

SCIENCE SPAZA SPACE

SPECIAL EDITION – COVID-19 – AUGUST 2020



Knowledge is Ncah!



COVID-19



A learner from Cedar High School of the Arts learns about the importance of wearing a mask to prevent the spread of airborne diseases.

Pic: RainedUpon Media / SU MBHG

Yo, guys! 2020 is more than half-way through and, wow, the world has turned upside down!

Don't worry, we're here to help you stay ahead of the game. COVID-19 has shaken all of us, but this edition will keep you informed and help you to stay safe! You'll learn all about epidemics and the origins and symptoms of COVID-19.

On page 3, read about **SARS-CoV-2 and the symptoms of COVID-19**, then learn how testing is done and how you can stay safe. Catch up with **Dr Ngcebo Mhlongo** from the Africa Health Research Institute to hear his take on COVID-19 on page 9.

Be sure to check out the article on antibacterial surfaces and nanotechnology. Complete the **activity worksheet on germs** (download here: <https://bit.ly/witsgerms-worksheet> and <https://bit.ly/saastananotech>).

On page 11, read about what other clubs are getting up to, and on page 12, there's a **cool experiment** to teach others about germs and soap. Then, sign up YOUR science club! And remember – we always want to hear about what you've been doing! WhatsApp us on **076 173 7130** to be featured!

The Science Spaza Team



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We are talking to our future leaders. Are you?



COVID-19 has reached pandemic status, with 213 countries and territories affected. Pic: Pixabay

Here's the low-down on pandemics

You might have heard of an epidemic – like a flu or polio epidemic. So, what's all this about a pandemic?

Epidemics happen when a disease affects many people at the same time or in the same area/ community. They often start with an "outbreak". An outbreak is a small, but noticeable rise in the number of people infected with a disease. An example is the sudden rise of pneumonia cases in the city of Wuhan, China. Scientists and health workers now know that this increase was caused by the coronavirus that causes COVID-19. This virus spread to other parts of China, which resulted in a larger number of cases throughout the country. That's how this novel coronavirus caused an epidemic.

The spread of COVID-19 became uncontrollable once it started to reach other countries and regions. The number of infected cases increased quickly. When a disease/virus spreads globally, it becomes known as a pandemic. At this point, it becomes a public health emergency of international concern.

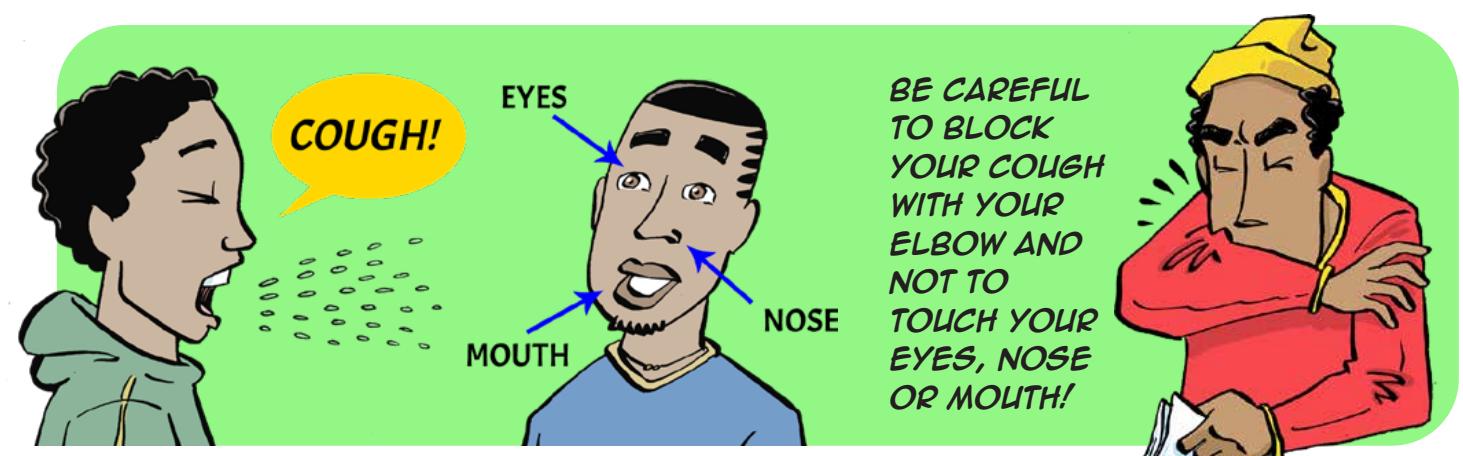
When an epidemic becomes a pandemic, governments from all over the world become involved in the attempt to prevent the disease from spreading and to treat those who are already infected.

You may be wondering how to stop an epidemic. Fortunately, they do come to an end eventually. There are a few reasons why this may happen.

- At the beginning of an epidemic, the weakest and most susceptible people are affected. Over time, a population builds immunity to the disease, so eventually there are fewer people who can still get sick from the virus. This causes the epidemic to slow down gradually and come to an end.
- Immunity in a population can be boosted by creating a vaccine against a disease so that people don't need to get sick to become immune. Scientists are working around the clock to develop a vaccine for COVID-19.
- Another reason could be a change of season. For example, the flu is commonly spread during the winter and doesn't spread so well once spring and warmer weather arrive, so there are fewer carriers. This also happens with malaria, as it is spread by mosquitoes, which are not active during winter and are therefore unable to spread malaria.

WORDS YOU SHOULD KNOW:

Susceptible – in terms of disease, this means "being able to get sick". In a way, this is the opposite of being immune.



Introducing SARS-CoV-2: the virus that's taken over the world

A virus being spread through coughing. Pic: Pixabay

HOW MANY TIMES IS THE WORD COVID-19 USED ON THIS PAGE?* IF IT TAKES SO LONG TO FIND A FEW WORDS, IMAGINE HOW HARD IT IS TO FIGHT THE ACTUAL, MICROSCOPIC VIRUS IN A POPULATION WITH MILLIONS OF PEOPLE!



So, the words “coronavirus” and “COVID-19” are everywhere suddenly. What do they really mean and what’s the big fuss about coughing and sneezing?

Coronavirus Disease 2019, or COVID-19, is the name of the illness that is caused by the “Severe Acute Respiratory Syndrome Coronavirus 2”, which has thankfully been abbreviated to “SARS-CoV-2”. This virus is from a family of coronaviruses, which are named for the “crown” or “corona” of protein structures on the outside of the virus. It was discovered in 2019 after a large outbreak in the city of Wuhan, China. Before this, there were only six coronaviruses known to infect humans, four of which commonly cause mild illnesses and two that cause severe disease and are distant cousins of SARS-CoV-2, known as SARS and MERS.

This new or “novel” coronavirus causes a “flu-like illness” which can progress to infection of the lungs. It is usually passed from an infected

person to someone else who breathes in droplets from a cough or sneeze. Uninfected people could also touch a surface that the droplets have landed on and move the virus into their own body by touching their eyes, nose or mouth. These droplets don’t stay in the air very long and usually spread only two metres from where they started.

