

RESOURCE LIBRARY | ACTIVITY : 3 HRS

# Designing a BioBlitz Learning Experience

Recruit and support scientists, naturalists, and other expert volunteers to lead BioBlitz inventories that engage both students and community members in a fun, dynamic, participatory science learning and stewardship event.

## GRADES

4 - 12

## SUBJECTS

*Biology, Ecology, Experiential Learning, Geography, Physical Geography*

## CONTENTS

4 PDFs, 6 Links

## OVERVIEW

Recruit and support scientists, naturalists, and other expert volunteers to lead BioBlitz inventories that engage both students and community members in a fun, dynamic, participatory science learning and stewardship event.

For the complete activity with media resources, visit:

<http://www.nationalgeographic.org/activity/designing-bioblitz-learning-experience/>

## Program



## DIRECTIONS

Follow the steps below and use the provided handouts to help scientists, naturalists, and other expert volunteers prepare to lead an inventory group as part of a BioBlitz event.

## **Before the Event:**

### **1. Recruit expert volunteers.**

Reach out to a variety of possible experts, such as field scientists, college students, extension agents, master naturalists, and other enthusiasts with expertise in natural history (e.g., butterfly experts or edible plant experts).

### **2. Determine and map your site.**

Use online and paper maps to plan where the experts and their participants will observe flora and fauna. If possible, obtain or reproduce maps so that students and other participants will also have them to use during the event.

### **3. Track down equipment, and plan for a basecamp.**

The handout, *Bioblitz: Suggested Equipment List*, can guide you in obtaining the equipment your expert volunteers and participants will use to aid in observing species. Also, plan for a science tent or base camp where groups meet to test out technology and other equipment. Experts can display specimens or photographs of plants, insects, or other organisms. Live specimens can be displayed for a short period of time before returning them to their habitats. A basecamp can be an exciting, dynamic environment where expert volunteers, event organizers, and participants can all come together before or after BioBlitzing in the field.

### **4. Develop strong relationships with your expert volunteers.**

Send volunteers information ahead of time so they can prepare themselves to work with students and engage all participants in having a meaningful, inspirational learning experience. Send the handout, *Bioblitzing for Volunteer Experts: Tips for Engaging School Groups*, to them in advance. Provide an opportunity to visit the BioBlitz site and discuss needs and opportunities as part of a planning meeting. Plan how your experts will be recognized as group leaders. For example, you can provide t-shirts, hats, or a simple name tag.

## **5. Pre-plan for data collection and technology at the event.**

Give guidance on using iNaturalist.org to collect observation data. You can provide this iNaturalist [BioBlitz Guide](#) to help expert volunteers familiarize themselves with the technology and how it is used during a BioBlitz. For the participants who will not have access to iNaturalist (e.g., young children), consider using a low-tech alternative such as clipboards with a simple Species Identification Cards [worksheet](#) for sketching and writing notes.

### **During the Event:**

#### **1. Keep your expert volunteers engaged and happy.**

Bioblitzing and leading inventories can be hard work! Have staff ready to answer any last minute questions and help with equipment. Plan to provide your expert volunteers with snacks, drinks, cold water refills, or a bag lunch if possible. Local grocery stores will often give donations.

#### **2. Document and share the event.**

A BioBlitz can be a great way to build a continued and expanded stewardship of the local environment. Take photographs of the action, share special moments and exciting findings on social media, and set the stage for ongoing engagement from the community.

#### **3. Showcase the event live for participants and the community.**

If possible, display the webpage for your iNaturalist project at your base camp/science tent to show the tally of observations. The required equipment for a display is included in the equipment list. This can add to the excitement and engagement around the BioBlitz effort to document as many species as possible. Make sure to share the link to your project in your handout materials so even those not at the event can follow your progress.

## After the Event:

### 1. Summarize the results of the BioBlitz, and share!

Once the inventories have wrapped up, use tips from the iNaturalist.org [BioBlitz Guide](#) and make sure all the observations were uploaded to the iNaturalist project page. The final count of observations and species identified will appear on the project homepage.

