Summer and Autumn 2021 | Year 14, Issue 2

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EYE ON SCIENCE

A YEAR LIKE NO OTHER: *NEW WORLD*

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SCIplanet
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Letter from the Editor-in-Chief

By: Maissa Azab

In a world already changing quickly at a pace unprecedented in human history, the past year-and-a-half certainly caused a dramatic shift in the way people live, behave, and think. Having lived through a global pandemic, the entire surviving population is finding itself in a new world that is, albeit more somber, in many ways better. Indeed, so many discoveries and innovations have been and are still being made on all levels of existence.

I would say that one of the best outcomes of this dark and difficult time is the overdue emphasis on and attention to science and scientific advancement. It is true that so many controversial attitudes have also emerged; yet, from an overall perspective, the world is now much more attentive to science and what it dictates. Moreover, the pandemic has pushed governments and institutions to invest more and more in science, helping scientists work more efficiently to find solutions for both existing and emerging issues as quickly and effectively as possible.

Certainly, scientific and technologic advancement have been our savior, not just on the health front, but in all aspects of life. Technology has kept us connected during times of isolation; it has also rescued most industries and a great portion of the workforce from a bleak downfall. As a result, education-wise and professionally, we have become more practical, adaptable, and technologically-driven. In fact, the nature of education, work, and doing business has irreversibly shifted; both the classroom and the workspace concepts have been completely deconstructed and is being reconstructed in an entirely new light.

That said, we need to be cognizant and cautious as we tread into this new world, full of potential and new horizons, but not without risk factors. We have suddenly come face-to-face with a tsunami of drastic change and sweeping technology that is rapidly spreading and prevailing on all aspects of life; from the personal to the professional and all around. As with so many things in life, this could be, and is, great in so many ways, but we need to pay attention to the impact it has on our quality of life, just as we need to be careful and attentive to overexposure, misuse, and plain abuse of these new, fairly untested, possibilities.

It is true that everything has an upside and a downside, yet the pandemic has forced us to see firsthand that there are, indeed, a myriad of different options in the way we live and do almost everything. This experience and knowledge have the potential of revolutionizing life as we know it; it is my true belief that the good will eventually prevail and that we are indeed on the threshold of a bright new beginning.

In this second special issue we dedicate to a year like no other, a year that has changed life on Earth, we are keeping up the optimism as we move from the individual to the collective experience of the pandemic and its repercussions. We look at some of the impacts on and of scientific and technologic advancement and invention; we look at the cons and so many pros of the new world; we share some interesting news and discuss a variety of perspectives. Hopefully, you will enjoy this new installment of *SCIplanet* and be inspired; we also hope children in your family enjoy the kids' installment. We also invite you to visit *SCIplanet* online at www.bibalex.org/sciplanet for a continuous, enjoyable reading experience, and we invite you to follow us on Facebook, Instagram and Twitter.

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OCEANS AND MARINE LIFE

Water covers more than 70% of our planet, hiding most of its secrets in the depths of its mighty oceans. Under this theme, we invite you to explore our magnificent seas, meet impressive creatures, understand alarming threats, and act to preserve marine ecosystems.

BIOLOGISTS WORKING FROM HOME:

The Future of Biology Rearch

By: Youssef Abdel-Maksoud

In 1983, biochemist Kary Mullis came up with a technique that everyone knows today, and that is considered a breakthrough that has transformed the future of molecular biology research: the Polymerase Chain Reaction (PCR). This technique is applied in the diagnosis of several diseases, such as COVID-19; this is how millions around the world first heard about it. Yet, it is one of the techniques applied by almost every biologist for many purposes. Today, it is a simple technique that can be done by a lab technician and only requires pushing some buttons, but it was not always that way. When the technique was first introduced, it was labor-intensive; requiring so much time and effort, and several steps that should be done manually.

A primitive and a modern thermal cycler. Credits: Wikipedia and Fisher Scientific.

Over time, a small device was developed to do all that in a programmable way: the PCR machine, known as the thermal cycler, which is basically an automated version of the same machine that was introduced in 1983.

The biology research laboratory is packed with instruments that do the work of what was once a manual, tedious, and labor-intensive process. Biology labs are filled with equipment of various levels of automation, starting with pipettes that require manual work but are somewhat automated, and other machines similar to the thermal cycler that conduct a single task, such as the centrifuge and the vortex mixer.

The modern biology laboratory is not only the result of efforts to build a better-equipped research facility. The biology laboratory has always benefited from advances in other fields, building on the novel technology introduced in kitchens, restaurants, and factories. Even today, to a great extent, it looks like a kitchen, with refrigerators and freezers and even microwave ovens. Most of the labs are air-conditioned, just like our homes, and contain ice-makers, similar to most cafes and restaurants. One piece of equipment in the lab that is adopted from industrial facilities is the ultra-low-temperature freezers for long-term storage.

The improvement of the biology laboratory did not stop there, all of those advancements were the foundation of a major step that changed the way biologists conduct their research: making the laboratory fully automated!

Robots in Labs

In the early days of biology, research required access to a laboratory or a field, with animals or other model organisms to work on, but with the advancements in the biological sciences and with the new technologies fueling these advances, this is not the case anymore! A scientist can work on cutting-edge biology research only with an Internet-connected device—such as a laptop—and that is it!

Today, it is getting harder to guess the discipline of science a scientist works on, just by looking at their workspace. More

of those sitting in front of computers, with screens full of codes, are biologists and not computer scientists!

Automation seems like an obvious step in biology, as the research in the field is full of repetitive work: handling a tiny volume of liquid multiple times, mixing the same solution every now and then, and conducting similar series of steps on each experiment. Automation is the answer to such problems. Moreover, as mentioned before, in a typical biology laboratory, a lot of automation is already under the hood; with lots of the lab instruments having some level of automation.

Some research requires great levels of accuracy that is only possible for robots, others include exposure to carcinogenic (cancer-causing) substances. Robots are superior to humans in those situations as well as in repetitive tasks, and biology research is full of them. It was, thus, a logical step to try to make use of robots in the laboratories. Companies started to provide researchers with bench-top robots that can automate certain parts of their research, this was for a long time limited to super expensive systems that were only affordable for huge research labs and big pharma until some relatively affordable alternatives, mostly benchtop small systems, such as Opentrons OT-2 robot came to life.

Affordable benchtop systems allowed researchers to create protocols for their experiments, set everything up, click on the start button, and sit on their desks to watch the robot do the work! The robot is even connected to the Internet and some of its functions could be controlled without being present in the laboratory.

However, those systems have limitations. Most of them are liquid-handling robots, they can do a myriad of tasks, but not every part of a lab protocol can be done using them. They also require some preparations and usually are built to work alongside human researchers, so, despite benchtop systems being a great solution that provide some levels of automation, they might not be the perfect solution for a scientist wishing to work from home. Cloud labs are that perfect solution.

Biology in the Cloud

Have you ever heard of cloud computing? If you did not hear about it, at least you are benefiting from it, in the form of using a service to store your photos or reading an article on a site that uses a cloud server. In cloud computing, you do not need to own and manage a server to be able to store your files. In the same way, in cloud labs, a researcher does not have to have all the expensive lab instruments, or a laboratory at all to conduct an experiment! As a researcher, all you need to do is to write some lines of codes, wait for the results of your experiment, and that is it!

Many companies provide this service, for example, Emerald Cloud Lab. The company have a huge facility full of robots, and any biology researcher can remotely control tens of those robots and instruments, and conduct experiments in the company's labs while being at home! The experiments will be mainly done by the robots, with a simple code to control the parameters, and the results will appear on the researcher screen in real-time. They can even follow their experiment using cameras installed in the laboratory. This is not only limited to protocols and experiments that could be automated, as in biology, some protocols are considered automation-unfriendly, and have to be done manually. Most biology cloud labs have professionals on-site to help with those kinds of tasks, allowing for the full experiment to be done remotely!

Our lives transformed drastically due to digital advances. The way to commute, cook, store food, communicate, get entertained, and the way we work, all changed. Biology research was one of those aspects.

This change was not only reflected in more robots helping biologists, or in some of them having the option to work from home with the help of cloud labs, but everything that constitutes a good researcher has changed. The set of skills and even the kind of work expected from researchers is dramatically changing, with less and less focus on handling skills—which is better performed by robots—and more emphasis on data analysis skills, most of which is done off the laboratory and is suitable for working from home.

Even scientists with no access to automated tools or cloud labs, are working more on their desks or from their homes, with more publications in every field. A researcher has more papers to read, and is expected to read more than what was expected 20 years ago!

The COVID-19 pandemic gave a boost for all of those developments, with thousands of scientists being forced to leave their labs and try to figure out a way to work from their homes. Will this impact continue in the future? Will we see fewer researchers in labs and more at their homes? Let us wait and see!

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Role of ROBOTS in Coping with NEW CORONAVIRUS

By: Seham Elsherif

The world before the new coronavirus pandemic was completely different from the world after it. We are now in a whole new world in which the need for technology has increased, becoming an essential part of it and an alternative solution to the consequences of the pandemic. While the world was concentrating all its efforts to discover drugs and vaccines, technology companies and research groups in universities around the world have been seeking solutions that can help people accomplish tasks with minimal financial losses and reduce their exposure to the risk of infection. Thanks to artificial intelligence and the internet of things, robots have developed and been used in various fields, but how can they be used to combat the coronavirus pandemic? In this article, we will explore the answer to this question.

One of the advantages of using robots during this pandemic is that they are invulnerable to infection, they do not need masks, and are easy to clean and disinfect. Robots are usually used to accomplish repetitive tasks, such as monitoring and assisting medical staff, disinfection, and providing various services to patients.

Nowadays, robots used in disinfection are the most widely used robots due to the increased pressure on medical institutions and the need for constant disinfection, because contaminated surfaces are a primary source of virus transmission. Disinfecting hospital rooms with chemicals such as hydrogen peroxide fumes are very effective; however, they require a long time to be done—up to five hours—so the rooms can be used afterwards. Computerized Tomography (CT) scanners must be disinfected by hand and cannot be disinfected with chemicals.

Consequently, disinfection robots were needed, such as the LightStrike robot, produced by the American company Xenex. A single robot costs more than USD 100,000 and uses a wide range of ultraviolet rays to destroy the genetic material of pathogens, whether viruses or bacteria; one room can be disinfected in ten minutes. Given the danger of ultraviolet rays to humans, there are sensors that cut the rays when a person passes in the room. The company declared that the robot is able to eliminate the coronavirus within two minutes. As a result of using this robot, infection rates decreased from 45% to 80% and it was used in more than one medical institution, including the famous Mayo Clinic.

In Rwanda, robots have been used to protect the medical staff from infection and reduce their association with patients, by performing some tasks of both the nursing staff and the reception staff, such as taking the patient's temperature and vital signs, receiving video calls, and noticing those who are not wearing medical masks and urging them to wear them correctly. The robot Pepper costs about USD 30,000; it is produced by the Belgian company Zorabots. Moreover, robots made by the Chinese Company UBTech Robotics, which encourage wearing masks through broadcasting videos and urge people to constantly wash hands, have also been used in Rwanda. These robots are similar to those in the "Star Wars" movie.

In China, robotic patrols have been launched to educate bystanders about ways to combat the virus; additionally, robots have been used in food delivery to patients in quarantine, and to dispense medicines to patients in hospital. In Tunisia, robotic patrols have been launched to ask passersby why they were leaving their homes during the quarantine and also to verify their identity.

In Hamburg, Germany, Starship Technologies has created a six-wheeled robot to bring food to customers, equipped with radar, GPS, and some cameras. At the Southern Denmark University, a team of engineers and doctors have developed a robot that meticulously takes a pharyngeal swab using computer vision and machine learning techniques to identify the exact location in the throat. In Edinburgh, Britain, a robot that can talk to more than one person at the same time has been developed with the aim of helping the elderly. In quarantine locations in Washington, USA, the doctor remotely treats the patient using a robot equipped with a camera, microphone, and stethoscope to prevent the doctor from contacting the patient.

Credits: Southern Denmark University

The only disadvantage of using robots is that they are very expensive, but once they are widely used, the price will decrease. The futurist Martin Ford believes that people in the future will prefer to go to places with fewer workers and more machines because they will feel less risk and more safety. Will the day come when we will find robots all around us?

