Why are we losing Biodiversity?

"Finding out & Reporting"
Learners investigate the influence of habitat fragmentation on biodiversity

Grading: Ψ Ψ Ψ Ψ

Time: ⚏⚏⚏

Place: Inside & Outside

Group size: Groups 10 max.

Activity Outcomes:

Learners are able to:

- collect data and plot a graph
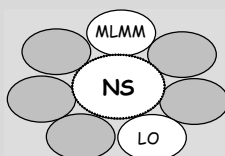- interpret consequences of habitat fragmentation

Assessment:

- Educator evaluates graphs and interpretation of data using a rubric

Skills:

- Forming hypothesis
- Collecting and organising data (graph)
- Interpreting findings

Learning Area links

MLMM

NS

LO

Space for species

Background:

Habitat loss is one of the biggest threats to biodiversity. Roads, shopping centres, housing developments, commercial farming activities, coastal resorts, overgrazing, collection of firewood and other types of development are breaking up our forests and other natural areas into smaller and smaller pieces. Conservationists call this problem - **fragmentation**. Habitat fragments are often too small and isolated to support a wide variety of species. Fragmentation is affecting biodiversity. Developers are not trying to destroy biodiversity when they build roads or homes but some people feel that not enough thought and value are given to biodiversity. Therefore a better understanding of how fragmentation is affecting biodiversity is needed.

This activity points out one way in which fragmentation affects biodiversity.

Activity Guidelines

Needed: *Plastic bag, string, wooden sticks, new spring leaves, "leaf ID" chart.*

✍ Learners are asked to count the number of species in a sample area made up of **plots** (see next page) of different sizes, each representing a different habitat. Learners could make a prediction about how they think a habitat's area will affect the number of species it contains.

The local park, school yard or open unused land could be used as a sample area.

✍ Bring learners to the **plots** which were set out earlier.

✍ Learners work in groups

✍ Tell each group to take a leaf from each different species they find in their plot and put it in their plastic bag. Encourage learners to be as gentle as possible and not to take more than one leaf if they can avoid it.

✍ Refer to the handout "**Leaf ID**" for basic leaf characteristics.

✍ Plan to spend at least 15 minutes collecting leaves. Time will vary according to the number of species and learners.

✍ Some learners could do the collecting while others could identify the plants.

Setting Up Plots

How to tell different plant species apart:

- Pick two leaves of two very different species
- Learners should recognise that the two leaves are from two different kinds of plants
- Ask them to list the differences (shape, edge, veins)
- Refer to handout "Leaf ID"

✎ Bring all the samples back to the classroom and let groups sort through their samples. Make sure that each group only has one sample of each species. Use the best one and discard the others.

✎ Now ask learners to bring their samples to the **data log** which you have prepared. Learners from Plot 1 tape a sample of each species in the "species" column and put a circle with a cross under the "Plot 1" column, next to each species, to show that they were first found in Plot 1.

✎ Every time one of these species is found in a plot, simply mark with an "X" to show that it is in the plot, but that it is not new to the entire sample of species.

✎ Next ask learners from plot 2 to put up their samples. If a sample of a leaf is already on the data log, mark it with an "X" in the species row. Any new species should be taped up and a circle with a cross should be placed in the species row under Plot 2 to show that it first appeared in Plot 2.

✎ Do the same for the rest of the plots.

✎ Once the data log is completed, learners use the information in the log to fill in the data **summary table**. This will help to plot the species -area curve.

✎ The graph can be made as a group or as a class "Total area" on X-axis and "Number of Species" on the Y-axis.

✎ Interpret the graph

Very few species on smaller plots, however, no new species found on larger plots - if area increases to a certain size, the graph levels out

Conclusion: **Smaller areas** have fewer species therefore **fragmentation has a negative effect** on Biodiversity

Data Summary table:

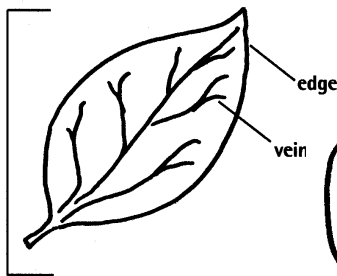| Plot Number	1	2	3	4	5	6	7	8	9	10
New Species *(first seen in sample area; ⊗s in this plot)*	7	5	1	1	1	0	1	1	1	2
Total Number of Species *(all ⊗s up to now)*	7	12	13	14	15	15	16	17	18	20
Plot Area m^2	1	1	1	1	4	4	4	16	16	16
Total Sample area *total of plot area in m^2*	1	2	3	4	8	12	16	32	48	64

One way to tell plants apart is by looking at their leaves.

-Leaf I.D.-
Artwork by Bettye Braus

general shape
edge
vein

Shapes:

oblong

oval
(elliptic)

lance-like
(lanceolate)

egg
shaped
(ovate)

inverted
egg
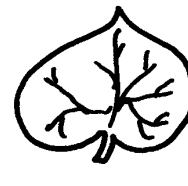shaped
(obovate)

narrow
(linear)

needle
shaped
(acicular)

round
(orbicular)

heart
shaped
(cordate)

triangular
(deltoid)

kidney-shaped
(reniform)

arrowhead-like
(sagittate)

Sample Data Log

Plots

Species | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

Edges

lobed

rounded
(crenate)

tooth-like
(denate)

wavy
(undulate)

smooth
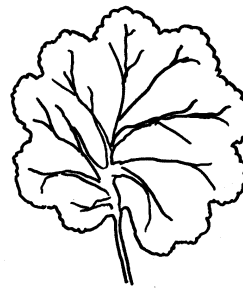(entire)

double
saw-like
(double
serrate)

saw-like
(serrate)

Veins
(There are three main ways in which veins are arranged on leaves.)

parallel

palmate

pinnate

Variations

🌐 Discussion

"Does wildlife have a good chance to survive outside conservation areas"

Talk about the threats to species moving between habitat fragments and discuss ways in which learners / the community could help. Here are some ideas:

On roads:

- ✎ Erect wildlife crossing signs to alert drivers.
- ✎ Construct subways or bridges so that animals can cross highways without being hit by a car.

In backyards:

- ✎ Plant indigenous plants to attract natural species.
- ✎ Cut down on the use of pesticides.
- ✎ Keep pet cats indoors as they prey on lizards, birds, squirrels and other wildlife.

Around the school:

- ✎ Provide water sources eg, ponds, bird baths, marshy areas.
- ✎ Put up boxes that birds could use for nesting.
- ✎ Convert part of schoolyard into wildlife habitat.

In the community

- ✎ Plan "greenways" such as bike paths, hiking trails and corridors that connect reserves far apart.
- ✎ Encourage members of the community to become involved in making decisions about land development and how it will be done.

📷 See Enviro-Facts no 38

🌐 Habitat Fragments in your community

You might find some fragments of forest, sand dune system, grassland or fynbos in your area.

Take your learners on a field trip to investigate different-sized fragments.

Study the biodiversity in the fragments and then compare them. The learners could ask a local park ranger, a conservationist or any other expert to help with the investigation.
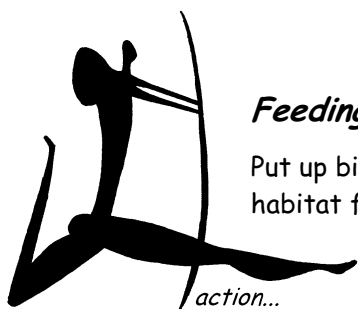
Feeding the birds

Put up bird feeders for birds travelling between habitat fragments in search of food

action...