

Bush Telegraph

Vol. 4 - No. 2

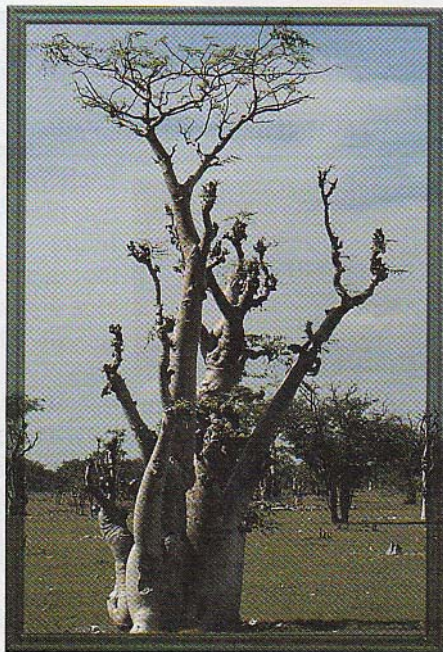
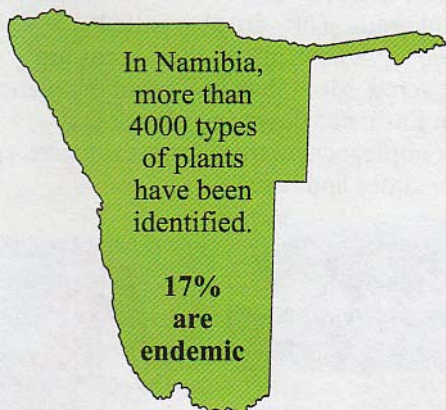
2004

KINGDOM PLANTAE

All living things on our planet Earth have been sorted into different groups called kingdoms. The kingdoms are:

**Monera, Protista, Fungi,
Plantae and Animalia.**

No one actually knows how many different kinds of living things exist in each kingdom. It is believed to be somewhere between 2 - 100 million. Why do we not know? There are just many things in the world that we humans have not found, identified or have destroyed before it was discovered.



Moringa ovalifolia

CENTRE OF ALL LIFE

Plants are the very basis of all life on Earth. All animals, including us, are extremely dependent on plants for life. Are you aware of your plant dependence?

Take this plant quiz:

1. Where does the porridge that you eat for breakfast come from?
2. What does your livestock eat?
3. What are your clothes made from?
4. Where does the oxygen that is in the air you breathe come from?

Did you know?

Nowadays only twenty different plants provide about 85% of our food.

A person who studies plants is called a botanist.

The word photosynthesis means "light"- "putting together".

More than 1000 trees are cut down to build a new homestead!

Rice is the international plant of the year 2004



INTRODUCING THE PLANT KINGDOM

The Plant Kingdom has two subkingdoms:

THALLOPHYTES

Lack a true root, stem and/or leaves. They include algae and fungi. (Read page 10 to find out more about algae)



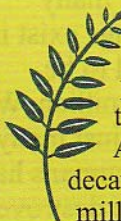
Lichens are two plants living together: an alga and a fungus. The alga

produces food through photosynthesis. The fungus absorbs water easily. The two work together in a symbiotic relationship to get their basic needs. Lichens need special protection because they are very sensitive to changes in the environment.

EMBRYOPHYTES

All develop from a tiny form of the plant (an embryo). They include liverworts, mosses, club mosses, horsetails, ferns, cone-bearing plants and flowering plants.

Liverworts and mosses live in almost all regions in the world. They prefer moist, shady areas. Both are usually no bigger than 20 cm. They are very simple plants.



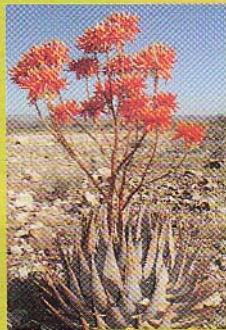
Club mosses, horsetails and ferns were some of the first plants on the Earth. At that time they covered large areas of land. As these plants died and decayed, they turned into coal over millions of years.

Cone-bearing plants produce cones from where the seeds fall out. These plants belong to the group *gymnosperma* because their seed is uncovered. Examples are fir and pine trees.

