

RESOURCE LIBRARY | ACTIVITY : 1 HR

# Analyzing BioBlitz Data

Students investigate and analyze local biodiversity using iNaturalist observations. They collaborate in small groups to explore observations and identification of various taxon groups. Then students create a class graph of data and draw inferences about biodiversity, invasive species, and endangered species in their local park.

## GRADES

4 - 8

## SUBJECTS

*Biology, Ecology, Experiential Learning*

## CONTENTS

1 Photograph, 1 Link, 2 PDFs

## OVERVIEW

Students investigate and analyze local biodiversity using iNaturalist observations. They collaborate in small groups to explore observations and identification of various taxon groups. Then students create a class graph of data and draw inferences about biodiversity, invasive species, and endangered species in their local park.

For the complete activity with media resources, visit:

<http://www.nationalgeographic.org/activity/analyzing-bioblitz-data/>

## Program

**bio**blitz

## DIRECTIONS

## **1. Explore student observations and identifications from BioBlitz. (10 minutes)**

Write “BioBlitz Discoveries” on the board. Have students take turns writing the names of different species they discovered at the bioblitz. Students can come to the board a few at a time and write simultaneously, or a few representatives can write while the rest of the class brainstorms and lists what they remember. If time allows, ask students to contribute a few fun species facts they learned during the bioblitz.

Give students time to examine the list and remove any redundant species. Then have students tally the total number they were able to recall. Ask each student to write his or her name and the total number of species he or she estimates were identified by all participants at BioBlitz on an index card. Students should fold their index cards in half and pass them to you.

Tell students they are about to see the actual number of species currently identified. Open your local park’s BioBlitz project page on iNaturalist by searching for the location name. Students should see the total number of species tallied on the left side of the home screen in the green “Totals” box. Invite a few volunteers to sift through the index cards and identify which student(s) made the closest guess. Explain that students will now use iNaturalist to explore observations of what is living in their park.

## **2. Preview how to navigate iNaturalist to find observation data. (10 minutes)**

Divide students into pairs or groups of three. There are 11 taxon groups, and each student group will be responsible for observation data with their assigned taxon group. Make sure each group has access to a computer, and have them go to [www.inaturalist.org](http://www.inaturalist.org). If the class has an account, they can log in using the class username and password.

Demonstrate for students how to navigate around their park’s BioBlitz project page, highlighting the website features. Have students click on the “Observations” button in the green Totals box on the left side of the screen. Show students how to toggle between the different views of observations: map, list, and icon. Introduce students to the search filter.

Review taxon group icons and checkboxes for threatened and introduced species. Show students an example of filtering for a particular group, for example birds, then click “Update Search” to show all birds in the results.

### **3. Explore and analyze BioBlitz observation data. (15 minutes)**

Explain to the class that they will work in their small groups to analyze the bioblitz observation data for one taxon. Then, they will synthesize, or put their data together, in a class graph in order to visualize the biodiversity of their park. They will also analyze data for introduced and endangered species in their area and will consider how their community can address these challenges.

Distribute a copy of the Analyze Bioblitz Results and Bioblitz Taxa Graph handouts to each group. Assign a taxon to each group, or have groups pick a taxon name out of a hat. Student groups will analyze observation data for their taxon and create a piece of a graph that the whole class contributes to. The worksheets are designed to guide groups through each step. While students work on this task, draw a large graph on the board with the name of each taxon along the x-axis and number on the y-axis and a key for colors to use with observed and identified data. Then rotate around the room to guide groups as needed.

As groups finish the observations of their taxa, have one group member record the findings on the class graph using the designated colors for observed and identified data. They need to record the percent of total observations and the percent of total species identified for each taxon. Tell students to be prepared to share defining characteristics, total number of species and observations, the five most common, any unexpected observations, any introduced species, and any endangered species.

### **4. Present and Synthesize Findings (25 minutes)**

Have groups take turns sharing their findings in a one-minute presentation and adding additional information to the class graph. Each taxon should have two bars: one for number of observations and one for number of species identified. As one student presents the group’s

findings, another student can add total number of species and observations and the most common species and any introduced and/or endangered species above their bar graphs on the board.

