

# Marine Pollution Lesson Plan (3 days)

## QuikScience project

**Subject:** Marine Biology

**Grade:** Ninth

**Lesson Topic:** Land originated marine pollution,  
Consuming healthy fish

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### **Lesson objective:**

To educate the Animo and Lennox community about the effects of storm drain runoff into the ocean. To organize students at Animo Leadership Charter high school to carry out a community-based service project based on identifying and educating community practices that contribute to marine pollution. **Goal:** to educate students, parents and the community in healthy fish consumption, species and quantity.

### **State standards:**

California standards for life sciences, grades 9-12, High school, ecology and biology

#### **6. Stability in an ecosystem is a balance between competing effects.**

As a basis for understanding this concept, students know:

- a. biodiversity is the sum total of different kinds of organisms, and is affected by alterations of habitats.
- b. how to analyze changes in an ecosystem resulting from changes in climate, human activity, introduction of non-native species, or changes in population size.
- c. how fluctuations in population size in an ecosystem are determined by the relative rates of birth, immigration, emigration, and death.

### **Resources:**

**Class textbook** Marine Science by T. Greene, classroom library books, Internet, teacher prepared packet.

**Technology** Video, PowerPoint, Internet, CD-ROM, overhead projector

### **Focus student:**

**Day 1-**As students enter the class they will see a PowerPoint of a local beach after a storm with a variety of plastics and land-based debris covering the beach. It will be a captivating photograph and it will be entitled: would you swim at this beach? Who is responsible for this? Imagine this as your habitat.

### **Organization of the Classroom**

I have organized my class in a **constructivist / cooperative model** using heterogeneous groups of four that are called **P. O. D. S.** Each group, or P. O. D. of students, has named their group. The students have bonded over the past several weeks and see themselves as a cohesive unit (I change the P. O. D. members every two months). At the beginning of each class the P. O. D. coordinator for the week checks on attendance, tardiness, homework, preparedness of each student in the group. They perform dissections and group projects as a team as well as research, textbook reading, and worksheet completion. They **work as a team** and compete against other teams in the classroom for certificates, educational rewards, the privilege of attending special field trips, and extra credit points. The competition is friendly but intense. This takes care of the major classroom management issues as I the teacher have the right to deduct points from each P. O. D. for negative behavior or to award special points for exceptional behavior, assistance to other P. O. D. S., etc.

I generally try to incorporate four different activities and give them a few minutes break in the middle of the 90 minute period. I maintain a very visually stimulating class and one in which students actively participate in class discussion, P. O. D. collaboration, and question and answers.

### **Prior knowledge:**

At the beginning of this unit we do a **K. W. W. L. chart** with the students. One student is asked to come to the overhead and write down all of the items that might possibly be in a gutter in Lennox and then move from a storm drain onto the beach after a rain or storm. We compile a list of about 10 items which students copy into their duplicated K. W. W. L. chart in their notebooks. Then we solicit questions that students want to ask and have answered about marine pollution over the course of the unit. We take about eight to ten questions that are incorporated into my lesson and materials that students will read and view.

### **Differentiated instruction:**

Due to the fact that all my students are **English language learners** and the class incorporates special education students, I have integrated my cooperative learning strategies with **SDAIE** techniques. There are a lot of **visuals, hands-on activities, realia, worksheets, distributions of specimens and dissections** as part of each major unit. I group students so that they can receive assistance from others in their group. During the lesson itself, I utilize **Spanish vocabulary** as much as I can (also accessing prior knowledge at this time), instruct English language learners to use Spanish language web sites, and copy related material into special packets for those English language learners needing more help in their language transition. At times I have organized Spanish language study groups. I spend substantial time on vocabulary; **incorporate vocabulary words into PowerPoint slides** with pictures of the particular feature. Vocabulary and concept definitions are a focus of the homework. I have developed an ecology crossword puzzle that aids students in vocabulary learning and retention. My assessments are also coordinated with the special education teacher at Animo so that **special education students receive accommodations** in their assessments as well as in their placement in the front of the classroom and in a strong P. O. D.

### **Learning styles:**

The use of many visuals, including PowerPoint, overhead, specimen distribution, hands-on worksheets, short video clips and continuous movement around the room touches on **various learning styles** and will assist each and every student in learning the material. We **read** homework assignments and the answers, we read sections from the textbook, and we work through our **worksheets together** so students hear the questions and answers as well as see them **written** on the board or overhead.

### **Model:**

Throughout each lesson I model several examples. First is the setup of the homework in the **Cornell** note-taking method. Second, is note taking during PowerPoint's and class discussion in this same format. I ask a student how they would set up the information in the Cornell method, so students can model themselves from other students work as well. Third, the **completion of worksheets** through transparencies on the overheads. Fourth, during **dissections**, I will model each incision and step-by-step procedure prior to students carrying out this activity.

