

Module 6.4

Science and Technology in Society How do science and technology affect the quality of our lives?

CT Science Framework Topics

Science Content Standard 6.4

CMT Expected Performances

<p>6.4 - Water moving across and through earth materials carries with it the products of human activities.</p> <p>Most precipitation that falls on Connecticut eventually reaches Long Island Sound.</p>	<p>C 10. Explain the role of septic and sewage systems on the quality of surface and ground water.</p> <p>6.4.1</p> <p>C 11. Explain how human activity may impact water resources in Connecticut, such as ponds, rivers and the Long Island Sound ecosystem.</p> <p>6.4.2</p> <p>6.4.3</p> <p>6.4.4</p> <p>◆ <u>REQUIRED CMT EMBEDDED TASK: DIG IN</u></p>
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SCIENCE CONTENT STANDARD 6.4

<p>CONCEPTUAL THEME:</p> <p><i>Science and Technology in Society</i></p> <p>CONTENT STANDARD:</p> <p>6.4 – Water moving across and through earth materials carries with it the products of human activities.</p>	<p>GRADE-LEVEL CONCEPT ♦ Most precipitation that falls on Connecticut eventually reaches Long Island Sound.</p> <ol style="list-style-type: none"> 1. Water is essential for life and is a distinguishing feature of Earth among the planets in our solar system. Humans and other organisms use water in various ways. 2. The surface of Earth is largely covered with water, most of which is saltwater found in oceans. Only freshwater is drinkable, and it is found on the land (surface water), beneath the ground (groundwater), and frozen in glaciers. 3. Water is a universal solvent that dissolves and carries many substances through the environment (for example, acid rain, calcium, carbon dioxide, oxygen, salt, metals, etc). Many substances that are dissolved in water may be either harmful (pollutants) or beneficial to organisms (minerals, oxygen, nutrients). Water temperature affects its ability to dissolve substances such as oxygen and salt. 4. Some water that falls to Earth as precipitation soaks into the ground, some evaporates almost immediately, and some moves across earth’s surfaces filling streams, rivers and reservoirs. Several factors influence whether water seeps into the ground, including the amount of rainfall, the length of time it falls, the permeability of the ground surface and subsurface, saturation of the soil, and steepness (slope) of the land. 5. Water moving beneath the earth’s surface is influenced by size of and spaces between the particles in rock and soils. 6. Water moving across the earth’s 	<p>CMT EXPECTED PERFORMANCES</p> <p>C10. Explain the role of septic and sewage systems on the quality of surface and ground water.</p> <p>C.11 Explain how human activity may impact water resources in Connecticut, such as ponds, rivers and the Long Island Sound ecosystem.</p>
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	<p>surface is affected by the shape and slope of the land and the properties of the surface materials it encounters. The area draining into a river system or other body of water is a watershed. Folds and faults in Connecticut's landform cause water to move generally from north to south, eventually draining into Long Island Sound.</p> <p>7. ADD TOPO MAPS?</p> <p>8. Water moving through a watershed picks up, suspends or dissolves various substances produced by nature and by human activities. The quality and usability of water depends on what materials have been picked up, carried and concentrated in the water.</p> <p>9. Water quality is important to support a variety of aquatic life and for human consumption. Water quality is evaluated by measuring indicators such as levels of dissolved oxygen, pH, turbidity and the presence of other dissolved substances. Substances such as heavy metals (e.g., lead and aluminum), sulfur, fertilizers, road salt are pollutants that may be dissolved in surface water or ground water, making the water unhealthy.</p> <p>10. Water entering Long Island Sound carries with it the products of human use. These pollutants negatively impact the aquatic life, commercial and recreational uses of the Sound.</p> <p>11. Point source pollution, such as untreated sewage, industrial or recreational waste, can be discharged directly into the Sound if it is not regulated and controlled. Nonpoint source pollution originates across the large area whose waters flow into Long Island Sound, and is difficult to trace or control. A major contaminant reaching</p> <p>CONTENT STANDARD 6.4 - continued</p>	
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	<p>Long Island Sound by way of watersheds is nitrogen.</p> <p>12. Drinking water may come from groundwater sources accessed by drilling wells, or from surface water reservoirs.</p> <p>13. People’s use of water adds waste products and harmful materials to the water which must be removed before returning the water to the environment. Wastewater can be purified using various physical, biological and chemical processes.</p> <p>14. Septic systems use settling and bacterial digestion to break down wastes in a holding tank; then the water is further purified as it is spread across a leaching field and percolates through layers of soil.</p> <p>15. Sewage treatment facilities are required in densely populated areas. Sewage treatment facilities use multiple filtration, biological and chemical methods to purify water before returning the water to the environment.</p> <p>16. Laws, regulations and remedial actions have helped to protect and restore water resources.</p> <p>SCIENTIFIC LITERACY TERMINOLOGY:</p>	
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Module 6.4 Science and Technology in Society

