

Biology

Environmental Engineering- Wetlands

Subject Area: Biology

Grade Levels: 9 - 12

Date: December 2, 2010

Lesson Overview

NEED.org – standards

The purpose of this project is for you to get a better understanding of how Biology can be used in the real world other than in research labs, gardens, and agriculture. While researching these jobs/ organizations, students will answer the following questions in a Power Point Presentation that relates to the state standards:

How does the job, act or person help preserve Biodiversity? What is Biodiversity, why is it important?

What changes/ impacts in an ecosystem can result from the introduction of non-native species &/ or human activity?

How is or can an ecosystem be restored? What are Wetlands? Why are wetlands important?

How is the stability of the ecosystem maintained between its producers and consumers?

Materials Included in this Lesson

Web sites

Computer

Internet Access

Teacher Power Point

Other Materials for this Lesson

Demo PPT

Warm Ups

Skills the Student will Learn

How to build a power point, how to research material, and discuss findings.

How does the job, act or person help preserve Biodiversity?

What is Biodiversity, why is it important?

What changes/ impacts in an ecosystem can result from the introduction of non-native species &/ or human activity? How is or can an ecosystem be restored? Why is it important?

How is the stability of the ecosystem maintained between its producers and consumers? What are Wetlands? Why are wetlands important?

Student Deliverables

**Warm Ups**

The project will be a **Power Point Presentation** of approximately 10 slides, emailed to me: [jmcallister@wusd.k12.ca.us](mailto:jmcallister@wusd.k12.ca.us) with a title page and **works cited** page. It will include: text, pictures, diagrams, figures, and facts that answer the previous 3 questions stated above. Do NOT cut & paste information

Length of Lesson: 2.5 Days

## Activity Day One

1. **Warm Up** – What are Wetlands? Why are wetlands important? Where are wetlands? **Demo** my Engineering of to show the level of expectations and detail. Works Sited is mandatory.

Students **research Biodiversity** with the **student Resources and web sites** listed below:

<http://www.sacregionblueprint.org>

- <http://wecallithome.blogspot.com/2009/09/eureka-elks-lodge-eureka-california.html>
- <http://www.prbo.org/cms/79>
- [http://www.markbrownphoto.com/wp-content/uploads/2010/04/MG\\_6598.jpg](http://www.markbrownphoto.com/wp-content/uploads/2010/04/MG_6598.jpg)
- <http://www.fws.gov/sacramentovalleyrefuges/images/sacriver.jpg>
- [http://www.des.ucdavis.edu/faculty/Springborn/Yellow\\_star\\_thistle.jpg](http://www.des.ucdavis.edu/faculty/Springborn/Yellow_star_thistle.jpg)
- <http://www.des.ucdavis.edu/faculty/Springborn/>
- <http://www.spn.usace.army.mil/projects/dwsc/index.html>
- [http://www.portenf.sa.gov.au/webdata/resources/photogallery/NAE\\_Plastic\\_Bottle\\_Rubbish.jpg](http://www.portenf.sa.gov.au/webdata/resources/photogallery/NAE_Plastic_Bottle_Rubbish.jpg)
- [http://www.fs.fed.us/wildflowers/rareplants/whyare/images/bush\\_lupine\\_lg.jpg](http://www.fs.fed.us/wildflowers/rareplants/whyare/images/bush_lupine_lg.jpg)
- <http://dj003.k12.sd.us/images/frog%20dissection/039img.gif>
- <http://kingfish.coastal.edu/biology/sgilman/generalfoodweb.jpg>
- <http://aquaforia.com/wordpress/wp-content/uploads/2010/04/suisun-marsh-2.bmp>
- [http://cdn.physorg.com/newman/gfx/news/2006/06-26delta\\_h.jpg](http://cdn.physorg.com/newman/gfx/news/2006/06-26delta_h.jpg)
- <http://www.perc.org/articles/article454.php>
- <http://blogs.uscannenberg.org/news21/spring09/sacramento-san-joaquin-delta.jpg>
- <http://blogs.uscannenberg.org/news21/spring09/2009/04/restore-the-delta-says-water-c.html>
- <http://maps.google.com/>

## Activity Day Two

1. Warm – Up: What is Biodiversity? List examples of Biodiversity. Why is Biodiversity important?

Discuss Threats to Biodiversity such as: Habitat Loss, Habitat Fragmentation, & Introduction of Exotic Species.

Students will work on web sites researching Biodiversity with the previous web sites.

## Activity Day Three

Warm – Up: Energy Pyramid. Producers, Consumers & Decomposers. How does energy flow through and ecosystem?  
Finish PPT with appropriate works cited page and email to me.

## Enrichment Suggestions

Fieldtrip to Nature Preserve. Interview a person from one of the Agencies. Bring in a Guest Speaker.