Rarely, very, very small droplets are released into the air. This is called “aerosolisation” (think of your deodorant which comes in an *aerosol* can). This can happen when doctors are swabbing an infected person’s airway to test for the virus, or when they put a tube into the airway to help a patient breathe. These tiny droplets stay in the air far longer than the larger droplets. There might also be aerosolisation of viruses from flushing a

toilet that an infected person has used! Once the virus is breathed in, it enters the cells of the infected person and hijacks the protein-making system inside the cells to make copies of itself.

This article was published in collaboration with Stellenbosch University’s Division of Molecular Biology and Human Genetics.



Watch out for the symptoms of COVID-19

COVID-19 affects people in different ways. Most infected people will develop mild symptoms, but people with underlying health issues are more severely affected.

Common symptoms include:

- Fever
- Tiredness
- Dry cough

Some people may experience:

- Aches and pains
- Nasal congestion
- Runny nose
- Sore throat
- Diarrhoea

Once a person becomes infected, symptoms take 5-14 days to show. If you feel any of these symptoms, call the South African Department of Health’s COVID-19 emergency hotline on 0800 029 999 or WhatsApp 0600 123 456 for support.

COVID-19 causes an increase in body temperature. Be sure to check whether you feel these symptoms. Pic: Pixabay



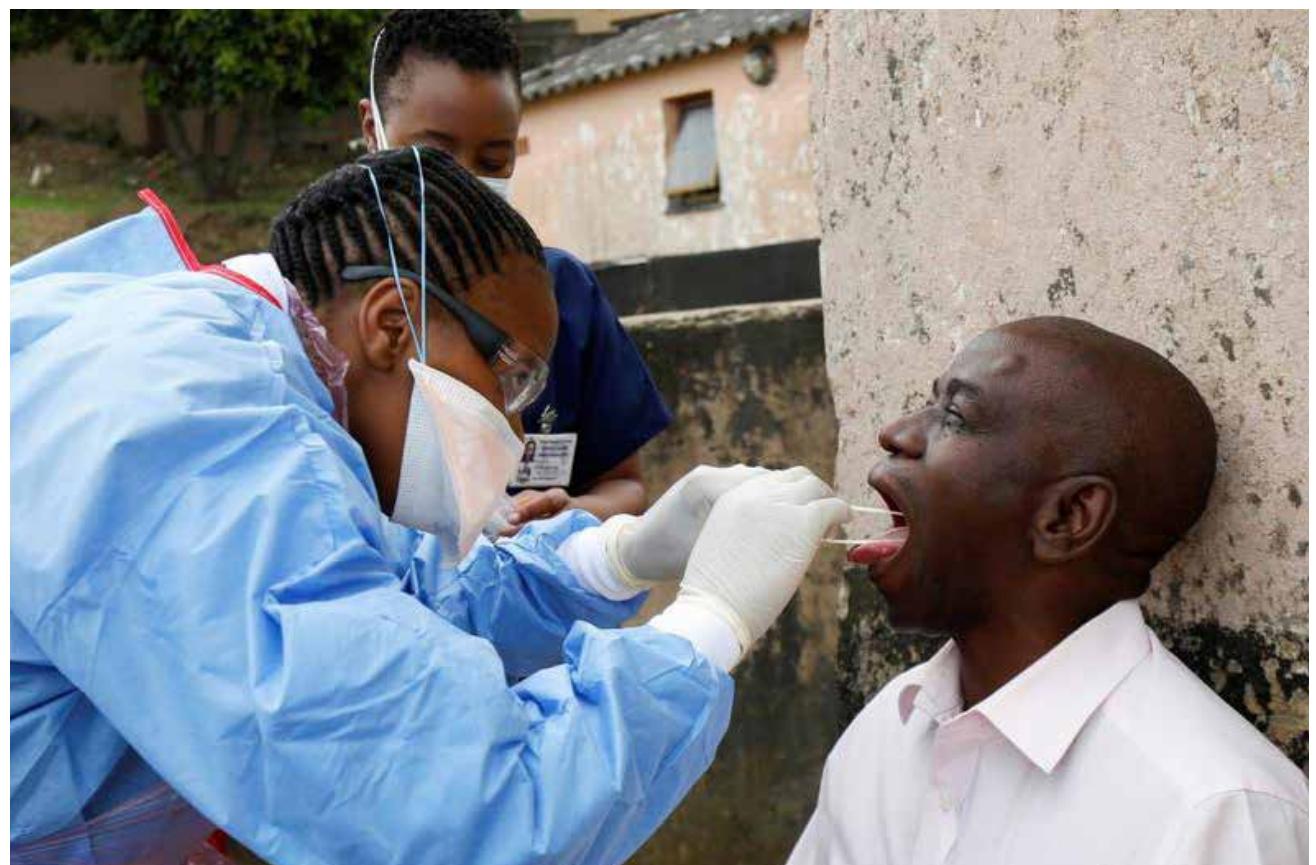
*ANSWER: 13

Testing for coronavirus: knowledge is power

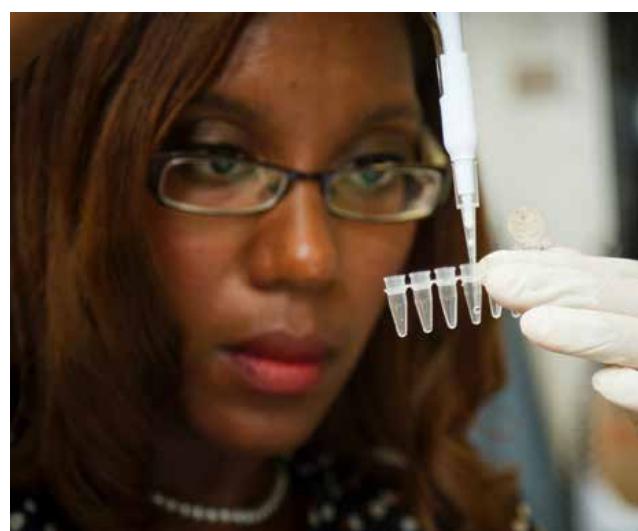
Most people with COVID-19 become mildly ill and recover at home. Currently, there is no treatment for this virus. So, why, you may ask, is it necessary to test for it?

The answer is simple: if you test positive, the results are helpful to inform others, especially those who you have been in contact with. A positive result also helps you to know that you should quarantine yourself at home and avoid all contact with the outside world. However, the symptoms of COVID-19 are not always the same and are similar to those of other illnesses (like the flu), so not everyone who has these symptoms needs to be tested. Only people who are most likely to have the disease and those who have severe respiratory symptoms need to be tested.

During testing, a good quality specimen is important. Specimens are collected by a healthcare worker who wears special protective equipment. Specimens for testing are collected using swabs. An upper airway swab is taken from the back of the throat, while phlegm from the lower airways is collected from those who have a cough.



A health worker wearing a protective suit takes a swab from a resident during door-to-door testing in Umlazi township near Durban, South Africa. Pic: TRT World



Testing capacity for SARS-CoV-2 has had to expand drastically in South African laboratories.

Pic: National Cancer Institute, Unsplash.com

COVID-19 is currently diagnosed using a special test called a *reverse transcriptase polymerase chain reaction* (RT-PCR). It can detect whether SARS-CoV-2 is present or not and will confirm a very recent or active COVID-19 infection. The test can be negative in the early stages of the disease; therefore, a negative result does not mean that you do not have the disease! Results are generally available within a few days.