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LONG-LIVED HUMORAL IMMUNITY:

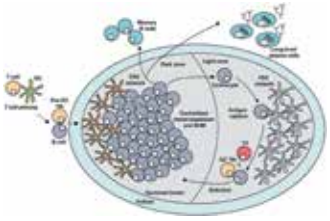
New Hope for Escaping COVID-19 Reinfection

By: Ahmed Mosa

We live in difficult times; COVID-19 has instilled fear in everyone's hearts, a fear that haunts people even after recovery. Patients cannot rest despite being physically and mentally exhausted after infection. The main role of science is to improve lives; that is why science is an indispensable weapon in this combat. It brings hope to hearts by extinguishing the darkness surrounding the unknown. Recent scientific efforts have borne fruit with strong potential to grant peace of mind to the recovered. Evidence indicates that long-lived humoral immunity, also known as antibody-mediated immunity, is obtained for the first time. If you are a former, especially mildly infected, patient afraid of reinfection, we hope reading this article will make you feel better.

First and foremost, to introduce aspects of the immune system, it consists of innate and adaptive immunity. Adaptive immunity consists of cellular immunity, by T-cells, and humoral immunity, by B-cells; yet they are not isolated. The T-cells' interactions with B-cells are crucial for humoral immune responses. We will discuss two arms of humoral immunity: memory B-cells and long-lived plasma cells.

Memory cells, on one hand, are exclusive to the immune system; they allow storing information of foreign stimuli to trigger faster and stronger secondary responses in a second infection. Long-lived plasma cells, on the other hand, are non-replicating and antigen-specific; they reside majorly in the bone marrow and remain long after the clearance of the pathogen—these are Bone Marrow Plasma Cells (BMPCs). Formation of BMPCs requires Germinal Center (GC) response. GC specialized microenvironments form within secondary lymphoid tissues, such as the spleen and lymph nodes, upon infection or immunization. T-cell interactions make GC cells go into a cascade ending with the formation of memory B-cells and BMPCs as in the figure.



GC Response. Credits: frontiersin.org

Now, to tackle the roots of said terror. Firstly, the previously infected are less susceptible to COVID-19 infection, but reinfections do occur 6–12 months after the first. Antibodies decline in the first few months after infection; this has raised concern that BMPCs are not generated, possibly due to not eliciting GC response. This fear is justified; we are not telling patients to think more positively without evidence; that is neither responsible nor scientific. Science is always about following the evidence where it leads. We intend to present genuine evidence for a more promising future ahead of you as a former COVID patient.

A study published in May 2021 showed high promise of BMPC formation in patients with mild COVID infections. The study mainly searched for antibodies, along with BMPCs and memory B-cells against COVID-19 spike protein (S). It provides the first direct evidence for antigen-specific BMPCs after infection. Blood and bone marrow were examined. Blood samples were collected at four points: one, four, seven, and eleven months after symptoms onset. Bone marrow was collected at seven and eleven months. Most patients were mildly ill.

At one month, 77 individuals were examined. Seventy-four indeed had detectable anti-S antibodies; however, at latter points, antibodies declined. The decline was highest in the initial months; then, it slowed down at 4–6 months. At seven months, only 18 patients had bone marrow aspirates collected and compared to 11 healthy volunteers. Fifteen had BMPCs secreting S-specific antibodies, while none of the 11 controls had any. At 11 months, only five of the 18 had follow-up bone marrow aspirates collected along with one additional recovering donor. All of them had stable BMPCs secreting S-specific antibodies. Frequencies of anti-S BMPCs showed a modest significant correlation with anti-S antibodies. This is a huge indication of long-term antibody maintenance by BMPCs.

As for memory B-cells, S-binding memory B-cells were maintained for at least seven months after onset at significantly higher levels than controls. This data rigorously supports that mild infection induces robust long-lived immunity with both memory B-cells and BMPCs. Finally, the study only involved mild infections; however, there is a strong basis to generalize to severe infections similar to the 2014 Ebola virus, where long-lasting antibodies existed in the survivors.

To conclude, if you are a former patient, be more assured because your body's immune system is there to protect you.

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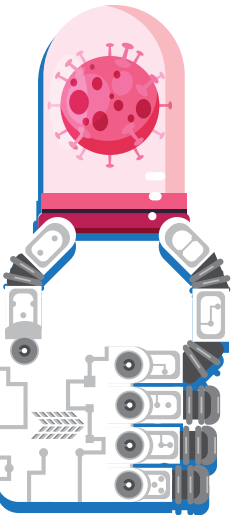
TECHNOLOGY COMBATTING THE CORONAVIRUS



The year 2020 witnessed the emergence of the novel coronavirus; world countries in their attempt to contain the pandemic spread, set precautionary measures such as full closure and home quarantine. Inventors have, thus, developed some innovations at a rapid pace to solve pandemic-related issues and help people overcome this crisis safely and securely; let us review some of them.

By: Zahraa Abo-Eleneen

1. Alternative Respirators

As the pandemic spread, various countries experienced shortages of ventilators. To alleviate this problem, engineers at Mercedes worked with doctors at University College London to produce alternative devices for ventilators by developing the existing breathing aid named Continuous Positive Airway Pressure (CPAP).

The CPAP machines push a constant stream of air and oxygen mixture into the airways, which helps increase the amount of oxygen in the lungs, and keep the patient's airways open. They are easier to use than ventilators, which require patients to be sedated and intubated. The team focused on reverse-engineering the CPAP device, which they dismantled, improved on, and made suitable for rapid and mass production.

The Italian company ISINNOVA also made another attempt; it designed an emergency ventilator mask by adjusting a snorkeling mask to save COVID-19 patients. The project was prompted by a request from the Head Physician of the Italian Gardone Val Trompia Hospital to address the ventilators shortage; and the Company resorted to 3D printing to manufacture valves to work as ventilators.

2. Touch Alert Wristband

The American company Slightly Robot developed a wristband that vibrates whenever the person wearing it goes to touch his face. The band uses an algorithm that interprets the data sent from the gravity sensor, triggering an alarm when the wearer touches their face by hand.

The device was originally designed to discourage other habits, such as nail-biting (onychophagia) and hair-pulling disorder (trichotillomania); yet, the spread and transmission of the coronavirus by touching the nose, mouth, or eyes with a contaminated hand, introduced a novel use that helps prevent its spread.

3. Battery Face Mask and Microphone

In 2020, South Korean electronics company LG introduced a battery-powered air-purifying face mask, which employs a pair of filters, similar to home air purifiers.

The Company prioritized developing protective face masks for customers, without compromising comfort and hygiene; the masks are placed in a special case sterilized with UV-LED lights. The mask is lightweight, weighing 94–126 grams, and can be worn for four to eight hours.

In 2021, the Company announced a new version of its air-purifying face mask with built-in speakers and microphones to amplify the wearer's voice, to communicate easily with those around them in comfort.

4. Delivery Robot

In order to reduce contact and communication among people, to limit the spread of the novel coronavirus, requests to the American company Starship Technologies in San Francisco for six-wheeled food delivery robots increased. The robot is a box, inside which food is put, and fixed on wheels.

Since 2014, the Company has introduced robots to deliver food to homes; however, the spread of the emerging virus has created a thriving environment to increase its use to deliver medicines and other tools without human contact.

5. Robot Dog Enforces Social Distancing

In Singapore, the American engineering and robotics design company Boston Dynamics developed a robot dog named "Spot", which roams in parks to ensure that people stay at safe distances, to prevent the virus from being transmitted from one person to another.

The robot dog, which can be controlled remotely, is equipped with cameras to count the park's visitors. It also has sensors to avoid crashing, and loudspeakers to send voice messages that urge social distancing and monitor safe distance.

6. Cleaning and Sanitizing Robot

Refugees at Zaatari camp in Jordan built a robot sanitizer using LEGO to avoid coronavirus infection. The Japanese startup Mira Robotics also developed a remotely controlled robot, named "Ugo", to clean all surfaces.

Truly, necessity is the mother of invention. The world will always be in need of creative individuals and inventive minds to face the problems and issues using smart solutions, which do not only help us but also save our lives.

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How to Combat Zoom Fatigue

In response to the spread of the new coronavirus, and the onset of home quarantine and working from home measures, the wide use of the online virtual meeting application Zoom has boomed. Its almost daily and continuous use, has resulted in "Zoom fatigue"; let us know what it is, what its causes are, and how it can be avoided.

Zoom fatigue is not limited to its meetings, but rather a new term describing the state of fatigue and exhaustion due to the excessive use of virtual communication platforms. Although the name is associated with the famous Zoom application, it is linked to other applications too, such as Skype, Google Hangouts, and other video calling applications.

Researchers at Stanford University devised a "Zoom Exhaustion and Fatigue (ZEF)" scale, which showed that the frequency and duration of virtual meetings are associated with the level of fatigue.

Reasons

In face-to-face interaction, people partially focus on the words of the speaker, while they use physical signs and gestures to deepen their understanding of the conversation. However, when they speak via a video calling application, the narrow screen limits what can be seen for a more accurate and clear understanding of the speech.

The video limited space on a phone's or laptop's screen allows seeing a person's head and perhaps shoulders, so the attention, scrutiny, and effort is intensified to draw an overall picture of what the other person is saying. It can get more complicated when the video quality is poor, or the Internet connection is unstable, and facial expressions become blurred as well.

Stress and suffering increase in meetings attended by more than two persons, or by an entire team, for example. This small screen is divided into smaller squares according to the number of attendees, which reduces the space of vision clarity, and increases eye distraction in an attempt to focus on body language too; a form of mind multitasking.

Signs and Symptoms

Zoom fatigue causes a general feeling of exhaustion, accompanied by:

1. Feeling tired after the virtual meeting.
2. A growing feeling of tiredness at the end of the work day; even though work is done from home.
3. Daydreaming during virtual meetings.
4. Forgetfulness and difficulty concentrating.
5. Eye irritation and strain more than usual.
6. Regular headaches.
7. Anxiety of having to turn the camera on.

How do you overcome Zoom fatigue?

Use whatever suits you from among these tips:

1. Do not schedule back-to-back meetings. Plan rest time in between meetings; either by meditating or walking outdoors for a few minutes.
2. Agree on a meeting end-time and stick to it.
3. If you feel overwhelmed to see your face on the screen, you can hide it; some applications settings allow you to hide yourself, while others can see you.
4. Use Bluetooth headphones to roam freely during the meeting, and avoid sitting still, which can increase boredom; however, you have to turn your camera off.
5. If you have more than one virtual video meeting per day, you can request to replace some with audio calls.

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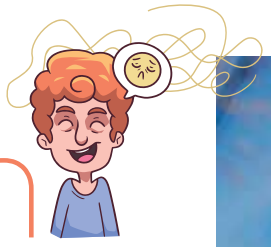
TECHNOLOGY AND INVENTIONS

Humans lived for millennia without the luxury of supreme technology we have today. However, they have always sought the tools that can make their life easier. With the application of technology, time-consuming processes can be executed with ease and in less time; technological development has thus never stopped, and will never stop to evolve and reinvent itself. We hope you enjoy browsing the related stories.



Children Mental Health Post COVID-19

By: Sara Khattab

It has been almost two years since the outbreak of COVID-19 and still people are struggling to cope with this new post COVID-19 life. Amidst this struggle, a section of the world's population has been taken for granted: children. Around 1.5 billion children around the world have been affected directly and indirectly by the pandemic. Although, since the very beginning and until now, the infection rates in children are much lower than that in adults, and even though, when they do get infected, their symptoms are usually mild, they still face other types of challenges brought on by this pandemic. Isolation and social distancing strategies, lockdown, school closures and shifting to online learning have changed the lives of the children.

Most parents think that kids are easier to adapt and will not feel stressed about the changes happening around them, but this is not true. Studies were conducted on many children around the world where parents reported that they noticed a change in their children's behavior during the obligatory stay-at-home period. These studies showed that anxiety and depression increased among school-aged children. The extent of the psychological impact varies according to the child's age, educational status, family economic status, in addition to whether the child has special needs or a pre-existing mental health condition.

Health safety measures related to COVID-19 affected so many employees around the world; many people lost their jobs, others had to go to work daily under the stress of being infected, while the lucky ones worked from home. Many working from home parents found it stressful to work in the presence of their children. Struggling with meeting the needs of their children and keeping them entertained while locked up at home was also stressful. All of this stress imposed on the parents can be easily passed to the children.

