

## U.S. Fish & Wildlife Service

### Albemarle- Pamlico Environmental Education Activity Kit



## Fit For A Fish: *Chlorine-A Hazardous Waste*

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**Activity Description:** Learning how to test your tap water for chlorine and learning how to remove the chlorine, making your tap water fit for a fish.

### Objectives:

- To determine if your tap water is fit for a fish to live in.
- To learn some of the basic properties of chlorine.
  - a. Why is it used?
  - b. How can it be removed?
  - c. Why is it important to the environment to not pour it into our rivers and streams?

**Age Group:** Grades 6 - 8

### Materials:

- Chlorine test kit which can be purchased from a pool supply store for approximately \$6.00.
- 12 glass or plastic jars with lids (baby food or peanut butter jars work fine).
- A straw for each student.
- A clean gallon jug with lid.
- 1/8 teaspoon
- Household bleach will be needed if you use unchlorinated well water.

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### Introduction:

Chlorine is used by most towns and cities to help make drinking water safe. Its use began in 1879 when Englishman Thomas Soper used chlorine to kill typhoid bacteria. It is a very good disinfectant and kills many of the germs that could make us sick. Chlorine is also used by towns and cities to disinfect treated sewage before it is returned to our streams and rivers. Unfortunately, chlorine kills fish just as effectively as it kills germs. If you have ever brought a fish home from the pet store and placed it in fresh water from the tap only to find it mysteriously dead the following day, chlorine was the likely culprit. These fish deaths and those that occur in our rivers and streams are a terrible waste because we can easily remove chlorine from water.

Chlorine is similar to many hazardous wastes in that exposure to air or sunlight is very effective in making contaminated water safe. However, many other hazardous wastes are poisonous to people as well as fish.

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## Poison, In Our Water?

Generally, when we think of poisons we do not think of the water we drink. Although safe for us to drink, tap water in most towns and cities is poisonous to fish because of the chlorine that it contains. We need to realize that many animals are different in their response to different chemicals, and we can kill them unintentionally. There are about 600 wastewater (sewage) dischargers in the Albemarle-Pamlico Estuary, which discharge a total of 368 million gallons of wastewater per day. A good portion of those chlorinate their waste-water before it is discharged into rivers and streams. If the chlorine is not removed it can kill fish.

