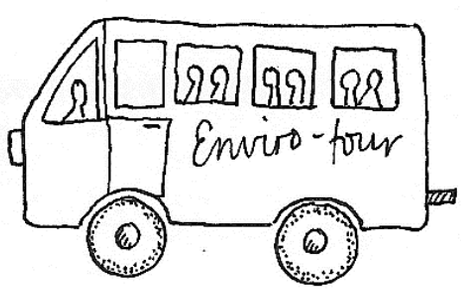
NaDEET
Learning & living for a sustainable future

TEACH for ESD

TEACH IN NATURE

Fieldwork

Outdoor Learning



Fieldtrips &
Enviro Tours

TEACH FOR ESD TOOLKIT GUIDE 3.9

Teach for ESD - Toolkit Guide 3.9

TEACH IN NATURE

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OVERVIEW

If we want our learners to take positive environmental action, we need them to *care* about nature. Personal experiences in natural spaces are vital for fostering a love and appreciation for the environment. If we want to solve the environmental crisis, we need to create as many opportunities as possible for our learners and ourselves to connect, understand and care for the natural world. So, let's teach in nature, and let nature be the teacher!

In this guide we will focus less on *what* to teach, but rather explore *how* to teach outdoors.

We can conduct **fieldwork** with our learners so that they can learn through their own hands-on investigations. As teachers we can take on the role of - 'interpreters' and use teaching methodologies such as flow learning to facilitate meaningful experience-based **outdoor learning**. Outdoor teaching and learning can take place within our schoolgrounds, or somewhere else during a **fieldtrip** or **enviro tour.** These need careful planning, but they can be an invaluable experience for our learners!

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1. FIELDWORK

Collecting information (data) is an important competency that all learners need to develop. **Fieldwork** is a form of data collection that provides real-world, hands-on experiences that enables learners to make links between the curriculum and reality.

FIELD WORK

First-hand observations and data collection done in a real, natural environment as opposed to a controlled environment (such as a classroom or laboratory).

FIELDWORK IS RELEVANT FOR ALL SUBJECTS!

Many subjects such as languages, history and entrepreneurship require learners to investigate topics in more depth by preparing and conducting interviews. Mathematics are essential in the collection and analysing of information. Therefore, fieldwork presents a great opportunity for ***cross-curricular teaching****!*

RESOURCE CHECK

See **pg. 67** in **Collecting Information** of ***Tools of the Trade*** for ideas on which information to collect on the living, non-living and the social and cultural environment. For tips on interviews, see **pg. 98 – 101**.

Fieldwork can be part of an outdoor lesson, or it can be part of an enviro tour programme. It plays an important role in ESD, as it can be used to gather information about local environmental concerns and thereby enable real-life solutions and environmental action! This section therefore focuses on fieldwork techniques that can support and complement biodiversity and climate change education, as explained in ***Toolkit 3.1 – Teach about the Environment***.

EXPLORING BIODIVERSITY

We can explore biodiversity through a variety of different and exciting fieldwork methods, such as habitat or vegetation maps, plant or animal identifications using different sampling methods, and doing habitat assessments. All these methods can be used together to conduct a biodiversity audit. The phase level and subject that we teach, will determine which and how many methods we use.

VEGETATION & HABITAT MAPS

Creating a vegetation map of the schoolgrounds or any area of study, is a good first step to become familiar with the different types of plants or habitats there might be on the schoolground.

RESOURCE CHECK

Use the ***School Biodiversity Audit*** worksheets with junior primary learners to make a habitat map – or play biodiversity bingo. Learn how to make a vegetation map on **pg. 76, 77** and **79** in **Collecting Information**, ***Tools of the Trade***.

SAMPLING METHODS

Depending on the size and habitat, it is usually easiest to divide the schoolgrounds into different sections, using a **grid** approach. If we are doing fieldwork in larger areas, we might not have enough time and people to study the whole area. Instead, we can take a sample using **quadrants** or **transects**.

RESOURCE CHECK

Read more about sampling methods, types of sampling (pg. 68 – 71) and transects (**pg. 80**) in **Collecting Information**, ***Tools of the Trade***.

IDENTIFICATION & CLASSIFICATION

Investigations such as vegetation surveys and animal observations will often require us to do identification and **classification** of organisms with our learners.

RESOURCE CHECK

Learn how to identify and classify animals and plants by reading **pg. 5 - 7** in ***Taxonomy and Systematics***.

TAXONOMY

the science of classifying, describing, and naming (of) species or groups, according to certain criteria.

CLASSIFICATION

the organisation of all living organisms into groups according to certain characteristics or traits.

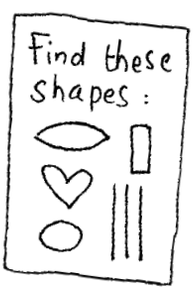
TAXONOMY AND SYSTEMATICS

Plants, fungi, animals, and microorganisms are classified into the following groups:

Kingdom
Phylum
Class
Order
Family
Genus
Species

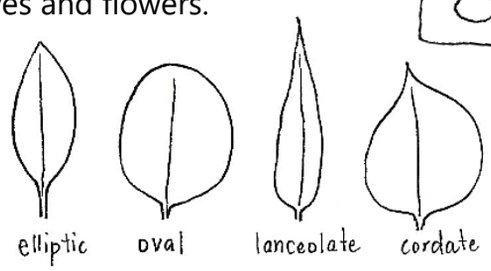
IDENTIFYING PLANTS

Plants are the group of living organisms that are generally the easiest to identify, since they can be studied closely. Identifying plants is a skill, that can be made fun for all ages! Knowing how to differentiate between monocotyledons and dicotyledons is part of the natural science curricula. We can use mathematics (symmetry & shapes) and even design games to study the different shapes and arrangements of leaves and flowers.



RESOURCE CHECK

Learn how to start with plant identification by reading ***Plant Identification Basics.***



For the most arid country in sub-Saharan Africa, Namibia has a surprising number of indigenous plants, many of which are endemic! Let us get to know the indigenous plants of our area!

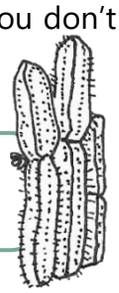
RESOURCE CHECK

To identify indigenous trees and grasses in your area, use the ***Tree Atlas*** and ***Identification Guide to southern African Grasses***.

