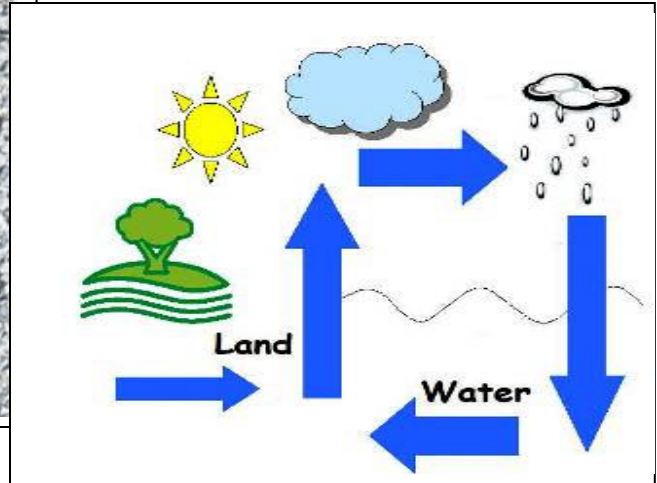


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## WATER POLLUTION

### Aim:

Students should understand the concept of the water cycle before moving onto water pollution. (See lesson plan “Oceans all Around Us”). Students can learn about what causes water pollution and how to be environmentally aware.

### Background:

#### What is Water Pollution?

Water pollution is the deterioration of the quality of water. Toxic substances or organisms changes the water’s composition which can damage living things and their habitats

#### What causes Water Pollution?

Pollutants that affect our oceans come from many different places. One of the main causes of pollution is the water and other pollutants that flow into storm drains. Storm water is the water that comes from rain and runs off into gutters called storm drains. Urban runoff is water that comes from water used in human activities such as cleaning the car to watering the garden.

Storm water and urban runoff are carried to streams, rivers and eventually to the ocean. This runoff can contain many contaminants that affect clean water. Contaminants can include:



### Lesson Plan: Water Pollution

- **Dirt** - is manageable in small quantities. However dirt from erosion, land slides and from the street can destroy the quality of the water in the streams, rivers, lakes and the ocean.
- **Leaves and Grass clippings** - can block out the sun and rotting material can suffocate plants and animals in the water.
- **Litter** - such as cigarette butts, tin cans, plastic bags, bottles and paper etc. are thrown onto the streets or blown from rubbish bins can eventually end up on the seashore and in the oceans. Animals in the ocean can often mistake this for food or get caught in it causing sickness and death.
- **Soaps and Detergents** - used for cleaning cars, windows and buildings can take out the oxygen in the water, which is deadly for animals and plants that live in the ocean.
- **Oil and air pollutants** - (what goes up must come down) from cars can seep into the water supply under the ground causing damage to fresh water and eventually the ocean.
- **Chemicals** - weed & bug killers in gardens, chlorine for swimming pools, cleaning agents for windows, paint from paint brushes and pots etc)
- **Pesticides and Fertilisers** - from farms can seep through into the water tables under the ground or are washed off into main streams and rivers. This can then be washed out to sea.
- **Animal and Human Waste** - contains bacteria and viruses that can cause harmful diseases.

#### What are the Effects of Water Pollution?

Water pollution affects our quality of life, our habitats, and our drinking water.

#### How can Water Pollution be controlled?

Water pollution can be prevented by undertaking even the smallest actions in the home, school and community. These can include:

- Correctly dispose of hazardous household products. Avoid letting contaminated water such as chemicals, soaps, grass clippings, paint etc run into storm drains.
- Recycle and dispose of all rubbish properly. Ensure that litter is thrown in the rubbish bin and does not get blown away. Pick up litter that has “escaped” and put it in the bin.
- Conserve water in the home and garden. Use efficient plumbing fixtures so only the necessary amount of water is used for flushing toilets and showers. Use less water when washing cars. Use a bucket with water and soap to wash the car, and then drain the dirty/soapy water down the sink or in the grass. Only use the hose when it is needed – do not let it run constantly.
- Use natural fertilizers in the garden.
- Be “green” with the maintenance of the car so it does not leak oil and release bad fumes from the exhaust.
- Volunteer for a beach clean up, tree planting or water quality monitoring.



### Lesson Plan: Water Pollution

#### Materials:

- 1 Litre Plastic Bottle
- dish washing liquid, soil, vegetable oil
- tap water
- Glass jars or plastic cups
- Water Pollution and cleaning Polluted Water – Chart
- Samples of litter found on the beach. (As part of the exercise it is useful to have some samples in reserve)
- Litter Biodegradation - Information sheet (see below)

#### Activity 1: Learning about water pollution

Step 1: Introduce students to the concept of water pollution using vocabulary such as: pollution, contaminants, biodegradation, conservation, recycling, filter etc

Step 2: Experiment / Demonstration – polluting water / cleaning polluted water

**Safety Note:** This experiment can be done as a demonstration or by the students (depending on their age). Students must not drink the water and must wash their hands after the experiment.

##### Part 1: Polluting water

- Get the students to guess what will happen to the water if items such as dish washing liquid, soil, cooking oil are mixed with clean water.
- Place the items into the 1 x Litre plastic bottle. (½ a Litre of tap water, 2 x Tablespoons of dish washing liquid, 2 x Tablespoon vegetable oil, 1 ½ cups of soil) Label the bottle noting the date and the items placed in it. Leave the water for a couple of days to age.
- After a number of days examine and record what has happened to the water. (*The water should have gone cloudy i.e. it has been contaminated*). Compare and record it to clean water. Discuss what has made the water go cloudy.
- Highlight how contaminated water can affect the fresh water supply and the ocean. Discuss what would happen to animals and plants if they were living in the polluted water.

##### Part 2: Cleaning Water

- Look at methods of cleaning polluted water. Discuss how this can be done ranging from water been cleaned naturally (reeds in swamps), using water treatment plants to cleaning up oil spills in the ocean.
- Pour clean water into a one plastic cup and pour the “polluted water” into another cup. Observe and record the differences.
- Get the students to swirl the “polluted” water in the cups (e.g. with a popsicle stick). The students should observe and document what happens to the water after five minutes (*the dirt should settle to the bottom of the cup that contains “polluted” water*).
- Provide the students with a clean clear jar and a coffee filter.



### Lesson Plan: Water Pollution

- Ask the students to pour the “polluted” water into the clean jar using the coffee filter.
- The students should observe, record and discuss what happens to the water using the coffee filter (*the water becomes clearer*). Ask the students how effective they think the filter is working by comparing it to the water that comes from the tap (*the water is still dirty, discoloured, smells etc*). Could the filtered water still contain contaminants?
- Get the students to record their results on the Water Pollution and Cleaning Polluted Water – Chart.
- Extension – experiment with other items that could be used to filter the polluted water such as sand, clean stones etc. Compare the differences.

Step 3: Discuss with students what other contaminants can pollute water (see list above). Encourage the students to become water detectives and find pictures in magazines or draw pictures to illustrate their understanding of what causes water pollution. They should then discuss in detail how this pollution affects the oceans.

Step 4: Use samples of litter and discuss with students how long they think the different types of litter will take to biodegrade.

See additional art lessons on creating posters and collages using “safe” litter promoting a “save the seas” campaign.

#### **Outcome:**

Students will have developed an understanding of the language associated with pollution and being environmentally aware. They will also have developed skills in:

- observation
- recording
- interpretation of results