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GLOSSARY & BACKGROUND

**Shaft
Barb**

Vane
Source Pollution
Non-point source pollution
Contaminants
Pesticides
Fertilizers



Lesson 6.4.2

THE AFFECTS OF OIL SPILLS ON BIRDS

Background: The impacts of environmental pollution are often difficult to see. A major oil spill, however, provides dramatic evidence of potential impact to wildlife. All forms of life are affected by such a disaster. Many people are involved in efforts to prevent oil spills and their consequences as well as help clean up efforts should an accident occur. Such actions are not always successful, and sometimes have unfortunate consequences as well. The purpose of this activity is to examine some of the possible consequences of oil spills on birds.

1. Examine a feather with a magnifying glass or a dissecting microscope. Sketch the feather below, label the **shaft**, **vane** and **barbs**.

2. Use your fingers to rub the feather *against* the vanes. This should mess the feather up. Now gently stroke your fingers of the feather with the vanes. This should cause the vanes

to hook up together and the feather to return to its original shape. What are the hooks that link the barbs together called? _____

3. Fill a container with water and submerge the feather for 5 seconds. Remove the feather and shake it gently. Compare the feather wet to the way it looks dry.

4. Lay the feather on a paper towel and record the amount of time it takes for it to completely dry.

5. What is preening? Why is it necessary for birds to have a natural coat of oil on their feathers?

6. Now simulate an oil spill by dipping the feather in oil. Remove the feather and record your observations below (what does it look like). Do you think this bird could fly?

7. Birds caught in oil spills are washing with liquid Dawn to remove the oil. Wash the feather with one or two drops of dawn and rinse well. Record your observations below.

8. Lay the feather on a paper towel and wait for it to dry completely. Record the time it takes for it to dry now.

9. Why does the feather remain wet longer after it has been washed with soap?

10. Do you think a bird after being washed with Dawn will have trouble flying or swimming?

11. What should you do to ensure a bird's survival that has been washed with Dawn?

12. How do you think oil would affect other animals, like fish or mammals. Speculate how oil would affect scales and hair.

Effects of Oil Spills on the Egg

13. Sketch the amniote egg. Label the chorion. What is the function of the chorion.
14. Make a prediction about whether an egg is permeable to oil.
15. Obtain a hardboiled egg soaked in oil. Carefully peel the egg. Record your observations below.
16. Was the shell permeable to oil?
17. What do you think would happen to the embryo in an egg that has been soaked in oil.

OIL, WATER, AND SOAP

18. Fill a Styrofoam bowl full of water. Using a pipette, drop three or four drops of oil on the surface of the water. Record your observations.
19. Use a pipette to drop a few drops of detergent over the oil. What happens?
20. Why do commercials claim that "Dawn Breaks up Grease"? Is this a valid claim?

Clean-up: Wash your Styrofoam bowl and with soap and water and make sure it is rinsed well. Throw away the feathers and the egg parts.