Part of the body's response to the SARS-CoV-2 infection is the production of antibodies against the virus. These antibodies can be measured to detect infection in individuals starting a week after symptoms develop. Therefore, they show if there is an infection or if an infection has occurred.

This article was published in collaboration with Stellenbosch University's Division of Molecular Biology and Human Genetics.

WORDS YOU SHOULD KNOW:

RT-PCR – a type of test used to diagnose COVID-19. The “reverse transcriptase” part of the test turns the virus’s RNA into DNA. A PCR is a technique used by biologists to make many copies of a piece of DNA (like a tiny molecular photocopier). Basically, this test looks for a piece of genetic material that only SARS-CoV-2 and no other known virus on the planet has, and then makes copies of this so that it can be detected.

The story of COVID-19 and the human body

When SARS-CoV-2 lands in someone's body, it starts building an army. A virus contains genetic material (in this case ribonucleic acid, also known as RNA), which is the blueprint for building more viruses. Once a virus has entered a host cell (a cell belonging to the infected person), it helps itself to the host's protein-making machinery and makes many copies of itself.

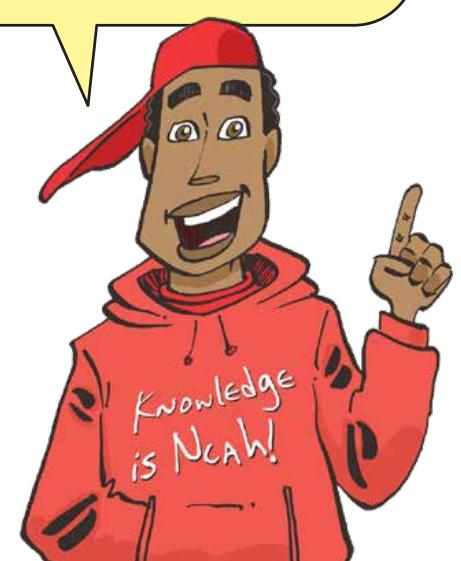
Fortunately, the infected person's immune system, especially the white blood cells, notices the virus. A protective reaction called “inflammation” is now launched in the respiratory system and the bloodstream. Often, this unlucky person will develop a fever, a cough, tiredness or muscle aches. Sometimes, the infection causes the air sacs (alveoli) of the lungs to fill with fluid. This is called pneumonia and can prevent the necessary amount of oxygen from entering the bloodstream.

People who become extremely ill from COVID-19 usually have some other health problem such as diabetes, heart disease or high blood pressure, which makes it difficult for them to fight the infection. Because of these underlying health problems, the person may need extra oxygen through a facemask. In very severe cases, they will need the support of a mechanical ventilator – a machine that takes over the breathing function of the lungs. The best way to prevent the virus from spreading is to follow the advice of the Minister of Health by keeping distance between yourself and others, staying away from public places and washing your hands regularly with soap and water. This protects other people who are vulnerable and who could get very sick or die from COVID-19.

This article was published in collaboration with Stellenbosch University's Division of Molecular Biology and Human Genetics.

CAN YOU UNSCRAMBLE THE FOLLOWING WORDS FOUND ON THIS PAGE?

- YMPOTSMS
- ESADIES
- CISPNEME
- SDINSIAGO
- SRVUI
- DOBEIANSIT



* Answers: symptoms, disease, specimen, diagnosis, antibodies, virus

IT TAKES A LITTLE MORE THAN A
DREAM
TO KNOW WHAT THE
FUTURE HOLDS
IT TAKES
ENGINEERING



CHOOSE YOUR QUALIFICATION

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Diploma in Chemical Engineering | Diploma in Civil Engineering | Diploma in Electrical Engineering | Diploma in Pulp and Paper Technology |
Diploma in Mechanical Engineering | Diploma in Industrial Engineering | Diploma in Mining Engineering

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Advanced Diploma in Electrical Engineering (Power Engineering) | Advanced Diploma in Electrical Engineering (Telecommunications Engineering)
| Advanced Diploma in Engineering (Mechanical Engineering) | Advanced Diploma in Mining Engineering | Advanced Diploma in Industrial
Engineering | Advanced Diploma in Chemical Engineering

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Stopping the spread: say no to coronavirus!

The coronavirus is such a tricky little organism! While scientists have not developed a vaccine to prevent infection, we all have an important role to play in stopping the spread of the virus. Together, we can do this.

To stop its spread, we need to remember how it spreads: through tiny droplets when an infected person coughs, sneezes or talks. These droplets are too heavy to remain in the air. They fall onto surfaces or floors and can remain there for a long time. The virus doesn't spread itself! It spreads through us, and if we stop moving, the virus stops, too.

This is why social distancing is important. We are all encouraged to keep at least a two-metre distance between each other. That's the length of a door. Social distancing helps to protect you from breathing in the virus if you



are close to an infected person. Always remember to cover your nose and mouth using a tissue or sleeve when coughing or sneezing, or do the DAB and cough into your elbow.

The coronavirus can remain on surfaces for a long time. That's why it's important to wash your hands regularly. The virus can enter your body through the eyes, nose and mouth when you touch your face. So, washing your hands with soap is VERY important!

OTHER PEOPLE'S LIVES ARE IN YOUR HANDS!

Always wash your hands with soap for 20 seconds or more. Soap is used to break down the layers of viruses on our hands, and water is used to wash them away.

