



The **EARTH** Edition 2022



If you are alive, you need this planet! In this edition, we celebrate our beautiful planet and take note of the challenges we face to make sure we and future generations can enjoy life to the full here!

Did you know that **South Africa is one of the richest countries in the world when it comes to wildlife?** Learn about the value of life on our planet and why we need to take care of it on page 3. Meet biodiversity's Little Five on pages 4 and 5. **Meet an inspirational agricultural entrepreneur** on page 6, and dig into some green gardening fun on page 7.

Learn how asthma is caused and worsened by air pollution on page 8. **Letago Kgomoeswana** is an environmental scientist who looks to age-old knowledge to help us deal with climate change now and into the future. Hear about her journey to the world stage in the **FameLab 2021 competition** on page 10.

Join the Science Spaza gang, and let's take care of the planet that takes care of us. Happy reading!

PS: We'd love to hear from you! Keep the pictures and messages coming! Send them to us via WhatsApp on 076 173 7130.

The Science Spaza Team



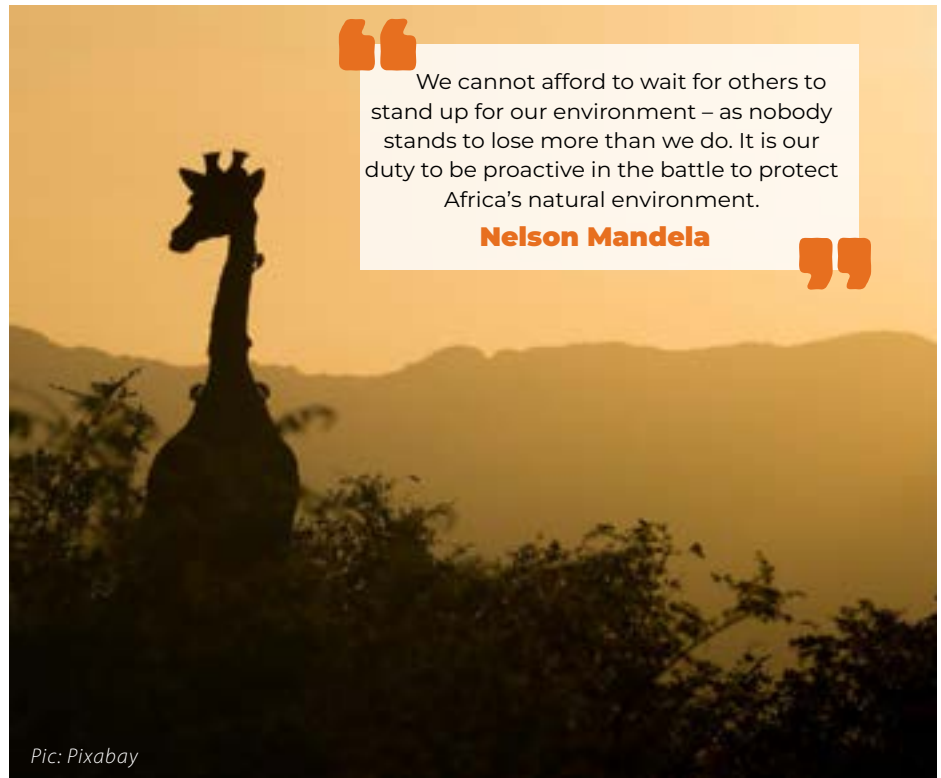
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We are talking to our future leaders. Are you?



Pic: Pixabay



We cannot afford to wait for others to stand up for our environment – as nobody stands to lose more than we do. It is our duty to be proactive in the battle to protect Africa's natural environment.

Nelson Mandela



South Africa has some of the best wildlife in the world!

We have more than 100 000 different kinds of living creatures here, which makes us one of the most biologically diverse countries in the world.



Earth: Will we treasure or trash it?

Have you heard about the fungus that grows on sloths that could treat cancer? Or the Italian goats that start moving away days before a local volcano erupts? How about the Welwitschia plant of Namibia that can live for more than a thousand years? The living creatures of this planet have all kinds of amazing abilities, and humans still have so much to learn from them all.