### **Guided practice:**

Students will demonstrate their understanding of the material covered (i.e. the lesson objective) through the successful **completion of their worksheet** with the rest of their P. O. D. during class time, the successful completion of their **homework**, reviewed by the P. O. D. coordinator the next day and checked by the teacher

two times a week. The teacher will also summarize the material, or ask a student to summarize what they learned over the course of the day. Often I will ask students to **write a short summary** in their notebook about what they learned and to use newly acquired vocabulary and information from the PowerPoint or video.

### **Checking for understanding:**

The ability of the students to **collectively complete the worksheets** and to begin work on the **vocabulary crossword puzzle** that includes materials from the days lesson and prior homework, will give me an understanding of their level of comprehension and ability to do work on their own. I will randomly call on **students to answer questions** from the worksheet or from the prior day's **homework**.

### **Ongoing feedback:**

During guided practice I constantly **move around the classroom**, giving assistance where needed, especially to **special education** students and **English language learners**. If I have a TA, I ask him/her to do the same in assisting individuals or P. O. D. S. I am available for support and **answer questions continuously** during the class.

### **Formal and informal assessment:**

Informal assessments will take place during the course of the class viewing the PowerPoint, working on the **worksheet, diagramming and labeling dissected organisms**, and seeing how the P. O. D. S. function. A formal assessment will be a **quiz after this unit**. This will be preceded by a **Jeopardy** game which reviews vocabulary and concepts.

### **Closure:**

Students will be asked to **write a summary** in their class notes prior to the end of class. Although only be a few sentences long but they will review what they learned that day about the types and forms of trash in their community that is accidentally or on purpose placed in a gutter in the harm that does the marine environment and incorporate the material they copied down into the summary.

### **Independent practice:**

A homework assignment, working on the **crossword puzzle** will enable students to apply what they have learned, what they need to learn from their notes, as well as to provide advanced learners with initiatives to continue on their own.

### **Activity:**

Using the QuikScience team's initial project students will further participate in a public education campaign on marine debris to raise the awareness of the school and the whole community. Students will develop campaign slogans, posters, press releases and other materials this can be based upon an actual community cleanup day that highlights the completion of the unit. Such an event would be coordinated by the QuikScience team and the honors marine biology students and the contacts they've made in the community over the course of the project.

### **Student and teacher Presentation to the Class:**

A team of QuikScience members will make their PowerPoint presentation on their project to each of my ninth grade classes. They will then initiate the class discussion which will result in an increased number of

volunteers to participate in the distribution of developed materials in the Lennox community. These will include such items as the seafood watch card a bilingual questionnaire and ecological organizations brochures. They shall also distribute actual examples of marine debris and display the potential dangers to marine life using this realia as well as PowerPoint.

### **P. O. D. Activity**

**First activity:** Each student will receive a copy of the questionnaire. Their first task will be, as individuals, will be to complete it. Then they will discuss it in a group and the team members will facilitate a discussion on practices regarding disposal of waste items in the storm drains. Students will then be asked to write a summary of the discussion in their notebook. Each P. O. D. will then receive a question about items that are normally found in the storm drains and how they could best be disposed of safely. Their task will be to formulate a response to their particular question and item that they will present and share out to the class.

**Second activity:** The students will receive a copy of the Physicians for Social Responsibility brochure “Healthy Fish, Healthy Families” as well as the Monterey Bay Aquarium produced “Seafood Watch Card.” Students will be given a series of flash cards depicting fish from the three categories of the seafood watch card: best choices, proceed with caution, and avoid. In a contest with the other P. O. D. S. they will place the fish in the correct category. The game will be structured like a seafood watch bingo.

### **Independent practice/homework**

Students will be asked to take the questionnaire home and ask their parents the same questions as they were asked and enter the replies... They will have a discussion with their parents about healthy fish consumption, using the new Spanish-language seafood watch card for the West Coast as a pivotal point. In their notebook they will summarize their parent’s responses to their son/daughter proposals for effecting a change in community practices of waste distribution and fish consumption. They will note resistance or agreement and interest of their parents.

The next day in class, in each P. O. D., students will compare the responses by their parents. They will then enter their data on a chart on the front board and the class as a whole will compile information regarding disposal of waste products and fish eating habits in their community. We shall graph the answers as well as list the types of fish that are currently being caught and eaten by the Lennox community. As a summary, students will write in their notebooks their observations of this process and the goals that they would like to have for their families eating habits and disposal of potentially dangerous waste products.

This data will inform the QuikScience team and give them a baseline upon which to gauge the later progress of their project. Through the ninth grade, we shall have a core of 150 sets of data which we shall then expand to the rest of the school. Our initial goal then will be to receive back 500 questionnaires, compile that information, analyze it, and then proceed with their educational effort throughout the community, at the parents meetings, to other schools and organizations.

With this completed, we’ll begin our educational efforts to change ingrained eating and disposal habits.