NATIONAL SCIENCE OLYMPIAD

Advancing knowledge,
transforming lives,
inspiring the nation through the
National Science Olympiad

science & innovation
Department:
Science and Innovation
REPUBLIC OF SOUTH AFRICA

HARMONY™

NRF National Research Foundation | SAASTA South African Agency for Science and Technology Advancement

How to enter the NATIONAL SCIENCE OLYMPIAD

The national science Olympiad is written in the first quarter of each year. Schools can enter grade 10-grade12 learners as soon as the entry forms are made available; the final closing date of the Olympiad is at the end of January. There is a small entry fee payable and early birds get a discount, but arrangements can be made with SAASTA if a school is not able to pay the fee.

Exam papers are mailed to participating schools. The results are marked and moderated by an examination committee and the winners announced at an awards ceremony organised by SAASTA.

More information is available on the SAASTA website (www.saasta.ac.za)
or email scienceolympiad@saasta.ac.za

> “Science is the key to our future, and if you don't believe in science, then you're holding everybody back.”
> **Bill Nye**

This book celebrates 55 years of the National Science Olympiad and our Ten-Year Partnership Anniversary with Harmony Gold Limited.

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Message by Dr Molapo Qhobela

National Research Foundation
Chief Executive Officer

The year 2019 marked the twentieth anniversary of the National Research Foundation (NRF), an independent government agency established through the National Research Foundation Act (Act No 23 of 1998).

As the NRF we have been mandated to promote and support research through funding, human resource development and the provision of the necessary research facilities in order to facilitate the creation of knowledge, innovation and development in all fields of science and technology, including indigenous knowledge, and thereby contribute to the improvement of the quality of life of all South Africans.

In order to fulfil this mandate the NRF acknowledges the importance of communicating and engaging the wider community about the critical role of science and research in the development of our society, especially in the age of artificial intelligence, robotics and the fourth industrial revolution.

The NRF's facilities have over the years played a critical role in the science engagement agenda through providing science awareness platforms. The NRF Bill that was recently amended and signed by the President of South Africa has mandated the South African Agency for Science Advancement (NRF|SAASTA) as the national coordinating body for science engagement. The new mandate for the NRF|SAASTA is an opportunity for us to go out there and reach out to more members, especially those who are disadvantaged and have little access to information and opportunities brought by science and technology. Now that the NRF bill has been approved into an Act, over the next few years the NRF, through SAASTA, will continue to coordinate the implementation of the Science Engagement Strategy across the NRF and other entities within the Department of Higher Education, Science and Technology.

Within the NRF, all science-engagement activities have been consolidated under three focus areas; namely science

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education, science awareness, and science communication. It is through the Science Education unit located within the NRF|SAASTA that we will be able to build the supply of tomorrow's scientists and innovators. The unit has played a pivotal role in preparing today's youth to become tomorrow's scientists and engineers through a variety of programmes that focuses on educator and learners support, including the National Science Olympiad, which celebrates its 55th anniversary. The National Science Olympiad is one of the programmes that help us to identify talent, to encourage excellence in science education and to stimulate interest in the sciences by inspiring young people to consider careers in science and technology.

As the NRF, we would like to thank the role played by partner such as Harmony Gold Mining Company through the last decade, especially with the support they have provided on the National Science Olympiad programme. Harmony's support has enabled participation in this competition to grow, with an average of over thirty thousand learners writing the paper annually in the last five years.

This gesture provided by Harmony over the past few years has gone beyond their areas of operation in South Africa, but to also benefited learners at national level and the SADC region. Lastly, we would like to thank all the partners such as science museums, sciences centres, government departments and institution and the private sector for opening their doors for learners who cus Weeks over the years.

Dr Molapo Qhobela
National Research Foundation - Chief Executive Officer

Foreword by Dr Beverley Damonse

Science Engagement and Corporate Relations of the National Research Foundation (NRF)

The National Research Foundation (NRF) responds to the priorities and strategies of government through supporting research, human capacity development, platform provisioning, and science engagement in all knowledge fields. Science Engagement is an externally focused division that directs and coordinates the discourse on science in society. Through the science awareness, communication, and education initiatives, Programme 2 of the NRF supports the national imperative of developing a scientifically literate society. From a policy perspective, the National
Development Plan (NDP) also focuses extensively on the application of science and technology in the transition towards such a knowledge economy.

The recently amended NRF Act has mandated the NRF/SAASTA as the coordinator and implementer of the Science Engagement Framework. The Science
Engagement Framework aims to integrate the natural sciences, engineering, social sciences, and humanities, in pursuit of a society that understands and values science and technology and its critical role in national prosperity and sustainable development, while engaging critically in societal development. The goals of the framework are to:

- Popularise science, engineering, technology and innovation as attractive, relevant and accessible in order to enhance scientific literacy and awaken interest in relevant careers;
- Develop a critical public that actively engages and participates in the national discourse of science and technology to the benefit of society;

"Science Engagement is an externally focused division that directs and coordinates the discourse on science in society. Through the science awareness, communication, and education initiatives, Programme 2 of the NRF supports the national imperative of developing a scientifically literate society."

- Promote science communication that will enhance science engagement in South Africa; and profile South African science and science achievements domestically and internationally, demonstrating their contribution to national development and global science, thereby enhancing their public standing.

To enhance the relationship between science and society, the investment in science engagement activities at NRF/SAASTA and the National Research Facilities envisages reach an average of 1.08 million members of the public, 2 900 educators, and 220 000 learners per year. In line with the Department of Science and Innovation's Youth into Science Strategy and the Department of Education's National Strategy for Mathematics and Science and Technology, the National Science Olympiad (NSO) identifies and nurtures talent in SET.

The NSO contributes in increasing the human capital in the critical areas of Science, Engineering and Technology. Between 2015 and 2019, through the NSO, we have managed to reach more than one hundred and fifty thousand learners, an average more than twenty thousand per annum.

Whilst we celebrate the ten-year relationship with Harmony, NRF/SAASTA and all NRF business units will continue advancing knowledge, transforming lives and inspiring a nation through science engagement.

Dr Beverley Damonse
NRF - Group ExecutiveScience Engagement and Corporate Relations

The NSO Message by Dr Jabulani Nukeri

NRF-SAASTA - Managing Director

We are proud to share with you some of the work that has been completed by SAASTA's constituent and patrons in support of the Science Engagement Strategy in this booklet. We have also included some accomplishments in terms of supporting the communication and advancement of science.

Our contribution to the awareness of science through education, exploration, exhibitions and actual experience has grown over the last decade. Critical to this area is the support we provide to growing the pool of quality learners today, who will become the scientists and innovators of tomorrow.

It is then against this background that SAASTA, a business unit for the National Research Foundation (NRF), stands for the advancement of public awareness, appreciation and engagement with Science, Technology, Engineering, Mathematics and Innovation (STEMI). We believe that creating a future for the new generation with job opportunities for all, better health and wealth to all our people is a vision that is shared by all South Africans and must be consciously and tirelessly pursued and invested in by both Government and the business sector. We have managed to do so over the years through partnerships with stakeholders like Harmony Gold Limited.

Our ten-year partnership with Harmony, through collaboration has assisted SAASTA to empower young scientist across the country. We strongly believe that for any country to be globally competitive in the fourth industrial revolution, an investment by Government and the business sector is critical.

These outcomes will not be possible or achieved without an investment in STEMI education because the applications of Science, Engineering and Technology (SET) lead to new products and services that can make our world and our country a better place for all.

"Our ten-year partnership with Harmony, through collaboration has assisted SAASTA to empower young scientist across the country. We strongly believe that for any country to be globally competitive in the fourth industrial revolution, an investment by Government and the business sector is critical."

SAASTA has embraced this social and strategic responsibility since its inception in 2002. One of the key platforms that SAASTA is using to identify and nurture talent in SET is running SET Olympiads and Competitions (Astro-Quiz, Famelab®, National Science Olympiad, Natural Science Olympiad, Schools Debates and Young Science Communicators Competition) targeting both primary and secondary school learners and students at Higher Education Institutions (HEIs) across the country. It is through these competitions and programmes that we are able to create opportunities for our new generation, making an impact by contributing to the economic development of this country and beyond. Therefore, for South Africa to make its mark, we need to prepare our youth to be effective citizens in the envisaged fourth industrial revolution era, which will be underpinned by a scientific, mathematical and technological world that we can only dream of as of now. Our scientific knowledge is also being used to address increasingly complex scientific issues. This includes communicating science to the broader public in an exciting and engaging way through interactive exhibits and a mobile planetarium at seven national science festivals. We are educating the public on emerging technologies, such as nanotechnology and hydrogen fuel cells, through exhibit stands and information dissemination at outreach programmes and conferences. Our international footprint continues to grow; we are making an impact in different areas of science engagement. We are currently entrenched in the following countries, Malta, the United Kingdom, China, New Zealand, Japan, Ireland and five SADC countries namely: Namibia, Zimbabwe, Lesotho, Malawi and Mozambique. We hope that the Ten-year anniversary with Harmony will expand and create more opportunities for the young and brilliant minds that will not only grow in their careers but also create a science friendly country.

Dr Jabu Nukeri
NRF-SAASTA: Managing Director

Message by the Sponsor Mr. Peter Steenkamp

Harmony Gold - Chief Executive Officer

As Harmony Gold Mining Company, we are proud to have been involved and supported the SAASTA's National Science Olympiad for a decade now. The SAASTA's NSO initiative forms part of Harmony's commitment to the sustainable socio-economic development and well-being of our mining communities. This is mainly because education is one of the four key priority areas of Harmony's corporate social responsibility (CSR) contribution in South Africa along with socio-economic development; sports, arts and culture; and broad-based black economic empowerment (BBBEE) support.

Our partnership with SAASTA over the last ten years focused on improving performance in sciences and mathematics through learner and teacher development initiatives. Harmony recognises the need for the socio-economic development of South Africa and of the broader communities in which it operates. This was evident, as our partnership with SAASTA has enabled us to reach learners from various communities in the country, including learners from the SADC region.

We regard education as an important contributor towards the development of any society as it can play a critical role in the transformation of South Africa.

Through our involvement in the NSOs, together with SAASTA, we have positively contributed to increasing the number of youth's interest towards careers in science, technology, engineering and innovation.

Harmony has contributed close to R15 million towards the advancement of science and technology since 2009. We would like to reach more schools in rural areas and other under-served communities in order to ensure that every child, regardless of background, is given exposure to various opportunities in the STEM field.

"The SAASTA's NSO initiative forms part of Harmony's commitment to the sustainable socio-economic development and well-being of our mining communities."

Throughout this journey, we have seen learners from disadvantaged and deep rural communities in South Africa hoisting the South African flag high at various international science competitions such as the London International Youth Science Forum, the Beijing Youth Science Creation Competition and the Australian National Youth Science Forum just to name a few.

Mr. Peter Steenkamp
Harmony Gold - Chief Executive Officer

THE NATIONAL SCIENCE OLYMPIAD

HISTORY OF THE NATIONAL SCIENCE OLYMPIAD

The National Science Olympiad™ was started in 1964 by FEST (Foundation for Education, Science, and Technology), an organisation that became the business of the National Research Foundation.

OVERVIEW OF THE NATIONAL SCIENCE OLYMPIAD

The National Science Olympiad is one of SAASTA's flagship projects. Since 2005, the now 53-year-old project has offered learners in grades 10-12 an exciting opportunity to compete in science with fellow learners from SADC countries such as Lesotho, Zimbabwe and Namibia.

OBJECTIVES

The main aim of the competition is to identify talent, to encourage excellence in science education and to stimulate interest in the sciences. It seeks to inspire young people to consider careers in science and technology.