So far, we know about a million different species on earth, but scientists believe there could be up to eight million more just waiting to be discovered! Sadly, many of these undiscovered species will be extinct before we even find them. Climate change and human activities like mining, farming, hunting destroy the homes of these creatures, robbing us of the chance to learn about and from them.

The well-known nature filmmaker Sir David Attenborough said: "We need all the riches of our planet to help us live healthy, happy lives well into the future."

The word biodiversity refers to all the different kinds of living things and the places where they are found. The word bio comes from the Greek language and means "life". Diversity means "different or varied" and comes from Latin.

The abundance of biodiversity on Earth gives us food, the soil it grows in, medicines, safe spaces to live in and places where we can celebrate, relax and enjoy meaningful moments.

Science can help us to protect the treasure of biodiversity on our beautiful planet.



Our waste products are trashing the environment, causing harm to humans, plants, animals, water, air and soil. Pic: Pixabay



The natural environment is a treasure that supports life on Earth. Pic: Pixabay

Get ready to reduce, reuse and recycle! Scan the QR code below, check out the worksheet about the three R's and turn waste into opportunities!



BIODIVERSITY

Lion, rhino, buffalo, leopard and elephant. The Big Five are the celebrities of wildlife, known and loved around the world. But did you know that some of the lesser-known species are the real stars in keeping our planet healthy? Let's take a look at five of the most important species on Earth and how **YOU** can protect them!



1. BEES

You might not like it when they discover your can of cola, but bees are one of the most important species on Earth. Bees pollinate most of the food plants that we eat. Without bees, there will be no carrots, apples, pears, onion, citrus fruits, coconuts, grapes and many more. Agriculture, pesticides and urbanisation are some of the biggest threats to bees.

WHAT CAN I DO?

Plant flowers! In pots or in your garden, on the side of the road and in parks.

Bees are important pollinators for many of our favourite food crops. *Pic: Pixabay*

2. BATS

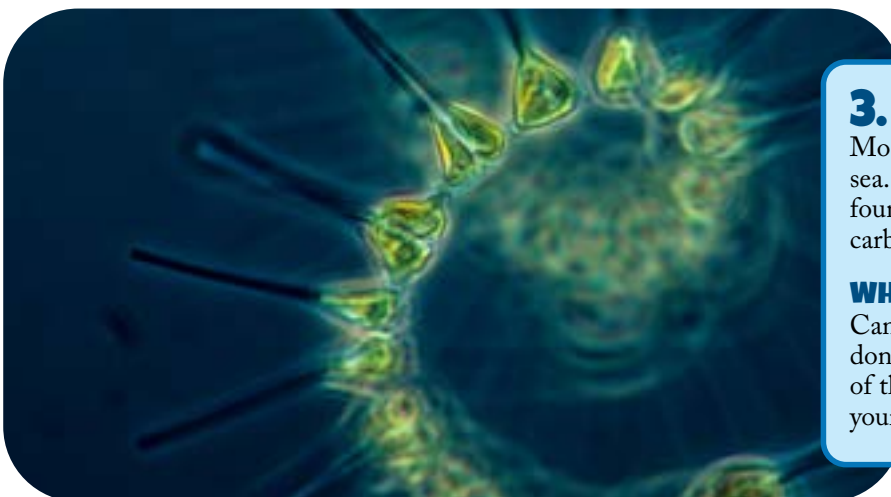
Did you know that bats are a sign of a healthy environment? Bats pollinate some of your favourite fruits like mangos and guavas. They are wonderful pest controllers. Insect-eating bats eat thousands of bugs every night, including the mosquitos that spread malaria.

WHAT CAN I DO?

Don't bad-mouth bats. Rather help to spread the word about how important they are.



Like bees, bats are also important pollinators of food crops. *Pic: Pixabay*



3. PHYTOPLANKTON

Most of the oxygen in the air comes from the sea. Phytoplankton are tiny little creatures found in the ocean. Just like plants, they use carbon and make oxygen.

WHAT CAN I DO?

