



Marine Biotechnology and Bioinformatics

for Teachers

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

Description of Audience

This biotechnology/bioinformatics activity is designed for use by students in middle and high school.



CA State Standards

Grade 7: 5a and b

Grade 9-12: 8a, 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

Students will develop an interest in

- Oceanography
- Bio Technology careers
- Becoming marine environmentalists
- Marine Biology & Bioinformatics careers

Learning Objectives

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

- Tell how the lives in the ocean get energy
- Students will be able to describe how the marine environment is divided
- Students will be able to classify most marine organisms

Purpose/Rationale

- To introduce students to marine life
- 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

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 visit a tide pool?
3. Introduce the vocabulary using the PPT
4. Students will write what they know about marine life, draw them and write where the location is
5. They 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?



Materials/Resources

PPT (Marine life), worksheet, students' journals, field trip to Tide pools



#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, 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 they 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 animals, to other groups in class using a power point presentation or a poster, I believe they achieved the objectives of the lesson.



- Successful completion of the worksheet
- I can assess the students' work after going through their worksheet and power point presentation.

The students who didn't get it can follow the power point presentation to identify their animals. They also will be paired with another student who can identify marine life to get help

Suggestions for Future Work

- Find how salinity affects marine life.
- 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 do presentations to the class.
- Emphasize the responsibilities before the group begins to work.
- Find a way to get the attention during the group work.