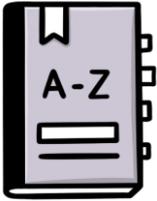


SCHOOL BIODIVERSITY AUDIT

Name: _____ Grade: _____

INTRODUCTION



Biodiversity is a term used to describe the variety of life on earth. It also includes the ecosystems and communities that these species form.

Why is biodiversity important?

A healthy biodiversity ensures that all the ecosystem processes that we rely on to survive (clean air and water, food supplies, plant pollination) remain healthy and functioning. Levels of biodiversity are a good indicator of ecosystem health.

How healthy are the biodiversity levels at your school?

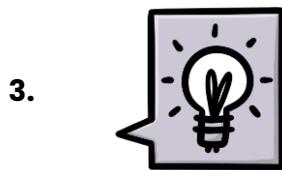
How healthy do you think that your school ecosystems and communities are? Scientists employ a variety of methods to measure the levels of biodiversity in an area. **Let's try a few on your school grounds.**



Quick review of the scientific process

Let's have a quick review of the scientific process before we begin.

- **OBSERVE OR ASK A QUESTION**
- **DO BACKGROUND RESEARCH**



CONSTRUCT A HYPOTHESIS

This is an assumption based on previous knowledge that you will test to see if it holds true. *E.g. our school will have high levels of biodiversity, because we have large indigenous gardens.*



TEST WITH AN EXPERIMENT



ANALYZE RESULTS



DRAW CONCLUSION



COMMUNICATE YOUR CONCLUSION

My School's Biodiversity

You need to work through the first three steps of the scientific process and construct a hypothesis regarding your school's biodiversity level. Once you have a hypothesis you can use one of the methods below, or even make your own, to test your predictions.

METHODOLOGY 1 – ACTIVITY

METHODOLOGY 1

Assessing habitat biodiversity through land-use maps

A quick method to get a general idea of habitat diversity and thus biodiversity is to get an idea of the land use at your school.

Google Earth is a great tool to use. If you are unable to access Google Earth, please contact your Sustainable Schools' Coordinator to provide you with a printed aerial map of your school.

Using a grid overlay system, you can calculate the percentage of the school grounds allocated to the following:

- Hard surfaces (Astro, parking lots, courtyards, sand areas)
- Buildings
- Garden areas
- Grassed areas
- Treed areas
- Water features (swimming pools not included)

Grids can be hand drawn on maps or printed onto transparent paper and laminated for re-use.

METHODOLOGY 1 – DISCUSSION

Discussion points to inform your conclusion

- How much of your school's grounds were covered in hard surfaces/grass/trees/sandy areas? How does this affect biodiversity?
- How do the different surfaces affect erosion?
- How do the different surfaces affect rainwater run off?
- What are the weaknesses using this methodology?

METHODOLOGY 2 - ACTIVITY

METHODOLOGY 2

Vegetation Survey

Vegetation, trees in particular, provide a variety of ecosystem services including clean air, shade, carbon storage, reduction in soil erosion as well as providing habitats for other plants and animals.

Looking and measuring the trees and other vegetation in an area can give us a good idea of the biodiversity of an area.

Fill in the table below. Determine the following:

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

Type of Plant (Species name if possible)	Indigenous /Alien	Alive / Dead	Hollows	Tally	Total Number
Wild almond <i>Brabejum stellatifolium</i>	Indigenous	Alive	No		4

BIODIVERSITY NETWORK

Grade 8 - 11 Audit

Total number of species:

Total number of indigenous species:

Total number of alien species:

Total number of species with hollows:

METHODOLOGY 2 - DISCUSSION

Discussion points to inform your conclusion

- How many trees did your school have in total?
- How many of your trees were indigenous? How does this affect the biodiversity and ecosystems?
- How many of your trees were alien? How does this affect the biodiversity and ecosystems?
- How many of your trees had hollows? How do you think this could contribute to biodiversity?
- What are the weaknesses using this methodology?