In Namibia, we have only **one** indigenous and endemic cone-bearing plant: the *Welwitschia mirabilis*. Male and female cones are found on separate plants. It only has two main pairs of leaves. The *Welwitschia* can live over 1000 years. It does have traits of a flowering plant and is sometimes believed to be the link between flowering and cone bearing plants.

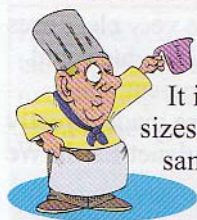


Flowering plants produce fruits, flowers and seeds. They are also called *angiosperms* because their seeds are covered. More than half of all the plants on Earth are flowering plants. For example, acacia trees, grasses, maize, tomatoes and roses.



What are some other flowering plants?

BASIC RECIPE FOR PLANT LIFE



It is believed that there are more than 300 000 different kinds of plants in the world.

It is easy to see that they have various shapes, sizes and colours. Most plants basically work the same way. They share the same main formula to live and grow. The steps in the recipe stay the same for all plants. It is the type and amount of each ingredient that will change depending on where

the plant lives.

INGREDIENTS

Water	Air
Sunlight	Soil
Minerals	

STEP ONE: GERMINATION, getting started

- 1) Take a seed. The seed has been resting. Inside it has food stored that needs to be "woken up".
- 2) Give the seed the perfect environment. It needs the right combination of:
Moisture + Air + Darkness + Warmth
- 3) Wait. The seed's baby plant will now be started. It will use the seed as food to grow until it is big enough for step two.



STEP TWO: PHOTOSYNTHESIS, making food

- 1) Look at the small seedling. Inside there are cells that have a green pigment (colour) that is called chlorophyll.
- 2) Give the plant sunlight. The sun's energy when it reaches the chlorophyll makes it excited creating energy.
- 3) Now give the plant air and water. The chlorophyll's energy mixes: water + air (carbon dioxide) = glucose (sugar) + oxygen
- 4) The plant releases the oxygen into the air. The glucose is its food.



STEP THREE: WATER MOVEMENT & TRANSPIRATION, drinking

- 1) Now that the plant has food, it also needs water.
- 2) Give the plant water. The plant absorbs the water through its roots.
- 3) Add sunlight and air. The sunlight and air absorb the water out of the plant through its leaves. The water is therefore "sucked" throughout the plant.
- 4) The water transports food and minerals to all parts of the plant.



STEP FOUR: RESPIRATION, breaking down the food

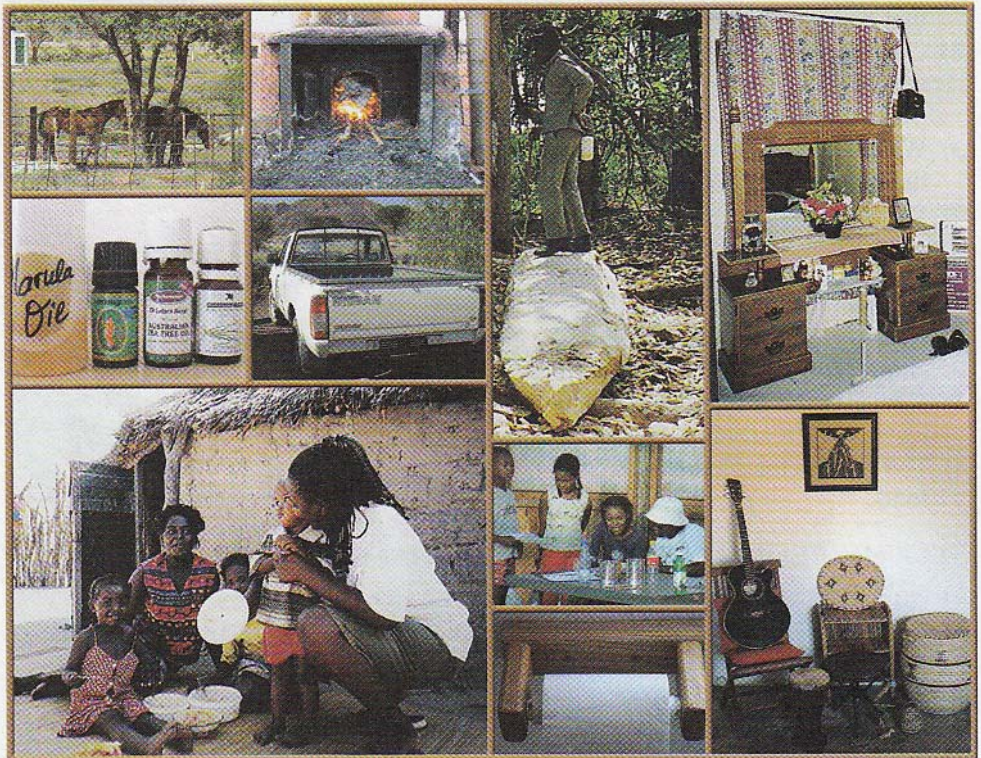
- 1) The food produced in step two (glucose) needs to be broken down to be used by the plant.
- 2) Add oxygen + glucose = carbon dioxide + water + energy
- 3) The plant uses the energy to grow, reproduce and repair itself.

