



HOUSE OF SCIENCE

By: Maissa Azab

“SCIENCE EVERYWHERE” IS NOT JUST A SAYING; IT IS A FACT.

There is absolutely nothing in life that is not connected to science; our role as science communicators is to simply spotlight this reality from every possible angle. This year, we are tackling science from the perspective of everyday places and activities we live, study, work, and experience without giving much thought to the myriad of sciences lurking in every corner, vessel, piece of furniture or equipment, etc.

In this initial issue, we are exploring the science at home. Sitting on my couch in my living room; I am fully aware that there is science in everything I have touched, used, eaten, or drunk since I woke up a few hours ago. As a matter of fact, the science at home begins with the building itself; the materials, methodologies, and techniques used in making it a sustainable dwelling for numerous families for many generations before and after. It is in every item of finishing, furnishing, or refurbishing used by each one of these families to make their house a home that is unique to them.

Science at home is inside our kitchen; not just in the various appliances, but also inside the cabinets and even on the stove. Science is, of course, in all the detergents, toiletries, and even cosmetics used by the household to stay healthy, fresh, and preppy. It is even in the way we communicate with our family members, raise our children, or deal with our pets. There is even science in the energy flowing around the home. Actually, science at home is still progressing; there is no doubt modern technology is bound to continue changing our way of life, including our homes, drastically.

As always, we hope you enjoy your read here and online, incite your interest, and look forward to your reviews, comments, and/or suggestions at PSCeditors@bibalex.org.

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THE SCIENCE OF

FURNITURE



By: Mona Shehata

Science plays an important role in developing new ideas and making more creative designs possible. Indeed, technological advancements have their input in the furniture industry, and thanks to computer programs that make it possible to sketch designs. Moreover, scientists have succeeded in synthesizing materials that are not readily found in nature; they have managed to go far beyond the traditionally-used materials.

Applying different scientific fields in furniture design gave room for more creative possibilities. For example, imagine a rocking chair consisting of two circles and a seat between them. It is physics that made it possible to determine the balance point to prevent the sitting person from falling.



Another example is making bookshelves with a self-contained chair and stool that can maintain their balance regardless of the number of books they carry. The chair serves as the basis for the design, where all the shelves are either horizontal or vertical and perpendicular or parallel to the chair. This item relies heavily on geometry and trigonometry to measure the angles, lengths, and locations.



On the other hand, computer programs create unique irregular designs. There is the Computer Aided Design (CAD) technology based on the concept of digital manufacturing; CAD files can control machinery through two approaches: computer numerical control and rapid prototyping. The former covers a scope of operations and procedures—such as engraving, laser cutting, lathe turning and wood routers—while the latter makes easy and complicated geometries through binding very delicate sheets of liquid or powder.

If you are not impressed enough yet, let me tell you that now we can use fungi to make furniture. Tables and chairs are made using mushroom composites that provide an alternative option to wood, plastic, and other materials. These products are natural, free of toxins, and compostable.

Production starts with adding mycelium* tissue to an agricultural byproduct that has a carbon base, such as cornhusks and sawdust; the mycelium uses said-byproduct to create a huge fiber web, which is later transferred into a mold. The fibers grow filling the mold, which is then placed in an oven to denature proteins and kill fungi.

Mycelium can be shaped into myriads of forms and textures through manipulating temperature or carbon dioxide levels.

Mushroom furniture looks like rocks, but is only a little tougher than cardboard; by mixing with nutrients and other components, it can be strong like balsa wood or soft like cork. Wooden legs are added as a structural base. A marble-esque substance used for tabletops can be custom-made from bacteria that create calcium carbonate around sand grains. Adjusting the temperature or pH level, modifying the sand size, or even adding colors to the mixture can create different products ranging from bricks to tabletops.

The main problem facing the industrialization of this unusual furniture is that it is not commercial, since it is still too costly for production to compete with regular furniture.

Moreover, now we can create organic table legs. These are planted with a biopolymer bracket placed on the sprouting bamboo shoot. When it sprouts, it binds with the plastic as anticipated. Upon reaching the desired height, it is chopped and then soaked in natural rubber to make table feet. The plastic makes attaching the tabletop to the legs an easier and more simple process, which was typically a problematic task.

We also have the Orbit Chair which uses the human bone structure as the basis for its design. It was created with the help of a prosthetics company. The chair is light and sturdy, and the seat and back are built as one piece. The rigidity is due to the two plywood layers that have a gap between them. They are then condensed into an intricate curved design. The design provides high strength compared to the weight ratio it can endure, and uses less resources.

Tables and chairs are made using mushroom composites that provide an alternative option to wood, plastic, and other materials.

Modern furniture industry relies on many aspects, such as computer designs and the use of different sciences to produce imaginative designs. New materials will keep coming up in response to continuous research and experimentation. Indeed, science and creativity provide endless possibilities that would definitely add smart and elegant touches to our homes.

*Mycelium is the vegetative part of a fungus, and is made up of white- or cream-colored fungal threads or filaments.

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AROUND THE WORLD IN 5 HOUSES

By: Hend Fathy

From freezing icy, to melting sandy environments, humans inhabit most of the terrestrial spots on Earth. The diversity of climatic conditions and naturally-available resources has allowed unique lifestyles to flourish across the world. One aspect of this human legacy is vernacular architecture; the common domestic architecture of a specific region. Vernacular architecture is best reflected in houses that are tailored to address the local community needs and depend on the available construction materials. Let us take a tour around the world to examine some examples of these seemingly simple, yet science-based, houses.

Harsh Deserts

Not so far away from us, across the Sahara and Arabian Deserts, we can find nomadic or Bedouin tents that are quite popular in our culture. If you have not visited a nomadic tent in some safari trip, you must have seen many in Arabic movies, or read about them in Arabic literature or adventure books.



As the name suggests, nomadic lifestyle implies moving frequently from one spot to another. Hence, Bedouin tribes need portable shelters that could be set up and taken down easily; flexible, lightweight, and strong textiles meet these requirements perfectly. Bedouins weave architectural materials from the locally available animal hair, and use them to create floors, walls, and ceilings for their tents.

Bedouin dwellings have to also provide protection against the Desert's harsh climatic conditions. Traditional tent fabrics are hand-woven by Bedouin women, using ground looms from sheep, goat, or camel hair. These natural textiles have malleable properties that allow stretching them into different shapes. Typically, tents are built in rectangular structures supported by poles in a manner that allows air to circulate within them.

Dark animal hair fabrics have high insulating properties that allow the absorption of the harsh desert heat during the day and releasing it at night when temperatures drop below zero degrees Celsius. On rainy days, the woven fibers absorb the water and swell, the tiny holes in the fabric close, and the tent becomes waterproof. Last but not least, the coarse weave diffuses sunlight, creating an illuminated interior in daytime.

Icy Poles

The Inuit⁽¹⁾ have survived one of the toughest environments for hundreds of years; namely, the freezing Arctic region where we can find the Inuit's amazing igloos. Although they do not actually live in igloos, the Inuit can stay in these icy hunting camps for as long as entire winters. Igloos can range from small one-person shelters, to large multi-room compounds.



Although the building blocks of igloos are made of ice, their interiors can reach up to 40 degrees warmer than the outside temperature. The thick icy walls capture the inhabitant's body heat inside and block the chilling winds, making the weather feel much warmer. Moreover, the short door opening and the tunnel structure of the gate prevent the harnessed warmth from escaping outside.

Structurally, igloos are self-sustaining thanks to their dome-shaped structure, which keeps them balanced against strong winds and storms. A repetitive

process of thawing and refreezing also helps fuse the ice bricks together, making the entire structure super strong. The igloo interior slightly thaws as the inhabitants' body heat raises its temperature; when the hunters leave it during hunting expeditions, the melted snow freezes over. This process also increases the igloo insulation capabilities, making it much warmer few days after construction.

African Abodes

Although vernacular architecture is a universal concept, Africa in particular is rich with numerous examples thanks to its diverse tribal culture. The Sidama people of Ethiopia are famous for their beautiful bamboo-woven houses known as tuguls. The tugul—known world-wide as the Ethiopian House—is a dome-shaped building with a small front porch shading the entrance. The building frame is made of locally available bamboo and covered with grass and ensete⁽²⁾ leaves. Tuguls are specifically designed to protect their inhabitants during rainy seasons at the Sidama Zone. They have pointed tops and circular bodies that shed heavy rainfall away and prevent leaking.



In the north of the Cameroon reside the Musgum ethnic group, who have been building fascinating high mud huts for long decades. Their huts are mainly made of compressed sun-dried mud laid over a thatch of lashed reeds. Professor Ronald Rael of the University of California, Berkeley, described Musgum huts as an “ideal mathematical form” which can withstand the load of building with minimum use of material. Unfortunately, only few Musgums still construct these huts nowadays, as they are considered outdated.

The dwellings are based on simple, yet well-planned, geometric designs that are mostly of conical form; the walls are thicker at the base than at the summit,

which keeps the building stable. The exterior face carries geometric patterns, which, in addition to their ornamental effect, provide a foothold for construction and maintenance workers, and contribute to the drainage of rain. Musgum huts can reach nine meters high, which keeps the interior cool in hot summer days; moreover, a circular opening at the top of the hut promotes the air circulation, and it can be closed during the rainy days. These openings are also used as escape exits in case of floods, which are quite common in the region.