FORMAT OF THE COMPLETION

The competition comprises an annual examination in science (Physical and Life Sciences). The competition questions are designed to encourage all learners, those who love science and those who have never been exposed to the fascinating world of science, to take Physical Sciences and Mathematics at high school level and to consider a career in science, engineering or technology. The top national performers win all-expenses-paid trips to the London International Youth Science Forum and the Australian National Youth Science Forum.

ACHIEVEMENTS AND CHALLENGES

During the June-July or September schools vacation, a group of 100 learners who excel or demonstrate potential in the Olympiad examination are invited to participate in a Science Focus Week and Award Ceremony consisting of stimulating lectures, industry visits and other fun events.

Learners from different categories who demonstrate exceptional performance are selected to attend the London International Youth Science Forum during either July-August or the Australian National Youth Science Forum in January of each year.

NSO FOCUS WEEK

During the focus week a high profile award giving ceremony is organised and key stakeholders from government, science councils, and the business sector are invited.

SAASTA'S ROLE IN SCIENCE AND TECHNOLOGY EDUCATION SUPPORT

In order for The South Africa Agency for Science and Technology Advancement (SAASTA) to deliver on its mandate of advancing public awareness, appreciation and engagement of science, engineering, innovation and technology in South Africa, the core functions within the business unit drive the key strategic areas integrally. All science and technology promotion or awareness programmes within the NRF reside under three key strategic areas that combine to form an integrated and seamless approach.

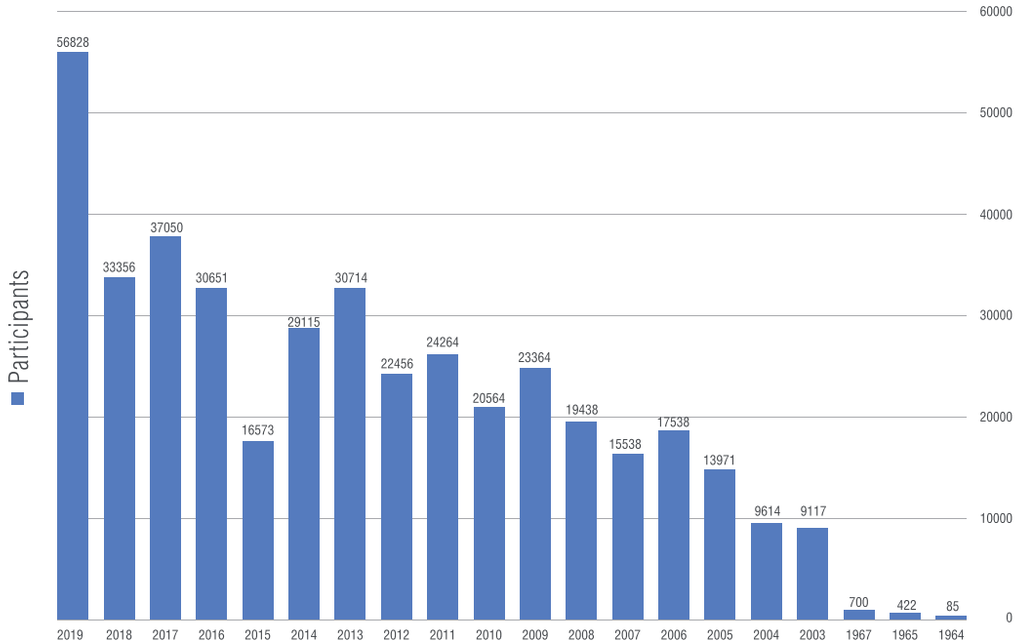
The Science Education, which aims to build the supply of tomorrow's scientists and innovators, the Science Communication, focuses on providing credible and accurate information that is accessible to all South African communities and the Science Awareness platform which literally focuses putting the world of science in society's hands through exhibitions and through hands-on experience of science.

SAASTA's contribution to the NRF's vision is to grow the pool of quality learners today who will become the scientists and innovators of tomorrow.

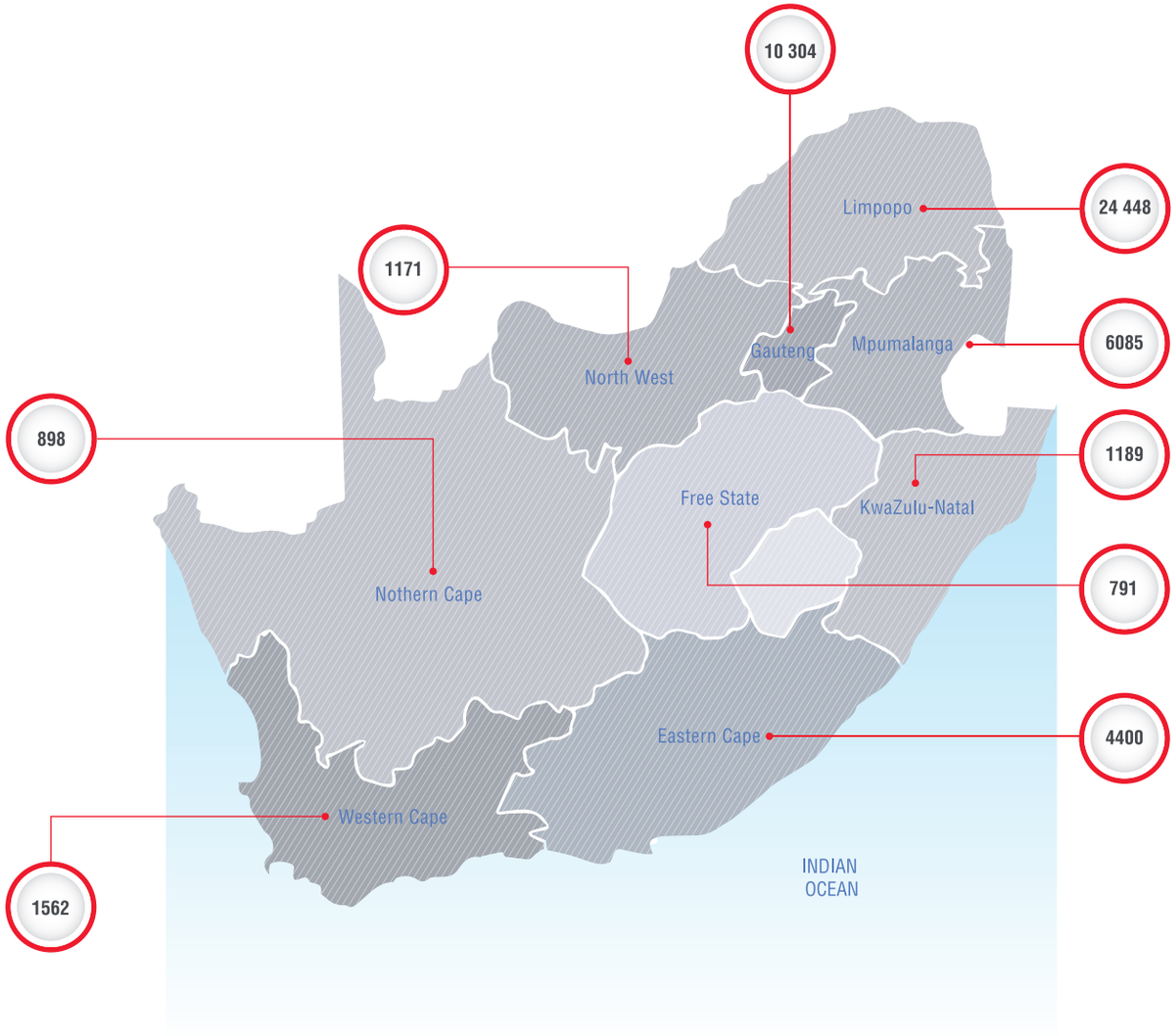
NSO PARTCIPATION OVER TIME

Participation

Between 2009 and 2019 more than hundred thousand learners participated in the National Science Olympiad



LEARNER PARTICIPATION PER PROVINCE IN 2019



THREE-PARTY CONTRIBUTION TOWARDS SET

The South African Agency for Science and Technology (SAASTA) aims to advance public awareness, appreciation and engagement of Science, Engineering and Technology (SET) in South Africa. SAASTA is a business unit of the not-for-profit National Research Foundation (NRF).

The NRF is the government's national agency responsible for promoting and supporting research and the development of high-level skills in all fields of humanities, social and natural sciences, engineering and technology.

The national Department of Science and Innovation (DSI) funds the NRF.

ADVANCING KNOWLEDGE, TRANSFORMING LIVES AND INSPIRING THE NATION THROUGH THE NATIONAL SCIENCE OLYMPIAD

Nithaya Chetty

Professor of Physics, University of Pretoria

Professor Nithaya Chetty believes that science is an instrument for development in South Africa. To understand the impact that science has had on Nithaya Chetty's life, Professor in the Department of Physics at the University of Pretoria, it is best to start at the beginning." I grew up in rural KwaZulu-Natal in the village of Thornville in the 1970s during the height apartheid. I went to an all Indian primary school that long-drop toilets, no electricity and only one bank of taps attached to a tank drew water from a borehole.

"The year I matriculated from Raisethorpe High school in Pietermaritzburg (1980s), was turbulent. It was a year of school boycotts, police raids and my high school science teacher was put in jail. Despise this; I decided I was going to study for my matric even though classes were closed. I studied from textbooks and I used past examination papers as a guide, but nothing was more helpful in my own learning than teaching to my peers. I began to hold classes and teach Mathematics, Physics and Biology. I was rewarded at the end of the year by being placed first in the national matriculation examination in my apartheid-defined racial category- and achievement that still remains bitter-sweet for me today".

It was also the year Nithaya was selected to attend the International Youth Science Fortnight in London. "This was a turning point in my life, as I found out for the first time that there were real rewards for hard work in science," he muses.

It was the first time that he was exposed to multi-racial group of students in his age group, all with a common interest in science. That sense of camaraderie left an indelible mark on Nithaya: "Being in London, in a non-racial society, was an entirely new experience for me, and one that I began to cherish deeply. There is no doubt that my visit to London was life-changing, and very influential in helping me choose a career in science.

Despite his simple upbringing, Nithaya considers himself lucky, as he was able to achieve his ambitions of becoming an academic and contributing to higher education in South Africa. "I remember voting in 1994 for the first time in my life, at the SA consulate in New York, and deciding then that I needed to come back home to contribute to developing South Africa," he says.

"Throughout my life, I have had a deep yearning for scientific education as an instrument for development and much of my professional life has been driven by this goal largely because I am and embodiment of this. Science was instrumental in extricating myself from a life that was destined for mediocrity."

Prof Tshilidzi Marwala

Vice-Chancellor at the University of Johannesburg (UJ)

"The National Science Olympiad brings back long-forgotten memories of my own journey toward a career in Engineering and Technology which began in 1989, when I was in matric at Mbilwi Secondary School in Limpopo Province and wrote the National Youth Science Olympiad," says Prof Tshilidzi Marwala, Vice-Chancellor at the University of Johannesburg (UJ).

"I remember clearly the day my principal announced that I had won the Olympiad and would join other learners as a delegate to Youth Science Focus Week and the London International Youth Science Forum. It was through these experiences that I, a young man coming from the so-called 'Bantustan' of Venda- one of the most rural areas in South Africa- was able to be exposed to many exciting scientific ideas. My participation in these events in my early years increased my interests in science and its potential to fundamentally change the world in a very substantial way. I met people from all over the world, was exposed to their thoughts and learned how they planned to compete in the globalised world."

Tshilidzi used the opportunity to visit the University College of London and Oxford University where he gained an appreciation of the importance of engineering and science for the development of modern society. This inspired him to follow a career in engineering.