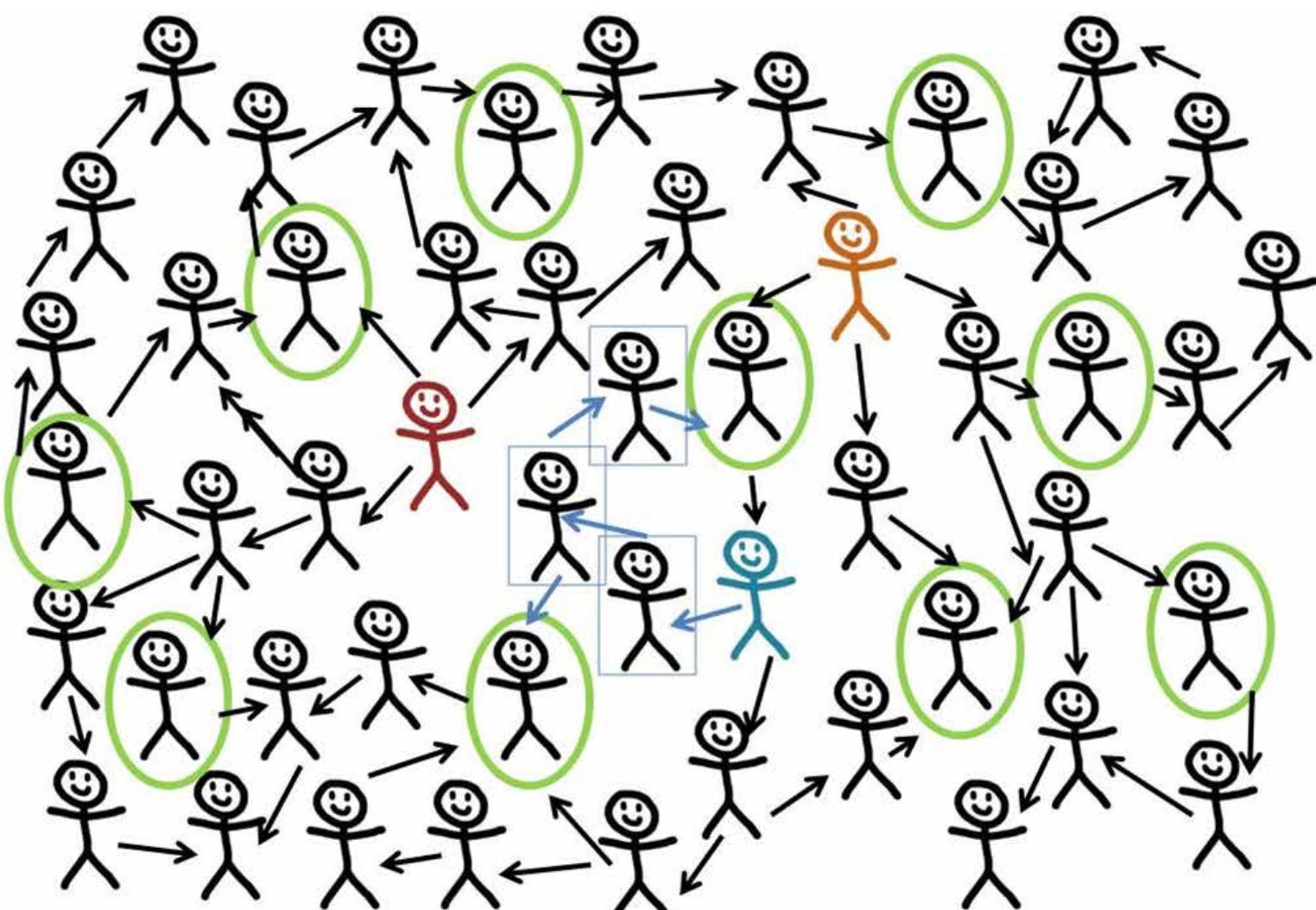


Handwashers are heroes!

When someone washes their hands often, they are much less likely to get sick and less likely to pass germs on to the next person.

In this activity, follow the spread of disease in a school with a coloured pen or marker. The three learners in colour are infected with different diseases. The arrows show you which learner has touched which one. In this school, when a sick learner touches another learner, they pass the disease along. But when it gets to someone who washes their hands (green circle around them), it stops. We've started the blue disease as an example.

How many learners will get the red, blue and orange diseases? How many non-handwashers will stay healthy because handwashers protected them?



*Answers: Red disease: 1; Blue disease: 9; Orange disease: 7; Healthy non-handwashers: 13

Learning Robotics

Techno Youth® Robotics Programme (TYRP) is an initiative that is led by NRF-SAASTA in collaboration with the Inspired towards Science Engineering and Technology (I-SET), a community engagement flagship project of UNISA college of Science, Engineering and Technology. The programme is structured as a competition for learners in grade 4 -9, although in 2020 the rollout of the programme will focus on learners in grade 4-7. Learners are expected to work in teams to complete a series of obstacles. These obstacles are designed in such a way that learners are required to assemble the robot body, and create attachment(s) which will enable the robot to perform certain maneuvers. Using block programming learners are expected to code the robot in such a way that the robot can overcome each obstacle.

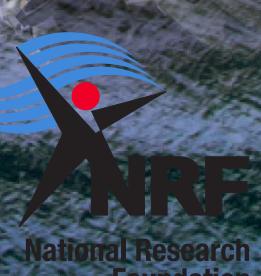
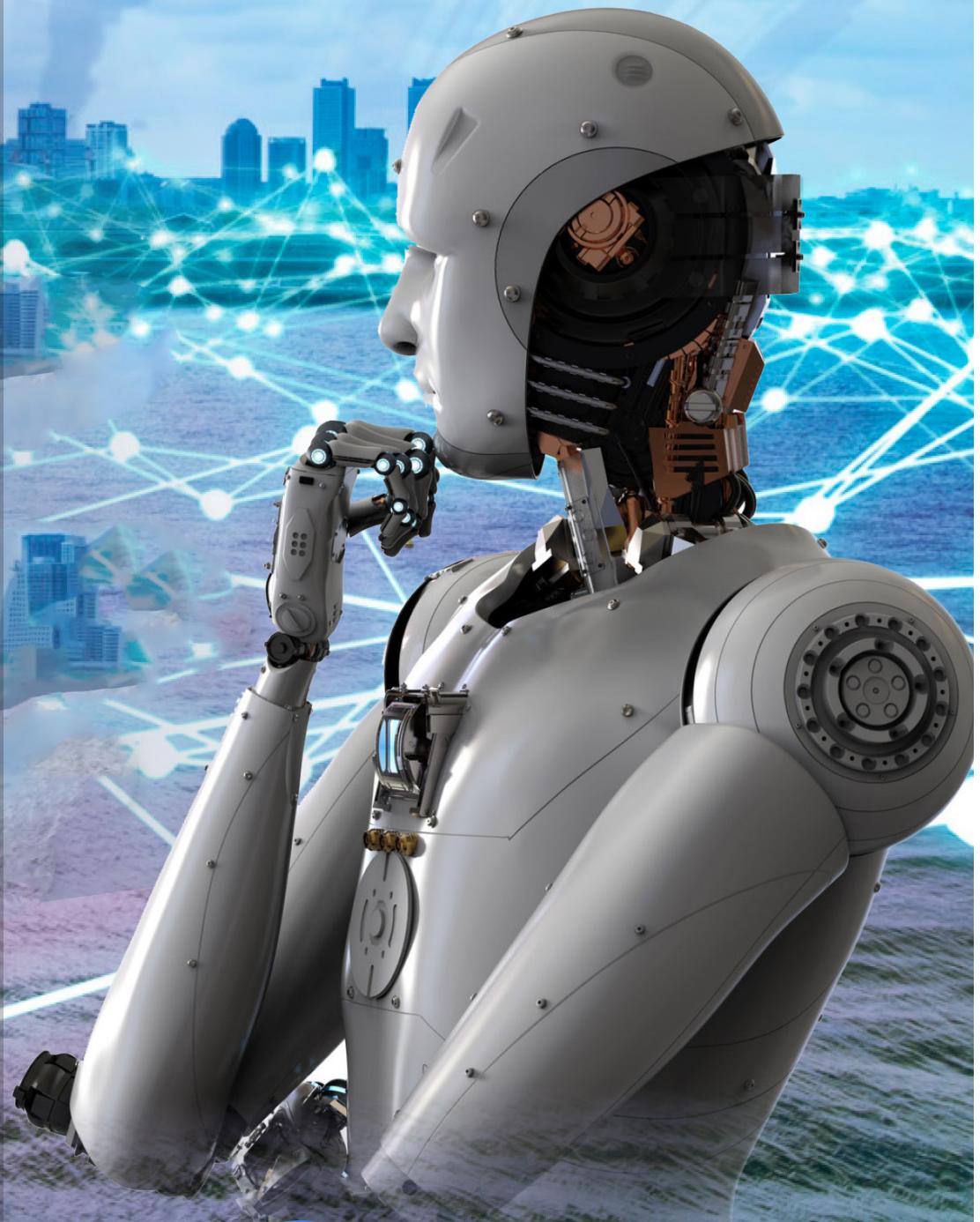
Stretched over a period of three days learners are first taught how to assemble the robot body (including the use of various sensors). Then core principles of critical thinking and innovation are then indirectly taught through gamified approach whereby learners are given an opportunity to conduct trial tests of their programmes (coding) for each obstacle, while also testing the effectiveness attachment(s) design. The efficiency of the overall code and design is then tested during the robot round whereby teams of learners are expected to compete against each other. TYRP is simply a robotics initiative which aids learners to develop fundamental skills of problem solving at an early age.