Chinese Forts

In China, several forms of vernacular architecture flourished across the centuries; many remain to this day. An interesting example is the Hakka⁽³⁾ people's dwelling known as the tulou; although wars would typically destroy fortified architecture, fortified tulou houses have evolved from war. During the 18th and 19th centuries, the Hakka people were confronted with armed warfare for local resources. Consequently, they constructed massive round and squared houses to stave off intruders, forming amazing self-sustaining micro-communities.

Tulou walls were constructed about one-and-a-half meters thick, and three to four storeys high; the whole construction had one entrance with a bolted door, and no windows on the ground level. The ground floor was usually used for storing weapons, whereas the second was used for storing food and grain, and the third and fourth floors were inhabited. These historical buildings are still inhabited until today.

Tulous were mainly built of the commonly found rammed earth, which consisted of raw material, including earth, chalk, lime, and gravel. Rammed earth provided the needed protection during wars, because it is non-combustible, strong, and durable. It is also thermally massive, which enables the dwelling to

store heat and provide inertia against temperature fluctuations. One tulou averagely housed 20 families with about 100 people; larger ones housed up 80 families. Tulous also contained permanent water sources and had sophisticated sewage systems, which made them self-sufficient for long periods of time.



Last but not least, it is time to mention the one big home that shelters us all; planet Earth. It is Earth that provides all cultures with clean and reliable building materials, helping us adapt to surrounding conditions. It embraces all human races and cultures, inviting us all to unite, celebrate our differences, and preserve our unique traditions.

Glossary

- (1) **The Inuit** are the natives inhabiting the Arctic regions of Greenland, Canada, United States, and Russia.
- (2) **The Ensete** is an Ethiopian local flowering plant, also known as the Ethiopian banana. It is distinguished with large banana-like leaves with a good quality fiber used for general weaving purposes.
- (3) **The Hakka** are originally North Chinese who migrated to South China during the fall of the Song Dynasty in 1270.

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By: Hossam Ragab

Can SMART HOMES

A "smart home" is a one that has highly sophisticated automated systems that control essential properties; such as lighting, temperature, multi-media equipment (music and TVs), monitoring and activating security apparatus (cameras and fire systems), locking windows and doors, and many other functions. A smart home seems "smart" because its computed systems can monitor many aspects of daily life. For example, the TV turns on automatically to your favorite channel at the exact time when your favorite weekly show is broadcasted. Similarly, your refrigerator automatically checks the stored foods and tells you what you need to buy. The house would also turn off the lighting system once you step out to spend an evening with friends.

The idea of a smart home sometimes seems like something from Hollywood. Many of us would recall the 1999-comedy *Smart House* about a woman who wins the "house of the future" equipped with an automatic maid who wreaks havoc. Today, smart home technology has become an unquestionable reality and is subject to continuous development. Smart homes have also become a feature of the

modern age, as they have proven especially useful for the elderly and the disabled who wish to live independently; they also attract those who appreciate luxury and distinction.

The word "smart" has become part and parcel of the technology lexicon; indeed, "smart" devices are taken for granted nowadays. Who does not own a smartphone on which they highly depend? What about smart watches, or smart glasses for viewing 3D movies? Not to mention smart boards in classrooms, smart projectors, and other technologies used nowadays at factories and companies.

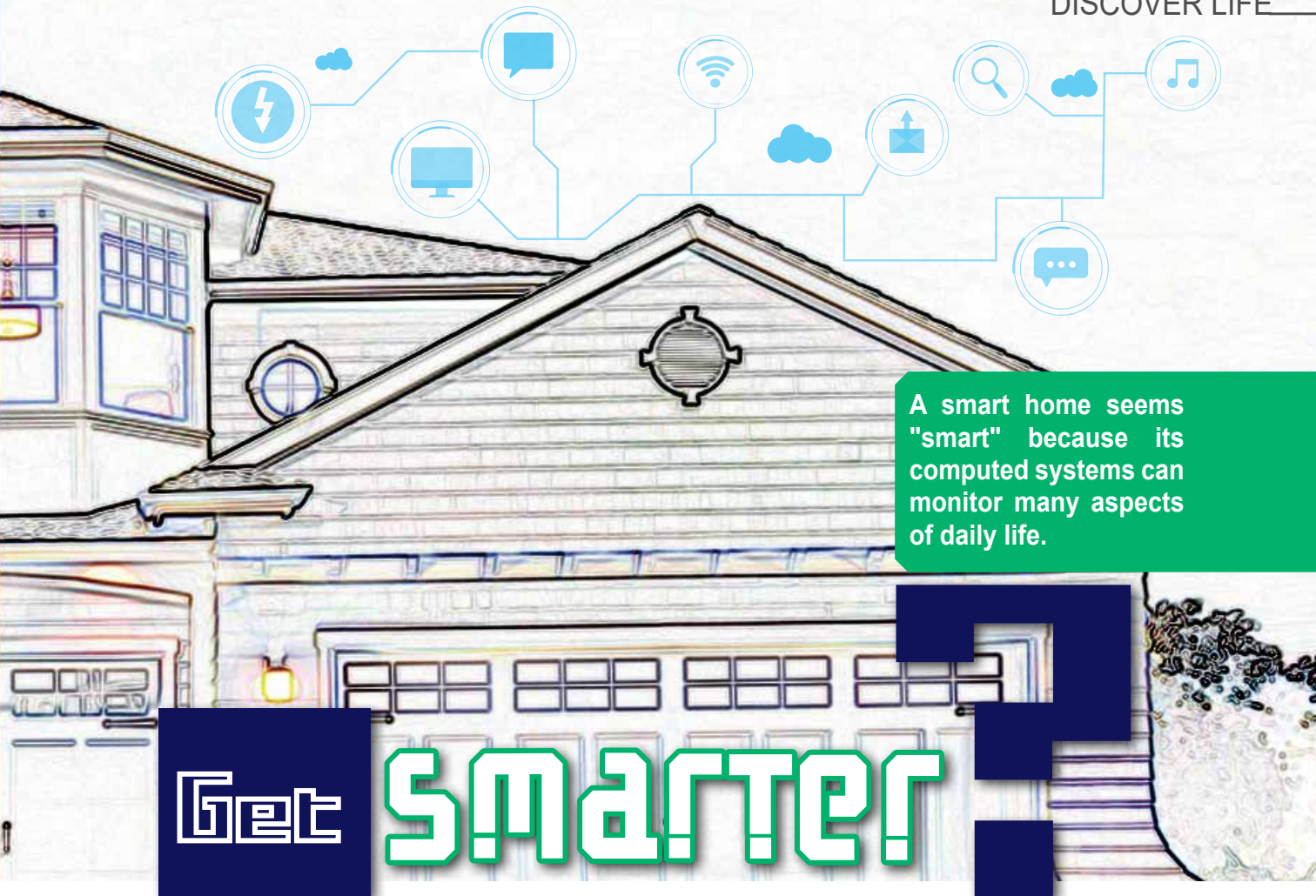
Gartner, Inc.—The world's leading research and advisory company—predicts that, by 2020, there will be approximately 20.4 billion Internet of Things (IoT) enabled devices. IoT is the technology that enables us to control everything through the Internet, including our houses, cars, or work computers. The International Data Corporation (IDC) states that, by 2025, there will be 80 billion devices connected to the Internet with the value of that market predicted to reach \$564 billion by 2022. These expectations indicate a huge forthcoming technical revolution that would

swipe away all traditional concepts of the Internet technology field.

A new term "artificial intelligence" has emerged along with the radical technological advancement. It refers to the intelligence of equipment and programs that imitate human mental abilities and functional patterns; such as the ability to study, make conclusions, and react to non-programmed commands. The term also refers to the academic study concerned with the development of intelligent computers and software. Prominent researchers define artificial intelligence as: "the study and design of intelligent systems that understand the surrounding environment and take actions that increase its success chances". John McCarthy who coined the term in 1955 defines it as the "science and engineering of developing smart equipment".

If you are a good follower of science fiction movies, you would definitely remember the spectacular performance of Will Smith in *I, Robot*. The movie presents the story of robots, upon which humans depend for everything, coming out of control. In the movie, Will Smith, assisted by his robot friend, tries to save the world from destruction by the controlling unit that used artificial intelligence to develop itself. The controlling unit was trying to terminate the human race and fully control

Now, upon your request, your house is capable of thinking, analysing, making decisions, and responding automatically to any given event or problem.



A smart home seems "smart" because its computed systems can monitor many aspects of daily life.

Get

Smarter

the Earth. Despite of the vast difference between the movie and reality, we actually have machines that can think somehow or find solutions on their own to help humans.

Back to our main topic, this article is based on a "universal implementation model for the smart home". The proposed smart-home architecture comprises four modules: a Central Management Unit (CMU), a User Interface (UI), Home Equipment and Appliances Interface (HEAI), and External Communication Interface (ECI). The CMU components include the Smart Home Operating System (SHOS), the Smart-Home Database (SHDB), and the Artificial Intelligence Unit. The Artificial Intelligence Unit is a significant component of the CMU; it works as the controlling mind of the house just like computer and smartphone processors.

From here, we move to the term Home Intelligence (HI), which indicates the automation of home intelligence. It transforms the smart home from a set of remotely controlled appliances or tasks performed according to recorded commands while the house owner is outside to an integrated system and environment capable of automatically making conclusions and interacting properly in accordance with the variable circumstances and events. Now, upon your request, your house is capable of thinking, analysing, making

decisions, and responding automatically to any given event or problem. These events can be related to security, health, comfort, entertainment, work, etc. Your house shall use all its appliances and connect them into one internal network to achieve the required goals in harmony; the system will not refer back to you unless you want it to.