### 2. Share the results!

After tallying the final counts, make sure to share them with everyone involved. Send BioBlitz results to teachers to share with students. Include them in thank you notes you send to volunteers. Your efforts and dedication resulted in meaningful interactions with the local environment for participants. It is time to celebrate and share your efforts with all involved, including any media outlets that are willing to share with their audiences.

## Tip

Before the event, research and provide to expert volunteers some facts about the park or region's biodiversity, such as estimated number of species. If possible, provide numbers for different taxa: plants, mammals, birds, reptiles, amphibians, fish, and invertebrates. You can also provide numbers for endangered or threatened species.

## Modification

If there are enough park staff, set up two or more stations for students to visit at the base camp: one station for plants and another for invertebrates. See the handout Plant and Invertebrate Investigation Stations for ideas.

## Modification

Incorporate art into plant identification by providing crayons and paper for students to make leaf rubbings of the trees they identify. Students can do leaf rubbings on paper, then write the name of a tree after identifying it with a dichotomous key.

## Tip

When recruiting scientists and expert volunteers, show [this video](#) to give a sense of how a bioblitz works and how they can help.

## Informal Assessment

In addition to the number of species identified and any unusual findings, measure your event's success by the number of students and others participating in this event.

## Extending the Learning

To find species numbers, access the National Park Service Inventory & Monitoring (I&M) website to find species checklists for your park. Follow these steps:

1. Visit [science.nature.nps.gov/im](http://science.nature.nps.gov/im) and click on the Map for I&M Networks in the left menu.
2. On the map, click on your local I&M network.
3. On the left menu, click on Larger Network Map. Determine which park is closest to your location.
4. Once you determine the park closest to you, click on "Inventory" in the left menu.
5. Select "Species Lists" from the list of different inventories available.
6. Click the link to NPSpecies.
7. You should now be using the site: <https://irma.nps.gov/NPSpecies/>. Select your local park in the dropdown menu and click "Go."
8. Select the "Checklist" option to retrieve a list of all present or "probably present" species. Select "Full list" to retrieve a list of native or non-native classification and abundance.
9. Download the results as a .xlsx file and open them in Microsoft Excel, or select "Report/PDF" to open them as a printable checklist.

## OBJECTIVES

## Subjects & Disciplines

### **Biology**

- [Ecology](#)
- Experiential Learning

### **Geography**

- [Physical Geography](#)

## Learning Objectives

Students will:

- Make observations during a bioblitz event
- Use field identification tools and techniques when observing plants and invertebrates
- Use iNaturalist to document and identify organisms

## Teaching Approach

- Learning-for-use

## Teaching Methods

- Experiential learning
- Hands-on learning
- Inquiry

## Skills Summary

This activity targets the following skills:

- 21st Century Student Outcomes
  - Information, Media, and Technology Skills
    - Information, Communications, and Technology Literacy
  - Learning and Innovation Skills
    - Critical Thinking and Problem Solving

## National Standards, Principles, and Practices

### NATIONAL GEOGRAPHY STANDARDS

- **Standard 1:**

How to use maps and other geographic representations, geospatial technologies, and spatial thinking to understand and communicate information

- **Standard 18:**

How to apply geography to interpret the present and plan for the future

- **Standard 4:**

The physical and human characteristics of places

- **Standard 8:**

The characteristics and spatial distribution of ecosystems and biomes on Earth's surface

## NEXT GENERATION SCIENCE STANDARDS

- **Crosscutting Concept 3:**

Scale, proportion, and quantity

- **HS. Ecosystems: Interactions, Energy, and Dynamics:**

HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

- **MS. Interdependent Relationships in Ecosystems.:**

MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

- **MS-LS2: Ecosystems: Interactions, Energy, and Dynamics:**

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

- **Science and Engineering Practice 1:**

Asking questions and defining problems

- **Science and Engineering Practice 3:**

Planning and carrying out investigations

- **Science and Engineering Practice 8:**

Obtaining, evaluating, and communicating information

## PREPARATION

# What You'll Need

### MATERIALS YOU PROVIDE

- Hand lens
- Microscopes
- Aquatic nets
- Arthropod beating sheets (or white bed sheets)
- Bug viewers/magnifiers
- Clear sandwich bags