Lesson 6.4.3



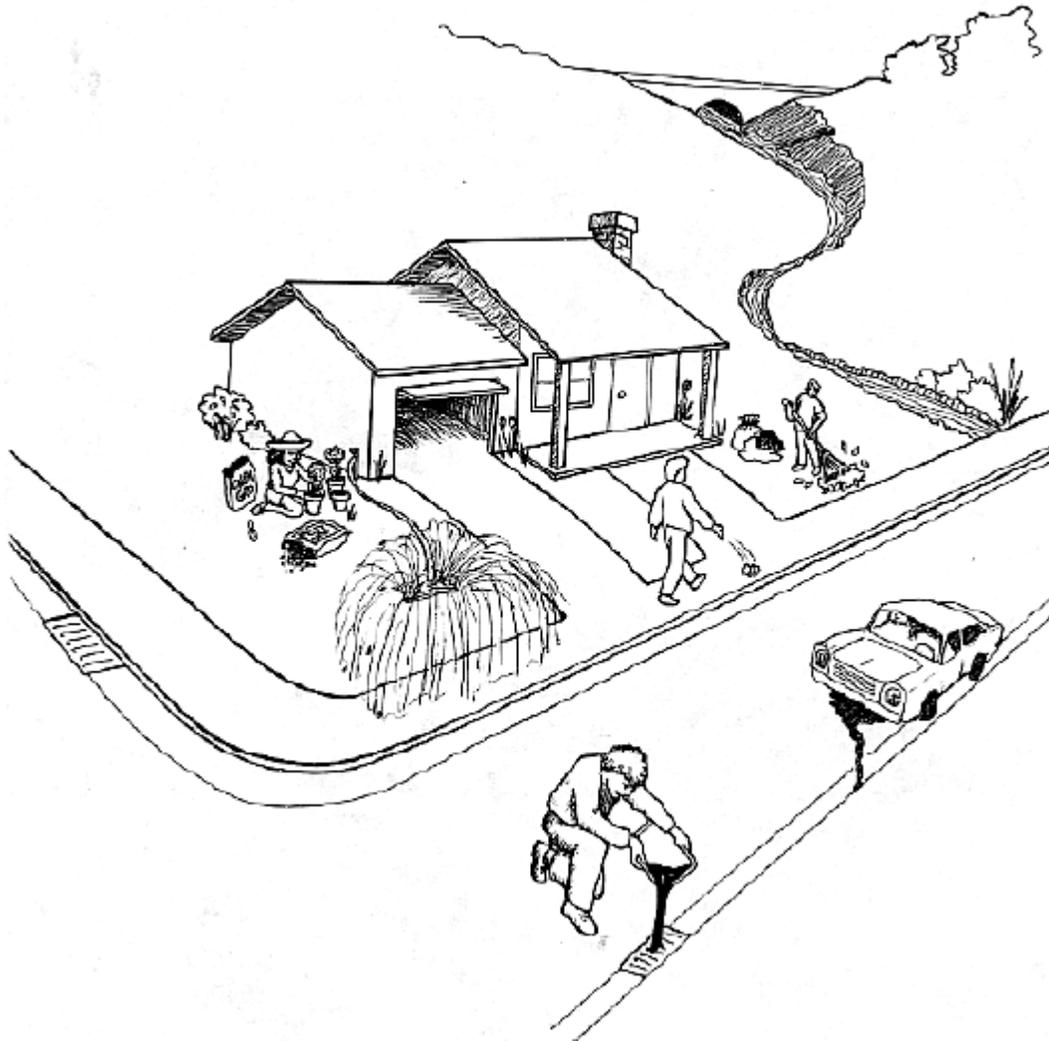
Nonpoint Source Kids Pages

What's **WRONG** With This Picture?!?



The people below are taking care of their home and car, but they are doing many things that can damage the environment, especially our water. Click on the spots where you think someone is doing something wrong for a

surprise.