For example, the system will not tell you that you left a window open or did not turn the stove off; alternatively, it will close the window and turn the stove off. In case of an earthquake, the house will wake you up quickly and automatically open all doors to facilitate escaping. In case of a fire, the house will try to put it out; if it fails to do so, it will automatically call the fire department. Concerning comfort and welfare, your smart home will spare no efforts. It will prepare your favorite dish at 5:00 pm sharp in time for your return from work. Then, you will find hot bathing water ready for a relaxing shower before you go out in the evening. Now, you will find your car waiting with a running engine, so that you can move immediately.

The Artificial Intelligence (AI) of smart home appliances must be able to utilize the data from all your networked devices to achieve best benefits to the user. You would ask me how this works; the answer lies in the AI of your

appliances, which has learned your habits and would be able to predict your personal needs at a given moment. The AI Unit in your house has learned that you like a certain type of calm music that you always play on your phone; accordingly, it will choose a set of musical pieces that match your taste and play them at different times. Your house would also call your mother daily at the same time you call to check on her, and would turn the TV on Thursdays at 7:00 pm in time for your favorite show.

Artificial Intelligence of home appliances is the base where it all starts. It is learning and making conclusions, rather than how we use things, that can make your house more harmonious with your lifestyle, especially when it comes to security, energy, saving, comfort, and entertainment. The way you interact with your smart home is what determines whether it is an essential part of your life or just a luxury that does not mean much to you.

With the enormous technological advancement nowadays, I do not find all this fictional; soon enough, smart homes will be integrated into our lives. I fear that we might one day experience the dark side of this unstoppable advancement, or that we may face the dangers of human-made smart machines. Shall we ever get there? The coming days hold the answer to this question.

Home

is where

By: Maissa Azab

In my early years of life, I was constantly torn between my passion for art and science; eventually, I came to realize they are intertwined in everything surrounding us, everything we experience, and everything we do. What I knew early on, and what motivated me to study the art, and science, of the spaces we occupy—interior design to be exact—was my inherent belief that peace of heart and clarity of mind, and consequently, success and happiness arise as much from our surroundings as they do from our insides. However, we must not confuse “happy” surroundings with “rich” or “luxurious” settings; indeed, peace and harmony can be achieved in any setting, no matter how humble.

You might not think of “science” when you think art, creativity, and design, but there is a science to aesthetic tastes, and how the light and colors of your surroundings affect your mood. Our aesthetic tastes are as unique as our DNA; research has shown that many people share certain aesthetic preferences—such as landscape paintings and the color blue—human biology may help explain why.

Neuroaesthetics is a sub-discipline of empirical aesthetics, which takes a scientific approach to the study of aesthetic perceptions of art, music, or any object that can give rise to aesthetic judgments. By contrast, Neuroaesthetics is “a concept that encompasses new possibilities of aesthetic experience and the capacity of works of art to effect and sculpt the materialized brain”; it was initiated by Warren Neidich in 1995. Neuroaesthetics uses neuroscience to explain and understand the aesthetic experiences at the neurological level.

A new study out of Yahoo Labs looked at what kind of aesthetics attract people, using digital photo filters; the researchers wanted to know whether manipulated images engage people more than unfiltered ones. They assessed 7.6 million photos, controlling variables as the number of followers and tags a photo received. The results showed a distinct difference; people are 21% more likely to view filtered photos and 45% more likely to comment on them, compared to regular photos.

“People add filters to match the narrative in their head at the time of the shot” says David Ayman Shamma, one of the study authors. If a filter lets our brains process the content of a photo more easily—something called “perceptual fluency”—it can make us like the image more. Filters may also stir up emotions that draw people to the image; the findings mirror other studies showing that emotional response drives people’s engagement in social media. “There is strong evidence for a link between an emotional response and aesthetic preferences” explains Oshin Vartanian, a psychologist who studies cognitive neuroscience at the University of Toronto Scarborough.

have a universally positive association; this influences their preference for it.

The 1990s survey also found that most countries, except one, favored landscape paintings; several decades of research have similarly identified the same preference for open countryside, green grass, trees, water, etc. The popular argument says this speaks to our evolutionary history and basic survival instincts “we tend to prefer open environments that allow us to look for resources and watch for predators, as well as the ability to hide from predators (like in a tree)” Vartanian says. This mental assessment occurs whether you realize it or not, and whether you are looking at the actual scene or just a painting of a landscape.

Indeed, interior design is not just about choosing beautiful objects to fill a room, but about using space effectively and efficiently for its users; it is also about the importance of material choice to the health and sustainability of a home.

In an earlier attempt to identify people’s artistic tastes, two Russian artists surveyed over 10,000 people in ten countries, in the 1990s, to find out their “most wanted” and “least wanted” paintings. The survey results revealed that people across the world generally liked, and disliked, many of the same things in artwork.

All ten countries preferred the color blue; as a matter of fact, studies dating back to the 1940s have shown people presented with a palette of colors typically choose blue as their favorite. The prevalent theory to explain this is that people subconsciously associate colors with things of the same color. When someone sees the color blue, it reminds them of pleasant blue skies and clear water, which

On the other hand, the majority of people surveyed for the project disliked abstract art. Abstract paintings are highly conceptual, which means it takes a lot more energy to understand, whereas representational art has a storyline that the viewer can immediately follow. Similar to the photo filters, we typically prefer images that are easier to process; this bias, however, does not apply to people trained in visual arts.

In 1994, scientists came up with a somewhat arbitrary list of “laws” of aesthetics, which include, among others: grouping, symmetry, hyper-normal stimuli, peak shift, isolation, and perceptual problem-solving.

Grouping evolved to defeat camouflage, and more generally to detect objects in

Resides the Heart

cluttered environments. Evolution also had a hand in shaping the appeal of symmetry; in nature, most biological objects—prey, predator, mate—are symmetrical. Symmetry may also be attractive because asymmetrical mates tend to be unhealthy, having had bad genes or parasites in their early development.

A less obvious universal law is that of hyper-normal stimuli. Ethologist Nikolaas Tinbergen of the University of Oxford noticed that newly hatched seagull chicks started begging for food by pecking at their mother's beak, which is light brown with a red spot. A chick will peck equally fervently at a disembodied beak; this instinctive behavior arose because, over millions of years of evolution, the chick's brain "learned" that a long thing with a red spot means mother and food.

Tinbergen found that he could elicit pecking without a beak; a long stick with a red spot would do. Then he made a remarkable discovery; if the chick viewed a long, thin piece of cardboard with three red stripes, it went crazy. The chick preferred this strange stimulus to a real beak; without realizing it, Tinbergen stumbled on what we call a "superbeak"—he later shared the 1973 Nobel Prize in Physiology or Medicine for his work on animal behavior patterns.

We do not know why this effect occurs, but it probably results from the way in which visual neurons encode sensory information; the way they are wired may cause them to respond more powerfully to an odd pattern. Similarly, art, stirs collectors to pay a lot of money for an artwork without understanding why it is so compelling. Through trial and error, and ingenuity, modern artists have discovered ways of tapping into idiosyncratic aspects of the brain's primitive perceptual grammar, producing the equivalent for the human brain of what the striped stick is for the chick's brain.

Any artist will tell you that sometimes in art "less is more"; indeed, our brains have limited attentional resources—an attentional bottleneck results because only a single pattern of neural activity can exist at a time. Here is where isolation comes in; a cleverly contrived doodle or sketch allows your visual system to spontaneously allocate all your attention to where it is needed without being distracted by all the other irrelevant clutter—color, texture, shading, and so on—that is not as critical as the beauty of the form conveyed by outlines.

Home Aesthetics

Indeed, interior design is not just about choosing beautiful objects to fill a room, but about using space effectively and efficiently for its users; it is also about the importance of material choice to the health and sustainability of a home. Ever since human beings started carving out their own spaces in the form of caves then huts, which diversified into palaces and forts, interior designing has been in existence. In fact, the very art and science of interior designing was inbuilt in the very process of building. As human beings became more refined, they started to carve out even more complex, grand interiors; thus, arose the need of forming a systematic, defined study of the process of building.

Interior designs are created in response to, and coordinated with, the building shell; they acknowledge the physical location and social context of the project. Designs must adhere to code and regulatory requirements, and encourage the principles of environmental sustainability. The interior design process follows a systematic and coordinated methodology, including research, analysis, and integration of knowledge into the creative process, whereby the needs and resources of

the user are satisfied to produce an interior space that fulfills the project goals.

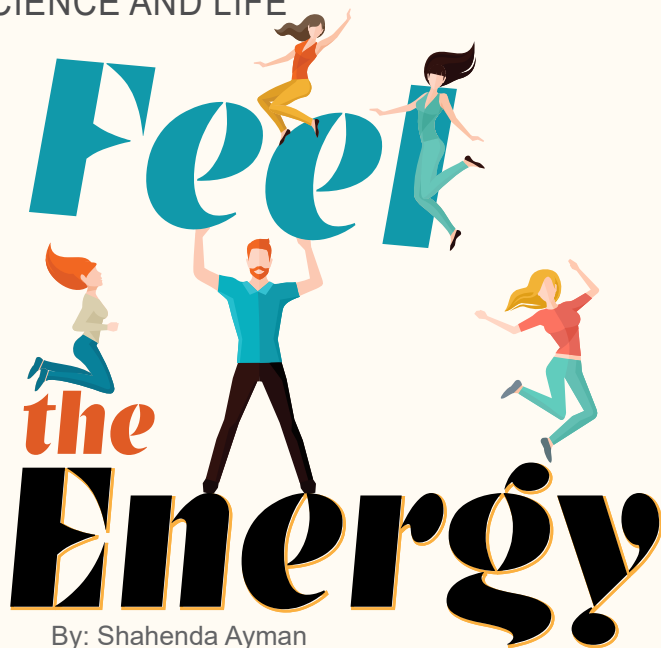
The art of design, and the science of how we think, are actually closely linked, especially when it comes to color. For example, fiery vibrant colors stimulate the brain to boost hunger; on the other hand, the widespread use of gray in the workplace creates calm, composed moods that help workers concentrate and work harder. Light, shadow, and color seem so simple and straightforward, but there is more than meets the eye, especially to people like Laura Bellia.