He was awarded a scholarship by the Educational Opportunities Council to study Mechanical Engineering at Case Western Reserve University in Cleveland, Ohio, USA, from where he graduated magna cum laude. In 1995 he was employed at the CSIR as a Project Engineer. He studied further at the University of Pretoria, obtaining his Master's in mechanical engineering in 1996. Between 1997 and 2000, Tshilidzi did a PHD in Computational Intelligence, after which he became a Postdoctoral Research Associate at the University of London's Imperial College of Science, Technology and Medicine, working on intelligence software.

On his return to South Africa in 2001, he first worked at South African Breweries before taking up a position as Associate Professor and Head of the Control Systems Group at the School of Electrical and Information Engineering at the University of the Witwatersrand. He was then appointed Dean of Engineering and Built Environment and later the Deputy Vice-Chancellor: Research, Postgraduate Studies and the Library at the University of Johannesburg until his appointment as the University's Vice-Chancellor.

"My generation has played its part, but we have great expectations of the emerging generations- far greater than any other previous generation. They will have to take us into an advanced industrial age. In the information age that we now live in, knowledge and money are but two sides of the sane coin. This generation has the greatest opportunity and potential to change the world, but this is not enough: an opportunity of a lifetime has to be taken within the lifetime of the opportunity.

"The world we live in today is in desperate need of learners who will give more than 100% in their day-to-day lives. Learners today are privileged to live at a time when the collective intellectual capital of the world is the highest it has ever been. Of course, this situation comes with its own challenges and responsibilities.

"There is the responsibility to find cures for pandemics such as HIV/AIDS, tuberculosis and malaria. Our planet is undergoing a period of environmental destruction and degradation, and this generation will need viable sources of energy for the future. It is also their responsibility to develop technologies that will ensure effective production of crops and the preservation of livestock. This is necessary to combat the global food crisis, the effect of which is being felt by each and every country. I consider myself privileged to have very talented postgraduate students who will take up these challenges eagerly."

Dr Christina Busisiwe Vilakazi

Senior Researcher
Council for Scientific and Industrial Research

Christina Busisiwe Vilakazi was a National Science Olympiad finalist in 1999. “There are so many things that I remember from the Olympiad”, says Dr Christina Busisiwe Vilakazi. “The one thing that stood out for me was learning about the exciting areas of science from some of the world’s best scientists and learning about other cultures and traditions. Being in an atmosphere where science was the catalysts for all activities, I learned the provoking, demanding and fun side of science.”

She says that attending the London International Youth Science Forum had a major impact on her career as it instilled a belief in her that there are endless possibilities. “It was a truly memorable experience and something I will never forget. The forum provided me with a real sense of independence and trust in my own ability, as well as confidence in my opinions and beliefs. The scientific opportunities I was exposed to broadened my interest in science and provided me with an insight into the applications of science in everyday life. Most importantly, it gave me a huge appreciation of the importance of science in the betterment of mankind”.

Dr Christina Busisiwe Vilakazi is a Senior Researcher in the field of medical device development at the CSIR. She completed an MSc in engineering in 2007 at the University of the Witwatersrand. This was followed with a DPhil in biomedical engineering in 2012 as a Nelson Mandela Scholar from the University of Oxford in the United Kingdom. “ My research was mainly in biomedical Engineering which combines the design and problem-solving skills of engineering with medical and biological sciences to help improve patient healthcare and the quality of life of individuals. The research specifically looked into the monitoring of vital signs in end of the general ward. Using advanced signal processing and computational intelligence techniques, I worked on producing reliable systems that provide early warning of degradation of a patient’s condition.”

She says that engineering is, by its very nature, a creative profession. Because we live in times of rapid social and technology changes, the need for the engineers to think creatively is greater now than ever before. Engineering is for an individual who likes to question, explore, invent, discover and create, the qualities needed in engineering are an analytical mind, a logical approach to problem solving, creativity and imagination. Engineering requires good communication skills and a strong background in maths and science. And lastly, one needs a deep interest in science and technology and the enthusiasm to keep up to date with new developments in a rapidly changing environment.

“I would like to thank the National Science Olympiad for affording me the opportunity to be one of the delegates that represented South Africa at the London International Youth Science Forum”, she concludes.

Dr Thuthula Balfour

Dr Thuthula Balfour is a qualified medical doctor, public health medicine specialist and MBA graduate that spans 20 years, Dr Balfour-Kaipa has a special interest in HIV and AIDS prevention, TB and public health policy. Dr Balfour enjoys science because it forms the basis for many things and can be tested. This rationality has always steered her thinking. "If you want my buy-in, first bring me the evidence to support the facts," says the chamber of mines' Head of Health, Dr Thuthula Balfour.

Dr Balfour followed in the footsteps of her mother who was one of those few women doctors to qualify from the University of Natal in 1968, a choice she admits to have been motivated by pursuing a career more than a passion.

"I remember that I wanted to be a professor in genetics or astronomy, which I was once interested in. I used to spend hours in the school library, exploring the world through books, being constantly amazed at how we are but one entity in a much bigger picture.

But back then Science didn't have a big picture. Not like it does now. Today, there are role models and options."

Dr Balfour was part of the National Science Olympiad selection that went to London in 1980, an experience she holds to her heart. "All of a sudden I was meeting people from all over the world. South Africa was very protected in those days and everyone else seemed so streetwise.

I was my first time oversees and an exciting exposure to Science. I wanted to explore but I wasn't very adventurous and ended up not going back oversees but rather studying medicine.

"So, my advice to learners is to study your passion. Just do it! Anything from singing into Science, it's all possible. Although I do think Mathematics is fundamental to everything and by taking Maths and Science you are keeping your options open."

Andile Ncontsa

Chief Executive Officer – Litha Communications

"Being a millionaire at the age of 27 taught me that life is more than just financial success. My next immediate life purpose is to change young people's lives," says Andile Ncontsa, CEO Litha Communications, and former CEO of the Old Mutual Foundation.

Science is change. It's the gateway to a career filled with the variety and opportunity. Andile believes that being a scientist provides the freedom to solve real problems and advance humanity. An interest in the science and Mathematics broadens your career options. In life problems can range from small (solving a single Maths equation) to a very large (South Africa's National Development Plan). But the steps are the same: discovery of the problem, the decision to tackle the issue, understanding the problem, researching available options and taking actions to achieve your goals.

"Science helps you with the logic ability to isolate causal relationship so that you can solve the real problem, not just symptoms. Of course, not everyone will become a scientist. Most of the careers we will have ten years from now, do not yet exist. Science is the best preparation for this new landscape. From humble beginnings in rural Traskei, Andile has always had an inquisitive and questioning mind. "I fix my friends' bicycles and build design of cars I had never seen using wire. Even today I am a source of fascinating information (to me at least) about all manner of things ranging from science, philosophy, psychology, politics, economics and leadership. He says.

Participating in the Olympiad and London international, Science Forum taught Andile that everything is possible. "It taught me that to build a ship, as Antoine de Saint-Exupery eloquently states, you do not need someone to 'drum up the men to gather wood, divide the work and give orders', but instead, you need to 'teach them to yearn for the vast and endless sea'." Another pivotal memory of that experience was his flight to Johannesburg: "This beautiful airhostess said: Excuse me Sir, are you going to have water or wine?' I said: 'I beg your pardon?' (just to make sure that I heard her correctly when she called me 'Sir'). From that I experience, I told myself I was going to be great, and called 'Sir'. How, I had no clue!

"Now that I am older, and have children of my own, I know that the question 'what do you want to be when you grow up?' is, as kids put it, a 'dumb and annoying' adult question that expects doctor or pilot or engineer'. The important thing for a child to want to be when they grow up is to be happy."

Visualising his next immediate challenge of changing young people's lives, this is what he says he sees: "I am looking at a black girl, seated behind a desk, iPad in front of her. She is looking out of a window; her face content and pondering. She sees a landscaped garden nearby with green trees and birds chirping. On the horizon, she can see a picture of the Globe. I am looking at her with a smile; my arms are folded around my stomach. She is not aware of me. I feel happy and I know my life purpose is being fulfilled."

Mteto Nyati

Chief Executive at Altron

When he won the National Science Olympiad in 1980, Mteto Nyati was the first person to travel abroad in his family. “It was a big deal for my family and community in terms of what was possible,” says the once rural boy from the former Transkei, who is now accustomed to international travel as he heads one of the globbaly acclaimed and prominent JSE listed technology company Altron.

Mteto Nyati is the Chief Executive at Altron having joined the company in April 2017. He is responsible for transforming Altron into a world class Information and Communications Technology company that does good business while doing good. Prior to joining Altron, Mteto was Chief Executive Officer of MTN South Africa. He also led Microsoft South Africa for six years.

Before going to London, Mteto was contemplating a career in Medicine but things changed: “When I came back from the Science Olympics it was very clear that I wanted to study Mechanical Engineering.” This decision has shaped his career and led Mteto into a worldly of endless problem-solving possibilities. “I seek problems. The common theme in terms of the roles I have taken throughout my work life has been that of a problem-solver. I like turning around struggling businesses or creating a work environment that enables employees to do their best work.

“This thinking has helped me to stand out as I seek the things most people try to avoid: problems. Most organisations are looking for solutions – my thinking helps me to be relevant to any organisation that I choose to serve.”

A self-proclaimed optimist, Mteto sees himself tackling Africa’s challenges and helping with the renewal of this beautiful continent.

His unique approach to life began with an interest in Science in Grade 6 when Mteto realised he wanted to see how the knowledge he gained at school could be applied. “I used to carry out Science experiments at home using salt, water and batteries. I also created a small vegetable garden influenced by lessons in Agricultural Science.”

From there he obtained a BSc Mechanical Engineering from the University of Natal. He was awarded a Rhodes scholarship in 1985, named a World Fellow at Yale University in 2004 and joint winner of the IT Personality of the Year award in 2013.

“Sciences give human beings the tolls to better understand life. Sciences usually give those that have invested time and effort in understanding it, a sustainable competitive advantage.

“The Sciences are nothing to be scared of – the trick to doing well is to understand the first principles that inform everything else. This helps you understand the fundamentals of life – you literally walk with your eyes open.”

Makhanana Nkhwashu

Project Officer at the South African Agency for Science and Technology Advancement

What Makhanana Nkhwashu learnt from participating in the National Science Olympiad is beyond measure. She encourages learners to just write one NSO paper as that will stimulate their interest for science; at the end of the day, "there is nothing to lose," Says Makhanana Nkhwashu, Project Officer within Science Education at the South African Agency for Science and Technology Advancement.

Currently, Makhanana is a postgraduate student at the Tshwane University of Technology, specialising in Mathematical modelling and simulation within process control. "I have a passion for waste water and industrial water treatment and her MTech project was based on Carbon dioxide capture process. Climate change and global warming is another field of interest.

"My supervisor and role model Dr Lucey Moropeng Mavhungu. She has passion for what she does as a senior lecture is admirable. She saw a potential on a first year student and throughout with all the ups and downs, she believed in that student. I admire her character as an engineer and mentor." Says Makhanana

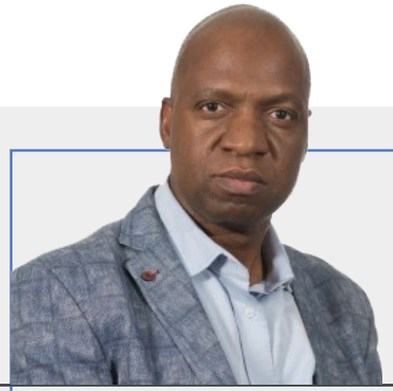
In Primary she used to excel in Maths and science more than the other subjects. Her grandfather, the late Mr Jim Nkhwashu influences her to study engineering after matric. "I followed his advice because I also wanted to study Engineering." Says Makhanana

Makhanana participated in the NSO 2009 when she was doing her Matric and wrote the Life science paper. "It was only three learners in my school, two were writing Life science and one physical science. Though the paper long, it was fun because I was so engaged with the questions." Says Makhanana.

