sediment Run-off Look Like?





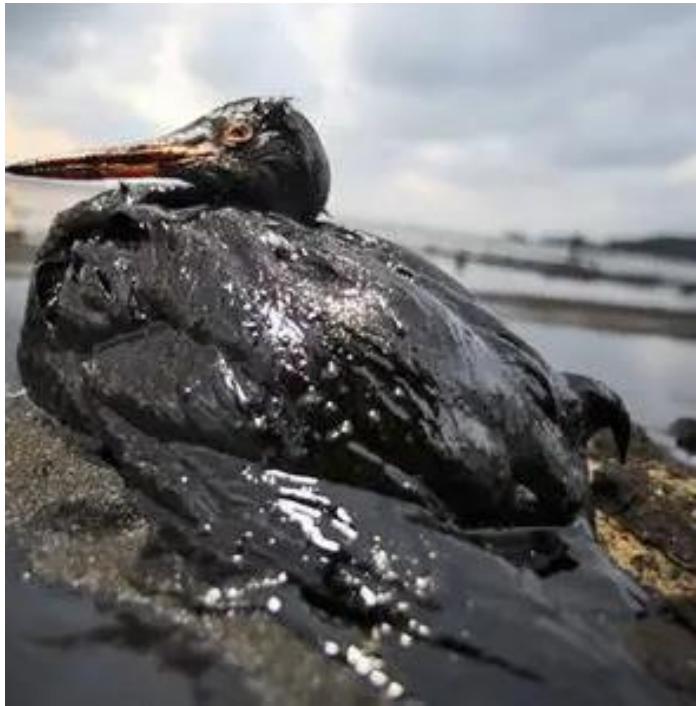
Examples of Point Source Pollution

"Any contaminant that enters the environment from an easily identified and confined place."



Environmental Impacts

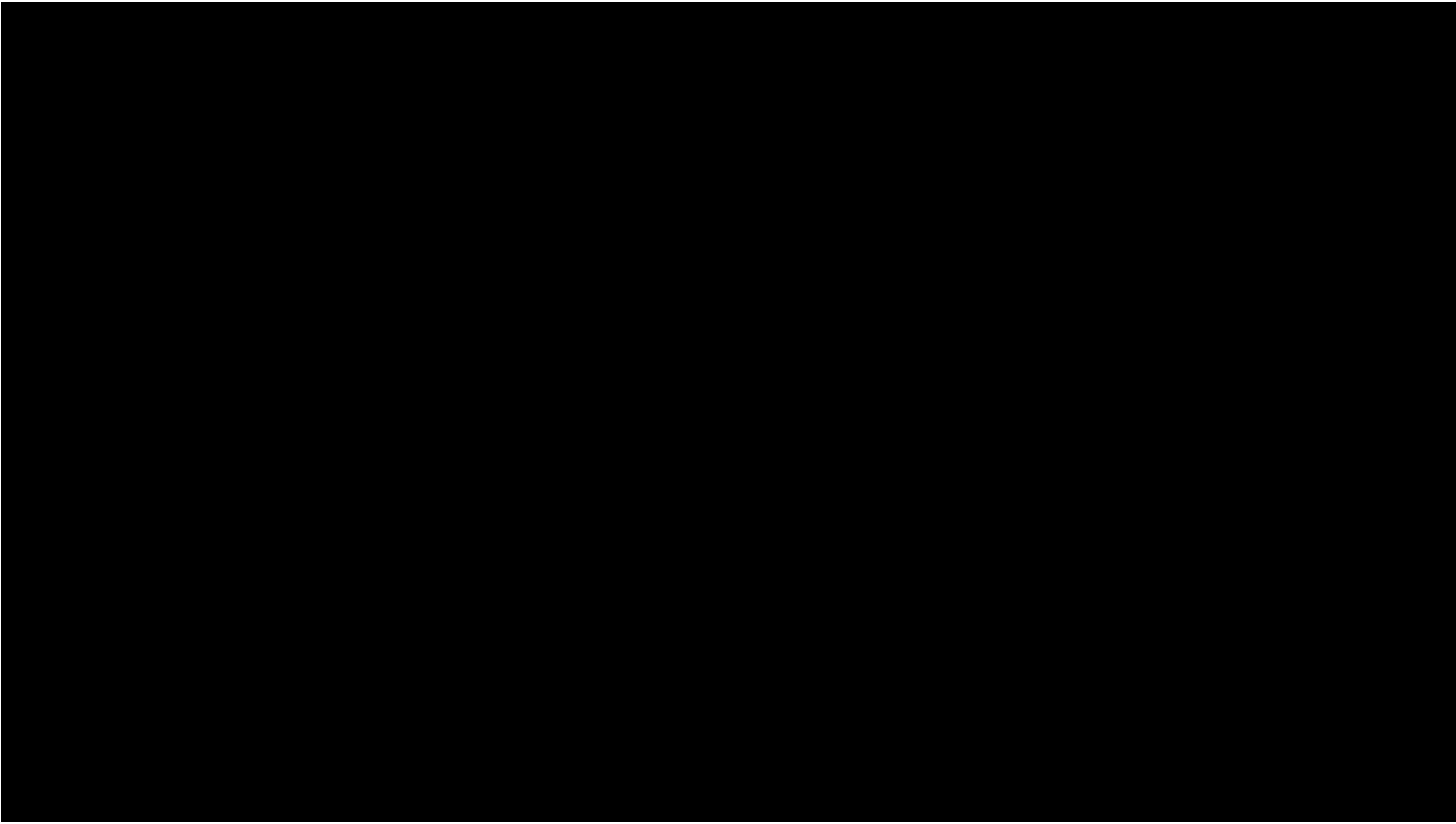
(Wildlife)