Bellia is an industrial engineer at the University of Naples, Italy, who studies lighting and its impacts on people. She wanted to understand how the human eye interprets wall colors when different lights are applied to them. She added that it is important to carefully choose sources of light with the proper color for walls, because walls can change the distribution of the light as it arrives to the eyes. Some of Bellia's findings are described in a paper published in the journal *Lighting Research & Technology*.

In reality, applying science in interior design is quite challenging; researchers have to first build something, then test it, and compare it with a control building, which requires time and money. While researchers have limited ability to carry out experimental trials, there is another way to find out the impacts of a designed environment: retrospective studies.

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Feel the Energy

By: Shahenda Ayman

Our homes are our comfort zones, where we crawl to escape life stresses. However, this is not the case for all people; some people feel bummed out in their own homes as a result of the negative energy build up in the home. This is because our feelings, thoughts, and emotions emit a certain type of energy, and also attract other energies.

Many quantum physicists determined that human emotions are “energy in motion” surrounding our bodies. Dr. Bradley Nelson, the author and founder of *The Emotion Code*, claims that emotions, and their resulting energy, are so powerful in fact, that they can literally determine the experiences we bring to ourselves. When exposed to negative thoughts, or “energy”, our DNA responds by tightening up, becoming shorter and switching off many of our DNA codes. However, when experiencing love, joy, gratitude, and appreciation, the DNA relaxes and the strands unwound and become longer.

This means that any negative or lower frequency emotions—“energy”—can have a damaging effect on your body. Studies have also shown that changing the frequency of a diseased cell, including cancerous cells, can stop them from growing or spreading. Beside your own energy, which keeps you happy and healthy, the energy of your home is also very important. Like anything else, your home has a specific energy, which means you can raise it to create a more welcoming and comfortable space for you and your family, and anyone who enters it.

Many quantum physicists determined that human emotions are “energy in motion” surrounding our bodies.

There are many reasons behind the existence of negative energy at homes; however, human thoughts and emotions are the most frequent. Pessimism, anger, or jealousy, can build up negative energy in the atmosphere. Sometimes, it is found naturally all around us in the environment; when high levels are present, people become depressed and anxious.

A new research suggests that human tears emit a chemical that other people detect and respond to. Another research by Wen Zhou and Denise Chen of Rice University demonstrated that human sweat glands emit distinct chemicals when people experience different emotions. They showed evidence that other people can sense those chemicals at a later point in time. Taken together, these new findings suggest that our intuitive beliefs in emotional residue may be more than just superstition.

The signs of negative energy can be detected by our physical senses, as well as feelings. For example, bad odors of unknown origin that appear and disappear quickly can be a sign; strong feelings of oppression and being constantly watched are another. When the room or house feels very heavy and uncomfortable to be in, you may experience nausea, headaches, or other ailments; upon leaving the location, you immediately feel better.

When you limit the amount of negative energy, your life will definitely be happier. There are many ways to remove negative energy from your space

Cleaning

Cleaning your home should be on your priority list to fill the area with more positivity, because clutter and dirt attract negative energy. This explains why you feel good when you enter a clean and clutter-free room, and the opposite happens when you enter a dirty, and messy room.

Clean and vacuum each and every room of your home regularly. Make sure to clean your cooking area and kitchen of dirty dishes every night. Keep your stuff organized and put them in their designated place. Get rid of things you do not need anymore because clutter appears there.

Smudging

Smudging is considered one of the oldest and most effective ways to remove negative energy from your home. Sage is the most popular herb for smudging; when burned, it releases large amounts of negatively-charged ions in the air, which neutralize the positive charge in the air. The aroma of sage is relaxing and soothing; moreover, negative ions improve your sense of wellbeing and mental clarity.

Before smudging, clean your house and open all the doors and windows, as well as cupboards and drawers. Start off by cleansing yourself by lightly fanning the smoke into your body from the feet up to your head. Then, walk slowly around your home, swirling it in circular motions, concentrating on the walls, corners, floor, as well as the ceiling.

Sunlight and Fresh Air

The simplest way to boost positivity in your life, as well as your home, is to let sunrays and fresh air enter your home; they have inconceivable cleansing powers. Open your windows and doors in the early morning to allow fresh air and sunlight in, and negative energy out. You can even expose your body to early morning sunlight by standing in the window or balcony every morning; this will boost the production of vitamin D in your body, which is important for your overall health. Bright sunlight also relieves anxiety and reduces depression. Sunlight is not only important for your body, or for absorbing the negative energy from your room, you must also dry out

your washed laundry in sunlight and expose your plants to sunlight from time to time.

Every time you feel depressed or feel that your home is gloomy, try any of the above-mentioned methods. They say “a happy wife means a happy life”; it seems that “a happy house means a happy life”; as we spend most of our time at home, we need to keep it as happy as possible.

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WATER FILTERS

About 71% of the Earth's surface is water-covered, ranging from seas, salty oceans, and frozen Poles, to freshwater found in groundwater, rivers, and some lakes. Out of all the water on Earth, freshwater makes up about 3% only; yet, is it really safe to drink?

By: Fatma Asiel

Several thousands of years ago, the answer could have been "Yes"; now, however, different pollutants have affected environmental resources, including water, and the answer is no longer "Yes"! Nowadays, in several developing, as well as developed countries, it would be rare to find a house without a water filter, to acquire fresh and clean water, prevent diseases, and enjoy great taste.

Water Treatment History

Water filters are regarded as a modern invention; in fact, the idea is ancient, dating back to when Man first learnt the importance of obtaining clean water to drink. The earliest documentation of water treatment was found in Sanskrit writings dating back to about 2000 years ago. Methods used then included boiling water or dipping heated metal tools into it to improve its taste, as in Ancient Times, people determined the purity of water by taste.

Later on, the famous Greek physician, Hippocrates, invented his own filter, which was made of a cloth pouch to trap sediments of boiled water and produce clean water. In 1627, a breakthrough occurred in the history of water treatment when Sir Francis Bacon invented the first seawater desalination and purification technique by means of sand filtration. Through the following centuries, water filtration evolved to the technology existing nowadays.

How do water filters work?

Water filters apply two basic techniques:

- **Physical filtration** is straining water by removing minute solid particles, whether organic deposits or chemical sediments.
- **Chemical filtration** involves passing water through an active material, which removes pollutants and sediments chemically as they pass through.



There are four types of water filters:

- 1) Activated carbon filter is the most common household water filter, which is based on charcoal that removes impurities and sediments chemically from water. While great for removing all common water pollutants, including chlorine-based chemicals, activated carbon filters cannot cope with heavy metals, such as sodium; thus, the filters eventually clog up with impurities.
- 2) Reverse osmosis filters pass water through a very fine membrane at high pressure, so contaminants remain behind.
- 3) Ion-exchange filters are designed to split apart atoms of contaminating substances to make electrically charged ions, which exchange harmful ions for useful ones.
- 4) Distillation filters purify water by boiling it; since water boils at a lower temperature than toxic heavy metals, they remain behind as the steam separates away and boils off. Unfortunately, some Volatile Organic Compounds (VOCs) boil at a lower temperature than water, which means that they evaporate with the steam and cannot be removed by the distillation process.

The main benefit of using water filters is obtaining safe drinking water with no impurities, harmful chemical compounds, or toxic metals, thereby improving health and reducing waterborne disease and cancer risks. Despite the wonderful benefits of water filters, they have some disadvantages if the disposable water filter cartridges are not replaced periodically. In this case, the filter does not work effectively, reduces useful salt and mineral amounts in water, and loses its utility.

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Cookware

Mendace

By: Jailane Salem

Food is our fuel; without it, people cannot function. While the number of restaurants has increased tremendously, nothing beats a home-cooked meal. Not only is there great nutritional value, but also there is a sentimental one. Yet, while some families have certain recipes jealously guarded and unchanged from one generation to the next, the same cannot be said of the cookware used to make those recipes.

Cooking is such an integral part of the human experience that in most museums one will find cooking and eating utensils on display. Early cookware was made from naturally occurring materials such as clay and wood, until ceramic, cast iron, and copper cookware were developed. We have all seen the old cookware our grandparents used for cooking; simple looking pots made from aluminium in most cases. Nowadays, however, cookware options are endless; every couple of years or so, a new trend emerges in the cooking pot category.

An interesting development that became key for modern cookware was non-stick cookware; it was marketed as the healthier option for cooking since less fat will be needed in the cooking process. Not only that, for those having to clean and wash the pans, the cleaning process was meant to be easy and quick. The non-stick pan innovation was popularized by the brand known as Teflon.