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Environmental Protection Agency's Office of Wetlands, Oceans, & Watersheds
Revised October 15, 1997

[url:http://www.epa.gov/owow/nps/kids/whatwrng.htm](http://www.epa.gov/owow/nps/kids/whatwrng.htm)



Lesson 6.4.4 – Freddy the Fish

I. SUBJECT: How pollution affects animal life and habitats.

II. OBJECTIVES:

1. The student will understand that an animal's habitat is affected by pollution.
2. The student will make predictions about the affects of pollution on animals.
3. Students will explore the affects of different pollution mediums (oil, trash, chemicals, etc.) on the environment.
4. Students will create a knowledgeable letter that will make an argument to the local community to clean up pollution.

III. MICHIGAN STANDARDS:

Science/[Strand III/Content Standard 5/Elementary](#)

Benchmark 4

"Describe positive and negative effects of humans on the environment."

Science/[Strand I/Content Standard 1/Elementary](#)

Benchmark 5

"Develop strategies and skills for information gathering and problem solving."

IV. MATERIALS: large flip-chart paper, markers, overhead, pictures of pollution (2), sponge shaped like fish (4), 1 gallon jar or bottle (4), fishing line, pencils (anchors), soil, syrup, salt, paper dots, brown sugar, soap, red and green food coloring, water, writing paper, pencils, chalkboard, eight paragraphs of things that humans do to harm water.

V. PROCEDURE:

Housekeeping: We will tell the students that they can not eat any of the materials that we are using, because you never know if they would be harmful. We will also tell them that we will be calling on a lot of helpers for the activities, but if they have been a helper already they need to be honest and not try to be one again. They can answer as many questions as they want, but when we ask for a volunteer we will only ask for a new one.

1. **Engage:** As a class, we will begin with a KWL chart. The teacher will start by asking the class what they know about

pollution. As the students add their knowledge, the teacher will add it to the chart. Next, the teacher will ask the students what they would like to learn about pollution. Those items will then be added to the want to learn section. While doing this chart, the teacher will keep in mind any misconceptions the students may have about pollution and make sure they go in the want-to-learn section so that they can be corrected.

2. **Explore:** The teacher will place two pictures on the overhead. The first will be of a polluted body of water. The second will be of an animal that has been affected by the pollution (ex. bird in oil spill). (obj 2)

2a. **Representation:** The students will then be asked to pull out their journals and write one paragraph in response to the questions, “What do you think the pictures are of?” and “How do you think the animals and the habitat are being affected?”. After they finish writing, the students will be asked to pick their most interesting “bit” from their writing. They will then be asked to share their ideas with a neighbor. (obj 2)

2b. **Discussion:** The students will be asked to regroup and share their ideas. The teacher will write these class ideas on the board and the students will be asked to offer anything that they want to add that is pertinent to their peers’ ideas.(obj 2)

Explain: The teacher will divide the class into four groups, and hand out the materials for Freddy the Fish activity. The teacher will tie one end of the fishing line to Freddy the Fish, and the other to a pencil. The teacher will have a student fill the bottle $\frac{3}{4}$ full of water. Then various students will come up and read a note card of the story of Freddy the Fish. Pollution will be added at each step of the story by other students that the teacher calls up to assist. (obj 1, 3)

Afterwards, the teacher will talk about some facts about pollution and some of the ways pollution has hurt water supplies, plants, and animals in places around the world, such as: Things that pollute water: there are eight paragraphs in The Water We Drink book on pages 12 through 15 that talk about the different ways people add to water pollution. We will have students who haven’t had a chance to participate yet, read one of them to the class, and then we will discuss. For example, one paragraph is “We harm the water we drink when we send garbage to landfills. Harmful chemicals in our waster seep through the ground in the land fill and end up in groundwater. One landfill alone is estimated to leak four million gallons of toxic liquids a day into nearby streams.” This way the students are involved and we are not just telling them about pollution. This also relates to what they have learned about before, the food chain. As told about on page 43 of Cleaning up our Water, insects and small fish absorb the poisons, and the bigger fish eat them and also absorb the poison, and it can reach all the way to humans, as in the case with Mercury.