Just like adults, kids had their worries too; because their very young minds could not fully comprehend the virus and its complications, they agonized about their own health and the health of their loved ones. These worries can be overwhelming for children of their age. On the personal level, my four-year-old son would panic if he forgot to put on his mask while outside; he would say: "Corona will enter my mouth and I will get sick, so you will get sick too". At the beginning of the lockdown and curfew, my son and his cousins kept asking when they were going to be able to go to school again and if they would see their friends ever again. It was difficult to assure the kids, while we ourselves were uncertain of what was going to happen next.

Normally, routines influence the social, emotional, and cognitive development of children of all ages. Children usually feel safe and comfortable in their daily routine since they can expect what will happen next. The repeated opening and closure of schools messed up the children's daily routine, causing feelings of stress. Similarly, sleeping and meal times were not consistent, affecting the children's appetite and ability to sleep well at night.

In the early years of childhood, one of the ways children can acquire communication and language skills is through social interaction; when children meet together, language skills develop faster and efficiently. Moreover, communicating in different settings helps children learn and observe different kinds of behaviors; sadly, COVID-19 reduced the social interaction and gatherings of the children, whether at schools, daycares, clubs, or family events. During the past year, parents noticed their children have a slight delay in speech; the coronavirus does not have to be the main reason behind this, but it could have had an impact on that. Additionally, children face an added risk of childhood obesity due to lack of physical exercise and movement, especially those used to exercise regularly.

To better understand the state of children's mental health and wellbeing, parents should be alert to signs that may indicate that their children are feeling stressed. Some common behavioral signs of stress and anxiety include increased fussiness, irritability, frequent tantrums, and aggression, in addition to separation anxiety and wetting the bed after being potty-trained. Some children complain of frequent stomachaches or headaches; parents can also notice a change in

sleeping and eating habits. Other signs include lack of interest in normal activities and personal relationships, while some children may have difficulty concentrating and remembering things.

Even though most countries have lifted or at least loosened their lockdowns, people are still required to practice social distancing and limit gatherings. Returning to normal life after this long time can be stressful for children to handle as well. Parents can help children deal and cope with this stress; it is important to encourage them to express their feelings, whether by talking, writing, or drawing. Parents should listen to their children without criticizing or underestimating their feelings. They also need to limit their exposure to news about COVID-19; news can frighten children and increase their feeling of anxiety. Children usually mimic their parents' behavior, so parents are advised to manage their own stress and adopt healthy habits, such as exercising; involving the children in some activities, such as having a walk together in open areas, is also advisable.

During this stressful time, children need to feel loved and supported. It is too early to conclude how the changes those children have been through will affect their lives in the future. Being aware of the mental health and wellbeing of your children in an early stage will help you solve any problem before it impacts them.

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By: Fatma Asiel

Dementia is a defect in cognitive abilities that affects thinking and memory, leading to a complete change in human behavior. It is common knowledge that dementia affects the elderly, but what we are talking about in this article is a specific type of dementia that affects children and adolescents; that would be digital dementia.

Digital Dementia...the Scourge of the Century

Digital dementia is a decline in children's and young people's cognitive and behavioral functions, in addition to memory confusion and poor concentration, due to excessive use of technology and an inability to dispense with it in every little detail. They use calculators to make little calculations, calendars to remind them of significant dates, and spend most of their time watching videos and playing electronic games on their mobile phones.

All that reliability has led in one way or another to a decline in cognitive abilities due to the use of modern technology; that is how digital dementia was defined by the German scientist Manfred Spitzer. He cites the notion that the brain is like a muscle; if you do not exercise or use it, it wastes away. Digital dementia occurs because, on the one hand, electronic devices stimulate the right hemisphere of the brain, which is responsible for visual perception and distinguishing shapes and sounds, but on the other hand, the activity of the left hemisphere of the brain, which is responsible for tasks that include logic, language, numbers, and analytical thinking, decreases.

The symptoms of digital dementia are short-term memory loss, delayed mental development, anxiety and depression, as well as social isolation, lack of physical activity, balance disorders, uncoordinated movements, and neck curvature due to incorrect posture while holding the phone and looking at the screen. If a child or young person shows one or more of these symptoms combined, they may be suffering from digital dementia.

Protection

There are several methods to reduce digital dementia; they can be applied to children, adolescents, and even young adults. Most importantly, limit screen time for children, and replace it with physical games, such as running and exercising, or mental games, such as chess and cubes. Reading is a great alternative to electronic devices, for teens and young adults, and exercising as well.

As we previously stated, social isolation is a symptom of digital dementia, so it is essential to specifically include children in various social activities, and integrate them with other children of the same age to practice artistic and physical activities; even just talking to each other is of considerable benefit.

Additionally, sitting in the correct posture is critical to maintaining the health of the eyes, and the vertebrae of the neck and back. Most electronic device users do not take this point into consideration; the device is usually below eye level, so the user bends their head forward, which affects the vertebrae of the neck. The fact that the phones are held too close to the eyes also affects eyesight. It is preferable to sit on medical chairs while using desktop computers or laptops, to tighten the back and keep it in a proper position.

Technological devices have become an integral part of our children's lives and ours. However, we must bear in mind the negative consequences of their wrong usage because they can greatly affect entire future generations.

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A Lockdown Generation (2):

The Psychological Impacts of the Coronavirus on Youth

By: Dr. Rania Abdel-Meguid

The turmoil that the human race witnessed in 2020 was almost unprecedented. Unlike any previous epidemic, the novel coronavirus has turned the whole globe upside down; throughout the world, people suffered. The novel coronavirus, and the resulting complete lockdown of all human activities, had serious impacts on the human psyche and mental states.

Among the groups who were deeply affected by the lockdown were university students everywhere. In an attempt to maintain social distancing and prevent crowdedness, universities around the world were shut down after the outbreak of COVID-19, switching to online learning. Even though things seemed bright and shiny for students who could now enjoy the warmth of their beds while learning without having to be physically present in class in cold winter mornings, for many the distance learning experience was not that easy.

During times of pandemics, a dangerous monster that threatens people's lives more than the pandemic itself does is fear. It is true that pandemics may cause people to lose their health or even lives, but the problem with fear is that it may cause you to lose your life a hundred times every day with every casualty you hear of. The thing with fear is that it feeds on your mental stability until you are on the brink of madness. According to Taylor (2019), this was the case with the outbreak of the Ebola virus in West Africa where the "epidemic of fear" was "worse than the epidemic itself in terms of the number of people affected". Similarly, the effect of the SARS outbreak in 2003 was greater than the medical impact even though SARS was considered more dangerous to the elderly and medically frail. Vos (2021) concludes that "[t]he psychological impact is often more extensive than the direct somatic effects of pandemics".

The COVID-19 pandemic did, indeed, have grave consequences on psychological terms. Many people contracted the virus, and many who survived met death face-to-face, and their trauma did not end with recovery. Those who did not contract the virus, on the other hand, suffered from the loss of loved ones, sudden unemployment as a result of the downsizing policies adopted by many businesses, or even fear that would eat up their hearts whenever they thought about the future. Vos (2021) argues that, unlike other pandemics, which almost had a roadmap, COVID-19 is leading us to unknown intersections. Accordingly, the whole globe has been living under a cloud of uncertainty as to what the next step should be.

Our brains have been burning with thoughts about whether to be vaccinated or not, to protect ourselves from the disease or to suffer the side effects while we do not know how far they could affect us. Confusion and anxiety would reach insurmountable levels with news about people dying from clots after taking a certain vaccine or another, causing a state of panic. People were also not in their best shape, having to stay in bed for hours, days, and weeks, and this lack of exercise was in many cases accompanied by unhealthy eating habits as a subconscious reaction to the state of depression people were gradually drowning in.

Moreover, the lack of connection with others and being even unable to maintain intimacy with loved ones caused people to be emotionally disturbed and resulted in resorting to social media as a kind of escapism from reality, as well as a window on the world outside. Spending time on our electronic devices also came at the cost of our mental health as we found ourselves gradually being detached from reality, causing us to feel psychologically

disturbed, and at times, experience the fangs of guilt for not being able to save those who were suffering. To sum up, during lockdown, our mental stability shattered to pieces.

Studying Amidst Nightmares

Certain social groups suffered double the psychological burden; among those are university students who had their share of worries, anxiety and depression. With classes suddenly transferred online, students found themselves facing brand new challenges.

One of the biggest challenges posed by distance learning is the lack of interaction, which characterizes discussions in classrooms. Even when cameras are on, that is nothing like face-to-face interaction in which students participate with zeal and get instant feedback. It gets much worse when the cameras are off, as students find themselves interacting with a dark screen and lack their instructors' feedback, a great deal of which is manifested in facial expressions. Things become even more challenging when the Internet infrastructure is not strong enough, which results in students hearing only fragments of what their instructors say and half the sessions wasted in the latter checking if they can be heard.

These challenging sessions take place mostly in the students' own bedrooms. This lack of change has an effect on students' mental state; over time, they lose interest and motivation until they can barely understand what is said during online classes. Moreover, contrary to college days during which they were taught in class, studied at home, and had time for activities with their peers, students found themselves bombarded with E-mails instructing them to write assignments and prepare presentations, notifying them of a change of class time or carrying feedback on previous assignments.

Exams were another story; it seemed that online exams were the time for freezing laptops, power cuts, or Internet disconnections. This was one of the biggest sources of panic for many students, especially given that, they and their teachers, had never been trained to apply technology in teaching before the pandemic, and the online teaching process started suddenly without prior preparation.

Above all, students lacked a normal college life, in which they could socialize and mingle with their peers, with all its healthy psychological effects: teamwork, having coffee between sessions, going on college trips, a lot of laughter, fun, and lifelong memories. As a result of the psychological burden, mixed with the fears shared by almost everyone in their communities, students had a traumatizing experience, gasping to catch up with material, having no break from constant demands for tasks, and panicking over their exams and future.

The outbreak of COVID-19 changed our lives to the very core. In addition to its physical impacts, it has also had an effect on our mental states. Even though people differ in terms of their psychological reactions to pandemics, every one of us has had their share of fatigue. What we can do for now is committing ourselves to precautionary measures, such as social distancing, handwashing, avoiding crowds, and taking vaccines if they are available in an attempt to curb the spread of the virus.

Seeing a psychiatrist is not a bad idea if you feel like that tense period, with all its woes, has already had the best of you. Exercising also can make you feel better and help you combat your laziness and despair. Scientists are working around the clock to reach solutions for the crisis; until they do, let us hope for the best and try to take stress and anxiety off our minds.

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New New World: Workplace

By: Maissa Azab

I had always suspected it and the pandemic has proven me right: working remotely can be a huge asset for work. That, of course, applies mostly to office jobs that do not require in-person dealings with clients or specific equipment and resources that cannot be transferred. If the purpose of work is truly to produce outcomes that benefit the employer, the industry, the economy, and the community at large, most people are more likely to be much more productive and creative if they are allowed to adjust their working hours and workplace—be it home or anywhere else—to better align with their personal needs. That has certainly been my experience and one of the most prominent takeaways from the pandemic; but that is not all, of course.

Certainly, I am one of the lucky who got to keep their job and I fully understand that the pandemic has had detrimental impacts on many people's livelihood. I am also aware that not everyone has had an easy time working remotely due to technical and connectivity issues. The purpose of this article, however, is to look at the big picture of how work, the workplace, and work environment have changed and might further change post-pandemic.

Wakeup Call

Despite it being amongst the most dire and bewildering times for the generations living on Earth now, many have managed to use the COVID-19 pandemic as an opportunity for change. There is no denying the way we work has changed; I am one of those who believe that, in many ways, it has changed for the better. During this challenging and unprecedented time, we have seen employers and employees embrace new skills and develop new behaviors that have improved the way we operate.

In answer to *BBC Worklife*, Stewart Butterfield, CEO and co-founder of Slack, said: "We all know that work will never be the same; even if we do not yet know all the ways in which it will be different. What we can say with certainty is that the sudden shift to distributed work has provided a once-in-a-generation opportunity to reimagine everything about how we do our jobs and how we run our companies… There is an opportunity to retain the best parts of office culture while freeing ourselves from bad habits and inefficient processes, from ineffective meetings to unnecessary bureaucracy… People are making new choices about where they want to live and creating new expectations about flexibility, working conditions, and life balance that cannot be undone. Our Future Forum research of 4,700 knowledge workers found the majority never want to go back to the old way of working. Only 12% want to return to full-time office work, and 72% want a hybrid remote-office model moving forward".

According to the McKinsey & Company report on the future of work after COVID-19, before the pandemic, the largest disruptions to work involved new technologies and growing trade links; COVID-19 has, for the first time, elevated the importance of the physical dimension of work. The pandemic has pushed companies and consumers to rapidly adopt new behaviors that are likely to stick.