Teflon used a manmade chemical, Polytetrafluoroethylene (PTFE), in their pans to make them non-stick. This synthetic resin is non-flammable and has a waxy, slippery, and tough quality to it, as well as a high melting point; it also does not interact with other chemicals. It is produced by the polymerization of tetrafluoroethylene and was discovered by coincidence by American chemist Roy Plunkett in 1938. However, it was not used in cookware manufacturing until the 1960s when the first Teflon pans were

released. They were highly in demand that many other brands followed afterwards.

Nevertheless, it has turned out that the use of PTFE in cookware is somewhat problematic. During the manufacturing process of PTFE, an acid known as Perfluorooctanoic (PFOA) is used. This, too, is a manmade chemical; whilst it burns off during the process of making PTFE, a small percentage remains in the final



product. What has recently been discovered is that PFOA is possibly carcinogenic, which means that those living in close proximity to plants that manufacture it are at a higher risk of developing cancer. It has also been discovered that once it enters the environment or the human body it can remain for a long period of time.

In regards to PTFE coated cookware, there is concern, because when heated beyond a certain point, PTFE coated cookware can release fumes that contain PFOA. When inhaled, these fumes can cause flu-like symptoms, which are sometimes called "Teflon flu". Most people do not make the connection to PFOA exposure, because the symptoms usually take a few hours to be revealed and people tend to think that they actually have the flu.

Nowadays, however, cookware options are endless; every couple of years or so, a new trend emerges in the cooking pot category.

These risks of using such non-stick gave rise to alternative non-stick cookware known as ceramic coated cookware, which is made from metal that is coated with a layer of ceramic made from inorganic materials. These inorganic materials are applied through a process called Sol-gel, where the liquid inorganic materials are transformed into a gel that can adhere to metals in one coating.

While that type of cookware is touted as more environmentally friendly and safer for use—as it tends to withstand higher temperatures without the risk of cracking or being damaged—there are still some risk factors. These occur when manufacturers do not adhere to regulations that warn against the use of lead and/or cadmium in the ceramic coating material. Some traces of these have been found in some ceramic glazes, which is why it is important to be sure that one is purchasing from a reputable seller.

While manufacturers have been trying to innovate and improve performance of cookware, we have yet to reach the ideal, especially as newer manmade chemicals have yet to be understood fully. What one has to do is always be on the lookout for a better and healthier option, and to always try and use the cookware one has, according to the instructions it came with, so as to avoid any potential hazards that can be the outcome of misuse.

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How Cooking Affects the Nutrient Content of Vegetables

By: Fatma Asiel



Vegetables are key providers of our essential nutritional needs, such as vitamins, minerals, and fibers. As such, different kinds of vegetables are part and parcel of any healthy diet. Vegetables can be served fresh, squeezed and filtered, or cooked by different techniques; but, do vegetables maintain their full nutritional value after cooking?

You may be surprised to know that they already lose some value right after harvest; that is, long before getting cooked. However, vegetables lose much value upon cooking, which is why it is advisable to eat them fresh whenever possible. Moreover, keeping vegetables in the refrigerator in case you will not eat them on the same day lessens the nutritional loss.

Unfortunately, some kinds of vegetables are not edible if not cooked, so they cannot be consumed fresh. Yet, not all cooking techniques have the same effect on the nutritional value; some techniques tend to preserve as much nutrients as possible after cooking.

Poaching

You can cook vegetables by submerging them in boiling water under different temperatures. A study conducted on broccoli found that over 50% of vitamin C is lost when poached in water. Moreover, poaching negatively affects the glucosinolates compounds that protect our bodies against cancer. Glucosinolates easily dissolve in water; and are, therefore, lost when vegetables are poached. Poaching also affects the nutritional value of leafy vegetables, such as spinach, a large amount of chlorophyll is lost, which is responsible for their green color.

Grilling

It is undeniable that grilling is among the best cooking techniques used around the world; it gives a unique flavor and a strong taste, not only to vegetables, but also to beef and chicken. Grilling allows us to enjoy healthy foods without boiling them; however,

it might cause the loss of some vitamins and minerals, particularly if the vegetables lose their juices during grilling.

Frying

Frying food in vegetable or hydrogenated oil is notorious for adding large quantities of complex fats to our food; yet, the harm of

frying vegetables does not stop there. Deep frying causes the loss of over 60% of the carotenoids, which are the substances that provide vegetables with their red, orange, or yellow colors as in sweet potato and carrots. Carotenoids are also antioxidants, and therefore, are important for our wellbeing.

Microwaving

This cooking technique was not known decades ago; yet, it has become popular thanks to its speed and the better taste it gives to vegetables. Microwaving does not affect the vegetables carotenoids; however, it causes the loss of much of the glucosinolates and vitamin C. The percentage of losing vital compounds and vitamins depends on the duration and temperature of microwaving.

Steaming

Steaming is one of the safest and best techniques for cooking vegetables, as it preserves as much vitamins and nutrients as possible. One study found that steaming vegetables causes the loss of only 15% of vitamin C maximum. However, the problem is that the taste of steamed vegetables is not appreciated by many people.

Tips for preserving food nutrients during cooking

- Do not let vegetables lose their juices while grilling.
- Poach vegetables in a small amount of water.
- Do not microwave vegetables under high temperatures and for long durations.
- When steaming vegetables, add some spices and lemon to obtain a better taste.

Before cooking vegetables, we should always investigate the best technique to preserve as much nutritional value as possible. The used cooking method should not prevent our bodies from the healthy nutrients they would benefit from. Also, taste should not be given priority over value. Last but not least, remember that it is always possible to enjoy tasty food with high nutritional value through following some simple tips.

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Pet Friendly

By: Mariam Elsayed

Pets are domestic animals kept for companionship and entertainment, as they are friendly and loyal. Pets include, among many others, birds, hamsters, and rabbits, but the most popular are definitely cats and dogs. It is easy to own a pet, but it is challenging to take care of it.

Once you own a pet, you have to know how to provide it with the special care it needs. Make sure to provide it with a dry, safe, and frequently cleaned place with adequate amount of healthy food and clean water to decrease the risk of diseases. It is also important to provide them access to a constant litter box to prevent them from contaminating their bedding; try not to change the box's place frequently in order not to confuse them.

Health-wise, pets as cats and dogs can develop diabetes and kidney diseases. Diabetes can be controlled in pets as humans by certain medicines, well planned diet and exercise; unlike diabetes, kidney diseases, which are more common in cats than dogs, are incurable. When it comes to zoonotic diseases, which can be transmitted from animals to humans, vaccines play a crucial role in protecting the health of pets and consequently, that of their owners. Thus, you have to make a vaccine schedule by the recommendation of a trusted veterinarian.

Humans can be infected by a bite from an unvaccinated dog infected with rabies, which is one of the most serious zoonotic viruses, affecting the nervous system and becoming fatal if not treated properly. On the other hand, the most famous cat zoonotic disease is toxoplasmosis, caused by the *Toxoplasma gondii* parasite. It may be transmitted to humans by direct contact with an infected cat fecal matter only, not from the cat itself,

causing miscarriage of pregnant women. Unfortunately, no vaccine is discovered for toxoplasmosis yet, but you can protect your cat by not feeding it raw or unwell cooked meat.

The most common pet disease is mange, which is caused by many types of mites and can transmit to human by direct contact with the infected pet. You can notice the infection of your pet when it intensively scratches, licks the infected parts of its body, and loses lots of hair. Ticks are common in pets as well; you can see them on dogs more than cats, because cats stay at home and are not walked like dogs, and they also clean themselves, which increases their ability to get rid of ticks on their own. Ticks are very dangerous, as they can easily transmit many diseases to your pet; once you notice any extraordinary behavior or any symptoms, take your pet to the veterinary clinic, but you need to be careful how you carry it.

As animals are unpredictable, you have to learn how to handle them properly; carrying a pet depends mainly on its breed, weight, and size. For example, the best way to carry a cat is to put your hand around its chest then raise it up; once its hind limbs leave the ground, support them by your other hand, never leaving them, then move the cat towards your chest, so that the cat feels safe and secured. On the other hand, it is not advised to scruff your cat by carrying it from the loose skin around the back of its neck as the mother carries her kittens, unless it is necessary. You can use the scruff method with a stray cat or an aggressive one; it will make it calmer properly through the releasing of a relaxing hormone. However, cats do not like this method as it hurts them, because the cat's weight will be loaded on its

neck, causing it pain, so make sure to support its hind limbs by your other hand to decrease this load.

While carrying quite a heavy dog, it is better to stand facing the dog's side then start to wrap your arms around its body; one arm under its neck reaching the front leg and the other under the rump reaching the back leg. This method will not work with a very heavy dog so you must ask for someone's help.

Dogs and cats are like kids; they love to play and to have their own toys. A healthy dog should be walked for at least half-an-hour a day, or spend time carrying out exercises. Owning a pet is more than just having an animal to play with; they are a responsibility to take with a loving heart and an educated mind.

Once you own a pet, you have to know how to provide it with the special care it needs. Make sure to provide it with a dry, safe, and frequently cleaned place with adequate amount of healthy food and clean water to decrease the risk of diseases.

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Chemistry

and



Beauty



Despite the beauty of Chemistry, which continues to successfully astonish us with new inventions to meet our daily needs, it remains a double-edged weapon. For example, women pay a lot of attention to their looks without considering the potential harm of using some products such as hair dye and nail polish for a long time, the result of which may be the destruction of their beauty, or even illness.

