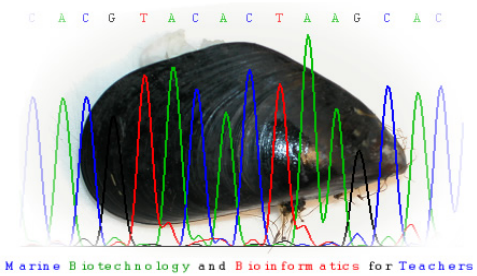

SCIENTISTS WRITE!

Title of Lesson: Scientists Write!

Designed by:

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Background:

Subject: Journal building and preparation for journaling during lab and field projects. Students will use a journal to record observations, make notes about what research may be needed to answer questions that have come up in the field, to sketch or to make connections in the curriculum. This relates to bioinformatics and biotechnology because scientists need to know how to make careful observations and to write them accurately.

Description of Audience:

This biotechnology/bioinformatics activity is designed for use by students K-12.

State Standards:

This biotechnology/bioinformatics activity fulfills the following State of California Science Standards in the Ninth through Twelfth Grade Scientific Investigation. The ability to make observations is the crucial first step in the scientific process. In recognition of this fact, the State of California Board of Education has stressed observation skills in the following Standards.

GRADES NINE THROUGH TWELVE—BIOLOGY/LIFE SCIENCES Ecology

Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept:

a. Students know biodiversity is the sum total of different kinds of organisms and is affected by alterations of habitats.

b. Students know how to analyze changes in an ecosystem resulting from changes in climate, human activity, introduction of nonnative species, or changes in population size.

c. Students know how fluctuations in population size in an ecosystem are determined by the relative rates of birth, immigration, emigration, and death.

National Standards:

This biotechnology/bioinformatics project-based multimedia learning activity fulfills the following National Science Standards:

- Standard A: Develop abilities and understanding in field of scientific inquiry
- Standard C: Expand understanding of life sciences
- Standard F: Explore an important issue of science in a social perspective

STEM Connection:

Career connections include scientific writer, news reporter, teacher, professor, lab and field scientist, poet.

Goals(s):

The goals of this lesson:

1a) Students will find journaling is fun.

1b) Teachers will find it's great way to engage students during a field exercise.

2) The observation skills of students are sharpened.

3.) Students will look into the larger scope of a topic after journaling in the field.

4a) A connection between the field and the laboratory or classroom can be made with journaling.

4b) Students can take pictures with digital cameras and use their journal entries as bullets to incorporate concepts in a PowerPoint upon return to the lab.

5) Communication skills are enhanced when students share their journal.

6) Students will remember the experience in greater depth by taking a journal home.

7a) Journaling can greatly enhance the learning experience of students in a field study.
7b) Teachers will use a student's journal as an assessment tool to check for learning and comprehension.

Learning Objective(s):

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

- Derive a connection between the field study and the classroom.
- Answer driving questions listed in the journal.

Materials/Resources:

In order to complete this lesson, the following materials are needed: (for each student):

1.A thick cover sheet (construction paper, cardstock or recycled cereal box cardboard)

2. Inside pages. (range of pages from blank pages, vocabulary list
open-ended questions, purpose of lesson, field guide photos and places to write). Consider using recycled or scrap material.

3. Supplies for cover decoration can include magazine clippings, glue, crayons,
markers, and colored pencils.

4. Stapler and/or hole puncher, twist ties, string, twine or raffia.

5. Photocopier (color copier preferred if field guide with photos included). Be sure to credit any photos downloaded from the internet. Before using any photos check that there is no copyright and that you credit the photo.

Prior Teacher Preparation:

Getting Ready:
Photocopy pages to go into every journal (i.e. questions). Gather all the materials and lay them out. Make an example journal to share.

3-Step Procedure:

#1 Introduction:

Introduce the field journal as a tool they will be using in the field. Make it clear that the journal can be used to record observations about marine biology, field ecology, art and poetic observations all rolled into one. Bring in some exemplars from previous years or show some on-line excerpts from from famous journalists. Acquainting students prior to using it greatly aids them in using their journals effectively

#2 Exploration:

Personalizing the Product
Starting with the cover page, make sure the focus of the field journey is on the front. Enblazen the title in bold letters, for example: **MUSSEL ECOLOGY or Invasive Plants of Mare Island**, or **Tracking Invasive Mud Snails at the Slough** across the front of the cover. Provide a large space for the student's name as well as a space to provide student's personal touches would be appropriate.

