

W.A.T.E.R WORKSHEETS

STORM WATER PARK BIOBLITZ

A lesson for determining species richness and biodiversity by investigating stormwater parks

ACTIVITY DESCRIPTION

A BioBlitz is an event that focuses on finding and identifying as many unique plant and animal species as possible in a specific area over a short period, usually 24 hours or less.

Information from a BioBlitz at a stormwater park will help determine this area's ecological health by measuring species richness and biodiversity. Species richness is a basic measure of biodiversity. Biodiversity or biological diversity, is the variety of life on Earth, including plants, animals, and microorganisms living in an area, habitat, or community.

People who conduct bioblitzes are called community or citizen scientists. Citizen scientists can be anyone in the community regardless of their educational or professional background. Citizen scientists are any members of the general public who collect and analyze data relating to the natural world, typically as part of a collaborative project with professional scientists. The information collected and recorded from a bioblitz can help land managers, stewards, and community members understand the ecosystem's overall health and functionality and decide what is needed for continued maintenance, stewardship, and enjoyment of the park site.

SUGGESTED CURRICULUM APPLICATIONS

Science: Biology, ecology, natural history

Math: counting the number of individuals found that are of one species, counting the number of unique species, calculating species richness, recording and analyzing data

Geography: habitat types, ecosystems, abiotic and biotic factors, land use, mapping and enjoyment of the park site.

ACTIVITY OBJECTIVES

- Observe, identify, and record plants and animal species at the stormwater park.
- Determine the species richness and biodiversity of the stormwater park.
- Understand how species richness is an indicator of ecosystem health and is used to assess the biodiversity of a defined area.
- Engage in science by observing, identifying, measuring, and recording plant and animal species data.
- Understand how using and caring for stormwater parks can improve ecosystem health and functionality.

ACTIVITY VITALS

- **Activity Time:** Preparation time is 1 hour.; Activity time (45 minutes)
- **Subject Areas:** Science, Math, and Geography
- **Grade Levels:** 9th–12th grade
- **Skills:** Observation, species identification, data collection, measuring, and recording
- **Key Vocabulary & Concepts:** Biodiversity, citizen science or scientist, common name, data, ecology, ecosystem health, ecosystem services, identification, observation, species, species richness
- **Jobs and Careers:** Biologist, Ecologist, Conservationist, Statistician, Global Information Systems (GIS) Analyst, Urban Planning

LET'S GET STARTED

THIS EVENT CAN BE HOSTED ONLINE VIA MOBILE APPS OR OFFLINE WITH PAPER DATA SHEETS!

ACTIVITY MATERIALS (OFFLINE OPTION)

- Selection of field guides or nature guidebooks to identify species: birds, invertebrates, reptiles, amphibians, mammals, plants, and fungi/Protista
- Clipboard & pencils
- Copies of the Student Datasheet: Stormwater Park BioBlitz Datasheet
- Copies of the Stormwater Park Site Map

ACTIVITY MATERIALS (ONLINE OPTION)

- Mobile device (phone/cameras) with internet access to capture photos or research species.
- A mobile nature observation app such as iNaturalist, Seek, and eBird
 - Create a unique project or participate in the "Pima Cty Stormwater Park Bioblitz" project (not yet available).
- *More information on how and why to use these mobile apps is in the BioBlitz Extension section.*

ACTIVITY PROCEDURE

Preparation (In the classroom)

- Offline versus Online Identification and Recording of Species
 - Determine if students will identify and record species offline, using paper data sheets, or online using mobile nature observation apps.
 - Gather the necessary materials, supplies, and equipment needed and/or
 - Upload a mobile nature observation app (optional; see more information in BioBlitz Extension)
- Determine if your students will record
 - **all organisms** found onsite (General Biodiversity BioBlitz) or
 - **specific organism types** found onsite (Categorical Biodiversity BioBlitz)

To aid students' observation and identification skills, we suggest these items:

Birds

- Binoculars
- Field guides

Invertebrates

- Butterfly nets
- Collection jars
- Aquatic nets
- Bucket or shallow tub
- Handlens or magnifying glasses
- Field guides

Reptiles: Snakes, Lizards, Tortoise

- Field guides

Amphibians

- Aquatic nets
- Bucket or shallow tub
- Handlens or magnifying glasses
- Field guides

Mammals

- Field guides
- Track guides

Plants

- Field guides

Fungi/Protista

- Field guides

Select and practice using the observation materials suggested for each organism type: birds, invertebrates, reptiles, amphibians, mammals, plants, and fungi/ Protista.