Campaign for clean seas. Join a beach clean-up, donate or sign a petition to keep pollution out of the ocean. Host a litter clean-up initiative in your area.

Phytoplankton produces most of the oxygen on Earth. *Pic: Pixabay*

'S LITTLE FIVE



4. DUNG BEETLES

There are more than 7000 different species of dung beetles across the world. These little “poop-scoops” clean up when big mammals do a number two. Dung beetles lay their eggs inside balls of dung which they then roll away and bury. The dung ball makes a delicious snack for their young. Rolling and burying dung helps to scatter seeds, protect farm animals from parasites and put nutrients back into the soil.

WHAT CAN I DO?

Organic farms have more dung beetles compared to industrial farms. Support local and organic farmers.

On a roll! A dung beetle in action rolling a ball of dung. The dung ball will be buried before the female lays her eggs in it. The dung serves as the first meal for the hatching larvae. *Pic: Pixabay*

5. PHYTOPLANKTON

If you thought soil was dead, think again! One hand full of soil contains more microorganisms than there are people on Earth! Fungi break down dead plants and animals. Some kinds of fungi can even break down toxic chemicals in the soil.

WHAT CAN I DO?

Follow the example of fungi and recycle. Make sure to take your old batteries, electronics and light bulbs to the e-waste collection to avoid soil pollution.



Fungi like mushrooms play an important part in recycling nutrients in nature. *Pic: Pixabay*

Join the Science Spaza gang and do your bit for biodiversity. Help to save one of the Big Five! Scan the QR code and download the "Save the Rhino" worksheet.



INNOVATION FOR THE NATION:

It starts with a seed



Growing food on a rooftop farm. The green way! Pic supplied: Andile Matukane

If you are looking for Andile's fresh produce, don't look down to the ground, look up! Andile Matukane is an agricultural entrepreneur, and she is definitely on her way up. Her business, Farmers Choice, grows and supplies vegetables like spinach, kale and cabbage in Gauteng. Her newest idea to grow vegetables on the rooftops of malls is taking off like hotcakes, or should we say hot chakalaka?

Who needs a farm, to farm?!

Andile has been farming for eight years now. She came up with her rooftop farming idea while she was waiting to get more land to farm on as her business grew. Now, Andile has set up a rooftop farm on top of one of the biggest shopping centres in Gauteng. The restaurants and shops in the mall can buy vegetables from Andile's rooftop farm for the freshest produce in town.

These veggies are also environmentally friendly by cutting out the transportation of the produce from the farm to the shops.

Andile believes that every human being should have access to affordable fresh produce. Her word of encouragement to any Spaza Space readers and young entrepreneurs interested in agriculture is: "Never miss the opportunity to be the one feeding our nation. It simply starts with one seed."

WOW, ISN'T THAT A GREAT IDEA! DO YOU HAVE AN IDEA THAT COULD CHANGE YOUR COMMUNITY FOR THE BETTER?



Locally produced, environmentally friendly vegetables are grown on the rooftop, while you shop! Pic supplied: Andile Matukane

ACTIVITY PAGE

Going green with food gardening

DO YOU:

- WANT TO HELP SAVE THE PLANET?
- BE HEALTHY?
- SAVE SOME MONEY?

IF YOU TICKED ANY OF THE BOXES, THEN THIS ACTIVITY IS JUST FOR YOU! WHY NOT START A FOOD GARDEN AT HOME OR SCHOOL? GROWING GREENS COULD BE EASIER THAN YOU THINK.



Avocados for the next generation. Next time you eat an avo, don't miss the chance to grow an avo tree by germinating the seed over a Jar of water. *Pic: IrySci*

AWESOME AVOS

To germinate an avocado seed, gently stick toothpicks into the sides of the pit and place them on the rim of a glass filled with water. The seed should touch the water. After a couple of weeks, you will see the seed opening up and a root and shoot will come out of the seed. Once a couple of roots have formed and you have a few leaves, transplant the seed to a large pot or into your garden. Remember to water it often.

