**Science Curriculum Outline**

Below is the outline of ideas for the science curriculum. If you’re interested in helping out with this aspect, some tasks include:

* Editing the outline with additional ideas and modifications
* Writing scripts for sections
* Making sure the right supplies get to the right place

Learning Goals

1. See some examples of university-level research
2. Understand some fundamental concepts in ecology
3. Learn about the impacts of humans on the environment

Overview

1. Time: 10 am – 11 am
2. Location: Bivens Arm Research Station
3. Lessons:
   1. Introduction to Bivens Arm
   2. Biodiversity and its benefits
4. Time: 11:15 am – 12:15 pm
5. Location: McCarty B Lab
6. Lesson: Invasive species and infectious disease

Introduction to Bivens Arm

1. Describe current research taking place here
   1. Drought/invasion experiment
      1. Invasion and plant communities
      2. Soil microbial communities
      3. Animals and granivory
   2. Industrial hemp program
      1. Refer to media releases for more information

Biodiversity and its benefits

1. Mini lecture concepts
   1. Biodiversity
      1. Species richness
      2. What is a species?
   2. Ecosystem functions
      1. Biomass
      2. Disease suppression
      3. Pollination
   3. Question: Does higher species richness lead to more biomass, greater disease suppression, and/or higher pollinator abundance?
   4. Hypotheses:
      1. Higher species richness leads to more biomass unless a high-biomass invasive species is present in the community.
      2. Higher species richness leads to fewer disease symptoms because specialist pathogens are prevented from spreading rapidly.
      3. Higher species richness leads to more pollinators because more specialized pollinators are more likely to have food/reproductive host plants present in the community.
2. Experimental design: [**https://doi.org/10.1002/ece3.2729**](https://doi.org/10.1002/ece3.2729)
3. Data collection: In groups of 2-3, students will collect data from the drought/invasion experiments on species richness, an approximation for biomass, and either pollinator or disease intensity.
   1. Hold PVC quadrats over a plot
   2. Record number of observable plant species (morphological differences)
      1. iNaturalist app
   3. Use a meter stick to estimate height of plants within quadrat
   4. Record number of observable pollinators or
   5. Record percentage of leaves with disease symptoms
4. Supplies (5 each)
   1. Quadrats
   2. Data sheets
   3. Pencils
   4. Notebooks
   5. Meter sticks

Invasive species and infectious disease

1. Mini lecture concepts
   1. Invasive species
      1. EDDMapS app
   2. Infectious disease
   3. Fungicide
   4. Question: Does fungicide affect the growth of a native or invasive species? (a real research project that is part of a larger project)
   5. Hypotheses:
      1. Fungicide does not affect the growth of either species
2. Data collection: Each student (or pairs) will have one plant of each species
   1. Measure height
   2. Scan leaf for leaf area
   3. Measure leaf weight
3. Supplies
   1. Notebooks
   2. Pencils
   3. Rulers/tape measures
   4. Scanner and computer
   5. Scales
   6. Weigh boats