Set teams with three to five students and assign roles for a map reader, observer, identifier, and recorder. If using a mobile app, assign an app user and photographer. In student teams, introduce and review Activity Materials, Roles, Student Datasheets, and Online Mobile Nature Observation Apps.

Preparation (Before the Activity)

1. Set up a BioBlitz Activity Station at the stormwater park to organize activity materials and supplies and use it as a teacher/student convening and discussion site. The Station serves as a place where teams or individuals can return to ask questions, get identification assistance, and convene at the end of the activity. If needed, the first aid items can be administered here too. Ideally, a person should

LET'S GET STARTED

ACTIVITY PROCEDURE CONTINUED

attend the Activity Station during the duration of the activity.

2. Hand out copies of the Stormwater Park Site Map and Student Datasheet: Stormwater Park BioBlitz Datasheet to each team.
3. Using the Stormwater Park Site Map, explain the Park's perimeter and set boundaries for the activity.

Step 1: Explore and observe unique species

- Student teams explore the activity site, searching for unique species for each organism type (General Biodiversity BioBlitz) or a specific organism type such as birds, mammals, or plants (Categorical Biodiversity BioBlitz).
- Observe each species briefly to determine key characteristics that will help you and your team identify its common name, such as cardinal or morning dove, creosote bush, or prickly pear.
- If you observe more than one individual within the same species, count the number of individuals. For example, morning doves often are in groups. Record the number of individuals on the Student Datasheet: Stormwater Park BioBlitz Datasheet.

Step 2: Identify each unique species

- Use field guides or online websites to identify the common name of each species observed. For example, if you observe a bird, use the bird field guide to identify which bird species it is. Is it a cardinal, morning dove, or Gila woodpecker?
- Do this for all unique species found and for all organism types or a specific category of organisms.

Step 3: Record all species observed

- Use the Student Datasheet: Stormwater Park BioBlitz Datasheet.
- Write the species' common name, organism type, and number of individuals observed.

Step 4: Calculate the species richness of the Stormwater Park

- Count the number of unique species for each of the organism types.
- The total number of unique species is the species richness. *For example*, If you observe three types of birds (cardinal, morning dove, and Gila woodpecker), the species richness is 3.

Step 5: Reflection & Discussion

- Gather the student group at the Activity Station, or Step 5 can be done in the classroom if time is limited.
- Ask students to present what they discovered about the species richness of the park. How does this compare to another ecosystem the students may be familiar with? For example, their school campus, a parking lot, a pond, or a forest
- Discuss specific findings for each of the organism types.
- What was surprising to you about the species observed onsite?

SUGGESTED REFLECTIONS

How might changing variables at the site affect biodiversity?

How does plant diversity affect the number of unique organisms or species?

How does biodiversity support ecosystem services?

How does biodiversity affect resilience?

How can the biodiversity found at Stormwater Parks affect people's quality of life?

How can you increase biodiversity?

STUDENT WORK + DATA SHEETS

Stormwater Park BioBlitz Datasheet

EXTENSIONS:

- **Online Identification and Recording**
 - Follow website instructions for uploading a mobile nature observation app like iNaturalist, Seek by iNaturalist, and eBird.
- **Incentivize the experience:** Teams can compete for the most identified and uploaded species. The team with the most unusual or unique discovery wins.
- **Student-led School Campus BioBlitz**
 - Use prepared BioBlitz instructions and support by iNaturalist at iNaturalist BioBlitz.