SAVE YOUR SEEDS

Tomatoes, peppers, pumpkins and chillies can fairly easily be grown from the seeds that you find in them. Keep the soil moist while the seeds are germinating.



Save the seeds from your next salad to start your own food garden. *Pic: Pixabay*

REGROW FOOD SCRAPS

Use food scraps from your kitchen to start a veggie garden. You won't get a carrot if you plant a carrot, or a beet if you plant a beet, but the carrot or beetroot tops can regrow. Carrot and beetroot leaves are healthy and sweet and can be added to stews and soups as a source of vitamins and fibre. Potato tubers are the part of the potato plant that gives rise to a new plant, and are also called the vegetative part.



A) Place carrot tops in a shallow bowl of water. B) The tops will start to regrow in a couple of weeks. The leaves are healthy and can be added to soups and stews. *Pic: IrySci*

Look for a potato that is starting to regrow. Roll down the sides of a cloth or plastic bag to form a shallow pot to plant the sprouting potato in (remember to add drainage holes if you use plastic). As the plant grows taller, unroll the bag and add more soil. Potatoes will form in the bag after the plant has flowered. You can also plant a sweet potato tuber that is starting to sprout in the garden. You can regrow leeks and celery by planting the bottom stalks in moist soil.

DON'T FORGET TO WHATSAPP US YOUR PICTURES OF FOOD GARDEN!



Scan the QR code below. Get more great tips for building your own vegetable garden in the "One Home, One Garden"



STEPS FOR BUILDING A VEGETABLE GARDEN



Asthma: Is pollution leaving us breathless?

The cars, buses and taxis we ride, our cooking fires, burning of rubbish, and factories all put harmful gases into the air. Air pollution causes all kinds of environmental problems, from raising global temperatures to making the ocean more acidic and making more of us sick. Research shows that dirty air is a big trigger for asthma.

Asthma is a common breathing condition. Chances are that at least one in every five people will have it. People with asthma might have a cough or wheeze (whistling noise in the chest) and a feeling of tightness in their chests. They could feel short of breath, especially after being active or when they hang around people who smoke cigarettes or vape. Feelings of excitement or stress or even a cold could also bring about asthma symptoms.

Dirty air can cause or worsen asthma. It's helpful for a person with asthma to try and avoid air pollution. For example, keeping the house free from cigarette and fire smoke can help sufferers of asthma breathe better. Luckily, asthma can be controlled. Asthma medication is safe to use, and even young children can learn how to use an inhaler. Inhalers allow the patients to breathe easy and continue to live a normal and active life.

A group of researchers from the United Kingdom teamed up with seven African countries to learn about the challenges that children living with asthma in Africa



Learners in KZN who were part of a research study about asthma are seen here carrying special backpacks. The backpacks contained instruments to measure air pollution as the learners went through a normal day. Pic: ACACIA

face. This research programme, called Achieving Control of Asthma in Children in Africa (ACACIA), hopes to see more kids breathe easy and go about life without air pollution and asthma symptoms.

ACACIA will gather information that could help us to understand the effects of air pollution better. Research like this is important to find ways to deal with asthma triggers and help more people understand asthma and enjoy a normal active life.

Scan the QR code below to learn more about asthma and the ACACIA programme.



Asthma in South Africa

1 in 5 young people in South Africa have asthma. Fewer than 2 in 10 children diagnosed with asthma are on the right medication. The number of 13- to 14-year-olds in South Africa who wheeze due to asthma is the highest in the world.



A puff a day keeps the doctor away! Inhalers are safe and an easy way to treat asthma. Blue inhalers are usually used to relieve asthma symptoms, while brown inhalers are used daily to prevent asthma attacks.

Pic: Internet



Industries are a major source of air pollution in South Africa. The airways of a person with asthma are overly sensitive to certain things like air pollution, allergies, cold air and smoke which can trigger breathing difficulties.



A spacer device attaches to an inhaler to help patients to inhale asthma medication more easily.

A peak flow meter measures the amount of air you breathe out and can be used at the clinic or with your doctor to see how well your asthma is doing.