Turning Tables

The entire workforce had no choice but to develop new skills and experiences during the pandemic; most significantly, we have all been forced into a crash course on modern technology. The result is that more people than ever have the skills and knowledge to work effectively from anywhere; businesses have been forced to embrace technologies in ways never done before. There is no denying that these new skills and technologies that we might have never had the opportunity or reason to try will continue to help businesses flourish in a post-pandemic world.

Remote work and virtual meetings are likely to continue, albeit less intensely, because in-person interaction is still very much needed to a certain degree. With that in mind, after positive experiences with remote work during the pandemic, many companies are already planning to shift to flexible workspaces, taking steps

towards hybrid working environments, where teams can work both remotely and in the office. This will reduce the overall needed space and bring fewer workers into offices each day, which could prompt a large change in the geography of work, as individuals and companies shift out of large cities.

This shift has seen a rise in companies becoming "virtual first"; meaning that workplaces are being distributed across offices and homes, and employees have the freedom to choose how they work. For companies to successfully work in this innovative way, they must be virtual-ready; businesses need to embrace and invest in remote communication technologies such as using cloud storage for data and putting security measures in place for different modes of working. Leaders must also know how to effectively manage, train, and evaluate virtually.

Hidden Gems

A major positive outcome of this new situation is that giving employees more flexibility in choosing when and where they work can increase gender equality. Research has long established that remote work can help mothers better balance their work and family responsibilities, which makes them less likely to sacrifice one for the other. Moreover, data collected during the pandemic suggests that working from home may also make the father more involved; more couples share family responsibilities more equally now than they did before the pandemic. If institutions continued to offer remote work opportunities after the pandemic is over, more women will have a level playing field.

Not only has the push towards virtual communication force reshape the way institutions, companies, and big businesses organize and operate, many consumers discovered the convenience of e-commerce and other online activities during the pandemic. Hundreds of thousands of small business owners—yoga and piano instructors, therapists, accountants, and others—maintained and even grew businesses using video to connect with customers. Other kinds of virtual transactions, such as telemedicine, online banking, and streaming entertainment, have also taken off. This shift to digital transactions has propelled growth in delivery, transportation, and warehouse jobs; that model is believed will be a large part of our future.

Remote work may very well put a dent in business travel as its extensive use of videoconferencing during the pandemic has ushered in a new acceptance of virtual meetings and other aspects of work. This is definitely good news—financially—for businesses; albeit not for the travel industry, even though tourist travel is expected to make a full comeback at some point. Yet, the reality is, less travel is definitely great news for the environment, and we have all seen and felt evidence of that during the months of complete worldwide lockdown.

Unexpected Eye-openers

Zooming back in on the personal experience of employees; for years, professional and personal lives have been kept apart, with little overlap between them. With the rise of virtual meetings and remote working, it has given us an insight into team member's private spaces. We are now used to seeing children and pets on-screen, interrupting all kinds of virtual activities. While this might seem like a distraction to the working day, these little glimpses into personal lives can actually improve workplace relationships. These personal interactions are not unprofessional; they allow teams to connect and get to know each other in a new way. Overlapping personal and professional lives can help teams work better together and understand one another's everyday challenges.

On the other hand, the pandemic has seen a sharp rise in mental health issues. While this is in no way a positive outcome, these difficult times have forced businesses to understand and acknowledge the importance of mental wellbeing at work. Companies are, thus, doing more than ever to protect and promote positive mental wellbeing among teams. This focus on mental wellbeing in the workplace is set to keep momentum in a post-pandemic world.

Finally, for many, the pandemic and related restrictions have made us aware of the "value of work in our lives", and I do not mean financially. Again, this is not about those who have lost work and income and need it to survive, but those who are working from home, even rediscovering old loves, or honing new skills. For different reasons, we are socialized into thinking that work is all about money; however, even those who continue to enjoy the economic value of work while in lockdown still feel there is something missing.

Whether employed or not, this is the time to re-evaluate the true value of work in our lives and try to benefit from the experience of the past year–and–a–half to look at things from new perspectives. We all need to re-discover ourselves, our values, and our needs to lead a fulfilled and fulfilling life. We should also strive to explore and discover the new opportunities the pandemic has opened for us to maybe find new callings and go after them.

Hopefully, many of the positive work outcomes such as a greater focus on mental health and wellbeing, more freedom and flexibility for employees, and outstanding innovations will keep workforces happy and healthy while businesses remain as creative, responsive, and successful.

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ART in the Time of the CORONAVIRUS

By: Mahmoud Hagras
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The pandemic that hit humanity in late 2019 has caused a semi-pause to human activity, air traffic, and tourism around the world. Many people worldwide were stuck in their homes, going out only for absolute necessity. Everybody has been committed to putting on masks, which has suddenly become part of our everyday outfits. What about art in the time of the coronavirus? How have artists coped with the pandemic? Has it fueled their imagination to express the anxiety humanity experienced?

Good creative work is based on three main pillars: talent, technique, and theme or stimulator. At times of stability, prosperity, and peace, decorative arts flourish. Creative works lose their true value due to the lack of inspiring themes that ignite the desire to create and express human feelings.

There have been some trials to relieve stress during the early waves of the pandemic. Some fashion houses opted for designing masks, making them more appealing and harmonious with everyday outfits. Embroidered and encrusted masks emerged, as well as printed ones that suit all age groups. These masks might have slightly relieved the psychological stress associated with the obligation to put masks on.

Yet, the situation was completely different with plastic artists. They were isolated, unable to travel, or easily go to their ateliers; some had to be locked down at home. This situation has encouraged some of them to resort to digital arts, such as photography, digital graphics, and digital illustration. As a result, many art institutions organized exhibitions where they invited artists to submit their digital artworks. "A case in point is the Bibliotheca Alexandrina's the Art of Staying at Home" exhibition held in December 2020. The exhibition hosted the works of Egyptian and foreign artists, expressing the state of shock, fear of the unknown, and isolation they experienced.

I selected some of the participating works to shed light on. The first is that of the Egyptian artist Mohamed Anwar; it was chosen for use in the exhibition's promotional material. It is a photograph of the artist's room, depicting the loneliness and desolation he experienced. Although the artwork looks simple at the first glance, it is very expressive of the state of fear the world experienced due to the lockdown. Anwar says that staying at home makes one reconsider everything in our lives; from personal issues, through the daily routine, to one's house facade.

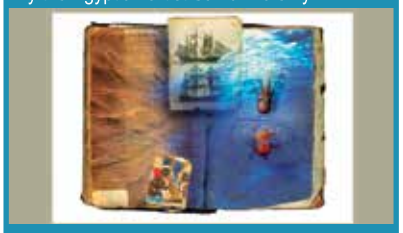
The Egyptian artist Samar Baiomy participated in the exhibition with a set of portraits that feature different stories and states, all related to the same fears associated with the lock-down. Through contemplating the characters putting on masks, we experience the same pain, anxiety, and fear of the unknown future.

The Canadian artist Mark Bovey presented a digital collage artwork, using pages of a decayed book that dating back to 1895. He then added colored fragments and cartoon drawings on the pages, creating a character that combines the past and the future, attempting to understand and solve the mystery of this angry world. The young Egyptian artist Mahmoud Novanci presented a very expressive painting that carries much pain and loneliness. The painting depicts a boy putting on a mask, sitting on the floor of a closed room, accompanied by a lonely fish in a pot and some paper kites.

Apart from the bleak scene of the pandemic, there are two sides to the whole experience. On the bright side, we find calmness prevailing in the world for a while, allowing planet Earth to breathe and take a break from our everyday devastating activities. I personally believe that Earth needs a break every now and then to start over; just like the great flood of prophet Noah, peace be upon him.

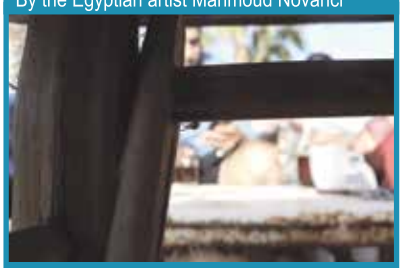
By the Egyptian artist Mohamed Anwar

By the Egyptian artist Samar Baiomy



By the Canadian artist Mark Bovey

By the Egyptian artist Mahmoud Novanci



By the Egyptian artist Mahmoud Hagras

The world has stopped, and we saw new images of planet Earth without humans and their problems; we actually had a chance to contemplate and feel the world around us. We are not alone on the planet; there are milliards of creatures around that we do not notice due to our hyperactivity. This was the theme of my artwork in the Art of Staying at Home exhibition. I, a sculptor, had to stay home. I resorted to using my mobile camera to photograph creatures surrounding us, ones that we did not use to care about.

5 Mentally-Fit Ways to Deal with Change

By: Dalia Abdel-Maguid

Change is a fact of life. It helps us evolve and empowers us with the experience we need to grow and become wiser. Change can be good or bad; while it is sometimes controllable and manageable, other times, it can be right down terrifying. This is when you have to find positive ways to deal with change.

The problem is that we get caught up in the daily grind of everyday living. We take care of everyone and everything else that we forget to take care of ourselves. Staying mentally healthy enables us to stay alert so we can better manage change. It also helps you connect with who you are as a person, be confident in your choices and your abilities.

Lucky for you, we have got you covered! Keep reading to find out how you can adapt to change in a healthy way.

1. Develop Healthy Habits

Goal setting helps keep you mentally alert; it gives you something to plan and look forward to. Make it a point to try something new every month, like a new hobby or a new exercise routine.

Challenge yourself to read a book each week or eat at a new restaurant every now and then. We know that stepping out of your comfort zone can be scary, but it can be just as exciting. It is a great way to learn new things and meet new people.

Being proactive about your mental health can help guide you towards making better choices. This is especially true when it comes to dealing with change.

2. Know Your Core Values

When you know what your core values are, hardly anything can make you feel weak. The first step is to define what they are.

Ask yourself: What is important to you? Is it honesty? Loyalty? Efficiency? Financial security? These are your personal values. Make a list and hang it up somewhere you can see everyday. Having that constant reminder will keep you focused and determined.

3. Express Your Needs

It is important to remember that communicating your needs is important. The trick is in the way you convey your thoughts and feelings.

First, learn how to speak clearly. When you do so, you organize your thoughts in a simple, straightforward fashion. Choose words that convey your poise and determination.

Be confident and stand up for what you want. Society has led us to believe that if you speak up, you are domineering and bossy. Yet, if you nod in silence, you are obedient and compliant. That could not be farther from the truth! Expressing your needs in an effective, calm manner is healthy. It is not arrogance—always remember that!

4. Accept What You Cannot Control

By accepting whatever happened in the past, you let go of the bitterness and pain and no longer feel like a helpless victim. It is true: there are certain things we have no control over. So, it is useless to spend hours worrying and fretting over something that you cannot change.

While we cannot escape the inevitability of change, we can control how we respond to it. That gives you more control, and when you are in control, you will be more resilient, more confident, and certainly much happier.

Alternatively, there are things we can change. Figure out what those are and take action whenever possible.

5. Look for the Silver Lining

Life is all about ups and downs, highs and lows; no one is happy or miserable all the time.

One of the best things you can do when you are dealing with change is to look for the silver lining. Every situation has something good or humorous about it.

Looking on the bright side can help you see your problem from a whole new angle. Having that fresh perspective will allow you to cope with the change.

Final Thoughts

With these five hands-on ways to deal with change, you are ready for anything that comes your way. Sure, it might be a bit scary at first. After all, having a healthy dose of fear every once in a while will only make you stronger.

Remember, whichever coping mechanism you use, always know your self-worth. Having a positive self-image can help you stay spiritually, emotionally, and mentally fit, especially during times of change.