The long term goal is to develop learners who can think and develop technological tools that have an element of artificial intelligence as the world demands in order to cope with the growing economic demands. An easy example could be the high demand of food, and therefore intelligent robots need to be developed to cope in the agri-processing of food.

A critical part of TYRP is mentoring and coaching for learners (including educators) hence the regional qualifiers are usually held at various science centres (and other venues such as schools) during school holidays for period of three days. Together with Science centres the programme extends to offer continuous mentoring to learners throughout the year and teams can be coached so that they can perform better

at the finals which normally are held towards the end of the year. Science centres also play a vital role whereby they can identify and nurture talent through the programme.

The cross-cutting skills acquired and/or transferred through robotics enables learners to visualize and apply concepts that are being taught in structured STEM classroom lessons. These skills can easily then be used to stimulate creativity, innovation as well as passion for STEM orientated careers which are offered at various universities and colleges. These careers include the various fields engineering, IT (programming and software development), statistics etc. Although TYRP is an introductory initiative and aimed at early to mid-childhood cognitive development, it is one of the strong supportive pillars that give shape to futures.



National Research Foundation

SAASTA

South African Agency for Science and Technology Advancement

www.saasta.ac.za

Antimicrobial surfaces?!

The spread and growth of bacteria on surfaces happens quickly and is a leading cause of the formation of biofilms, especially in hospitals. This is why hospitals aren't as clean as you think they are!

If you think that microorganisms are lone rangers, think again. Bacteria and other microorganisms can form slimy communities, called biofilms, on surfaces. Biofilms present a tricky problem for the healthcare system because they are difficult to clean and can even resist antimicrobial compounds (like antibiotics) and people's immune systems.

Biofilm formation can be stopped by using antibacterial surfaces that will prevent the growth and spread of germs. Certain metals have specific characteristics that lower the risk of germs spreading on their surfaces. A good example of an antibacterial metal is copper. Copper ions are released when the copper surface meets a microbe. The copper ions form free oxygen radicals (a highly reactive form of oxygen) from molecular oxygen, which are highly toxic to bacteria. This prevents bacteria from surviving and forming biofilms on the surface, keeping it clean and safe for anyone who touches it.

Check out our worksheet created in collaboration with CoE Strong Materials in order to learn more about antimicrobial surfaces and see what they've developed! Download here:

<https://bit.ly/witsgermsworksheet>

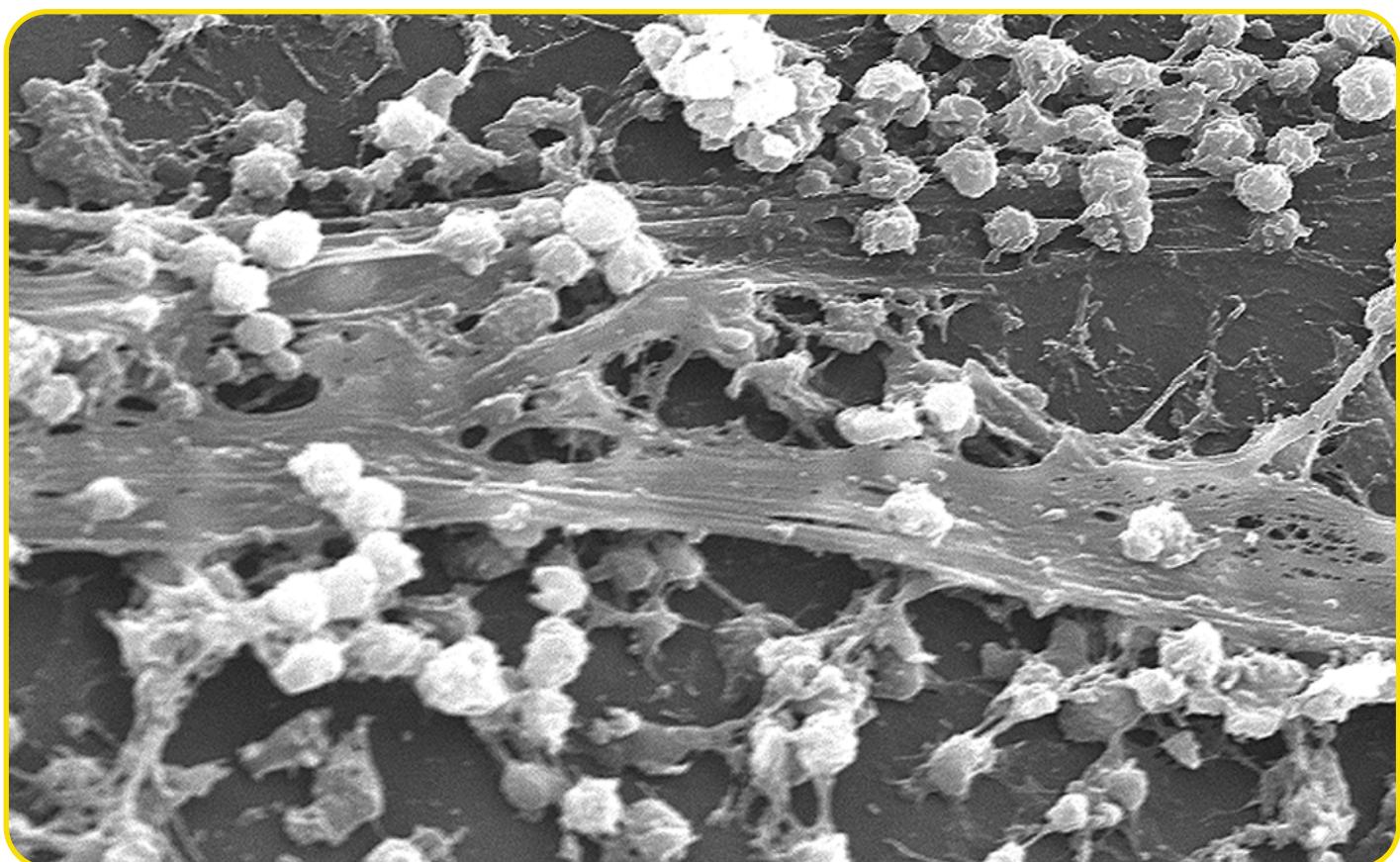
WORDS YOU SHOULD KNOW:

A **radical** is an atom/molecule that has one or a few unpaired electrons, making it very chemically reactive.

An **ion** (like a copper ion) is an atom or molecule that has more protons than electrons, or vice versa. Therefore, ions have charges. Copper ions tend to be atoms that have lost electrons, making them positively charged.

A **biofilm** is a collection of one or more types of microorganisms (such as bacteria, including germs), which grows on many different surfaces, including inside the human body.

A **protozoan** is a tiny simple organism belonging to a group called protists, which are neither plants nor animals.