RESOURCE CHECK

When in the Succulent Karoo biome, use the ***Endemic Plants of the Sperrgebiet*** guide to identify plants in this biodiversity hotspot.

Many of the ornamental plants (plants grown for their attractive appearance) that are found in garden nurseries are **alien (exotic)**, originally coming from other parts of the world. Make sure that you don't have any **invasive alien plants** on your school property!

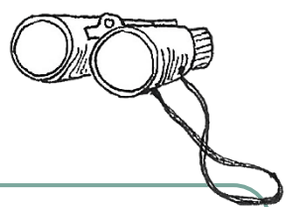


RESOURCE CHECK

Use the **Ornamental Plants at NAAC** slideshow to identify common garden plants that are not indigenous. Use the **EIS Resources on Invasive Alien Plants** to identify the alien invasive plants.

IDENTIFYING ANIMALS

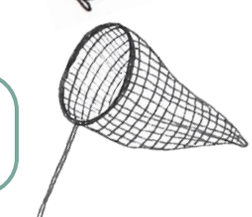
Animals can be trickier to observe and identify. Some are very small or too fast, and some we might not see because they are nocturnal. To overcome this, we can study tracks or droppings, take pictures, use a magnifying glass or binoculars.



RESOURCE CHECK

Use the Hands-On field guides ***Common Household Life*** and ***Schoolyard Life*** to classify the animals that you might find around the schoolgrounds. If you live in a more arid environment, use ***It's Time to Identify***.

Insects are one of the most diverse groups of organisms, and it can be quite difficult to classify them down to the species name. We can, however, try to identify which *order* or *family* the insects in our school are from. Catching them and studying them up close can be a rich educational experience – but we need to take care to not hurt or kill them!



RESOURCE CHECK

Get familiar with insect families and orders – use the ***Identifying Insects*** guide from *Master Gardener*, then start sampling with ***Invertebrate Sampling Techniques.***

RESOURCE CHECK

Use the ***Dragonflies and Damselflies of Namibia*** to identify these interesting insects, often found close to waterbodies.

Birds require a little bit more patience; however, this group has been well studied and there is a wealth of resources on identifying birds in Namibia. Binoculars are a very useful tool to identify birds!

Did you know that Namibia has close to **700** bird species?

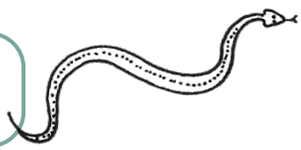
RESOURCE CHECK

Use ***The Owls of Namibia*** and ***Namibia's Large Birds of Prey*** to identify larger birds within the area. Download the free ***Merlin Bird ID*** app!

Many **reptiles** and small **mammals** are not as easy to observe and identify, due to their behaviour: moving very fast or only being active at night. But we might still be able to see and study their tracks!

RESOURCE CHECK

Identify snakes using the pictures in the ***Snakes of Namibia*** folder.

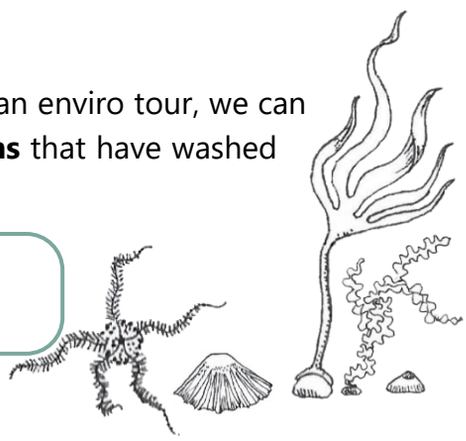


RESOURCE CHECK

Use the ***Field Guide to Animal Tracks of Southern Africa*** to help identify the tracks of animals.

IDENTIFYING MARINE LIFE

If our school is close to the ocean or we are in a coastal town as part of an enviro tour, we can conduct fieldwork at the beach. We can identify some **marine organisms** that have washed up on the shore, or that live within the inter-tidal zone.



RESOURCE CHECK

Explore the rocky shores with your learners using species knowledge from the ***Field Guide to the Living Marine Resources in Namibia***.

HABITAT ASSESSMENT

A **habitat assessment** is an attempt to quantify the value of an area in how well it can provide different micro-habitats for a variety of animals.

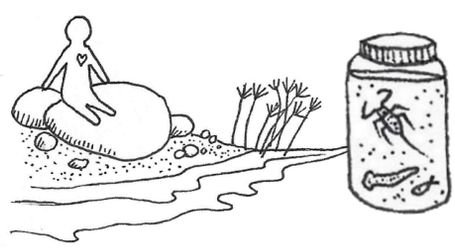
RESOURCE CHECK

For habitat assessment guidelines see **pg. 3-4** and **11** of ***A Simple Guide to Conducting a School Biodiversity Audit.***

For a river or a wetland habitat, we can do a **water quality assessment** by studying the animals that live in these freshwater bodies. Specific animals are indicators of freshwater ecosystem health.

RESOURCE CHECK

Use the ***MiniSASS Water Quality Test Kit*** for an easy to do water quality assessment.



FIELDWORK FOR CLIMATE CHANGE

RECORDING WEATHER

Observing and recording daily weather is an important part of climate change education!

If we do not have instruments to record weather, we can simply start by recording the direction of the wind and observing the weather conditions, e.g. clear skies, sunny, cloudy, misty etc.

Human beings have observed, studied, recorded, and predicted weather conditions for centuries! It is due to the curiosity and consistent daily record keeping of weather patterns (along with the technological advancements), that we realised and can prove that climate change is indeed happening.

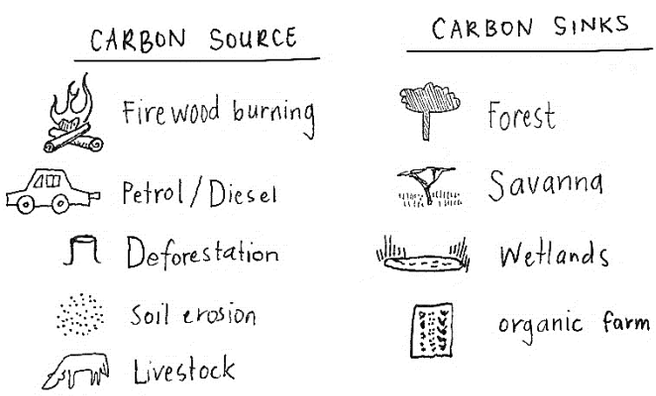
We can invest in a few weather recording instruments like thermometers and rain gauges, or eventually set up our own Stevenson screen, to record daily maximum and minimum temperatures, rainfall, wind speed, and humidity. Work together with social science or geography teachers!