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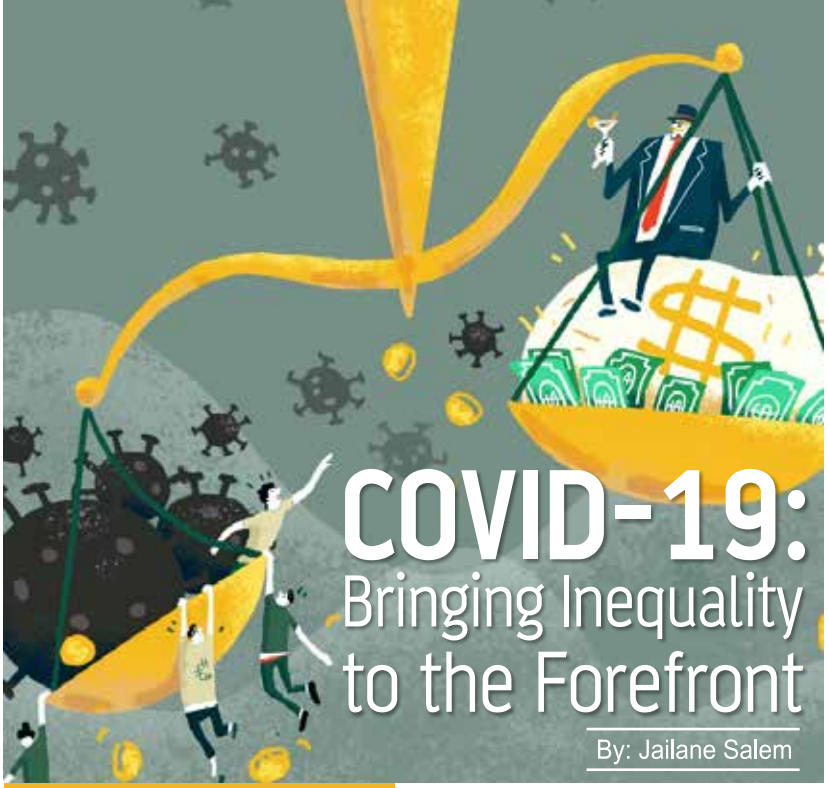

COVID-19: Bringing Inequality to the Forefront

By: Jailane Salem

When the world came to a stop, some people fared better than others. The pandemic has highlighted all the problems and inequalities that have been plaguing the world. We only have to look at how the pandemic has affected the rich and poor of the world differently to see that. The virus can infect anyone; yet, gender, social status, and place of abode all factor in how badly one is affected. According to a feature by the United Nations Development Programme (UNDP) on the impact of COVID "Developing countries, and those in crisis, will suffer the most, along with the already vulnerable all over the world; those that rely on informal economy, women, those living with disabilities, refugees and the displaced, as well as those that suffer from stigma".

There was a marked difference in people's abilities to shelter from the virus due to the nature of their work. Those who have access to a stable Internet connection, a computer, and a job that can be conducted from a desk were lucky and able to work remotely. Those whose jobs depend on physical labor or contact with the public either had to expose themselves to the risk of catching the virus—sometimes for minimum wage—or they lost their jobs. An article by Ian Goldin, Professor of Globalization and Development, and Robert Muggah, Director of Igarapé Institute, stated that a "recent survey of 37 countries indicates that 3 in 4 households suffered declining income since the start of the pandemic, with 82% of poorer households affected."

Your access to technology greatly shaped your experience of the pandemic; with education moving online, not everyone had the luxury to follow through. According to Henrietta H. Fore, Head of the UN Children's Fund, due to the pandemic "140 million families are likely to fall below the poverty line; 168 million children have been out of school for more than nine months; and one-of-three students do not have access to remote learning". Girls' education, in particular, was a problem before the pandemic hit; 132 million girls were denied schooling for various reasons. It is estimated that 20 million more school-aged girls will not return to school post-pandemic. This is devastating because education can lift people out of poverty, allowing them to have a better quality of life.

Access to education is but one aspect where being female puts one at a disadvantage; with the pandemic, many problems faced by women have exacerbated. According to Winnie Byanyima, Executive Director of UNAIDS (The Joint United Nations Programme on HIV/AIDS), "COVID-19 has dramatically widened the gaps between men and women in terms of wealth, income, access to services, the burden of unpaid care, status, and power". Byanyima points out that, while COVID-19's impact has so far been unequal within societies and across nations, gender inequality will actually hinder any effective recovery from the pandemic, for how can the world properly recover if half its population is at a disadvantage? While talking and bringing these inequalities to light is important, it is even more important to fund projects that bring about actual tangible change and help reverse the disadvantaged position women are at.

If we look at the race for vaccination and the numbers of people vaccinated per population around the world, a stark picture of the state of global inequality emerges. While some richer countries have already vaccinated a large swath of their people, some poorer countries have yet to start their vaccination drive due to lack of access. This has been dubbed as vaccine apartheid.

COVAX (COVID-19 Vaccines Global Access Initiative) was created to counteract this disparity in hopes of creating an equal opportunity access to the vaccine. However, as the numbers indicate, this effort is not enough. Many developing nations do not have the facilities where they can make and store their own vaccines. Even if they do have the manufacturing capabilities, it is not easy to obtain access to the patents and know-how of making the required vaccines. The divide has become quite obvious; while some are celebrating their vaccination milestones and easing restrictions, the virus still runs rampant in many hotspots around the world. This means more aggressive strands of the virus could emerge and be resistant to the vaccines that have been developed and administered. We could end up back in square one!

In her article, Byanyima states: "Achieving a more equal world is not only a moral imperative, it will make the world more resilient to pandemics like COVID-19 and makes us all healthier, safer, and more prosperous. We cannot afford not to do it." It is in everyone's best interest to close the gaps of inequality between and within nations. If anything, our connectedness has been highlighted during these trying times and only together can we all make it out.

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The Post-COVID World: Some Predictions

The "new normal" is a phrase that we have all become familiar with, denoting that the old normal is dead. Irrevocable changes have taken place since the pandemic swept over the globe. We have somewhat acclimated to the changes that have taken place, but without a doubt more changes are still occurring and will keep occurring further down the line even after we emerge from the pandemic. Famed author Arundhati Roy wrote an article entitled *The Pandemic Is a Portal*, in which she said: "Historically, pandemics have forced humans to break with the past and imagine their world anew. This one is no different. It is a portal, a gateway between one world and the next". What will this brave new world of post-pandemic be like?

In the realm of work, many white-collar workers have become familiar with working remotely. According to Jay Van Bavel, Associate Professor of Psychology and Neural Science at New York University "[t]he population has had a massive crash course in modern technology, so I think that these new skills and experiences will be the true engine of change". Since many workers have become more tech-savvy, companies will regard office space as a money drain rather than a sound investment, which in turn will create a bigger push for remote work.

According to Van Bavel, this change will have other knock-on effects that could lead to an increase in gender equity in the workforce. Moreover, telecommuters might flock to smaller cities or rural environments. As bigger cities have increasingly empty spaces, they could become occupied by other sectors of society that could not afford it previously; therefore, changing the demographics of cities.

While city landscapes are expected to change, so will the nature of how we do our work. Vinod Kumar, CEO of Vodafone Business, believes that not only will people's workdays be more virtual, they will also be more automated. "The rise of 5G networks and connected machines will enable virtual on-the-go workstations. These virtual stations will provide employees with all the amenities of a digital workplace, from AI-powered assistants that prep whiteboard presentations to virtual reality headsets that put you at the table of a morning meeting with co-workers around the world". Some of the more forward thinking companies will use these new developments to add to their competitiveness, and this flexibility and added ease of work will further incentivize workers.

Architects and city planners will also be greatly affected by the pandemic. Many city skylines are peppered with skyscrapers, often hailed as the epitome of architectural feats, but now after the emphasis on the importance of natural ventilation and the dangers of closed spaces, they could become obsolete. When designing buildings and urban spaces, many will consider the importance of having good ventilation systems, as well as more open spaces. Social distancing might not be as needed after the pandemic is over; however, at a moment's notice, if we need to go back to stricter measures, physical spaces will need to account for it.

We have also all become aware of the importance of having public open spaces where people can gather, breathe in the fresh air, but also stay safe. This could lead to an increase in public spending to create more such green open spaces. Especially that we have learnt that travel can be restricted, for those who relied on going to other cities or countries to find reprieve from city life, having public green spaces available in urban settings has proven to be of great importance.

Speaking of travel, when we can travel more easily, what are some of the changes that we can expect? We are already hearing about vaccine passports, and it is expected that viral screening could become prevalent just as security screenings are. As we have also been taught last year, conserving the environment is something we need to prioritize; therefore, travel experts believe that travelers will be more concerned with sustainable travel. Many images emerged last year showcasing how nature and the environment benefitted when the world came to a halt. Many living in cities that have long been ailed with smog saw blue skies and surrounding natural landscapes that they rarely got to see beforehand. This leads some optimists to believe that some countries might impose "fly-free days" to combat pollution from plane fuel emissions, and prioritize the health of the planet over profit made from travel.

Change is never easy, and while we continue to adapt to the ever-changing reality that we are inhabiting, the lessons we have learned and are learning will hopefully shape a better future in post pandemic era.

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COVID-19 and the CLIMATE CRISIS

By: Shahenda Ayman

Certain years are regarded pivotal in history; 2020 will definitely be counted one of them. It will always be remembered as a time when more than 1.5 million people died globally during a pandemic. During 2020, all aspects of life changed; the streets of the most crowded cities in the world were empty, people were locked down in their homes, malls and restaurants were closed. The world paused in response to the outbreak of the new coronavirus pandemic (COVID-19), which hit almost all the world and left sad memories in every home around the globe.

In addition to the pandemic, 2020 witnessed several natural disasters: smoke plumes from bushfires in Australia, a freakishly protracted heatwave in Siberia, the most tropical storms ever registered in the Atlantic, devastating blazes in Brazil's Pantanal wetlands, the highest flood levels recorded in east Africa, unusually devastating cyclones and typhoons in India, Indonesia and the Philippines, the hottest northern hemisphere summer in history, and temperature records in the Antarctic and the Arctic, where winter ice formation was delayed for longer than in any season in the satellite era.

The story is equally disheartening when it comes to global carbon emissions, which fell steeply, but not for long enough to dent climate fears. Since 1990, there has been a 45% increase in total radiative forcing—the warming effect on the climate—by long-lived greenhouse gases, with CO_2 accounting for four—fifths of this. Months of empty roads and skies, and slow economic activity reduced global greenhouse gas discharges in 2020 by an estimated 7%; the sharpest annual fall ever recorded. However, according to the World Meteorological Organization (WMO), carbon dioxide levels saw a growth spurt in 2019; the annual global average breached the significant threshold of 410 parts per million and the rise continued in 2020.

"Carbon dioxide remains in the atmosphere for centuries and in the ocean for even longer. The last time the Earth experienced a comparable concentration of CO_2 was 3–5 million years ago, when the temperature was 2–3°C warmer and sea level was 10–20 m higher than now. Nevertheless, there were not 7.7 billion inhabitants," said Professor Petteri Taalas, WMO Secretary-General. "We breached the global threshold of 400 parts per million in 2015. And just four years later, we crossed 410 ppm. Such a rate of increase has never been seen in the history of our records. The lockdown-related fall in emissions is just a tiny blip on the long-term graph. We need a sustained flattening of the curve" said Professor Taalas.

According to a study published in September 2020, during the early months of the pandemic air quality has improved, greenhouse gas emissions have reduced, and the daily global CO_2 levels dropped by 17%. Other research showed that the pollutant nitric dioxide levels were lowered drastically by 20–40% across the United States of America, Western Europe, and China. Analysis of data from 44 Chinese cities also found that the pandemic travel restrictions resulted in reductions of between 4.58% and 24.67% in five major air pollutants. These reductions reduced levels of the harmful particles present in vehicular emission, declining black carbon by 22–46% and ultrafine particle number concentration by 60%–68%. Another study from Brazil found that during the partial lockdown in São Paulo, levels of nitric oxide decreased by up to 77.3%, while carbon monoxide dropped by up to 64.8% compared with 5-year monthly averages.

The change was visible from space, satellites picked up clear reductions of smog belts over Wuhan in China and Turin in Italy; residents in many cities could also see the difference. In Kathmandu, Nepal, residents were astonished to see Mount Everest for the first time in decades. In Manila, the Sierra Madre became visible again. In the UK, 2 million people with respiratory conditions experienced reduced symptoms. Breathing cleaner

air also meant 6,000 fewer children developing asthma and 600 fewer being born preterm. Experts suggested that the unprecedented decrease in air pollutant emissions during the pandemic could also reduce seasonal ozone concentrations.

Sadly, the gains were short-lived; once the lockdown eased, traffic surged back and so did air pollution. In a survey of 49 British towns and cities, 80% had contamination levels that were now the same or worse than before the pandemic. Although China, the EU, the UK, Japan, and South Korea have all announced carbon neutral targets by mid-century, no nation is doing enough to achieve such a goal. Most stimulus spending is going to fossil fuel industries that are making the climate worse rather than to renewables that could make it better. These twisted priorities have raised concerns that the COVID-19 lockdown may end up like the 2008/2009 financial crisis, which led to a brief fall in emissions followed by a surge back to record highs.

