Eco-Schools USA Biodiversity Audit

Learning Objectives

- To raise awareness about biodiversity and its role in the overall health of the planet.
- To investigate the native biodiversity of the school and surrounding community.
- To identify key aspects of local habitats and the local ecosystem that promotes biodiversity.
- To make connections between human actions and the level of biological diversity found within a habitat and/or ecosystem.
- To improve the biodiversity found on school grounds.
- To provide information regarding the benefits of a biologically diverse ecosystem to students, families, and the community.

Curriculum Links

Science, Mathematics, and Technology

Eco-Schools USA Pathways

Biodiversity, Healthy Living, School Grounds, and Water

Background

The audit focus is to survey the school grounds to assess the level of biodiversity of flora and fauna found within the school. Biodiversity is the web of life. There are a variety of living things that are found within the school coexisting with the activities of students and teachers. These include the trees, shrubs, smaller plants and grasses, as well as birds, mammals and small invertebrates such as spiders and insects. The aim is to quantify the area of the school covered by vegetation and to assess the amount and diversity of habitats which could support a variety of species. Students will be encouraged to devise strategies to increase the level of biodiversity in the school grounds.

Procedure

1. **Base Map Investigation**
   Students will work in teams, where possible, to cover the entire school grounds. Any areas of grassland, bare soil, forest, and garden beds will be marked out on a base map which should include X and Y coordinates and gridlines (having gridlines will allow students to more accurately calculate schoolyard percentages). Also don't forget to include a compass rose. Students can use tape measures to help complete the task. An example of a base map is included on the last page.

Proportion of the school grounds that are:	**a. hard surfaces: _____%** **b. school buildings: _____%** **c. grassland areas: _____%** **d. forested areas: _____%** **e. garden beds: _____%** **f. other: _____%** **TOTAL 100 %**

2. **Complete tables 1-3 and the Biodiversity Index**
   For the areas surveyed, comment on the general level and variety of habitats which support biodiversity. Identify the areas of the school grounds that are already contributing to increased biodiversity, and include any features that are already in place.
   ***NOTE* All tables may be done in a manner that best suits your student's developmental level.**
3. The Eco-Action team should **work together to gather the data** needed to complete the audit.
4. **Analyze the results** and report the findings to the school community.
5. **Formulate an action plan** and be sure to monitor and evaluate along the way.
6. Keep this report with your records. This information will be needed when updating your school's metrics, responding to periodic Eco-Schools USA surveys, when applying for awards, and when communicating with the school community.

TABLE 1. HABITAT HEALTH OBSERVATION SURVEY

Survey up to six areas and complete the following table. Date: _____ School: _____

Map Reference	Plants													Habitat									
	Layers			Natives			Weeds			Area													Comments/Rating
	Herbs	Shrubs	Trees	None	Few	Most	Most	None	Some	Lots	Small	Medium	Large	Nests/Hollows	Mulch	Logs	Rocks	Water	Litter	Leaf Litter	Foliage	Rate each for its level of biodiversity as: • Good • Fair • Poor
Forested Area- Draw your symbol here:																						
Grassland- Draw your symbol here:																						
Bare Soil- Draw your symbol here:																						
Garden Beds- Draw your symbol here:																						

"Draw your symbol here" – You will have a variety of objects on your base map and will need to create symbols for identifying these schoolyard markers and areas. Look to the base map on the last page for an example.

NOTE For older students-along with the tick/check marks you place in each box you may also wish to put an approximate percentage of the area, for example- In the forested areas section you have ticked or checked **shrubs and trees** under **Layers,** now estimate what percentage of the forested area is covered by shrubs and trees.

TABLE 2. TREE SURVEY

Large trees (dead or alive) are nature's sky scrapers, providing food, homes and shelter for all kinds of animals. For this portion of the Biodiversity audit, your goal is to identify the habitat value of trees in your school grounds. During a walk around your school grounds, your task is to count every large tree that **has a trunk with a circumference of more than 20 inches**. For each tree, determine the following:

- Is it a native (indigenous) tree or an introduced (exotic) tree?
- Is it dead or alive?
- Does it have hollows for animals to nest in (i.e., a habitat tree)?

Type of Tree	Species	Tally (i.e., Number of Trees)	Total Number
Native / Alive without hollows			
Native / Alive with hollows			
Native / Dead without hollows			
Native / Dead with hollows			
Subtotal: NATIVE TREES			
Exotic / Alive without hollows			
Exotic / Alive with hollows			
Exotic / Dead without hollows			
Exotic / Dead with hollows			
Subtotal: EXOTIC TREES:			
TOTAL NUMBER OF TREES:			

TABLE 3. SCHOOL GROUNDS VERTEBRATE ANIMAL OBSERVATION SURVEY

Date: _____ School: _____ Temperature: _____
Weather Conditions: _____
Audit Group Members: _____

Mammal Species	Evidence*	Tally	Status N=Native I=Introduced	Behavior / Habitat Notes (e.g., sleeping, calling, hiding, hunting, perching, etc.)
1.				
2.				
3.				
4.				
5.				
Reptile Species	**Evidence***	**Tally**	**Status N=Native I=Introduced**	**Behavior / Habitat Notes (e.g., feeding, resting, aggressive, molting, hiding, moving, swimming, mating, etc.)**
1.				
2.				
3.				
4.				
5.				
Amphibian Species	**Evidence***	**Tally**	**Status N=Native I=Introduced**	**Behavior / Habitat Notes (e.g., feeding, nesting, aggressive, hiding, moving, calling, perching)**
1.				
2.				
3.				
4.				
5.				