By: Rokaya Samir

As for temporary pigments, they are the contrary of permanent dyes; they place the dye particles on the outer layer of melanin only and do not penetrate into the hair follicles. Besides that, the presence of a small amount of oxidizing agents, such as hydrogen peroxide, ensures finalizing the hair dyeing process in an alkaline medium; this amount makes the dye temporary. Temporary dyes do not contain ammonia or its alternatives, so it fades after applying shampoo repeatedly on hair.

Hair dyeing has harmful effects; it destroys the hair on the long run, and in some cases, may lead to severe sensitivity resulting in some deaths. Some studies discovered a relation between using hair dyes and increased rates of bladder cancer; thus, it is preferable to use gloves while applying dyes to hair.

Nail Polish Chemistry

Nail polish consists of nitrocellulose, in addition to other chemicals that give it its different colors—such as green chromium oxide, titanium dioxide, ferric oxide, manganese, mica, ultramarines—as well as UV rays filters in order not to change its color when exposed to sunlight. Moreover, some thickening agents* are added to keep the luminous particles shiny for a long time inside the container.

The danger of using nail polish lies in the presence of so-called triple toxins: formaldehyde, toluene, and dibutyl phthalate. Formaldehyde gives a strong volume to the nail polish, toluene gives it its soft appearance, and dibutyl phthalate prevents it from dryness.

Formaldehyde is known to be a carcinogenic substance; while toluene reduces blood cells, destroys the liver, and causes congenital malformations in fetuses. What is strange about nail polish is that it may harm you severely when you try to remove it; that happens because we use acetone to remove nail polish. Acetone inhalation leads to eye redness, pulmonary congestion, and dyspnea; frequent exposure to acetone causes chronic

inflammation of the trachea and difficulty in breathing.

It is worth mentioning that there are nail polish removers that are acetone free, but contain other toxic chemicals, such as ethyl acetate, which is similar in its toxicity to acetone and toluene. There is also methanol, which is more toxic than acetone; it causes coughing, dizziness, vision disorder, blindness, or coma, according to the degree of inhalation or swallowing.

These materials do not only harm user health, but also harm the health of the workers at nail polish companies and beauty center employees, because they are exposed to these substances for long times. Recently, a more advanced type of nail polish emerged; synthetic gel nail polish lasts for several weeks, equating three times traditional nail polish is applied. Every layer of the polish is braced with UV rays, increasing the risk of cancer.

To reduce potential side effects of using nail polish, we recommend using water-based nail polish, as it does not release any toxins.

Last but not least, research and studies will continue to study the chemicals that humans use on daily bases, in an attempt to find alternatives less harmful on human health while meeting our needs. Knowing their side effects, we should reduce our usage of these materials to maintain good health and avoid illness.

Glossary

***Thickening agents:** Substances when added to any water mixture increase its viscosity without any fundamental change in its other properties.

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SKINCARE SECRETS

By: Jailane Salem

While not everyone is super invested in taking care of their skin, there is at least one moisturizing cream in every household. These creams are especially handy during wintertime when our skin tends to get dry, especially after washing our hands. This modern comfort of having nice-smelling cream to make us feel soft and supple is nothing new; skincare has been around for thousands of years.

Nowadays, we see endless advertisements for the newest and latest addition to the skincare world "Skincare is the biggest segment in the beauty industry with its global sales expected to cross USD 130 billion by 2019". Skincare routines have indeed become extremely elaborate; one has to cleanse, tone, exfoliate, moisturize, peel, extract, and so on and so forth! Various products promise



to make us feel refreshed, renewed, rejuvenated, and forever youthful! Such grand promises, but do they deliver?



Before delving into the skincare of today, let us first take a short detour to revisit the skincare of the past. We all heard of Cleopatra bathing in milk to retain her youth, but how else did the Ancient Egyptians take care of their skin? Oils were a key feature in their regimen, which included the likes of sesame, olive, and castor oil. These oils helped keep their skin well balanced and youthful, as well as moisturized. Many also applied masks, such as honey and milk; they also used scrubs made from aloe-vera, oils, and sometimes even mixed with sand, to exfoliate dead skin.

Across the Mediterranean, the Ancient Greeks followed some of these practices

as well. Honey, milk, and yogurt were used for their anti-aging properties. Honey especially has antibacterial properties that protect the skin and deeply nourish it. The Greeks also realized the great properties to be found in fruits, especially berries; they would grind them up into a paste and apply them to the face. Berries have a multitude of benefits; they are rich in vitamins A and C, antioxidants, and their acidic nature serve as a great exfoliant. The vitamins maintain a healthy level of collagen in the skin, which in turn provides that plump and youthful look to the skin.



In China, during the Qin Dynasty, recordings of an Empress skincare regimen survived and is interesting to examine given the different ingredients she used. For her, skincare was linked



with ingested food; she believed that eating sesame seeds, black beans, as well as yam, were greatly beneficial. She also used seaweed and jellyfish for their cleansing properties; interestingly, seaweed is still used in skincare in parts of Asia to this day. Seaweed is rich in vitamins, minerals, and antioxidants that help protect and regenerate the skin. It has anti-inflammatory properties that can help soothe acne, as well as rosacea and skin inflammation. The Empress also did facial massages, using hands or some utensils to help exercise and lift facial muscles. This practice is believed to help tone facial muscles, as well as propagate better blood circulation; therefore, keeping the elasticity of the face.

While our ancestors relied on natural ingredients that were not heavily processed, things are different for us. In addition to the natural path of our ancestors, we also have the option of buying ready-made skincare products that are specifically manufactured to help target specific skin concerns.

Our skin is the body's shield against the outside world; it is coated with what is known as the acid mantle, which is a thin acidic film that acts as our buffer against external elements, keeping bacteria and pollutants that may otherwise penetrate our skin at bay. The pH of facial skin usually rests around 5.5, keeping it on the acidic side; when choosing skincare



products, one must keep in mind that it should not be too acidic or too alkaline.

What makes our own skincare is the special attention that is given to ingredients and their beneficial properties, which are studied in depth in a scientific manner. Each year brings on new trends and innovations; if you peruse what is available in the market, certain ingredients will keep coming up. These include, but are not limited to antioxidants, Alpha Hydroxy Acid (AHA), and Beta Hydroxy Acid (BHA).

Antioxidants counteract the effects of free radicals, which are molecules or atoms that are missing an electron. Free radicals set in motion a domino effect; they keep destabilizing neighboring healthy atoms in their quest to become stable, causing cell membranes to break, disrupting and damaging healthy cells. Free radicals can be found everywhere, from the environment to the food we consume, and they have been linked to skin diseases and premature ageing. They can turn the oils naturally found in our facial skin rancid, causing damage to collagen, which is key for the well-being of our skin, as it is the main protein in our tissues that gives our skin its strength and elasticity. With depleted collagen, sagging of the skin occurs and fine lines and wrinkles become more pronounced.



Antioxidants have the ability to neutralize the effect of free radicals and calm down their disruptive nature; products do that in two ways. On the one hand, they can break the chain reaction through donating electrons to free radicals; hence, rebalancing the skin tissue. On the other hand, they can prevent oxidation from occurring in the first place. Many topical antioxidant products can be found in stores; their ingredients include vitamins A, C, or E. However, since antioxidants block the process of oxidation, they themselves become oxidized, making the fight against free radical damage ongoing.



To that end, one needs to reapply antioxidants on a regular basis.

AHAs are chemicals that can occur naturally or be synthesized in the lab; they are water soluble and tend to work on the skin's surface. A popular AHA is glycolic acid, which can be found in moisturizers, peels, and serums. AHAs help exfoliate dead skin cells by dissolving the bonds that hold skin cells together. As a result, pores become unblocked and fewer bacteria would build up on the skin, preventing spots and other skin issues; the process also helps reveal newer and smoother skin.

Unlike AHAs, BHAs are oil soluble; they have higher penetrative powers and work on the skin's surface, as well as inside pores. In skincare, this chemical is used to fight against acne prone skin, and has anti-bacterial and anti-inflammatory properties that help the skin fight off irritants. It is usually better suited for those with oilier skin, as it can be drying.

Taking care of one's skin is a delicate affair, because different skin types react differently to different skincare products. If misused, some skincare products can damage the skin's natural protective abilities instead of fortifying it. Accordingly, paying a visit to a dermatologist is always a good idea; they can help you navigate the modern skincare labyrinth and set you off on the right path for a healthier and more glowing skin.

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Chêering; CURIOSITY

By: Esraa Ali

Parents always complain about their toddlers, who keep destroying everything at home, to know what is inside, or about their young children who keep wondering and repeating the same questions over and over again. It could be annoying for anybody; the truth is, however, as children question, wonder, and explore, they actually learn.

Encouraging your children's natural curiosity and passion about learning helps them grow, explore the world they live in, and develop a scientific mind. While your toddlers turn the light of the room on and off over and over again, they learn about cause and effect. Pouring liquids into different-shaped containers, over their clothes and over rugs means that your children are learning about mass and volume. Thus, you need to foster your children's curiosity and support them to develop appreciation and love of science.

The Cycle of Curiosity

Children's world is composed of incalculable new things to discover. Since birth, they are curious about this new world they are experiencing for the very first time. They learn new words, meet new people, visit new places, and play new games; more often than not, they use their senses to explore their world. A curious child will continue to explore and discover for the pleasure it provides. Pleasure and joy of exploration forces the child positively to repeat his/her exploration every day. Repetition leads to mastering new concepts that provide the child more confidence, which

in turn increases the child's willingness to be more curious.

Throughout that positive cycle of curiosity, children grow and learn every day. Scientific research has proven that children who often wonder and explore their surrounding world progress better in their studies and relationships, as well as their work as they grow older, and become more intelligent, creative, and satisfied people.