Staphylococcus aureus bacteria forming a biofilm on medical equipment. Pic: Wikimedia Commons/CDC

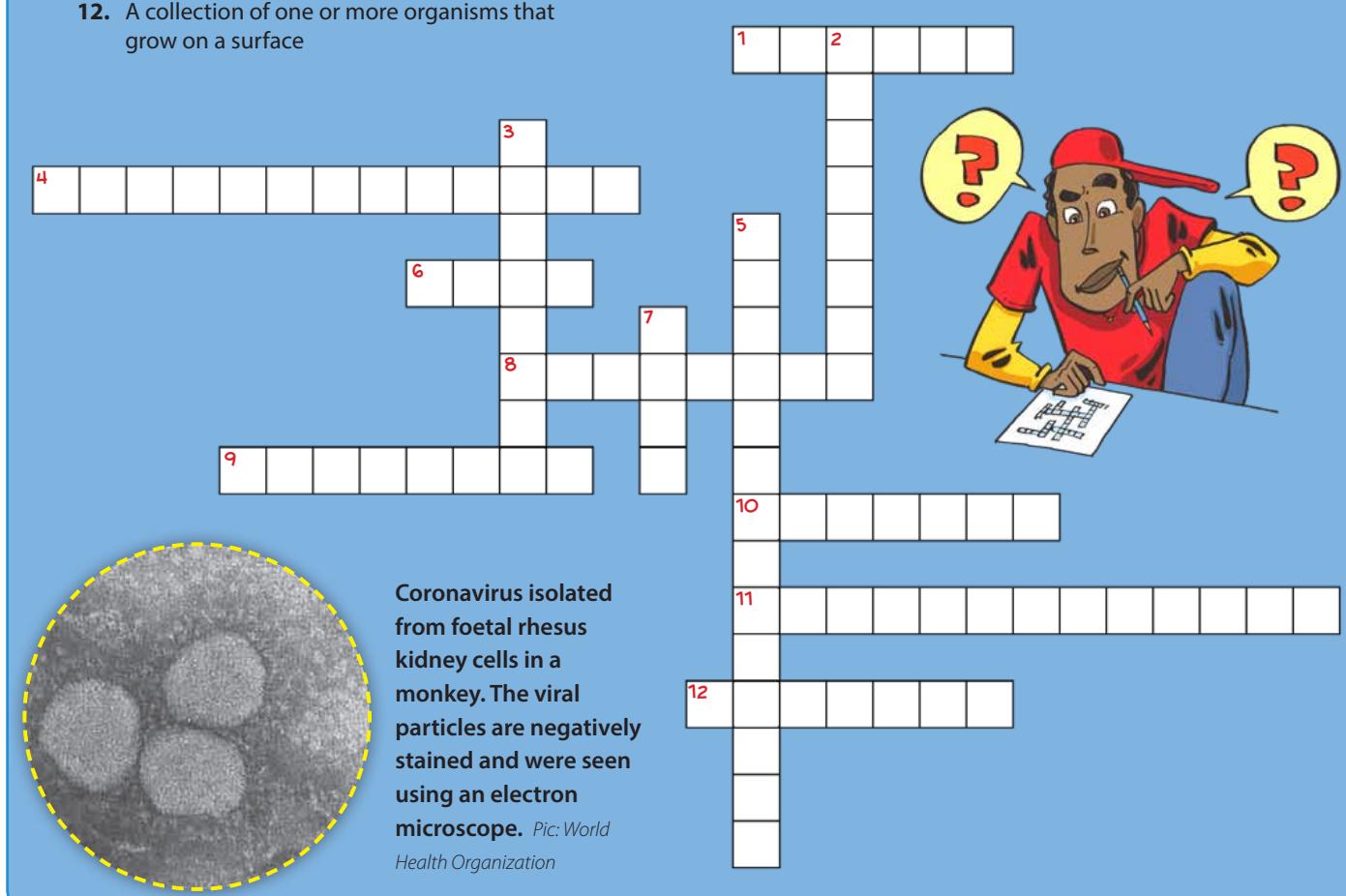
PUZZLE YOUR MIND

CLUES: ACROSS

1. A soft metal that does not allow germs to grow
4. Active against bacteria
6. An organism that causes disease
8. A microscopic, single-celled organism
9. An individual animal or single-celled life form
10. An atom that has one or a few unpaired electrons
11. Not allowing microbes to grow on any surface
12. A collection of one or more organisms that grow on a surface

CLUES: DOWN

2. A tiny simple organism belonging to a group called protists
3. A microorganism that causes disease
5. Very small organisms
7. The smallest existing particle of a chemical element



Answers: 1. Across: 1. Copper; 4. Antibacterials; 6. Germs; 8. Bacteria; 9. Organism; 10. Radical; 11. Antimicrobials; 12. Biofilm
Down: 2. Protozoa; 3. Microbe; 5. Microorganisms; 7. Atom

Let's talk to a scientist!

Dr Ngcebo Mhlongo, a medical doctor based at the Africa Health Research Institute in KwaZulu-Natal, takes us through how we can help stop the spread of COVID-19, and what we can do to keep ourselves and our loved ones safe.

How can I help stop the spread of COVID-19?

Stay at home if you can, as our president has instructed. The virus spreads when you inhale droplets from an infected person who coughs or sneezes – or even talks. The danger is that some people may not know they are infected while spreading the virus. By staying away from public places and not visiting friends and family, you will help to protect yourselves and others. If you must go out for work, for groceries or to a healthcare facility, stay at least two metres away from other people and make sure you wear a cloth face covering. Wash your hands frequently with soapy water for at least 20 seconds. If you do not have water and soap close by, use hand sanitiser, but soap and water are best. Avoid touching your face, because you could have touched contaminated surfaces, and then when you touch your nose, eyes or mouth, you get infected. At home, make sure you regularly clean surfaces that you touch often – like doorknobs and light switches.

How can I protect myself?

There is no cure or vaccine for COVID-19 yet, but if you have a strong immune system, your body can fight off the virus. Most infected people will get better. To stay healthy, follow the above advice and maintain a healthy lifestyle through eating healthy food, drinking enough water and exercising (within lockdown regulations). It is important for people with HIV, TB, diabetes and other conditions to continue taking their medication as usual. If you are feeling sick in any way, please consult your doctor or clinic. Do not ignore any health problems, because now it is more important than ever to know everything about your health.



Dr Ngcebo Mhlongo. Pic: AHRI



This article was published in collaboration with the Africa Health Research Institute.

MAINTAIN SOCIAL DISTANCING!

KEEP YOUR DISTANCE!
AT LEAST 2 METRES

WHEN SOMEONE COUGHS OR SNEEZES, THEY SPRAY TINY DROPLETS INTO THE AIR.

IF THEY HAVE CORONAVIRUS, THE DROPLETS CAN INFECT OTHERS WHO BREATHE THEM IN. THE VIRUS CAN ALSO SPREAD WHEN THE DROPLETS LAND ON SURFACES OR ON PEOPLE'S HANDS.

STOP THE SPREAD. STAY AT HOME AND COUGH INTO A TISSUE OR YOUR ELBOW.

HOW CAN YOU KEEP SAFE AND SLOW DOWN THE SPREAD?

