



Nature's Design

7TH grade
Ecology program
at Jack London State Historic Park

Teacher's Outline

Theme: By understanding ecosystem dynamics and the role of biodiversity in nature we can find meaningful ways to reduce the impacts of climate change on our local ecosystems.

Curriculum Goals: Student's will...

- Explore local ecosystems through inquiry and hands-on learning.
- Work collaboratively in small teams to collect and compare data on the diversity of flora and fauna found in the park's wild environment and in their own school yard.
- Conduct analysis to infer general biodiversity levels within each location and understand the importance of biodiversity for ecosystem health and resilience.
- Be given a challenge to re-design their own school campus to increase biodiversity levels, without impeding the needs of the school; JLSHP's PARK CONTEST opportunity.

Teacher Tasks: Teachers and other field trip chaperones will play a role in supporting and supervising student groups. Throughout this outline, a description of teacher/chaperone tasks will be marked with the image noted here.



PROGRAM SCHEDULE (3 sessions in total):

- * Day 1 – *Nature's Ground Rules*; 90 min. at school
- * Day 2 – *Biodiversity Bonanza*; 4 hr. field trip at Jack London State Park
- * Day 3 – *Think Tank*; 90 min. at school

Next Generation Science Standards (NGSS)

Disciplinary Core Ideas Met Through the Program:

LS2.A: Interdependent Relationships in Ecosystems
LS2.B: Cycle of Matter and Energy Transfer in Ecosystems
LS2.C: Ecosystem Dynamics, Functioning, and Resilience
LS4.D: Biodiversity and Humans
ETS1.B: Developing Possible Solutions

Correlating Performance

Expectations for NGSS:

MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem
MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem
MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services



TO DO BEFORE WE START

Throughout the program students will be operating in small science teams (teams will stay the same for all visits). Please organize student teams before our first program session, a.k.a. “Day 1” (roughly 5-6 students per team). Students can come up with their own team name or you can assign each team a name or number that works best for you and your classroom dynamics.

We will be conducting our first session in your school yard. Ahead of this, you and your JLSHP educator will determine the area(s) of the school yard to be explored with students on Day 1.

At the teacher in-service, you will receive all the student field notebooks. Feel free to go through the notebooks with your students ahead of time to get familiar with the content.

Please note the “Responsibility in Research” page of the student field notebook as you are reviewing it. We want to ensure a safe experience that leaves no trace.

JLSHP will work to provide 3-4 trained docents (“group leaders”) for each field trip to the State Park. If you are able, please provide additional chaperones to assist with student safety on the trail. The number of chaperones needed will depend on the size of your group.

JLSHP will provide all materials and equipment for all three days of the program. You will only need to make sure students have their notebooks for each session and are prepared for any expected weather conditions.

DAY 1: Nature’s Ground Rules (90 min. at school)

In this opening session we will introduce the core science concepts guiding this program; interdependence and biodiversity. The lesson is conducted on the school yard and students will learn basic field techniques as we explore the plants and animals thriving there. We will also briefly introduce the design challenge that will be explained in detail on Day 3. *Teachers are always welcome to chime in and make any connections to classroom learning that comes up throughout the program.*



JLSHP educator will lead discussions and introduce/demonstrate all activities and the use of field equipment. Teachers (and any aids) will be needed to help monitor students on the school yard and encourage/guide them as they collect data and carry out research activities.

Itinerary:

1. JLSHP educator will meet you and your students in your classroom for a brief introduction. Then, we will move to the school yard for the rest of the session.
2. We introduce field equipment and its proper use in the school yard.
3. We conduct a brief bird spotting/identification walk around the yard.
4. We introduce plant quadrat activity and conduct arthropod identification in shrubby area.
5. Students complete scientific illustration of at least one arthropod.
6. Complete team’s species lists.

Materials used: binoculars, beating sheets, collection vials, observation trays, hand lenses, quadrats, field notebooks, field guides

DAY 2: Biodiversity Bonanza (4 hrs. at JLSHP)

This second field lesson will take place in the forest at Jack London State Historic Park. Utilizing the techniques and tools learned on Day 1, students will continue to engage in scientific processes by setting up their own field study sites and working cooperatively to create their team’s second set of species lists.