As each group presents, instruct the other groups to add the graphs of each presenting group to their BioBlitz Taxa Graph worksheet. Have colored pencils available to students to match the colors on the board.

After all groups have contributed to the class graph, give students five minutes to examine the graph and look for patterns in the data, or any relationships between taxon groups, numbers of species and observations, and so on. Students should spend two minutes studying independently, then discuss with their group and prepare to share their conclusion. If helpful, use the following prompts to guide groups' inquiry processes:

- Do any of these groups have a much higher number of observations than others? Why do you think that is?
- Do any taxon groups have a large discrepancy between the number of observations and number of species identified? Why might this be?
- Are there any patterns between the number of invertebrates and vertebrates identified? Explain.
- Think back to our first task when we learned the number of species of each of these groups. Do you see any relationships between the number of species globally and the observations from our park?
- What endangered species were found in the area? Are there any relationships between endangered species and taxon groups?
- What invasive species were found in the area? Do you see any patterns with invasive species and taxon groups?

With the remaining time, conduct a whole group discussion using the questions above. Elicit students' ideas from each group throughout the discussion. To conclude the activity, remind students that a bioblitz only covers one day of data collection, and it is one of many methods to study local biodiversity. There may be much more diversity to discover at different times of year and using different methods and equipment. This bioblitz did show that the more we look around us, the more diversity we see.

## Modification

If time allows, in Step 1 have students explore their understanding of the various taxon groups by circling different classes of species in different colors (e.g., reptiles/green; birds/orange, mammals/ blue).

## Modification

In Step 3, as groups take turns recording information on the graph on the board, have early finishers explore another taxon group. Then when each group presents their results to the class, other groups can confirm the accuracy of the results.

## Modification

Provide sentence frames for English language learners to prepare them for the presentations:

"We observed \_\_\_\_\_ total species, and we identified \_\_\_\_\_ of the observed species."

"Characteristics of our group include \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_." "The most common species we observed was \_\_\_\_\_."

## Informal Assessment

Evaluate students' data analysis, presentations, and inferences made during discussions. Listen carefully to students' ideas in the whole-group discussion at the end of the activity. Encourage all members of groups to participate in presentations and during the discussion of results.

## Extending the Learning

- Compare diversity from various bioblitzes, including the most common plants, invertebrates, and vertebrates found across the country.

- Using the calculations in the optional Step 7 on the Analyze BioBlitz Results worksheet, have students create a pie chart to visualize Percentage of Taxon Observations.
- Investigate which invasive and endangered species are of concern in your park and discuss ways to manage them.
- Conduct a follow-up mini-bioblitz in your schoolyard to compare species found there with the local park and also to keep students engaged in local biodiversity analysis.
- Celebrate biodiversity and show bioblitz results by having students create a display for the school. Student contributions can feature “biodiversity superlatives,” such as smallest, largest, fastest, slowest, slimiest, most colorful, best camouflage, most surprising, most common, rarest, and most dangerous.

## OBJECTIVES

# Subjects & Disciplines

### **Biology**

- Ecology
- Experiential Learning

# Learning Objectives

Students will:

- Analyze local biodiversity data using iNaturalist bioblitz observations
- Use descriptive statistics to visualize and synthesize findings
- Make inferences about local biodiversity

# Teaching Approach

- Learning-for-use

# Teaching Methods

- Discussions

- Inquiry
- Multimedia instruction
- Research
- Visual instruction

# Skills Summary

This activity targets the following skills:

- 21st Century Student Outcomes
  - Information, Media, and Technology Skills
    - Information Literacy
  - Learning and Innovation Skills
    - Communication and Collaboration
    - Creativity and Innovation
    - Critical Thinking and Problem Solving
  - Life and Career Skills
    - Social and Cross-Cultural Skills
- 21st Century Themes
  - Environmental Literacy
- Critical Thinking Skills
  - Analyzing
  - Applying
  - Evaluating
- Science and Engineering Practices
  - Analyzing and interpreting data
  - Constructing explanations (for science) and designing solutions (for engineering)
  - Obtaining, evaluating, and communicating information
  - Using mathematics and computational thinking