How to Encourage Curiosity?

Encourage your children's curiosity by teaching them to be flexible thinkers and doers; teach them to view the world from different perspectives. For example, instead of teaching them a certain technique for playing puzzle or LEGO, show them that what is important is having an output through putting the pieces together, but there is no single way to do this right. Show them final outputs of the combined pieces and let them unleash their imagination by making different combinations and watch their own results.

Providing your children with an environment that supports their autonomy and make personal choices encourages curiosity. Try to involve your children in various activities of their interest and give them challenges to push their skills to the limit; alternatively, your children would be prey of boredom and worry. If you need your children to get involved in a certain activity, provide

them with the rationale for its benefit and importance to them, rather than pressing them to do it, as they would likely rebel against your control. Attempt to identify your children's interests, be responsive to what they care about, and help them locate a meaningful connection to their activities to evade boredom and flourish their curiosity.

"Parents must have the courage to say: Yes" says Todd Kashdan, Clinical Psychologist and Professor of Psychology at George Mason University. You need to help your child feel competent; otherwise, they would flee rather than explore. Parents need not only focus their children's attention on what is only mysterious or uncertain in their surrounding world. They should allow more time also for playing, which is free of constraints and the fear of failure



and errors, beside praising their actions and providing them with constructive feedback.

Try to select new activities for your child, or make fine adjustments to their beloved ones. For example, if your child loves cooking, do not restrict him/her to a certain recipe; allow them to become more creative with the ingredients. You may also play music they appreciate in the background and invite their friends to join. Your child will never forget that new experience, be open to new experiences, and feel more comfortable to their curious nature.

Children need to feel secure and have a support system to help them act on curiosity and experiment new things. A secure child would tend to feel more comfortable and excited, would explore and ask dozens of questions. Curiosity arises from the safe and the familiar; thus, supporting your child's exploration lets them be themselves and make them more curious to pursue more activities with greater enthusiasm.

When you share with your children their interests, and listen to them, be responsive to their past experiences, and be part of their future plans; they would feel more comfortable. Moreover, accepting all your children's positive and negative feelings help them do the same, and in turn enhance their curiosity and strengthen your relationship.

The Do's and Don'ts

You can go on nature walks and ask about your child's opinion in animal footprints, different types of plants, or even look for bugs. You can also try one or more experiments in the kitchen. Look around the house and try different experiments that amaze your child and trigger their curiosity. You can watch different items floating and sinking in



water, or build a volcano from baking soda and vinegar.

You can also observe the weather everyday together; ask your child to write a journal about it and take pictures of it. Ask your child to review his/her journal and write their own notes about the changes he/she witnesses. You can also check the weather worldwide and compare it to the weather in your own town.

Try to go on field trips together, by visiting the zoo or a science museum; these places are designed to trigger visitor's curiosity. You may also try to grow a plant together and watch its growth everyday as he/she grows too. Such experiences will be imprinted in your child's mind forever.

Several parents would notice curiosity fading in their children. This phenomenon could be noted in making fewer new friends, joining fewer social groups, reading fewer books, and losing interest in new experiences. These signs are a serious alert for parents; as the saying goes "Curiosity dimmed is a future denied". The less curious your children are, the harder you can teach them, because you will find difficulty in inspiring and motivating them.

When children are afraid, they will seek the familiar and stay in their comfort zone. Fear kills children's curiosity; they will be afraid of novelty and will

be unwilling to explore new things. Fear could result from family distress, violence, war, or natural disasters, which all crush the enthusiastic exploration of a curious child.

Absence is another major factor that hinders exploration. The absence of a caring adult kills the sense of safety that helps the child discover new things, as well as the pleasure of sharing their discovery and feeling that someone is supporting them. On the other hand, adults' continuous disapproval also constrains child's exploration of the world. Children respond to our fears and attitudes; thus, a repeated "Don't", or an expression of disgust towards mud on their shoes for example, will diminish their curious nature and joy of getting in touch with nature in your house garden or your next family trip.

Millions saw the apple fall, but Newton asked Why?!

Nobody can feel good all the time; the same is true for children. However, you can keep your children open-minded, curious, and profoundly aware of their surrounding world. Training your children to live a meaningful life and become more curious explorers will be the seeds of building their personalities and having their own story of life.

Parenting, on the other hand, does not have a right and wrong manual; yet, it is a difficult task. As you raise your child, read more and remember that you are both liable to trial and error. Having that mindset will help you acquire happiness and wisdom, and above all, understand the true meaning of a good life.



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déjà vu

between ILLUSION & TRUTH

Have any of you ever felt like they have already experienced a present situation? It is a strange and unique phenomenon that takes place in the human mind, best known as *Déjà vu* (already seen).

The term *Déjà vu* was coined by French scientist Émile Boirac, in 1876, in his book *The Psychology of the Future*. Although several scientists attempted to come up with other equivalent or explanatory terms, “*Déjà vu*” has remained the most used. Swiss psychologist Arthur Funkhouser classified the *Déjà vu* phenomenon into three categories: *Déjà vécu* (already lived), *Déjà senti* (already felt), and *Déjà visité* (already visited), all involving a sudden feeling that the person has experienced the current moment before.

Several scientists attempted to connect this phenomenon to a mental or psychological disorder that a person might be suffering from. However, this assumption was dismissed because it turned out that all people experience *Déjà vu* at least once. *Déjà vu* is closely related to the way the brain records an immediate event and how the two hemispheres coordinate this complex process. It is also related to the increased percentage of the dopamine neurotransmitters in some of the brain temporal lobe cells. Some scientists relate it to a defect in the process of emitting electrical charges in the brain.

Another scientific explanation of this phenomenon is based on the fact that the brain is divided into areas responsible

for different functions. For example, the visual center is in the back part of the brain, while the hearing centers are on the sides of the brain, etc. When a person sees something, it is first deciphered by the visual center that is only responsible for translating signs into images. Understanding new images or remembering familiar ones, on the other hand, takes place in the cognitive center. Sometimes, a delay occurs between the two processes allowing the photo to arrive to the memory center before the recognition center; hence, the brain thinks it saw it before.

Another explanation of *Déjà vu* is that, when a person exists in a certain place or experiences a certain situation, the incident is translated into neural signals. The neurons then send these signals to be saved in the short memory. This process takes place in a fraction of a second; yet, sometimes, the neurons send the same signals to the long memory by mistake, causing the feeling of *Déjà vu*.

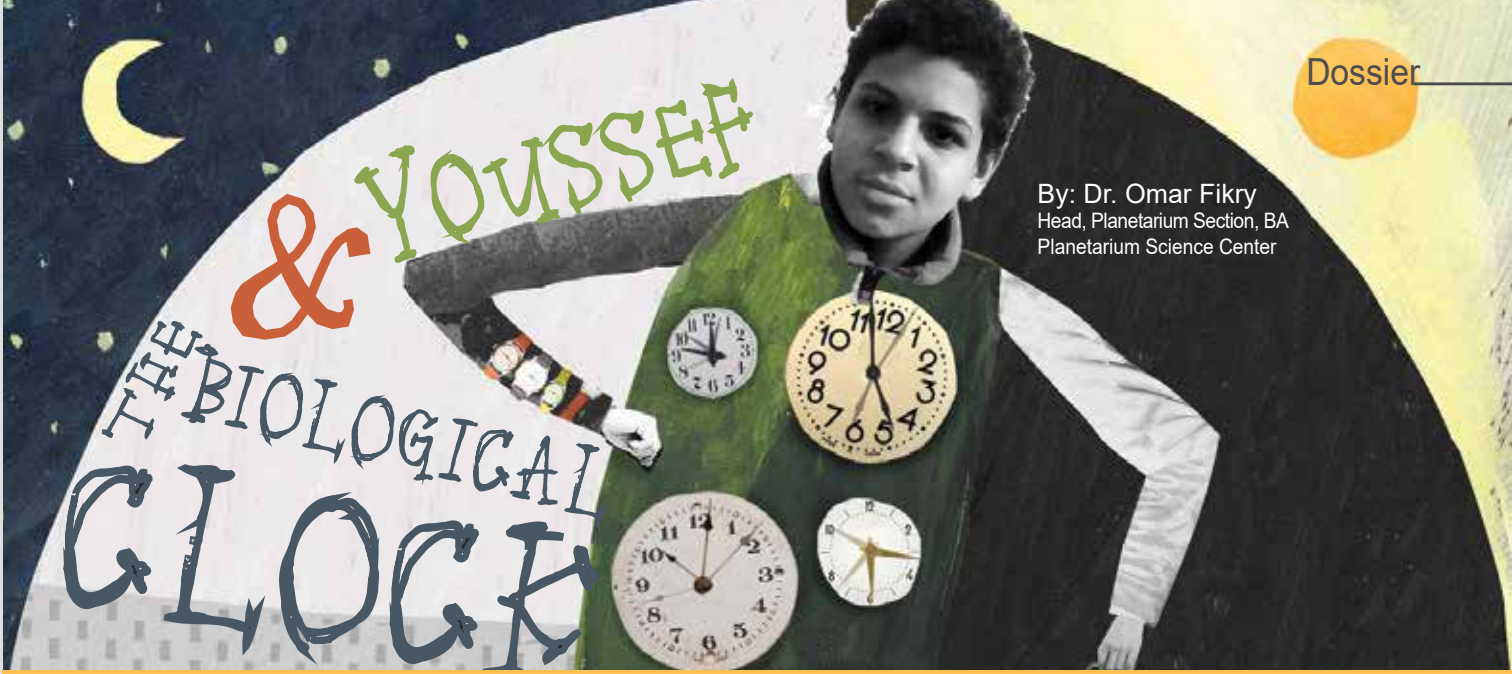
As the long memory saves an infinite number of memories, this phenomenon can result from an experience we lived in the past and forgot. Yet, we could retrieve that experience, which made us

think we experienced the situation twice. The point is that the human brain does not delete any piece of information it records, even if we forget it. Moreover, since the memories of the subconscious mind exceed those of the conscious mind by millions of times, what was recorded in the subconscious mind years ago will be summoned and remembered once the situation is repeated.

