

**Science at the Cienega**  
**Post-Visit Activity**  
**Analyzing Data and Preparing a Scientific Report**

**Activity Overview**

Upon returning from their visit to the Leonora Curtin Wetland Preserve, students will take time to complete any calculations and take home questions in their Student Field Journals. Following a checklist of tasks, calculations and questions, the teacher leads the class through a review and discussion of each of the on-site activities. Data will be review and analyzed and *Take Home* questions will be answered and discussed. Next, following the scientific method, students prepare a final report on one of the investigations conducted during their field trip. Students are encouraged to share their final reports with each other and the community.

**Materials**

- Student Field Journals (with data collected on-site)
- Student Field Journals – Teacher’s Edition

**Learning Objectives**

Upon completion of this activity, students will be able to...

- Analyze and discuss the interactions of biotic and abiotic factors in a wetland environment.
- Describe and analyze differences between life zones at the Leonora Curtin Wetland Preserve.
- Design and conduct a study to compare plant diversity, density and abundance between different field sites.
- Describe how aquatic macroinvertebrates can be used as indicators of water quality.
- Calculate and apply an index value in the analysis of water quality.
- Describe how phenology may be used as an indicator of environmental conditions.
- Follow the scientific method to complete a report on a field investigation.

**Activity Preparation**

- Visit the Leonora Curtin Wetland Preserve and conduct the activities led by your docent guide.
- Have students record data in their Student Field Journals. Bring the Journals back to class.

**Activity Procedures**

1. Discuss the class trip to Leonora Curtin Wetland Preserve, reviewing activities and memories.
  
2. Have students take out their Student Field Journals and give them time to complete the *Take Home* sections of the activities if they have not already done so. If desired, group students back into their color groups and allow them to work in teams to complete any data analysis (including computations and Take Home questions).
  
3. Review and discuss each activity following the data sheets and *Take Home* questions in the Student Field Journals. Use the *Take Home* questions as a guide to your discussion. Possible answers are presented in the Teacher’s Edition of the Student Field Journal. Refer to the checklist of tasks, calculations and questions below to guide you through each activity:

**Checklist of Tasks, Calculations and Questions**

**Senses at the Cienega**

**On-site:**

- Make and record observations of biotic and abiotic factors at the wetland Preserve.

### **Take Home:**

- Answer and discuss take home questions. (See Teacher's Edition for answers.)

### **Survey at the Cienega**

#### **On-site:**

- Record plant data (density, diversity and abundance) collected at randomly selected quadrats in different zones at the wetland Preserve. Note that some student groups will have collected data from the dry uplands and others from the riparian zone. In some cases, students may have both.
- Combine teams' data. (Each group was further divided into three teams for data collection.):
  - Calculate average plant density. (Calculations in Student Field Journal)
  - Calculate average plant diversity. (Calculations in Student Field Journal)
  - Note most abundant plant.
- Students should share their data so that all students have data from both upland and riparian zones. (This may occur on-site or back in the classroom.) Data from the same sites will vary between students groups.

#### **Take Home:**

- Answer take home questions. (See Teacher's Edition for answers.)
- Compare and discuss the results recorded by each group. How did these results compare with the predictions students may have made prior to their field trip?

### **Sampling at the Cienega**

#### **On-Site:**

- Collect samples of macroinvertebrates from the pond at the Preserve.
- Observe, identify and record macroinvertebrates collected. Use the data sheet: *Macroinvertebrate Sorting and Recording Table* in the Student Field Journal.
- Tally and record totals of each kind.

#### **Take Home:**

- Record totals of each kind of macroinvertebrates listed under *Sensitive Organisms*, *Somewhat Sensitive Organisms*, and *Tolerant Organisms*. Use the data sheet: *Macroinvertebrates as Water Quality Indicators* in the Student Field Journal.
- Calculate the Index VALUE for each group by multiplying the total number of individuals for that group by the multiplier listed. Use the data sheet: *Macroinvertebrates as Water Quality Indicators* in the Student Field Journal.
- Calculate the Water Quality Index following the instructions on the data sheet: *Calculating Water Quality in the Student Field Journal*.
  1. Add the Index Values of each group to get an Index Value Total.
  2. Divide the Index Value Total by the Total # of Organisms to get the Water Quality Index.
  3. Compare your Water Quality Index with the indicator indices for Good, Intermediate and Poor water quality.
- Compare and discuss the results of the Water Quality Indices calculated by each group. How did these results compare with the predictions students may have made prior to their field trip?

### **Seasons at the Cienega**

#### **On-Site:**

- Observe and record data on phenology of cottonwood and one-seed juniper trees at the Wetland Preserve. Note that some student groups will have collected data on cottonwoods and some on junipers.

- Students should share their data so that all students have data from both the cottonwood and juniper. (This may occur on-site or back in the classroom.) Data may vary between students groups.

**Take Home:**

- Answer and discuss the take home question about phenology. (See Teacher’s Edition for answers.)
- Give students time to do the *Consider the Cottonwood* Take Home activity. Have students share and discuss their responses.

4. Assign and discuss the ***Final Take Home Activity*** in the Student Field Journal. Students are asked: *Choose one of the four activities conducted during your trip to the Cienega and prepare a report on your investigation following the scientific method. Be sure to include your observations, any predictions or hypotheses, the data you gathered, and a discussion of the results.*

Give students guidance on this assignment as needed. Providing a template for their reports may be helpful. A template might look like and include the following:

**Introduction and Questions**

Explain what is being investigated and provide any relevant background information. Describe the organisms involved. List the questions being asked and pose any predictions or hypotheses.

**Description of the Investigation**

Describe how the investigation was conducted. What tools or materials were used and how? What kind of data were collected and how?

**Results**

Provide the results recorded from your investigation. Included tallied totals and computed data from your datasheets.

**Data Analysis, Discussion and Conclusions**

What do your data tell you? What doesn’t your data tell you? How do your results compare with your predictions? Can you draw conclusions from your results? What other questions come up about this investigation? Do your data bring up new questions leading to other investigations?

5. When completed, consider having students share their reports with the class. Exemplary reports could be shared with the school community, sent to the Santa Fe Botanical Garden, and/or developed into science fair projects! Good luck!