Science is our everyday life. We live science, we breathe science. Everything around us is science. Science revolves around us and I embrace it as it determines our lives.

Previously, she has worked as a Science Education Volunteer and later became the Project Assistant before being appointed as a Project officer within Science Education at the South African Agency for Science and Technology Advancement, a business unit of the National Research Foundation.

Her responsibilities include providing STEMI related career development services, coaching and mentoring for STEMI practitioners, undergraduate and Educator support programmes. As a student, Makhanana was a Green Drop Auditor student at Water group for Waste water treatment plants.



Shadrack Mkansi

Science: A platform for any profession

Shadrack Mkansi is where he is meant to be in life: “I am fulfilled by the work I do. It was my dream to help others become scientists and that is what I am doing now.

“Science promotion and growing the science sector has become my passion because I can testify that a life in the science is interesting and full of opportunities,” says the science awareness platform manager at SAASTA, who is responsible for science promotion programmes in South Africa and is also the centre manager for the Johannesburg Observatory.

Born in Petanenege, Limpopo, Shadrack describe himself as an inquisitive child who wanted to know everything about everything he came across. “I wanted to fix things even if they were not broken. I tried fixing my bicycle, my watch, that of my father, his radio and electronic appliances. I landed myself in trouble many times for this!”

His intrigue of the world around him was noticed by his high school principal in Standard 8 (Grade 10) who referred Shadrack to another school in the area that offered mathematics and science to matric level. His first memories were being able to help other students in his class in these subjects. He recollects that he could spot errors made by his teachers during problem-solving and correct them –often lending him into more trouble for outshining them.

In 1985, Shadrack entered the Olympiad, and was selected to go to Johannesburg and then London. “The excitement of my fellow schoolmates and the teachers remains unforgettable. I even received gifts from the chief minister of our area. After my first encounter with an aeroplane, I was mostly fascinated by the different science laboratories, all of which had science equipment. This was not the case back home. Science became more practical after seeing the demonstrations and the experiments we were able to do in the laboratories. After witnessing the science shows, I just knew I wanted to be a scientist.”

To this day, if there is a problem to be solved, Shadrack is your scientist: “I am not stressed by challenges that come into my life; I look for various ways of tackling them and enjoy knowing that I can solve them.”

Shadrack strongly believes that opportunities are vast for learners studying science since they can easily divert to any profession. “There are so many things to discover and only scientists have the skills to do so,” says Shadrack giving the example that in today’s age of medicine and technology we still can’t cure’ flu or AIDS, and have yet to discover if there is other life in the universe. “It is our responsibility to solve our challenges and learning science will ensure that we take that responsibility.”

Mrs Sally Walsh

The passionate Educator

For more than forty years, Mrs Sally Walsh dedicated her life to teaching and amongst those subjects she enjoyed teaching, science was always her favourite. Mrs Walsh had for four decades taught Physical Education, Biology, Life Sciences, Physical Sciences, Natural Science at St Mary's DSG. Mrs Walsh believes that understanding Life Sciences principles is fundamental to understanding life as we know it.

Motivated by the late South African President Nelson Mandela, Mrs Walsh has always lived by the belief that Education is the most powerful weapon which you can use to change a nation. Her love for teaching was motivated by her undying love she always had for children from walks of life. "I get a huge, intrinsic reward when I see the light of understanding switch on in a child's eyes," Said Mrs Walsh. Despite being a science teacher, Mrs Walsh is passionate about sport and still play hockey at Masters and Grand Masters level. Mrs Walsh has a deep seated passion for the natural world and is continually inspired by Sir David Attenborough who is an English broadcaster and natural historian.

Mrs Walsh first entered her learners in the National Science Olympiad in 1995, and every year since then. She finds the Olympiads and the science debates to be an excellent way to challenge and nurture the learners as part of their learning. Mrs Walsh believes that the Olympiads are one of the best ways to help learners to reach their full potential. "I found that it's only when you extend talented students to challenge themselves way out of their comfort zone, that they fully start to grasp the extent of their abilities," Said Mrs Walsh.

One of her main highlights in her two decades long journey in the National Science was when one of her learners, Ruth Purcell won the NSO Award for two years in a row. I felt extremely proud of her. She grew so much as a person as she rose to each challenge and succeeded. Her understanding of the Sciences increased exponentially as she participated more and more against very talented students from other schools, not only in the Olympiads, but also in the science debates, essay-writing competitions and expos.

Mrs Walsh is of a notion that participating in the Olympiads can complement teaching mainly because sometimes, confines of the school syllabus could be limiting. Children can reach incredible heights, if they are exposed to stimulating and challenging situations.

Mrs Walsh advice is that "it always seems impossible until it's done - Nelson Mandela". Sometimes the most challenging situations bring the greatest rewards. She concluded by saying that a child's hunger for learning is immense, so let them explore, challenge and debate, until they can reach for their dreams with confidence. The Olympiads are excellent tools for this.

HARMONY'S IMPACT ON THE NATIONAL SCIENCE OLYMPIAD

HARMONISING THE FUTURE OF SET IN SOUTH AFRICA SINCE 2009

In 2009, Harmony entered into a R7.5 million sponsorship agreement over a period of three years with the South African Agency for Science and Technology Advancement (SAASTA) to fund the National Science Olympiad and some of its associated activities. The sponsorship from Harmony has enabled SAASTA to increase overall participation in the Olympiad and reach learners in rural and disadvantaged communities, many for the first time.

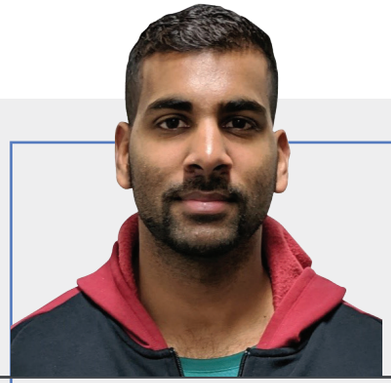
Through this partnership, Harmony has participated in the National Science Focus Week and provided sponsorship to a number of top South African learners to attend the Youth Science Forum in London and other international science fair events since 2010.

Harmony has also assisted SAASTA with the successful implementation of its SET role modelling campaign, which gave learners exposure to a range of potential career opportunities in SET, through discussion and interaction with many different SET career professionals.

Harmony has also initiated SAASTA's science promotion and awareness projects in seventeen (17 schools within areas of Harmony's operations, an excellent opportunity to invest in the company's local communities and ultimately contribute to the future skills resources in the areas of science, engineering and technology (SET) across the country. Learners in these schools have participated in a number of different SET-related projects aimed at giving talented young school learners the opportunity to develop their SET skills and the encouragement to pursue studies in one of these fields.

All of these projects made the decade long Harmony's partnership with SAASTA a resounding success. The partnership envisages continuing inspiring more learners with new confidence in SET-related subjects next year, especially those within Harmony's home communities. Amongst those who benefited from the partnership includes learners, parents, educators and their schools. The following section looks back at the life and achievements of persons who benefited from the partnership.

PARTICIPANTS FROM 2008 – 2012



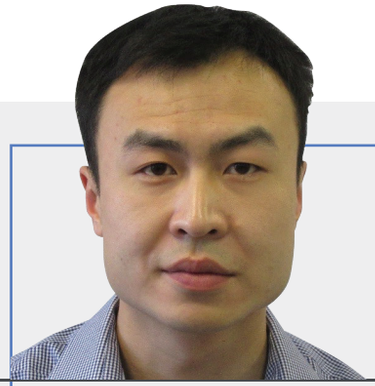
Arlton Gilbert

The Actuary - 2008

One of Arlton Gilbert's academic highlights was being placed amongst the top twenty (20) in South Africa in 2008 National Science Olympiad. Arlton who graduated from the Star College in Westville, KwaZulu-Natal Province is currently working for one of the oldest insurance companies in South Africa as an Actuary. He responsible analysing and developing the pricing of the new and old insurance products, a responsibility that requires one to have special mathematics and accounting and finance knowledge, analytical skills\ and good business knowledge as well as having strong computer skills.

Arlton regards himself as someone who values hard work and is very passionate about playing and watching sports. He studied mathematics because he believes that he is naturally quite good with Mathematics and Science. Doing Mathematics and Science was like a natural choice for him and didn't even have to think twice about it. Arlton highlights that his experience at the National Science Olympiad was that it's a competition that smart people did and it gave him a chance to experience learning outside of the normal school curriculum which he believes it's slightly watered down to accommodate everyone.

Arlton enjoys science because it allows people to know and make sense of how things work in life. Participating at the NSOs encouraged him to learn more than what was just taught in the normal school curriculum. Being placed in the top twenty (20) nationally it also made him realise that he had a lot of potential for a career in mathematics and science. Arlton advises young learners to look at the NSO's as a chance to learn things outside their school curriculum. He further advises the learners to give it their all, as in increases their chances of getting bursaries in the future.



Junfeng Guo

The Chemical Engineer – 2008 & 2010

After failing to win any prize in the 2008 National Science Olympiad, Junfeng Guo took a break in 2009; little did he know that he would claim the first prize in 2010. Junfeng participated in the NSOs in 2008 and 2010. The challenging experience in 2008 aspired him to come back even more prepared two years later to attain first place in 2010 which also earned him a plane ticket to the 2010 London International Science Forum.

Junfeng has always perceived himself as a reductionist because of his ability to understand and analyse complex scientific concepts or methods that appeared to be difficult in a simplistic way. For him, the scientific methods are the simplistic way of thinking and analysing the complex world. Arlton highlighted that he learnt many new and novel ideas in the field of science during the presentations at field trip week in Pretoria as well as the 2010 London Youth International Science Forum.

Junfeng has advised learners to take the NSOs as an opportunity to challenge themselves because the rewards thereof are definitely worth the effect.

After completing his matric, Junfeng went on two complete an undergraduate and a master's degree in Chemical Engineering. He is currently (2019) working ad-hoc as a Research Assistant while looking for a good PhD or employment opportunities overseas. He sees himself either obtaining a PhD or working as Chemical Engineering overseas in the next five years.

Phathutshedzo Eugene Ratshiedana

The Earth Man – 2009

Phathutshedzo is a Geologist by profession, from Limpopo province in Madatshitshi. Phathutshedzo said he loves science and he always wanted to be a scientist with the inspiration of Steven Hawking who transformed the understanding of Black Holes in his disabilities.

Phathutshedzo took part in the NSO in 2009 focusing on the Life Sciences (Biology) as a subject. He said it was not easy, but he found it encouraging and fun. During his participation in the NSO, Phathutshedzo said that he learned that time is crucial, and he acquired skills in time management and got more understanding in field of science. He also said that participating in the NSO makes one a competent individual as they gain knowledge and skills to approach and solve difficult problems in a short period.

After matric, Phathutshedzo studied Bachelor of Earth Sciences in Mining Geology with the University of Venda. Then he worked at Sibanye platinum as a Strata technician for a year. He further studied GIS, Mine sampling and Project management short courses in 2019, Phathutshedzo enrolled for Masters Project management at the University of Johannesburg.