HUMANS AND PLANTS

Most of our food, clothing and housing come from plants. These are very clear uses of plants. What about our medicines, modes of transport, industrial products and artwork? Did you know that plastic is made from fossil fuels (an ancient plant product)? What about the air that we breathe? All of these things are made directly or indirectly from plants. Without plants, we could not survive on planet Earth. We most definitely could not live the way we currently do.

GOING BACK TO OUR ROOTS: The Plant Hunt

Look and study the pictures below for all the different plants and plant products. Complete the list of all the plant products that you can find. The first ones have been done for you. You should be able to find between 20-30 things!



PLANT HUNT LIST

- 1) A dug-out canoe
- 2) Basket
- 3) Thatched roof
- 4)

PLANTS IN TROUBLE

Hi, I'm Sophia. What is the big fuss? Everybody is always talking about people cutting down too many trees and livestock overgrazing the fields. Plants can grow back. Besides we can plant faster growing trees instead.



What do you think about what Sophia said? Is she right? Are there environmental problems surrounding plants in Namibia? Can you help her?

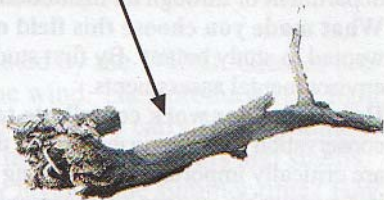
Directions: Look at the pictures and read the definitions below. Match the environmental problem in the circles to the correct picture and definition. Draw a line to connect the correct answers.

Overgrazing

Bush encroachment

Deforestation

Alien invasive plants



This happens when grass in one area does not have time to recover. When animals continuously eat the grass in the same area, the new shoots do not have a chance to grow and the grass dies. No new seeds are produced.

This happens when trees are cut down faster than new ones can grow back in one area. Without large, fully grown trees, the area will be barren.

This happens when open, savannah areas become completely covered with bushes. The bushes grow very close together preventing other plants, like grasses, from growing.

These are plants that do not naturally grow in an area. They are introduced for food, building materials or to look pretty. They can outgrow and displace indigenous trees and be harmful to water supplies.

PERSONALITIES IN CONSERVATION



Name: Dr. Antje Burke

Organisation: EnviroScience

Job Title: Director

No of years on the job: 9

Who is EnviroScience?

It is an environmental research service company. www.enviro-science.info



What does EnviroScience do? We do environmental impact and natural resource assessments, environmental management, ecological specialist studies, input to national and regional planning and ecological research. Most of these studies are field-oriented. We coordinate and are involved in leading ecological research, which enables the latest techniques to be applied in environmental management. Although we work throughout the country, we have specialised experience in the South.

What is your professional background? I am a plant ecologist by training. I first however studied Geography and Environmental Assessments because the Botany programme was very difficult to get accepted to at the time. Through my Geography studies I was able to specialise in Ecology and specifically Plant Ecology. I now have a Masters and PhD in Ecology and conduct my research in conjunction with several Namibian institutions and government departments including the National Botanical Research Institute and the Ministry of Environment and Tourism.