METHODOLOGY 3 – ACTIVITY

METHODOLOGY 3

Faunal Survey

This methodology works in much the same way as the tree survey, but instead focuses on the faunal (animal) species count in your school. It is best to undertake this type of survey over a few days at different times to get the best results (for example – many animals prefer certain types of weather or are only active in the morning).

Learners will need to walk the school grounds and note any fauna that they see.

When recording fauna, you need to include the following information:

- Location of sighting
- Weather
- Date
- Time of day
- Observer
- Species
- Number of individuals
- Any notable behaviour
- Habitat
- Evidence of species (this is if you see the droppings, or footprint but do not directly see the animal)

METHODOLOGY 3 – DISCUSSION

Discussion points to inform your conclusion

- What was the most common species found?
- Which habitats had the most species? Why do you think this is?
- How high were the levels of biodiversity in your school?

BIODIVERSITY NETWORK

Grade 8 - 11 Audit

- How can we improve these levels?
- Did time of day affect species variation and/or number?
- What is the weakness in this methodology?
- Which is more indicative of environmental health - population or species count?

BIODIVERSITY NETWORK
Grade 8 - 11 Audit

METHODOLOGY 3 - WORKSHEET

Date: _____ Time: _____ Observer: _____

Weather: _____

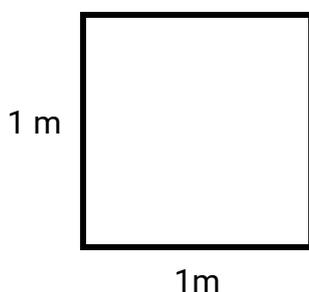
Species	Number	Location	Habitat Type	Notable Behaviour	Evidence
Leopard Toad <i>Amietophrynus pantherinus</i>	4	School pond	Wetland	Males calling	Direct
Cape Eagle owl <i>Bubo capensis</i>	1	Oak tree	Wooded	-	Indirect - Owl pellets collected

Total number of species: _____ Total number of indigenous species: _____ Total number of alien species: _____

METHODOLOGY 4 – ACTIVITY**METHODOLOGY 4****Additional methods to elevate studies - Quadrat Diversity studies**

The above methods have focused on general levels of biodiversity of the entire school grounds. You can also look more closely at smaller areas using quadrats. This is useful to compare different areas of the school (for example the hockey field to the flower garden).

Learners can make their own quadrats using coat hangers, pipes, dowel rods, sticks or string. A quadrat is a square that should measure 1m X 1m



Here are some links to videos about using and making quadrats:

<https://www.youtube.com/watch?v=3r0xQgNXT-g>

<https://www.youtube.com/watch?v=KuG-UjpQzm0>

Throw your quadrat into your chosen area. You need to throw it randomly, because you don't want to bias your study by choosing an area that might have a higher species level. **Record anything living, located inside your quadrat** (this can include trees, other plants, insects, fungi, birds, invertebrates etc.). You will need to count the total number of species. This count will give you the species richness. *For example, if I counted 1 type of sunbird, 2 types of bees, and 1 type of mouse: my species richness would be 4.*

Next you need to count the number of individuals in the quadrat. This is called the species evenness. *For example, I counted 5 malachite sunbirds, 3 honeybees, 6 carpenter bees and 4 mice: my species evenness would be 18.*

Scientists use a formula called the biodiversity index to describe the amount of species diversity in an area.

BIODIVERSITY NETWORK
Grade 8 – 11 Audit

A simple biodiversity index is calculated as follows:

$$\frac{\textit{Species richness}}{\textit{Species evenness}}$$

For example: 4 / 18 = 0.223

This should give you a number between 0 and 1. Using this index, numbers closer to 0 indicate a low biodiversity while numbers closer to 1 indicate a high biodiversity.

This process should be repeated several times to get an average biodiversity index.

METHODOLOGY 4 – DISCUSSION

Discussion points to inform your conclusion

- Why did some areas have higher biodiversity indexes?
- Why was it important to make quadrat placement random?
- Which areas had the highest levels of biodiversity and why?
- What is the weakness in this methodology?

DISCUSSION

Overall discussion points

- Which method was the most effective?
- Should more than one method be used simultaneously?
- How can you improve the biodiversity of the school?