Kabelo Sebiloane

The Plant Scientist - 2010

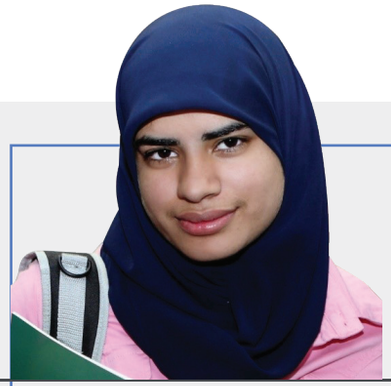
Kabelo Albina Sebiloane is a BSc Zoology and Botany graduate from the University of Johannesburg. Currently, she studying a Honours programme in BSc Botany which expects to complete by 2019. Her Honours research project is based on Taxonomy of parasitic plant of the genus “Sopubia”. Kabelo through her studies and fieldwork exposure has over the years gained extensive knowledge in laboratory and fieldwork research in zoology and botany. Kabelo has worked as a laboratory assistant for more than two years and that has improved her skills in conducting experiments, research and writing scientific reports.

Kabelo became interested in science around 2009 when she was in grade 9. The love for science let to Kabelo to watch Mindset channel 319 on DSTV while hear peers watched the cartoons. By watching educational TV channels, she got to learn about different chemistry experiments, solving mathematical equations and physical sciences. However, her school visit to SAASTA and Sci-Bono in the same year cemented her affection with science. The following year, in 2010, Kabelo entered the National Science Olympiads competition and wrote the Life Science paper.

Kabelo advised learners that partaking in the National science Olympaid is very fun and it gives one an opportunity to be tested on the many aspects of sciences.

“This is where you get to see how important and broad science is. Science is the future and without science and Scientists the world cannot survive." Said Kabelo.

Kabelo also believes that the world would become extinct without science. Kabelo has also thanked the National Research Foundation (NRF) for the scholarship she received in 2018 to continue with her Honours qualification.



Fatima Haq

The Software Developer - 2010

Fatima Haq, who is currently working for one of the big four banks in the country as a Software Developer participated in the National Science Olympiad in 2010. Fatima graduated from Sama High School (Now Nizamiye School Mayfair) in 2010 and went on to study BSc and Honours degree in Biochemistry and Cell Biology from the University of Witwatersrand. Fatima loves science and is currently working towards opportunities for combining her biology knowledge with information technologies (IT). She has since completed two IT related diplomas in Web Development with Shaw Academy between 2016 and 2018 and is currently an IT practitioner within the banking sector.

Fatima has since 2011 volunteered for organisations such as LifeLine Johannesburg, Al-Khaleel "The Friend Drug Counselling Centre," Islamic Relief Worldwide and Al-Hakeem Unani Tibb Healthcare. Fatima has a fascinating young career, which includes being a Tutor, Wits University's Biochemistry and Cell Biology Postgraduate Committee Member, Web Developer and Software Developer. Fatima is also very passionate about teaching, passion she followed during a gap year she took after completing her matric.

Fatima has always found science to be very captivating, as well as illuminating; for it is very satisfying when everyday/normal things are explained or actually proven by science. Although a scientist by heart, in her spare time, Fatima creates artworks, read books or cook for her family. She loves nature and taking pictures of flowers.

Fatima highlights that her participation in the 2010 NSOs was a very rewarding and fun experience as she was always a bookworm with little time to socialise with her peers. The 2010 NSO Focus Week allowed her to meet many different people, wind down and enjoy the learning experience outside the classroom walls. It also provided her with an opportunity to travel abroad and represent South Africa at the London International Youth Science Fair. Fatima believes that science has and will always allow us to better our lives and environments, while answering many existential questions. In short, according to Fatima, "Science basically explains life".

Thabang Letageng

The Cyber Guard - 2010

Thabang Letageng, who had found inspiration in his mother, was born and raised at Mohlarekoma, a rural village in Limpopo province. He is passionate about computers, and giving back to the community, by assisting learners from disadvantaged socio-economic backgrounds with university applications and financial aid application.

Mr Mashifane (his former high school principal) motivated Thabang, who always told him that dreams could be achieved regardless of the circumstances, and that, as long as one consistently works towards their dreams and avoid distractions along their way, their success is guaranteed.

Mathematics and Science are important to Thabang, since it has been proven over time that, Mathematics and Science have the ability to improve people's way of life from health care to housing and sanitation.

During NSO participations in 2010, Thabang was intimidated at first, and the first test was very challenging to him. However, that encouraged him to make sure that he understands the content he was taught. He also realized that memorising just to get a passing mark in exam is simply not good enough. He says some of the questions asked in the exams are applicable in real life, and they show the importance of Mathematics and Science in our everyday life. Thabang's advice to other learners is that, they should listen to their teachers and make sure they understand what they are taught in class. In addition, always be willing to go the extra mile when it comes to education, as that education is our key to a poverty free life.

Thabang obtained a degree in Computer Science from the University of Pretoria in 2015, and successfully got employment in one of the big four audit firms in the world in the same year. He is currently qualified as a Certified Information Systems Auditor (CISA), and is working for FNB as a Specialist Technology Auditor. Thabang is currently working towards a Certified Information Systems Security Professional qualification, and he hopes to become one of the best young information security consultants in the next five years.

Christian Parschau

The Entrepreneur in Making - 2012

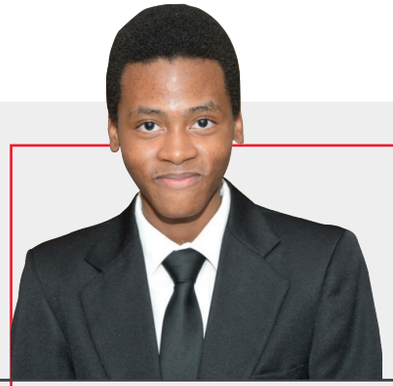
Christian Parschau, the National Science Olympiad participant in 2012 is determined to use his scientific skills to address the country's unemployment challenges. His father who has a business that employs many people in South Africa drives Christian's business interest. Christian says President Cyril Ramaphosa motivates him and his vision is to try to address problems faced by South Africans. He decided to study science related courses because he was fascinated by how the physical world works. I also decided

Christian took part in the NSO while doing his matric in 2012 and made it to the national finals. He was a member of the Gauteng Team that finished 3rd and has stayed friends with his teammates even at the University of Pretoria. After the NSOs he completed matric in 2012 and went to study Mechanical Engineering at the University of Pretoria.. During his studies at the University of Pretoria, Christian was part of the three students who were selected for the 2015 Massachusetts Institute of Technology's (MIT) student exchange programme in collaboration with the University of Pretoria. The MIT exchange programme provided Christian with an opportunity to spend a year in the United States of America before coming back to South Africa to complete his degree the following year.

In 2018, Christian continued with his studies and bagged himself a Master's in Industrial Management with Cambridge University. He is now pursuing a career in management consulting and will in few ears' time establish his own business that will operate in the African continent. Christian still envisages completing his PhD in engineering in the near future.

Despite learning a lot about science and career opportunities during his participation at the NSOs, Christian has also learned a lot about challenges faced by other learners and learned that he was in fact privileged to have an opportunity to learn at a nice private school like De La Salle Holy Cross College. However, he has encouraged other learners to stretch themselves beyond limitation.

PARTICIPANTS FROM 2013 – 2018



Hamandishe Mathivha

The Game Changer – 2013, 2014 & 2015

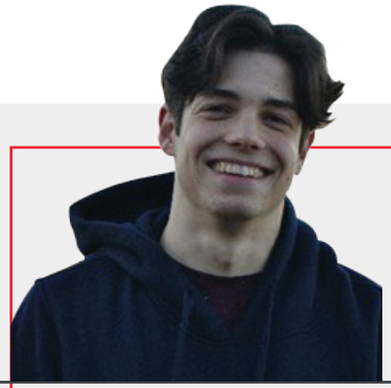
Hamandishe Mathivha was the undisputed NSO Award winner for three years in a raw. Hamandishe is currently a student at the University of Cape Town doing Honours degree in Computer Science. His dream is to own a technology business. He was inspired by Elon Musk who wants to do 'good' in the world by using technology.

He chose science because science teaches him a lot about how the world works. He has been curious about the world from a young age, which made him enjoy science although science was compulsory at school.

Hamandashe participated in the in the Olympiad from 2013-2015. In 2013, he did the Life Science paper and in 2014 and in 2015 he did Physical Science paper. He said that the questions were challenging, but he had fun. The great moment for him was when he won a trip to attend London International Youth Science Forum in 2013. He was excited to travel to other continent and meet other students who are also interested in Science. He learnt to be positive about achieving his goals. He put lot of effort for the event and he got good results.

He mentioned the importance of science from cooking, gardening and the use of a computer. He is also interested in the advancement of technology and science, which transform the world at an incredible pace.

He advised other learners to do their best in their activities and academics and have fun.
After participation in the National Science Olympiad, he was involved in the Science related creation where he created a game for Android and released it on Google Play App store.



Joshua Knipe

The Actuary in the making – 2013

Joshua Knipe is a currently a fourth and final year Actuarial Science student at the University of Cape Town. Joshua describes himself as a hard worker who values the importance of maintaining a balance – both socially and professionally in terms of staying active. Joshua was a recipient of Allan Gray full scholarship during high school and as a result, he was able to attend Bishops Diocesan College from 2011 to 2015. Being an Allan Gray scholar shaped the way I look at South Africa and the issues it faces.

His grandfather, whom despite a very tough childhood worked hard his whole life to change his circumstances for the better, inspires Joshua. Joshua's grandfather was always available to discuss science related topics with him. To feed his desire for science, Joshua started reading science book at a very tender age. As he grew older, all science related matters fascinated him and that made him to enjoy doing science at school. Although followed a different career path, he believes science is very important if one is pursuing in careers like engineering.

Joshua participated in the 2013 National Science Olympiad. He describes his NSO experience as an enjoyable one some of the questions covered a wide range of science topics. Being involved in-group discussions with other learners and engaging in various activities were some of Joshua's highlights. . The questions and the activities made him to be more curious and that drove him to try to understand more about the world of science and its principles.

Throughout his academic career, Joshua has held several professional and leadership roles. In 2018, he was a member of the Building Entrepreneurial Leaders Programme, an initiative that aims to identify, nurture and grow the future leaders of South Africa and Africa at large. Joshua was also a Title Treasurer for Smuts Hall Residence at the University of Cape Town. Currently, Joshua also works as an Actuarial Science Tutor at UCT. Joshua plans to remain within the academic field and is planning to enrol for masters in Financial Mathematics. After that, he plans to become a qualified Actuary.

Kholiswa Ntshinga

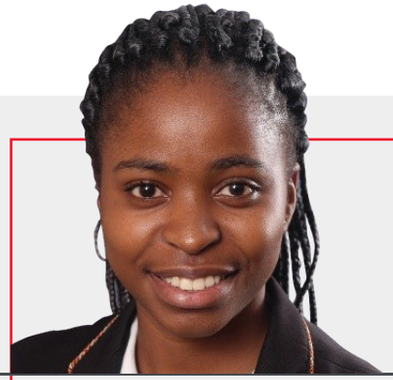
The GeoComputation Data Analyst – 2014

Participating at the National Science Olympiad was amongst of the Khayelithsa born Kholiswa Ntshinga's greatest achievements in life, something beyond her dreams.

The NSO became her stepping-stone to participating at international competitions where she was able to meet with many smart and amazing people who are doing incredible work in the science field. Kabelo participated at the National Science Olympiads in 2014. With her love for science growing every day, in 2015 Kabelo participated at the Eskom Expo for Young Scientists, with a project named: Reducing Mycotoxins on Home grown maize, which led her to being selected to represent the Cape Town region at the Eskom Expo for Young Scientists International Science Fair held in Johannesburg that year. The project won herself and her partner a silver medal and a scholarship award from the University of Stellenbosch. The project also won her a ticket to represent South Africa in Beijing at the Science and Creation Youth Competition in 2016, a trip was fully funded by SAASTA. The project also earned Kholiswa and her partner a second place in the Microbiology category and a special award the Chinese Agricultural Organisation.