Can young, interested Namibians complete these studies in the country? They can study botany through the Biology department at the University of Namibia. If they would like to continue their studies and specialise in a specific field like vegetation science, then they must most likely study through a university outside the country.

Can you make a living as a plant ecologist? It is very difficult if one would like to work as a freelance plant ecologist. However it is possible if one has a position within a government department or through an institution.

What made you choose this field of work? I have always been interested in plants and wanted to study botany. By first studying geography, it expanded my interest to conducting environmental assessments.

How does your work contribute to conservation in Namibia? There is a direct link to conservation activities in everything that I do. On the practical side, environmental assessments are critically important to informing development activities. If development is to be done in a sustainable manner, environmental assessments can help indicate the extent of the impact. They therefore can minimise the conflict in land use. On the research side, I have conducted many studies that provide us with information that was previously unknown. For example, hotspots in endemism and vegetation surveys. On the awareness side, I have written several books about plants, specifically plant identification guide for the Namib Desert. These help the public to learn more about the area and its vegetation.

Do you believe that in general all of Namibia's plant life has been studied? No. We know basically what is where, but we do not know why the plants are in certain places and not in others. We also do not know what the impact of human activities and climate change is and will be in the future. These things are poorly studied.

Antje's Message to Namibia's Youth: Become a botanist. We need a lot more people who are specialised in their field in Namibia.

Photos: J.Burke

FOR THE BEGINNING READER POLLINATION

One of the ways that flowering plants can reproduce is through pollination. Plants make pollen in the male part (anther) of the flower. Pollination is when the pollen and the female part of a flower (stigma) come together. When the flower is pollinated, it then forms a seed. This seed can then grow into another plant



WORKING TOGETHER: Some flowers can pollinate themselves. Others need help to get the pollen to the stigma. Let us look at some flower pollinators!

Some **BIRDS** will help pollinate plants. This Dusky Sunbird is looking for food (nectar). It is attracted to the flower by its sweet smell and bright colours. When the Dusky Sunbird gets the nectar, the flower's pollen will rub onto the bird's forehead. At the next plant, the sunbird will rub the pollen onto the flower's stigma.



INSECTS like bees, butterflies and moths often pollinate plants. This tree also uses its smell to attract insects. Instead of smelling nice though, it has a very terrible stinky smell. The tree is called a Smelly Shepherd's Tree. Who do you think will come and pollinate the tree?



Many plants are pollinated by the **WIND**. Grasses are mostly pollinated by the wind. They produce very light, dry pollen that the wind can easily carry. Wind-pollinated grasses do not need to have bright colours and smells. Have you ever had hay fever in the summer time? Hay fever is an allergy to all the different pollen being blown around by the wind.

PLANT VOCABULARY

Endemic- Occurring naturally only in a particular area

Indigenous- Occurring naturally in an area

Symbiotic relationship - A relationship between living things where one or both are dependent on the other for survival

Barren- Lacking vegetation, unproductive

Unsustainable- Not able to maintain and support.

FOR THE ADVANCED READER GHAAP

Emergency veld food turned diet pills?

Indigenous knowledge (IK) about plants in Namibia and the rest of southern Africa is very important to gaining a greater understanding of our natural environment. Many of these plant resources have been used for hundreds of years as food, medicine and for general health. Traditional plant resources and traditional lifestyles went hand in hand. In today's Namibia, however, human population increase often pressurises the land and depletes its resources in an unsustainable manner. In addition, a greater dependence on a cash economy has created a push towards commercialisation of resources previously used on a limited basis.

The law: In Namibia all *Hoodia* species are protected and a permit is required for its harvesting and trade. Currently there is no international legislation. It is believed that there is an active illegal trade in *Hoodia* plants. There is a movement underway to have the *Hoodia* protected by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) under Appendix 2. This would help to establish well-monitored and legal trade to benefit local people and the environment.

