

Rio Mora STEM Lesson Plan

A. J. Rominger

September 19 and 20, 2018

Learning objectives

- Students will know that arthropods are incredibly diverse
- Students will know that different habitats help contribute to that diversity
- Students will understand what a taxonomic order is
- Students will be able to identify common arthropod orders
- Students will have an appreciation for good lab protocol

Lesson plan

Brief presentation (10 min)

- Present the tree of life highlighting arthropods
- Present the Sevilleta LTER and Rio Mora NWR as different habitats
- Present the sampling that was done at each
- Discuss the day's activities
 - sorting arthropods
 - what is an order?
 - “field marks” for common orders
 - * Arachnida
 - Araneae (spiders)
 - Acari (mites)
 - Scorpiones (scorpions)
 - Solifugae (camel spiders)
 - * Insecta
 - Coleoptera (beetles)
 - Diptera (flies)
 - Hemiptera (true bugs)
 - Hymenoptera (bees, wasps, ants)
 - Lepidoptera (butterflies and moths)
 - Orthoptera (grasshoppers and crickets)
 - discuss the sorting protocol below using an example of an already sorted sample

Sorting protocol

- Materials
 - Each group of 2–4 students will be given one sample to sort to order, half groups will get a sample from the Sevilleta, half from Rio Mora
 - Each sample will be in a ziploc bag containing:
 - * the sample itself
 - * 4 labeled plastic bowls for dividing the sample as needed
 - * 8 50ml tubes for sorting orders into, each labeled by sampling location and order
 - * A data recording sheet
 - In addition to the sample bag, each group will receive:
 - * Equipment for processing and cleanup

- forceps
 - paper towels
 - gloves
 - a squirt bottle of propylene glycol
- * An identification sheet with pictures of the common orders
- Several dissecting scopes will be available for the groups to share; this is only for fun, it will not be required for identification
- Process (20 min)
 - One person will divide the sample into enough bowls such that each person can sort their own bowl
 - Students will sort through their bowls, picking out individual arthropods, identifying them to order, and placing the identified specimen into the appropriate tube
 - A tally will be kept on the data sheet of how many specimens of each order are found in each sample; these data sheets will be given to the instructor to tabulate, or a representative from each group can write the totals on the white board
- Cleanup (5–10 min)
 - all tubes will be capped and kept out for sharing between groups
 - all bowls will be squirted with the propylene glycol, letting all the fluid drip back into the primary sample container
 - sample containers will be lidded and returned to the sample bag
 - the work area will be wiped down with paper towels
- Discussion (15–20 min)
 - After all sorting is complete we will discuss as a group any qualitative differences between the Sevilleta and Rio Mora
 - We will quantitatively compare differences in the total number of arthropods and representation of different orders at the two different locations
- Wrap-up: Tubes will be returned to sample bags