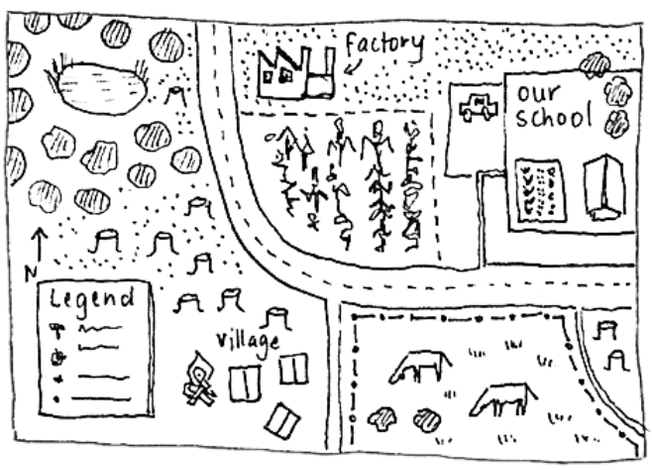
RESOURCE CHECK

Refer to **Chapter 15** (**pg. 71 – 76**) in *NASA's* ***Meteorology: An Educator's Resource for Inquiry-Based Learning for Grade 5-9*** guide for guidelines on how to construct your own weather instruments.

MAPPING CARBON SINKS & SOURCES

While we cannot easily measure how much carbon dioxide is released from different activities within our surroundings, we can identify which areas and/or activities within our local environment act as **carbon sinks** and **carbon sources** (see ***Toolkit 1 – Environmental Knowledge***). We can collect information by taking pictures or making sketches of activities such as burning of wood, deforestation, and organic farming to record where these are on a basic map of the area or note the GPS coordinates.





UNDERSTANDING OUR DATA

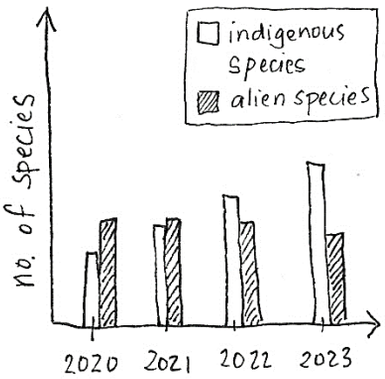
Once we have finished our data collection, the next important step is to analyse our data with our learners and make sense of it. As educators, we need to put the results in context and make the links between this real-life data and what our learners have learned in class (refer to ***Toolkit 3.1 – Teach about the Environment***). Our findings could inform our next ESD action!

We need mathematical skills to make calculations and draw graphs, social studies to create maps, and language skills to write up results and conclusions.

BIODIVERSITY DATA

Depending on the kind of data that we collected, we can process and make different deductions on biodiversity in our study area. We can create basic graphs for the following biodiversity indicators:

- The **number of plants** in different areas
- **Different types of animals** on the schoolgrounds
- Percentage of **indigenous vs. alien species**
- **Biodiversity Index**



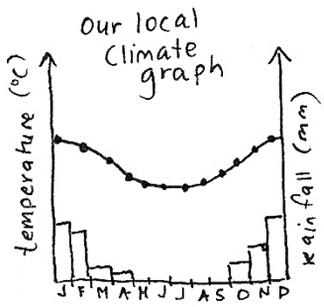
If repeated over time, we can use it to monitor how an area's biodiversity may be changing.

RESOURCE CHECK

Refer to **Section 4** (**pg. 9**) in the ***Schoolyard Biodiversity Investigation Educator Guide*** for guidelines on how to calculate a biodiversity index.

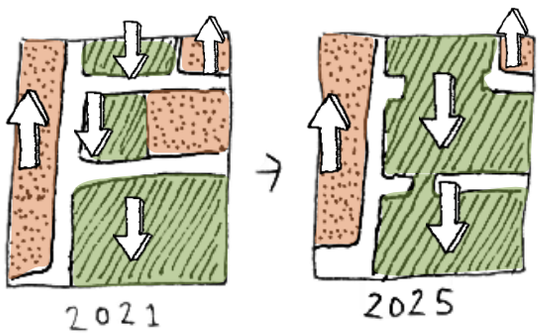
CLIMATE CHANGE DATA

Once we have collected **weather data** over a period of weeks and months (and eventually years) we can plot our recordings onto a climate graph. We can calculate the averages and compare our findings to typical climate graphs of our area or biome.



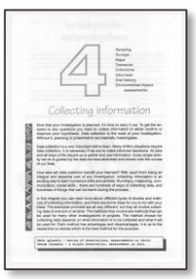
With our information collected on carbon sinks and carbon sources, we can produce a final map which **uses colours** to represent our findings. We can use the map to identify where we want to create more carbon sinks.

If we collect information about the same area over an extended period of time, we can even map how **land use change** happens over time.



RESOURCES FOR FIELDWORK

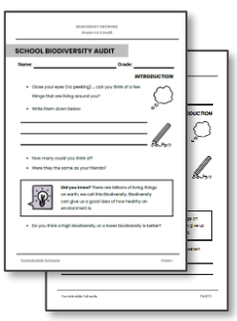
Junior Primary JP | Senior Primary SP | Junior Secondary JS | Senior Secondary SS | Teacher T



JS SS T

Tools of the Trade

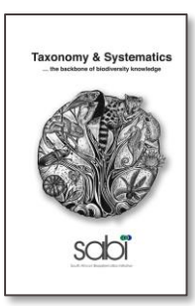
CHAPTER: This chapter on *Collecting Information,* informs on the collection and extraction of information. It explains methods of data collection, types of information and what kind of information to collect per context.
AUTHOR: D. du Toit, T. Sguazzin, EnviroTeach (1995)



JP SP

School Biodiversity Audit

WORKSHEET: These are two worksheets made by Nature Connect, as part of their SusLinktainable Schools programme. The worksheet for Grade 1 – 3 includes a biodiversity bingo. The worksheet for Grade 4 - 5 instructs learners to create a habitat map of their schoolgrounds.
AUTHOR: Nature Connect (n.d.)
Link: https://sustainableschools.natureconnect.earth/