Bio-piracy? The *Hoodia* is currently in the spotlight as its traditional use has been "discovered". Through the increased documentation of indigenous knowledge (IK), the hard-earned knowledge of many people is becoming available to all. Although this is the aim, proper acknowledgement and appropriate inclusion in any commercial developments of the species is a must. It is after all the IK that has sparked the research of the species in the first place.



Hoodia species

Type: Stem Succulent

Description: The *Hoodia* usually grows as a small shrub but it can grow to 1.5 m. This slow growing plant has thick, thorny stems. When the flowers bloom, they have an unpleasant smell which attracts flies to pollinate them.

Habitat: They are found mostly on gravel plains and rocky outcrops.

Traditional use: An appetite-suppressant for shepherds and hunters away from home. The thorns are scraped off and it is then eaten like a cucumber.

Market use: As the main ingredient in diet pills to promote weight loss.

Environmental risks: Uncontrolled, unsustainable harvesting to meet market demands causing extinction of wild populations.

There are currently ten recognised species that are difficult to tell apart, unless in bloom.

PLANT ACTIVITY PAGE

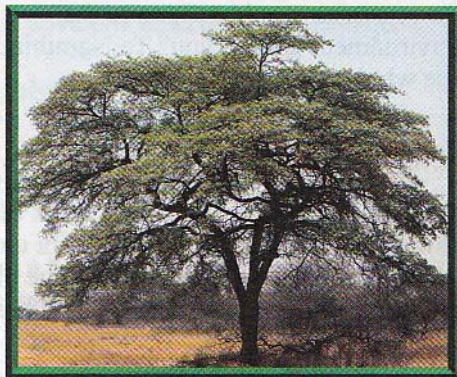
Below is an activity you can do at home, in the classroom or with your Environmental Club. Put on your thinking caps and apply your maths knowledge to plants!

M PLANTS & T H S

Materials

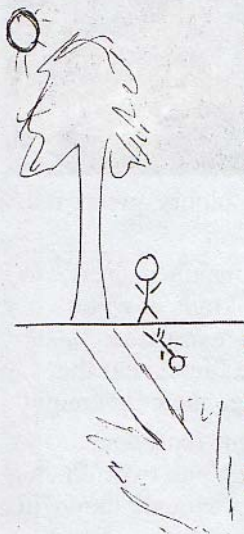
Tree
Measuring tape
Pencil
The sun's shade
A friend

Have you ever wondered how tall some trees are? Would you like to be able to measure one? Follow the directions below and apply your maths skills in real life! It is best to do this activity in the mid-morning or mid-afternoon when the sun creates a long shadow over the tree.



DIRECTIONS:

- 1) Both you and your friend should stand next to the tree. You should be in a straight line and facing the shadow.
- 2) While your friend remains standing next to the tree, take the measuring tape. Measure the length of your friend's shadow.
- 3) Measure the length of the tree's shadow.
- 4) Now measure your friend's height.
- 5) Write the measurements down in the spaces given. Make sure that all the units are the same. For example, centimetres.



TREE WORKSHEET

Friend's shadow = _____

Tree's shadow = _____

Friend's height = _____

DOING THE MATHS

To work out the height of the tree, you must set up a simple ratio equation. The equation is set up for you below. Fill in your data and multiply to find out the height of your tree.

FRIEND'S HEIGHT

FRIEND'S SHADOW

=

TREE'S SHADOW

TREE'S HEIGHT

THE BIGGER PICTURE

PLANTS ARE OUR LIFE SUPPORT SYSTEM

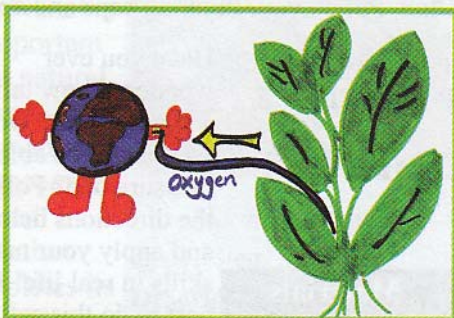
Can you imagine life without plants? What do you think would happen to the environment around you? To Namibia? To the whole Earth?

It is very simple.