As on day 1, JLSHP educator will lead discussions and introduce and demonstrate all activities in the field. Teachers and other adults will be needed to help monitor behavior

and encourage/guide students as they carry out research activities. We will need to keep students fairly quiet on the bird walk so that we don't scare our subjects away. We also need to watch out for poison oak on the trails!

Itinerary:

1. Your JLSHP educator will meet your group in the Beauty Ranch parking lot. Please note, there is only one portable toilet in this lot. The museum lot has regular bathrooms. Please arrive early if you think your students will need the facilities before we hit the trail.
2. In the parking lot, we will organize our groups, pass out field gear, and briefly review Day 1.
3. We will assign each student team(s) and adult leader, for safety and supervision along the trail and at our study site.
4. We will focus our research around the area of the London Lake site (no water). It will take approximately 25 minutes to hike in (steep hill). To use our time wisely, we will conduct our bird identification along that hike. To make this walk more manageable, groups larger than 30 will need to be split in half and the JLSHP educator will walk with one half while you (the teacher) walk several yards behind with the second half. We will re-group at the lake site.
5. Student teams will be assigned to an area marked by small plant flags. JLSHP will choose these areas ahead of time based on plant diversity, sensitivity of the area, and avoidance of poison oak. Students will conduct their plant mapping activity here.
6. Once their plant maps are complete, students can carefully begin their arthropod study. Each student will complete at least one scientific illustration of an arthropod before carefully releasing collected specimens back into the habitat.
7. We will take the last few minutes of the field trip to complete species lists.
8. Once we have packed up and removed all traces of our presence, we will head down the service road and back to the picnic tables next to the Beauty Ranch parking lot. Your group can have lunch here if you choose. Then on the bus back to school.

Materials used: binoculars, beating sheets, collection vials, observation trays, hand lenses, quadrats, field notebooks, field guides

DAY 3: Think Tank (90 minutes at school) This wrap-up lesson will be conducted back in the classroom where we will reflect on our collective observations and “crunch” the data. We will compare our two study locations and work to develop a general picture of the biodiversity levels in our local habitat and surrounding community. This will lead to a discussion about why biodiversity is so important and how it relates to events happening in our world today. Finally, students will be asked to consider how modern society's activities and choices might affect our local ecosystems in the long run. This final brainstorming activity will introduce the school yard design challenge...

Re-wild My School Design Challenge (Completed by teachers following the program/contest option)–

THE CHALLENGE: “Re-design your schoolyard to support and increase the biodiversity on your campus, while also honoring the needs of the school.” Students can design and create posters (or build models for contest option) that demonstrates a basic understanding of ecosystem dynamics and the interdependence of living and non-living components of an ecosystem. Many teachers have turned this challenge into a graded assignment for class. A template with guiding questions will be provided for students to help them brainstorm and plan their designs.

THE PARK CONTEST: Some “starter-materials” for the construction of the school yard models will be given to the teacher to distribute to interested students. At the teacher’s discretion, student projects can be submitted to JLSHP for the yearly design contest. Projects that most clearly demonstrate ecosystem dynamics and interdependence should be selected for promotion to the “Exhibition Day” at the park (held in May). Here, we will invite students (and their families & teachers) to display their models at an outdoor exhibition during Jack London State Historic Park’s Call of the Wild weekend event. Judges from the Benziger Family (experts in biodynamic farming and landscape design) will be on-site to select the top 3 winning designs. All participants in the contest will receive certificates of participation in the event. We will promote student designs on our website, to inspire all who visit our park to think about building and landscaping in new and innovative ways!

Itinerary:

1. JLSHP educator will meet you and your students in your classroom and this session will take place inside. We will begin by reviewing our research and creating a master species list together. Student teams should have already completed their species lists from days 1 & 2 in their notebooks. Together, we will create a master list. The master class list will open a discussion on the importance of biodiversity for ecosystem health and resilience.
2. We will pose questions to foster a class discussion on potential ecosystem solutions to lower levels of biodiversity in the student’s own school yard.
3. JLSHP educator will then introduce the design challenge and park contest and explain rules and prizes. Students can enter a design as a team or as individuals. We leave that choice to the teacher’s discretion. This will wrap-up the main program.



Students will work in their science teams during the data crunching portion. It would be helpful to have them seated together with their field notebooks (completed data sheets) at the beginning of this class session.