Then we will talk about ways that students can help to save the water such as: reuse water at home to water plants, fill up a water bottle instead of running the faucet, use detergents without phosphates that encourage algae and bacteria growth in lakes, clean latex paint filled brushes indoors, but don’t just use the sink as a waste dumb because then it may come back in your water later, and fix leaks! (obj 1 and 3)

Elaborate: Students will write an “I-poem” from the point of view of an animal or habitat in a polluted area. Have the students draw and color a picture to accompany their poem.

4a. **Summary/Closure:** Bring out the KWL chart and review what the class wanted to learn about pollution. Ask- Did you learn what you wanted to know? What did you learn about pollution? Record answers on the chart.

VI. FOLLOW-UP ASSIGNMENT: For homework, the students will think of one way they could clean up a habitat. They must write it up and turn it in the next day. The next day, have the students share their ideas and pick one that the class can participate in. For example, have the class clean up garbage around the school. (obj 4)

VII. EVALUATION OF THE OBJECTIVES

A. Formative:

1. Participation (response to questions, attentiveness, effort in writing) – 10 points
2. Writing in journal – 5 points/question -10 points total
3. Contributed and cooperated in Freddy the Fish activity
4. Created “I-poem”- 5 points
5. Completion of follow-up assignment- 5 points

B. Summative: Questions on Final Test such as:

1. What are three ways that humans harm the water supply?

Answers will vary. Possible answers may include the following: littering, leave the water running, dump chemicals down the drain, etc.

2. How does pollution harm animals?

Tiny fish and plants absorb toxins and through the food chain other animals absorb the toxins through eating the fish. Another possible answer could be that they get stuck in plastic garbage, or choke on things, or their habitat could be damaged.

3. What can everyone do to help the water supply to stay clean and useful?

Answers will vary. Possible answers may include the following: don’t let the water run when you’re doing dishes, recycle, put garbage in it’s place, etc.

The test will be short answer and each question will be worth three points. There will be about ten short answer questions on the final test.

VIII. REFLECTION:

Was the material adequate?

Was the rate too slow or too fast?

How were the responses to the questions, what needs to be modified?

What else do I have to do to make this lesson better?

Were the directions clear enough?

IX. REFERENCES:

Wheeler, J. (1990). *The Water We Drink*. Abbdoo and Daughter, Edina AZ, 1990: 12-15.

Goldman, L. *Cleaning up our Water*. Children’s Press, Chicago, 1994: 43-51.

Michigan Department of Education (1996). *Michigan Curriculum Framework*.

Lansing: State of Michigan.

Grammar, D. (1995). *Freddy The Fish*. Retrieved October 19, 2002, from the University of Texas El Paso TES course web site:

<http://www.tnrcc.state.tx.us/admin/topdoc/gi/235/chapter3.html#2>

X. SELF EVALUATION:

I really like this lesson for a lot of reasons. It covers a lot of components of teaching and addresses many of the issues in different ways. I like the way this lesson accommodates several of the multiple intelligences. I like the different components like the poetry, the questions, the journals. There's a reflective component as well as a learning model in the traditional sense.

The only real fear I have with this lesson is that there's too much involved and that if it's rushed it'll be too overwhelming and not sink in or that if taken too long, it'll drag. We'll see.

Overall, I'm pleased with the way our ideas came together and look forward to using this lesson on pollution in the future. I feel that out of ten points, everyone in our group deserves the full credit. Everyone put in a lot of time and worked together to come up with this plan. Once our ideas started flowing, it was fun to bounce ideas back and forth.

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Experiment and Materials

Freddy the Fish is a good visual experiment to do with children to illustrate the effects of pollution on water sources. To do this experiment, the teacher reads or has the children read the story of Freddy as written below. At the end of each section is a direction to add something else to the water to simulate pollution. After each item is added, the class can discuss the effects or the teacher may choose to wait until the end.

Each group will need:

- A sponge fish
- A jar with water in it
- Soil
- Brown sugar
- Syrup
- Salt
- Paper dots
- Soapy water
- Red food coloring
- Green food coloring

Imagine a clean river as it meanders through a protected wilderness area. In this river lives Fred the Fish. How is Fred? Fred has lived in this stretch of the river all his life. But now he is going on an adventure and travel downstream.