JS SS T

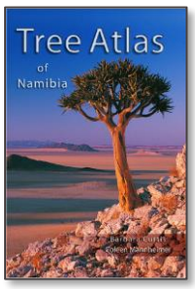
Taxonomy and Systematics

BOOKLET: This booklet lays out the basics of taxonomy and systematics. It explains what they are, providing history and guidance on the fields, how they are co-related and why the practices matter (including case studies).
AUTHOR: South African Biosystematics Initiative (2017)
Link: http://learningthroughnature.co.za/resoursedownloads/taxonomy-and-systematics-booklet/

JS SS T

Plant Identification Basics

GUIDE: This guide introduces the basics of how to identify different plant species. Using many illustrations, it explains characteristics to look for and how to use them to classify the plant and identify it.
AUTHOR: Montana State University Extension (2013)
Link: https://static1.squarespace.com/static/5804eb039f74569692067655/t/5aeb007e0e2e725df96d287c/1525350535812/identification+basics.pdf



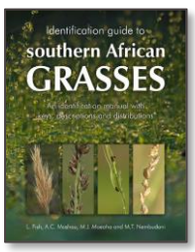
JS SS T

Tree Atlas of Namibia

BOOK: This is an atlas of all trees in Namibia with a description and where the tree occurs.

AUTHOR: B. Curtis & C. Mannheimer (2005)

Link: https://treeatlas.biodiversity.org.na/



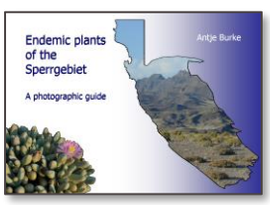
JS SS T

Identification Guide to southern African Grasses

BOOK: A graphic, informative guide on the identification of grasses found across southern Africa. It contains identification methodology, species identification, key, distribution, illustrations and description.

AUTHOR: L. Fish, A.C. Mashau, M.J. Moeaha, M.T. Nembudani (2015)

Link: https://www.researchgate.net/publication/315808949_Identification_guide_to_southern_African_grasses_an_identification_manual_with_keys_descriptions_and_distributions



JS SS

Endemic Plants of the Sperrgebiet – A Photographic Guide

GUIDE: A guide to the endemic plant species of Namibia, this booklet gives general information on this category of species, their state in Namibia and distribution, followed by a list of endemics in the area.

AUTHOR: A. Burke (2020)

Link: https://n-c-e.org/sites/default/files/2020-10/e-%20book.pdf

JS SS T

Ornamental Plants at NAAC

PRESENTATION: This guide provides photos, species names and some information about many ornamental plants that are found in nurseries; however, are not in Namibian plant guides as they are alien plants.

AUTHOR: K. Ravikumar, SPA, NAAC (2017)

Link: http://www.naac.gov.in/images/docs/campus/Ornamental%20plants%20at%20NAAC.pdf

JS SS T

EIS Resources on Alien Invasive Plants

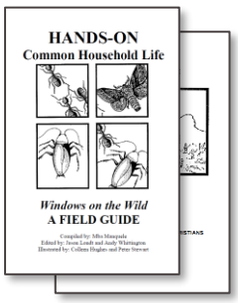
POSTER & BROCHURE: The poster and brochures show alien invasive species in Namibia. These resources contain species lists, identification guidance including photographs, and highlight alien species of concern.

AUTHOR: P. Mutota (n.d), WML Consulting Engineers (n.d), Environmental Information Service Namibia, C. Mannheimer (n.d)

Link: http://www.the-eis.com/atlas/sites/default/files/Alien%20plants%20poster.pdf

Link : http://the-eis.com/elibrary/sites/default/files/downloads/literature/Alien%20invasive%20plant%20species%20in%20Namibia.pdf

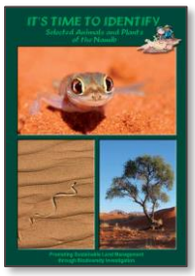
Link : http://www.the-eis.com/atlas/sites/default/files/QUICKGUIDE%20TO%20INVASIVE%20CACTI%20IN%20NAMIBIA.pdf



JS SS T

Hands-On Field Guides

GUIDE: These resources (*Common Household Life* and *Schoolyard Life*) serve as field guides to plant and animal species found in the two different environments, including identification guidance and basic facts.
AUTHOR: M. Manquele (2003) and D. L. Christians (1993), WESSA
Link: http://learningthroughnature.co.za/resoursedownloads/?view=category&sort=post_title



SP JS SS T

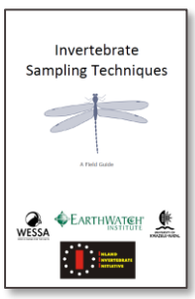
It's Time to Identify

GUIDE: This local identification booklet focuses on selected animals and plants found in the Namib desert. It contextualises the area, followed by identification guidance, pictures, facts on species and "similar species."
AUTHOR: NaDEET (2015)
Link: https://nadeet.org/sites/default/files/It%27s%20Time%20to%20Identify_2015%20Internet.pdf

JS SS T

Identifying Insects

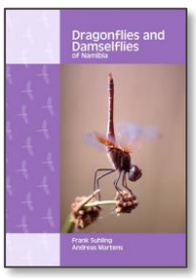
GUIDE: This booklet guides learners on identifying insects through the following: arthropod taxonomy, insect anatomy and growth, and insect orders. There are many helpful photos.
AUTHOR: D. E. Whiting, M. Small (2017)
Link: https://cmg.extension.colostate.edu/wp-content/uploads/sites/59/2020/01/GN-310-Entomology.pdf



JS SS T

Invertebrate Sampling Techniques – A Field Guide

MANUAL: The educational booklet on invertebrates provides lesson plans and material to introduce collecting and sampling of species at school/home. It includes both active and passive sampling methods.
AUTHOR: D. Archery, D. Padayachee, A. Ramishwer, M. Ndlovu, F. Vukomba, S. Vroom, N. Nxele, P. Sokhela, P. Chetty (2009)
Link: http://learningthroughnature.co.za/resoursedownloads/invertebrate-sampling-techniques/



JS SS T

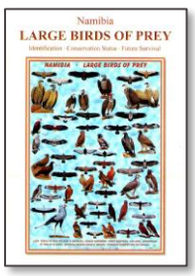
Dragonflies and Damselflies of Namibia

BOOK: This is a compilation of information on the various species of dragonflies and damselflies found in Namibia, from identification (including photographs) to biology and ecology, habitat and the key families.
AUTHOR: F. Suhling, A. Martens (2007)
Link: https://www.researchgate.net/publication/327051371_Dragonflies_and_Damselflies_of_Namibia