Over the years Kholiswa has been actively involved is various science related activities such as science competitions, conferences, mentorship and judging at the Eskom Expo for Young Scientists competition, judging at the International science fair in Birchwood in 2018.

Kholiswa is currently working as a GeoComputation Data Analyst for Africa New Energies and is responsible for collecting geological data that helps to identify potential hydrocarbon seepages. She is also giving back to her community by serving as volunteer and mentor to learners participating at the Eskom Expo. In the next five years, Kabelo dreams to be amongst the top female GeoComputation Data Analysts the world.



Anza Tshipetane

The Social Entrepreneur – 2015, 2016 & 2017

The nineteen (19) years old University of Cape Town student and social entrepreneur participated in the National Science Olympiad consecutively between 2015 and 2017. Tshipetane, who is studying Bachelor of Medicine and Surgery (MB, ChB) at the University of Cape Town (UCT, hails from Tshisahulu village outside Thohoyandou in Limpopo Province. Her love for science started during her primary education at Tshisahulu Primary School. She then proceeded to Mbilwi Secondary School where her love with science was further groomed. The University of Johannesburg Vice Chancellor Professor Tshilidzi Marwala who also hails from the former Venda homeland inspires Tshipetane.

Tshipetane started participating in science competition while at primary school, and has not looked back since then. Tshipetane indicate she chose to do science at school mainly because of its ability to open doors to greater opportunities, including going overseas as part of competition winners. The NSOs motivated her to be innovative and encouraged her to finding solutions to global problems. Anza believes that her progress as a female scientist will inspire and empower a lot of women and previously disadvantaged students to work hard and prove to themselves to the world that they can go as far with dedication. Her biggest highlight of the National Science Olympiad becoming the winner in 2017 and being presented with an opportunity to represent the country at the London International Youth Science Forum (LIYSF).

From being a participant in 2017, Anza is now a staff member of the LIYSF and the South African Ambassador of the 61st LIYSF. In her science journey, Anza has started an NGO called the Gifted Hands of South Africa, which aims to focus on youth development through science and technology. The Gifted Hands of South Africa has teamed up with Young Scientists for Africa to open more opportunities for disadvantaged learners from rural communities of be able to participate at international science fairs such as at LIYSF and many others.

Anza has indicated that in addition to her medical career she aims to be a social entrepreneur in order to help find solution for global problems. Anza encourage young people to be dedicated in order to reap the full harvest of their hard work

Rejoyce Nkomonde

The Minerals Processor – 2016

Hamandishe Mathivha was the undisputed NSO Award winner for three years in a raw. Hamandishe is currently a student at the University of Cape Town doing Honours degree in Computer Science. His dream is to own a technology business. He was inspired by Elon Musk who wants to do 'good' in the world by using technology.

He chose science because science teaches him a lot about how the world works. He has been curious about the world from a young age, which made him enjoy science although science was compulsory at school.

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He advised other learners to do their best in their activities and academics and have fun.
After participation in the National Science Olympiad, he was involved in the Science related creation where he created a game for Android and released it on Google Play App store.

Keotshepile Mosikare

The Mechanical Engineer – 2016

Keotshepile Mosikare, from Kraaipan village in North West, completed his matric in 2017. He is correctly a second mechanical engineering student at the North West University. His grandmother inspires Keotshepile the mechanical engineer in making. His grandmother taught him that everything can be achieved and that every challenging situation he faces is there to groom him to be the best. Every time when Keotshepile thinks of giving up, he remembers what his grandmother taught him and that keeps him moving.

Keotshepile chose to do science in school, because he wanted to be an engineer and that science is challenging it feeds his sense of curiosity. Science has been important to him science he dreamed of being an engineer, and science it is the part of our everyday lives and it helps us to modify complicated things.

The year 2016 was the year Keotshepile participated in the National Science Olympiads. Taking part in the NSO was overwhelming experience to him. Keotshepile said that, during the NSO he learned different methods of approaching questions, which helped me to improve his grades. He highlight that the presentations from the facilitators made maths and science so simple. Apart from participating in the NSO Keotshepile has participated in the world science day, were he was debating regarding the healthiness of scientifically modified foods.

Keotshepile's advice to other learners is that they should allow themselves to learn. He further said that, they should be part of the movement and pay attention to the facilitators, since they have a lot to give.

Ayanda Ntengo

The Network Communicator – 2016

Ayanda Ntengo was raised in Soweto. Her mother who supported and guided him inspired her. She is currently studying National Diploma in Information Technology at NMU.

She went to a Technical High School where Science was compulsory. She became interested in science as it allows learners to question and understand the environment around us so that we can be able to discover new things.

She started participating in the National Science Olympiad in the year 2016 when she was in Grade 11. She said that it was a nice event and she enjoyed learning from her peers and their approach to Maths and Science problem solving. The main highlight for Ayanda was Maths class and the way Maths and Science were taught and the teacher motivated her. Furthermore, she added that it was great to meet people from other background and learn different methods of solving problems. She became curious about Maths and Science subjects and developed a passion for these subjects. From the event, she learnt to work together and motivate one another. Ayanda describing herself as a shy person was able to interact with other learners.

Science became important to her because it improves the human needs and the standards of living. She noticed that people around the world value science a lot and great goals has been achieved through science.

She advised learners to be willing to learn and work hard and make use of the opportunities like National Science Olympiad Ayanda currently focusing on her studies and she is planning to obtain a Masters' degree in Communication Networks.

Wesley Lehihi

The Mining Engineer in making – 2016

Wesley is an aspirant young man from Mahikeng. He is currently a first year student at University of Johannesburg studying mining engineering. Beyers Nel, the COO of Harmony Gold Mine, inspires him. He is a dynamic and senior mining professional with a Bachelor's degree in mining and registered as a professional engineer with Engineering Council of South Africa (ECSA). He made him realise that he can reach the executive level with the same qualification he is studying.

He chose Science at school because it leads to many career opportunities. He is also interested in Science because it is experimental, it leads to exposure of many and it is the fundamental of many courses.

He participated in the 2016 National Science Olympiad. He described his experience in the Olympiad as a great one. His great moment was competition with one another in the Olympiad and he was happy with the prizes, bags from the competition. The participation in the Olympiad has helped him to improve his grades from average to high. The lecturers who looked at science from different perspectives and encouraged him to solve problems that he might encounter in the future also inspired Wesley. He learned that he could figure out ways of solving problems and make it meaningful to the people
Science is important for Wesley's career as it address problem-solving skills. Wesley believes that the application of science, engineering and mathematics are useful to day-today activities.

He advises learners to make use of platforms like the National Science Olympiad. The NSOs have made his realise that science is adventurous and has provided him with an opportunity to meet people who studied various science disciplines such as physicists, astronomers and technologists.

During the focus week, Wesley learned skills that include problem solving, time management and the applications to real life problems using the fundamentals of science. He want to see himself working with scientists for a good mining company.

Knowledge Sithole

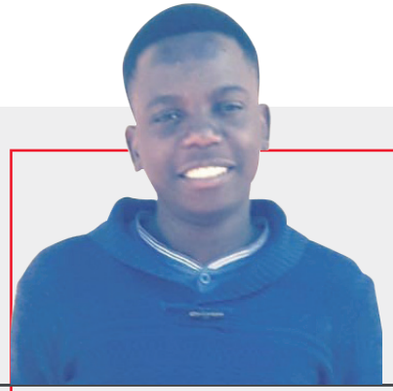
The Mechanical Engineering in the making – 2016

Knowledge Sithole is a 22-year who hails from Kokosi Township in Fochville. Knowledge is inspired by his brother Mr E Sithole who graduated from Wits University. He chose science so that he can explore different career fields in the world.

He participated in the National Science Olympiad in 2016 when he was in Grade 11. He said that he had a great experience when networking with other learners. He was motivated in other studies and he got more information about choosing a career that will best suit him. His highlights were the lessons, the materials and the food. These activities made the event fun and joyful. From the participation, he became positive and he knows how to set goals and to improve his residential area. He strongly urges other learners to participate in the National Science Olympiad and to take their studies seriously. Knowledge valued the study of Science because it has different career opportunities and it is about everything around us. Moreover, he mentioned that science is important to sustain life and it makes the world a better place.

His involvement in science related activities includes conducting titration experiment for Grade 12 learners at SCI-BONO.

The journey of National Science Olympiad has given him a vision of a better future. Currently he is studying Mechanical Engineering at the Cape Peninsula University of Technology in Cape Town. In five years period he want to see himself as a qualified technician and do something related to physics.



Nicolas Baptista

The Mechanical Engineer – 2016 & 2017

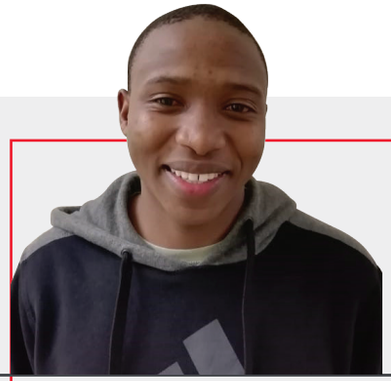
Nicolas Baptista is an ambitious and honest young man hails from Kokosi Township in Fochville. He described himself as a loving and respectful person and he likes making jokes. He works hard in his studies to achieve his dreams. He is also a family person and he love spending time with his friends and people who are positive.

Scientist, Isaac Newton who made a huge contribution in improving the standard living of the people, inspires Nicolas. Nicolas chose science because it empowers him to make significant contribution to the improvement of living standards for people. Furthermore, the field of science has many opportunities around the world.

He participated in the National Science Olympiad in the 2016 and 2017. He was excited about the programme and he was exposed to other opportunities. He also felt challenged, as he was unsure of the results. He was very impressed to represent his school in the Science camp. It also meant a lot for him to be featured in the Science magazine.

Nicolas learnt to be independent and to attempt and solve problems in his own way. He understood the importance of learning about the world, making new discoveries and improving the living standard for all. He encourages learners to do the preparation and presentation well and to be careful when answering questions.

His journey has been good. After science camp, he has been passing science with higher marks and he received achievements at school. Currently, he planning to enrol for Mechanical Engineering diploma at the Western TVET College and he would like to see himself working for a bigger company in the next five years.



Tebogo Raphadu

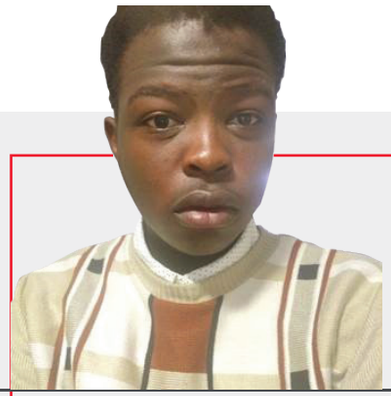
The Mechatronics Engineer – 2016

Mechatronics Engineer in making at the Stellenbosch University, Tebogo Raphadu from GaBroekman village outside Polokwane where he received his Primary and High school education. He was always interested in Science and Technology from early childhood. Elon Musk, the co-founder and CEO at Tesla, overseeing all product design, engineering and manufacturing of the company's electric vehicles, battery products, and Solar Roofs, inspires Tebogo.

In 2016, Tebogo participated in the NSO. He found it being a little bit challenging because he was only in grade 11; fortunately, he had great teachers to help him. Tebogo felt so lucky to be one of those who visited different companies and gained knowledge from different industries. He highlights that National Science Olympiad had a biggest influence on his career choice, and that is when he decided to study Mechatronics Engineering.

Tebogo advise other learners to prepare for their exam because it can be challenging, Above all, he says they should enjoy the NSO.

Science is the basis of understanding how things work in the universe and their impact on different life forms on earth, it is important to understand it says Tebogo Raphadu.