***Evidence:** D = Direct sighting – animal was observed

E = Evidence of animal – e.g., scratch marks, droppings, fur, feathers,

CALCULATING YOUR BIODIVERSITY INDEX

Courtesy of the American Museum of Natural History

The question of how many different species exist in a particular environment is central to the understanding of why it is important to promote and preserve species diversity. A uniform population of a single species of plants adapted to a particular environment is more at risk if environmental changes occur. A more diverse population consisting of many species of plants has a better chance of including individuals that might be able to adapt to changes in the environment.

Scientists use a formula called the biodiversity index to describe the amount of species diversity in a given area. A simple biodiversity index is calculated as follows:

$$\frac{\textbf{the number of species in the area (numerator)}}{\textbf{the total number of individuals in the area (denominator)}} = \textbf{biodiversity index}$$

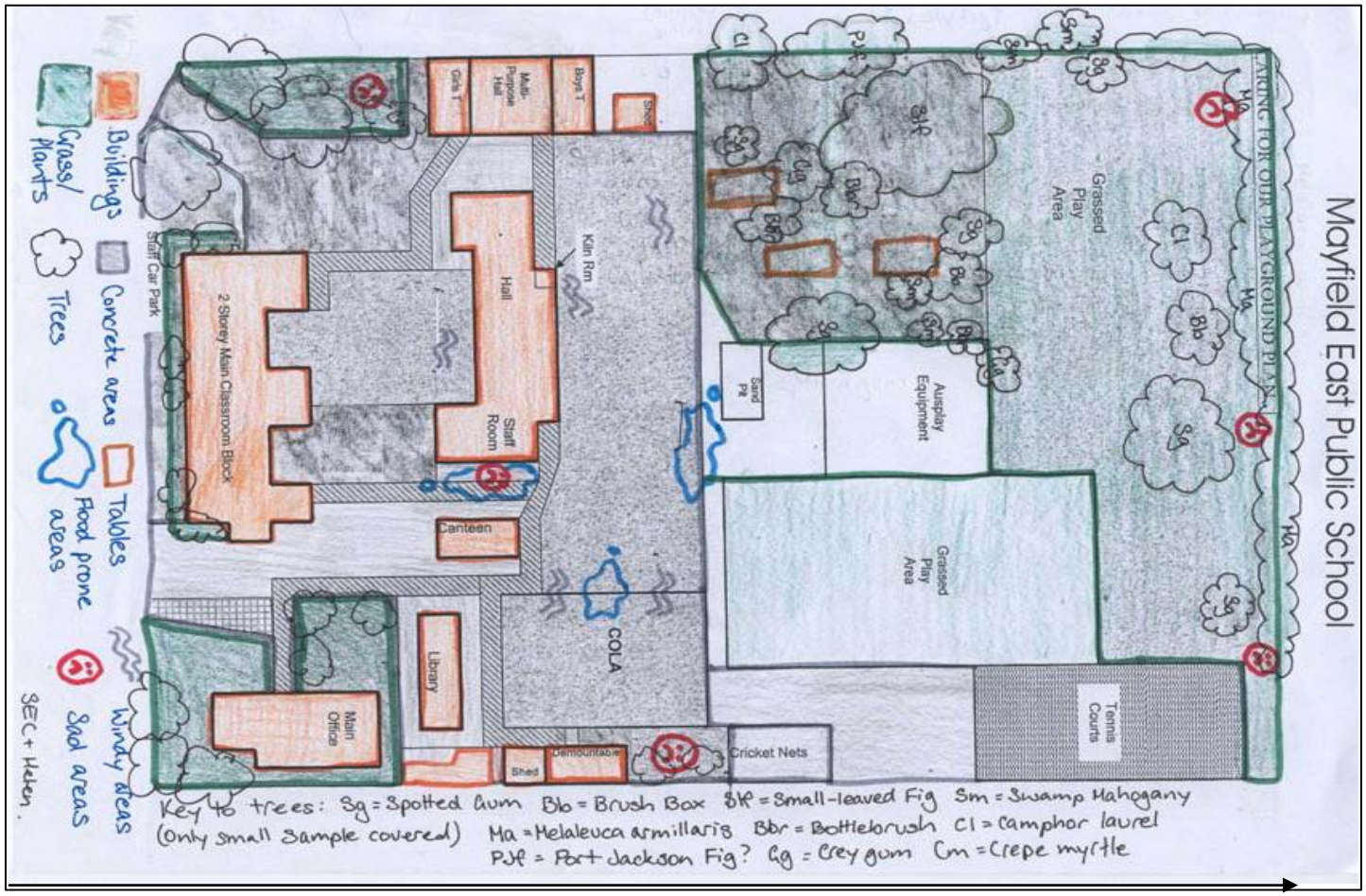
For example, a 4 X 4 meter square area in a carrot patch has 300 carrot plants, all the same species. It has a very low biodiversity index of 1/300, or 0.003.

A 4 X 4 meter square area in the forest has 1 pine tree, 1 fern, 1 conifer tree, 1 moss, and 1 lichen, for a total of 5 different species and 5 individuals. The biodiversity index here is high, 5/5 = 1.

NOTES:

Summarize the results from data collection:

BASE MAP EXAMPLE



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