There is no time to lose, the COVID-19 pandemic has provided us with a platform for more sustained and ambitious climate action to reduce emissions to net zero through a complete transformation of our industrial, energy, and transport systems. The needed changes are economically affordable and technically possible and would marginally affect our everyday life.

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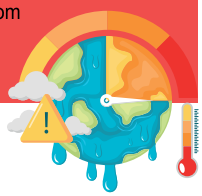

Mountain Hares and Climate Change

By: Ahmed Nouh

Despite the negative effects of the coronavirus pandemic on the world, it carried a ray of hope for climate change and global warming. During the mandatory lockdown period due to the untamed spread of the virus, we observed some decrease in CO_2 emissions, an enhanced air quality in some regions, and a healing Ozone. However, environmental damage has already taken place, and it needs a longer period to witness a positive change.

To mention one direct effect of climate change on our environment, let us go Scotland, Britain, where mountain hares suffer an untimely change of their fur color. Due to climate change and the disorders in the snow falling seasons, the hares lost their ability to camouflage and hide from predators.

In Winters, the hares' fur turns from brown to snowy white to imitate the changes in the surrounding environment, where the temperature decreases and the snow falls to cover the ground. Thanks to these changes, the fur turns white to allow the hares to hide, a process known as camouflage. The open environment makes hares easy preys; hence, camouflage is vital to help them hide from their sharp-eyed predators such as th golden eagle.

The change in fur color takes place in response to the decreased amount of day light the hares are exposed to over some weeks. It is the only method these hares use to avoid predators. It is worth mentioning that this type of camouflage happens to 21 animal species including the arctic fox, the long-tailed weasel, the snowshoe hare, and the ptarmigans. However, two research studies, the second of which conducted in late 2020, found that many hares were not able to survive due to untimely color changes, making them easy targets to hungry predators.

The study was conducted by Marekta Zimova, an evolutionary ecologist at the University of Michigan, USA. She found that the decreased snowfall period over the mountains and the shortened snow cover period affect the hare's ability to change fur color, making them easy preys. She also found that there is a life-threatening 35-day discrepancy between the end of Winter and the fur returning to its original color. It is expected that fatalities in the hare population will increase, leading to their extinction by 2100.

In the end, our look to the environment in the post-coronavirus world should change. We must try to avoid the mistakes of the past and fix them if possible, to make tomorrow better for us and the coming generations.

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AGRICULTURAL PESTICIDES

QUESTIONS Q&A ANSWERS

By: Hend Fathy

We usually hear contradictory views on agricultural pesticides, with much focus on their hazards. I would say they are ill-reputed chemicals, often depicted in movies and TV series as carcinogenic products promoted by greedy devilish people aiming at milking the cash cow.

At the beginning of my career I worked, under the supervision of a distinguished pesticides' expert, on a translation project of a user manual tackling the safe use of pesticides. Indeed, it was an enlightening adventure where I learnt a lot about an entirely new field to me and realized how limited and unscientific my view of pesticides as a common citizen had been.

Pesticides can best be described as plant protection products. They are key players in crop cultivation; without them, the world would lose much of its food, and farmers most of their income. Think of the vaccinations and medications that save people's lives; can you imagine the world without them? Still, what if these drugs were misused; here they would pose serious hazards to one's health.

Misusing pesticides can have devastating effects on entire ecosystems, the environment, and public health. Therefore, governments around the world have regulatory entities that oversee the assessment, registration, trade, distribution, and use of pesticides in their countries. Examples include the Environmental Protection Agency (EPA) in the USA and the Agricultural Pesticides Committee (APC) in Egypt.

Let me take you dear readers on an informative journey of questions and answers to shed some light on pesticides, their types, importance, and further points.

What Are Pesticides?

Pesticides are chemicals used to control specific creatures that are considered pests; these include any organism that causes plant diseases, be it plant, insect, rodent, or micro-organism. These chemicals are designed to kill or repel pests, so they are toxic by definition. No wonder the branches of science that study them are chemistry and toxicology.

Pesticides come in different formulations, including liquid, gel, paste, chalk, powder, granules, pellets, and baits. They also come in different containers, including glass, plastic or metal flasks, plastic bags, or paper bags.

What Are the Types of Pesticides?

There are several types of pesticides that are classified according to the type of pests they target. Hereunder are some common types:

- *Insecticides*: Used to control insects, they can be further divided to ovicides, which act against insect eggs, and larvicides, which act against larvae.
- *Herbicides*: Used to control unwanted plants, known as weeds, which can stunt plant growth and even damage crops.
- *Fungicides*: Used to control fungal problems like molds, mildew, and rust.
- *Rodenticides*: Used to control rodents like mice and rats.
- *Antimicrobials and disinfectants*: Used to control germs and microbes such as bacteria and viruses.

Why Are Pesticides Important?

The main benefit of pesticides is that they significantly increase the world's food production. Pesticides have allowed farmers to maximize the benefit of their resources, such as seeds, water, and fertilizers, to produce more crops on less land, increasing crop productivity by 20–50%.

Pesticides have also greatly contributed to preventing food loss in both pre- and post-harvest stages. According to a research paper published in *Agronomy for Sustainable Development* journal, "Without pesticides, 70% of crop yields could have been lost to pests". This is without doubt a loss our world cannot afford, given the fact that millions of people are already facing food shortage or malnutrition issues.

Additionally, the use of pesticides has also helped farmers make more profit and avoid catastrophic financial losses. Farmers can also protect their crops while avoiding the hardship of weeding and removing pests from fields on their own. This means many vulnerable field workers, including children and poor women, having the choice to pursue opportunities away from farming; thus, improving the quality of life and raising living standards.

Moreover, according to the EPA, using pesticides can help prevent significant public health problems. They protect us against many vector-borne diseases carried by pests such as mosquitoes, ticks, and rodents. These diseases include the West Nile virus, Lyme disease, rabies, bubonic plague, malaria, and typhus. Pesticides can greatly reduce the number of such pests around crops, and hence reduce the number of human deaths due to these diseases.

Together, all of the abovementioned benefits contribute to safeguarding valuable resources and making food much more affordable.

How to Use Pesticides Safely?

As mentioned earlier, pesticides are toxic chemicals by definition. Therefore, users must strictly abide by the safe-use instructions and procedures provided by manufacturers and local competent authorities. Workers who handle pesticides should ideally receive proper training and be well-informed of the hazards associated with the pesticides at their workplace.

Pesticides should always be transported and distributed in their original labelled containers. They should be stored in sheltered and well-ventilated spaces that are not accessible to children or animals. Empty containers should be properly rinsed before disposal and should never be reused for other purposes. Workers who mix or apply pesticides must put on Personal Protective Equipment (PPE) such as gloves, boots, and face masks, to minimize exposure through dermal absorption and inhalation.

What Is Meant by Maximum Residue Levels?

Pesticide residues are the traces of chemicals left in treated crops. The amounts of these residues must be kept as low as possible and safe for consumers. Ideally, residues should always be monitored by relevant competent authorities. For example, in the USA, the Food and Drug Administration (FDA) is the entity responsible for monitoring and enforcing pesticide residues in raw agricultural commodities.

The Maximum Residue Levels (MRLs) are the highest level of a pesticide residue that is legally tolerated on food products within a given country. Before exporting agricultural products to many countries, importers must comply with the MRLs they have set.

There are several established MRLs databases and food monitoring programs with the aim of safeguarding the consumers' health. The most renowned database is the Codex Maximum Residue Limits (MRLs) for Pesticides, adopted by the Codex Alimentarius Commission, affiliated to Food and Agriculture Organization (FAO) and World Health Organization (WHO).

However, according to WHO, locally grown food may not be properly monitored for residues of pesticides in all countries. Also, families who consume food that is directly brought from the fields might be exposed to higher levels of pesticides.

How to Wash Pesticide Residues From Fresh Produce?

Before answering this question, let me relieve you by saying that residues on food tend to decline greatly as pesticides break over time. Now, let us know how to wash our delicious and nutritious fruits and vegetables.

Always start by washing your hands and cleaning surfaces, cutting boards, and utensils with soapy water before handling fresh produce. Scrubbing tolerable products, such as root vegetables, with a clean brush, and rubbing soft items, such as tomatoes, under running water, are the best methods to remove residues.

INTERNATIONAL YEAR OF
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2021

Avoid using detergents, or you will just end up adding more chemical residues to your food. Many fruits and vegetables are porous, and would trap these chemicals, making it difficult to rinse them off.

The process is a little more difficult with fruits with waxy or soft skins because pesticides tend to stick better to them. So, it is recommended to peel off waxy fruits like apples to avoid consuming pesticide residues that might be trapped underneath the wax.

In conclusion, I hope I did some justice to pesticides and helped you revisit your view of them as I once did. It only takes some research or valuable advice from an expert to correct a common misconception, does it not?

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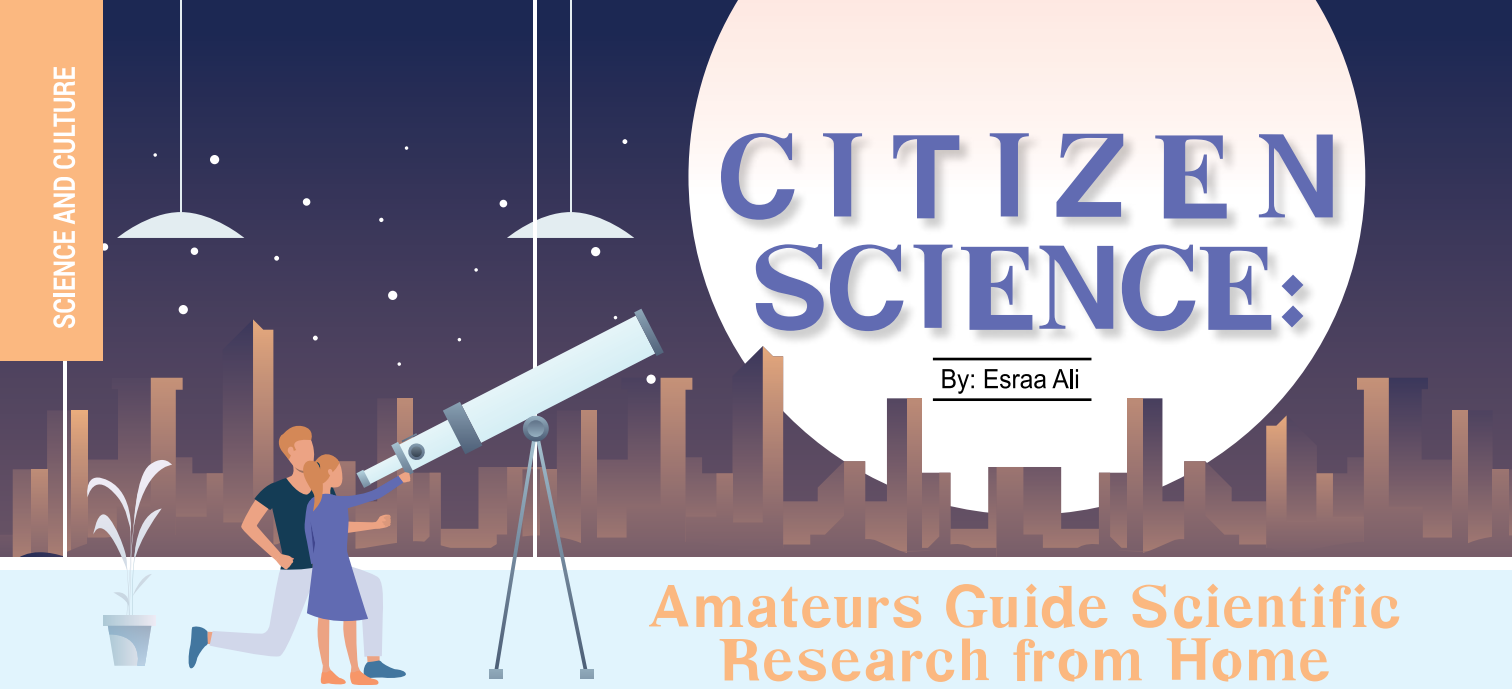

CITIZEN SCIENCE:

By: Esraa Ali

Amateurs Guide Scientific Research from Home

How often have you seen something that intrigued your curiosity while observing the sky, or a plant or a bug in your house garden that you had never read about before, but then you just ignored that? Such events may seem normal and fairly frequent, but we do not give them enough attention. However, scientists consider them rare and significant events that may lead to new scientific discoveries. The concept of "citizen science" has thus arisen to bridge the gap between science enthusiasts and scientists, who can together present discoveries and research in different fields.