Fred swims into farm country. He passes a freshly plowed riverbank. It begins to rain and some soil erodes into the river. (Dump soil in into Fred's jar.) How is Fred.

Fred nears a housing development. Some fertilizer from the pastures and lawns washed into the river awhile back. (Place brown sugar in Fred's jar.) The fertilizer made the plants in the river grow very fast and thick. Eventually the river could not furnish them with all the nutrients they needed, and so they died and are starting to decay. Their decomposition is using up some of Fred's oxygen. How is Fred?

Fred swims beside a large parking lot. Some cars parked on it are leaking oil. The rain is washing the oil into the river below. (Pour pancake syrup into Fred's jar.) How is Fred? During a recent cold spell, ice formed on a bridge. County trucks spread salt on the road to prevent accidents. The rain is now washing salty slush into the river. (Put salt in Fred's jar.) How is Fred?

Fred swims past the city park. Some picnickers didn't throw their trash into the garbage can. The wind is blowing it into the river. (Sprinkle paper dots into Fred's jar.) How is Fred?

Several factories are located downstream from the city. Although regulations limit the amount of pollution the factories are allowed to sump into the river, factory owners are not abiding by them. (Pour warm soapy water into Fred's jar.) How is Fred?

The city's wastewater treatment plant is also located along this stretch of the river. Also a section of the plant has broken down. (Squirt two drops of red food coloring into Fred's jar.) How is Fred?

Finally, Fred swims past hazardous waste dump located on the bank next to the river. Rusty barrels of toxic chemicals are leaking. The rain is washing these poisons into the river. (For each leaking barrel, squeeze one drop of green food coloring into Fred's jar.) How is Fred?

Taken from Gammar, Debbie. (1997). *Environmental Teaching Guide Vol. 2*. TNRCC. pg. 35-36.

Background Information

Water pollution is a very serious issue that we face every day. Large companies often use our natural lakes and streams as a dump. Sometimes, power plants pollute by heating the water. Many times, we are contributing to water pollution and don't even realize it. Other times, we realize it and don't do anything about it. Let's take a look at a few different ways we pollute our water. Being aware is the first step to making a change.

1. As a result of plowing river beds, erosion takes place into our rivers and streams during wind and rain. This eroded soil in our water makes it dirty and murky.
2. Farms use fertilizer on their crops as well as houses use fertilizer on their lawns. This fertilizer erodes into our water sources. Fertilizer causes plants to grow thick and plentiful. With so much plant life, our water doesn't have enough nutrients to maintain them all, so they die. As they die, they decay, which depletes oxygen levels in our waterways. Less oxygen means less air for fish and other water animals to have.
3. Nearby parking lots is another source of pollution. As oil and other automotive chemicals drip from our vehicles, they are washed down the sewage drain which goes into our water ways. These chemicals adulterate our water.
4. When salting icy roads, icy slush water is splashed and washed into our waterways. Salt is not a natural part of these ecosystems.
5. Cities often pollute by littering. These stray garbage items blow and wash into the water depleting oxygen as they decay or often killing animals that choke on them.
6. Although factories are limited to the amount of pollution they are allowed to dump into the water, often they don't abide by those rules contaminating the water beyond a level that it can recover from.
7. Waste plants sometimes have sewage breaks which leak and drain into waterways depleting oxygen and filling water with harmful waste and bacteria.
8. Toxic waste is stored in barrels often. Those barrels, however, get old and rust. As they rust they leak and get into our groundwater which flows back into streams, rivers, and lakes.
9. Power plants use water to cool their reactors. They pump this warm water back into the water source. This warmer temperature encourages the growth of bacteria and plant life which overpopulate the accommodation of natural nutrients. They then die and decay depleting oxygen.

The Fish Quiz

NAME _____

Fill in the Blank

1. Decaying plants in water sources depletes _____ in the water.
2. _____ causes plant life to grow more than it would naturally.
3. Plowing river beds causes _____.