Karabo Ramakau

The Information Scientist in the making – 2017

Karabo Ramakau from Khutsong location in Carltonville is a first year student at the University of the Free State. Karabo has always wanted to do Chemistry and but it was his love for programming Bachelor of Science in Information Technology majoring in Computer Science and Chemistry

Science has always been Karabo's interest since his childhood. He chose to do science in high school because he enjoyed Natural Sciences in primary as it explained things happening around him. Neil DeGrasse Tyson, an American astrophysicist inspires Karabo. He regards him as an intuitive, intelligent and an insightful scientist. Science is important to Karabo because it is not a matter of presumptions and opinions; everything that has considered scientifically correct was tested and proven Correct.

Karabo participated in the NSO in 2017. The experience was unexpected as he was asked questions he never expected, but that encouraged him to study hard for his tests and exams. Nonetheless, the chemistry part of it was really nice and easy for him since he is best at it. During the NSO he realized that he doesn't know enough and there's always more to learn, especially in the field of science and technology. Karabo also participated in the National Standard Bank IT competition in 2018 and the experience was great. In the next five years, Karabo sees himself working on safe wearable technology to convenience daily interactions with electronic devices.

THE NATIONAL SCIENCE OLYMPIAD DRIVERS

The growth of the National Science Olympiads in the past decade can not only be attributed to SAASTA and Harmony Gold, however, the parents, the educators, Mathematics Science and Technology Coordinators and other education role players played a significant part in this success. This section looks at the contribution of selected role players in the programme.

Mr Nditsheni Cedrick Lidzhade

The Principal

Mr Lidzhade's inspiration for education is his love for children and the development of Science and Technology in our country South Africa. Mr Lidzhade obtained Bachelor of Education from the University of South Africa with specialization in Education Management in the mid-1980s.

Mr Lidzhade has been in the education sector for more than three decades. He started as a Biology (Life Science) teacher at Mbilwi Secondary school in 1998.Mr Lidzhade briefing left Mbilwi to become an acting Principal at Marude Secondary school in Thohoyandou. It was under his leadership that Marude produced the outstanding results in grade 12 for the first time. Upon his return to Mbilwi, Mr Lidzhade was appointed as HOD for Life Sciences and he was later appointed as Deputy Principal. In 2010 Mr Lidzhade, was promoted to a position of a principal at Mbilwi Secondary school. Mr Lidzhade has been awarded best educator award in Life Sciences for several years. In 2015, he was part of the delegation that was sent to China by the Minister Basic Education. In 2016, he was awarded the best principal in Limpopo Province.

Mbilwi secondary school under principal Lidzhade, had been participating in National Science Olympiad since National science Olympiad was started. From 1994, Mbilwi initiated that all learners from grade 10 to grade 12 should participate in the NSO. Under his leadership, the following learners have won awards to go to USA, London and Australia: Tshikhudo Ndivhuwo (1996 to MIT), Raphulu Rambani (2004 to London), Takalani Phumudzo(2007 to London), Dzulani Thanyani (2012 to London) Mathivha Hamandisha (2013 London) ,Mathivha Hamandisha (2014 to Australia) , Risuna Rivombo (2016 London), Tshipetane Anza(2017 to London) , and Mathivha Hamandisha (2015 awarded R40000-00 by the Minister of Basic Education) . Apart from these Mbilwi always had learners participating in Youth Science week in Pretoria being one of the top 100 performers in National science Olympiad. Mr Lidzhade's NSO main highlights were the achievements of Mathivha Hamandisha from 2013 to 2015. He further says NSO contributes a lot in roving the performance of learners in Mathematics, Physical Sciences and Life Sciences.

Principal Lidzhade has advised other principals to encourage their learners to participate in the NSO competitions. However, it is important for educators to assist in preparing the learners to the competitions. Learners must realise that science is interesting and that there is a lot one can explore in Science and there is no development without science and technology advancement.

Mr Peter Mukwevho

Coordinator for Sciences

Mr Peter Mukwevho is a provincial Coordinator for Natural Sciences, Physical Sciences and Technical Science in the Department of Education in Limpopo. He provides professional leadership through the implementation of systems and structures that allow for effective management in the above subjects in the province. Furthermore, Mr Mukwevho coordinates and manages national, provincial and district priorities and projects.

He has been in education sector for over 24 years. He served as a Physical Science teacher from 1995 – 2002. He worked as a Provincial Coordinator in the North West province whilst at Mathematics Centre. He was appointed as a Senior Education specialist in Physical Science from 2007 – 2009 serving in the Capricorn District. In May 2009, he was appointed as a DCES at the provincial office.

He believed that mathematics and science education empowers everyone. It increases the level of exposure and preparedness and it assist learners and teachers in choosing STEM careers. He participated in the National Science Olympiad as a learner and as a teacher.

The highlight of Mr Mukwevho in the Olympiad was seeing learners participating in the activities. The National Science Olympiad has increased the number of learners in science subjects. Limpopo has higher number of participants in the Olympiads than other province. The Olympiad contribute to the learning of the subject for the learners. Currently the province has produced 22 learners with brilliant results for Physical Science in Grade 12.

I'll like to advise Teachers and Subject Advisors to encourage more learners to participate in all the competitions, starting with Natural Sciences Olympiad, Astro Quiz, Science Debates and NSO. By competing, learners unlock their interest in the STEM careers as it complements the academic discipline.

Thuntsi Thekiso

The Called One

Thuntsi Thekiso is currently teaching at Kheleng Secondary School located at Lejweleputswa district in Free State and has been teaching physical sciences and mathematics for over four years. Mr Thuntsi is an experienced professional with a blended background in Production, Chemical Engineering, Education and SHEQ management. Despite venturing into engineering early in his career, Mr Thuntsi believes that teaching has always been his calling.

Although Mathematics is one of the subjects that Mr Thuntsi is capable of teaching, he enjoys teaching Physical Sciences, because it is more challenging and has the ability to make one to learn how to face and deal with their daily challenges. He said what makes teaching science important to him, is that, concepts that one is teaching are in everyday life and it is just that we never seen them like that. So making examples of what we do and live every day is what makes it fun and very important to him and his learners.
Mr Thuntsi made his NSO debut in 2018, an experience he describes as life changing for his learners. He main highlight is seeing his learners getting the same opportunities as learners in Mpumalanga somewhere in Nelspruit. Although the NSO exam was very challenging for his learners, he believes that it has provided them with an opportunity to learn new things as a group.

Participating in the NSO, has allowed Mr Thuntsi to always be expectant of questions that himself as an educator might not have be familiar with. Although his learners did not make it to the national level in 2018, he is hopeful that in the future they will be able compete with learners from other provinces at national level.

Mr Thuntsi has advised learners to avoid being in comfort zone and allow themselves to be challenged as it keeps the mind active, and the subject interesting. It does not feel like work, that is Mr Thuntsi's advice to other teachers and learners.

Ms Gaynor Purcell

Imbokodo

Ms. Gaynor Purcell recognised that her daughter had an incredibly enquiring mind and unique capacity to absorb and process knowledge from a very young age. Gaynor is the mother of Ruth Purcell, a two-time NSO winner who is currently based in Australia. Gaynor has expressed that Ruth has always loved nature and would spend hours in the garden discovering bugs and butterflies, pressing flowers and interesting leaves. “From primary school, she started doing research on any school project and her research was beyond the bounds of what is expected.” Said Gaynor. This was her quest for knowledge. The mother realised Ruth’s talents in humanities and Sciences. At primary school level, her Mathematics and science marks were excellent and she was always keen for extension exercises. She added that her daughter is articulate in her written and oral presentation and she is exceptionally well informed. Moreover, Ruth was Dux of school in her matric year and she was awarded Honours Cum Laude for academics, humanities and science.

Ms Purcell believes that it is important for the parents to take a huge interest in their child’s education and encourage them continuously. She said that educating a child can’t merely be out-sourced to the school and parents need to be there for moral support with continuous encouragement no matter what hurdles are being encountered. She describes her daughter as a self-motivated character. Despite Ruth’s exceptional achievements, she has always remained a humble and gracious young lady. Ruth also loves ballet and music, has played violin for the KZN Youth Orchestra for five years, and was part of the school String Group and Orchestra. Ruth was also was awarded Full colours for music.

Ms Purcell is pleased with the National Science Olympiad and she encouraged schools to participate in the competition. Winning the National Science Olympiad in 2015 gave Ruth the opportunity to attend the National Youth Science Forum at the Australian National University (ANU) in Canberra at the beginning of her Matric year in 2016. She is now a student at ANU as she got into their very prestigious course (they only take 50 students) to study a Bachelor of Philosophy in Science with an embedded Honours year. “Without the opportunity to represent SA at the NYSF, I don’t think she would be there today. It is amazing how doors get opened both nationally and internationally by competitions and initiatives like SAASTA offer.” Said Ruth.

Ruth has also made the most of all the opportunities she has been offered at ANU thus far getting involved outside pure academics. She is the President of the Science Society and is also the Joint College of Sciences Student Association (SRC) rep. She has also recently been appointed a sub-editor for the student newspaper, Woroni for all the research media and writes articles for the University Science Wise publication.

ABOUT THE DEPARTMENT OF SCIENCE & INNOVATION

The Department of Science and Innovation (DSI) formally known as the Department of Science and Technology (DST) seeks to encourage socio-economic development in South Africa through research and innovation. To achieve its goals, DSI provides leadership, an enabling environment and resources for science, technology and innovation. Through its Programmes, which include Administration, Technology Innovation, International Cooperation and Resources, Research Development and Support and Socio-economic Innovation Partnerships and several entities that work alongside it, the Department is accomplishing ground breaking science and enhancing the well-being of all South Africans.

STRATEGIC OVERVIEW

Vision

Increased well-being and prosperity through science, technology and innovation.

Mission

To provide leadership, an enabling environment and resources for science, technology and innovation in support of South Africa's development.

Values

- Professionalism: The Department is professional and delivers high-quality performance to both internal and external stakeholders.
- Innovation: The Department is innovative in solving problems and enhancing effectiveness and efficiency.
- Ethical behaviour: The Department and its employees are consistent in their actions, and accountable and transparent in dealing with public funds and other resources.

Knowledge sharing: The Department and its employees share and use knowledge constructively to ensure that it contributes to the building of a robust and productive knowledge economy

ABOUT THE NATIONAL RESEARCH FOUNDATION

The NRF is an independent statutory body established through the National Research Foundation Act (Act No 23 of 1998), following a system-wide review conducted for the Department of Arts, Culture, Science and Technology (DACST). The new entity incorporated the functions of the research funding agencies that were previously servicing various sections of the research community, namely the former Centre for Science Development (CSD) of the Human Sciences Research Council (HSRC) and the former Foundation for Research Development (FRD) that included several National Research Facilities.

As a government mandated research and science development agency, NRF funds research, the development of human resource capacity and critical research infrastructure to promote knowledge production across all disciplinary fields. The goal of the NRF is to create innovative funding instruments, advance research career development, increase public science engagement and to establish leading-edge research platforms that will transform the scientific landscape and inspire a representative research community to aspire to global competitiveness. The NRF promotes South African research interests across the country and internationally, and together with research institutions, business, industry and international partners we build bridges between research communities for mutual benefit.

MANDATE OF THE NRF

The NRF receives its mandate from the National Research Foundation Act (Act No 23 of 1998).

According to Section 3 of the Act, the object of the NRF is to:

- Promote and support research through funding,
- Human resource development and the provision of the necessary facilities in order to facilitate
- The creation of knowledge, innovation and development in all fields of science and technology, including indigenous knowledge, and thereby contribute to
- The improvement of the quality of life of all the people of the Republic of South Africa.