Citizen or Citizen Scientist?

"His greatest shock was the day he learned that his high high-school results did not qualify him to enroll in the scientific college he had always dreamt of joining" a repetitive sad short story in almost every Egyptian home. Regardless of the subject or college, this concept has led us to falsely believe that it is a local issue that shatters our dreams and causes us to lose our passion. However, science has always proven that this stage in life is never the end of our journey of discovering life. Learning is a long-term process, and our passion for science helps us face this vast universe and solve its riddles.

Discovering life is not a new concept or is restricted to certain people; it is as old as humanity itself. Curiosity is an innate passion, and the difference between people lies in their observations, reflections, and critical thinking. In response, the concept of "citizen science" has emerged; its official practice dates back to the nineteenth century when a number of volunteers, who were interested in science and were non-specialists, raised common questions with scientists on migratory birds. They joined them in recording observations by collecting, analyzing, and writing reports. Today, the scientific fields in which volunteers are engaged are diverse; including astronomy, environment, medicine, amongst others. The tools of collecting and sharing data on global levels have also diversified.

"Science needs more eyes, ears, and perspectives than any scientist possesses" this is how the SciStarter database of citizen science projects invited science enthusiasts to join this practice, which encourages all to conduct scientific research; however, following certain rules and under scientists' supervision. The volunteers' qualifications and age differ, ranging from kids playing in their backyards to amateurs with advanced astronomical equipment made easier to use thanks to scientific advances. Technology has also facilitated data assembly and sharing, which was hard for scientists to achieve on their own.

How Do They Research from Home?

The best method for fighting COVID-19 was staying home, but it hindered some scientists from conducting research due to travel restrictions or directing funds to medicine; amongst many other reasons. Still, it was an opportunity for others to fulfill their passion for science and explore other worlds from their homes. One of the most prominent citizen science projects is Planet Hunters TESS, funded by NASA since December 2018. It announced in a paper published by the *Monthly Notices of the Royal Astronomical Society* journal the discovery of two giant exoplanets that are similar in size to Neptune and Saturn in our own solar system, orbiting around a Sun-Like Star, but almost 1.5 times bigger and slightly brighter.

Credits: NASA/Scott Wiessinger

"Studying them together, both of them at the same time, is really interesting to study how planets form and evolve over time," said Nora Eisner, a doctoral student in astrophysics at the University of Oxford, UK, and lead author of the study. She added, "This system is interesting because it was discovered by you! With this find, you have once again shown that with visual vetting we are able to detect exciting planet systems that automated computer algorithms struggled to find. Thank you to everyone who helps out with the search for distant worlds on Planet Hunters TESS and who helps further our understanding of our Galaxy." The published paper has the

name of Nora Eisner in collaboration with more than 20 persons, most of whom are volunteers.

"I participated in the discovery of a new exoplanet" is indeed a source of pride, but this is not applicable to only one person or a hundred! The Planet Hunters TESS project includes more than 29,000 citizen scientists from across the world, who study images of stars' brightness in different stages and notice differences that would reflect the presence of exoplanets. "I regret sometimes that in our times, we have to constrain ourselves to one, maybe two subjects. I am really grateful that I have the opportunity to participate in something different" said Alexander Hubert, a college student and one of the project participants.

In a special statement to *SCIplanet* magazine, Prof. Nidhal Guessoum, Professor of Astrophysics at the American University of Sharjah and founder of the "Contemplate with Me" program for science communication, says "Amateur activity in scientific research projects has been going on for decades, and in astronomy, in particular, it may date centuries back. Several astronomers contributed great discoveries, and they were not professionals at the time; they were only passionate about the sky, the universe, and astronomical phenomena. They gradually advanced and got equipped with great devices that enabled them to perform observations emulating specialists".

He adds that there is a huge number of discoveries that have been made and named after their amateur discoverers, citing discoveries of exoplanets, "In 2011, amateurs discovered two planets, orbiting a star about 226 light-years away from us; before that, they discovered a planet orbiting two stars (binary stars), and there are plenty of other examples in this field". Dr. Omar Fikry, Head of the Bibliotheca Alexandrina Planetarium Theater and founder of the "Let's Talk Astronomy" program for science communication, also explains the concept to the Magazine saying, "the Comet Shoemaker-Levy 9 series of discoveries were made by a German man and his wife; it is one of the most famous contributions by amateurs. This Comet was their ninth discovery, for which they became famous in 1994 as they received recognition from the International Astronomical Union for their contributions in research, proving the importance of the amateurs' role in academic astronomical research".

Dr. Fikry noted that specialists rely on amateurs to study comets and verify the calculations and observations of supernovae. For example, astronomers provide data of stars believed to be supernovae, and ask the participants, who are mathematics, physics, and computer enthusiasts, to analyze this data after being trained on how to do that. This task does not require high professionalism, as much as it needs computer skills to contribute to research and interpretation of some astronomical phenomena. Although these operations are simple, he adds, they consume the strenuous efforts of the academic researcher. When students complete their work under the supervision of the researchers, the amateur stage ends, and the researcher starts writing their scientific report, after having removed a burden a science enthusiast amateur was able to handle.

Dr. Fikry emphasizes that astronomy enthusiasts today, are of varying degrees: "Some own a simple or an advanced telescope and follow the nearby planets and the moon phases, while others are more advanced amateurs emulating specialists; they have maps and databases of the sky, and observe a specific part to discover new objects that have not been discovered by specialists before". Similarly, Prof. Guessoum confirms that, today, advanced astronomical research programs and projects exist, in which amateurs participate in searching for stellar explosions (novas, kilonovas, supernovas, gamma explosions, etc.; for example, Grandma – Kilonova Catcher). He says: "Today, amateurs have good devices, and most importantly, the time and the ability to observe and monitor the sky for long periods, which are things observatories do not have due to the strong demand on huge devices, and the reservations for one research or another".

Credits: Grandma/Kilonova Catcher

If Science Is A Space, Be An Astronaut!

In his reply to a question that *SCIplanet* asked both scientists—"Should we hail or warn from amateurs participation in scientific research?"—Prof. Guessoum did not see any danger "As long as these amateurs are well-trained, attend workshops, and their observations and results are carefully examined before publishing; just as we examine and peer-review any paper presented by a specialist". Dr. Fikry also confirmed that this practice is "of a double benefit; for an academic researcher, they win time, and for amateurs, they get a taste of and practice academic research under the supervision of specialists".

Credits: Citizen Science/Virginia Greene

In conclusion, we assure you that citizen science is not concerned with astronomy only; this example aims to inspire you. Citizen science is concerned with diverse life sciences and has several projects worldwide; I invite you dear reader to check them out, as you may find what could be of interest to you—for example, Citizen Science Central, National Geographic Community Geography, CitSci, and Zooniverse. If you have ever been obsessed with science at any stage of your life, but have folded your dream away for any reason, retrieve it and join scientists in presenting a new contribution and tell the world: "Here I am!"

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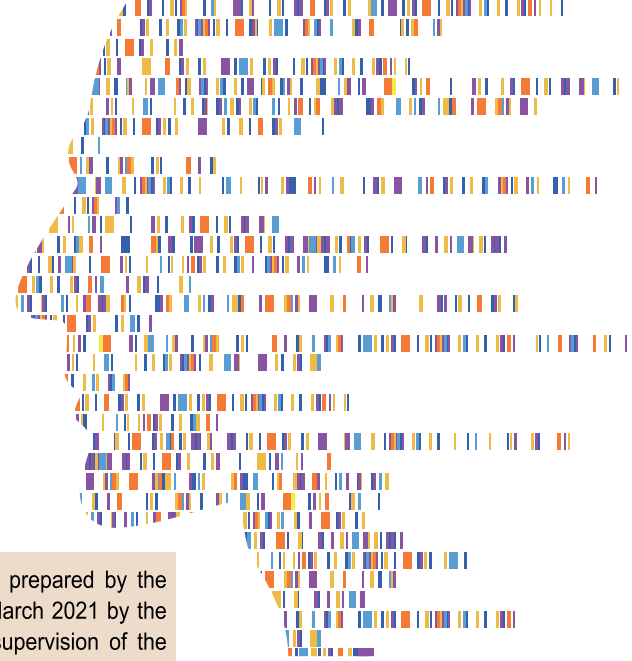
REFERENCE GENOME PROJECT IN EGYPT



The "Egyptian Genome Center", whose scientific material was prepared by the Academy of Scientific Research and Technology, was declared in March 2021 by the Ministry of Higher Education and Scientific Research, under the supervision of the President. The Center's establishment is a huge scientific leap; not only for Egypt, but for the entire African continent. The Egyptian Genome Center—the first of its kind in Egypt and the largest in Africa—is responsible for establishing a reference assembly of the DNA of Egyptians and Ancient Egyptians, which is known as the "Reference Genome". It is a digital database of DNA sequences, compiled by scientists as a representational example of a set of genes in an ideal individual of a certain species. It is scientifically known that the DNA of all humans is 99% similar, with the remaining 1% specified for racial and ethnic differences that distinguish each group of people from the other.

By: Dr. Shaymaa Elsherif
Senior Translator, Bibliotheca Alexandrina

It seems that the outbreak of the new coronavirus, its accompanying symptoms, and its treatment protocols, brought this topic to the forefront of attention in the scientific community. The practical reality proved the clear variance and total difference in the reactions of different bodies towards the virus, for the Egyptians in particular and for the rest of the countries in general. There were young people who were infected and lost their lives because of the virus, while many of the elderly were cured of it. There are also many people who were infected without showing any symptoms, with the ability to infect others, and those who showed mild symptoms, in addition to those whose symptoms were severe and even dangerous from the beginning. This clear contrast between the different physical reactions towards the disease inside and outside Egypt revealed that the cause is the genetic traits of each person.

There is no doubt that this research approach will bring to the forefront the so-called "precision medicine", which depends on dividing patients according to their genetic background and factors. This helps in finding effective drug combinations that facilitate the treatment of each patient according to genetic factors. In fact, the establishment of the Egyptian Genome Center and identifying the roles that it is intended to play, aspire to achieve several goals, the foremost of which is helping scientists understand what distinguishes the DNA of Egyptians from other human breeds. This will inevitably help in determining their response to different drugs, and how they get infected by diseases, which will have a significant impact on supporting the Egyptian health system positively.

Moreover, the project will study the characteristics of the DNA of ancient Egyptians, which will help understand their genetic nature in terms of diseases that were prevalent in their time, and how they dealt with these diseases through medicines, medical preparations, and sometimes surgical operations. This step is considered a new milestone in the history of the first and oldest civilization known to humanity; may be it will reveal other secrets that archaeologists and ancient history specialists would not have thought of.

The Center will also record the DNA of every newborn, in order to protect them and their lineage. This record will also be an efficient and effective way to find her/him in case s/he is kidnapped. It will actually be a genetic information bank, the information and knowledge vaults of which we can go to whenever we need. It is a knowledge and technology revolution that Egypt has not witnessed before in either its ancient or modern history; a revolution that would tip the scales of science, and direct it towards broad horizons that we thought are far-fetched.

The United States of America is a pioneer in supporting and implementing the Reference Genome project; it was adopted by the US Government in 1984. It officially started implementing the project in 1990; the completion of the project was announced on 14 April 2003. Some Arab countries, such as Saudi Arabia, United Arab Emirates, and Qatar, followed the USA in adopting and implementing this project.

As a matter of fact, showing interest in this issue, and initiating serious work to implement it, is considered a protective shield that Egyptians will use against any possible epidemics that may appear in the coming decades. The genetic map of Egyptians will determine their readiness to face any epidemic diseases, and it will open up new horizons for laboratory and drug researches on the production of the best types of medicines and vaccines. The project is a scientific and technological revolution befitting the century of digital civilization; the 21st century.

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A ONE-WAY OR A ROUND TRIP TO MARS?

By: Dr. Omar Fikry
Head, Planetarium Section,
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Interest in Mars has been increasing since NASA announced its program to invade it by sending human spaceflights to the Red Planet in the 1930s and 1940s. Since the 1960s, scientists have become more curious about Mars, and their research papers about it are steadily growing. The development of meteorological technology has also increased scientists' interest; today, more spacecrafts are sent to Mars than to any other planet.