JS SS T

The Owls of Namibia

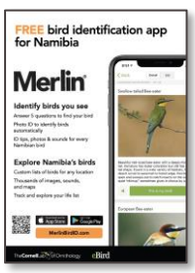
GUIDE: This resource is a guide to identification and general information on the various species of Namibian owls. It educates on behaviour, protection, care and owl's role in nature.
AUTHOR: NARREC (2009)
Link: http://the-eis.com/elibrary/sites/default/files/downloads/literature/The%20Owls%20of%20Namibia%20-%20Identification%20and%20General%20Infomation.pdf



JS SS T

Namibia Large Birds of Prey

GUIDE: This illustrated booklet on birds of prey includes key information on the various species found in Namibia, their identification, conservation facts and figures, rehabilitation, and the predatory role they play.
AUTHOR: NARREC (2009)
Link: http://the-eis.com/elibrary/sites/default/files/downloads/literature/Namibian%20Large%20Birds%20of%20Prey%20Identification%20Conservation%20Status%20Future%20Survival.pdf



SP JS SS T

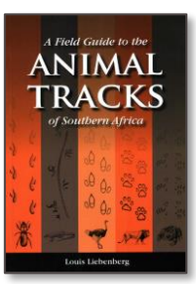
Merlin Bird ID

APP: The app is described on the brochure. Download the free app to identify and grow your knowledge of birds, their habitat, calls, characteristics and behaviour.
AUTHOR: The Cornell Lab of Ornithology and Merlin
Link: https://merlin.allaboutbirds.org/download/

SP JS SS

Snakes of Namibia

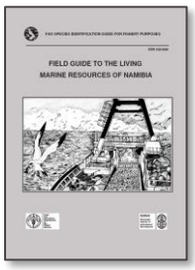
GUIDE: These posters of 23 snakes of Namibia give key information on each species including both common and scientific names, behaviour, habitat, venom, identification guidance, and pictures of the snake.
AUTHOR: F. Theart, C. Buys (2019)
Link: https://www.facebook.com/media/set?set=oa.1086271701565073&type=3



SP JS SS T

A Field Guide to Animal Tracks of Southern Africa

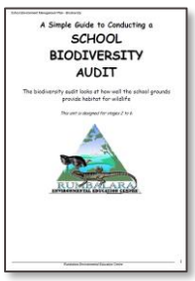
BOOK: This guide comprehensively informs on the tracks of Southern African animals and birds. It includes pictures and information on effective identification and tracking in the field, as well as, spoor interpretation.
AUTHOR: L. Liebenberg (2008)
Link: https://www.cybertracker.org/downloads/tracking/Liebenberg-1990-Field-Guide-Animal-Tracks.pdf



JS SS T

Field Guide to the Living Marine Resources of Namibia

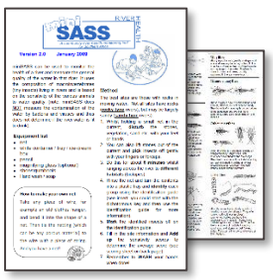
GUIDE: This is a comprehensive guide on the "living marine resources" of Namibia's ocean. Following a contextualising introduction, it includes a pictorial index and serves as a species guide with specifications.
AUTHOR: G. Bianchi, K.E. Carpenter, J. P. Roux, F.J. Molloy, D. Boyer, H.J. Boyer (1999)
Link: http://www.fao.org/3/x3478e/x3478e00.htm



SP JS

A Simple Guide to Conducting a School Biodiversity Audit

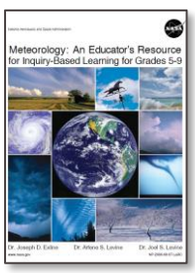
MANUAL: This booklet provides guidelines on how to determine how well the school grounds provide habitat for wildlife, especially insects.
AUTHOR: Rumbalara Environmental Education Centre (2014)
Link: https://rumbalara-e.schools.nsw.gov.au/content/dam/doe/sws/schools/r/rumbalara-e/green-schools/Biodiv_Audit_Final_2014.pdf



JS SS T

MiniSASS Water Quality Testing Kit

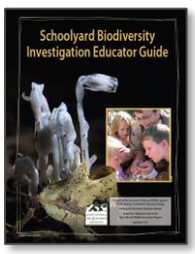
HOW-TO: This river health analysis kit includes information on this water quality testing method, the reference materials needed for the test and analysis, and an informative guide to conducting a miniSASS test.
AUTHOR: P. M. Graham, C. W. S Dickens, R. J. Taylor (2004)
Link: https://minisass.org/



T

Meteorology: An Educator's Resource for Inquiry-Based Learning for Grade 5-9

MANUAL: This publication provides learner-centred lesson plans about various topics relating to weather and climate. It also gives instructions for making simple weather instruments.
AUTHOR: J. Exline, A. Levine, J. Levine, NASA (2006)
Link: https://www.nasa.gov/wp-content/uploads/2009/07/288978main_Meteorology_Guide.pdf



T

Schoolyard Biodiversity Investigation Educator Guide

MANUAL: This booklet guides teachers on how to develop knowledge and appreciation for biodiversity through a biodiversity investigation. It includes lessons plans, samples and templates.
AUTHOR: E. Baker (2011)
Link: https://www.fishwildlife.org/application/files/4815/1373/1123/ConEd-Schoolyard-Biodiversity-Guide.pdf

2. OUTDOOR LEARNING

Learning can take place anywhere outside the classroom, including human-built environments. Regardless of what our schoolgrounds look like, if it is built up, barren or has lots of natural vegetated spaces, there is always something to explore or investigate. Depending on the age of our learners and what it is that we want to achieve, we can choose different outdoor learning methods and approaches. We need to remember to design our outdoor lessons in a learner-centred way - our role is to be the facilitator!

OUTDOOR LEARNING

participants learn through what they do, through what they encounter and through what they discover. Participants learn about the outdoors, themselves, and each other, while also learning outdoor skills.