A metaphysical point of view considers *Déjà vu* a sixth sense that enables the super powerful human mind to capture the onset of events before they take place and complete it. Hence, when the event actually starts, the person thinks s/he experienced it before. Despite several explanations, there is no final scientific say about the *Déjà vu* reasons. It is not confirmed whether it has indications to the brain's position, its electrical charges, or the chemistry governing its vital processes. The case is still ambiguous and uncertain.

Déjà vu is a unique phenomenon of the human mind, which the Great Creator finely designed “and mankind have not been given of knowledge except a little”. *Surat Al-Israa* (verse 85).

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& YOUSSEF THE BIOLOGICAL CLOCK

My son Youssef is a middle school student. He likes scientific subjects and discoveries. He watches only science and discovery channels and programs such as *Please Your Mind*, *The Magic of Physics*, etc. In one of our discussions, Youssef said: "How can I become a scientist and win a Nobel Prize?"

I advised him: "You should study hard, believe in your studies, set a goal for yourself, and strive to achieve it. You may enroll at the Faculty of Science or Medicine, for example. Then you may contact international scientists, discuss scientific issues not tackled, and you will serve humanity by your research results."

Youssef asked: "Like Ahmed Zewail?"

I replied: "Exactly, but you should know that winning a Nobel Prize is not as easy. Do you know who was awarded the Nobel Prize in Medicine in 2017?"

Youssef eagerly replied: "Yes, it was shared between three American scientists for their discovery of the genes responsible for the biological clock in living organisms."

I asked: "Do you know their age and the story of their research?"

He replied: "No, father."

I said: "They are Dr. Jeffrey C. Hall, 72 years old; Dr. Michael Rosbash, 73 years old; and Dr. Michael W. Young, 68 years old."

Youssef wondered: "Why didn't they receive the Prize at a younger age?!"

My reply was: "The story began in 1984, when attempted to understand the genes responsible for the biological clock in fruit flies."

He interrupted me saying: "Why did they research specifically fruit flies?"

I replied: "It seems you are not familiar with the term biological clock."

He said in denial: "It is something inside the human brain that automatically controls our sleep and wake up times."

I resumed: "You are correct; it is also responsible for major changes in behavior, mood, and body functions. Almost every cell in the human body, plants, animals, even fungi, have something similar to a clock. The temporary interruption of the biological clock during long flights causes a disorder known as "Jet Lag", which hinders the human body from adapting to the surrounding new place after traveling for long distances. This disorder results in digestive problems, headaches, insomnia, and sometimes temporary depression."

As for your inquiry about fruit flies, scientists found that "Period" gene encodes a protein known as "PER", which accumulates in fruit fly cells overnight before being broken down in the daytime. They found that the "PER" protein levels fluctuate and change over the 24-hour cycle, which represents the Earth cycle and synchronize with the biological clock rhythm in the fruit fly body."

Youssef commented: "How could they study genes that are not seen by the naked eye?"

I answered: "They use microscopic and micro-chemical analysis, which have developed over long years and helped the three scientists accomplish their research. At first, they thought that the sequential secretion and decomposition of proteins responsible for genes in cells result from the daytime light movement and darkness at night. When they

isolated the fruit fly in a dark place and other flies in a fully illuminated place for a continuous twenty-four hours, they observed no defect in secretion and decomposition of proteins responsible for the biological clock genes. Thus, they concluded that it is an internal process not affected by light and darkness, but is affected by the same rotation of Earth."

Again Youssef asked: "What are the benefits of these results, father?"

With relish I answered: "The benefits do not lie in the results of their fruit fly research only. They also noticed that the leaves of the mimosa tree are spread open during the day towards the Sun's direction, but fold up at night. They placed the plant in permanent darkness and discovered that the leaves continued their daily rhythm naturally. When they controlled the amount of protein responsible for the biological clock genes inside the cell, they found a way to control the behavior of certain vital activities."

I resumed: "The research's importance lies in discovering the mechanism of biological clock genes, which helps in controlling them and discovering treatments for several serious diseases resulting from its defect."

Youssef commented: "Indeed it is a complex and significant research."

I confirmed his words, saying: "The Nobel Prize Committee described their research as a complex one and offered them a prize worth USD 1.1 million to be shared equally among them."

Youssef thanked me, and resumed his study with gusto.

INTEL INTERNATIONAL SCIENCE AND ENGINEERING FAIR INTEL ISEF

By: Rania Farouk
Marketing Specialist, Planetarium Science Center

The Intel International Science and Engineering Fair (Intel ISEF), a program of Society for Science and the Public (the Society)*, is the world's largest international science competition for youth aged 14-18 years. Each year, approximately 1,700 students from more than 70 countries are offered the opportunity to showcase their scientific research and compete for an average USD 5 million in prizes. Intel ISEF is hosted each year in a different city in the United States of America; the Local Arrangements Committees from each city partner with the Society and Intel to provide support for the event.

The Bibliotheca Alexandrina (BA) Planetarium Science Center (PSC), in cooperation with the Ministry of Education, organizes the Intel Bibliotheca Alexandrina Science and Engineering Fair (Intel BASEF). Local assessments are handled over several stages, which qualify the winning projects to compete in Intel BASEF finals. Local affiliated fairs are held in Alexandria (covering Delta and Lower Egypt Governorates), Cairo (covering Cairo and Giza Governorates), and in one of Upper Egypt Governorates (covering Luxor and the central region Governorates). Intel BASEF winning projects represent Egypt in the Intel ISEF competition.

Intel BASEF welcomes school students, third preparatory to third secondary grades, to participate in the competition. Younger students could also attend to gain skills and experience, and get acquainted with this international competition. Students search for innovative ideas and can participate with an individual or team project—maximum two students per project. The competition includes 17 branches of science; the student can participate in one only. The PSC assists students in developing their ideas and applying; moreover, the PSC presents



Intel BASEF welcomes school students, third preparatory to third secondary grades, to participate in the competition.

lectures about presentation skills and sound methods of scientific research.

Students' projects are judged by uniform evaluation criteria, which assess the scientific research method or engineering design steps, and measure the creativity, accuracy, and teamwork in team projects. Evaluation is conducted by specialized university professors from Egyptian universities or research centers; each judge listens and discusses each project individually with the students.

Since 2013, Egyptian students win Grand Awards at Intel ISEF, as well as Special Awards. Among the several awards, Egyptians received the Fourth Place in the Mechanical Engineering category for *Algae Energy* project in 2017; the Fourth Place in the Earth and Environmental Sciences category for *Superconductive*

Hybrid Desalination project and in the Environmental Engineering category for *Desalination by Pervaporation System* project in 2016; the First Place Award in Environmental Sciences category for *Raise Straw Power* Project, the Fourth Place Award in the Environmental Engineering category for developing *A Revolutionary Desalination System* in 2015.

*Society for Science and the Public (the Society) is a champion for science, dedicated to expanding scientific literacy, effective STEM (Science, Technology, Engineering, and Mathematics) education and scientific research. It is a nonprofit organization focused on promoting the understanding and appreciation of science and the vital role it plays in human advancement.

For additional information, kindly check their official website: www.societyforscience.org

PLANETARIUM SCIENCE CENTER

"Science for All"

History of Science Museum

Opening Hours

Sunday–Thursday: 9:30–16:00
Saturday: 12:00–16:00

Guided Tours Schedule

Sunday–Thursday:
10:30, 11:30, 12:30, 13:30, 14:30, 15:30

Fees: EGP 2.- for non-audience of the Planetarium

ALEXploratorium

Discovery Zone

Opening Hours

Sunday, Monday, Wednesday, Thursday:
9:30–16:00
Tuesday: 9:30–12:30
Saturday: 12:00–16:00
Friday: 14:00–16:00

Guided Tours Schedule

Sunday, Monday, Wednesday, Thursday:
10:00, 11:00, 12:00, 13:00, 14:00, 15:00
Tuesday: 10:00, 11:00
Saturday: 12:00, 13:00, 14:00
Friday: 14:00, 15:00

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

Listen and Discover

Fees:

DVD shows: EGP 4.- (EGP 2.- for students)
3D shows: EGP 10.- (EGP 5.- for students)
12D shows: EGP 20.-

Available Planetarium Shows

Enlightened Mind; 19 min.

The Mission; 24 min.

Stars Show; 45 min.

Oasis in Space; 25 min.

Stars of the Pharaohs; 35 min.

Seven Wonders; 30 min.

The Life of Trees; 33 min.

**Kaluoka'hina:
The Enchanted Reef;** 33 min.

To Space and Back; 25 min.

**Alexandria, The Cradle
of Astronomy;** 22 min.

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**.

For schedule and fees, please visit the Planetarium Science Center website.


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BAPSC



CALENDAR



Science EVERYWHERE

01 | January

SUN	MON	TUE	WED	THU	FRI	SAT
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12 | December

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