Pretest
In the inside give ample room to answer one or a few questions as a pre-test of their understanding.

Mussel Ecology	**What is a mussel?**
Invasive Plants	**What impact is pepperweed having on local ecosystems?**
Mud Snails at the Slough	**Are invasive species taking over a niche?**

Construction

To build the journal, fold the internal (8 1/2 by 11-inch) journal pages in half, cover with the decorated sturdy paper or cardboard, and staple pages to bind them together. It would be a good idea to use recycled cardboard from saltines or cereal boxes as the front cover. The material is sturdy, and provides a message about conservation.

You can also hole punch and bind with twist ties or string.

The investment students have in their journal, the more they may gain from it. Students who hate their journals will throw them away after the trip, and thus miss out on the full benefit of journaling.

Guiding Questions
Having structure in a journal can help students focus and organize their ideas. This can be accomplished with creating pages with specific sections in the book. There is a plethora of ways to organize the journal. The

teacher should use thought and creativity to make the journal specific to the field experience and the students level and needs.
Be specific about what is the end result after the field experience.

"Today you will be collecting data and research in the field. Your final task will be to answer one of the two following questions.

Example: What effect is the invasive plant, pepperweed, having on the wetland?
What role did humans have on introducing an exotic plant, if they are responsible what can people do now?

Blank Pages
Journals should have plenty of blank pages. The artistic extension and the language art connection are necessary. Inadequate free space will limit the learning potential in the field. Many scientists have had the greatest results that were unplanned!

If you are using the journal for more than one day, allow several blank per hiking day.

Field Guide and Notetaker
Prepare a lab sheet for students to record data, answer questions.
Label spaces for observations and drawings.

Make a field guide with labeled photos and places to write their observations. Make a check box with a comment (check here if you see it).
Environmental Observations
Leave lines and guidance of what student's should write.

- Describe the field site.
- What organisms are found here?
- What evidence humans are making an impact if any?

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#3 Application:

Student apply what was learned today in his/her experience by answering the guiding question in a unique and personally satisifying way as described in this plan.

Extensions:

1.) **Sketching Activities:** Oddly enough, some students are unwilling to draw at certain stages of their lives. A great way to prepare students to journal in the field is to practice sketching prior to leaving the classroom. This could involve a collaborative effort with a school volunteer, parent or someone willing to do community service. Lots of encouragement is good.

2.) **Create a glossary:** Compiling a glossary will familiarize students with terms and concepts that may come up in the lab or field. Students can use the blank pages to write more words they are interested in learning about: perhaps the name of a birds spotted.

3.) **Preparea check list of supplies and clothing:** Students should know what they are getting into and have adequate foot ware and articles of clothing that can be layered. Tell them to bring a hat with a visor, sunscreen, a water bottle and a camera and binoculars.

4.) **Back up Plan:** Scavenger Hunt**s *can save the day*.** Set up a scavenger hunt for students to do during the field trip.

5.) **Quote List:** Reserve a section for quotes that students like and find meaningful. Start it off by sharing some quotes with an environmental or life theme in class. Leave a place for them to write after the quote. Can they come up with quotes of their own during or after the trip?

Examples:

”The happy beings who belong to the plant kingdom of Florida dwell together in gorgeous heaps and twisitings and tangles, but California plants rise side by side with scarce a prickle or tendril of attachment, looking skyward and proper, like good people at church.” -John Muir, JOM, pg.58.
Look for plants that fit this description.

“When California was wild, it was the floweriest part of the continent.” -John Muir, Our NP, pg.137.
Write here about flowers.

Other quotable people are:

Rachel Carson
Jacques Coustou
Ralph Waldo Emerson
Henry Thoreau
Walt Whitman

Assessment:

- Using the journal, make a **K W L** chart. (What students Know, What they Want to know and What they Learned) when using the journals in the classroom.
- If your Goals and Learning Objectives have been met then student should make a project to answer the guiding question or questions. This will also allow for research and enabling students to go beyond what was required. Some projects to answer the guiding question is a “rap” or poem, a poster, a power point presentation, a collage of words and pictures or an essay.

Students who do not "get it" will be paired with other students and get assistance and guidance from peers and the teacher.

Teachers’ Self Evaluation:

- *Incomplete*