FORMAL OUTDOOR LESSONS

Outdoor lessons can and should form part of formal teaching, as practical experiments, or fieldwork (see the previous section). Teaching outside can be challenging, because one's voice doesn't carry as well and the weather can be unpredictable – so it does require careful planning and a well-structured, thought through activities. Some tips to make formal outdoor lessons easier:

- → **Have a clear purpose**: choose an activity and topic that lends itself to learning *from* and *in* the outdoors.
- → **Make it learner-focused**: plan activities for the learners to do themselves, either as individuals or in small groups.
- → Give a brief introduction and instructions (such as dividing students into groups) ***before* leaving the classroom**, so that learners spend their time outside doing the actual activity.
- → Once back in the classroom, assess whether your learners have made the **links to the curriculum** with what they have learned outside.

RESOURCE CHECK

For an introduction to outdoor teaching and learning, read **pgs. 4 - 7** and **14 – 15** in ***A Beginner's Guide to Outdoor Teaching*** – a resource for Namibian teachers!

We can let our learners keep a **nature-journal**, as a way to record observations and reflections on what they learn in class in their natural science or social studies subjects. This can also encourage writing and drawing.

RESOURCE CHECK

Read the teacher's guide ***STEM-Learning through Science-based Nature Journaling***, then watch and share the presentation **Nature Journal Ideas** with learners for ideas.

EXPERIENTIAL LEARNING IN THE OUTDOORS

INTERPRETIVE TRAILS

Exploring the outdoors with a nature guide or as an **environmental interpreter** is a common activity done at environmental education centres. As teachers, we too can take on the role of interpreters and take our learners on an interpretive trail into nature. Tips for being a good environmental interpreter:

- → **Focus the learners' attention** as soon as possible.
- → **Teach less, share more**. Encourage learners to observe and question.
- → **Look and experience first – talk and discuss later**. Allow learners to talk and share their experiences or questions. Use their comments to direct it to a learning experience.
- → **Don't be a finger-pointer**. Ask questions (even if we don't know the answer).
- → **Be receptive and sensitive** to the learners' natural curiosity and allow this to guide the exploration and learning.
- → **Inspire a sense of wonder**, by sharing our genuine enthusiasm and delight for nature.

"Effective interpreter doesn't mean telling people what you know... it means using what you know to engage ... and motivate visitors to become active participants in their own learning."

BRIDGING THE GAP

SENSORY EXPERIENCES

We are more likely to remember experiences when we are fully present and focused, which can be done if we use several of our senses. Too often we rely on our sight – let us try to hear, smell, touch and (if it is safe) taste nature! For example, we can get our learners to close their eyes to focus on how many sounds they can hear. We can encourage our learners to touch different textures and smell the scent of plants.

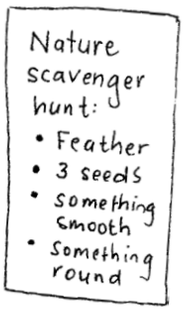
RESOURCE CHECK

To learn the role and skills of an environmental interpreter and how to involve all senses read **pgs. 3 - 12** in the booklet ***Bridging the Gap***.

LEARNING THROUGH GAMES & CREATIVITY

LEARNING THROUGH PLAY

Learning through play is an important and often neglected approach to formal learning, where knowledge can be gained or reinforced in a playful, but structured way. We can make many traditional and outdoor games into fun environmental learning games. For example:



- a game of chase or tag, turned into predator and prey.
- playing musical chairs to demonstrate habitat loss.
- A "nature scavenger hunt"

RESOURCE CHECK

Use the **Bat & Moth Game** lesson plan to demonstrate predator-prey relationships through this fun game with your primary school learners.

Learners of all ages love to play, and many enjoy games that include a challenge!

Flow Learning is a method of outdoor teaching that uses various nature awareness activities and organises them into four stages: *enthusiasm*, *attention*, *experience*, and *inspiration*. Here are some examples of flow learning games:

Web of Life

Nature Matchbox

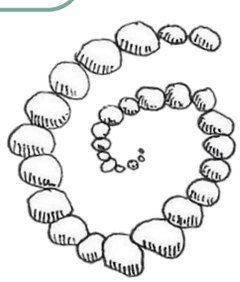
Pyramid of Life

Animal Parts

RESOURCE CHECK

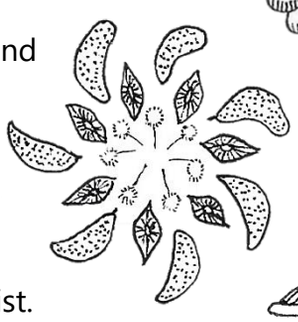
Read the article **Bringing Children Back to Nature** for an introduction to flow learning. Find the instructions for the above outdoor games in the ***Play, Learn & Have Fun*** booklet.

Note, that play as a teaching method is not the same as *free play*, which is also important – read more about free play in ***Toolkit 3.7 Promote Learner Well-being***.



LAND ART

Another form of learning and 'playing' in nature can be **land art**. Land artists make their art outside in nature, only using natural materials found at that location e.g. soil, rocks, vegetation, and water. The artwork is a natural part of the landscape and will eventually weather away again. Taking photos of the artwork is the only way to capture it. The wonderful thing is that everyone, young and old, can be a land artist.

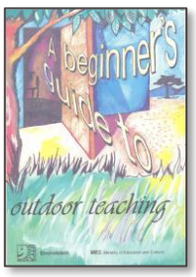


RESOURCE CHECK

See the **Creating Environmental Land Art** lesson plan for brief instructions. Then use the **Nature Inspired Arts and Crafts** presentation and watch the video ***An Infinite Scream*** for inspiration.

RESOURCES FOR OUTDOOR LEARNING

Junior Primary JP | Senior Primary SP | Junior Secondary JS | Senior Secondary SS | Teacher T



T

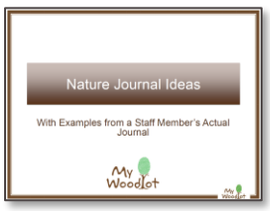
A Beginner's Guide to Outdoor Teaching

MANUAL: This teacher's guide on outdoor education outlines how-to of teaching outdoors, what to teach and why, it's cross-cutting nature, and its benefits. It includes objectives, activity ideas and useful resources.
AUTHOR: Enviro Teach (1995)

T

STEM Learning through Science-based Nature Journaling (for Middle and High School Teachers)

MANUAL: This teacher guide on nature journaling and how to go about it introduces the concept before it explains the process, explores tools, techniques, class discussion and project ideas, and means of evaluation.
AUTHOR: K. Brandes (2014)
Link: https://issuu.com/nurturenaturecenter/docs/building_teacher_s_notebook