Public Health Impacts

(Water quality)

How Does Contaminated Water Affect You?



Can You Tell Which of These is Contaminated?

A

B

BACTERIA

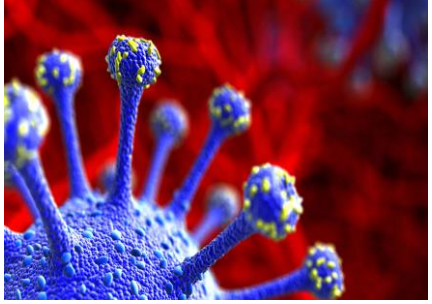
Typhoid fever

Gastroenteritis

Cholera

Dysentery

Leptospirosis



VIRUSES

Yellow fever

Dengue

PARASITES

Giardiasis

Cryptosporidiosis

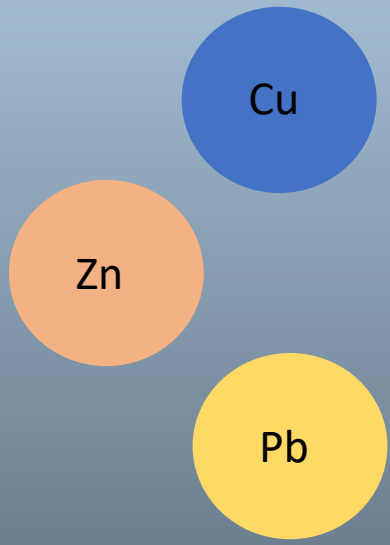
Malaria

CHEMICALS

Blue baby syndrome

Cancer

Heavy metal poisoning



Found in **human or animal feces**. Cause infections of the intestines that result in **severe diarrhea**.

Mosquito-borne illnesses like yellow fever and dengue rely on standing bodies of water to thrive.

Parasites are often found in **soils** and can sometimes produce symptoms that mimic other symptoms leading to a misdiagnosis.

Lead and Copper Rule

Lead was used for plumbing as it was **more malleable** than other metals.

Congress banned the use of lead pipes in **1986** because of **health concerns**.

Environmental Disasters

Pollution of the Cuyahoga River in Cleveland helped to create the **Environmental Protection Agency** (EPA) and **Safe Water Drinking Act** in 1974.

Clean Drinking Water Act (EPA)

The **Safe Drinking Water Act** (SDWA) is the federal **law** that protects public **drinking water** supplies throughout the nation. Under the SDWA, EPA sets standards for **drinking water** quality and with its partners implements various technical and financial programs to ensure **drinking water safety**.