Pic: Internet



Eskom Expo hosted regional science expos around SA



Eskom Expo for Young Scientists hosted regional expos in 35 regions around South Africa in July and August, where learners were able to showcase their research and engineering projects, after applying skills acquired in the classroom to real-life situations.

Learners in grades 4 to 12, along with learners from Technical and Vocational Education and Training (TVET) colleges who are in NC2 to NC4, are invited to register their own science and research projects for an upcoming regional expo.

Types of research projects to enter include Scientific Investigations or Experimental Research, which follow a method that answers a research question and tests a hypothesis – usually through

observations and experimentation – along with Engineering or Computer Science-related projects, which follow a design process according to the criteria, to build, test, redesign and retest a prototype, product or solution.

Learners can also enter Social Sciences projects, which follow a systematic approach that involves answering questions or testing a hypothesis on the functioning of human society, along with Mathematics or Theoretical projects, which explore quantity, structure, space and change.

#DiscoverEskomExpo and stand a chance to win full-time bursaries, scholarships, cash prizes and various opportunities by registering your project here:



<http://bit.ly/3dVnTGH>.

To access various resources and easy-to-use templates, click here:

<https://bit.ly/3ctUuik>.

Eskom Expo would also like to invite practising professionals, including engineers, doctors, veterinarians, school teachers, lecturers, researchers, scientists and IT professionals, to apply their academic and professional skills by becoming a judge at a regional expo and the **Eskom Expo International Science Fair (ISF)**. Read more here: <https://bit.ly/3m3rtl2>.

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Let's speak to a scientist!

Climate change and indigenous knowledge: Learning from the past to prepare for the future



Letago, winner of FameLab SA 2021, in studio recording a presentation about using indigenous knowledge to combat climate change.
Pic: FameLab SA

Representing South Africa during the International FameLab 2021 competition, Letago Kgomoewana explains using fire ash to protect seeds. *Pic: FameLab SA*

Spaza Team: Hey Letago, so nice to meet you. Please would you tell us about winning FameLab SA last year?

Letago: FameLab is a competition where scientists give a short, fun presentation. It's a bit like Idols, but for science, not singing. It was a great experience! I learned a lot about how to speak in front of people and how to present complicated science in a way that anybody can understand. I ended up winning the national competition and competed with the national winners from around the

world. This was an awesome experience, and I was so excited to finish in second place overall!

Spaza: Wow, congratulations, Letago. It sounds great! Please tell us about your research.

Letago: I am a master's student at North-West University. I am an environmental geographer, and my project looks at using indigenous knowledge to help us deal with climate change.

Spaza: What does "indigenous knowledge" mean?

Letago: Well, indigenous knowledge is the age-old, tried and tested ways of our ancestors. In my research, I have looked at the traditions and wisdom that local farmers use to help them deal with the changing climate that we are experiencing.

Spaza: Can you give us an example?

Letago: Yes, sure. Did you know that farmers use creeper crops such as watermelon, pumpkin and sweet potato to control weeds

and stop water loss from the soil in dry times? Also, local farmers watch insects, like locusts and butterflies, and other animals, since the way they behave can tell us when a drought is coming up.

Spaza: That's interesting. And you believe that scientists need to listen to local wisdom like this to help us cope with climate change?

Letago: Exactly! We need to use all the knowledge available to protect the environment and grow enough food as the climate continues to change.

Spaza: Any advice for aspiring young scientists?

Letago: Take part in any science programmes from an early age to explore the different fields of science and find a place where you can shine! Science olympiads, the Expo Science Expo for Young Scientists, and FameLab – there are so many opportunities to put yourself out there and begin to establish yourself as a young scientist!

Spaza: Awesome, thanks, Letago. All the best for your research!

Fame Lab

Ideas for your science club



LET US KNOW WHAT YOU AND YOUR SCIENCE CLUB GET UP TO, TO SAVE OUR PLANET!



To celebrate the wonderful planet we live on, why not take on a project to help save our world this term?