True or False

1. Fish need oxygen to survive.
2. Fertilizer in water sources makes them healthier for the environment.
3. Factories are sometimes allowed to dump a certain amount of pollution into water sources.
4. Litter is a large source of water pollution.
5. Sometimes toxic waste gets into water.

Multiple Choice

1. Oil that washes from parking lots drains into what?
 - a. oil reservoirs
 - b. garages
 - c. sewage drains
 - d. none of the above
2. Power plants pollute water by what?
 - a. warming water
 - b. cooling water
 - c. pouring chemicals into water
 - d. littering garbage into the water

Answers:

Fill in the Blank

1. oxygen

2. Fertilizer or Warm water (either would be correct)

3. erosion

True or False

1. True

2. False

3. True

4. True

5. True

Multiple Choice

1. C

2. A

The Fish Worksheet

NAME _____

Matching:

1. Soil Power Plants
2. Oil Farms and Houses
3. Fertilizer Picnics and Parks
4. Litter Winter Roads
5. Warm water Erosion
6. Salt Parking Lots

Define:

7. Erosion-
8. Pollution-
9. Ground Water-

Fill in the Blanks:

10. Fish use their gills to breathe _____.
11. Excess plant life dies and then _____.
12. Sewage drains empty into our _____ sources.

Answers:

1. Soil-----Erosion
2. Oil-----Parking Lots
3. Fertilizer-----Farms and Houses
4. Litter-----Picnic and Parks
5. Warm Water-----Power Plants
6. Salt-----Winter roads
7. Erosion:
8. Pollution:
9. Ground Water:
10. Oxygen
11. Decays
12. Water

Where Does Our Water Go?

Objective: Students explore the circulation of water and discover what they can do to clean the water they use.

Materials:

- Sand
- Humus
- Clay
- Water
- Mesh or cheesecloth
- Rubber bands
- Gravel
- 2-liter soda bottles (cut in half by teacher)

Concepts to explore:

- Water cycle
- Filtration
- Sedimentation
- Percolation
- Evaporation
- Condensation
- Water table
- Pore space
- Zone of saturation
- Zone of aeration
- Aquifers

Procedure:

1. After completing the activity, “Fantasia the Fish,” water will be collected from the bucket. This is “dirty” water.
2. Students will brainstorm how to clean the water using the supplies given.
3. Students will brainstorm other supplies needed that are not listed above.
4. Students will set up their experiments and observe and record how they are cleaning up the water.
5. Students will meet with other groups and share what they did.
6. As a class, students will come up with a collaborative procedure of how to clean up the water by closely examining the different types of soil and seeing which soil helped to clean the water the best.
7. Students will brainstorm how they will develop a method as to how to measure the degree of cleanliness of the water.

8. Students will write letters to the entities that were responsible for polluting the river to begin with.

Follow up: Students can take a class trip to visit their local water sewage treatment plant.

Fantasia the Fish

Objective: Students explore what impact humans have on our water supply and how that impact affects the Long Island Sound.

Materials:

- PCV pipe
- Food coloring
- Salt
- Sponge (cut in the shape of a fish)
- Cooking oil
- Small pieces of paper
- String
- Variety of soil (sand, humus, clay) or local soil
- Water
- Bucket
- Eight 1-liter water bottles
- Water source such as a faucet to simulate the river flow

Concepts to explore:

- Non-point water pollution
- Ecosystem
- Precipitation
- Source Pollution
- Contaminants
- Pesticides
- Fertilizers
- Rain water run-off
- Water pressure
- Tributaries
- Rivers
- Erosion

Procedure:

1. Place 2-3 drops of green food coloring in one 1-liter bottle and fill halfway with water. This will symbolize fertilizer.
2. Repeat using red food coloring to symbolize pesticides, and yellow food coloring to symbolize hazardous wastes, and blue food coloring to symbolize toxic chemicals.
3. Place salt and water in fifth bottle to symbolize road salt.
4. Place cooking oil in sixth bottle.
5. Place local soil in seventh bottle

6. Place small pieces of paper in eighth bottle.
7. Place labels on all eight bottles symbolizing the pollutants
8. As story is read about Fantasia's experience in the Long Island Sound, the polluted bottles will be dumped into the PCV pipe, washed down by the water from the faucet, symbolizing the Connecticut River, and make its way into the Sound (bucket) where Fantasia the Fish resides.
9. Ask students throughout the lesson how they think Fantasia the Fish feels.

