

**MARINE BIOTECHNOLOGY & BIOINFORMATICS FOR TEACHERS
MOSS LANDING MARINE LABS NSF ITEST GRANT
TEACHER LESSON PLAN FOR CLASSROOM USE
LIFE IN THE OCEAN**

Title of Lesson: Life in the Ocean

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Background: At the end of this lesson students will be able to understand what the life looks like in the ocean. This is the first lesson I present to my students before I introduce them to Bioinformatics and Biotechnology careers.

Description of Audience: This Biotechnology/Bioinformatics activity is designed for use by students in middle and high school

State Standards:

CA standards: Grade 7: 5a and b
Grade 9-12: 9a, b, c, d, e, f, g, h, i

National Standards: This Biotechnology/Bioinformatics activity fulfills the following National Science Standards:

- Content standard A: Science as inquiry
- Content standard C: Life Science
- Content standard E: Science and Technology

STEM Connection. All Biotechnology and Bioinformatics careers

Goals(s):

- Students will develop an interest in
- Oceanography careers
 - Bio Technology careers
 - Becoming Marine environmentalists
 - Marine Biology and Bioinformatics careers

Learning Objective(s)

Upon completion of this lesson, students will be able to:

- Identify lives in the ocean
- Tell how the lives in the ocean get energy
- Describe how the marine environment is divided
- Classify most marine organisms

Purpose/Rationale

- Introduce students to marine life and their surroundings
- The significance of this lesson is to inspire students to engage in Marine Biology and Bioinformatics careers
- Students are exposed to National and California standards

Materials/Resources

In order to complete this lesson, the following materials are needed: PPT (Marine life), work sheet, students' journals, field trip to Tide pool and the Pacific ocean

*power point: Life in the ocean

Prior Teacher Preparation

- Understand and investigate the marine environments, Tide pool, and the low tide beaches prior to field trip.

3-Step Procedure

#1 Introduction

Class discussion to arouse students' curiosity:

1. Have you been to ocean before? Have you seen any life in the ocean? Can you identify any animals or plants in the ocean?
2. What would you like to see if you pay a visit to a tide pool?
3. Introduce the vocabulary using the PPT
4. Students will write what they know about marine life, draw the pictures of them and write where the location is.
5. The students should be able to make hypothesis before they go on their trip to tide pool

#2 Exploration

Students will make a trip to tide pool in the area and write the answers in their journal:

1. What animals or plants did you see during your trip to tide pool?
2. Can you draw and write their names?
3. What do they look like?
4. Describe the parts you saw that are interested to you.
5. Why is it important to learn about marine environments?
6. Why do we see different animals and plants in different areas in the ocean?

#3 Application

1. Students can apply their knowledge to their next lesson to dissect mussels? They will be able to know why is it important to human life? (Pollution, population and etc.)
2. How can we identify different types in same species? (Introduce them to DNA extraction)
3. Research activity: Students will conduct research and make a PowerPoint about the marine communities and why they are important to our lives. They will also be making a list of careers that they can go to, if they learn more about Marine life.
4. Career Connection: This is the first step that the students are taking towards their Marine Biology careers. They will be able to do a web search to find what jobs are available if they pursue Marine Biology in college.

Assessment

- If the students are able to describe the Marine environment, Marine lives, and why are they learning about marine environments to other groups in class using a power point or a poster, I believe that they have achieved the objectives of the lesson.
- Successful completion of the worksheets.

- The teacher can assess the students work after going through their worksheets and power point presentations or a poster.
- The students who didn't get the information are able to follow the power point presentation to identify their animals. Those students also be paired with another student who can identify marine lives to get help.
- Suggested Future research for students:
 - a. Find how salinity affects marine life?
 - b. Learn to extract DNA from marine animals and compare within specie to determine if there are any invasive species.

Teachers' Self Evaluation

What I would have done differently:

- For safety and higher efficiency its better if the teacher takes 20 students at a time to the tide pool.
- Group evaluations should be done by peers before they present in front of the class.
- Emphasize the responsibilities before the groups begin their work
- Find a way to get the students attention during the group work