Wash your hands regularly with soap and water for at least 20 seconds.

Avoid touching your eyes, nose or mouth with unwashed hands.

Cover your cough or sneeze with a flexed elbow or a tissue, then throw used tissues into the bin.

The COVID-19 crisis has everyone talking and has created incredibly complicated problems for governments and scientists worldwide. To think like a scientist, you need to learn to **think critically**. This is **higher-level thinking** which needs to be developed and practised. If you're up for the challenge, grab a piece of paper and complete our COVID-19 critical thinking challenge below! To do this exercise properly, think deeply, research and take your time.

Warning: This challenge uses extreme mental resources; it is only for the brave of mind!

STRETCH YOUR BRAIN: THINK LIKE A SCIENTIST!

Level 1: Remembering

What causes COVID-19, and how does it spread?

Level 2: Understanding

Discuss why COVID-19 is different to flu and colds, and why it is placing strain on public healthcare systems all around the world.

Level 3: Applying

What are the factors that make South Africa vulnerable to the COVID-19 epidemic? What factors make South Africa less vulnerable? (These factors include but are not limited to climate, the health and culture of South Africans, the country's healthcare system, population density and size.)

Level 4: Analysing

Compare, using a table, how COVID-19 affects different areas of society with and without a lockdown and social distancing. Hint: This does not merely influence people's physical health. Each scenario also has enormous impacts on mental health, economics, education, etc.

Level 5: Evaluating

Take a stance on the most effective way to flatten the curve and prevent mass loss of life while taking other areas into consideration as well.

The GRAND challenge! Level 6: Creating

With your understanding from the previous five levels, develop/design/invent/discuss a way for South Africa to use the COVID-19 crisis as an opportunity, not a stumbling block. This could be on an economic, social or healthcare level.

It's a small world after all!

Every day, scientists are trying to find solutions to the problems that we face. Nanotechnology might be the *small* answer to BIG problems!

Nanotechnology is used to control materials at small scales. This usually happens at the atomic or molecular level – this means that things are about 100 nanometres in size, or smaller. When materials are changed at this size level, they start to behave in different and unique ways. For example, silver's special properties can be used to keep germs away. These awesome discoveries can be applied to the water and health sectors to improve human lives.

South African scientists are using nanotechnology in the water, health and energy sectors. Here's how:

Nanotechnology and water in South Africa:

South Africa is a water-scarce country, and access to clean drinking water is one of the major problems that we face. Nanotechnology is being used to clean, treat and purify water. The North-West University and the Council for Scientific and Industrial Research (CSIR) have come together to develop a treatment plant in the rural village of Madibogo, North West. The treatment plant uses ultrafiltration membranes to clean salty groundwater so that it can be used as drinking water.

Nanotechnology and energy in South Africa:

South Africa currently relies on non-renewable sources, such as coal, to produce energy. These sources of energy are limited, and using them is bad for the environment. Nanotechnology is being explored to provide clean, renewable

energy to the country. The Department of Science and Innovation has partnered with the CSIR and Mintek to explore the use of hydrogen and fuel cell technologies to produce alternative sources of energy.

Nanotechnology and health in South Africa:

Many people across South Africa live with HIV. This makes healthcare a challenge throughout the country. Tuberculosis infections are more likely in those who live with HIV, and they often require immediate medical

attention. This puts strain on healthcare in South Africa, BUT nanotechnology can help! Nanoparticles can be created in different shapes and sizes to "transport" medication to specific points in the body. This means that medication will work much faster and allow healthy cells around infected cells to remain healthy.

For more uses of nanotechnology, check out the worksheet that has been developed in collaboration with SAASTA! Download here: <https://bit.ly/saastananotech>



Biological organisms help with water recycling in the tanks at the water station. Pic: SAASTA

PUZZLE YOUR MIND

YNOOOHGNLTANCE

LORLMUAEC

EEENBAWLR

ISCPNNOETAALR

RDYOEGHN

CAN YOU
UNSCRAMBLE
THESE WORDS?



Answers - Nanotechnology; Molecular; Renewable; Nanoparticles; Hydrogen

NEWS FROM THE CLUBS

We asked our science clubs to get in touch and let us know how they've been coping with coronavirus, lockdown and going back to school. This is what they had to say:

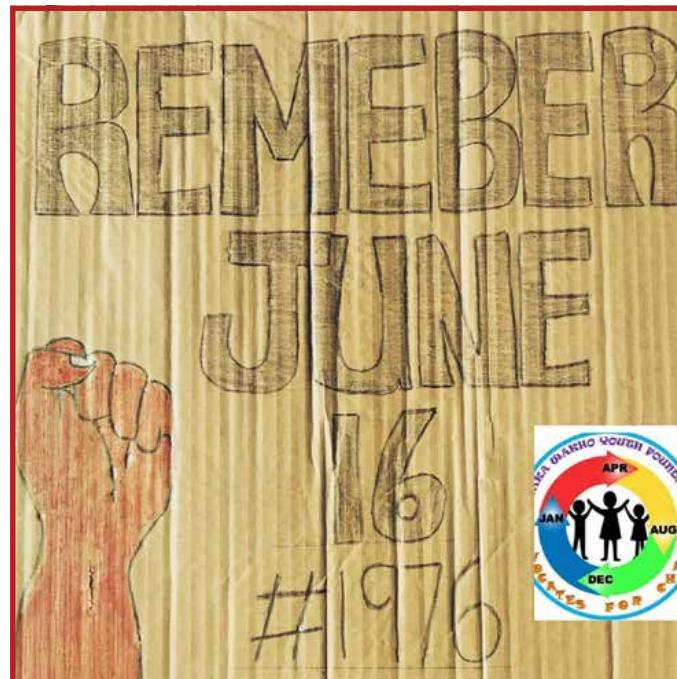
Our awesome members from **The Ozone Club** have been busy during lockdown! This is what they have to say:

UnyakaWakho Youth Foundation Ambassadors received an invitation to participate in the Action 24 Model Legislature programme from Youth@SAIYA.

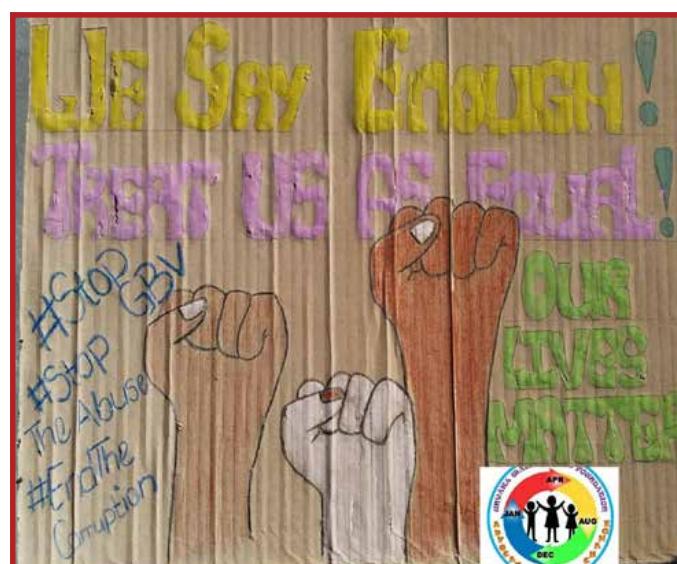
On Saturday the 29th of June, ambassadors of the foundation woke up to a chilly morning ready to debate, give opinions and share their solutions on a topic that leaves most people uncertain about their future and drenched in worry resulting in depression. The topic of the debate was "Reimagining our future: Youth voices on life beyond COVID-19".