No plants = no photosynthesis = no oxygen

When referring to plants, most think of flowering plants like trees, flowers or crops.

As we have learned on page two, the plant kingdom is much larger though and has very many different kinds of plants. One of these is algae.



THE "OXYGEN" OCEAN

Phytoplankton provides the world with 50% of our oxygen! It is a primary producer. Phytoplankton is the basis of the ocean's food chain. The Benguela Current is very rich in nutrients and oxygen-producing phytoplankton.

Phytoplankton

Phyto: plant

Plankton: wandering.

THREATS TO OUR LIFE SUPPORT?

70% of the Earth's surface is covered in water, mainly the oceans. Although this is a very large area, human activity is able to affect it. Some human-created problems for ocean life are: oil spills, industrial waste, littering and global climate change.

ALGAE

Type: There are very many different kinds of algae. For example, kelps, seaweeds, diatoms and flagellates.

Description:

Very simple one or multi-cellular organisms. They can be a variety of colours: green, red, blue-green and brown.



Habitat: Algae live mainly in the ocean. They can live in all kinds of water including lakes and man-made reservoirs. Most are found near the water's surface where there is sunlight.

Reproduction: Algae reproduce asexually by splitting into two. When the two parts are big enough, they will split again.

Movement: Most cannot move by themselves and are swept along by the water.



It is the sun that provides all plants with the energy for photosynthesis!



Chinga's & Nzovu's Corner



Thank you to all for sending your questions to us. It is wonderful to see our readers asking so many questions about the world around them. If you have any questions for Chinga and Nzovu, please write to:

**Chinga & Nzovu, NaDEET, P.O. Box 31017,
Pioneers Park, Windhoek**

Dear Chinga
and Nzovu,

Do elephants drink water
through their trunks?

David in Omiimbungu-Ongandjera

Dear David,
It is often believed that elephants drink through their trunks. The elephant uses his trunk as a tool to get water into his mouth. It sucks the water into its trunk and then pours it into its mouth. The trunk can be about 2 metres long and weighs 140 kgs. It is made of muscles and skin and does not have a bone inside. It therefore moves very easily and helps the elephant eat and drink. The trunk acts very much like our arms and hands.

Did you know that the elephant can hold up to 6 litres of water in its trunk? It can also be used as a shower!

Chinga and Nzovu

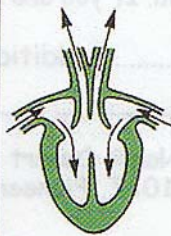
Dear Chinga and Nzovu,

To which group does an animal that has a 3-compartment heart, dry skin, scales and no legs belong to?

Simon in Oshakati

Dear Simon,
An animal that has the description you have given belongs to the class Reptilia. Our first thought is that it is a snake. However, it could also be a legless lizard or a legless skink. They all have dry skin, scales and no legs.

An important feature of a reptile is its three-chambered heart. (Biologists call the sections in the heart chambers not compartments.) Some reptiles do have four chambers like mammals, but most have three like amphibians. Blood travels through an animal's body to deliver oxygen, nutrients and other things to its cells. The heart is the centre of this system.



In snakes, "oxygen-poor" blood and the "oxygen-rich" blood enter the heart through two different chambers and then exit together out the third.

From: www.madsci.org

Chinga and Nzovu

UPDATE *** CONTESTS *** UPDATE

Congratulations to all who entered the two contests from the "Vulture Conservation" issue. Both contests were quite challenging.

The "Know your birds" contest from page 5 had thirteen entries. Only five of these were correct. The answers are:

A)



Cape Teal

B)



Kori Bustard

C)



Yellow-billed Hornbill

D)



Pale Chanting Goshawk

The winner of the prize (a bird identification book) is Leevi Ndara from Grootfontein. Well done!

The "Conservation Crossword and Contest" from page 9 had seven entries of which six were correct. The answer of the HIDDEN MESSAGE is:

SAVE LIFE FOR THE
NEXT GENERATION.

The winner of the prize ("Large Birds of Prey" poster and booklet) is Hendrina Shiwambi from Ondangwa. Congratulations!

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The **Bush Telegraph** is written by Viktoria Keding.