



## **Cabrillo Marine Aquarium Lesson Plan**

**Grade Level:** Fifth Grade

**Title:** Who Pollutes?

**Objective:** Students will: (1) be able to name at least a few types of pollutants that can get into storm drains; (2) observe how a bowl of clean water changes into dirty water as different pollutants are added to it; and (3) be able to describe solutions to the problem of pollution getting into our waterways that either individuals, cities, or lawmakers are doing.

**California Science Standards:** 5<sup>th</sup>: 3a, 3d

**Time to Complete:** 45 minutes

**Materials Provided by CMA Ocean Discovery Kits:** *Reading Handout: Who Pollutes? Story*, Labeled Film Canisters (22)

**Materials Provided by Teacher:** Large clear container, water to fill the container, contents of film canisters (*Helpful hint: use small amounts and dilute food coloring for the various colors needed, or mix a small amount of water and paint.*):

1. Construction site – dry soil
2. Trees – crumpled dry leaves
3. Homeowner – yellow water with small pieces of tissue
4. Cattle farm – brown water
5. Horses – brown water
6. Pesticides – baking soda
7. Fertilizer – baking soda
8. PCBs – yellow water
9. Cars – chocolate syrup
10. Exhaust – vinegar
11. Factory – cooking oil
12. Tune up – chocolate syrup and oil
13. Antifreeze – green water
14. Washing the car – soapy water
15. Mysterious liquid – red + green water
16. Garbage – small pieces of paper
17. Power plant – chocolate powder
18. Motorboat – chocolate syrup and oil
19. Picnickers – trash
20. Party – trash
21. Fishing – fishing line or dental floss

**Vocabulary:** pollution, storm drain, waterway, lawmakers, pesticides, fertilizers, PCBs, exhaust, antifreeze, power plant, water quality, prevent, contaminant

**Teacher Preparation:**

1. Fill each film canister about half-way with the contents that will represent that particular type of pollutant.
2. Make sure you close the film canister caps tightly so the contents don't leak.

**Lesson Outline:**

1. Review watersheds and the storm drain system pathway. Ask students "Where does polluted water and trash that gets into the ocean come from?" (Mostly, it comes from a variety of places inland.)
2. Set the scene for this story. Tell students that each of them is going to play the role of somebody who lives, works, or plays in the watersheds that drain into the bay.
3. Each student will receive a film canister with pollution inside. "We're going to tell the story of how these various pollutants get into the environment and drain down to the ocean. We're also going to see how we can help."
4. Set out a fishbowl or other clear container with one gallon of water in it. Have students sit where they can see the bowl of water.
5. Give each student a labeled film canister filled with its symbolic pollution (dirt, baking soda, etc.). See the materials list to fill the canisters. There are 22 total film canisters.
6. Tell the students to keep their container closed until it is their turn, do not shake their container (contents may leak), and do not reveal what they have to the other students.
7. Have them look at their canisters' label to see what they have. Circulate amongst the class to make sure everybody can name their item.
8. Begin to tell the pollution story. See the attached story. The container of water represents your nearest water body or the ocean.
9. Before you begin, have the students look at the container full of water. Ask the students if they would drink the water? Would they fish in it? Would they swim in it?
10. As you read the attached story out loud, have the students listen carefully to hear the word, or words, that are written on the label of their canister.
11. When they hear the word, pause the story. Have the student(s) take the lid off their canister, pour the contents in the container full of water (ocean or river), and hand you the empty canister.
12. Again ask the students if they would drink the water. Would they fish in it? Would they swim in it? Discuss the type of pollution that was just added to the clear container.
13. Continue to read the story, having students listen for their word, and following the steps above for each type of pollution.

14. Finish the story and then discuss some solutions that we can do in our everyday lives that will decrease the amount of pollution in our waterways. Discuss things that cities and lawmakers are doing to help solve the problem.

### **Lesson Extensions:**

1. Have students draw on a sheet of paper or make their own containers with a pollutant inside each of them. Have them write a paragraph describing each of their pollutants, where it comes from, how it can hurt the ocean, and what we can do to prevent that kind of pollution from entering the storm drain system. End the paragraph with other things that we can do to improve water quality and prevent pollution.
2. Ask students questions to assess their observations and knowledge as you proceed and after you finish doing the pollution story. Here are some possible questions:
  - What happens when pollutants get added to the water? How does it look/smell?
  - Which one do you think was the grossest pollutant and how did it affect the water?
  - How could we reduce the amount of pollution?
3. Discuss in more detail the Clean Water Act and how we can make a difference by appealing to lawmakers. Look into current measures that protect water quality. Tie in cause-and-effect relationships of “If – Then” sentences with the pollutants and what happens when they get into the environment.
4. For younger grades, you can remove some of the contaminants such as PCBs or mining. Concentrate on a few things with which we have the greatest impact, such as litter. Have students use whole body movements to act out their item or make a sound that correlates with their item, as they dump it into the container of water.

### **References:**

- Key to the Sea Curriculum Guide  
<http://www.healthebay.org/get-involved/ways-heal/classroom/key-sea>