Background Information: Connecticut River is one the largest rivers in the state of Connecticut. Other smaller streams and rivers called **tributaries** flow into the Connecticut River. Most rivers in the world flow from higher elevations to lower elevations and this is the case with the Connecticut River that flows downhill into the Long Island Sound. The Long Island Sound is an **estuary** which means it has fresh water flowing into it via the rivers and also has salt water which comes from the Atlantic Ocean. This mixture of fresh and salt water makes it home to a variety of plant and animal life. It is Connecticut's largest watershed meaning it is the drainage basin for all of the tributaries leading to it

The state of Connecticut has protected area of land and water. This is an effort to keep the tributaries from being polluted from **point** source pollution which come from factories, dump sites, and overpopulation. Non-point water pollution occurs when entities carelessly dump contaminants into tributaries or watersheds. Non-point water pollution occurs when contaminated water makes its way into the **water table** indirectly, such as when oil or gasoline from cars leak in the ground making its way into **ground water**. Ground water lies right below the water table at the point of saturation. Ground water is precipitation that has passed through sand, gravel, and other earth materials known as aquifers. Ground water is used heavily by farmers tapping into it via wells.

Story of Fantasia the Fish

Fantasia the fish has lived her entire life in the Long Island Sound (sponge of Fantasia is in bucket of water at the end of the PCV pipe), but she hasn't been feeling very well lately. She decides to talk with other fish that had swum down the Connecticut River and into the Long Island Sound. This is what she found out. One fish told her that he lived in a smaller river and he saw a farmer irrigating his farmland after he had sprayed his crops with pesticides. Some of the pesticides got washed into the river from the irrigation (Dump the bottle labeled "pesticides" into the PCV pipe).

Fantasia saw another fish that looked sick behind the gills and asked him what happened. He exclaimed that he was swimming in another river that passed by a golf course that was being fertilized. When the rain came, the fertilizer was washed into the river. (Pour the bottle labeled "fertilizer" to the PCV pipe).

Another fish also looking rather peaked swam up to her and Fantasia stopped her asking her where she came from. She said she was in a stream when she saw a house being built and the land was cleared away for construction and when it rained the soil was washed into the stream. (Dump the bottle labeled “soil” into the PCV pipe).

When Fantasia thought she heard enough, still another fish came to her to tell Fantasia of his adventure of swimming in another river that ran alongside of I -95 and he witnessed a tractor trailer jack-knife spilling its contents, which the fish later found out had hazardous waste materials in it. (Dump the bottled labeled “hazardous waste” into the PCV pipe. He also reminded her that last winter the salt trucks were out putting sand and salt on the road in order to deice it. (Pour the bottle labeled “salt” into the PCV pipe).

Still another fish told her story of swimming in a stream in a neighborhood when she saw a man changing his oil in his car, then poured the oil down the drainage pipe. You know where that water and oil will eventually flow into. That’s right, the Long Island Sound. (Pour the bottle labeled “oil” into the PCV pipe). She also reported to Fantasia that this same stream meanders past a paint factory that she witnessed old paint cans being dumped by the stream and some paint leaks into the stream. (Dump the bottle labeled “toxic chemicals” into the PCV pipe).

Now Fantasia found out why she wasn’t feeling good and it also explained why she didn’t find the tasty little fish she normally eats. She decided to take a swim at the beach. This usually always made her feel better, but when she came to the beach she saw people picnicking and discarding their trash into the Sound. (Dump pieces of paper into the PCV pipe). Now she was really sick.