ABOUT THE SOUTH AFRICAN AGENCY FOR SCIENCE AND TECHNOLOGY ADVANCEMENT

The South Africa Agency for Science and Technology Advancement (SAASTA) is a business unit of the National Research Foundation (NRF) with the mandate to advance public awareness, appreciation and engagement of science, engineering, innovation and technology in South Africa. Science, through research, has a crucial role to play in the growth of South Africa's economy. Active dialogue and engagement between science and society ensures that scientific research findings are easily translated into relevant, appropriate and beneficial innovation and entrepreneurial opportunities. Research findings should also have an impact on policy and social conditions in a country. This can only be achieved when science becomes a daily dialogue and discourse.

The fundamental principles of SAASTA's success in advancing a culture of engagement with science in South Africa lies in its synergistic approach. SAASTA initiatives fall under three key strategic areas:

- Science Education, through which we build up the supply of tomorrow's scientists and innovators;
- Science Awareness, through which we engage the public with the phenomena of science, engineering and technology,
- Science Communication, through which we share science and technology achievements with the public, building up their appreciation of benefits of science.

The three areas are interdependent, each enhancing the effectiveness of the other, while accommodating different target audiences and creating opportunities for joint initiatives across several government departments, higher education institutions, science councils, science centres and other science agencies. Science advancement is integrated in every level of the business of the NRF. SAASTA, the National Research Facilities (that focus on the fields of astronomy, biodiversity and conservation, and nuclear sciences) and the Research, Innovation Support and Advancement office (that supports research, researchers and the provision of world-class research infrastructure through a grant-making programme) are implementing a crosscutting science engagement plan.

MISSION

- To advance public awareness, appreciation of and engagement with science, technology, engineering, mathematics and innovation in South Africa.

VISION

- SAASTA aims to be the leading science advancement agency communicating the value and impact of science and technology in a dynamic knowledge economy, and simultaneously building the science engineering technology human resource based in South Africa.

ABOUT HARMONY GOLD MINING COMPANY

Harmony, a gold mining and exploration company, conducts its activities in South Africa, one of the world's best-known gold mining regions, and in Papua New Guinea, one of the world's premier new gold-copper regions. With 68 years of experience, Harmony is South Africa's second largest gold producer. Headquartered in Randfontein, South Africa, Harmony is listed on the Johannesburg Stock Exchange and on the New York Stock Exchange. In South Africa, our nine underground operations are located within the world-renowned Witwatersrand Basin – one in the Klerksdorp goldfield, two in the West Rand and six in the Free State, in the southern portion of the Basin.

In addition, Harmony has an open-pit mine on the Kraaipan Greenstone Belt as well as several surface treatment operations. In Papua New Guinea, Hidden Valley is an open-pit gold and silver mine. Our significant gold-copper portfolio includes a 50% stake in the Wafi-Golpu project in the Morobe Province, through a 50:50 joint venture with Newcrest Mining Limited (Newcrest).

FOCUS AREAS

- Exploration and acquisition
- Exploring for and evaluating economically viable orebodies and/or value-accretive acquisitions
- Mining and processing
- Establishing, developing and operating mines and related processing infrastructure. Ore mined is milled and processed by our gold plants to produce gold dóre bars.
- Sales and financial management
- Generating revenue through the sale of gold produced and optimising efficiencies to maximise financial returns
- Land rehabilitation and mine closure
- Restoring mining impacted land for alternative economic use post-mining and having in place approved mine closure plans

Harmony Values includes: Safety, Accountable, Achievement, Connected and Honesty

Harmony's strategy is to produce safe, profitable ounces and increase margins.

LOOKING FORWARD

For the coming years, the NRF|SAASTA wishes to increase the number of the National Science Olympiad Participants, expand the footprint in the SADC region, enhance the NSO's interest internationally, collaborate more with government and private sector and increase the contribution on learner and educator support programmes.

NUMBER OF PARTICIPANTS

Between 2008 and 2019 there has been a significant increase in the number of learners participating in the National Science Olympiad. In 2005, only about 9000 learners participated, compared with over 19000 in 2008. This increase in the number of entries is the main reason for the change in the format of the competition, namely moving away from a province-based competition to a format that allows for competition across all provinces. Between 2018 and 2019, there were about 60 000 learners who wrote the National Science Olympiad examination papers.

As an agency that provides itself Science and Technology advancement, SAASTA will look into utilising modern means of communication, such as social networking, virtual marketing using cell phone technology, the mass media and the internet to target as many schools as possible.

SOUTHERN AFRICAN INTEREST

After 55 years, the National Science Olympiad has earned a reputation as a necessary intervention that can encourage the youth to take up careers STEM fields, thereby addressing the skills shortage and building vital human capacity in science, engineering and technology. This reputation has given the Olympiad the opportunity to receive entries from schools in the SADC. The vision for the Olympiad is that South African learners should interact with their counterparts in the SADC region and it is planned to involve even more schools from SADC region, as well as increasing the footprint in the African continent.

INTERNATIONAL INTEREST

The National Science Olympiad gives learners who have demonstrated their exceptional talents an opportunity to attend various international science fairs such as the London International Youth Service Forum, the Australian National Youth Science Forum and the Beijing Youth Creation Competition amongst others. It is important for them to gain an international perspective and to really make the world their playground and the sky their limit. The learners' participation at the international science competitions gives them an opportunity to interact with other young people from all over the world who also love science. It is expected that the experiences in London will encourage them to want to be the best, not just in South Africa, but also in the world.

COLLABORATION WITH THE PRIVATE SECTOR

Harmony Gold Mining became the main sponsor for the National Science Olympiad in 2009. It is because of these collaborations that the Olympiad has been able to continue as it has for the past 55 years. In the next five years, SAASTA, through its focused marketing and communications campaign, hopes to attract the involvement and sponsorship of more public and private sector organisations that are also committed to the development of learners and educators.

In addition, SAASTA formed collaborations with industry annually mainly for the NSO Focus Week site visits by the learners. The site visits predominantly focus on industry learners attending workshops and site tours at various institutions for learning and career guidance purposes.

SCHOOLS SUPPORT

Government, through the Department Of Basic Education and the Department of Higher Education Science and Technology (DST) has put in place a number of initiatives to ensure that schools, particularly high schools, are given the necessary resources and are able to deliver quality teaching to the learners. The DST's Youth into Science Strategy is one such initiative. In addition to the Olympiad, SAASTA is committed to continuing its assistance to learners through various other projects.

MENTORING

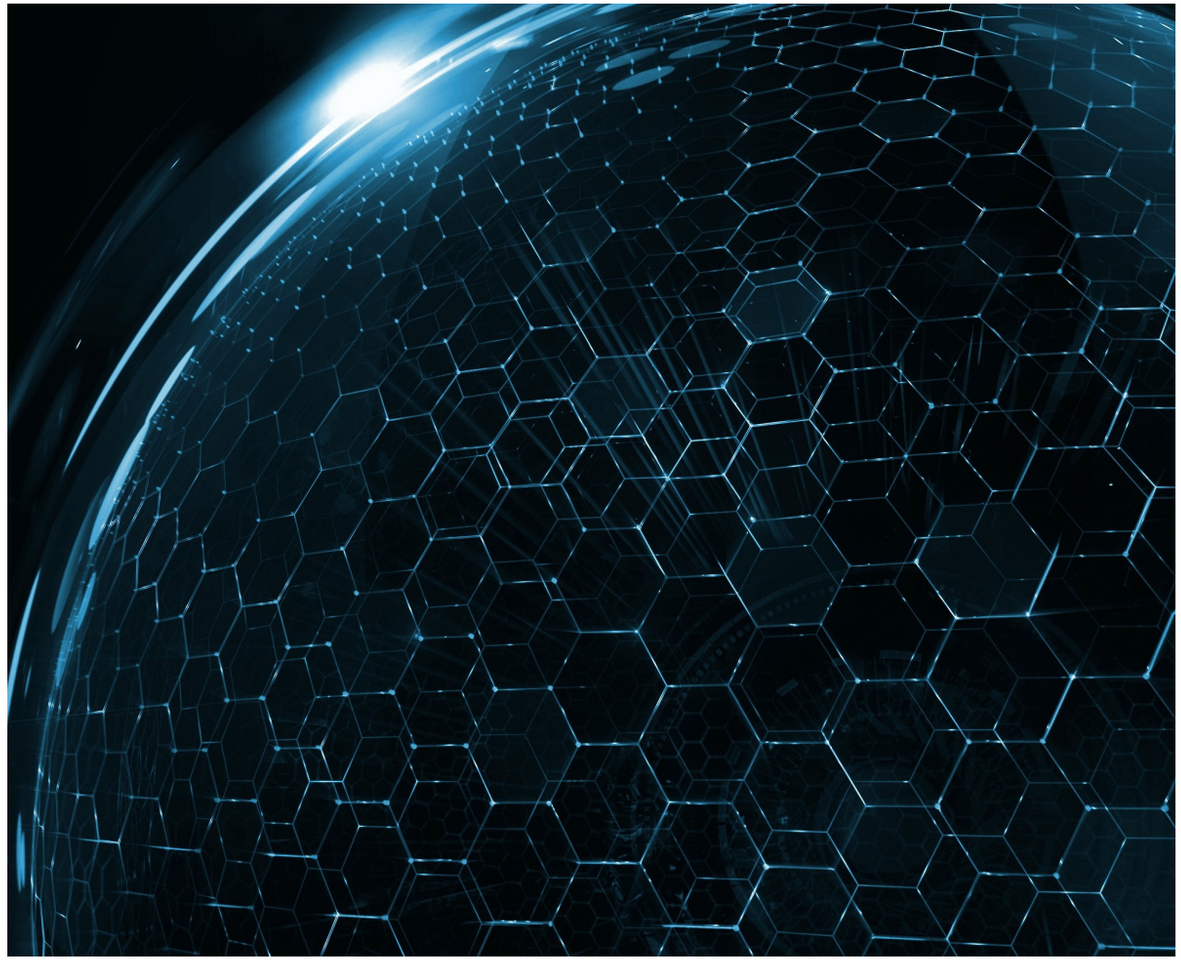
Through National Science Olympiad and other initiatives, SAASTA provide deserving students with mentors who advise them on career choices. SAASTA's Education Unit has a Role Modelling Programme that exposes learners to role models with various qualifications in science, engineering and technology (SET). The intervention provides learners with appropriate role models/mentors who, in turn, aim to entice these learners into pursuing careers in SET. The main aim is to ensure that the mentors see them right through from high school to completion of their tertiary studies and the beginning of their careers.

EDUCATOR/TEACHER DEVELOPMENT

Educators have been found to play a significant role in positively influencing learners to pursue careers in science. It is therefore imperative that educators are adequately developed in SET and are able to support learners. Through the Olympiad and a range of its other projects, In line with these aims, SAASTA coordinates projects that entail school science support through Educator Development Programmes. The educator workshops being held across the country are facilitated with the main objective of improving performance in Mathematics, Natural Science and Physical Sciences, Life Sciences, Life Orientation, and Technology.

PARTICIPATION BY OTHER GOVERNMENT DEPARTMENTS AND INSTITUTIONS

SAASTA would like to see more participation from government departments and institutions, such as the Department of Minerals and Energy, Environmental Affairs, and Trade and industry. Through a concerted effort by these departments, as well as the Departments of Education, and Higher Education, Science and Technology, it will be possible for more careers to be profiled and to give learners a more holistic approach to science careers.



NOTES

Advancing knowledge,transforming lives, inspiring the nation through the National Science Olympiad

National Research Foundation
SAASTA
South African Agency for Science and Technology Advancement

Physical Address
Didacta Building | 211 Nana Sita Street | Pretoria | South Africa

Postal Address
Box 1758 | Pretoria | South Africa | 0001

For Copies Contact
Tel: +27 (0)12 392-9300
Fax +27 (0)12 320-7803
info@saasta.ac.za