The billionaire Elon Musk, owner of SpaceX—a private space company sponsoring space research—declared a special program to land the first humans on Mars 2025/2026. "I would like to die on Mars. Just not on impact" is Musk's famous quote on his dream journey to Mars to die there of natural causes.

The debate now is: Will the trips be round trip or one-way, permanent colonization of Mars? Let me, dear reader, explain to you the difficulty and possibility of the two options.

The scenario of a one-way trip entails equipping a spacecraft with at least four well-trained astronauts, who should be selected based on their physical, mental, and psychological health, IQ scores, endurance, decency, wisdom, and calmness while dealing with emergencies. Assuming they land safely on the Red Planet, they will need to be lodged in special capsules equipped with all the necessary tools, food, and water supplies, as well as recycled and filtered air producing oxygen; they would be followed by another four astronauts every two years.

The selection scenario of the four would-be Martians is far more complex than this narrative. For example, which specializations will be sent first? How many males and females will be sent at a time? What will they do in the case of a birth or death on Mars? Will they initiate building cemeteries or birthing facilities? Accordingly, they will need medical equipment and medical care staff from among themselves. How about exploitation of Martian resources? How about farming methods and the supply of food, vegetables, and fruits? Are we sending them to Mars to be tortured, and change their natural lifestyle?

Will these first Martians depend on Earthian resources, and await aid and assistance every two years? Or, will they rebuild their lives and its needs there? It is indeed hard to answer the last two questions. The cost of transporting four astronauts every two years, with the needed supplies, equipment, and machinery is particularly high. It is especially hard to ask those Martians to depend on themselves and adapt to the new climate and life conditions because Mars is unpaved and unprepared for human habitation. Should that happen, and we attempt to adapt and build settlements there for a group of people who reproduce and grow, building their own civilization from scratch, that will require the entire Earth's budget.

Let us check the second scenario; that of a round trip. The expected timeframe of getting to Mars and back again in human spaceflights is two-and-a-half years minimum in the best conditions; the scenario still requires some of the details of a one-way trip. Assuming a successful mission and a safe landing on Mars, an integrated system must be set on its surface to launch and escape its gravity. There should also be a craft orbiting Mars waiting to pick the astronauts up to return them safely to Earth.

Astronomically, based on celestial mechanics, the timing of getting there and back should be when Mars is at its closest to Earth. This would save time, shorten the duration of the mission, and reduce its impact on the astronauts and their health. The most prominent challenge of traveling to Mars is studying its psychological and biological effects on astronauts, especially those involving long-term solitude and the absence of gravity.

Summing up this brief argument of a one-way vs a round trip to Mars, the subject still needs further study and research, though the second option is more likely. This has already occurred more than once to the International Space Station, which is constantly orbiting the Earth at altitudes of 400–600 km. There is no doubt that with Mars, the challenge will be much greater and more complex.

SCIENCE OUTREACH AT CITY CENTRE ALEXANDRIA

By: Nadine Elsarrag

Have you ever taken part in an enjoyable and amazing science outreach event? If not, you just have to join the Planetarium Science Center (PSC) while offering an amazing and successful science outreach in collaboration with City Centre Alexandria. During July 2021 and August 2021, the outreach activities were presented through the PSC's famous Science Tricycle, where children enjoyed several amazing science activities showing the wonders of science, through hands-on experiments and tricks.

One of the tricks demonstrated is mixing baking soda with vinegar. As a chemical reaction occurs, carbon dioxide gas is created, and it inflates the balloon causing it to expand.

Another trick using balloons is holding a blown-up balloon close to a child's ear while tapping lightly on the other side. Even though the animator only taps lightly on the balloon, the sound the child hears is amplified. The air molecules inside the blown-up balloon are forced into a small area and are close to each other, which enables them to carry sound waves better.

The animators, moreover, showed the children how differences in air pressure can force an egg into a bottle. In this experiment, a match is lit inside a bottle; when the air inside the bottle is heated, the match goes out. The air inside the bottle cools and contracts, creating lower air pressure inside the bottle than its outside; thus, putting an egg in the way would normally make the air molecules outside the bottle push the egg into it.

"Using balloons and bottles has, surprisingly, led us to an enjoyable experience and a successful public engagement event!"

It is worth mentioning that all the activities were presented by animators with great experience in dealing with children in primary and middle stages. The Science Tricycle received audience every 15 minutes; with maximum 20 students in every slot. The activities were divided into morning and evening activities; 10:00 am – 4:00 pm, and 4:00–10:00 pm.

From a different aspect, organizing a science outreach event was more challenging for the PSC team after the difficult circumstances in the last period. Collecting pre- and post-event surveys really helped us track how well our marketing outreach goals were achieved and identify what needs to be improved during the next iteration.

Although the organization of a science outreach activity in the new circumstances were very demanding and required a greater investment of time, resources, and innovative thinking, it was a wonderful experience indeed in so many ways. Seeing the amazement and enchantment of children viewing the beauty of scientific experiments was priceless. The most important of all goals for the PSC team was having fun and transmitting our excitement to the public in order to communicate passion and enthusiasm about science.

Having effective science outreach is definitely fun and rewarding; it is also greatly needed at this time in our society as students in primary and middle stages rarely get to do more than read about the exciting aspects of science. Science outreach helps reverse negative attitudes and gives the students the opportunity to be exposed to more exciting aspects of science, awake their interest and enthusiasm, and encourage the community to support science education in more interactive ways.

مركز القبة السماوية العلمي
THE PLANETARIUM SCIENCE CENTER

SCIENCE FOR ALL العلم للجميع!

Available Planetarium Shows

Seven Wonders; 30 min.
Kaluoka'hina: The Enchanted Reef; 33 min.
Great Barrier Reef; 42 min.
To Space and Back; 25 min
Stars of the Pharaohs; 35 min.
Oasis in Space; 25 min.
Alexandria the Cradle of Astronomy; 22 min
The Secrets of Gravity; 45 min.
The Future by Airbus; 27 min.
The Life of Trees; 33 min
Phantom of the Universe; 25 min
Space Flight (Live Show); 45 min.
Enlightened Mind; 19 min.

The Planetarium operates from Sunday to Thursday (except Tuesday), and offers three shows per day. For schedule and fees, please visit the PSC website.

ALEXploratorium

Discovery Zone

Opening Hours and Guided Tours Schedule

From Sunday to Thursday (except Tuesday): 10:30, 12:30, and 14:30

Tuesday: 10:30

Entry Fees: EGP 10.- (EGP 5.- for students)

Listen and Discover

12D Shows Fees: EGP 20.-

The Bibliotheca Alexandrina Planetarium Science Center (PSC) invites its visitors to spend a day of fun learning, where they can enjoy amazing scientific shows that cover a diverse variety of scientific fields and are suitable for a wide range of groups at the **Planetarium Theater**.

Visitors can also enjoy tours of the **History of Science Museum**, which highlights scientific discoveries throughout three eras: Pharaonic Egypt, Hellenistic Alexandria, and the Golden Age of Islam.

Moreover, visitors can enjoy a collection of interactive exhibits that targets children and adults, workshops, **DVD** and **3D** shows at the **ALEXploratorium** as well as shows at the **12D Theater**.

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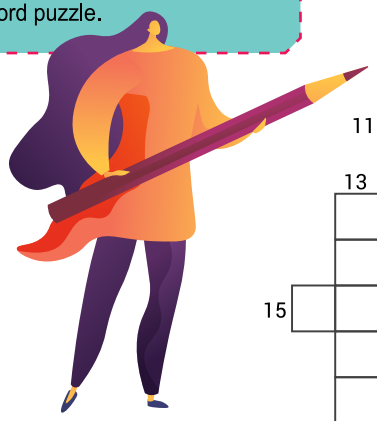
Planetarium Science Center
مركز القبة السماوية العلمي

CROSSWORD PUZZLE

The crossword puzzle is a special treat to revive old pastimes and enrich your interest in science. The difficulty varies in each issue, and the solution is published at the end of the page in reverse. For old times' sake, wherever you are, get your pen ready and try your hand with our second crossword puzzle.



ACROSS

3. is the amount of water vapor in the air; if there is a lot of water vapor in the air, it will be high.
5. a device for recording visual images in the form of photographs, film, or video signals.
7. is a portable shelter, usually made of a strong cloth supported by poles, and is a famous nomadic lifestyle.
8. helped people navigate on land, using stars as reference points, before modern technology devices; Maryam Al-Astrulabiya was its leading manufacturer.
9. is a calcium-rich summer snack and contains high levels of sugar.
11. is a compound used in high temperatures to overcome increased sweating rate and prevent unpleasant smell.
14. is a legend in cardiac surgery and is known as the "King of Hearts".
15. is an instrument containing a magnetized pointer that shows the direction long before the introduction of the GPS.
17. is a standard form of writing and reading used by visually impaired persons; it is named after its creator.
19. lost sight and hearing at a very young age; without her educator, Anne Sullivan, she would not have been a famous author.
20. "Giant…" are the rarest of the bear species, and they live in the Chinese bamboo forest.

DOWN

1. "…variant" is a highly contagious SARS-CoV-2 virus strain, more than two times as contagious as previous variants.
2. stimulates your immune system to produce antibodies, exactly like it would if you were exposed to the disease.
4. was an Egyptian scientist who was extremely dedicated to protecting the environment, and served for 17 years as the Executive Director of the UN Environment Program.
6. is a mineral that is necessary for life that forms 1.5% of the human body weight, and its chemical symbol is Ca.
10. was a young female Egyptian pioneer in nanotechnology and contributed to establishing this vital scientific field in Egypt.
12. is a very fine powder produced by trees, flowers, grasses, and weeds and is the main cause of summer allergies.
13. "Meteor…" is celestial phenomena, in which meteors appear to radiate from one point in the sky at a particular date each year.
16. is one of the most common blood diseases that affects red blood cells; leading to a decrease in their number below normal levels.
18. is known as the Red Planet because iron minerals in its soil oxidize, or rust, causing the soil and atmosphere to look red.

ANSWERS REVERSED

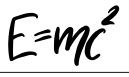
1. DELTA
2. VACCINE
3. HUMIDITY
4. MOSTAFA TOLBA
5. CAMERA
6. CALCIUM
7. TENT
8. ASTROLABE
9. ICE CREAM
10. MONA BAKR
11. DEODORANT
12. POLLEN
13. SHOWER
14. MAGDI YACOUB
15. COMPASS
16. ANEMIA
17. BRAILLE
18. MARS
19. HELEN KELLER
20. PANDAS

There is nothing more precious than quality family time. You can play family games in any occasion using simple household supplies, or none at all! Adding to the fun you will have; it will help you boost your science knowledge. You can also follow our pages on social media for more quizzes.

Draw A Scientist!

1. Bring pens, paper, and a timer.
2. Write on one sheet of paper the names of 10 famous scientists.
3. Split the players into two teams, and give each a pen and a piece of empty paper.
4. Ask each team to divide the page into three sections, and write a tag on each: (a) Physical Characteristics (b) Country (c) Famous for.
5. Give each team a scientist name, and ask them to try to draw (not to write) their responses to each tag within 5–10 minutes.
6. Now, exchange the papers and each team tries to guess the scientist name from the drawings.
7. The team who makes a correct guess within 2 minutes takes two points, and the other team gets one point for the drawings.
8. The team who draw a response to one tag only loses the drawing point, and the opposing team gets another point; even if they did not guess the scientist.
9. Repeat the steps with a new scientist name, until you reach the end of your list.
10. The team with the highest scores wins!

Now, can you guess the names of scientists from the following images?

	Physical Characteristics	Country	Famous for
Scientist (1)			
Scientist (2)			
Scientist (3)			

ANSWERS REVERSED

1. Albert Einstein 2. Charles Darwin 3. Isaac Newton

JOIN OUR TEAM

There are many ways to be part of *SCIplanet!* The magazine's team includes resident editors, translators, and designers, as well as contributors, freelance editors, and volunteers who wish to fulfill their passion for science and deploy their talents by creating relevant and valuable content that attracts readers. If interested, send your CV and an abstract of 100 words maximum describing why you would like to join us to COPU.editors@bibalex.org and we will contact you.

Roundtrip to Mars

Illustrated by: Mohamed Khamis

The winning caption By: Donia Al-Domiaty

You might have not been on such a journey yet, but if you are meant to go in the future, will you be ready?