SP JS SS T

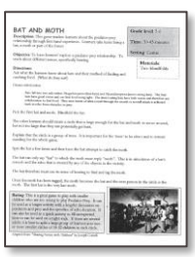
Nature Journal Ideas

PRESENTATION: An instructional presentation on how to approach nature journaling, what it is and tips for how to make a nature journal. It includes visual prompts and examples, as well as ideas for journaling entries.
AUTHOR: My Woodlot (n.d)
Link: http://www.mywoodlot.com/images/supporting_information/nature_journal_ideas.pdf

T

Bridging the Gap: A Handbook for Environmental Interpreters and Educators

BOOKLET: This guide equips environmental educators and interpreters with knowledge and skills to teach about nature most effectively. It includes capacity building guidance, principals, activities and information.
AUTHOR: J. Roff (2003)



T

Bat & Moth Game

LESSON PLAN: This is a lesson plan for the game 'Bat & Moth' from Joseph Cornell's 'Sharing Nature with Children" but has been adapted to the Namibian context.
AUTHOR: V. Paulick, AfriCat EE Centre Lesson Plans (2002)

T

Bringing Children Back to Nature

ARTICLE & LESSON PLAN: Giving a brief introduction to the importance of nature-based education and child-nature connection, this article in *Green Teacher* magazine explains the process of flow learning and includes activities aligned with the concept.

AUTHOR: J. Barlow (2016)

T

Play, Learn and Have Fun

MANUAL: A collection of environmentally themed games and activities for all ages, including related educational material. Explanation of the activity follows information on preparatory details and knowledge.

AUTHOR: Sheffield City Council, South Yorkshire Forest (n.d)

Link: https://www.wg.aegee.org/enwg/Environmental%20games%20and%20activities%20booklet.pdf

SP
JS
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T

Creating Environmental Land Art

LESSON PLAN: This document provides brief directions on how to conduct a land art activity with examples of land art done at NaDEET Centre by programme participants.

AUTHOR: NaDEET (2009)

T

Nature Inspired Arts and Crafts

PRESENTATION: Presenting various school nature inspired arts/crafts projects, each project includes a visual and step-by-step guide on how the project was created, and tips from teachers who carried out the projects.

AUTHOR: Planet Ark (2015)

Link: https://treeday.planetark.org/documents/doc-1369-2015-schools-tree-day-nature-craft-book.pdf

SP
JS
SS
T

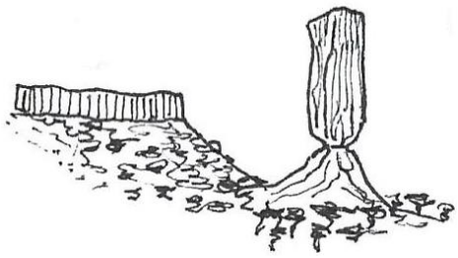
An Infinite Scream

VIDEO: This video shows Namibian environmental art activist, Imke Rust, creating land art in the Namib Desert, to raise awareness about mining and other environmental threats to our environment.

AUTHOR: Imke Rust (2015)

Link: https://www.youtube.com/watch?v=26H-KSo52HQ

3. FIELDTRIPS AND ENVIRO TOURS



FIELDTRIPS AND ENVIRO TOURS

Fieldtrips and enviro tours both take students outside of their everyday school environment, to experience and study something first hand.

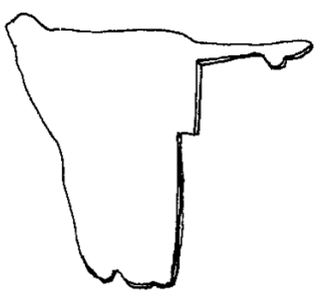
FIELDTRIPS

A fieldtrip can simply entail walking around, exploring and doing fieldwork in our immediate neighbourhood, shops, or local park. Fieldtrips can be an hour to several hours in length, but usually don't extend over a day. We can also choose to visit an environmental education centre, a museum, a nature reserve or a farm - which will entail some more logistics, like organising transport.

Can you remember any fieldtrips that you went on during your school time? What made them special?

ENVIRO TOURS

Enviro tours can stretch over a few days or even weeks, where perhaps several different places are visited. They usually include travelling longer distances and overnight stays. Some of the benefits of an enviro-tour is that it exposes learners to ecological and social environments that are different to their own context. This broadens their perspectives, and they gain an appreciation for their country. It also creates a space for learners to interact with one another and their teachers in a more personal way, forging new friendships and understandings of each other.



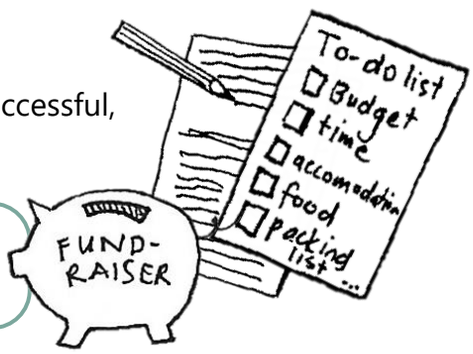
Tourists from all over the world come to see Namibia's beautiful and diverse landscape and its unique flora and fauna – and so should Namibian learners and teachers. However, our outings do not have to be far away and expensive to be successful and meaningful.

RESOURCE CHECK

For fieldtrip and enviro tour destination ideas, create the **Let's Go See Namibia Map!** from the back pages of the ***Free Rangers*** comic book. Browse through the ***Namibia's National Parks Brochures*** and/or use the ***Namibia App*** to plan the trip.

PLANNING TRIPS AND TOURS

As with any outdoor activity, for our fieldtrips or enviro tours to be successful, they need to be planned *well* in advance!



RESOURCE CHECK

A very good resource with tips on planning fieldtrips and tours, is the chapter on **Getting Started** in the ***Tools of the Trade***.

EE PROGRAMMES

TAKE PART IN AN ESTABLISHED EE PROGRAMME

There are several environmental education centres in Namibia, that offer environmental programmes for school groups. Some cater for day visits, while others offer week-long programmes. This has the benefit that we don't have to plan everything ourselves!

Explore and sleep under Africa's 1st International Dark Sky Reserve at NaDEET Centre on NamibRand.

RESOURCE CHECK

Look at the list of **Environmental Education Centres in Namibia**.