## Why Worry About Chlorine?

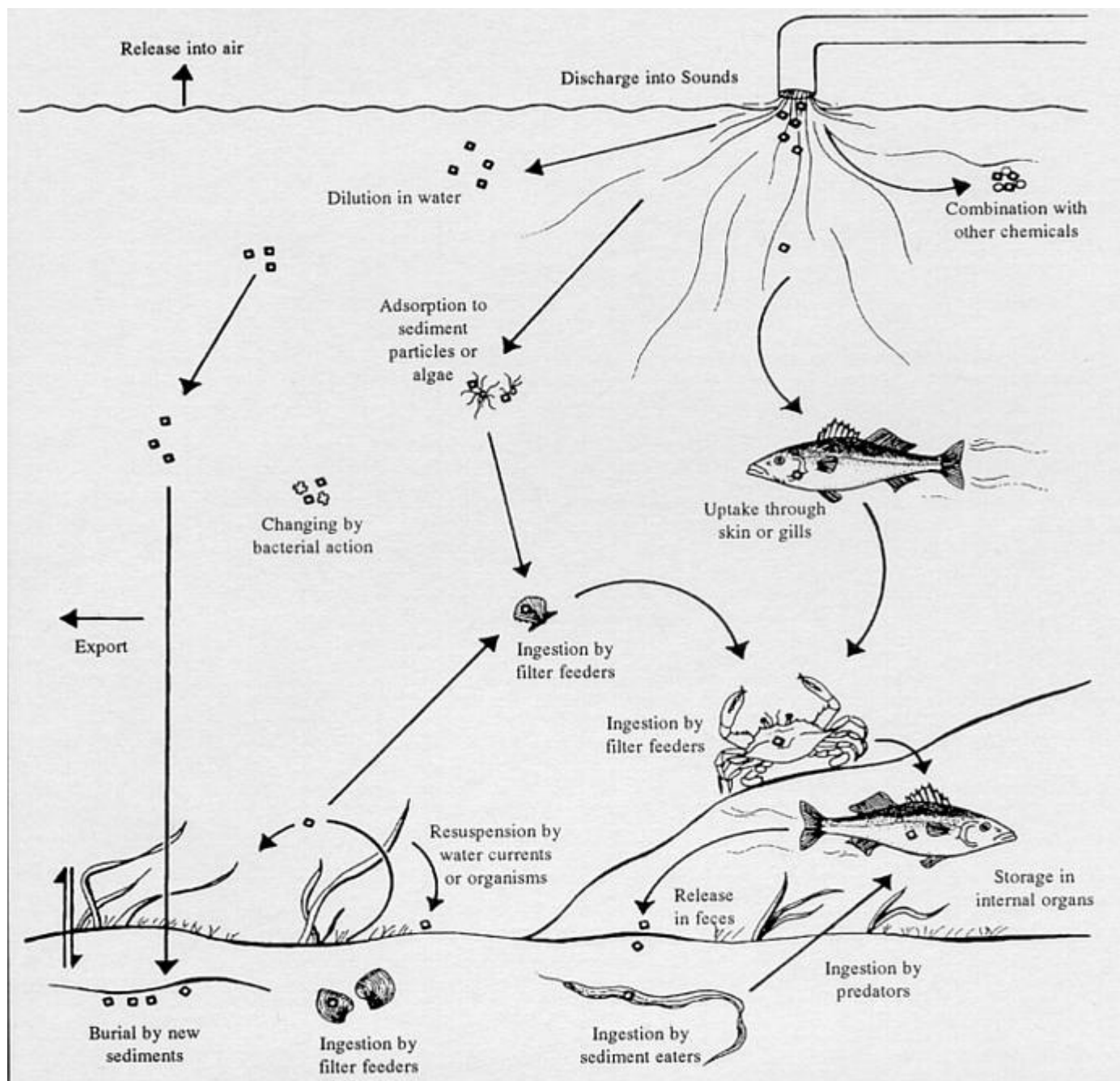
Chlorine is poisonous to fish at very low levels. Imagine adding only one pint of vanilla ice cream to a tanker truck of root beer to make a root beer float! No one would be able to see or taste any of the ice cream. If this same amount of chlorine (1 pint) was added to the tanker (20,000 gallons), the water would be poisonous to fish. Because chlorine is so deadly to fish and other aquatic animals, it is essential that this form of hazardous waste be removed from our treated sewage before it is poured back into our streams and rivers. Fortunately, water containing chlorine and many other forms of hazardous waste can be made safe by aerating it (stirring it vigorously) and exposing it to sunlight. If chlorine isn't removed, chlorine can remain in our deep, slow flowing, shaded rivers and streams long enough to travel downstream and kill fish and other animals as it goes.

## Activity: Ways To Make Water Fit For A Fish

Collect a gallon of fresh tap water and place a lid on the container so the chlorine will not escape. Before you cover the container, smell the water. If it contains chlorine you will probably be able to smell it since it smells like a swimming pool. Using your test kit (instructions should be included with the kit you purchased), test a small sample of this water for chlorine. If your water is not chlorinated, you can simulate city water by adding one-eighth teaspoon of household bleach to a gallon of water. The active ingredient in household bleach is chlorine. Divide your class into four groups. Each of the student groups should be provided with several ounces of water, three jars with lids, straws, spoons, and access to a window sill. Give the students enough water for a chlorine test. The groups (pretending they are scientists) should devise tests on how to rid their water of the hazardous waste chlorine. Allow the students enough time (20-30 minutes) to discuss ideas within their groups and conduct their experiments. After the experiments, groups should be prepared to answer the following questions for each technique:

- How long did it take to rid the water of chlorine?
- Which method would be the easiest for a town to use?
- Could the different techniques be combined?
- If they were combined, would that more effectively remove the chlorine?

Some students may want to bring water in from home to be tested. If you have time, this might be an interesting follow up experiment especially if some students have well water at home.



## FATE OF CHLORINE AND OTHER CHEMICALS IN THE SOUNDS

Illustrations by Sandra Koch

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