Wetland Investigation 5E Learning Cycle

John Armbruster, Depoali Middle School

Grade Level: 6-8

Building Background Knowledge: Students will see three to five different types of plants of varying degrees of similarity. Students will complete observations, composed of a differences and similarities graphic organizer based on the five plants. After completing the observations matrix, students will summarize their findings in an open share session. This activity will provide students with preexisting knowledge relating to observing and identifying plant features, so that they are ready when we visit the wetlands.

Engage: For this activity students will be acting under the pretense that they are helping Washoe County Planners make plans for designing and building a manmade wetland area. The county needs students to identify several species of plants in the wetland area adjacent Depoali Middle School. In doing so, students will not only be classifying and identifying plants, they will be collecting the information essential for making a model of a wetland. According to the USGS "The characteristics of existing wetlands, in the same general area, or in an area with similar land uses, can be used as models for what might be expected of the project wetland" (Kentula, 2002). Students will be working in teams of three and each member of the team will have specific duties. These duties include GPS operator, Data Manager, and Measurement Specialist. All members of the team are responsible for recording observations and all data collected in their own field journal.

Explore: Students will visit a wetland area near school. When the class arrives at the wetland students will be assigned a predetermined location with a surface area of 1 meter by 1 meter. The sites have been chosen based on prior observation and selected for their diversity of plant species. Each site will be marked off with tent stakes and string and will include latitude and longitude.

Students will complete the observations and classifications matrix. They go to three different locations around the pond and will record the latitude and longitude that is written on a stake. They will find 3 different types of plants; photograph it, and record observations of each plant. They will have a total of 9 observations between the 3 locations. Students will be looking carefully for characteristics such as, leaf shape/pattern/flowers, stem shape/texture/color, dimensions/height/width.

Students return to the lab with their photos, data, and field notes. They will use text based and web based informational resources available at school to identify the species of plants that they

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photographed and measured. All data will be entered into a class Excel spreadsheet so that data tables and graphs can be produced for the various findings from the field.

Explain: Students will generate tables and graphs to represent their quantitative data. As a group students will be asked to write a summary of their findings in their field journal and to briefly share them with the class.

Students will read informational text about native vs. non-native and invasive species of plants. The class will have an "accountable talk" discussion revolving around the question: what are the positive and negative effects of non-native plants on a native habitat?

Elaborate: Students deliver their findings in a mock presentation to the Washoe County Parks and Open Space Department. All presentations are required to be multimedia and incorporate technology. Presentations will be taped as though recorded for CSPAN or local public access news programming.

Evaluate: Pre- and post-tests will be administered to gather data on student understanding of the content. Throughout the multiday lesson students progress will be monitored with note book checks, discussion, student presentations will be assessed based on a presentation rubric.

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	Student Outcome, Objectives and Assessments
Content Objective	Students know that plants can be classified into groups and individually identified based on location and physical characteristics.
Learning Objective	Students will record quantitative and qualitative data from a wetland area and use it to classify and identify plants.
Assessments	*Preexisting knowledge* will be assessed using multiple choice/written response questions developed by the teacher and aligned with NV science standards. *Progress and Participation* will be assessed via notebook checks, and completion of observation/data matrices. *Understanding* will be assessed based on the content of their multimedia presentation which is expected to be comprehensive and is measured via the presentation rubric. *Student understanding (summative)* will be assessed using multiple choice/written response questions developed by the teacher and aligned with NV science standards.

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Materials
1. Field Journals 2. Pencil w/eraser 3. Measuring Tape 4. GPS Unit 5. Digital Camera 6. Classification Matrices 7. Sunblock 8. Close toes shoes 9. Bug spray

Please share your comments about successes with this method with John Armbruster, c/o Depoali Middle School, 9300 Wilbur May Parkway, Reno, Nevada 89521, 775-852-6700 or by e-mail: John Armbruster < JArmbruster@washoeschools.net >

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Dear Students of Depoali Middle School,

The Project: We at the Washoe County Regional Parks and Open Spaces are working on a major project that will help clean the water in our streams, provide habitat for wildlife, and provide outdoor recreation opportunities for citizens of Reno. With one project we can address all three of these goals at the same time. How do we plan on doing this? With the help of students at Depoali Middle School, we are going to construct a wetland habitat. That's right, with your help! The process for building a wetland area has many steps and can take many months, even years to complete. With your help we can get started right away and speed up the whole process.

Your Role: We chose to work with Depoali Middle School students for two reasons. First, because we are confident that you are smart and care about protecting the environment, and second because there is a wetland area within walking distance of school. Your task is to identify as many of the plant species that live in a wetlands area in Reno. When you are all finished you will present your findings back to Washoe County Regional Parks and Open Spaces, and we will use that information to keep the project moving. Thanks in advance for all of your hard work!!!!

Sincerely,

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Presentation Rubric	1-4	5-9	10-14	15-20
Presentation Structure *How your presentation flows and stays focused*			Presentation includes a Title Slide with names and a photo. The slides follow a somewhat logical path beginning with an overview, the methods you used (how you did it), your findings (data), explanation of data, and a conclusion with some suggestions for Washoe County employees.	Presentation includes a Title Slide with names and a photo. The slides follow a logical path beginning with an overview, the methods you used (how you did it), your findings (data), explanation of data, and a conclusion with suggestions for Washoe County employees.
Evidence of and use of field data *How you show the data that you collected*			Your data is presented somewhat clearly with tables and graphs. You include some pictures and labels of plants. You have a table to show which species are native or non-native to Reno	Your data is presented clearly with tables and graphs. You include pictures and labels of plants. You have a chart to show which species are native or non-native to Reno
Scientific Content and Vocabulary *How you explain what your data means using scientific vocabulary*			Your presentation uses some scientific terms correctly. You use some scientific terms instead of non-scientific terms. You use some scientific terms to explain your recommendations to Washoe County employees.	Your presentation uses scientific terms correctly. You use scientific terms instead of non-scientific terms. You use scientific terms to explain your recommendations to Washoe County employees.
Recommendations to Washoe County Parks and Open Spaces *How you tell your audience what plants are beneficial to a newly constructed wetland*			Your recommendations are somewhat clearly written. Your recommendations are partially based on data that you and your classmates collected. Your recommendations include a vague explanation for why a plant would be beneficial or not beneficial.	Your recommendations are clearly written. Your recommendations are based on data that you and your classmates collected. Your recommendations include an explanation for why a plant would be beneficial or not beneficial.
Presentation Quality *How well you deliver your presentation to your intended audience, and how appealing it is visually*			Your presentation is somewhat visually appealing. Your text that is mostly easy to read You include at least two pictures that help the audience understand your findings. You have a somewhat appropriate number of slides You read directly from the slide only some of the time.	Your presentation is visually appealing. You use text that is easy to read You include several pictures that help the audience understand your findings. You have an appropriate number of slides You do not read directly from the slides when presenting.

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