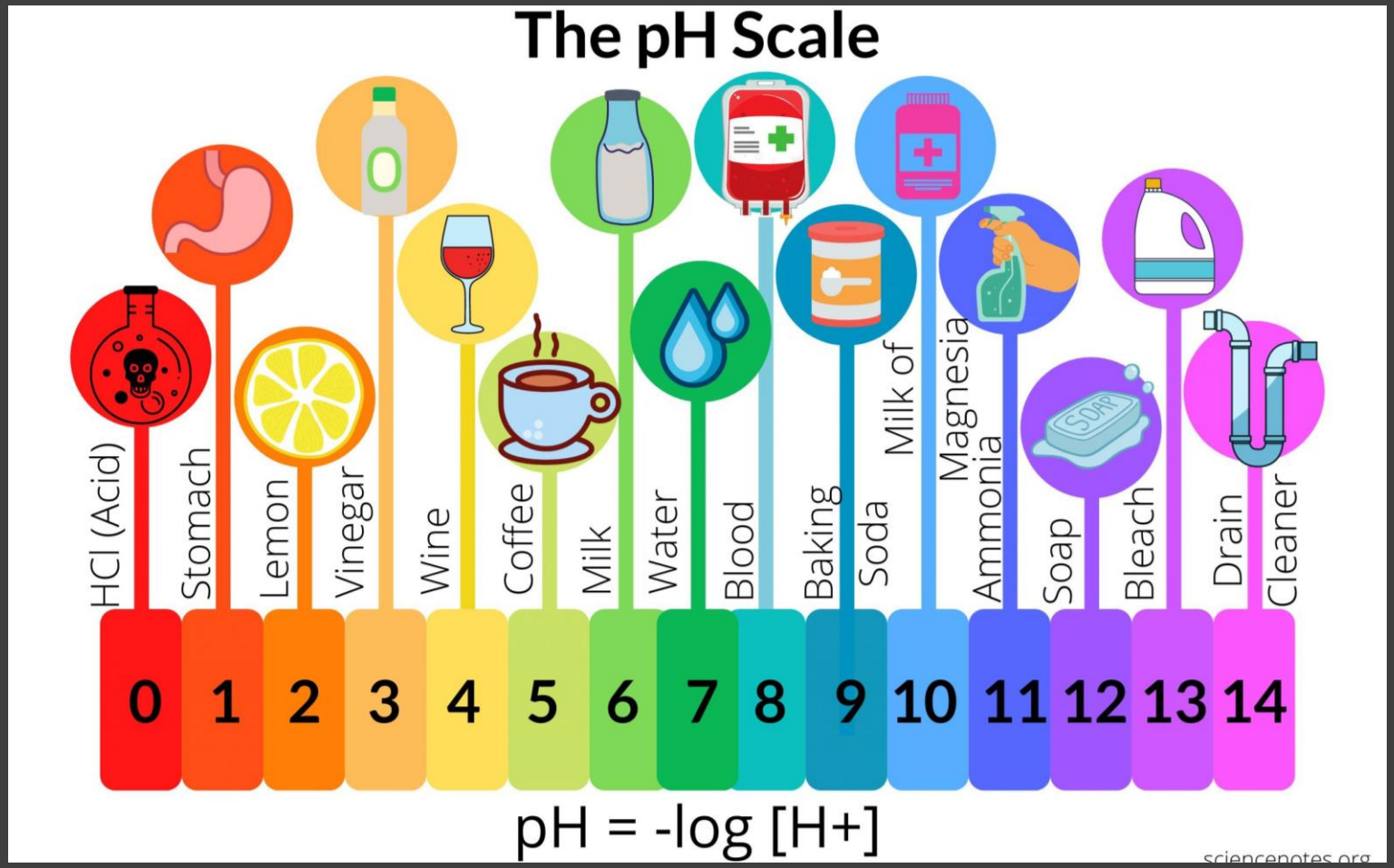
Flint Water Crisis

In **2014**, the drinking water source for the city of Flint Michigan was changed from Lake Huron to the Flint River.