- Flying insect nets
- iNaturalist
- Lenses for smartphones
- Local field guides or folding guides
- Maps of the park (optional)
- Paper and crayons for leaf rubbings (optional)
- Petri dish, plastic
- Plastic aquarium or other container
- Plastic or aluminum trays
- Plastic trays
- Pop-up insect habitats

## REQUIRED TECHNOLOGY

- Internet Access: Required
- Tech Setup: Digital camera (and related equipment), Mobile data device (smartphone or tablet), Monitor/screen

## PHYSICAL SPACE

- Park

## SETUP

For the Invertebrate Station: Print EOL Trait Cards on cardstock paper, punch holes, and attach the set to a key ring so they stay together. Students can then take these into the field as a reference.

For the Plant Station: Print dichotomous keys for local plant species.

For field inventories: Access the National Park Service Inventory & Monitoring (I&M) website to find species checklists for your park. Follow these steps:

- Visit [science.nature.nps.gov/im](https://science.nature.nps.gov/im) and click on the Map of I&M Networks on the left menu.
- On the map, click on your local I&M network.
- On the left menu, click on Larger Network Map. Determine which park is closest to your location.
- Once you determine the park closest to you, click on "Inventory" in the left menu.
- Select "Species Lists" from the list of different inventories available.

- Click the link to NPSpecies.
- You should now be using the site: <https://irma.nps.gov/NPSpecies/>. Select your local park in the dropdown menu and click "Go."
- Select the "Checklist" option to retrieve a list of all present or "probably present" species. Select "Full list" to retrieve a list of native or non-native classification and abundance.
- Download the results as a .xlsx file and open them in Microsoft Excel, select "Report/PDF" to open them as a printable checklist.

## RESOURCES PROVIDED: WEBSITES

- [What Tree Is That?](#)
- [Encyclopedia of Life: Species Cards](#)
- [iNaturalist](#)
- [iNaturalist Bioblitz Guide](#)
- [National Park Service Inventory and Monitoring \(I&M\)](#)
- [National Park Service: NPSpecies](#)

## RESOURCES PROVIDED: HANDOUTS & WORKSHEETS

- [Bioblitz: Suggested Equipment List](#)
- [Plant and Invertebrate Investigation Stations](#)
- [Species Identification Cards](#)
- [Volunteering Experts: Tips for Engaging School Groups](#)

## BACKGROUND & VOCABULARY

### Background Information

A bioblitz is a unique combination of taxonomic inventory, public outreach, and science education. The event is usually a 24-hour event in which trained scientists, naturalists, families, students, teachers, and other community members come together to explore and document the many plants, animals, fungi, and other organisms in a park or green space. A bioblitz is an opportunity for scientists and naturalists to involve the public in their hands-on fieldwork and approaches to experiencing, observing, and understanding the natural world. Students can participate for a portion of a bioblitz through class field trips, scout or club trips, or alternatively, with their families.

# Prior Knowledge

## Recommended Prior Activities

- [Introducing Biodiversity and BioBlitz](#)

## Vocabulary

Term	Part of Speech	Definition
bioblitz	<i>noun</i>	a field study in which groups of scientists and citizens study and inventory all the different kinds of living organisms within a given area.
biodiversity	<i>noun</i>	all the different kinds of living organisms within a given area.
citizen science	<i>noun</i>	science project or program where volunteers who are not scientists conduct surveys, take measurements, or record observations.
inventory	<i>verb</i>	to list or evaluate.

### For Further Exploration

### Websites

- [What Tree Is That?](#)
- [National Park Service: NPSpecies](#)
- [National Geographic - National Parks](#)
- [Encyclopedia of Life](#)



© 1996–2019 National Geographic Society. All rights reserved.