# National Standards, Principles, and Practices

## NATIONAL GEOGRAPHY STANDARDS

- Standard 8:

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

## NEXT GENERATION SCIENCE STANDARDS

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

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

- **Science and Engineering Practice 4:**

Analyzing and interpreting data

- **Science and Engineering Practice 5:**

Using mathematics and computational thinking

- **Science and Engineering Practice 6:**

Constructing explanations and designing solutions

- **Science and Engineering Practice 8:**

Obtaining, evaluating, and communicating information

## PREPARATION

# What You'll Need

## MATERIALS YOU PROVIDE

- Index cards
- Pencils
- Pens
- Markers, colored pencils, or crayons

## REQUIRED TECHNOLOGY

- Internet Access: Required
- Tech Setup: 1 computer per classroom, 1 computer per small group, Projector

## PHYSICAL SPACE

- Classroom

## SETUP



- Prepare for small group data analysis by setting markers/colored pencils/crayons, handouts, and a computer together in a location for each taxon group.
- Draw the class graph ahead of time if multiple boards are available (optional).

## RESOURCES PROVIDED: WEBSITES

- [iNaturalist](#)

## RESOURCES PROVIDED: HANDOUTS & WORKSHEETS

- [Analyze BioBlitz Results](#)
- [BioBlitz Taxa Graph](#)

## RESOURCES PROVIDED: IMAGES

- Example Graph

# BACKGROUND & VOCABULARY

## Background Information

A bioblitz is a short, intensive search for species in an area. While a bioblitz allows participants to document species, it differs from a scientific inventory in a number of ways. Scientific inventories are usually limited to biologists, geographers, and other scientists. A bioblitz brings together volunteer scientists, as well as families, students, teachers, and other members of the community.

While a scientific survey often focuses on unique or isolated areas, bioblitzes focus on areas that are connected to residential, urban, and industrial areas.

Finally, biological surveys may take a long period of time to conduct. A bioblitz lasts a short period of time, normally 24 hours. Team members work around the clock to inventory as much as possible in the time given, blitzing the natural area to complete their task.

These differences make a bioblitz a unique biological survey that encourages a relationship between the natural and human communities of a given area. Citizens work alongside scientists to learn about the biological diversity of local natural spaces. In the process, they gain a deeper understanding of and a stronger connection to their home environment. A bioblitz aims to promote and improve local natural spaces by empowering citizens to better understand and protect biodiversity.

Scientific investigations also generally occur over a long term and provide scientists with sets of data that represent an area's biodiversity more fully than a bioblitz. For example, a bioblitz conducted in an area in January would likely result in a much different set of observations than a bioblitz in May. A standardized monthly inventory of that same area may reveal how the species composition of an area changes throughout the year.

Therefore, when exploring data collected in bioblitzes, it is important to consider how the diverse volunteers, short time period, and variety of methods utilized in this event can limit the types of information that people can understand from this event.

## Prior Knowledge

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## Recommended Prior Activities

- [Designing a BioBlitz Learning Experience](#)
- [Introducing Biodiversity and BioBlitz](#)

## Vocabulary

<b>Term</b>	<b>Part of Speech</b>	<b>Definition</b>
<b>biodiversity</b>	<i>noun</i>	all the different kinds of living organisms within a given area.
<b>endangered species</b>	<i>noun</i>	organism threatened with extinction.

Term	Part of Speech	Definition
introduced species	<i>noun</i>	a species that does not naturally occur in an area. Also called alien, exotic, or non-native species.
invasive species	<i>noun</i>	type of plant or animal that is not indigenous to a particular area and causes economic or environmental harm.
taxonomic group	<i>noun</i>	things, such as organisms or ideas, organized by their relationship to each other.
threatened species	<i>noun</i>	organism that may soon become endangered.

## For Further Exploration

### Websites

- [Encyclopedia of Life: What is an Invasive Species?](#)
- [Instituto de Pesquisas Ecológicas: Biodiversity Mapping](#)



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