## Student Resources

*California Department of Fish & Game- Wildlife Biologist, Conservation Planning & Banking*

*Williamson Act, Mitigation Bank Consultant*

*Army Corp of Engineers – Wildlife Biologist*

*Corps approves Sacramento-area levee vegetation variance*

*California Environmental Protection Agency- State Water Resources Control Board:*

*Are Our Aquatic Ecosystems Healthy?*

*1972 Clean Water Act*

*Environmental Consultation Sacramento- [http://reports.analyticalcorp.net/fulcrum/deir/Fulcrum\\_DEIR.pdf](http://reports.analyticalcorp.net/fulcrum/deir/Fulcrum_DEIR.pdf)*

*Environmental Surveying/ GIS/Aerial Photography/ Auto Cad Program - Wetlands*

*California Environmental Restoration Specialist/ Renewable Energy*

*United States Geological Survey*

*Soil Scientist*

*Wildlife Education Rehabilitation Center*

*National Biological Information Infrastructure*

## State Standards Met

### **Ecology**

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**BI6.** **Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept:**

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**BI6. a.** *Students know* biodiversity is the sum total of different kinds of organisms and is affected by alterations of habitats.

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**BI6. 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.

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**BI6. e.** *Students know* a vital part of an ecosystem is the stability of its producers and decomposers.

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**BI6. f.** *Students know* at each link in a food web some energy is stored in newly made structures but

much energy is dissipated into the environment as heat. This dissipation may be represented in an energy pyramid

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### **4.0 Technology**

Students know how to use contemporary and emerging technological resources in diverse and changing personal, community, and workplace environments:

4.1 Understand past, present, and future technological advances as they relate to a chosen pathway.

4.2 Understand the use of technological resources to gain access to, manipulate, and produce information, products, and services.

4.3 Understand the influence of current and emerging technology on

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selected segments of the economy.

4.4 Understand geographic information systems (G.I.S.).

4.5 Determine the validity of the content and evaluate the authenticity, reliability, and bias of electronic and other resources.

4.6 Differentiate among, select, and apply appropriate tools and technology.

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## Lesson Plan Relevance To Externship

Some wetlands have to be engineered in order to increase the biodiversity of the ecosystem. Without this externship I wouldn't have the level of appreciation or understanding for how the state of CA Develops land, and the agencies involved. I have a better understanding of the Army Corp of Engineers, and the department of Fish & Game. The lesson's relevance is for the students to realize how Biology plays a role in almost everything we do. Whether it is a wetland or a park Biology and specifically Biodiversity is important for the stability of an ecosystem. Students got to research aerial photographs like the one's I used and saw during my externship. This gave them a better perspective of what the land was used for and where water is. The lesson taught the biology concepts through the "Engineering" point of view of having to build wetlands to maintain or promote Biodiversity in our neighborhood.



## Rubric for the (Environmental Engineering) Project

Student Deliverables	4 Exceeds Expectations	3 Meets Expectations	2 Approaches Expectations	1 Fails to meet Expectations
Research/ Group work	<ul style="list-style-type: none"> <li>• Stds. work well together, not distracted well focused, excellent teamwork, communication and ability to follow directions.</li> </ul>	<ul style="list-style-type: none"> <li>• Stds. Work well together most of the time, some distractions, moderate teamwork, and follows most directions.</li> </ul>	<ul style="list-style-type: none"> <li>• Stds. need improvement in working together, not getting distracted, and did not listen to directions.</li> </ul>	<ul style="list-style-type: none"> <li>• Stds. fail to work productively, or to communicate well, or to collect evidence/research for their topic.</li> </ul>
Poster/ Diorama	<ul style="list-style-type: none"> <li>• Excellent demonstration of Biodiversity &amp;/ or Wetlands demonstrates Critical Thinking, and Problem Solving of Biodiversity of habitat in new developments.</li> </ul>	<ul style="list-style-type: none"> <li>• Good demonstration of Biodiversity &amp;/ or Wetlands and demonstrates Critical Thinking and Problem Solving of Biodiversity of habitat.</li> </ul>	<ul style="list-style-type: none"> <li>• Needs Improvement of demonstration of Biodiversity &amp;/or Wetlands and demonstration of Critical Thinking and Problem Solving of Biodiversity of habitat.</li> </ul>	<ul style="list-style-type: none"> <li>• Fails to meet any demonstration of competence or knowledge of Biodiversity &amp; or Wetlands in their Project.</li> </ul>
Presentation	<ul style="list-style-type: none"> <li>• Well spoken, uses appropriate vocabulary that demonstrates comprehension of Biodiversity. Includes all parts of Biodiversity relative to specific habitat (Biome) such as wetlands. Examples include local areas that are relevant. Many diverse Native species of that Biome are explained well.</li> </ul>	<ul style="list-style-type: none"> <li>• Good Use of appropriate vocabulary that demonstrates some comprehension of Biodiversity. Includes some parts of Biodiversity relative to specific habitat like wetlands. Most Native species of that Biome are explained.</li> </ul>	<ul style="list-style-type: none"> <li>• Some use of vocabulary that demonstrates knowledge of Biodiversity. Includes parts of Biodiversity &amp; habitats but not specific to wetlands. Few Native species of that Biome are explained.</li> </ul>	<ul style="list-style-type: none"> <li>• Fails to demonstrate knowledge of vocabulary or concepts of Biodiversity.</li> </ul>