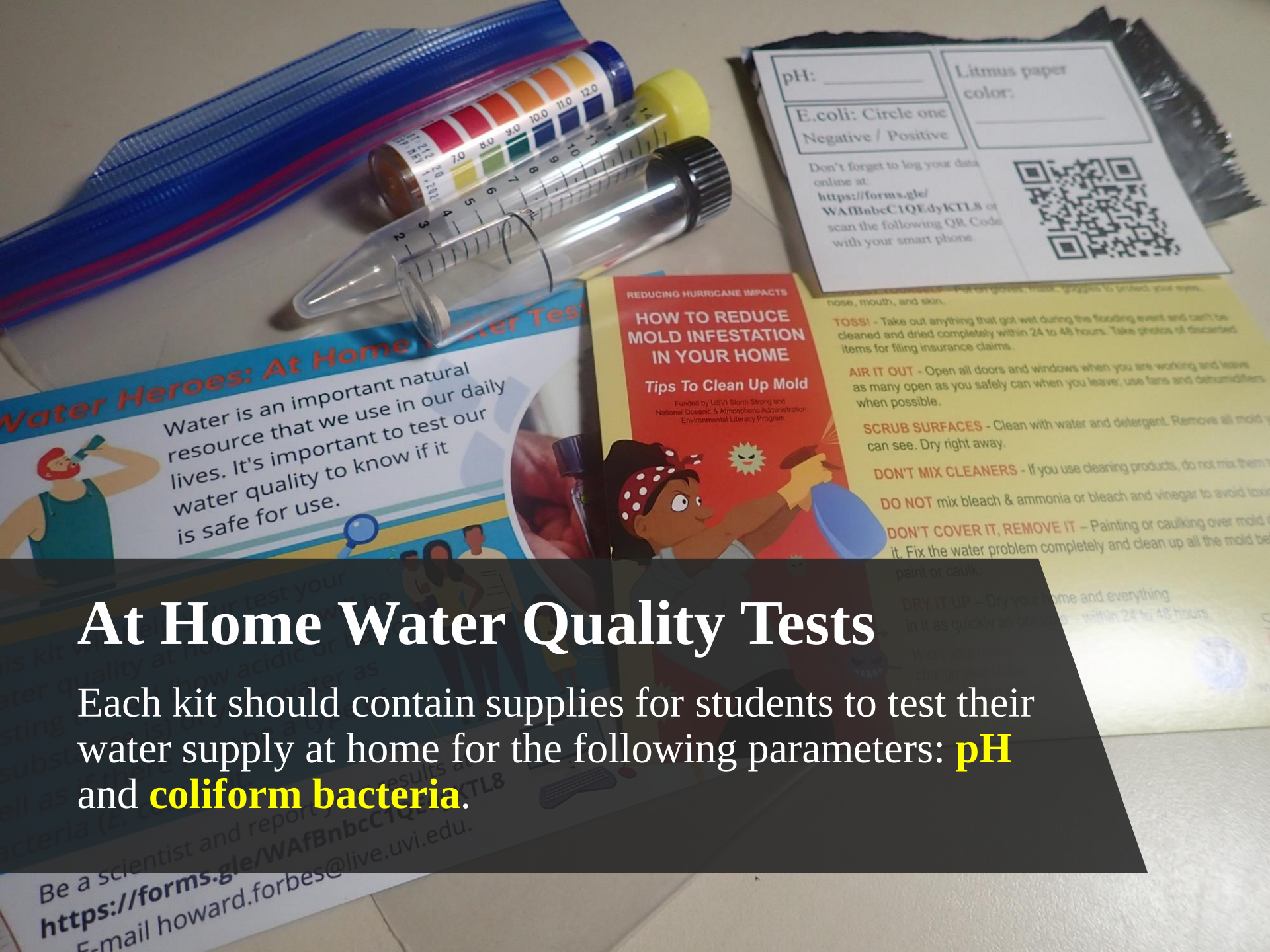
Changes in **water chemistry** resulted in **lead** leeching from pipes from and affecting over **100,000 residents.**

Water Quality Testing

(Parameters tested for and equipment used)



Drinking water should have a pH around **7**. pH values below 7 gradually increase in **acidity** whereas pH values above 7 gradually increase in **alkalinity**.



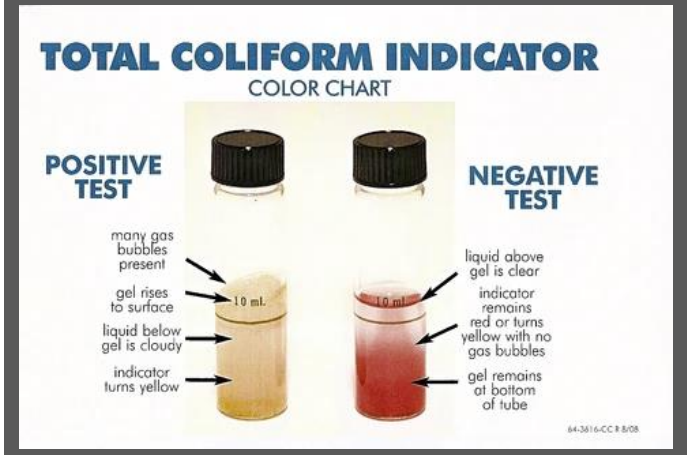
At Home Water Quality Tests

Each kit should contain supplies for students to test their water supply at home for the following parameters: **pH** and **coliform bacteria**.

Centrifuge tube: Use this tube to collect a water sample from your sink faucet (fill to ~10 – 12 ml).

pH Test: Insert litmus paper strip into water for ~5 seconds. Compare color of strip to pH chart found on vial.

Coliform Bacteria Test: Fill vial with water sample up to black fill line. Wrap foil around vial and set aside undisturbed for 2-3 days.



Limitations:

1) Test should be done at least 3x.
2) Does not tell you what kind or how much bacteria are present.

Upload your data!

What's Next?

- Complete At Home Water Testing Kit

Upcoming Topics

- Water Filtration – Lesson 3

Let's Recap

- Water contamination can either be from **non-point source pollution** or **point source pollution**.
- Common pollutants include **animal waste, leaf litter, pathogens, chemicals, and plastic waste**.
- Contaminated water can lead to harmful impacts to **ecosystems, wildlife, and human health**.
- **Smell, change of color, taste, and presence of particulates** can be used to identify contaminated water. However, some pathogens require testing to ID.
- The water quality parameter(s) being tested will dictate what equipment will be used. Some equipment are more affordable but not very accurate whereas others are more expensive but very accurate.

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