As ambassadors, we firmly believe that no mind should be idle. This is why we are always trying to keep the youth off the streets and exercising their minds. Our aim is to engage in more relevant educational activities to foster a truly smart African generation.

During the coronavirus pandemic, our in-person interactions have been limited, and this is why we were excited to join new virtual platforms to continue our engagement with the rest of South Africa.



The Ozone Club have created awareness around gender-based violence for Youth Month.

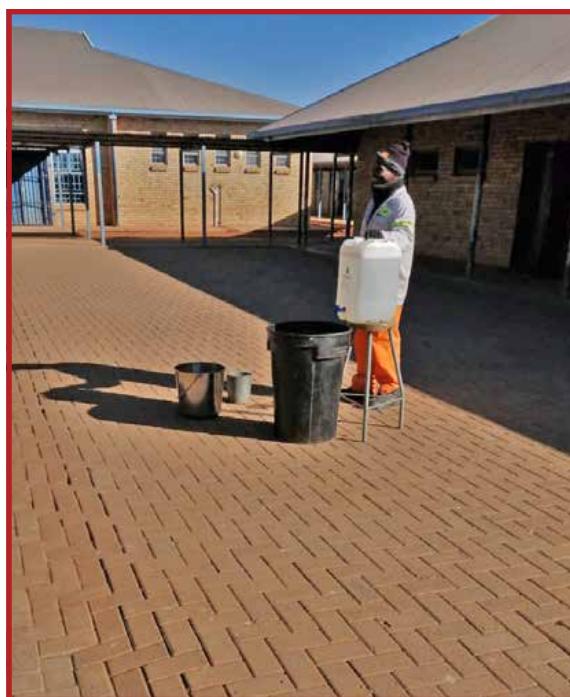


"Hi, my name is Nonkululeko 'Nonkanyezi' Zungu, co-founder of Impande Yesizwe Development Programme in Ntuzuma. This is me (in the above picture) accepting 20 loaves of bread donated by the Phoenix Child and Family Welfare Society to assist my community. We also do school clean-ups as an organisation. We are busy cleaning the science lab that we hope to have henceforth. We are approaching the digital world...and Science Spaza will come in handy. Thank you."

– Nonkululeko "Nonkanyezi" Zungu,
Thobile Science Club



St Augustine's Science Club is practising safe social distancing at their school! Well done!



KP Toto Science Club is putting safety and hygiene measures in place to receive grade 11 learners.

“Our club has cleaned our area and made a few chemicals using lemon and bicarbonate.”

– **Go Green Science Club**

LET'S MAKE GERMS SCATTER!

HEY, GUYS! HERE'S A FUN ACTIVITY FOR YOU TO DO AT HOME. THIS ACTIVITY WILL SHOW YOU HOW GERMS ARE SPREAD AND WHY IT'S IMPORTANT TO WASH YOUR HANDS WITH SOAP.

- 1** FILL YOUR BOWL WITH WATER AND SPRINKLE SOME PEPPER INTO YOUR BOWL (DON'T ADD TOO MUCH OR THE EXPERIMENT WILL NOT WORK SO WELL).

What's happening here:

The pepper floats on the surface of your water. This is like germs on surfaces.

- 2** STICK YOUR FINGER INTO THE WATER AND WATCH HOW THE PEPPER STICKS TO YOUR FINGER.

What's happening here:

This is like germs on a surface attaching to your skin. Every time you touch a surface and then your face, eyes or nose, the germs infect you and make you sick!

YOU WILL NEED:

- A LITTLE BIT OF WATER
- A BOWL
- A LITTLE BIT OF BLACK PEPPER
- LIQUID SOAP SUCH AS DISHWASHING LIQUID

- 3** COAT ONE FINGER WITH DISHWASHING LIQUID.

What's happening here:

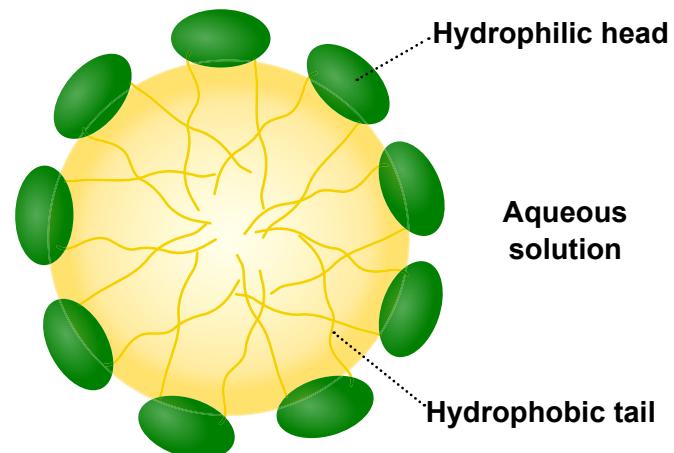
This is what happens when you use soap to wash your hands.



- 4** STICK YOUR SOAPY FINGER INTO THE WATER, IN THE CENTRE OF THE BOWL. POOF! THE "GERMS" SCATTER TO THE EDGE OF THE BOWL.

What's happening here:

You may conclude that germs are afraid of soap here, and that is true, but they don't run away like the pepper. While the pepper scatters because dishwashing liquid lowers the surface tension of the water, dishwashing liquid and other soaps have another important property. Soap is both hydrophilic (water-loving) and hydrophobic (fat/oil-loving). The hydrophilic nature of soap helps it to dissolve in water, but its hydrophobic properties allow it to destroy the lipid (fatty) membranes of microorganisms, including the membrane around viruses such as SARS-CoV-2. The soap destroys microorganisms, and the water washes them away – which is why we always need to wash our hands with soap and water!



Soap molecules can form a structure that is hydrophobic on the inside and hydrophilic on the outside. These two properties enable soap to clean all kinds of things.

Pic: SuperManu; wikidraft.referata.com/wiki/Micelle

START YOUR OWN SCIENCE SPAZA



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

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



SCIENCE SPAZA APPLICATION FORM

Complete the form below and send it to PO Box 22106, Mayor's Walk, 3208, email: info@sciencespaza.org or submit your application online at www.sciencespaza.org.

Name of school: _____

To be filled in by responsible adult (parent/teacher)

Municipality: _____

Name: _____

Province: _____

Surname: _____

Name of your science club: _____

Position: _____

Name of contact person: _____

ID number: _____

Telephone number: _____

Signature (parent/teacher): _____

Email address: _____

Date: _____

Physical address: _____

WHAT HAS YOUR CLUB BEEN UP TO?



So, the last few months have been different to anything anyone has experienced before. Lockdown and social distancing have forced everyone to become incredibly creative. Where there's a will, there's a way, and we are sure that many science clubs around the country have found a way to use this time well and adapt to the new way of life!

We would love to hear what you've been up to, how you've adapted and what you've been doing in this time. Please let us know and send us your pics on WhatsApp on **076 173 7130**. Who knows, a bright idea you've had may help someone else!