1. Organise a clean-up. Choose a local park or playground, gather your friends and pick up trash. Use gloves and remember to wash your hands well after picking up trash.
2. Start a recycling initiative at your school. Do research to find a company that will collect recyclables from your area.
3. Start a food garden at school (**see activity on page 7**).
4. Become a citizen scientist. Scientists sometimes ask for the help of ordinary people to collect data as part of their research. If you live near the beach, check out the ELMO citizen science project, where you can help scientists to learn more about and protect the sharks and rays that live in your area.

Check out www.elmoafrica.org or find it on **Facebook as @elmoafrica or Instagram as @Elmo_africa**. If you enjoy bird watching, join hundreds of volunteers who gather data about wild birds in southern Africa as part of the Bird Atlas project. Go to <https://sabap2.birdmap.africa/> to join this citizen science project.

Magnificent mud: Tales of change, not just dirt

Streams of water formed by a sudden storm rush by, washing along sand and pebbles in the wild water. The water finally calms down when the streams flow into a dam.

Here, the sand and pebbles sink to the bottom, along with some rotting plants and what's left of an animal that did not survive the flood. Thousands of years go by, but the sand, pebbles and animal remains stay there at the bottom of the dam, holding clues about the history of Earth.

To most of us, mud might just look like wet dirt, but to trained scientists, a bit of mud could tell a story that started thousands of years ago and goes on up to now. Earth scientists study a type of mud called sediment to learn about the climate and environment of the past. Sediment forms when soil, dust and the remains of plants and animals collect over time, layer upon layer.

Soil and all living things carry with them signals of the environments where they

came from. Earth scientists sometimes visit wetlands and marshes and bore into the wet ground to collect a sample of all the layers of mud that have formed there over the years. Just like detectives, they look for evidence in the mud to help them solve the mysteries of how the climate has changed over time. Here are some of the kinds of evidence that they look for:

Physical evidence like the size of mud grains shows researchers where the sediment came from. Large grains are heavy and probably washed in with water, while fine sand could have blown in with the wind. Larger grains could be a sign of wet weather with heavy rainstorms.

Biological evidence like fossils tells us what plants and animals were around at the time.

Chemical evidence gives a snapshot of the chemicals in the air at the time.



Learn more about sediment and how earth scientists use it to get the dirt on the climate of the past! Find the "Sediment science: Muddy tales of the past" worksheet in this edition of Spaza Space!

NEWS FROM THE CLUBS

The Science Spaza gang visited Glenashley Preparatory School in Durban to spread some COVID-19 savvy and help learners to be great germ fighters!

Dr Ann, a pharmacist and University of KwaZulu-Natal researcher, wrote a book to help young people stay safe during the pandemic.

The book, called The Germ Fighters' Health and Hygiene Rhyme, helps kids to remember COVID-19 safety protocols.

Scan the QR code below to join the germ-fighting fun and find Dr Ann's book and animation.



Here are some more science clubs enjoying the previous edition of this paper!



Learners from Glenashley Preparatory School excited to meet the Science Spaza gang and Dr Ann and learn about fighting germs. *Pic: Science Spaza*



Hola, Chieffians Science Club, looking good!



Members of the Summit Jr Science Club enjoying their Spaza Space newspapers.



It is great to see you are never too young to get started with science at Project Hope.

WE'D LOVE TO HEAR WHAT YOU'D LIKE TO SEE IN THE NEXT EDITION OF THIS NEWSPAPER. SEND US YOUR IDEAS!



Send us your feedback

We would love to hear about you and your science club and see pictures of the activities that you get up to. Send us your pics on WhatsApp on 076 173 7130.



REGISTER NOW TO RECEIVE FREE RESOURCES AND SUPPORT. YOU WILL NEED:

START YOUR OWN SCIENCE SPAZA

- 1 A GROUP OF FRIENDS WHO ARE EXCITED ABOUT SCIENCE!
- 2 A PARENT OR TEACHER TO ASSIST YOU
- 3 A TIME AND PLACE TO MEET
- 4 SOME *CURIOSITY* AND AN INTEREST IN FINDING OUT MORE ABOUT THE WORLD!



Scan the QR code below to complete the club registration form. Once you've submitted, we'll be in touch!



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