DEVELOP YOUR OWN EE PROGRAMME

If we are the ones planning and leading our own EE programme for the fieldtrip or enviro tour, then we need to make sure to spend some time preparing well in advance. An EE Programme during an Enviro Tour can have a good balance between work and play by including field work, flow learning and free time. It is a great opportunity to teach across many subjects and thereby bring the curriculum to life in real application. Also refer to the creative activities described in ***Toolkit 3.8 – Create Environmental Awareness***.

RESOURCE CHECK

Find more nature-inspired games in ***Environmental Activities for Youth Clubs and Camps.*** Look at the ***Guidelines for Excellence: Nonformal EE Programme*** document, which gives advice on planning EE-specific programmes.

BE SAFE & SUSTAINABLE

Being outdoors is wonderful and important, but it does come with risks and responsibilities. Accidents do happen – so we need to be prepared! We must not forget to pack a first-aid kit - we need to make sure that we know how to use it and that we have an emergency plan of action!

RESOURCE CHECK

Read the chapters: "Planning a School Visit" and "Outdoor and Adventurous Activities" in ***Planning and Leading Visits and Adventurous Activities*** guide and see the ***Medical Management of the Snakebite Victim***, a booklet specific to Namibian snakes.

Lastly, as ESD practitioners we must try to make our trip or tour as eco-friendly as possible by considering what we eat and drink, what we buy for and during the trip and how we travel etc. Refer to ***Toolkit 3.6 – Reduce Resource Use*** and ***Toolkit 3.8 Create Environmental Awareness*** for tips on how to continue reducing your resource use while travelling!

RESOURCE CHECK

Read the brochure ***Travel Enjoy Respect*** for tips on travelling more sustainably in Namibia.

RESOURCES FOR FIELDTRIPS AND ENVIRO TOURS

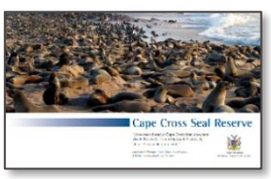
Junior Primary JP | Senior Primary SP | Junior Secondary JS | Senior Secondary SS | Teacher T

SP JS

Free Rangers

COMIC: The six-part Free Rangers comic series has a portion of a Namibia map on the back page. To get this informative, illustrated map, *Let's Go See Namibia*, put the pages together correctly. It produces a fun overview of points of interest in the country, each with a blurb of related activity suggestions.

AUTHOR: EduVentures (n.d.)



JS SS T

Namibia's National Parks Brochures

BROCHURE: Information brochures of 10 of Namibia's most popular National Parks, including information on their biodiversity and conservation efforts. Check the link for additional fact sheets for each park.

AUTHOR: Ministry of Environment and Tourism (n.d)

Link: https://www.namibiahc.org.uk/national-parks.php

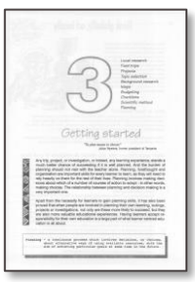
JS SS T

NAMIBIA APP

APP: This app is a comprehensive travel guide to Namibia, featuring accommodation, places of interest, maps, galleries for all 14 regions.

AUTHOR: Legends of Africa, Namibia (n.d.)

Link: https://play.google.com/store/apps/details?id=com.app.p9385EA

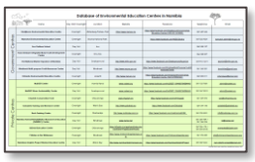


T

Tools of the Trade

CHAPTER: This chapter, *Getting Started,* educates on preparatory steps to learning experiences and investigations. It gives ideas for experiences, then informs on aspects to be considered such as planning methodology and tips.

AUTHOR: D. du Toit, T. Sguazzin, EnviroTeach (1995)



T

Environmental Education Centres in Namibia

DATABASE: This contact list of the environmental education centres in Namibia gives locality and contact details of each one. It also includes a link to their Facebook page and website for reference.

AUTHOR: NaDEET (2023)

T

Environmental Activities for Youth Clubs and Camps

LESSON PLAN: This guide, divided into topic-related categories, is a collection of outdoor-based youth activities encouraging environmental engagement.

AUTHOR: The Peace Corps (2017)

Link: https://files.peacecorps.gov/documents/PC_Environmental_Activities_508_mNd3UVx.pdf

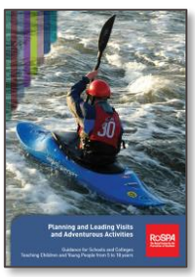
T

Guidelines for Excellence: Non-formal EE Programmes

BOOKLET: This is a best practice guide for development and administration of non-formal environmental education programmes. The guide identifies 6 elements of quality programmes, giving guidelines per aspect.

AUTHOR: North American Association for Environmental Education (2009)

Link: https://eepro.naaee.org/resource/guidelines-excellence-series



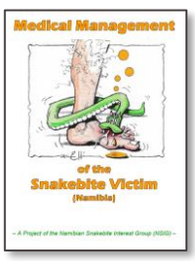
T

Planning and Leading Visits and Adventurous Activities

MANUAL: Produced as a teacher's guide for "adventurous" activities, this booklet focusses on planning and organizing trips and includes advice on carrying out safe activities.

AUTHOR: Royal Society for the Prevention of Accidents (2013)

Link: https://www.rospa.com/rospaweb/docs/advice-services/school-college-safety/school-visits-guide.pdf



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T

Medical Management of the Snakebite Victim (Namibia)

BOOKLET: This booklet gives general information on snake bites, followed by first aid management guidance and hospital management. Written for Namibian citizens as an educational guide to snakes and snake bites.

AUTHOR: P.J.C. Buys, E. L. Saaiman (2020)

SS

T

Travel Enjoy Respect

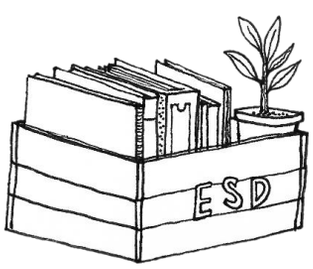
BROCHURE: This brochure gives practical guidance on responsible tourism and sustainable travelling practices in Namibia.

AUTHOR: TOSCO & EcoAwards Namibia (n.d.)

Link: https://prod.ihms.co/assets/files/1668687796360_ResponsibleTravelGuidelinesTOSCOandEcoAwardsNamibia.pdf

TEACH for ESD

TEACH IN NATURE
is part of the **TEACH FOR ESD TOOLKIT**.



Improving ESD Teaching & Learning Experiences in Namibia